LEARNING MADE EASY

Color Theory

for dummies®

A Wiley Brand

- Explore the careers of colorful professionals
- Experiment with interactive worksheets and swatches
- Learn strategies to work with color creatively

Eric Hibit

Visual artist and art educator

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Contents at a Glance

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Introduction

I know that my life would not be the same without the experience of bright red, light yellow, dark blue, and deep brown — or any of the colors that I see and love. I know also that the experience of color is impossible to fully convey in words. Yet the elusiveness of color is just as compelling as its ubiquity. And who knows if the colors I see match your perceptions? We may see color differently!

Congratulate yourself for your curiosity about the extraordinary (yet profoundly ordinary) topic of color. I'm pleased to present *Color Theory For Dummies* and share my knowledge of color with you.

About This Book

Whether color is a pleasure — or a pain — depends on individual taste. Some people adore color. Others avoid it completely. And preferences change over the course of people's lives. You may have picked up this book with the hopes of receiving guidance about color. Or you may feel that you know plenty already. Either way, the fundamental point of this book is to empower you, dear reader, as you navigate the vast world of color.

Empowerment happens though education. The more you learn, the more confidence you gain in working with color. But before you start learning, make sure that you aren't carrying preconceived notions about color.

Western culture is hyper-focused on the stale, romantic notion of natural talent, like little Mozart who wrote operas as a child. It's said that someone has an eye for color or no sense for color. These limiting binaries leave no room for genuine creativity, with all its wonderful struggles and subjectivities, or for the truth of how creativity develops: slowly and over time, propelled by curiosity, inspiration, joy, and angst. Creativity is a roller coaster ride of trial and error that never really ends. And creative work itself has no quantifiable or definite system of evaluation. So, I encourage you to free yourself from any limiting ideas about your color sense. Open your eyes anew to the world of color, and be open to your way of seeing and working with it.

No matter what kind of work you are doing or want to do with color, give yourself a big color hug — a message of love and support for your work with color.

And lastly, a few words about the color in this book. As you may have noticed, this book is filled with colorful studies to aid in your understanding of color concepts. Although every effort has been made to maintain consistency in printing, some colors will inevitably vary. The lighting under which you view the studies will also change their appearance; this is true for both print and e-book editions. In Chapter 5 (and other parts of the book), you'll read about the relativity of color and how it changes in context. I hope this brief disclaimer will offset any confusion about how a given color appears to your eyes as you read.

Why Dummies?

As a teacher, I'm committed to accessible learning. That's why I'm thrilled to write a *Dummies* book. The *Dummies* brand is known for making learning accessible to a wide range of readers with different interests, backgrounds, and goals. And I'm particularly excited to write a *Dummies* book about color because color is my passion! I studied color as an art student, and I teach color. I have also read the works of plenty of color theorists, some of whom exude an air of esotericism in their writing. In the public imagination, mystique surrounds color (especially in painting and in artist's biographies; for example, Van Gogh's manic fixation with yellow). This esotericism and mystique hold people's attention, but also hold people at a distance. I intend this book to be an access point for all kinds of people to learn about color and not feel like dummies in the process.

Knowing the four c's of color

What does it mean to "know about color"? The four c's of color define crucial points that make up color knowledge:

- **Compassion:** Understanding that color preference is personal, subjective, and unique; honoring your own ways of working with color; and celebrating the color choices that others make
- **Comprehension:** Knowing the scientific origin of color rooted in physics and biology; seeing how colors are composed and how they mix; understanding the vast range of colors and how to navigate this vastness to locate colors for your projects
- **Confidence:** Believing that you can make constructive decisions about color in your chosen medium or application; diminishing the belief that you — or anyone — is not good with color
- **Creativity:** Using color in original and authentic ways that reflect your vision and expresses your sensibility

Even if you think you already know about color, I guarantee that information in this book will enrich your work with color.

Foolish Assumptions

In this book, I assume two things. One, I assume that you know very little about color. Therefore, information is broken down to its most fundamental level and elaborated on from there. If you know more about color than I think you do, that's great! This book will still help.

Two, I assume that you are suspicious of color. Would you trust a banker who wore a suit made of bright colors like red, yellow, purple, and green? Color doesn't always have positive associations in Western culture. The Joker is the perfect example of a colorful villain. Suspicion of color goes back centuries, as far back as the German tale of The Pied Piper of Hamelin. (*Pied* means multicolored and has nothing to do with pies, as was my assumption!) The mayor of Hamelin hired the Pied Piper to play his flute to lure the rats away from the town. The piper accomplished what he was hired to do, but the mayor refused to pay him. In revenge, the piper lured away all the town's children, who were never seen again. (The folktale is thought to be a metaphor for a plague or a famine that devastated the community.) It's noteworthy that the piper is characterized by his colorful, pied attire. Archetypes like the clown, the buffoon, and the queer all appear as colorful characters throughout Western culture. The hegemony of Protestant culture in Europe and America is fundamentally color suspicious. Plenty of assumptions about color are lurking in culture. Look for them and give them a second — and third and fourth — thought!

Icons Used in This Book

This book contains icons that point of the type of information you're reading.


TIP

Read these suggestions for specific things you can do to learn more about color.


REMEMBER

Retain these main points and ideas.


TECHNICAL STUFF

Skip this information if you're looking only for a quick reference.


WARNING

Make sure to read this crucial information.

Beyond the Book

For even more to learn about color, check out this book's cheat sheet, which shows you helpful links to web pages containing information about color. To get to the cheat sheet, go to www.dummies.com and type *Color Theory for Dummies Cheat Sheet* in the Search box. You'll see not only the cheat sheet but any significant updates or changes that occur between editions of this book.

Where to Go from Here

In the 1990s in Japan, the term *shinrin-yoku* ("forest bathing") emerged. Like bathing in water, forest bathing is about immersion and renewal. The practice includes walking in nature and simply being present with the sights, sounds, and smells you encounter, soaking in the healing waters of the forest itself. Researchers have identified health benefits from forest bathing, such as reduced stress hormones and relaxing effects.

Why not try some *color bathing*? You don't need a forest, because color is already all around you. Simply walk through the world — your home, yard, neighborhood, or local park — with your eyes attuned to color. Be mindful of the colors you see and let them soak into your psyche. When I'm annoyed about being stuck in traffic, color bathing brings me back to the moment and allows me to appreciate the colors around me.

You can color bathe also by using some colorful materials. Purchase a pack of Color-aid paper (see Chapter 10 for details on Color-aid; origami paper is a great affordable alternative). Spread it out on a large table and observe the array. Surround yourself with your preferred colors, and tape some to the walls, where you can view them regularly. In this way, you can immerse yourself in color and become more familiar with it. As an artist, I have a personal relationship with certain colors; they're like family members that I return to again and again. Bathing in color might be a good way for you to begin to build your color relationships.

Lastly, I suggest hanging a color wheel in your space. You can print a color wheel from an online image, purchase one, or make your own. Having a color wheel nearby will set the mood for your color study.

1 Opening Your Eyes to Color

IN THIS PART . . .

Get an overview of this book.

Discover the history of color from cave painting to contemporary.

Explore the science behind color perception in physics and biology.

Learn color terminology such as tint, tone, shade, and hue.

IN THIS CHAPTER

- Considering the history, science, and language of color
- Understanding color's relativity, contrast, and dynamism
- Working with palettes and conveying meaning
- Exploring systems of color and different mediums
- Discovering ten colorful careers and ten ways to work with color

Chapter 1
Your Color Journey

This chapter is a colorful roadmap that briefly describes the main ideas you find throughout the book. My hope is to provide a foundation for your journey into color — and to whet your appetite! I also want to build in some redundancy; if you're like me, reading a thing twice never hurts.

Color is vast. The human eye perceives a seemingly infinite number of colors. Some colors are strikingly different while others are different in extraordinarily subtle ways. The world of color is an ocean of different perceptions, with incalculable possible combinations and juxtapositions. To work with color is to confront the vastness of color.

For a glimpse into the vastness of color that's all around you, try this: First, look at the back of your hand, observing its different colors. Some areas might be darker and others might be lighter (but the differences might be subtle). Second, look at the objects in the room you're in. Observe the dark colors, light colors, bright colors, and dull colors. Now imagine all the people in the world observing the colors on their hands and in their rooms in the same way. Compile these theoretical color observations in your mind. This is your glimpse into the vastness of color, observed in a hypothetical moment!

Color and the Power of Limits

In this book, I help you navigate the vastness of color by using a concept known as the *power of limits*, which is the sense of increased freedom (and control) within a decreased set of options — akin to the scientific concept of experimenting with constants and variables. The narrower your choices within (or your view of) a set of colors, the more you can do and see. Throughout the book, colors are presented in categories that narrow the color range, enabling you to make specific observations and progress without too many variables. When you focus on a narrow set of color choices, possibilities open up.

No matter your creative medium — painting, drawing, collage, graphic design, interior design, cooking, quilting, teaching, photography, or textiles — the power of limits helps you hone and strengthen your color skills.

Slowing Down to See Color

Many people are occupied by the digital devices that hold their attention so closely. Images move faster than ever, and colors are bright and backlit. The immersive quality of video games and VR is enthralling. But when observing color, our eyes need more time to adjust, especially when the difference between the two colors is subtle.

I suggest that you take a breath (or two) when looking at the color studies in the book. The extra seconds will help you perceive what is happening colorwise in whatever you're observing.

Where Color Begins

In Part 1, "Opening Your Eyes to Color," you learn about the history of color as well as the science behind color perception (the physics of color and the biology of the eye). You also learn about the link between language and color.

Appreciating the history of color

Humankind's work with color goes back to prehistoric times, where cave-dwellers decorated their walls with paintings of animals and abstract patterns. Throughout

history, humans have used the natural world as a source for color. For example, ancient Phoenicians used liquid squeezed from tiny snails as a source for purple.

Beginning in the 18th century, developments in science and industry resulted in the manufacture of color that was brighter, more vivid, and less expensive. These days, color is cheap, quickly produced, and widely available. Chapter 2 covers more details about the history of color — and its use by contemporary artists.

Talking about color

Language defines how we perceive, ponder, and communicate about color. There are several ways to describe colors. One method uses *basic color terms* (such as red, yellow, beige). Adding an adjective provides specificity (light blue or grayish-green). This is a straightforward — albeit general and imprecise — way to describe color.

Another method uses *fancy color terms,* which are largely associative (such as mauve, café latte, cordovan). Fancy color terms are memorable and can be fun to use, adding zest to the language. But they can also have a high-falutin' air about them, causing some people to doubt their color capabilities (for example, if they don't know what *chartreuse* is). Don't be fooled! The use of fancy color terms doesn't necessarily indicate expertise with color, and ignorance of fancy color terms doesn't indicate an inability to work with color.

REMEMBER

The gap between the perception of color — and how it is described with language — must be acknowledged. The word *maroon,* for example, conjures different colors for different people. Language never defines color; it simply points to it! Check out Chapter 4 for more information about color and language.

Why Is Color So Slippery?

Have you ever painted a room, only to observe that the color looked different once it was on the wall? Or have you purchased an article of clothing thinking it was one color in the store, only to experience it as a slightly different color at home? Painters often grapple with color's slipperiness when a color on the palette looks different on the canvas. Why? In Part 2, "Examining Color Relationships," you learn how color changes in context and about different types of color contrasts.

Seeing color in context

Chapter 5 is all about how color changes in context. Color's changing nature is also known as the *relativity of color* (which is the basis for color theorist Josef Albers's famous color theory book *Interaction of Color*). For example, a brown swatch takes on a greenish tinge against a large area of red but takes on a reddish tinge against a large area of green. Thus, the brown appears to be two different colors. Chapter 5 includes worksheets with color swatches that you can cut out and paste, so you can test color relativity for yourself!

Getting to know color contrasts

Chapter 6 is about contrasts of color and is based on the theories of 20th-century Swiss artist Johannes Itten. He identified contrasts such as light and dark; complementary contrast (colors opposite on the color wheel: red and green, blue and orange, purple and yellow); and warm and cool. Color contrasts can be used to create different effects. For example, warm colors evoke fire and the sun, while cool colors evoke water and ice.

Dealing with dynamic color

Do certain colors weigh more than others? Do some colors advance, while others recede? Can colors convey conditions such as wetness and dryness? The answer to all is yes!

In terms of weight, dark colors and saturated colors tend to weigh more, appearing heavier to the eye. Light colors tend to weigh less, appearing lighter and airier. A phenomenon called chromostereopsis is the reason why reds tend to advance and blues tend to recede. Sometimes, light and warm colors tend to advance, while dark and cool colors tend to recede. Warm earth tones tend to evoke dryness, while cool water tones tend to evoke wetness. More details about these dynamics are in Chapter 7.

Together, the relativity of color, color contrasts, and color dynamics show how slippery color is. Color changes according to context, it is affected by contrasting colors, and color dynamics such as chromostereopsis play on our understanding of where color is in terms of distance. So if you see color change before your eyes, don't be surprised. And don't think you're doing anything wrong. Better to embrace color's changing nature and celebrate its slipperiness!

A Colorist's World

The two chapters in Part 3 give you tools and information for working with color. Taken literally, a palette is a surface on which painters mix paint. Figuratively, a palette is a set of colors that any kind of creative practitioner might work with. Chapter 8 introduces palettes you can use whether you're planting a garden, sewing a quilt, or making a digital collage. Chapter 9 is about color and meaning, and covers color in consumer culture as well as color in visual art and personal expression.

A limited palette is a powerful palette

A key idea in Chapter 8 is the *power of limits,* which helps focus your work with color. The palettes I describe — monochrome palettes, analogous palettes, primary color and secondary color palettes, split complementary palettes, neutral palettes, and palettes based on nature — limit your options with color, which conversely opens up possibilities.

I also talk about the intuitive approach, which basically means working with color by the seat of your pants, in the moment, with no conscious strategy or approach. I believe that most artists — and other creatives — work this way, and you probably will too as you develop your creative projects. The deeper your knowledge of color, the more effective your intuitive work with color will become.

Meaningful color

As you discover in Chapter 9, color is rich with meaning in the world of consumer culture. Logos, brand identities, product packaging, and advertising all use color to communicate about goods and services. For example, Bank of America's red represents dynamism and strength, and Citibank's blue represents trustworthiness and reliability. The color of a brand contributes to the product's recognizability.

Moving beyond the conventional — almost cliché — color meanings in consumer culture, you consider the meaningfulness of color in art, which can be refreshingly subjective, personal, and nuanced. In the hands of poets, musicians, and visual artists, color takes on new, personal, and even private meanings that can reveal a profound depth of feeling.

Ways of Working with Color

In Part 4 you look at color systems that can help your work with color. You also look at different art mediums and the color possibilities for each.

Getting systematic with color

Chapter 10 addresses color systems, which are used to organize color in ways that make it easier to work with. Some systems standardize color, so that exact colors can be identified among different people at different times and locations. You learn about two standardization systems: Pantone, which is probably the most widely used color system today, and the Munsell system.

Other color systems present users with ways to apply color. These *application systems* include the color dictionary of Japanese colorist Sanzo Wada, which presents the reader with different combinations of colors that can be used in textiles and objects, and the system of color blots by British watercolorist Mary Gartside that are used in representational flower painting.


TECHNICAL STUFF

Digital color systems are also covered in Chapter 10. The primary colors for the mixing of light (additive mixing) are red, green, and blue (RGB), so it should come as no surprise that digital devices such as computer monitors use an RGB color system as their primary color.

Colorful mediums

Because color is bound up in the material qualities of whatever medium you work in, color varies greatly between painting (and even types of paint), drawing, textiles, digital art, and other forms. Knowing how color behaves in your medium is essential, so Chapter 11 covers a number of different mediums, such as acrylic, oil, watercolor, and enamel paints, color pencils, pastels, markers, dyes for textiles, and collage. In addition to the ins-and-outs of working with paint, I cover various techniques and approaches for collage as well as color selection for interior painting.


WARNING

When working with art materials, be sure to read all warning labels and follow the manufacturer's instructions.

My Colorful Part of Tens

The last section in all *Dummies* books is the *Part of Tens*, with chapters that describe ten of this and ten of that. This book has two chapters in the *Part of Tens.*

Saying hello to a colorful crew

Whether you are exploring which creative field to pursue after school, considering a second career, starting a small business, or simply looking for inspiration, the interviews in Chapter 12 provide a glimpse into the inner workings of color among a diverse groups of creative professionals. These interviews demystify how professionals in different fields use color and provide access points for you to enter their world.

Getting your hands dirty with color

The other chapter in the *Part of Tens*, Chapter 13, has ten exercises to kickstart your color creativity. Rather than assignments (or projects with clearcut conclusions), the exercises are open-ended and adaptable. After you start, you're on your own!

REMEMBER

It's good to read about color, but it's essential to engage in hands-on activities with color. When you move swatches of color around, mix paint, or draw with markers, you're engaging with color in a way that you can't do in your mind. You mix, juxtapose, and make color discernments that sharpen your ability to see and understand color — and these tasks must be done hands-on to really learn!

Do as many — or as few — of the exercises in Chapter 13 as you like. Work in any order, and adapt the exercises however you want. If you're a teacher, you might want to use the exercises as the basis for assignments. And heads up: Chapter 5 has hands-on on activities about the relativity of color.

Good luck!

In my research for this book, I stumbled upon the image in Figure 1-1, an early color photograph of a fortress in Staraya Ladoga, in eastern Russia. The photographs was taken in 1909 by Sergey Prokudin-Gorsky, a pioneer of color photography. The colorful bars around the edges of the image are the edges of color plates that, when overlapped, give the image its realistic color.

FIGURE 1-1: Sergey Prokudin-Gorskiĭ, Fortress in Staraya Ladoga, Russia, 1909, color photograph.

Prokudin-Gorskiĭ / Wikimedia Commons / Public domain

The image shows a curved pathway leading from an archway, down a little slope. To me, the pathway represents the beginning of a journey, leading out of the left side of the photograph and going who knows where. The colorful bands around the image give it a strangely contemporary look, in striking contrast to the ancient stone ruin. The color is both realistic and artificial in a technicolor sort of way. I have a special fascination with this image, and its colors are a big part of why I respond to it so strongly. I include it to welcome you on your journey with color, which I'm sure will lead you to unknown and surprising places.

IN THIS CHAPTER

- Understanding the origin of color
- Exploring cave paintings
- Discovering the story of purple through the ages
- Experiencing contemporary color

Chapter 2
History of Color

When I told my *Dummies* editor that I wanted to write a long chapter about the history of color, she replied, "*Dummies* books are short on history and long on action." I see her point: She knows that readers want to start working with the topic at hand: color!

To keep this chapter short, I chose a few topics on the history of color, knowing full well that this discussion has large gaps. To bring a little more history to the book, I've also peppered each chapter with historical examples. Like any field of study, color theory has a long history of ideas, methods, and observations.

In this chapter, you get a brief foundation of the history of color in ways that relate to how you might work with color today. You also look at examples of how contemporary artists work with color.

Early Humans and Color

Before cities, agriculture, and written language, humans living as hunter-gatherers created cave wall paintings that still exist today. Some of the most famous examples of cave paintings are in the Cave of Altamira in Spain and were created 36,000 years ago. Like other examples of prehistoric cave art, the paintings at Altamira depict animals such as deer and bison, as shown in Figure 2-1. There are abstract paintings at Altamira, as well.

FIGURE 2-1: A bison from the cave of Altamira.

acongar/Adobe Stock

Cave paintings show a *prehistoric palette:* blacks, browns, reds, *ochre* (dark brownish-yellow), and white. These colors were derived from minerals in the creator's environment. Blacks came from charcoal, yellows and reds from iron-oxide, browns from iron-oxide and manganese oxide, whites from a mineral known as kaolin. The minerals were mixed with a substance to make them stick to the surface, such as saliva or animal fat. Voila, the first paint was invented!

TECHNICAL STUFF

Paint is made of two parts: pigments and binders. *Pigments* are the substances that gives paint its color. Beginning with the cave painters and for much of human history, pigments came from minerals and other natural sources such as plants and animals. *Binders* are the substances that suspend the pigments and give paint its body and stickiness. Non-prehistoric binders include linseed oil (for oil paint), gum arabic (for watercolor), and egg yolk (for egg tempera). Binders are also known as *vehicles.*

Although the prehistoric palette is limited compared to the variety of colors we live with today, its beauty is undeniable. The velvety blacks, rusty reds, and chalky whites form a striking contrast. With an economy of means, prehistoric painters made images that feel remarkably substantial. For example, the black contour lines give structure to the bison's body. The rich red on the trunk evokes massiveness and vitality.

Ancient Pigments and Dyes

With the development of agriculture and the growth of cities, people's roles in society became more specialized. Craftspeople and artisans began to develop more advanced ways of working with color in a variety of applications. These

developments led to a growth in the production of color. One example of an outstanding ancient color is Tyrian purple.

Tyrian purple was produced by the Phoenician civilization as far back at 1500 BC. (The civilization was located primarily in modern-day Lebanon, along the coast of the Mediterranean.) The color itself came from the bodies of two types of sea snails. The unfortunate snails were squeezed for a single drop of purple fluid and then discarded. It took innumerable snails (and a long dyeing process) to produce even a small amount of purple fabric, so purple became associated with great wealth and status.

Figure 2-2 shows a mosaic of the Byzantine Emperor Justinian from 6th century AD. Although his robe looks brown, it is in fact meant to be purple. Note how the attendants to the left of Justinian have just an area of purple on their robes, which indicates that they are important but not as important as the emperor himself, who is fully clad in purple.

FIGURE 2-2: *Court of Emperor Justinian,* mosaic, Basilica of San Vitale, Ravenna, Italy.

Georges Jansoone/Wikimedia Commons/Public domain

Throughout the ancient world, different civilizations found pigments in the natural world. The Aztecs and Incas used a tiny bug called *Dactylopius coccus* to create a brilliant red known as *cochineal* (which continues to be used as a food

coloring known as *carmine*). *Lapis lazuli* (meaning blue stone) has been mined in Afghanistan for centuries. See Figure 2-3. Lapis was — and continues to be — used to make *ultramarine blue*, a particularly intense blue pigment.

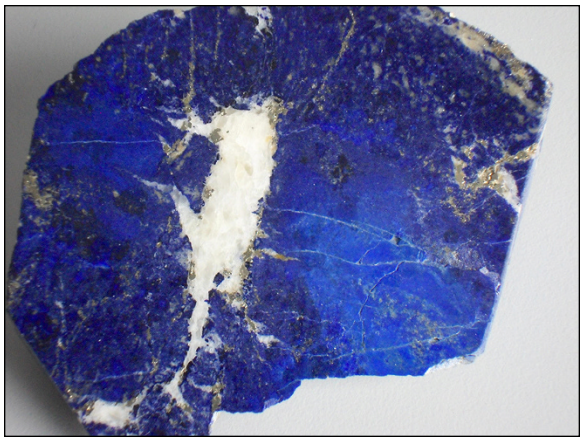


FIGURE 2-3: A chunk of lapis lazuli.

rikkerst/Pixabay

When it comes to ancient color, you may be surprised to learn that the Greek polychromed their art and architecture. (*Polychrome* means multicolored and usually refers to something that has been painted.) You can see plenty of white marble in the ancient Greek section of just about any art museum, creating the impression that Greek sculptures were originally white.

Neo-classical sculpture (sculpture made in the style of ancient Greek sculpture) from the Renaissance through the 19th century is never colorful. Rather, the white of the marble is considered a symbol of authority and power: a connection to the greatness of Greek art. The same is true for neo-classical architecture, such as the 19th-century buildings on the mall in Washington, DC.

In fact, the ancient Greeks painted their sculptures and buildings with a variety of pigments, in what must have been a dazzling display of color. The reproductions in Figure 2-4 gives a glimpse of how buildings and statues may have been decorated with color.

In 2008, the Liebieghaus Skulptureensammlung in Frankfurt, Germany mounted an exhibition titled "Gods in Color," featuring reproductions of ancient Greek sculptures as they would have originally appeared in all their colorful glory. Due to age and weathering, much of the color on Greek sculpture has worn away. But by analyzing traces of pigment on certain artifacts (and comparing them to other artifacts that have more discernable color), researchers were able to approximate the colors used in the originals, and apply these colors to digitally printed three-dimensional reproductions.

FIGURE 2-4: A 19th-century reproduction of polychroming on Greek architecture (left). Experimental polychromic reconstruction of the Grave Monument of Phrasikleia (created by Brinkmann and Brinkmann, Buck, Ursula GOM Braunschweig), 2010, cast from polymethyl metacrylate, 200 x 68 cm (right).

Left: Unknown author/Wikimedia Commons/Public domain. Right: Liebieghaus Skulpturensammlung, Polychromy Research Project, Frankfurt am Main; on permanent loan from Ludwig-Maximilian Universiät, München, Leibnizpreis 2007 O. Primavesi since 2014, © Vinzenz Brinkmann/ Ulrike Koch-Brinkmann.

The museum's website (`www.liebieghaus.de/en/exhibitions/gods-color-golden-edition` below) contains an informative, interactive page that lets you explore the reproductions as well as videos about the research and fabrication that went into the exhibition. Seeing Greek sculpture in full color causes a huge shift in perception! It will definitely shake up any notions you may have about classicism's association with whiteness and purity.

Color in Sacred Art

Color abounds in the sacred art of many cultures. In Islam, calligraphy is considered the highest form of sacred art because the Qur'an — the literal word of God — is a book. Between 1600–1800, the production of manuscripts in the Islamic world took place in royal workshops. Many different tradespeople were involved in the bookmaking process: papermakers, painters, calligraphers, and gilders. At enormous expense, sacred texts were illuminated with eye-popping designs embellished with beautiful color.

Figure 2-5 shows a page from an album of calligraphies taken from the Hadith (a compilation of the Prophet Mohammad's words and deeds) made around 1500. The marbled paper was created by suspending drops of color on the surface of a liquid and then laying the sheet on top to absorb the color. The result is painterly and hypnotic as blobs of orange, green, and blue merge and meld in pleasantly uneven ways.

FIGURE 2-5: Calligrapher: Shaikh Hamdullah ibn Mustafa Dede (Turkish, Amasya ca. 1436–1520 Istanbul), *Album of Calligraphies Including Poetry and Prophetic Traditions* (Hadith), ca. 1500. Main support: ink, watercolor, and gold on paper; margins: ink, watercolor, and gold on marbled paper, 12⅝ x 9⅜".

The Metropolitan Museum of Art

The Qur'an in Figure 2-6 shows a different palette comprised mainly of gold, blue, and red (with small accents of white and light blue). Pigments for manuscripts came from the natural world: lapis lazuli for blue, indigo for dark blue, and cinnabar for red. Use of gold and silver leaf was also common. Black ink for the calligraphy was made from carbon. In this Qur'an, colors are tightly interspersed in the design, resulting in a scintillating effect and an optical mixture of colors. (Optical mixture is covered in Chapter 5.) As in many examples of sacred art from Christian traditions, the predominance of blue and gold in this work evokes heaven and light: two essential aspects of the divine.

Tibetan Buddhist art is known for its use of vivid colors, as in the *thangka* (painting) in Figure 2-7. This painting depicts Medicine Buddha, the large blue central figure in the painting. According to Tibetan tradition, this blue buddha is a supreme being who lives in a place called *Pure Lapis Lazuli*: a pure land beyond our own. In the painting, Medicine Buddha is flanked by two *bodhisattvas* (beings on

the way to enlightenment). The orange bodhisattva to the left personifies the sun, and the lighter bodhisattva to the right (obscured by age and patina) personifies the moon. Bright red halos surround these three main figures, calling attention to their vitality and radiance. Countless figures of different colors and complexions surround the trio, suggesting beings from different realms gathered together under the Buddha's teachings.

FIGURE 2-6: Qur'an manuscript, Turkey, A.D. 1851–52, ink, opaque watercolor, and gold on paper, leather binding, 6¼ x 4¼″.

Metropolitan Museum of Art

TECHNICAL STUFF

Early stained glass was produced by the ancient Romans and the Egyptians. In medieval Europe, artisans created impressive stained glass windows such as the rose window at Notre Dame in Paris, shown in Figure 2-8. The color of stained glass comes from the inclusion of different metals in molten glass. For example, the addition of gold creates red, manganese creates purple, and iron-oxide creates green. Glass can be colored with a technique known as *flashing*, where a thin layer of colored glass is fused to a piece of thicker colorless glass.

Illiteracy among the general population was common in medieval Europe, so people learned about religion by looking at stained glass windows depicting different figures and scenes. In addition to this educational purpose, the windows are simply spectacular to behold. Like the bright and backlit colors on the digital screens that transfix us today, the colors of medieval windows are captivating. Vivid reds, glowing blues, and electric greens conveyed the power and authority of the church as the supreme intermediary between God and mortals.

FIGURE 2-7: *Medicine Buddha,* Tibet, 15th century, ground mineral pigment on cotton, 34 x 24½″.

Rubin Museum of Art, Gift of Shelley and Donald Rubin, C2006.66.7(HAR 125)

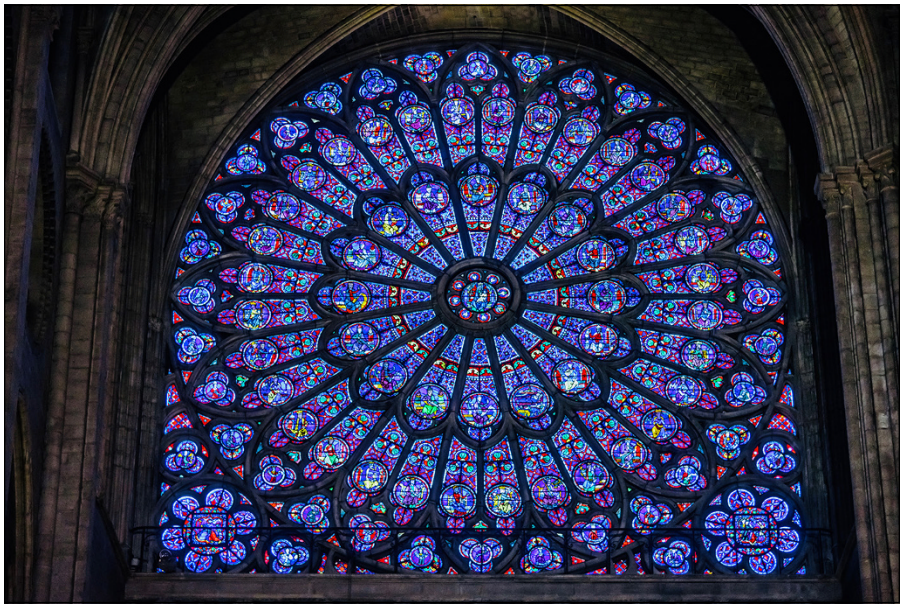


FIGURE 2-8: A stained glass window in Notre Dame, Paris.

DD25/Adobe Stock

Colorlessness in the Protestant World

The colorful stained glass that flowered during the Middle Ages fell under scrutiny during the Protestant Reformation in England. Like the practice of *indulgences* (wealthy patrons "buying" their way into heaven), the perceived idolatry of Catholic churches, including its colorful stained glass, were objected to by Protestants. In England, countless stained glass windows were destroyed in an attempt to remake religion according to Protestant ideals — namely, that worshippers experience a direct connection to the divine without the bureaucracy and aesthetic trappings of the Catholic church.

After the Great Fire of London in 1666 (already well into the Protestant era) architect Sir Christopher Wren was commissioned to rebuild dozens of churches that were lost, including St Stephen Walbrook London. Figure 2-9 shows the interior of St Stephen Walbrook, noteworthy for its lack of stained glass windows. Through colorless windows, worshippers could experience "the clear light of God" (so said my tour guide when I visited in 2018). The Protestant suspicion of color was transported with the Puritan's arrival in North America and is still evident in contemporary associations of colorlessness with truth, purity, and power.

FIGURE 2-9:
Interior of St Stephen Walbrook, London.

Modern Color

Fast-forward to the 19th century. Scientists working in labs began to discover ways to produce color with different chemical mixtures. People's reliance on the natural world for pigments began to wane, as a whole new colorful world took shape. Once again, purple serves as an outstanding example.

In 1856, 18-year-old British chemist William Henry Perkin was mixing chemicals in his laboratory in his quest for a malaria treatment. He accidentally discovered that one particular mixture yielded a vivid purple color. Perkins immediately saw the potential for the chemical's use as a fabric dye, and he established a dyeing facility and began production. Perkins named his color *mauvine*, from the French *mauve*, meaning *mallow* (a little purple flower). These days, the color mauve is usually identified as a dull purple or pinkish-purple, but Perkin's mauvine was a much brighter purple.

By the following year, mauvine had taken the fashion worlds of Paris and London by storm. *Illustrated London News* reported that Queen Victoria wore a mauve gown to her daughter's wedding in 1857. Perkin's discovery of mauve coincided with the evolution of the *crinoline,* a cage-like metal structure that gave dresses of the day great volume. Massive amounts of fabric were needed for these giant skirts, and Perkins was the man to deliver the purple goods. Figure 2-10 shows a later example of a dress with abundant purple fabric.

FIGURE 2-10: House of Worth, afternoon dress, ca. 1872, silk, mother of pearl, metal.

Metropolitan Museum of Art

Purple fabric is harmless enough, but some early modern colors were dangerous. For example, *Scheele's Green* (a bright yellow-green) was developed as a pigment in the late 18th century and became widely used in Victorian England for wallpaper, fabric, and even food. With the expanding popularity of Scheel's Green, stories spread of people sickened by household items dyed with the color. Sadly, one

of the chemical components of Scheele's Green is the poisonous element arsenic, which leached out of items colored with the color. Other poisonous elements that have been used to make colors include lead (for lead white) and cadmium (which is still used to make vivid yellow, orange, and red paint).

Contemporary Color

Contemporary life is filled with color from advertising and consumer culture, which I cover in Chapter 9. Here I focus on contemporary artists who use color to create new meanings and forge new visual experiences. Today's artists engage color in ways that challenge tradition and upend expectations of how color is used and what it represents.

Color is an important component of the site-specific installations of Atlanta-based artist MaDora Frey. Her piece in Figure 2-11 is constructed around a window in an exhibition space. Rocks appear to permeate the window, spilling into the space and onto the floor. Frey applies a space-aged colored film to the window, which reflects and filters lights as different colors. The landscape out of the window is cast in a synthetic magenta, while a vivid light coming through the window paints the rocks an unnatural yellow. By altering the colors of natural objects, Frey addresses the technological lenses through which nature is experienced in contemporary life (for example, by using your iPhone to take pictures of a mountain). In terms of color symbolism, the magenta landscape represents the earth's inherent femininity as a life-giving and life-sustaining entity.

New York – based artist Zahar Vaks uses oil paint and a variety of other natural and non-natural materials to create his palette. For example, in *Wrestling Red Tide,* shown in Figure 2-12, Vaks uses *turmeric* (a yellow spice) and cherry juice.

While visiting the Rauschenberg Residency in Captiva, Florida, Vaks experienced red tide, a harmful profusion of algae that turns Gulf Coast waters red. A complex phenomenon with numerous contributing factors, red tide is an environmental problem that harms marine life. In *Wrestling Red Tide*, Vaks includes silk-screened images of fish that he saw washed up on shore. The yellow-oche of the background gives a beautiful but somewhat unsettling mood to the piece. Painterly glyphs in white, blue, red, and green suggest the writhing movement of marine life as it struggles for the oxygen that red tide depletes. A piece of gauzy fabric hangs below the piece, suggesting a fishing net or some sort of filter: a possible intervention against the tide.

Portrait artist Kira Nam Greene uses color to infuse her paintings with personality and decorative beauty, as shown in Figure 2-13.

FIGURE 2-11: MaDora Frey, *Venus' Looking Glass*, 2020, granite, dichroic film, mirror, dogwood, grow lights, labor, 125 x 125 x 40″.

Courtesy of the artist

FIGURE 2-12: Zahar Vaks, *Wrestling Red Tide,* 2019, oil, iron gall ink, cellulose pigment, fabric flocking, alpaca thread, marker, turmeric, oxidized cherry juice, printed rayon, organza, Peruvian Balsam, wood, 29 x 28″.

Courtesy of the artist

FIGURE 2-13: Kira Nam Greene, *Kyung's Gift in Pojagi,* 2019, oil, gauche, colored pencil, acrylic ink on canvas, 50 x 40″.

Inspired by the colorful and pattern-rich works of Henri Matisse, Pierre Bonnard, and Miriam Schapiro, Greene surrounds her subject — friend and fellow artist Kyung Jeon — with a dazzling array of colors. Clothing and interior meld into a blend of colorfulness, alluding to Kyung's own work as a painter. Patterns from traditional Korean motifs address notions of ethnic identity and heritage. For example, patches of color reminiscent of a *pojagi* (a Korean quilt) hang behind Kyung. A plate of persimmons in the lower-left corner symbolize good fortune.

The red ribbons in the painting (near Kyung's shoulder and beside her hand) are sourced from another kind of Korean textile known as *chogak po* (cloth food covering that traditionally includes a red ribbon in the center). The similarity to the contemporary AIDS ribbon (and other commemorative ribbons) suggest compassion and healing. In the midst of these vivid and symbolic colors, Kyung meets our gaze with nonchalant dignity that conveys her sophistication and intelligence.

IN THIS CHAPTER

- Understanding the origin of color
- Exploring the connection between the eye and the brain
- Learning about synesthesia
- Experiencing color vision deficiencies

Chapter 3
The Science of Color

Color is an aesthetic experience, tied to our understanding of beauty, mood, and emotion. Underneath this world of appearances lies an extraordinarily complex set of phenomenon that result in color perception. Some aspects of color perception are rooted in physics and have to do with wavelengths of electromagnetic energy. Others are rooted in biology and how the human eye takes in color information and communicates with the brain. Because the biological structures that enable color perception are unique to each individual, color perception must be recognized as the subjective experience that it truly is.

In this chapter, you learn a bit about how processes in both physics and biology work together to create color perception. You also discover factors that contribute to different ways of seeing color, such as color vision deficiency and synesthesia.

The systems outlined in this chapter are more complex than could possibly be covered in a few pages. My hope is to provide foundational knowledge of how color perception works and to offer a tiny glimpse into the wonderous systems that make color perception possible.

Color in the Physical World

The miracle of color — and color perception — begins with the sun. Just like other stars in the universe, the sun gives off massive amounts of radiation in the form of heat and light. Without the sun, there would be no life on earth. Since ancient

times, humans have contemplated the sun's life-giving properties and celebrated them in culture, art, and religion. And for centuries, philosophers and intellectuals have speculated about light and its exact nature.

In the 1670s, Isaac Newton performed an experiment that defined our modern understanding of light and color. Newton channeled light from the sun through a small hole in a darkened room, and placed a prism in the path of the light coming through the hole. (A *prism* is a piece of glass that *refracts* — changes the direction of — light.) As a result of the refraction of white light, Newton observed *chromatic dispersion,* which is the splitting of white light into the colors of the rainbow: red, orange, yellow, green, blue, indigo, and violet. Figure 3-1 shows white light passing through a prism and the resulting spectrum.

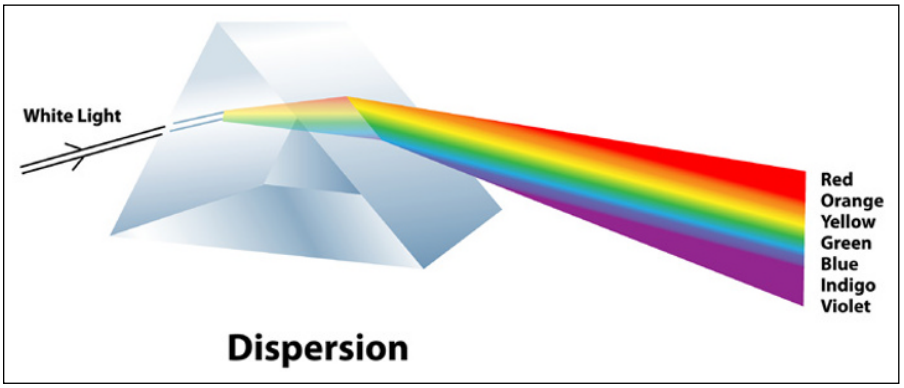


FIGURE 3-1: White light passing through a prism, resulting in chromatic dispersion.

O Sweet Nature/Adobe Stock

Newton observed that these colors can't be further divided into other colors but that colors *can* be recombined to again form white light. Thus, Newton proved that the source of color is light, and that white light is the sum of the different colors.

Defining light and color

Newton's experiment shows that color comes from light, but where does light come from? In the early 19th century, the scientist James Clerk Maxwell figured out that light is *electromagnetic radiation,* that is, energy that moves through space in the form of waves.

Electromagnetic waves include gamma rays, X-rays, ultraviolet, visible light (where color resides), infrared, microwaves, and radio waves. Electromagnetic waves vary greatly in width, from the infinitesimally tiny width of an atomic nuclei (gamma rays) to a width equal to the height of a skyscraper (radio waves).

The lower, gray band in Figure 3-2 shows the different wavelengths and their size in meters.

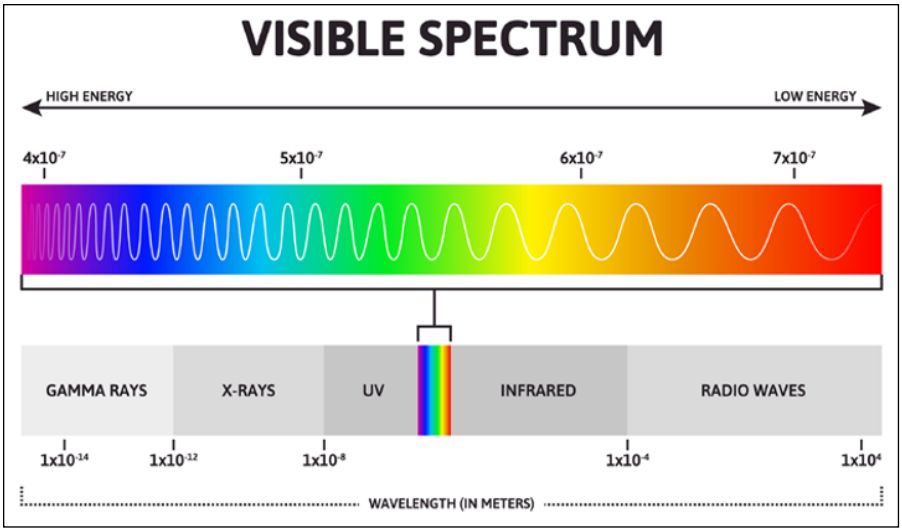


FIGURE 3-2: The visible spectrum within the electromagnetic spectrum.

WinWin/Adobe Stock

Within visible light (also called white light), the human eye is capable of perceiving a very narrow range of wavelengths between approximately 380 and 750 nanometers wide. (A *nanometer* is one billionth of a meter.) This range is known as the *visible spectrum*, and our perception of it is responsible for the experience we call color. The upper colorful band in Figure 3-2 shows the visible spectrum.

Light itself has different *color temperature*, which gives the light a yellow-based (warm) or a blue-based (cool) appearance. Incandescent light has a warm cast, while fluorescent light has a cool cast. Mid-day sunlight under clear conditions is considered the standard for *white balanced* light, which is neither perceptibly warm nor cool. These lights can be strikingly different and can dramatically change the way color is perceived (as in the example of "the dress," to follow). Figure 3-3 shows a range of lights, from warm to cool.

Understanding why things are colorful

You know that color originates in the visible spectrum, but how does that result in the colorfulness of things in our world? Why is the leaf green, the ball red, or the school bus yellow? The objects themselves are not part of the visible spectrum, so where do they get their color?

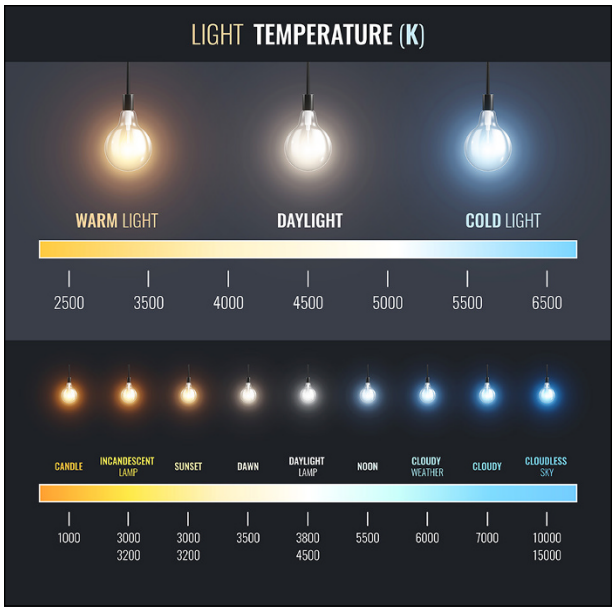


FIGURE 3-3: Lights of different color temperatures.

macrovector/Adobe Stock

You know that white light consists of different wavelengths, each a different color. When white light hits the surface of an object, the light bounces off the surface. Depending on the molecules that make up the surface of the object, some wavelengths are absorbed and others reflected. What is reflected is perceived as color. Some wavelengths are reflected because molecules that make up the objects contain *chromophores*, which are areas that interact with given wavelengths of light.

Figure 3-4 shows a beta carotene molecule, the substance that gives pumpkins, carrots, and many other living things their orange color. The part highlighted in red is the chromophore of the molecule: the part that reflects the orangish-reddish wavelength while absorbing all other wavelengths. All around us, chromophores reflect different wavelengths of light to create the colors we see! And of course, chromophores are responsible for the color in art materials such as pigments and dyes.

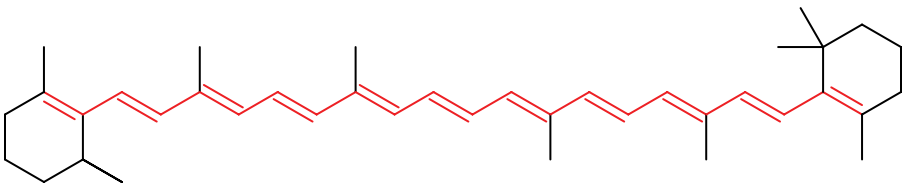
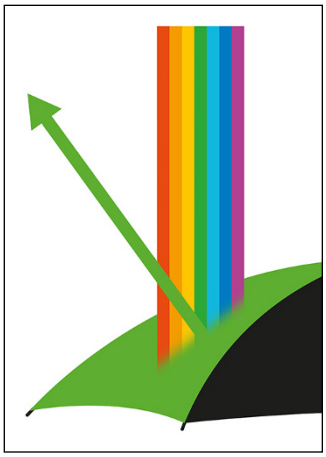


FIGURE 3-4: A molecule of beta carotene.

Another way to visualize this process of absorption and reflection is illustrated in Figure 3-5. White light (made of the visible spectrum) falls on the side of a green umbrella. As you can see, the green wavelengths are bouncing off the umbrella, while all other colors within the white light are being absorbed. This phenomenon is known as *subtractive color* because some wavelengths are being subtracted (absorbed). This process of reflecting and absorbing light explains many of the colors we see but is not the only way color exists in the world.



Aldona/Adobe Stock

FIGURE 3-5:
Subtractive color.

The opposite of subtractive color is additive color. In *additive color,* wavelengths of light are added to show color. For example, when shining a green light on a white wall, the green wavelength simply bounces off the surface of the wall. No wavelengths are being absorbed (as they are in subtractive color). It is no coincidence that a colored light is mentioned as an example here because additive color mixing is exclusively light based.

Subtractive and additive color models

You know that subtractive color is the result of wavelengths being either absorbed or reflected. Subtractive color is the color of objects such as green leaves and substances like paints, inks, and dyes.

Color mixing with substances is known as *subtractive color mixing,* and the primary colors are traditionally red, yellow, and blue. The sum of all the colors is a neutral gray-brown (rather than white, given that some wavelengths are absorbed and thus removed from the mixture). This color model is known as the *RYB color model.*

The alternate *CMY color model* (which uses cyan, magenta, and yellow as primaries) is also subtractive color mixing. The CMY model applies to a variety of color-mixing systems such as color-printing inks. Figure 3-6 shows the two models side by side. Note how, in the CMY model, blue and red (primaries in the RYB model) are secondary colors. In both color models, the sum of all colors is dark.

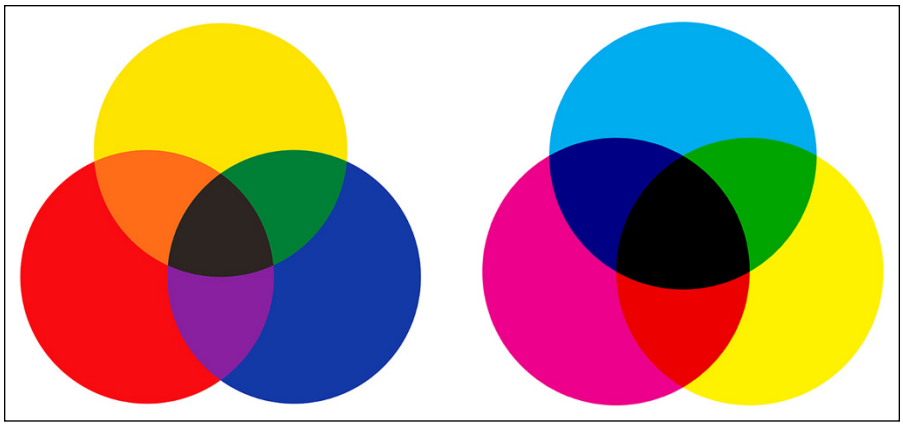


FIGURE 3-6: RYB color model (left) and CMY color model (right).

Left: Imagewriter/Adobe Stock. Right: pyty/Adobe Stock.

You know that additive color has to do with how wavelengths of light produce color. The *RGB color model* is an additive color model in which the primary colors are red, green, and blue. Figure 3-7 shows red, green, and blue lights mixing, which is known as *additive color mixing.* The sum of all colors is white. RGB color systems are used anywhere light is mixed to create color, such as the screen of a digital device. And as you learn in the next section, cells in the human eye use the additive color system to perceive color.

Subtractive and additive color in the context of digital color systems is covered in Chapter 10.

Roman Samokhin/Adobe Stock

FIGURE 3-7: RGB color model.

Biological Aspects of Color Perception

Perception of color is a product of the evolution of the eye. Hundreds of millions of years ago, single-cell organisms evolved *eyespot apparatus*, which are simple photoreceptive structures that enabled the organisms to sense light.

Following the simple eyespot apparatus of single-celled organisms, specialized cells known as photoreceptor cells evolved in multicellular organisms. *Photoreceptor cells* (defined in more detail shortly) are neurons that contain a light-sensitive protein and pigment that absorbs light.

In the process of evolution, these photoreceptor cells clustered in groups and formed *eyespots.* Eyespots (not to be confused with the *eyespot apparatus* of single-cell organisms) eventually formed in recessed cups on the organism's body. With the photoreceptor cells at the bottom of the cup, light would hit only some of the photoreceptor cells (depending on the angle of the light entering the cup). Thus, these primitive "pit eyes" enabled organisms to detect the direction and intensity of light. Organisms could move toward light conditions optimum for survival.

The eyes of different organisms evolved rapidly during the Cambrian explosion, approximately 538 million years ago. Known as the biological big bang, the Cambrian explosion was a period of vast evolution from which many diverse forms of life developed. Increasingly complex organisms developed more advanced eyes and color vision capabilities, aiding in the recognition of mates, avoidance of predators, and identification of nutritious food. Human eyes (as well as the eyes of gorillas and chimpanzees) have evolved to see the full spectrum within visible light. The eyes of other organisms have evolved to see only a limited number of colors. The eyes of organisms called *monochromats* see not color but only lightness and darkness.

The human eye

The human eye (represented in Figure 3-8) consists of different parts that work together to make vision — and color perception — possible.

The eye is a spherical organ with an opening at the front known as the *pupil,* which lets light into the eye. The size of the pupil changes according to the movements of the *iris,* the colored ring around the pupil. The iris is made up of muscle and nerve tissue that expands and contracts in response to the amount of light coming into the eye, thus changing the size of the pupil. If you change lighting conditions quickly (such as going from a dim room to the bright sun), you squint because your eyes have not yet adjusted to the influx of light. Over the iris and pupil is the *cornea*, a clear layer that protects against dirt and germs. The white part of the eye is known as the *sclera*.

The eye is filled with a clear, jelly-like substance known as *vitreous humor* (from Latin *vitreus*, meaning glass). This fluid, made mostly of water, helps the eye maintain its spherical shape. The *retina* is a layer of tissue at the back of the eye upon which falls the tiny image of what the eye sees, similar to how an image falls on an image sensor in a camera.

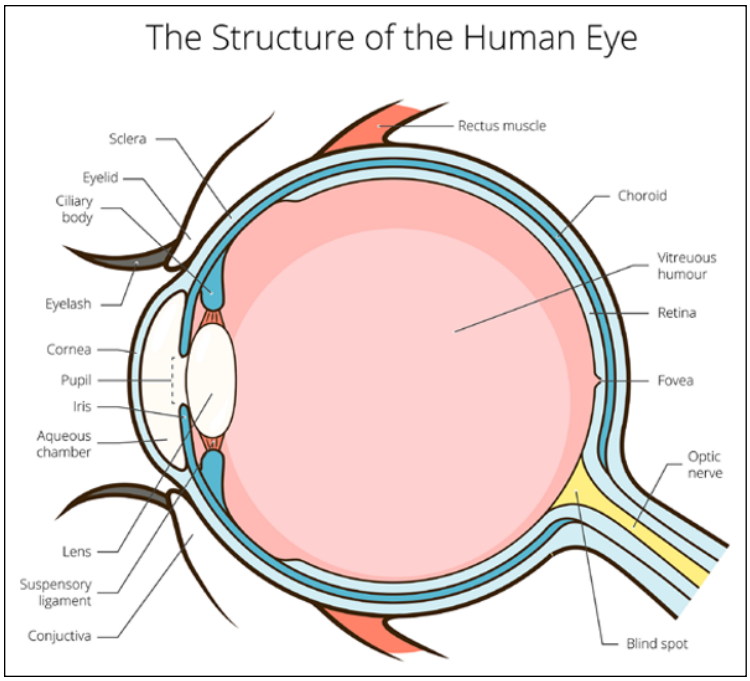


FIGURE 3-8: The human eye.

Alexander Pokusay/Adobe Stock

Photoreceptor cells

The retina is lined with *photoreceptor cells*, which are responsive to light and color. Photoreceptor cells are *neurons*, that is, cells of the nervous system that respond to sensory information and transmit signals. There are three types of photoreceptor cells, and each plays a different role in the perception of light and color.

Rods are rod-shaped neurons that are more sensitive to light than to color. Concentrated at the outer edges of the retina, rods aid in peripheral vision. Rods are responsible for vision in low-light conditions. The human eye contains approximately 100 million rod cells.

Cones are cone-shaped neurons that are sensitive to different wavelengths of light and thus make color vision possible. Cones function best in bright light. Cones are highly concentrated in the *fovea*, a small pit in the retina. The human eye has approximately 4 to 6 million cone cells. Cone cells come in three different types, with each one responding to a different wavelength of light:

- S-cones respond to short wavelengths, predominantly blue.
- M-cones respond to medium wavelength, predominantly green.
- L-cones respond to long wavelengths, predominantly red.

Each of the three types of cones contains a different protein (known as *photopsins*) that responds to the three different wavelengths of light. However, each type of cone responds to other colors in the spectrum, with plenty of overlap among them. For example, S-cones respond to purple as well as blue. The system of labeling the cones as blue, green, and red is simplistic, but nonetheless, human vision is identified as *trichromatic* (three color).

The three colors of trichromatic color vision — red, green, and blue — are the primary colors in the mixing of wavelengths of light. For example, yellow light is the result of mixing red and green wavelengths. Thus, photoreceptors that respond to red and green play a role in the response to yellow light. The millions of colors that the human eye can see originate from just three primary colors of red, green and blue!

Intrinsically photosensitive retinal ganglion cells, or *ipRGCs,* are the third type of photoreceptor cells. Discovered in the late 20th century, these neurons are sensitive to blue light and play a role in vision in low-light conditions. Because blue light suppresses the hormone melatonin, the blue-sensitive ipRGCs are thought to play a role in regulating sleep cycles.

Color in the brain

Signals from photoreceptors cells — generated by responses to different wavelengths of light — travel to other, nearby cells in the retina that, in turn, send signals to the optic nerve. The *optic nerve* extends from the retina to the brain and transmits the signals originating in the photoreceptor cells. The signals travel all the way to the back of the brain, to a section known as the *occipital lobe,* highlighted in Figure 3-9. The occipital lobe is the site of the *visual cortex,* the part of the brain that processes visual information.

The visual cortex is made of different parts, each playing a different role in visual perception. Color perception is not located in a single area. Rather, color perception is engaged in different parts of the visual cortex, adjacent to areas that handle other forms of perception such as facial recognition and word forms.

Different types of neurons (cells) in the visual cortex are responsive to signals from the three types of cones: S-cones that see predominantly blue, M-cones that perceive predominately green, and L-cones that perceive predominantly red. Within these neurons, further processing takes place to create the subjective experience of color perception.

FIGURE 3-9: The occipital lobe of the human brain.

decade3d/Adobe Stock

The Subjectivity of Color Perception

Because so much about how others see color can't be known, it's important to approach color with sensitivity and respect for different opinions. Color taste may be part psychology, but it might be rooted also in biological differences that we can't control. In this section, you learn about a few biological reasons for seeing color differently and some external factors, as well.

Addressing "the dress"

In 2015, a Scottish woman named Celia Bleasdale took a photo of a dress at a shopping mall. The dress, which was black and blue, appeared in the photo as white and gold to some people. After initial disagreements about the colors of the dress in Bleasdale's immediate circle, the image circulated on the internet and soon went viral. Widely posted on media outlets and social media, the image — which came to be known as "the dress" — was viewed by millions of people. The question was hotly debated: Is the dress black and blue, or white and gold? Even major celebrities weighed in. A quick internet search using keywords *the dress* will bring up the original image. How do you see "the dress"? Black and blue, or blue and gold? How can colors appear so differently to different people?

Your answer to the first question has a lot to do with how your brain interprets (or thinks it's interpreting) colors under shadows, highlights, and different color temperatures of light.

Color constancy is the brain's ability to know that the color of an object remains the same, even as the object is seen under different lighting conditions. You know that color temperature can range from very warm (such as incandescent light) to very cool (such as fluorescent light), to white balanced (midday sunlight under clear conditions). Depending on how your brain compensates for the colors you see under varying conditions to create color constancy, you may perceive colors differently from the way other people do. Memory of an object's color factors into color constancy.

"The dress" is a unique object of which most people have no memory. Without a reference point in the collective memory, the chances of people seeing "the dress" as different colors increased dramatically. The colors you believe the actual dress to be depend on two possible scenarios:

- You perceive the dress as white and gold under a bluish shadow.
- You perceive the dress as black and blue, illuminated by a yellowish light.

Figure 3-10 shows an illustration of how the colors of shadows and highlights on blue and black colors and yellow and gold colors could — surprisingly — create the same colors.

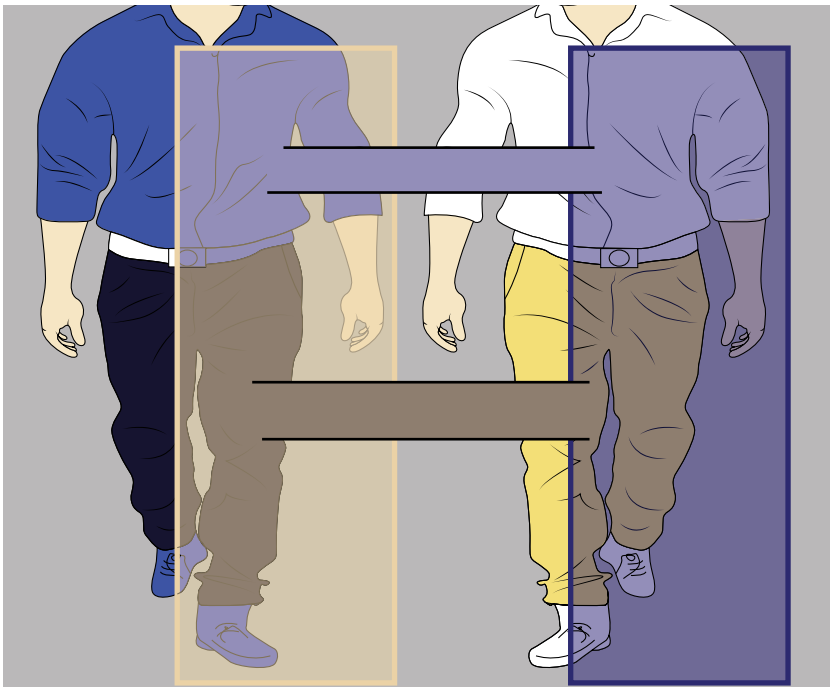


FIGURE 3-10: The color illusion of "the dress."

REMEMBER

"The dress" proves how subjective color perception can be. "The dress" also proved — amusingly — that people understand their color perceptions as facts, plain as day. However, it's a mistake to believe that color perception is fact. Too many biological and psychological differences exist between us to think of color perception as fact. And of course, color perception in culturally conditioned in ways that effect our perception as well. Differences in color perception must be not only tolerated but celebrated! After all:

We all see color differently.

Color vision deficiencies

When I teach color theory, I describe color vision deficiency in the first hour of the first class because it's important to establish that color perception is affected by biology. Addressing color vision deficiency welcomes students who may — knowingly or not — have the condition. A color vision deficiency does not disqualify someone from studying color theory or perusing creative work but does affect certain professions. For example, for safety reasons, pilots can't have a color deficiency.

Color vision deficiency is the inability to perceive certain colors. In some types of the condition, no color is visible. The term *color blindness* is used interchangeably with color vision deficiency, but color blindness implies a complete inability to see color. Most people with color vision deficiency see some colors normally and other colors atypically.

A number of different kinds of color vision deficiencies exist. The most common form of color deficiency is *deuteranomaly,* characterized by a reduced ability to perceive green. *Protanomaly* is characterized by a reduced ability to perceive red. Individuals with deuteranomaly and protanomaly are sometimes described as having red-green color vision deficiency because they have difficulty distinguishing between reds, greens, browns, and oranges. *Tritanomaly,* a rare type of color vision deficiency, is characterized by a reduced ability to perceive blue. The degree to which a person's color perception ability is affected varies from mild to severe. *Achromatopsia* is the complete inability to see colors and is often accompanied by other symptoms such as decreased visual acuity.

If you're curious about how the world looks through the eyes of someone with a color vision deficiency, there's an app for that! Chromatic Vision Simulator (`https://asada.website/cvsimulator/e/`) enables you to see protanomaly,

deuteranomaly, and tritanomaly through your smartphone camera. The app contains a slider that lets you adjust the degree to which color is affected in each type of color vision deficiency. Figure 3-11 shows three pictures I took of a color wheel using the app, comparing normal vision (left) with protanomaly and deuteranomaly (both exemplified in the center circle) and tritanomaly (at right). Note that protanomaly and deuteranomaly are identical in appearance.

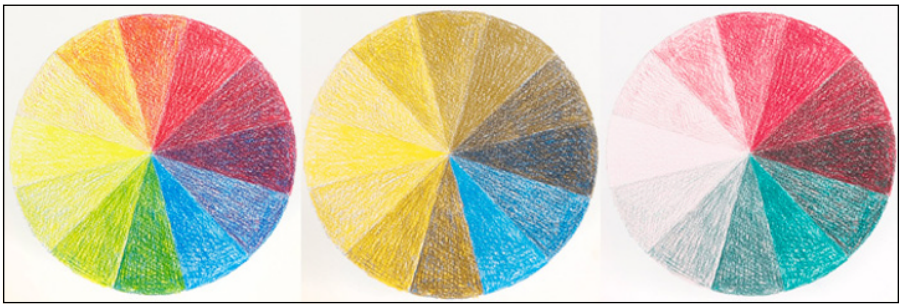


FIGURE 3-11: Normal vision (left), protanomaly and deuteranomaly (middle) and tritanomaly (left).

Color vision deficiency effects the cone cells of the eye, which are responsible for seeing color. Most types of color vision deficiencies are caused by a genetic mutation, but color vision deficiency can be caused also by damage to the eye or brain. The recessive gene that causes color vision deficiency is linked to the X chromosome. Biological males have XY chromosomes and are thus more likely to have color vision deficiency. Biological females have XX chromosomes, so if there is a recessive genetic trait on one X chromosome (such as color vision deficiency), the other X chromosome compensates for it. (Biological females who have one X chromosome with the mutation for color vision deficiency are carriers for the condition). As biological males do not have another X chromosome to correct a mutation on the chromosome, the mutation is expressed in their cone cells. About 8 percent of biological men and 0.5 percent of biological women have some form of the condition.

In Sweden in the 1870s, a serious railway accident brought widespread attention to color vision deficiency. The cause of the accident was linked to an employee misreading a colored signal. A doctor named Frithiof Holmgren designed a test using skeins of different colored yarn and discovered that a significant percentage of railway employees had a color vision deficiency. As awareness of color vision deficiency grew, methods of testing proliferated. In Japan in 1917, Shinobu Ishahara designed a test for color vision deficiency that's still used today. Known as the *Ishahara test,* it's a series of plates made up of arrangements of colored dots.

The plates contain numbers and forms that — if not visible — indicate deuteranomaly and protanomaly. Figure 3-12 shows plates from the Ishahara test.

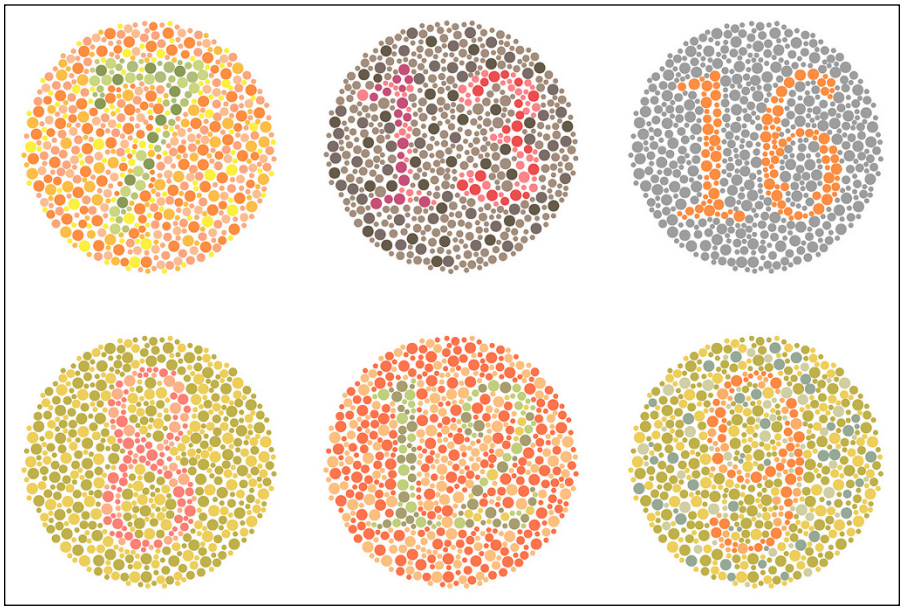


FIGURE 3-12: Ishihara test.

eveleen007/Adobe Stock.

REMEMBER

People with color vision deficiency should feel as welcome in art museums as any visitor. Color is not always the primary concern for artists, and some even downplay color's role or ignore it. The Canadian-American painter Agnes Martin said that color was not as important in painting as composition. It's quite a claim! Whether you agree or not, it's a refreshing perspective to ponder.

Synesthesia

Another biological cause of atypical color experiences is the condition known as synesthesia. People with *synesthesia* report involuntary correlations between perceptual experiences that are not typically linked. For example, people with *auditory-tactile synesthesia* experience different bodily sensations in response to certain sounds. People with *lexical-gustatory synesthesia* experience different tastes when hearing or reading certain words. A number of types of synesthesia involve the perception of color, including *grapheme-color synesthesia* (associations between letters or numbers and colors) and *chromesthesia* (associations between sounds and colors).

A person with grapheme-color synesthesia forms letter-color associations, and these associations are unique to that person and remain consistent. For example, the letter B is always blue or the letter Z is always green. Numbers can also have colors. People with grapheme-color synesthesia are aware of the real colors of letters and numbers in the world around them, while simultaneously experiencing their synthetic colors. And the real color of a letter or number does not alter the synthetic color experience. For example, a hot-pink 7 will always be hot pink, whether the 7 is printed in black and white on paper or neon yellow on a billboard. The emotional effect that people with grapheme-color synesthesia report varies greatly from benign or positive feelings about their color perceptions to annoyance when shown letters that are colored in ways that don't correspond to their synthetic colors.

The cause of the different forms of synesthesia is little understood. Grapheme-color synesthesia, which is one of the most common forms, has been studied more than other forms. The areas of the brain that process letter form information are adjacent to areas of the brain that process color information, so it's possible that atypical links between these regions are the cause of grapheme-color synesthesia. As for synesthesia, it's occurrence among family members points to a genetic cause.

Learning about synesthesia is a reminder that people see colors in different ways, and you can never be sure what someone else's experiences really are. It's important to honor our differences, withhold judgement, approach color with curiosity — and celebrate the different ways that color is perceived!

Other factors that affect color perception

Color vision deficiencies and synesthesia affect only a small percentage of the general population. However, everyday factors affect everyone's color perception. The lighting under which you're reading this book (or e-book) will affect the way you see the color studies herein. Colors look different under incandescent versus fluorescent lighting, which look different than colors under natural light. Another factor is fatigue, which decreases the ability to see subtle differences between colors. And finally, age can sometimes affect color perception, making it difficult to see faint colors and to discern between cool colors such as blue, green, and purple.


TIP

The best practices for observing color include using bright but diffused natural light or daylight-balanced light bulbs, in evenly lit work areas. Observe colors early in the day when your eyes are fresh. Have your eyes examined regularly and visit your eye doctor if you notice any changes.

IN THIS CHAPTER

- Defining values and hues
- Understanding the difference between tints, tones, and shades
- Developing your color vocabulary
- Exploring fluorescents and metallics

Chapter 4
The Language of Color

We humans are an extraordinarily language-oriented bunch. When we have words for something, it becomes more tangible, more of a reality in our lives. The same is true for color perception, a vast and elusive phenomenon. Language can help us identify and apply color in both our creative work and in everyday life.

In this chapter, I define color terms that will help you think and communicate about color more effectively. You discover the differences between values and hues, and how white, gray and black are mixed with hues to create tints, tones, and shades. You learn about the different ways in which people talk about color and get tips for developing your color vocabulary. Finally, you look at two special types of color, fluorescent colors and metallics.

Talking about Color with the Right Words

We all have our own way of talking about color. We have color words and phrases that we hold dear, and rightfully so! Often, our color words are as personal as the way we talk or eat. You might know exactly what color you are referring to when you say "maroon," but how can you be sure that others know what you're talking about? You might use works like *tint, tone,* and *shade* to talk about a specific color. ("I love that shade of maroon.") This is all well and good, but to delve deeper into color, you need to define your terms.

The technical language used in this chapter provides a shared language that is super specific, allowing you to zone in on color ideas and communicate as clearly as possible.

You begin your exploration of the language of color with a color phenomenon known as the *fluting effect,* which is visible in some of the illustrations in this chapter. To experience the fluting effect, rest your gaze on the middle color in Figure 4-1. After a few seconds, observe any subtle changes to the middle color.

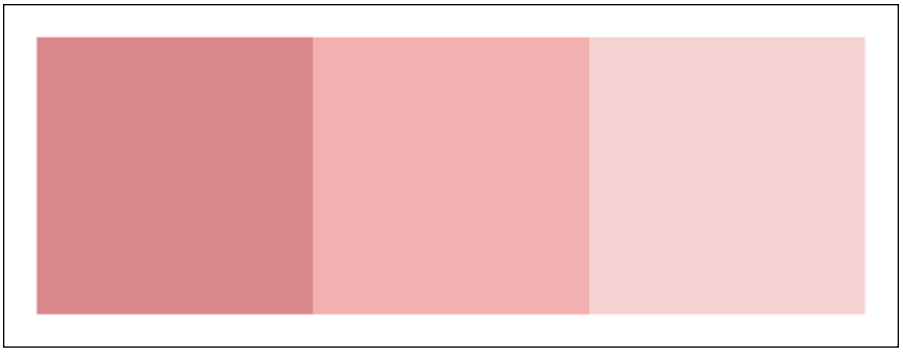


FIGURE 4-1: The fluting effect.

You may have noticed that the left side of the middle color (which is next to a darker color) appears to lighten a bit and the right side of the middle color (which is next to a lighter color) appears to darken.

The disparity of lightness and darkness within this middle color is an example of the fluting effect. It appears abundantly in some of this chapter's illustrations (especially Figures 4-9, 4-11, and 4-12), which is why I'm addressing it here. I hope this will be only a minor distraction (or maybe even a bit entertaining!) and that the main gist of the illustration will come across. I cover the fluting effect is more detail in Chapter 7.

Value: Gray is not a color!

Black, white and gray are not colors. This may come as a surprise, because in common parlance you might say, "Gray is my favorite color." It's not wrong to say this in ordinary conversation, but here we're talking technical!

REMEMBER

Black, white, and gray are values. A *value* is a degree of lightness or darkness. Black is the absence of light. White is the presence of light. All grays are degrees of lightness or darkness between absolute black and absolute white. The differences in light intensity between values is known as *value contrast.*

THE COLOR OF VALUE

Some blacks, whites, and grays contain small amounts of *hues* such as blue, yellow, or green (more info on hues to follow). The addition of even a miniscule amount of hue result in blacks, whites, and grays that skew warm, cool, or colored in some way. These blacks, whites, and grays are not values in the strictest sense of the term. Rather, they are colors that fall under the categories of tints, tones, and shades (more info on tints, tones, and shades to follow).

Value charts can help you see the range of grays that are possible. Figure 4-2 shows a 16-step value wheel, from black to white with 16 grays in-between. However, there are countless gradations between these 16 steps. Like the keys of a piano, the notes of grays could be played off one another in innumerable ways, creating beautiful nuances, harmonies, and contrasts between the different values.

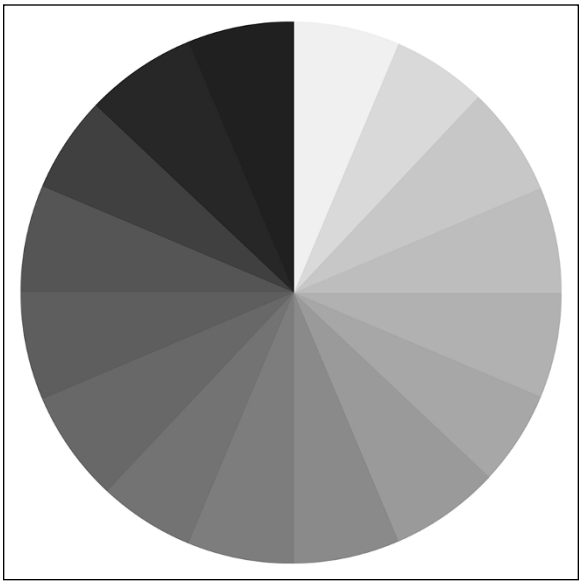


FIGURE 4-2: A 16-step value wheel.

iukhym_vova/Adobe Stock

TECHNICAL STUFF

Grisailles (from the French for *grayed*) are artworks and objects made entirely in grays. Figure 4-3 shows an early American cupboard painted with motifs in grisaille. The wide range of grays — from dark gray to very light gray — creates strong value contrast and gives a dimensional look to the object's surface.

FIGURE 4-3: Kast (cupboard), American (probably New York, New York) 1690–1720, painted wood, 60½ x 60¼ x 23″.

The Metropolitan Museum of Art

Another way to appreciate the power of value is in black-and-white photography. Figure 4-4 shows a photograph of a landscape in Colorado by Ansel Adams. The photo, like the cupboard in the preceding example, has a strong range of value and strong contrast. The bold use of value creates drama and interest.

Appreciating value for its own aesthetic potential and as a phenomenon independent of color will help you understand the lightness and darkness of color, which is covered more in Chapter 6.

Hues: Colors from the wheel

REMEMBER

A *hue* is a color in the visible spectrum.

The *visible spectrum* consists of red, orange, yellow, green, indigo, and violet, sometimes known by its acronym, *ROYGBIV* (the visible spectrum is covered in Chapter 3.) For simplification, the common color wheel forgoes indigo and violet, replacing it with purple. Within this rudimentary set of hues are *primaries* (red, yellow, blue), *secondaries* (green, orange, purple), and *tertiaries* (such as red-orange and blue-purple). Together, these colors make up the standard 12-part color wheel shown in Figure 4-5. Note the triangle of primaries in the center of the wheel, to which the secondaries are added to create a hexagram.

FIGURE 4-4: Ansel Adams, *Long's Peak, Rocky Mountain National Park,* 1941–42, photograph.

National Archives Catalog

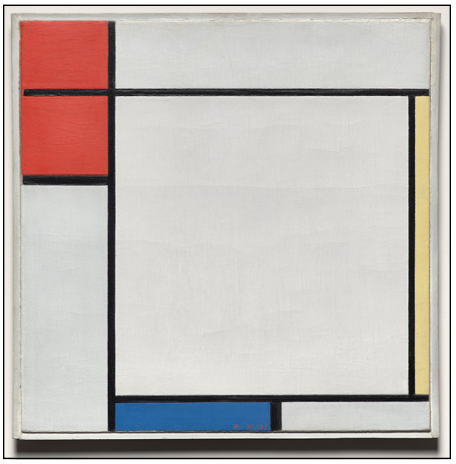
FIGURE 4-5: A 12-part color wheel.

zanna/Adobe Stock

In the world of *subtractive color mixing* (mixing color with substances such as paint or dye, as covered in Chapter 3), *primary colors* are those that can't be created by combining other colors. In other words, red, yellow, and blue can't be mixed

from other colors on the color wheel. Thus, primary colors are often thought of — perhaps with some prejudice — as more fundamental and basic than secondaries and tertiaries.

Primaries were widely used among modernist painters to express notions of truth and universality. The modernist painter Piet Mondrian used primary colors in his abstract paintings (such as the work in Figure 4-6) to express his desire for a new abstract art that did not depict nature in the realistic way that his earlier work had.



Cleveland Museum of Art

FIGURE 4-6:
Piet Mondrian, *Composition with Red, Yellow, and Blue,* 1927, oil on canvas, 19½ x 19½″.

Unlike the primaries, *secondary colors* are created by combining other colors:

green = blue + yellow

orange = red + yellow

purple = blue + red

See Figure 4-7. Viewed on their own, secondary colors have a different flavor than the primaries. Because they're a mix of two other colors, they're more nuanced or refined. Sophisticated? You decide!

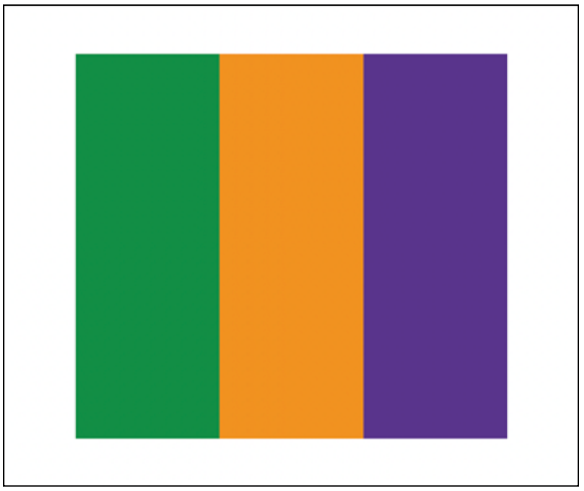


FIGURE 4-7:
Secondary colors.

THE VALUE AND HUE CONNECTION

In this chapter, I separate value from hues to help you understand the differences between them. But values and hues are intertwined. Hues themselves have different degrees of lightness and darkness (values), a characteristic known as a hue's *light intensity*. Yellow is the lightest hue, and purple is the darkest. More information about the light intensity of hues can be found in Chapter 5.

Tertiary colors are a combination of one primary and one secondary. For example:

yellow + green = yellow-green

blue + purple = blue-purple

red + orange = red-orange

Tertiary colors, shown in Figure 4-8, are subtler than the secondaries. When placed in random order, as in Figure 4-8, tertiaries say "colorful" without saying "spectrum" or "rainbow."

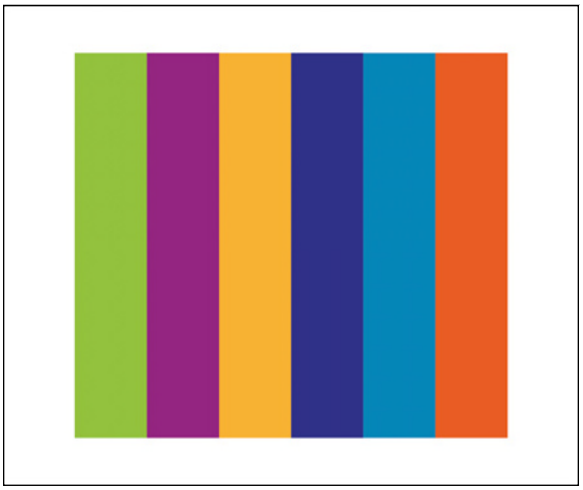


FIGURE 4-8: Tertiary colors.

Theoretically, the color wheel (refer to Figure 4-5) could be further divided into hundreds — even thousands — of minute gradations between the primaries, secondaries, and tertiaries. Yet, you still wouldn't have as many of the colors as you see in the world, such as the colors commonly called pink, beige, and navy blue. The true vastness of color — the millions of colors that the human eye can see — comes from combining hues with white, gray, and black to create tints, tones, and shades. Keep reading for details on these concepts.

Tints: Not just pastels

Tints are hue + white.

REMEMBER

Any color that includes white is a tint.

Many colors commonly referred to as pastels are tints: pinks, light blues, and light greens. In addition, colors that are commonly known as whites are tints: Cool whites may have a bit of blue, and warm whites may have a bit of orange.

However, it's a mistake to think that all tints are light, since even a small amount of white in a hue renders it a tint. For example, painters sometimes add a tiny amount of white to blue. Out of the tube, many blue paints are quite dark. The addition of white helps to open up the color and make it visible as blue (as opposed to black). White also makes color more opaque. (I discuss opacity in Chapter 7.) On canvas, the blue mixed with a tiny amount of white may appear quite dark but is in fact a tint.

All the colors in Figure 4-9 are tints. Colors with a small amount of white are at left, with increasing amounts of white as you move right.

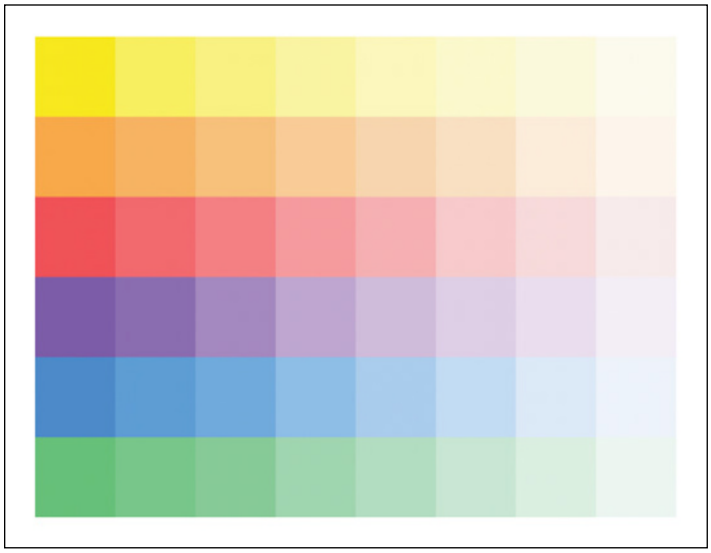


FIGURE 4-9: Gradations of tints.

Figure 4-10 shows a random arrangement of tints.

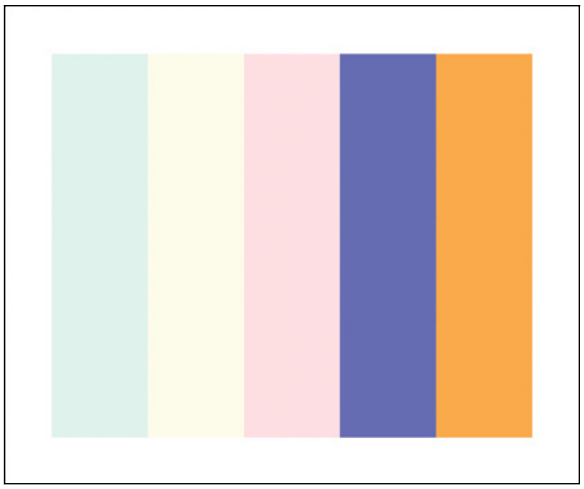


FIGURE 4-10: An arrangement of tints.

Tones: Dull is not boring

Tones are hue + gray.

REMEMBER

Any color that includes gray is a *tone.*

To wrap your head around the vastness of tones, consider the gray scale and the infinitude of different possible grays. Any gray in this scale could be added to any hue (and in any proportion) to make a tone. For example, adding a very light gray to a red will yield a different result than adding a very dark gray to the same red, yet both are tones.

The addition of gray has a dulling effect on hues. The degree of dullness, known as the color's *intensity,* has to do with the proportion of gray to hue.

Tones make up a range of colors that are commonly called *neutrals,* such as beiges and gray-browns. Some colors that are commonly thought of as grays (such as warm grays or cool grays) are actually tones: gray with a bit of red or blue, for example. Tones can be made also by mixing complementary colors, such as red and green, or blue and orange, or yellow and purple.

Although tones can appear dull, many colors that appear vivid may contain a small amount of gray. Adding a small amount of gray to a color removes it from the color wheel, rendering it less elemental and perhaps more sophisticated. The Munsell color system (covered in Chapter 10) uses not a color wheel but a color sphere: a model that shows how different values mix in different proportions with different hues to create a vast range of color.

All the colors in Figure 4-11 are tones. Colors with a small amount of middle gray are on the left, with increasing amounts of middle gray as you move right.

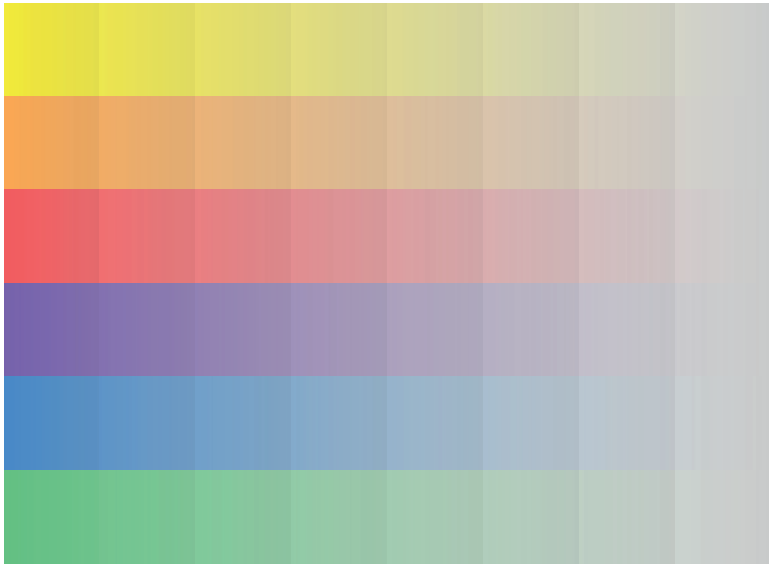


FIGURE 4-11: A gradation of tones.

Figure 4-12 shows a random arrangement of tones.

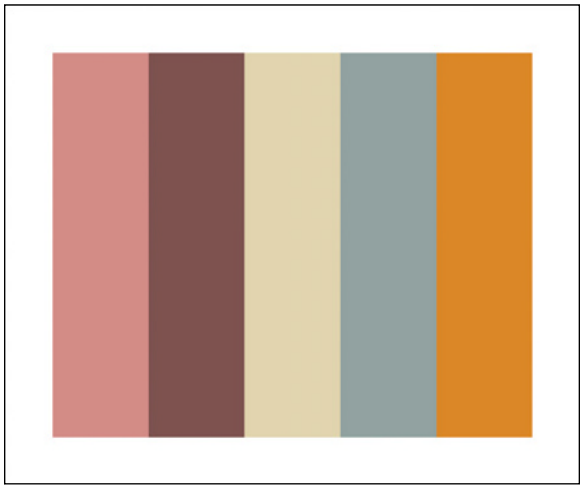


FIGURE 4-12: An arrangement of tones.

Shades: Black is beautiful!

Shades are hue + black.

REMEMBER

Any color that includes black is a shade.

Like its siblings tint and tone, the effect of black on hue has to do with proportion. A bright red will take on an ever-so-slightly darker character with just a tiny bit of black, perhaps not reading as a shade at all.

Colors that are seen as black can reveal their true identity as super-dark colors when placed next to one another. If you've ever tried to wear an all-black outfit and discovered that your trousers and shirt look like different blacks, you've discovered that blacks are not always absolute black but different shades.

REMEMBER

Shades of colors are commonly used to depict shadows. In context, shades can have the effect of making lighter and brighter colors appear more so. Thus, shades don't always make things appear darker; their presence can have the opposite effect.

In themselves, shades can be beautifully quiet, like the nighttime you might look forward to after a long and tiring day. Shades can also add power and authority to color: think navy blue and Harvard's maroon sweatshirts.

All the colors in Figure 4-13 are shades. Colors with a small amount of black are at left, with increasing amounts of black as you move right.

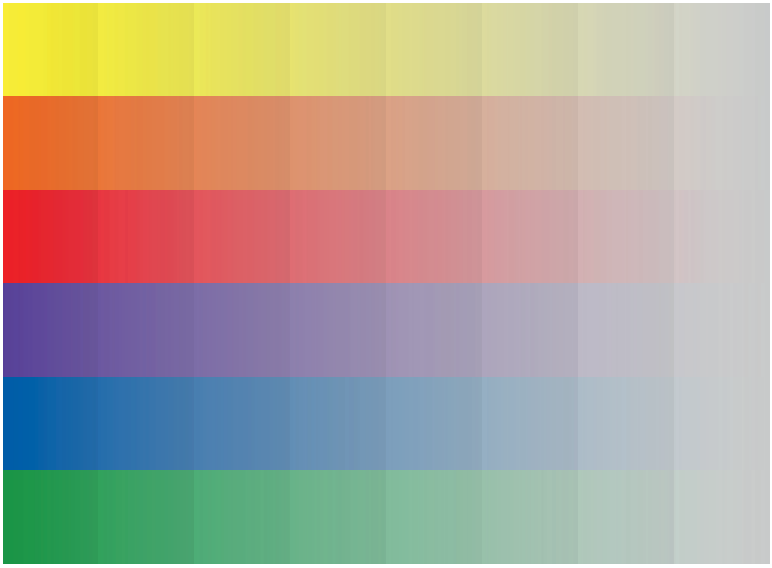


FIGURE 4-13: A gradation of shades.

Figure 4-14 shows a random arrangement of shades.

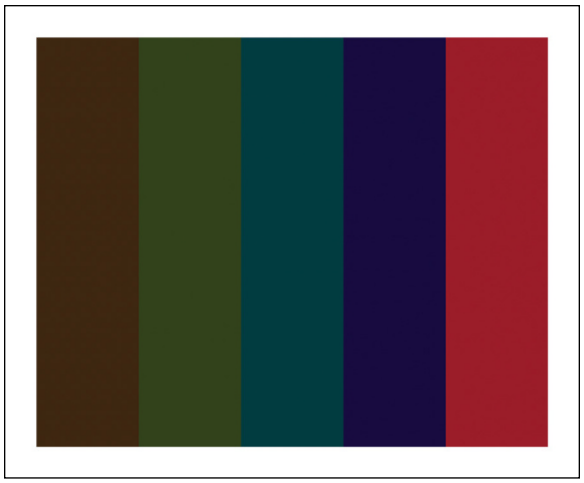


FIGURE 4-14: An arrangement of shades.

The dimension of color: puce

Just as a box has the dimensions height x width x length, so too color has dimension. Some colors are *one-dimensional*, such as the hue of orange plucked straight from the color wheel. Other colors are *multidimensional* — they are made from other colors or they include whites, blacks, and grays or both.

The colors words outlined in this chapter — *values*, *hues*, *tints*, *tones*, and *shades* — help you describe (to yourself and others) the dimensions, or components, of colors. For example, look at the fairly unusual color in Figure 4-15, commonly known as *puce*.

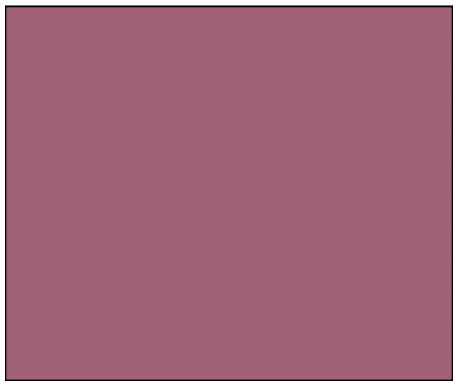


FIGURE 4-15: A sample of puce.

Explore the dimension of this puce. First, it has something vaguely reddish about it, so you know that is must have some red in it somewhere. Second, it's kind of dark, so you know it must have some black, too. Third, it has a dullness to it, so it must have white along with the black, thus creating gray and rendering it a tone. Alternately, the tone of puce can be created by adding green, which is red's complement, thus dulling the color and creating a similar effect as adding gray.

You may not know the proportions of the red, black, and white that went into making this particular puce, but at least you know its dimensions: red x white x

black = puce. Understanding dimensions helps you begin to mix the color with paint, locate it on a digital color picker, or simply understand its character.

Using Colorful Language

Language shapes the way we think about and see color. English has words for most basic colors, such as *red, yellow*, and *blue*. Different languages have more or fewer of these basic color terms. For example, Russian has two words for blue: one light and one dark. The African language Bassa has only two color terms: *ziza* for white, yellow, orange, and red, and *hui* for black, violet, blue, and green.

Beyond our basic abstract color words, the other way we talk about color says a lot about how we use language and our personal style. The technical terms outlined in the previous section are essential and will remain in use throughout the book. However, it's important to address other ways that people talk about color, so you can further define color for yourself and others.

Getting creative with fancy color words

Fancy color words use associations (animals, places, things, cultures) to communicate about color. For example:

- Camel (associated with the animal)
- Moroccan blue (associated with the place)
- Saffron (associated with the spice)

Fancy color words often have dramatic flair and are extensively used in fashion, design, marketing, and crayon boxes, as shown in Figure 4-16. Depending on who is talking, fancy color words can be used also in everyday conversation.

Fancy color words are wonderfully poetic. They add zest to language, spark the imagination, and are memorable. The trouble with fancy color words, however, is that they're vague. Do an internet search for *chartreuse* and you'll see a wide range of yellow-greens, all different from one another. Who gets to say what *chartreuse* is? No one, really, but a big company like Pantone would probably be considered an authority in the matter.

WARNING

Fancy color terms should not be relied on to communicate effectively about color. While a large vocabulary of fancy color terms might indicate that a person knows plenty of colors, it doesn't indicate a thorough understanding of color per se, nor the

ability to see, identify, mix, or successfully apply color in creative work. However, fancy color words are handy at helping us remember color. More on that soon.

FIGURE 4-16: Misty Meadow, Wintergreen Dream, August Sunshine: A walk through the paint department is like going to a poetry reading.

Describing color with adjectives

Another way that color is widely described is with the use of adjectives like *light, dark, warm, cool, saturated,* and *desaturated.* Instead of saying, "The wall is lavender," you might say, "the wall is light-purple." Adjectives are not necessarily more specific than fancy words, but they do have a different tone. They are more matter-of-fact and direct as well as less dramatic.

When talking about color in the classroom, I tend to use adjectives. I find it helps students identify colors more quickly and easily. For example, students born after a certain date might not be familiar with the fancy color word avocado because they don't remember the 70s when that color was trending! Fancy color words can be culture-specific, generation-specific, and gender-specific in ways that make their meaning opaque to some. In an effort to communicate effectively about a wide range of colors to large groups, it is best to use adjectives.

Developing your color vocabulary

Similar to your language vocabulary, you also have a color vocabulary. Your *color vocabulary* is your mental inventory of all the colors you know, whether you have words for them or not. Can you recall a memorable color from an object of your childhood? If so, it's part of your color vocabulary.

Developing your color vocabulary means venturing into the visual world of color, perhaps even forgetting words for a moment. Try this the next time you see a color that strikes you: Spend some time with it. Pause and stare at the color, which will help root it in your memory. Then use a memorable word or set of words to name it. The words you use will help you remember the color visually.

Developing your color vocabulary increases your ability to see, respond, and create with color. An experienced interior designer has a vast color vocabulary, enabling them to make nuanced decisions among a wide range of colors. Those just learning interior design might struggle to make a color scheme work, only because they don't yet know of that particular dark-purplish-brown, also known as Dark Chocolate Cherry, that will pull their whole design together!


TIP

Your color vocabulary will grow with practice. For an exercise on building your color vocabulary, check out Chapter 13.

Outliers and Oddballs

Even after the descriptions of values, hues, tints, tones, shades and all the color words that describe the bazillions of colors in existence, there are still some outliers to account for. If your favorite colors happen to be traffic cone orange and silver, you're probably wondering where those colors fit in the ROYGBIV spectrum, the color wheel, or the tint, tone, and shade categories. The answer is: They don't! Fluorescents and metallics are unique colors that need to be considered on their own terms.

Fluorescent colors: Ack! My eyes!

If you were alive in the 80s, you might remember the emergence of neon yellow, neon green, or another color with the word *neon* in front of it. These eye-popping colors appeared on clothing, toys, and a myriad of other objects. The dyes that make these colors possible are known as *fluorescent color.*


TECHNICAL STUFF

Fluorescent colors can absorb, convert, and reflect more light energy than is falling on them. When this higher energy level hits your eyes, you experience the brightness of fluorescent color.

Fluorescent color is not found in the ROYGBIV spectrum or the color wheel.

According to DayGlo, a leading manufacturer of fluorescent color, billboards with fluorescent color versus conventional color are noticed sooner, looked at longer, and looked at more repeatedly. In addition to advertising and design, fluorescent colors are widely used in safety applications, such as traffic cones and vests.

Metallics: Color with shine

Remember the gold, silver, and copper crayons in your crayon box? These colors are called *metallics* because they appear to shine like metal. Technically, metallic colors like copper or silver are not colors in the same way that hues, tints, tones, or shades are colors. This is because metallics include materials that give the appearance of shine. For example, some acrylic metallic paints contain tiny pieces of a mineral called mica to give the paint its metallic shine. Mica is widely used also in cosmetics to create shimmer and shine.

In visual art and design, metallics are represented in two ways: *actual* and *implied*. An example of *actual* metallics is the use of gold leaf in religious icons. In this case, the metal itself creates the shimmer in the work. A piece of clothing that imitates metallic (such as gold lame) is also considered an actual representation of metallics because the shimmer is coming from the material itself.

An example of *implied* metallics is shown in Figure 4-17. The appearance of shine is created by placing dark and light colors in context, mimicking the reflective surfaces of some metal on a non-shimmering surface, in this case a page of this book.

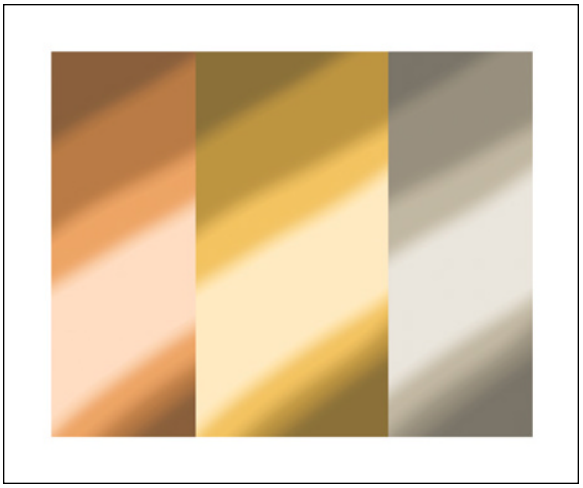


FIGURE 4-17: Three metallics: copper, gold, and silver.

When coordinating with metallic colors, consider the color underlying the metallic quality. The underlying color of copper is a red-brown color. The underlying color of gold ranges from yellow-green to yellow-orange. The underlying color of silver is gray. Understanding these underlying colors helps you coordinate effectively with the metallics, without getting distracted by the shimmer. For example, when coordinating with gold ask yourself what colors work with yellow.

2 Examining Color Relationships

IN THIS PART . . .

Explore the relativity of color with hands-on exercises.

Learn how to use color contrasts to create moods and effects.

Understand color's weight; wetness and dryness; and opacity and transparency.

IN THIS CHAPTER

- Understanding the relative nature of value and color
- Exploring the elusiveness of color with hands-on exercises
- Discovering different types of optical color mixing
- Experiencing the phantasmic color of after images

Chapter 5
The Relativity of Color

One of the main ideas in color theory is that color is *relative* — that is, your perception of color changes according to the context. The same is true for value.

The concept and practice of color's relativity usually takes up a significant amount of an art student's freshman year. In a curriculum developed by the late color theorist Josef Albers, students use color paper in exercises that explore how color shifts in context. These studies instill the understanding that color is a dynamic entity — and that this dynamism is something to accept, embrace, and even exploit in the creation of future work. In this chapter, you conduct similar exercises in which color changes before your eyes!

REMEMBER

Give yourself time to observe color slowly. In today's world, we're accustomed to rapidly moving, backlit images on digital devices. The speed, lushness, and brightness of these images are exhilarating! However, they can also desensitize us to subtler perceptions, and subtle perception *is* an essential part of color theory. Be sure to take a few seconds — counting "one, one thousand, two, one thousand, three, one thousand" — when you observe the examples in this chapter.

Seeing How Value Changes with Context

Let's first look at the relativity of value. As described in Chapter 4, *value* is the degree of lightness between absolute black and absolute white. It's commonly represented by a gray scale. Observing the gray scale in Figure 5-1, you might think that you have a sense of the lightness and darkness of the individual grays, and that's that! Nothing much to see here, right?

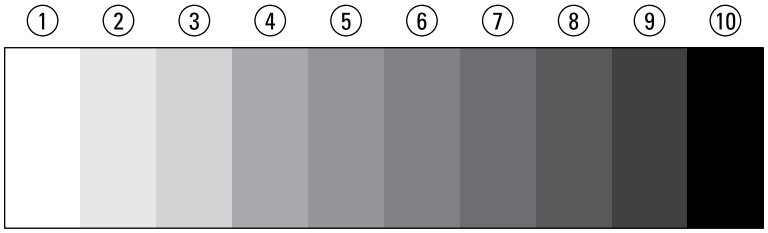


FIGURE 5-1: A 10-step value scale.

Well, not so fast. When you move these values into different contexts, they can become *different* values, appearing significantly lighter or darker than how you see them on the value scale. You test this statement in the exercises that follow. To get started, grab a pair of scissors and a glue stick (tape is not recommended), and find a well-lit area to work in. Indoors with bright (but not blinding) natural light is best. (For more on balanced lighting, refer to Chapter 3.)

Exercise #1: working with a dark gray

The worksheet for exercise #1, which appears at the end of the chapter, has values 2 through 9 from the 10-step value scale. Above the scale are boxes #1 (black) and #2 (light gray), in which you will place squares from the value scale. A completed worksheet for the exercise is shown in Figure 5-2.

Let's begin with value #6, a dark gray. Cut two squares from value #6 and place one in the center of each box. Using a glue stick, fix it in place. Try to avoid smearing glue where it might be visible because it might distract from the study.

Under good lighting conditions described previously, observe the study. You might see instantly that gray #6 appears as *two different values*: appearing lighter in the black box and darker in the light gray box. If you don't see this, take some time and let your eyes adjust. Rather than darting your gaze back and forth between the squares in the center of each box, try resting your gaze on the center line between the boxes. The squares will still be in your main field of vision but with a soft focus. Ideally, the squares of value #6 should appear as distinctly different values.

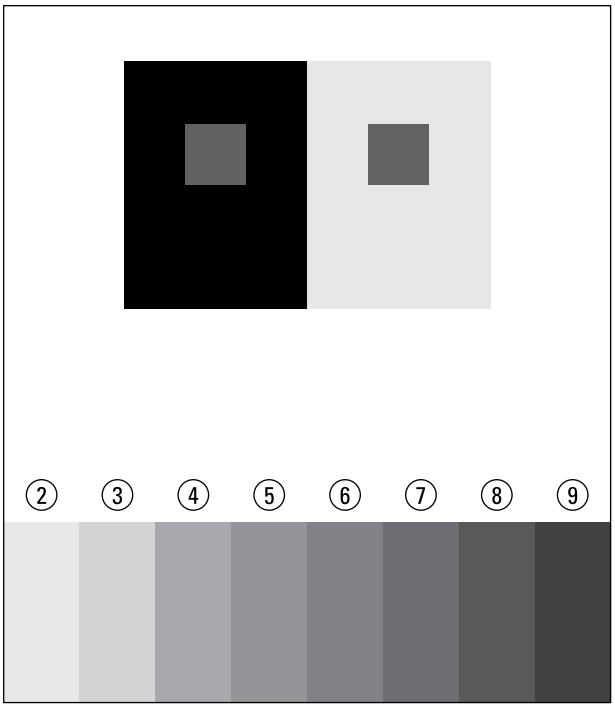


FIGURE 5-2: A completed worksheet for exercise #1.

On the worksheet at the end of the chapter, cut squares from other values and put them in the boxes. Can you make other values shift?

REMEMBER

Don't bother getting creative with the shape and positioning of the squares. The best way to see the relativity of value is with a very limited number of variables, and that's why the exercises are made with the simplest of shapes. Always follow this rule: Use the same swatch value in both boxes.

Exercise #2: working with a light gray

On the worksheet for exercise #2, which appears at the end of the chapter, use squares of value #3 (light gray) in the boxes. Follow the same steps as in exercise #1, cutting and position the squares in the boxes.

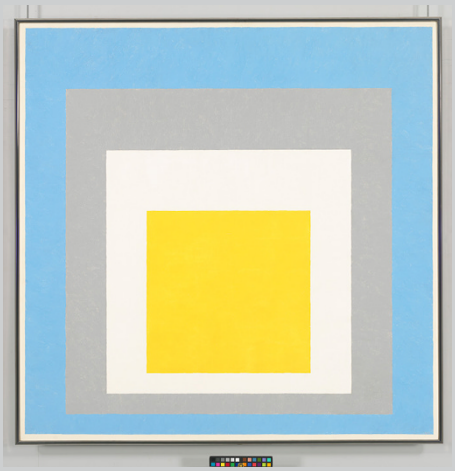
I hope you see that the light gray takes on a very different character depending on the boxes. In the study I created while writing this chapter, I was surprised to see that my light gray appeared almost white against the black square!

JOSEF ALBERS AND COLOR

Josef Albers (1888-1976) was a German-born artist who moved to America in the 1930s. He eventually taught in the fine art department at Yale University, where he developed his color theory approach and wrote *Interaction of Color* in 1963. By today's standards, some of the language in *Interaction of Color* is outdated (such as a reference to "gentleman preferring blondes"). Yet, the basic concepts are foundational and have greatly influenced how color theory is taught. *Interaction of Color* remains an important resource for students, educators, and anyone who wants to learn about color.

In his paintings, Albers practiced what he preached in *Interaction of Color*. Eschewing recognizable imagery in his work, for decades he used a simple abstract composition of centered squares within squares, as shown in the following figure. (He did make other types of abstract compositions, too). The true variable in his work is color. Depending on the lightness, darkness, or saturation of his chosen colors for a given work, one experiences a wide range of sensations: weight, gravity, atmosphere, advancement, retreat, warmth, coolness. By keeping his compositions entirely abstract and sticking with a relatively simple composition, Albers made color the main dynamic in his work.

You probably noticed the rectilinear look of the studies in this chapter. The 90-degree angle was practically fetishized in much of 20th-century art and architecture and continues to be "the" angle to use. And the 90-degree angle appears elsewhere: Look at the shape of this book! On a practical note, rectangles and squares are easier to cut than other shapes, making them the choice for Albers and other color theory practitioners.



Digital image © Whitney Museum of American Art / Licensed by Scala / Art Resource, NY

REMEMBER

The big takeaway from these exercises is that value is relative: It shifts based on context. To be more specific, value is relative *especially* when there's a strong contrast of value. If the values of the boxes were not very contrasting (for example, two values that are next to one another on a value scale), the value of the square probably wouldn't appear that different, if at all.

Seeing How Color Changes with Context

Like value, color is relative: It changes based on the context. In the exercises in this section, you move colors into different contexts to see how the colors shift — you'll not only *see* color change, you'll *make* it change. These simple exercises prepare you for a typical color theory class, which may involve a pack of color paper and similar projects as follows.

Remember that we all see color differently, so an exercise's effect for you might be different than for someone else. In viewing the examples here — and in working with the exercises at the end of the chapter — you'll gain a deeper understanding of color's relativity.

Exercise #3: the flushing effect

The *flushing effect* occurs when one color takes color characteristics away from an adjacent color. Look at the example in Figure 5-3, which has two reds: a rectangle of one red at the bottom of the page and a large box of a more saturated red above it. In this large box is a square of the same red as in the rectangle below.

The square of red in the box appears somewhat duller than in the rectangle. Indeed, the saturated red in the surrounding box has *flushed* some of the intensity from the red in the center.

To test this for yourself, go to the worksheet for exercise #3, at the end of this chapter, and cut squares of different colors and place them in the saturated red box. Which square changes most dramatically? There is no right or wrong answer — we all see colors differently, so what changes dramatically for you might not for someone else, and vice versa. The point is to get you to look at the colors and see for yourself which square color changes the most against the saturated red.

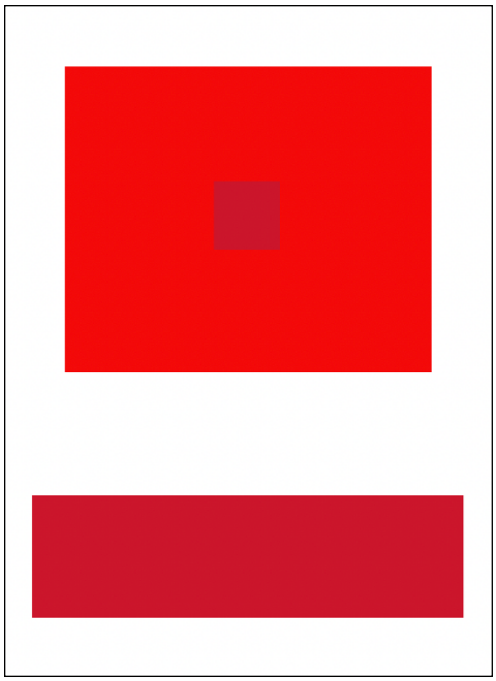


FIGURE 5-3:
Flushing effect.

Exercise #4: simultaneous contrast

Simultaneous contrast occurs when one color is placed in context with two different colors, causing one color to appear as two different colors. This is the most common color theory exercise when showing the relativity of color.

Figure 5-4 has two large color boxes, with a small square of color within each. Believe it or not, the small squares are the same color. They appear to be different colors because the context colors are changing the square's color character.

In exercises #1 and #2, you observed how value changes in context. Now you explore how color changes in context. However, you're still working with value in a way, because colors themselves have value (also called *light intensity*). For example, a light pink is a different color than a dark green, *and* it has a lighter value than dark green. (More on light intensity in the text section.)

Simultaneous contrast works especially well when there is contrast of color and value. Try it! The worksheet for exercise #4, at the end of the chapter, has a dark green box and a pinkish-orange box. Cut two squares from the brown area below, and glue them in the center of each box.

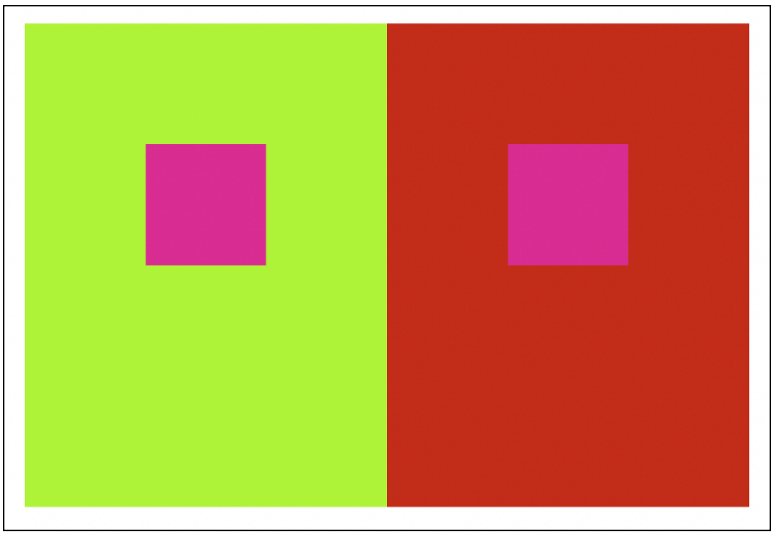


FIGURE 5-4: Simultaneous contrast.

As with the previous exercises, give yourself a few moments to observe the study, keeping your gaze loosely focused on the line where the two boxes meet. The color of the center square should appear quite different in each box. On the green box, the brown takes on a pinker character. On the pinkish-orange box, the brown takes on a darker — even somewhat greener — character.

Why does the brown square appear as two different colors against the green and pinkish-orange boxes? The following three aspects are at play:

- **Relativity of value:** The brown is lighter than the green and darker than the pinkish-orange. Thus, the square appears lighter against the green and darker against the pinkish-orange.
- **Flushing effect:** Against the pinkish-orange, the brown's warmth (or red, which is one of its component colors) is flushed away, making it appear cooler, or more green.
- **Complementary contrast:** Against the green, the brown takes on a pinkish character because green is provoking the red in the brown, which is its complement. (Read more on complementary colors in Chapter 6.)

On the second worksheet for this exercise (at the end of the chapter), you'll find the same box colors but with different colored swatches. Plug in different colors and see what you get. Just remember, in each study, always put the same square color in the boxes because the point is to make one color appear as two. Also, the success of the exercise depends on limited variables, so it's best to stick with the format provided.

Next, try another example of simultaneous contrast but this time with a different set of colors. The third worksheet for exercise #4 (at the end of the chapter) is structured the same as the preceding study, but with different colors.

Using only one swatch color at a time, try different colors in the boxes. Which swatch colors appear more differently in situ that others? Please note that there is no right answer here. The point is to experiment and decide for yourself which solution is most striking.

Exercise #5: light intensity

Let's revisit the *light intensity,* or value, of color: its degree of lightness or darkness. *Hues* (colors from the color wheel) themselves have light intensity: yellow is the lightest hue, and purple is the darkest.

Figure 5-5 illustrates the light intensity of hues. Each hue has its own column, with the hue itself indicated by a black dot in the lower corner. *Tints* (hue plus white) for the hue are above the hue, and *shades* of the hue (hue plus black) are below the hue. The position of each hue in its column corresponds to its light intensity, which lines up with a corresponding value in the grayscale column on the left side of the chart. Note how the hues create a spike in the chart, with purple and blue at the bottom and yellow at the top.

The chart makes it easy to see, for example, that yellow is a lighter hue than purple, or that orange is lighter than blue. However, it can be difficult to gauge the light intensity of colors outside such a chart, especially for bright, saturated, or fluorescent color.

In exercise #5, you explore the light intensity of bright colors relative to white. Using the worksheet at the end of the chapter, cut a square from each of the brightly colored swatches, and place the squares in any arrangement within the white area. Leave white space around each square, and don't let them touch or overlap. Then, under even lighting, take a picture of the page with your phone. Next, using the saturation tool on your phone's image editor, turn the saturation of the image all the way down, so it becomes a grayscale image.

Note that the squares, regardless of how bright the color, appears darker than the white paper. Indeed, no matter how bright or fluorescent your square, it's light intensity is darker than the white paper. It may be hard to believe that such bright colors have *darkness*, but they do!

Next, you explore how varying light intensity of color effects the way we see edges.

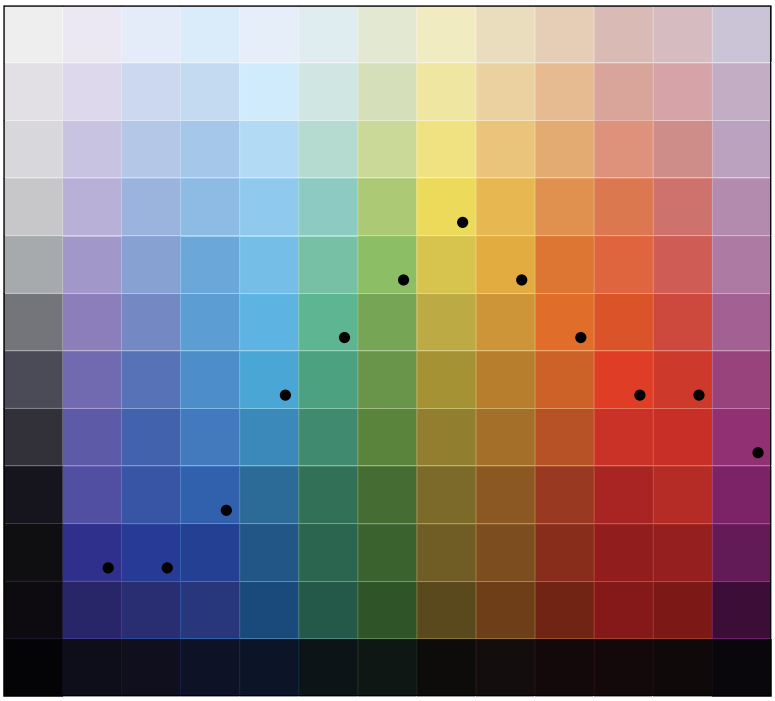


FIGURE 5-5: A chart showing light intensity of hues.

Using the second worksheet for exercise #5 (at the end of the chapter), cut a square from the dark blue color at the bottom and glue it in the left (light yellow) box. Then, cut a square from the pink color at the bottom and glue it in the right (light tan) box.

Observe the study. The box on the left shows *maximum* contrast of light intensity: a very dark color on a very light ground. The edges of the square are very distinct against the light yellow, so you see the dark square clearly.

The box on the right shows *minimum* contrast of light intensity. The square and the box are different colors, but their light intensity is very similar. The edges of the square are not very distinct against the light yellow, so you see the square as *softer*. (I have seen strong examples of these studies where the square practically disappears and reads like a mere smudge of color in the box).

TIP

When working on paper with colors of similar light intensity, the thickness of the paper tends to be highly visible. Depending on how the light hits your paper, you might see a shadow on one or more sides of the square. This shadow creates a distinct edge that diminishes the dissipating effect you're looking for. Try positioning your paper in a place where shadows are less distinct, or focus on an edge that is shadow-free when observing the study. (Advanced color-theory classes use a technique in which a swatch is inset into rather than on top of the ground

color.) Of course, when this exercise is produced digitally, as it is in Figure 5-6, the distracting shadows are eliminated.

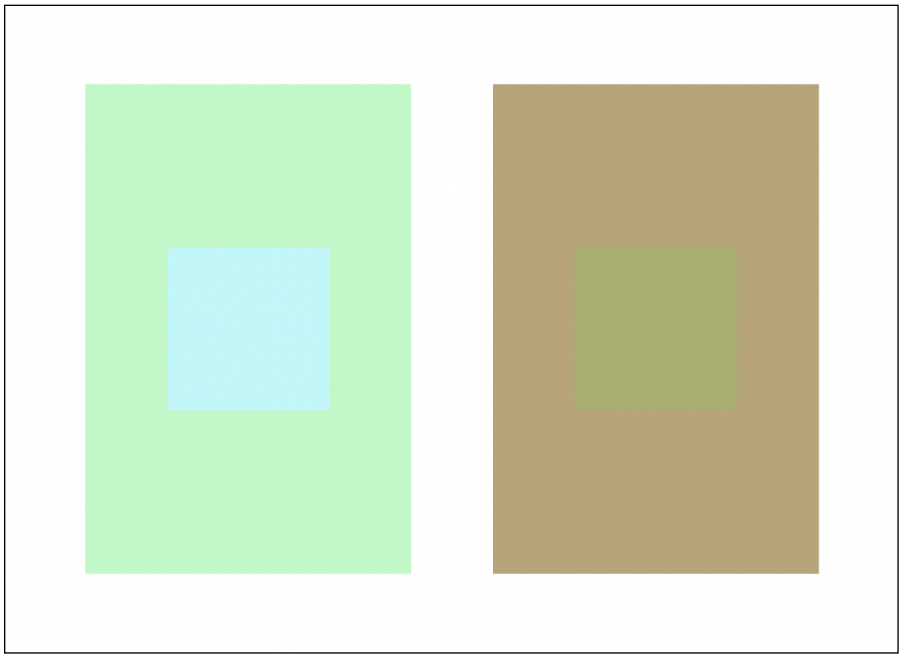


FIGURE 5-6: Two examples of color pairings with similar light intensities.

Exercise #6: flickering boundaries

In the last exercise, you explored how the edges of a square dissipate when there is similar light intensity between two colors. Next you explore how to use saturated color so that the edges are not only highly visible but also appear to flicker. If you've ever suffered a migraine, you're familiar with the experience of flickering lights in your field of vision. A slightly similar effect is created — albeit milder and I hope less painful — when certain colors are put together.

Flickering boundaries are not for the faint of heart, nor are they recommended in graphic design. They can irritate the eyes of a user who is navigating a web page or reading a sign. However, flickering boundaries can be exciting — even exhilarating — in the right context! For example, contemporary artist Sol Lewitt uses complementary color in huge, immersive wall murals, as shown in Figure 5-7.

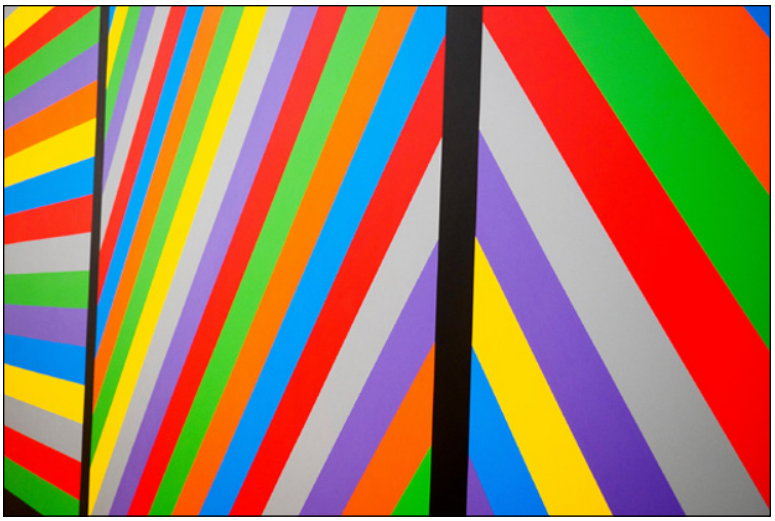


FIGURE 5-7: Sol Lewitt, *Wall Drawing #1084,* 2003, acrylic on wall.

Stefano Ravera / Alamy Stock Photo

Since one person's pain is another's pleasure, let's explore boundaries that flicker!

Figure 5-8, top, contains a chart with 6 different colored boxes, each containing a square of a color that results in a flickering effect. In observing this page, note which squares flicker more than others. You might notice that colors that are more saturated result in more flickering. Figure 5-8, bottom, contains a chart of lighter and desaturated versions of the same colors.

Compare these two charts. Consider how the colors make you feel, and if you prefer looking at one chart or another. Does the top chart in Figure 5-8 make you want to throw the book across the room, or are you getting high on the visual buzz of it all? Does the bottom chart make you want to go to sleep, or are the subtle colors stimulating enough to awaken your senses? Your answers may say something about your taste, temperament, and tolerance for color.

Why do some colors vibrate when observed in context? It's no coincidence that many of the box colors in Figure 5-8 are paired with squares of complementary color. Complementary colors are very different, and the high degree of contrast causes a vibration — or flicker — where the complementary colors meet. And while saturated and complementary colors work well for flickering boundaries, the effect can also occur between one neutral color and one saturated color.

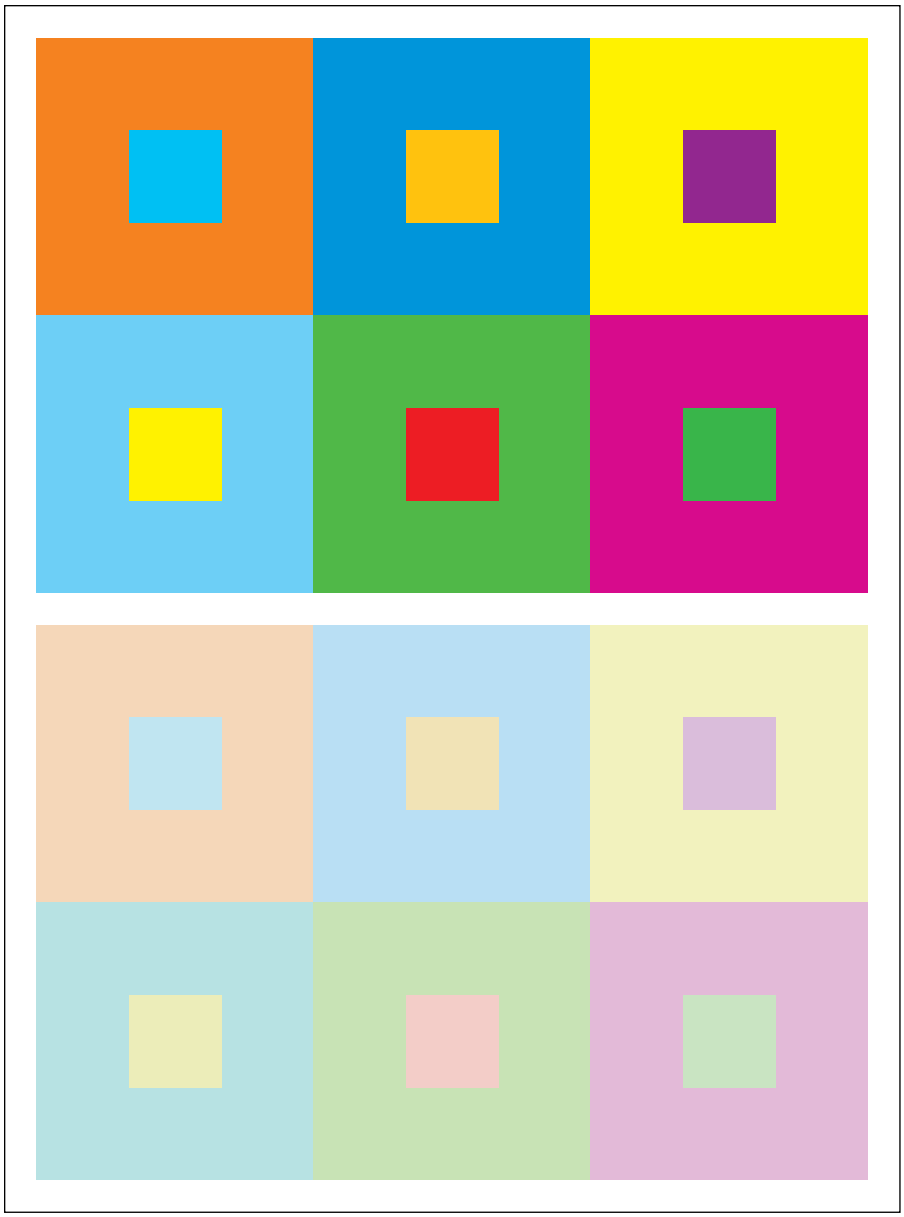


FIGURE 5-8: A chart of colors with flickering edges (top), and a chart with lighter versions of the same colors, without flickering edges (bottom).

Exercise #7: optical color mixing (Bezold effect)

The idea that color changes according to context is pushed to an extreme in an effect called *optical color mixing*, in which small areas of different colors appear to mix when viewed from a distance. The effect is also known as the *Bezold effect*, named for Wilhelm von Bezold, a German scientist who is credited with discovering the effect.

Figure 5-9 shows the effect in action. In this three-color study, yellow lines span two boxes: one red and one blue. Hold the study a few feet away or blur your vision a bit or do both. Sufficiently blurred, the box on the left appears orange and the box on the right appears as green.

FIGURE 5-9: Optical color mixture with red, yellow, and blue.

The actual colors of the study are yellow, red, and blue. The orange and green appear as a result of optical color mixing. This effect is another form of color relativity, a different way that color changes in context.

The success of optical color mixing depends on the proportions and intervals of the areas of color. In Figure 5-9, the stripes of color are narrow, plentiful, and evenly spaced, so your eyes can evenly mix these colors. Figure 5-10 contains bands of the same yellow, red, and blue, but the stripes are too wide so there is no optical mixing.

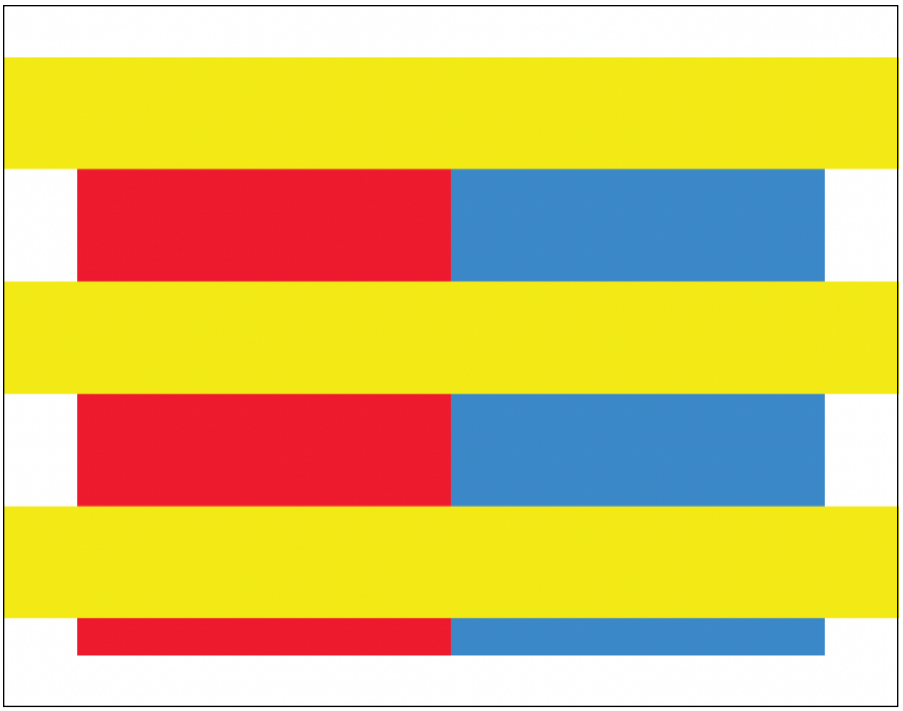


FIGURE 5-10: Failure of optical color mixing, due to the width of the stripes.

Optical color mixing has been widely used in visual art. The most notable example is pointillism, a late 19th-century art movement. French painters Georges Seurat and Paul Signac used tiny dots of color to render landscapes and people. From afar, the individual dots of color blend to form lush shadows, midtones, and highlights.

Almost as a by-product of the use of tiny dots (or lines of color, as in Figure 5-9), a visual buzz often results as our eyes make sense of these small color areas. This buzz becomes part of the color experience and characterizes it. Look again at the optically mixed orange in Figure 5-9. It *is* orange, but it's also an optically mixed orange, so it appears to hold the presence of the component colors — red and yellow — in its orangeness.

Viewing an optically mixed orange is a different experience than viewing a flat orange created from a mix or red and yellow paint. And depending on your distance from the study (or an impressionist painting), the color experience shifts. I remember my delight in seeing a beautifully painted piece of wooden furniture in a pointillist painting, rendered in brown with exquisite shadows and highlights, only to discover that the table was made of blues, yellows, and oranges, colors I never expected to be there. When I ask myself, "What color is the table?" there is no precise answer. It was brown and blue and yellow and orange. The painting I'm referring to is George Seurat's 1889–90 painting *Young Woman Powdering Herself*.

Let's look at more examples of optical color mixtures. Some colors mix readily, especially colors of similar light intensity, as shown in Figure 5-11.

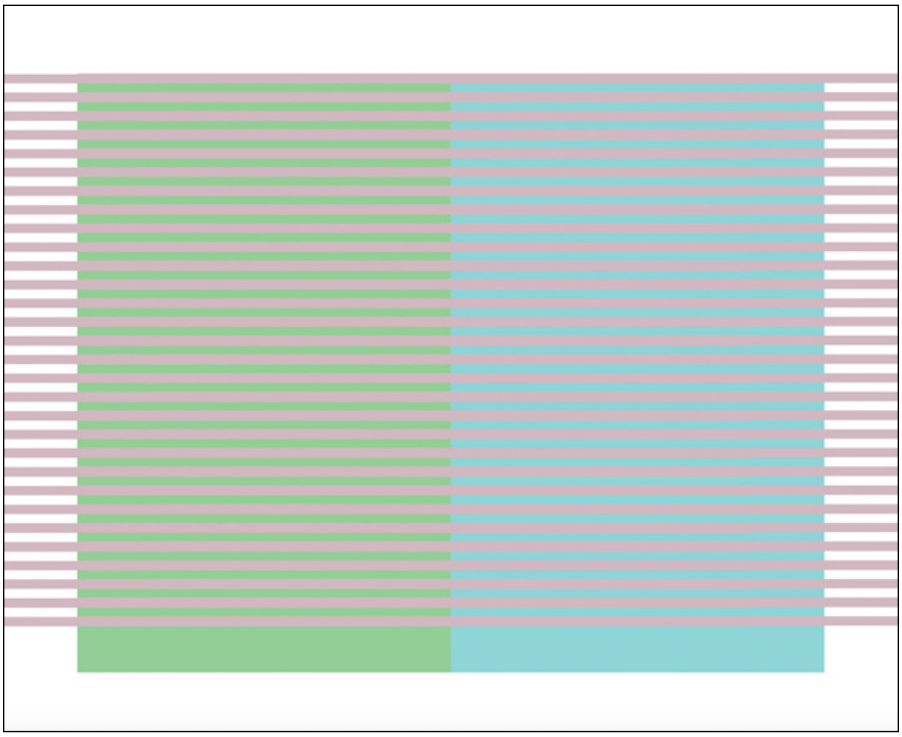


FIGURE 5-11: Optical color mixing with colors that mix readily.

Some colors seem to fight the mixture, especially colors of contrasting light intensity, as shown in Figure 5-12.

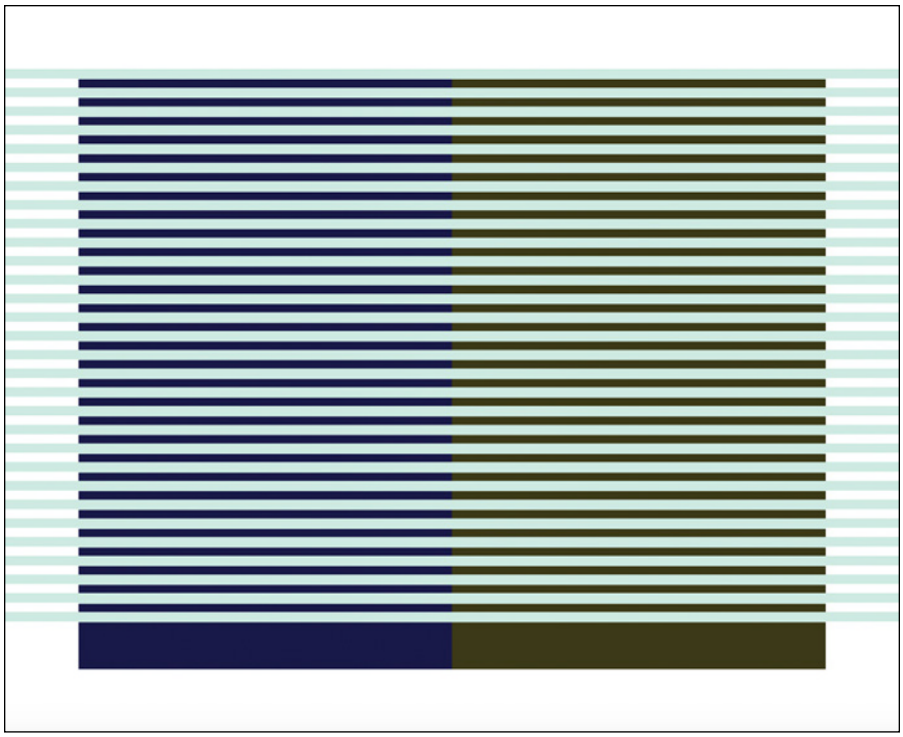


FIGURE 5-12: Optical color mixing with colors that resist mixture.

Super-saturated colors seem to mix and flicker, as you can see in Figure 5-13.

Exercise #8: after image

We see colors not only with our eyes but also with our brains. For example, when I was a kid I used to press the palms of my hands against my eyes really hard so I could see sparkles of color behind my closed eyelids. (I stopped doing this when I figured out it gave me a headache!) Some color sensations come not from without but from within. *After image*, the phenomenon of seeing a color after looking at another color, is an example.

After image appears in this discussion of the relativity of color not because one color changes in context but because one color causes another to come into being.

Behold Figure 5-14. Under well-lit conditions, hold the study about a foot from your eyes. Stare at the black dot in the middle of the red circle and count one-one thousand, two-one-thousand . . . up to ten-one-thousand. Then shift your stare to the black dot in the middle of the white box.

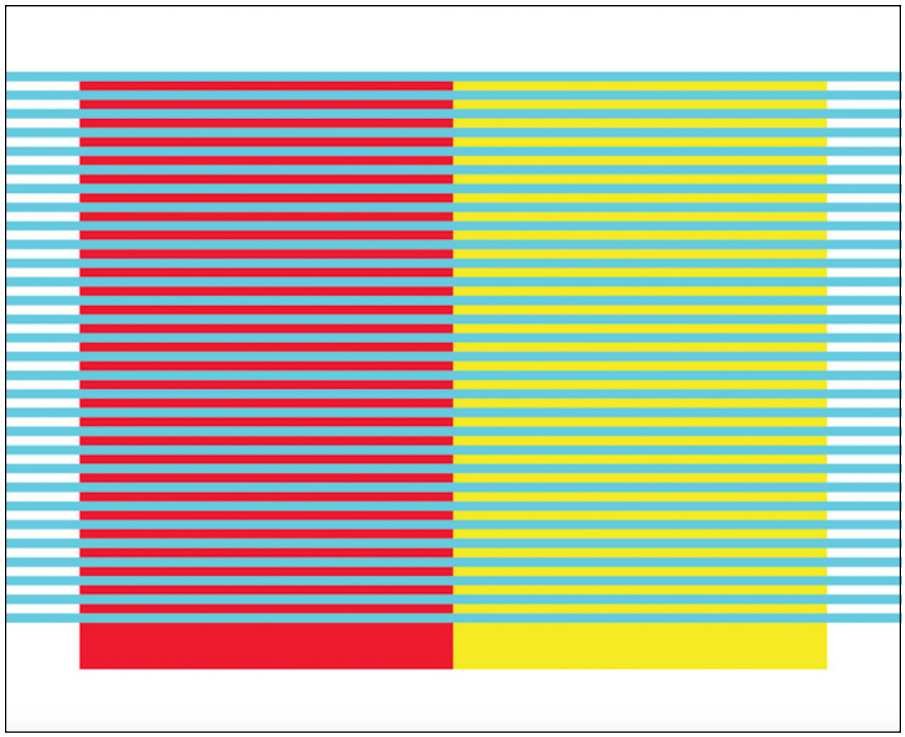


FIGURE 5-13: Optical color mixing with flickering.

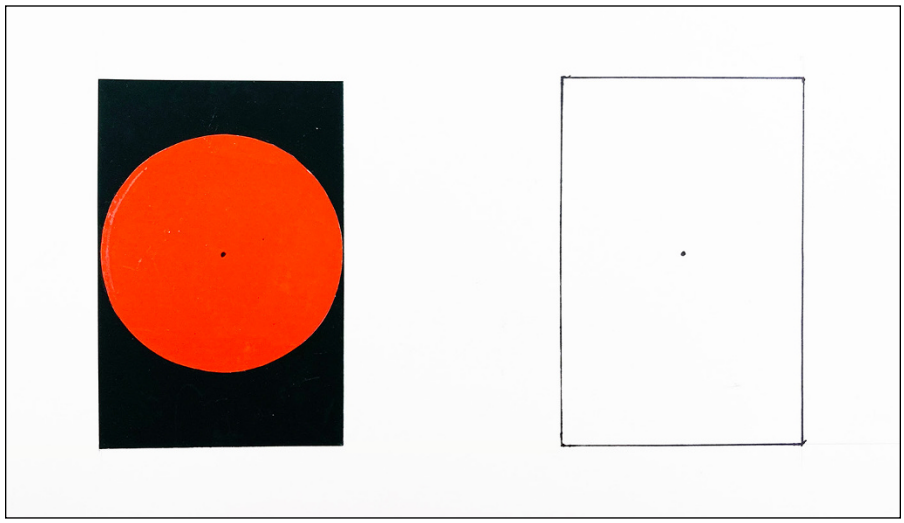


FIGURE 5-14: After image using red.

You should see an after image, appearing as a complementarily colored phantom hovering in the white box. The intensity and duration of the after image may depend on how long you've started at the circle in the black box, or the quality of light where you're observing the study. Figure 5-15 and 5-16 are other examples.

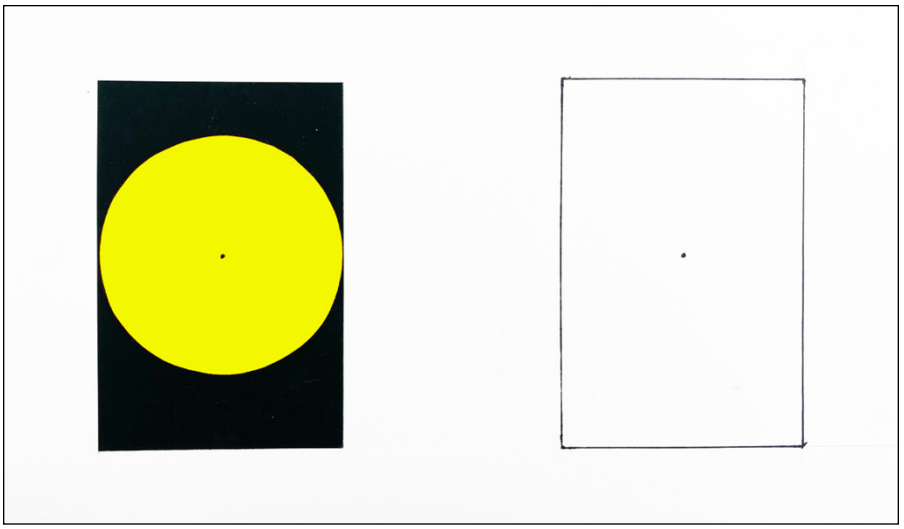


FIGURE 5-15: After image using yellow.

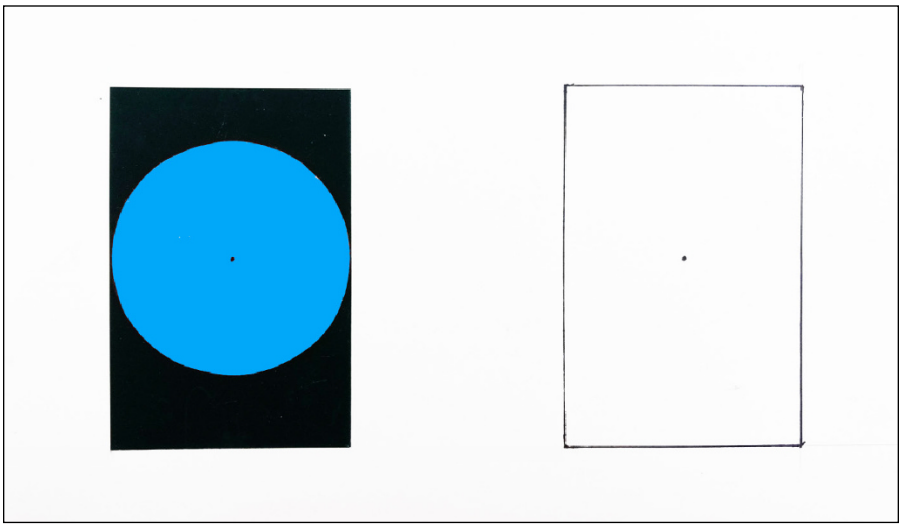


FIGURE 5-16: After Image using blue.

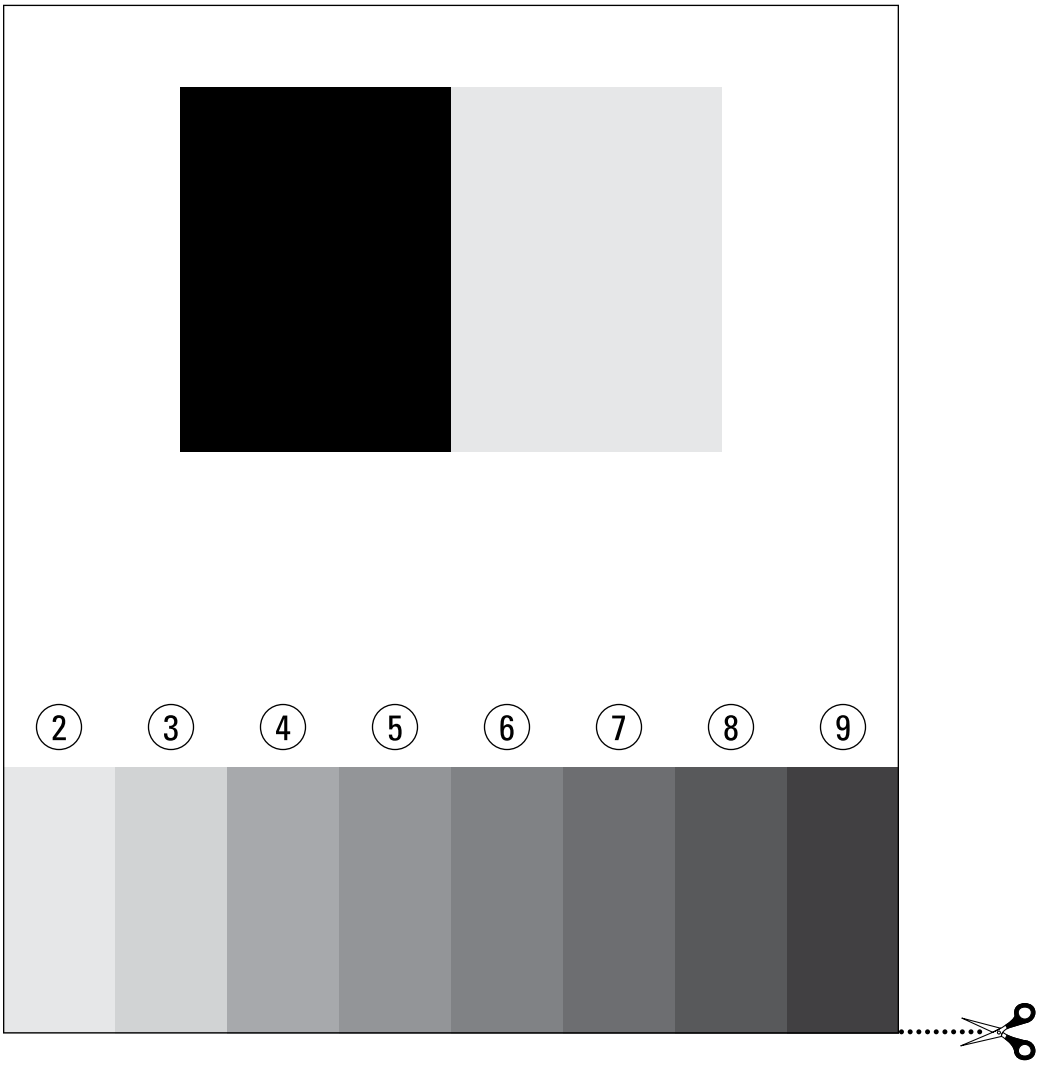
This exercise is one of my classroom favorites. The perception of the after image is usually followed by exclamations of surprise and wonder as to why this happens.

According to one theory known as *opponent process*, our photoreceptor cells respond to three different color pairs: black and white, red and green, and blue and yellow. All of our color perception comes from the effect of suppressing wavelengths of some colors to see others. When you stare at a red circle, your photoreceptor cells are not only responding to the red wavelength but also suppressing the green wavelength. When you shift your gaze to the white box, you see a burst of green in response to the suppression.

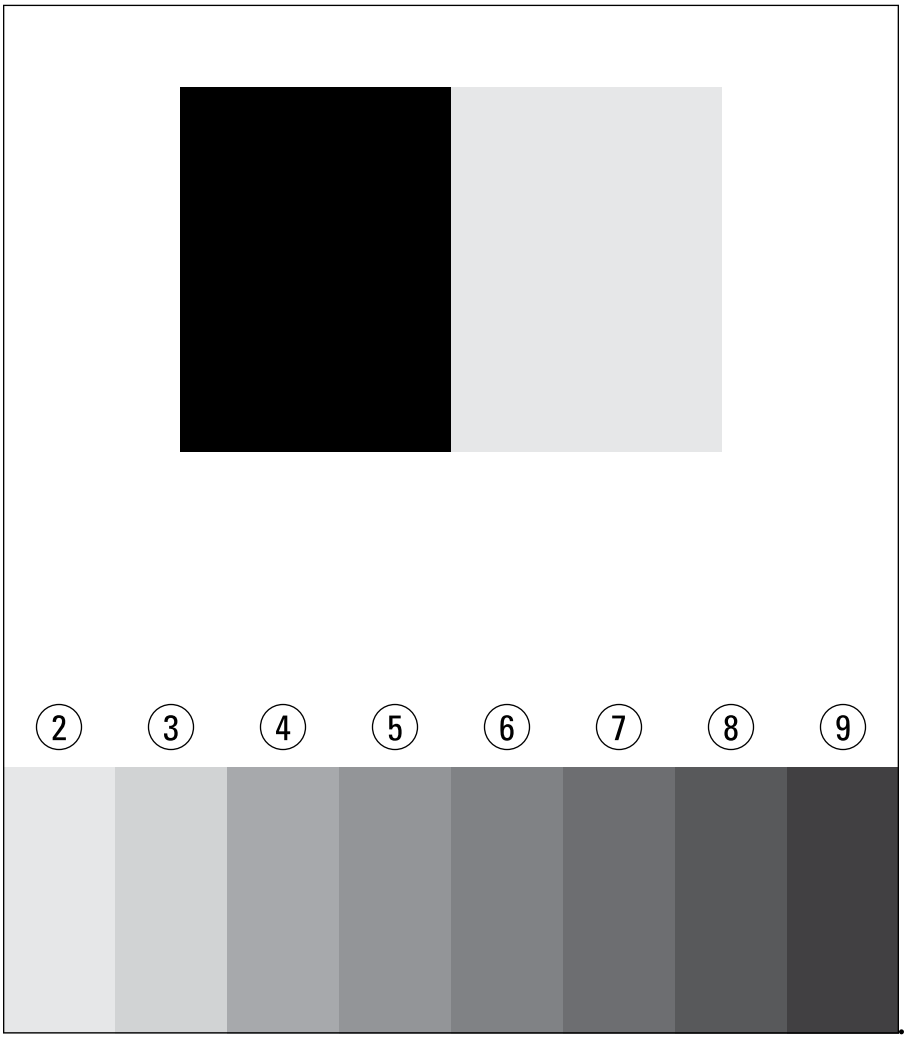
Value and color are elusive and can't be pinned down. What we call dark gray looks like light gray when it's against black. What we call brown becomes greenish against pink, and pinkish against green. And in optical mixing, red and yellow become orange before our eyes. Color is relative!

Okay, but so what? How does this help a designer or an artist? Well, for one thing knowing that color is relative prevents frustration. Imagine that you're an artist at your palette, painstakingly mixing the right sky blue. When you get the right color on your palette, you stop and apply it to your canvas and . . . it now looks green! If you didn't know about the relativity of color, you might think that your eyes were failing you. But because you're familiar with the relativity of color, you can begin to solve the problem. Maybe the lake below the sky has some red (being a bit purplish), and is causing the sky color to skew green. You could try mixing a new sky color with a bit of red — or simply accept the green sky as a wonderful surprise and a testament to color's slippery nature.

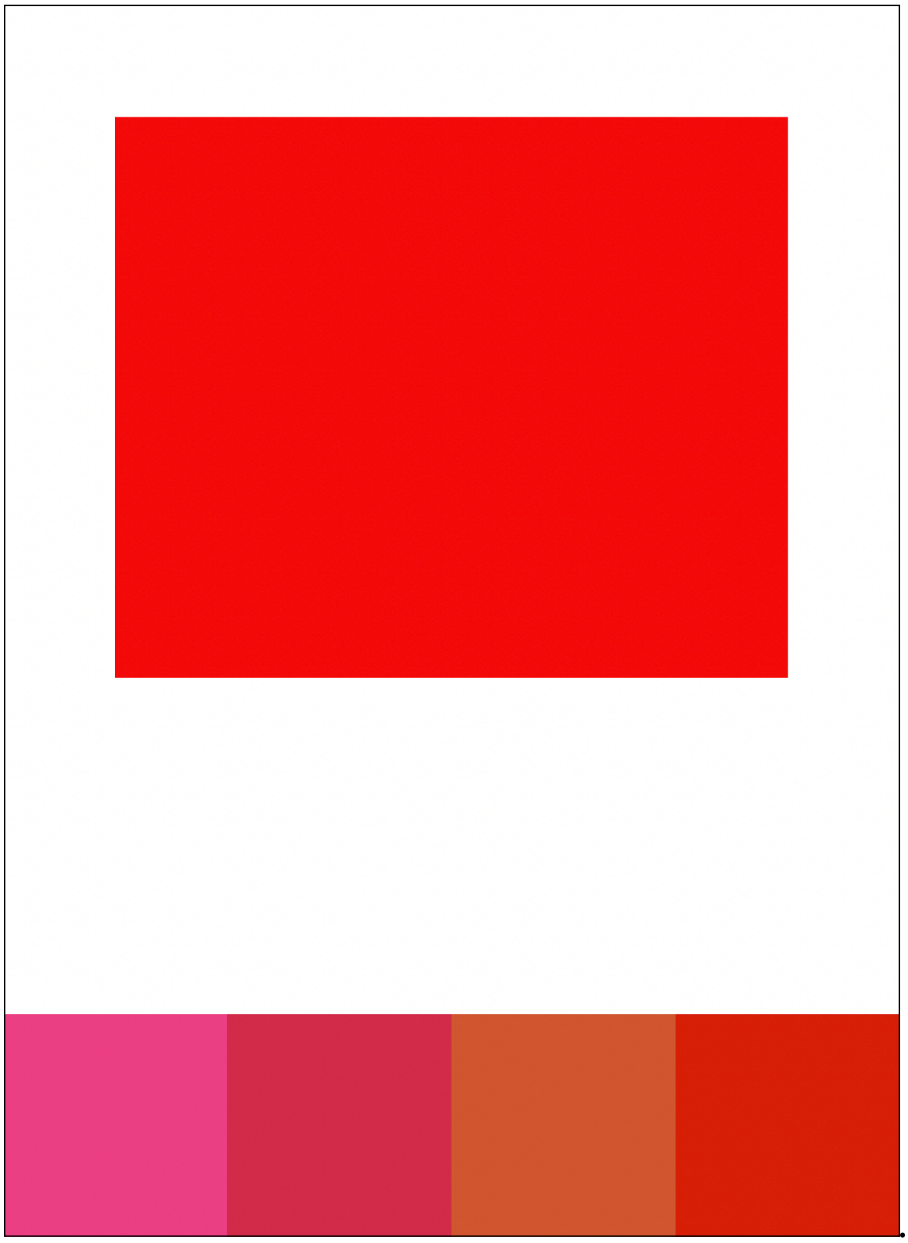
Worksheet for exercise #1



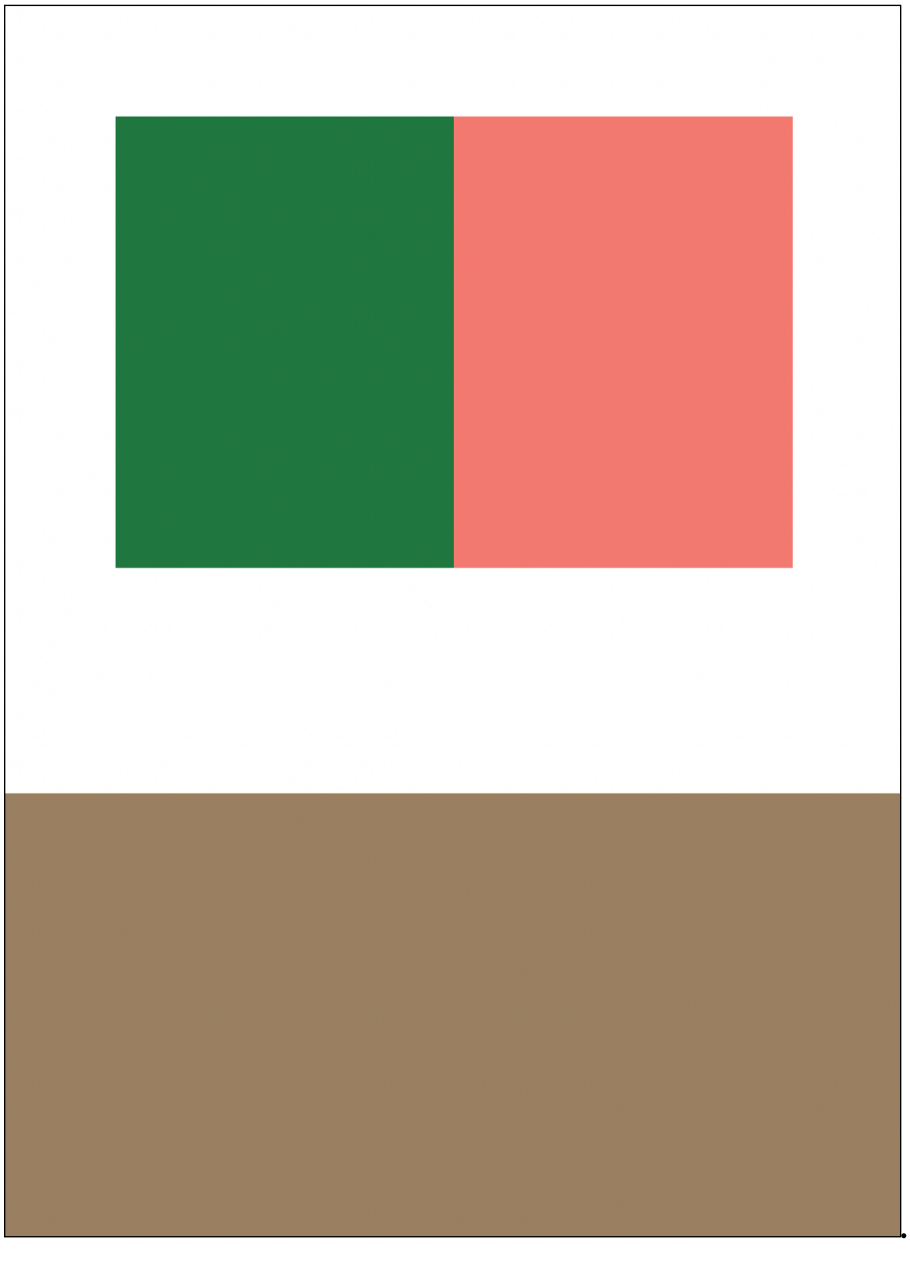
Worksheet for exercise #2



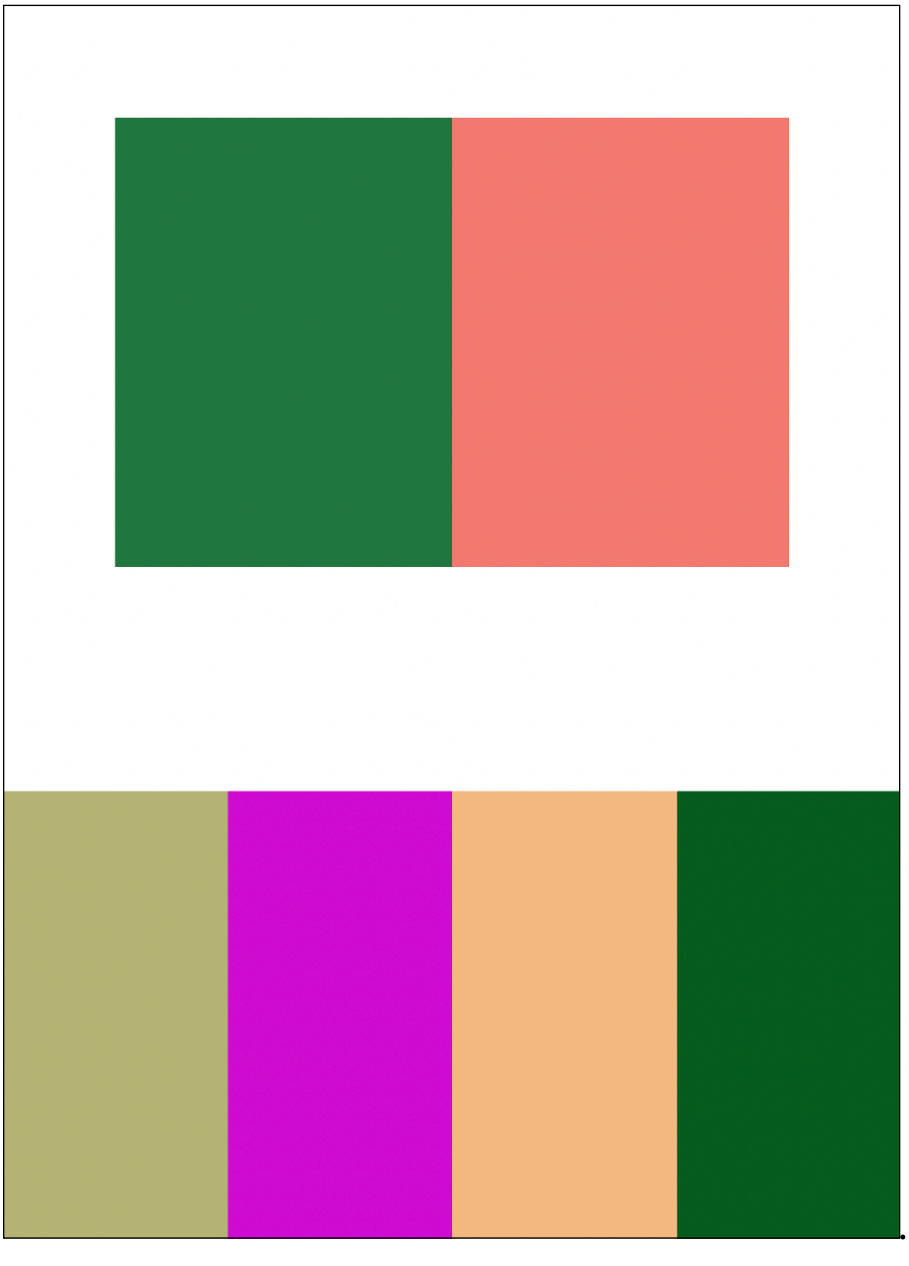
Worksheet for exercise #3



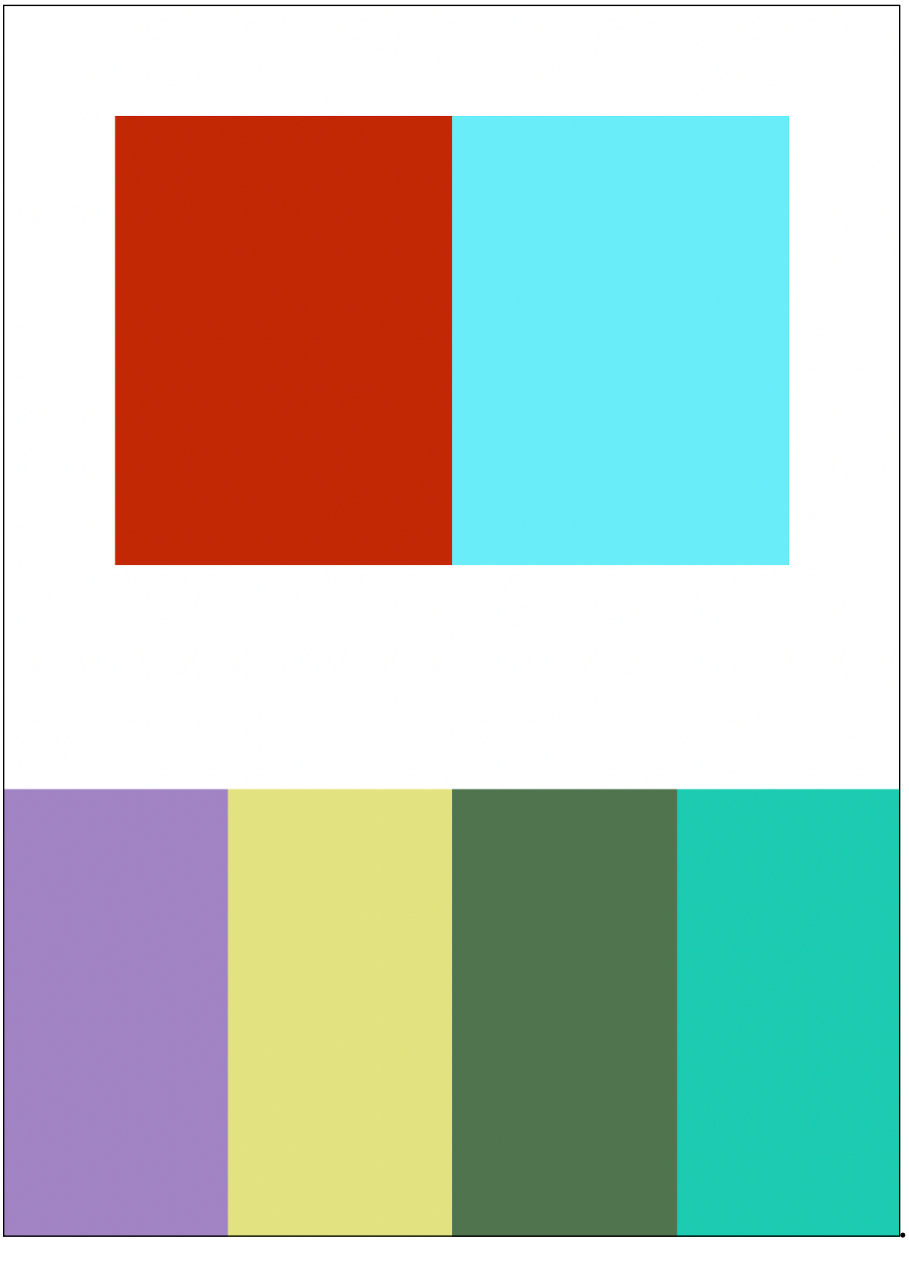
First worksheet for exercise #4



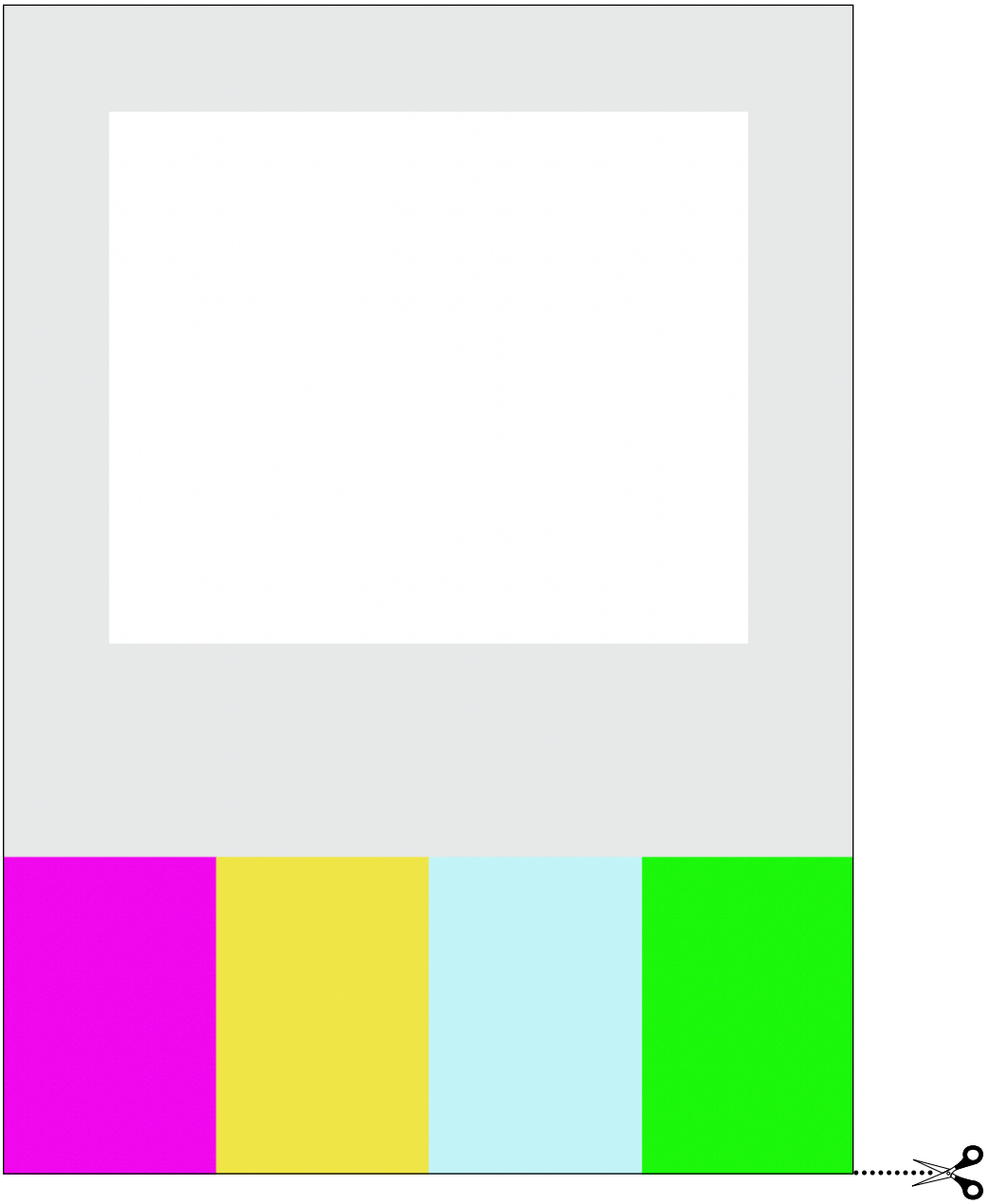
Second worksheet for exercise #4



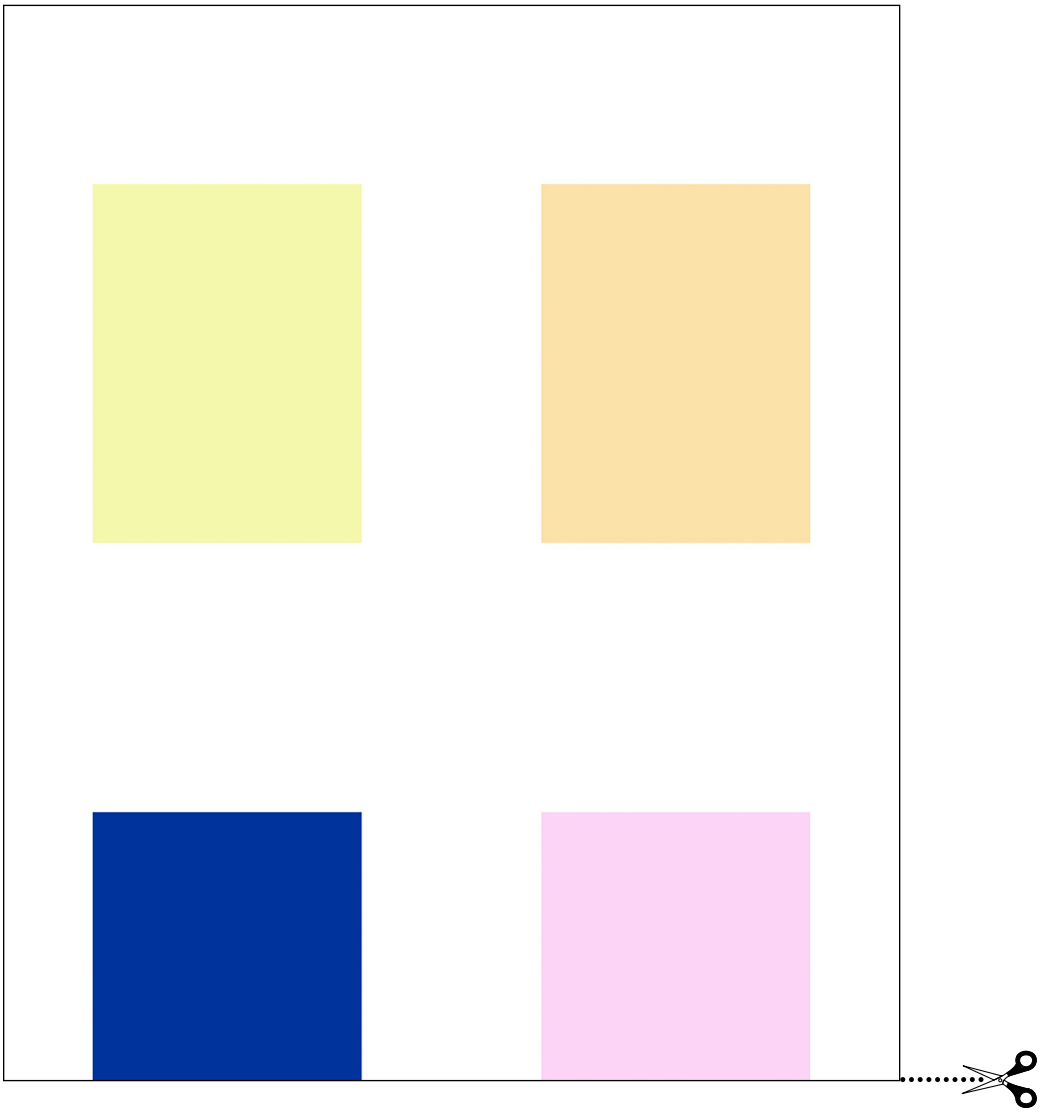
Third worksheet for exercise #4



First worksheet for exercise #5



Second worksheet for exercise #5



IN THIS CHAPTER

- Understanding the contrasts of color
- Exploring the temperature of color
- Discovering the real estate of color
- Experiencing atmospheric perspective

Chapter 6
Contrasts of Color

In Chapter 5, you explore color's relativity: how color changes in context. In this chapter, you focus on how different categories of color contrasts result in different perceptual, emotive, and expressive effects. Think of the relativity of color and the contrasts of color as sibling methods for working with color: related but unique, with some crossover.

The categories of color contrasts outlined in this chapter can be readily applied to creating color schemes, palettes, and plans for just about any creative project. These parameters can set you free, especially in the vast ocean of color and its infinite choices. For those beginning creative projects and feeling uncertain about what colors to choose, working with one color contrast is a good jumping-off point. For more experienced creators, working with color contrasts might shake up your typical ways of working with color.

Distinguishing Opposites with Color

The idea that color can be organized by contrast was codified by Swiss artist Johannes Itten. In his 1961 book, *The Elements of Color,* he outlined the seven categories of color contrasts:

- Contrast of light and dark
- Contrast of cool and warm

- Complementary contrast
- Simultaneous contrast
- Contrast of extension
- Contrast of saturation
- Contrast of hue

The idea of contrast was important to Itten, and he applied it to composition as well as color. Figure 6-1 shows examples of compositions similar to those Itten created for his students. The basic idea is that *contrasts define each other.* There is no long without short, no empty without full, no soft without hard.

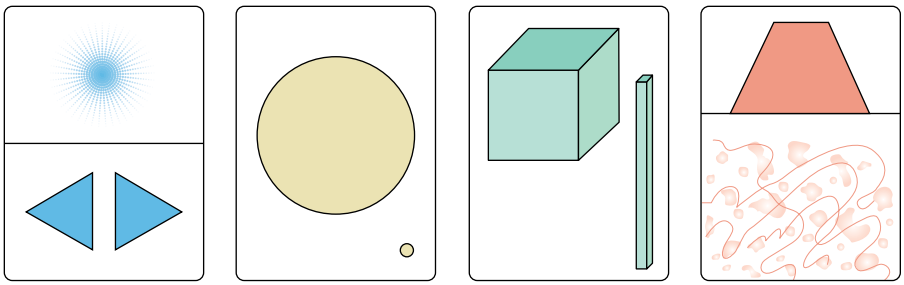


FIGURE 6-1: Examples of contrasts in composition.

In this chapter, you explore color contrasts and how they are applied in visual art. And since simultaneous contrast is covered extensively in Chapter 5, I don't cover it here.

WHO WAS JOHANNES ITTEN?

Johannes Itten (1888–1967) was a Swiss artist who taught at the Bauhaus, a progressive art school in Germany that operated between 1919–1933. At the Bauhaus, Itten was known for his involvement with *Mazdaznan*, a neo-Zoroastrian religion that espoused vegetarianism, breathing exercises, and meditation. Cultivating a monk-like status at the Bauhaus, Itten wore robes and had a shaved head.

Itten's paintings over several decades show a diverse range of subjects. Landscapes and figures in the earlier part of his career developed into geometric abstraction in his later years, although his work didn't always conform to a linear path. Colors, specifically contrasting colors — more than subject or style — tie his diverse output together. Itten

typically used a wide range of colors that were strikingly different, giving his paintings a kaleidoscopic look, as shown in the figure. Often, he used contrast of color temperature to organize and differentiate elements of his compositions.

Madrid/Visual Entidad de Gestión de Artistas Plásticos (VEGAP)

Contrast of Light and Dark

Let's begin with the simplest of the color contrasts: light and dark colors. An example of this contrast is shown in Figure 6-2, a study with alternating dark and light colors. If you look closely, you'll see that each bar is a different color, but the light-dark contrast is more obvious than the colors themselves.

Compare Figure 6-2 with Figure 6-3, a study with an identical composition but with colors that have less light-dark contrast. The colors in Figure 6-3 have a light intensity close to a middle gray.

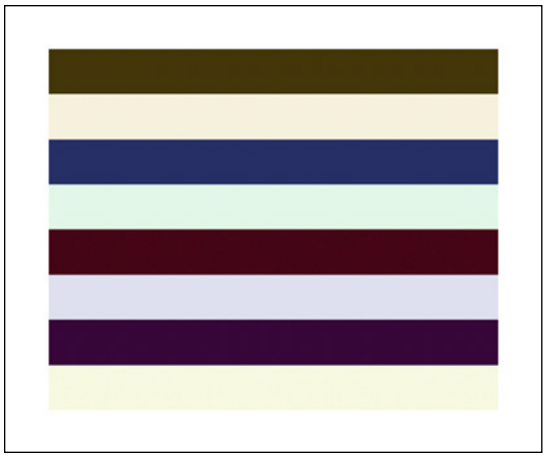


FIGURE 6-2: Colors with strong light and dark contrast.

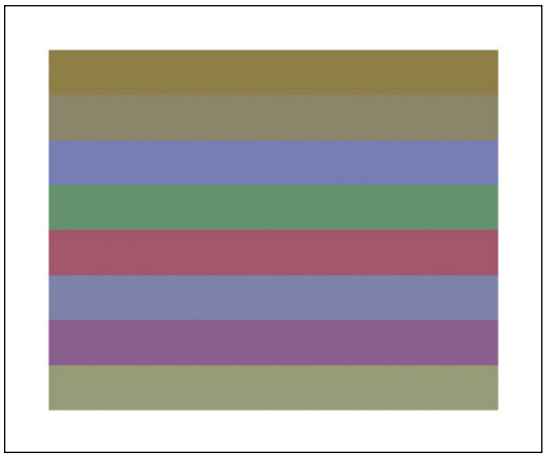


FIGURE 6-3: Colors with low light and dark contrast.

Note how the degree of light and dark contrast changes the appearance of the studies. In Figure 6-2, the study has a sharpness; the bars of dark colors are pronounced and heavy against the light bars. Even though the bars are different colors, it's their lightness and darkness that stands out. In Figure 6-3, the bars have less light and dark contrast, resulting in an overall mellowness to the study.

In Figure 6-3, differences between the colors themselves are more evident. For example, you can easily tell that the red bar and the green bar are different colors. Now look at the red bar and the green bar in Figure 6-2. The light and dark contrast is high, so the colors are not as easily identifiable.

REMEMBER

In terms of practical application, light and dark contrast can be used when a strong value contrast is desired, along with a lessening of color's chromatic identity (the color's presence as a hue). For example, Figure 6-2 contains light purple and dark purple, but not the pure hue of purple itself. I think the absence of the purple hue makes the study look more sophisticated overall and perhaps less elemental. What do you think?

Figure 6-4 shows gradations of green from light to dark, creating a similar effect as in a value scale. The eye moves smoothly through the transition, experiencing it as a visual crescendo. This creates a harmonious visual experience; it's easy on our eyes.

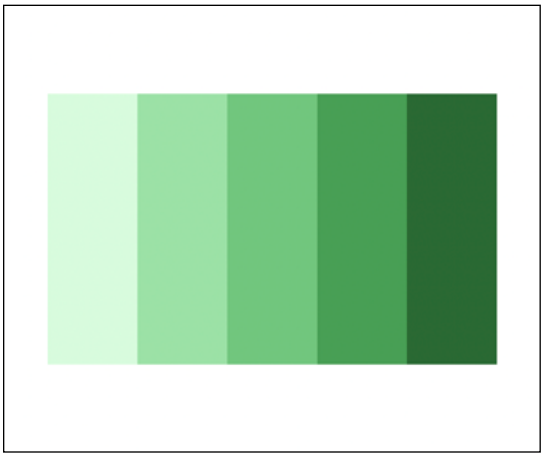


FIGURE 6-4: A gradation of greens, from dark to light.

Figure 6-5 shows an arrangement of dark and light greens not in a gradation but in random. Rather than a crescendo, our eyes bounce from color to color, creating a bumpier and less predictable experience. This can be exciting, like the dissonant sounds of a jazz piece that jostles your ears and awakens your senses!

Contemporary artist Matthew F Fisher's painting *The Blythe Giant*, shown in Figure 6-6, contrasts light blues and dark blues to create the shimmering effect of water. Note the light blue on the cresting part of the wave falling over the dark blue below. If the light and dark contrast were not as pronounced, the painting would lose its sense of drama. The light and dark contrast also describes light and shadow, drawing attention to the structure of the wave — giving it an almost architectural feel.

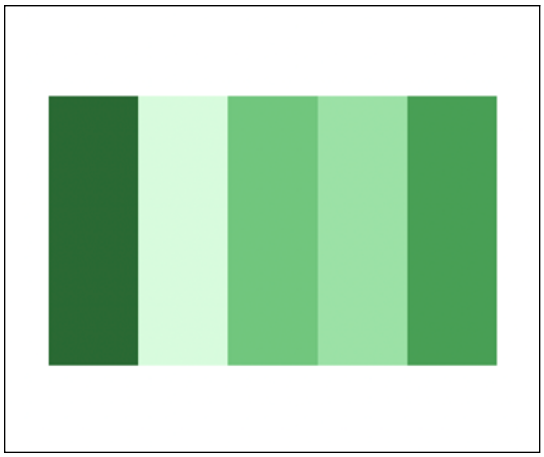


FIGURE 6-5: A random arrangement of light and dark greens.

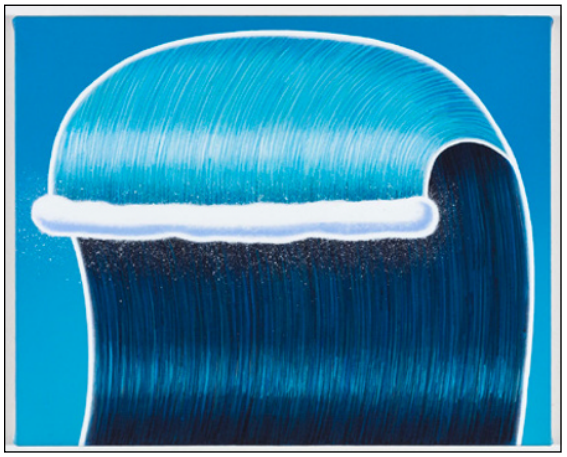


FIGURE 6-6: Matthew F Fisher, *The Blythe Giant*, 2018, acrylic on canvas, 12 x 15".

Private Collection, courtesy of Taymour Grahne Projects, London, UK

Contrast of Cool and Warm

The second contrast is between cool and warm, based on the idea that different colors evoke sensations of temperature. The conventional understanding is that red, orange, and yellow are warm colors and green, blue, and purple are cool colors. Cool and warm colors are typically illustrated by a split color wheel, as shown in Figure 6-7.

Color temperature associations are obvious and even border on cliché: warms evoke fire, the sun, embers. Cools evoke water, ice, and plant life. Such associations are exploited to the hilt in animation. Think of the cartoons you watched as a kid. Can you think of an instance where hot or cold was conveyed with color?

In the world of advertising, we're constantly reminded of the link between color and temperature. Just look at packaging for IcyHot, Dentyne Ice, Stovetop Stuffing, and DayQuil. They all use color temperature association to communicate about their product. Consumer culture indoctrinates us into a world of color temperature associations.

Color temperature is also subjective. You might perceive green as cool but someone else might perceive it as warm. The flame on my stovetop is bright blue, so I don't always think of blue as a cool color.

zanna/Adobe Stock

FIGURE 6-7:
A split color wheel with cool (left) and warm (right).

Clichés and contradictions aside, great potential exists when in color temperature contrast, especially when it's not taken too seriously. Because of their link to physical experiences, color temperatures can affect viewers in a visceral way.

Haptic (*touch*) sensations of temperature can be sudden (like jumping into a cold pool) or gradual (like feeling increasingly hot while standing next to a fire). In gradual sensations, temperature change seems to *radiate* in one direction or another.

Figure 6-8 shows a gradation of warm to cool, using white as a neutral center point. As you move your eye over the gradation from warm to cool, you *see* the temperature change. If you're especially sensitive to temperature, you might also feel the change in your body or your imagination or both.

Color temperature is strongly relative. For example, in Figure 6-8, some would say that the cool colors are made cooler by the presence of the warm colors, and vice versa.

Van Gogh's 1888 painting *Terrace of a Café at Night,* shown in Figure 6-9, is a fabulous example of temperature contrast. The orange-yellow glow of the café feels like an oasis of warmth in the cool blueness of night. The warmth of the café radiates out, changing the cobblestones from blue to yellow. Orange windows in the background also speak to cozy, inviting interiors. Van Gogh's use of color engages our innate desire for warmth, rendering the café in a mood of gladness and conviviality.

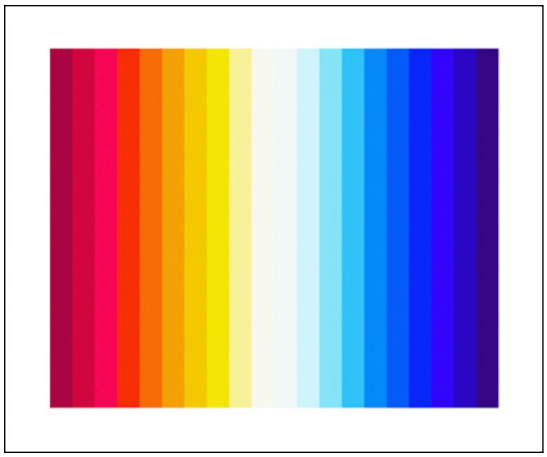


FIGURE 6-8: A gradation of warm to cool.

FIGURE 6-9: Vincent Van Gogh, *Terrace of a Café at Night,* 1888, oil on canvas, 31.8 x 25.7".

Vincent van Gogh/Wikimedia Commons/Public domain

When it comes to blues and fire colors such as red, orange and yellow, contrast of temperature seems fairly straightforward. Secondary colors such as green and purple are a little trickier. As a secondary color made of a yellow (warm) and blue (cool), green easily shifts its temperature identity. Typically, green is considered a cool color, but this perception is relative. Figure 6-10 shows a scale from blue-green to yellow-green. Do you perceive one side of the study as warm?

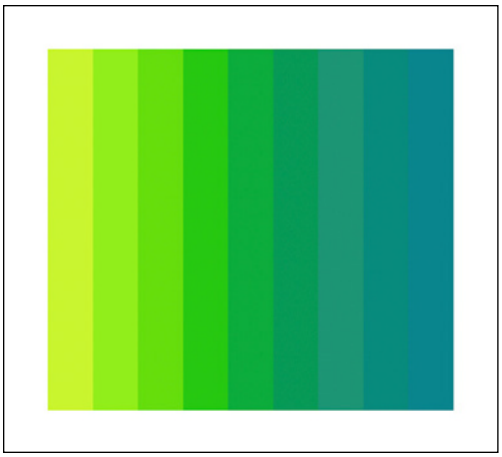


FIGURE 6-10: Warm and cool greens.

The yellow-green on the far left side of the study is commonly seen as warm, in relation to greens with increasing amounts of blue. This understanding of green as warm is because it has more yellow (a warm color) than the other greens. And of course, the blue in the blue-greens makes them appear cooler.

Again, color temperature associations can be subjective. If you see the yellow-green as cool, that's fine! I believe that many color associations (temperature and otherwise) are based on personal memories. If the color of your favorite t-shirt as a kid was ice blue, you might associate it forever with hot summer weather. Such associations may strongly inform how you see color.

Figure 6-11 has the same yellow-green as the one on the left side of Figure 6-10, but here it is in relation to a set of oranges. In this study, the yellow-green takes on a cooler cast. (For more on how color changes in context, see Chapter 5.)

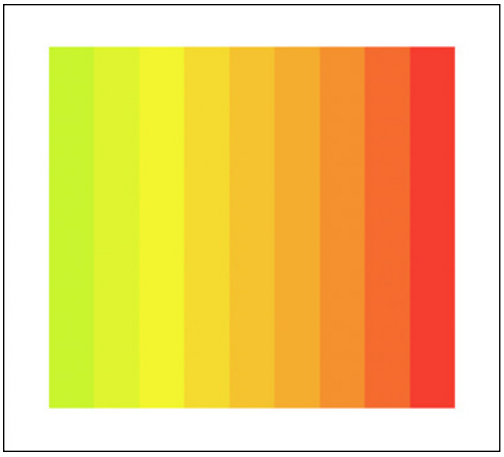


FIGURE 6-11: A yellow-based green appears cooler in the context of yellows and oranges.

As a secondary color made of red (warm) and blue (cool), purple also shifts temperature identity quite easily. Look at Figure 6-12. Do you identify one side of the study as cool and another as warm? Chances are, the purples with more red appear warmer, and the purples with more blue appear cooler.

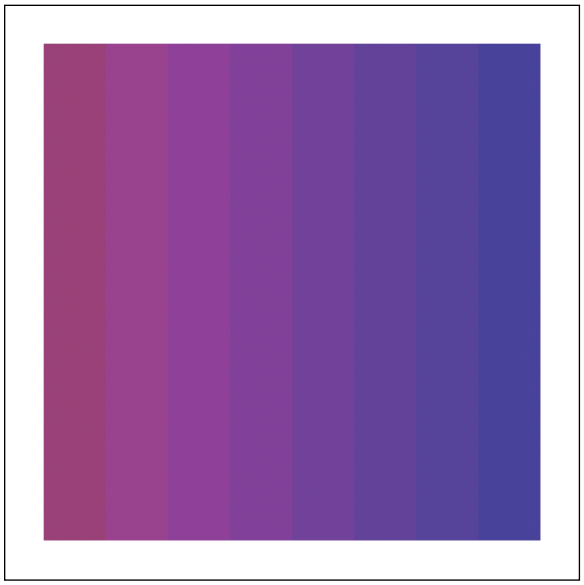


FIGURE 6-12: Red-purple appears cooler in the context of blue-purples.

Contrast of Complements

Complementary colors are opposite on the color wheel, falling into three pairs: red and green, yellow and purple, blue and orange, as shown in Figure 6-13.

As opposites, they seem to provoke or even antagonize one another. There's drama when complements come together. Red roses appear even more vivid against a bed of green; the yellow center of a pansy is highlighted by the purple edges of its petals.

FIGURE 6-13: Complementary color pairs.

REMEMBER

Complementary color contrast is powerful and arresting, commanding viewers to stop and look. But for all the mutual provocation, complementary colors form a dark gray when mixed on the palette (see Figure 6-14).

FIGURE 6-14: Mixing red and green to make dark gray.

As shown in Chapter 5, when fully saturated complementary colors are juxtaposed, a flickering edge is created. This is complementary contrast at its most extreme. In the following three studies, you look at other examples of complementary color contrast, all using the blue and orange complementary pair.

Soft complementary colors occur with lighter or less saturated colors, such as those in Figure 6-15. In this study, the power of complements is present, but it's more subdued. Soft complementary contrast retains the excitement of complements, while softening the clash that happens with fully saturated complements.

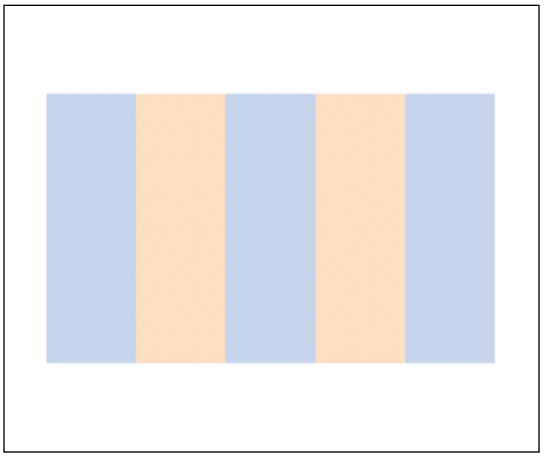


FIGURE 6-15: Soft complementary colors.

Hard complementary colors occur with fully saturated colors, as shown in Figure 6-16. In this study, you see the same arrangement of vertical bars as Figure 6-15 but with an increased intensity of edges due to the hard complementary contrast.

Dark complementary colors have the intensity of complementary colors but with a quieter energy, as shown in Figure 6-17.

Marc Chagall's 1911 painting *I and the Village*, shown in Figure 6-18, shows the power of complementary color contrast. In this dreamlike scene, an animal and a green man are face to face, staring into each other's eyes. Perhaps they're having a conversation. Between their mouths is a ground of bright red (a complement to the green on the man's face). The intensity of the red and green contrast draws

the viewer into the space between the animal and the man, underscoring the interaction between them. We don't know what they might be saying, but the complementary color contrast in that area of the painting speaks volumes. It adds tension, interest, and energy.

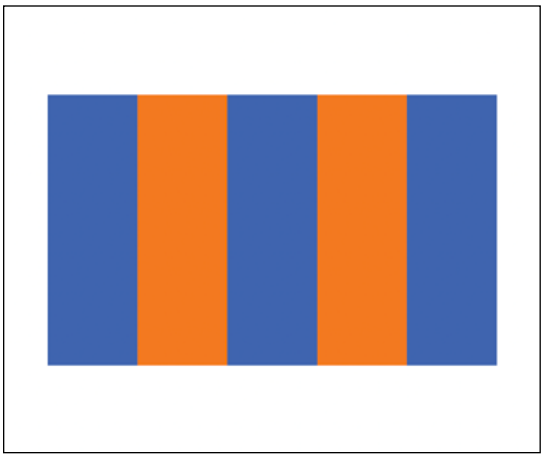


FIGURE 6-16: Hard complementary colors.

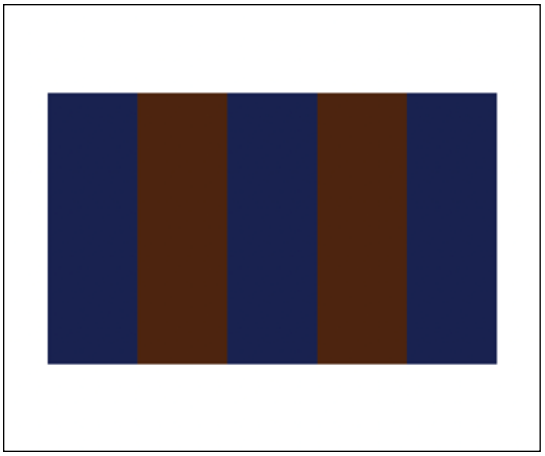


FIGURE 6-17: Dark complementary colors.

Peter Barritt / Alamy Stock Photo

FIGURE 6-18: Marc Chagall, *I and the Village*, 1911, oil on canvas, 75⅝ x 59⅝", Museum of Modern Art, New York.

Contrast of Extension

Contrast of extension has to do with the amount of space a color takes up within a composition. Think of contrast of extension as the color's real estate. Depending on the composition, some colors take up a lot of real estate and others not too much.

In one of my color theory classes, I had students work with saturated complementary colors to create flickering edges. Several students — despite having successfully created the flickering effect — expressed outright disgust at the color combinations. They couldn't stand to look at the pairs of saturated, complementary colors because they found them too jarring.

I noticed that in their examples, they had a 50/50 ratio of the two colors in each pair, so the contrast of extension was low. I suggested that they heighten the contrast of extension by changing the real estate that the colors occupied so that

there was a lot more of one color and, consequently, a lot less of the other. The amount of real estate that a color takes up in a composition is also known as *color distribution.*

Figure 6-19 shows the first example on the left and the modified example on the right. By changing the contrast of extension, the students were able to change the ratio of colors, making the situation more tolerable. Same colors, different effect. As you can see, colors change based on how much real estate they have in a given composition.

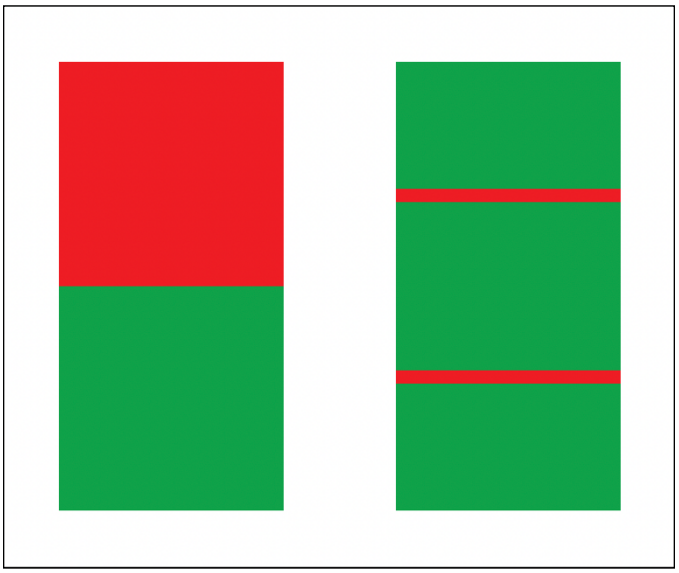


FIGURE 6-19: Contrast of extension.

In Monet's 1873 painting *The Red Kerchief,* shown in Figure 6-20, you can see a high contrast of extension between the red and other colors in the composition, such as greens and grays. If the interior of the room were the same red as the kerchief (which would create a low contrast of extension), the red kerchief would lose its emphasis and the entire work would change. The proportion of red relative to the other colors — the contrast of extension — creates the color's impact in the work.

FIGURE 6-20: Claude Monet, *The Red Kerchief,* c. 1868–1873, oil on fabric; framed: 50½ x 41⅝ x 5¾"; unframed: 39 x 31 7/16".

The Cleveland Museum of Art

Contrast of Saturation

Saturation refers to the chromatic intensity of a color. When a color is fully saturated, it can't get more full of color than it is. Hues from the spectrum or the color wheel are fully saturated colors.

Desaturation is the process of moving away from fully saturated, toward duller versions of the hue. This is accomplished by adding increasing amounts of a gray to the fully saturated hue. When a color is desaturated (also called unsaturated) it's said to be dull, or *grayed out*. In color mixing, desaturation can be achieved by adding a complementary color. For example, you can desaturate green by adding red.

REMEMBER

Desaturation occurs also when adding white or black to a hue because both white and black diminish a hue's intensity. However, the addition of white and black to a hue is more precisely described as *lightening* and *darkening* (respectively). Lightening and darkening do not produce the same effect as adding gray. For example, light colors often retain a quality of brightness, even though they are pale. Desaturation with grays produces a distinct dullness that is not seen with lightening or darkening.

Remember the definitions outlined in Chapter 4:

Hue + gray = tone

Hue + white = tint

Hue + black = shade

When you desaturate, you are usually making a tone. (However, as stated, you can desaturate also by adding white or black to hue, but the resulting tints and shades will not have the characteristic dullness that comes from adding gray.)

Figure 6-21 shows fully saturated hues (on the left) becoming increasingly desaturated (on the right).In this study, the hues are increasingly mixed with a middle-range gray to accomplish the desaturation. Keep in mind that any gray on the grayscale — very light to very dark — could be used to desaturate a hue. Thus, desaturated hues could be quite light or quite dark, depending on the value of the gray mixed with the hue.

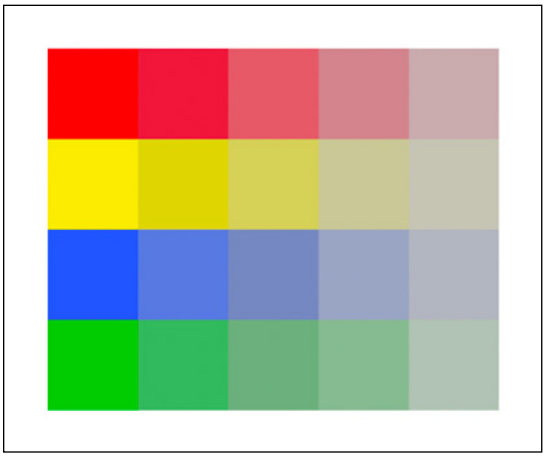


FIGURE 6-21: Hues becoming increasingly desaturated.

Contrast of saturation is evident in a widely used form of perspective known as atmospheric perspective. In *atmospheric perspective,* objects close to the viewer retain full saturation of color, while darks retain darkness and lights retain lightness. Moving deeper into space, colors begin to desaturate, darks begin to fade, and lights begin to dull. At long distances, colors are completely dulled, and darks and light lose intensity.

Figure 6-22 shows an abstract composition reminiscent of a landscape, with clear divisions of foreground, middle ground, and background. Note how the colors desaturate with increasing depth.

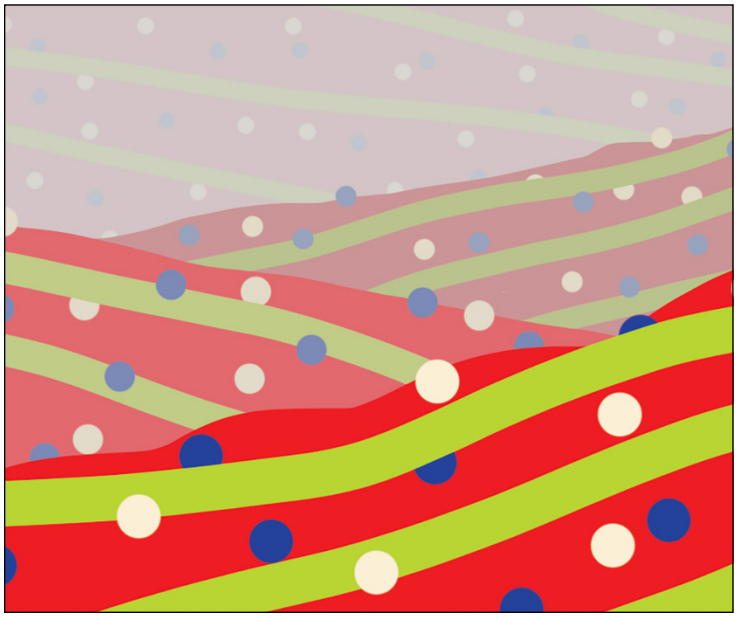


FIGURE 6-22: An illustration of atmospheric perspective.

If you've ever observed a mountain range or a city skyline, you may have noticed the effect of atmospheric perspective. The greater the distance between the observer and the subject, the greater the amount of water molecules suspended in air. At a distance, these molecules have the effect of dulling color. Of course, the color of atmosphere itself is also at play: the blueness of the sky or the orangeness of the sunset add color to distant objects that might not seem particularly dull. Yet the basic principle of atmospheric perspective remains widely used by artists seeking to create a sense of depth in their work.

There isn't much going on in John Henry Twachtman's 1885 painting *Arques-la-Bataille,* shown in Figure 6-23. A bit of grass, water, land, and sky divide the composition into more or less even horizontal bands. These bands create a sense of equilibrium in the landscape. Our eyes rest with the openness of the scene. And what an openness it is! From the relative brightness of the emerald green grass and the lightness of the water, colors become less saturated and we move further and further into a breathtakingly open space.

FIGURE 6-23: John Henry Twachtman, *Arques-la-Bataille,* 1885, oil on canvas, 60 x 78⅞".

The Metropolitan Museum of Art

Contrast of Hue

Contrast of hue is the most fun of all the color contrasts, because it's the most freeing! *Contrast of hue* simply means color contrast without respect to any of the other forms of color contrast. Any and all colors could be placed in any context, and the result can be experienced for what it is. I think of contrast of hue as the crayon box approach: how a kid might pick colors, watching them play off one another in surprising ways.

The genius behind Itten's contrast of hue is the recognition that freedom from categorization deserves a category all its own. Indeed, works that employ contrast of hue often have a sense of playful abandon. Contrast of hue identifies the way so many creative people work with color: intuitively.

Contemporary artist Corydon Cowansage's painting *Waves 1*, shown in Figure 6-24, is a striking example of contrast of hue. I see the multicolored forms in this painting as a melting checkerboard — or maybe a deflating hot air balloon. In addition to these dynamic forms, the freedom of the colors gives the painting its playfulness.

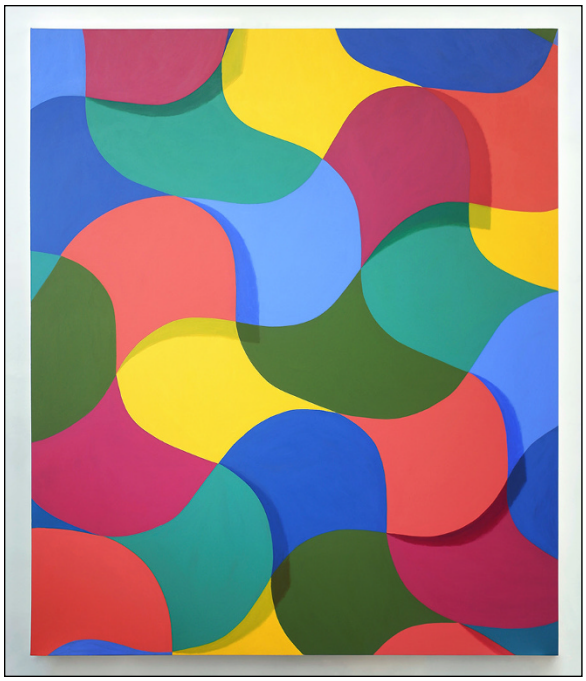


FIGURE 6-24: Corydon Cowansage *Waves 1*, 2020, acrylic on canvas, 84 x 70″.

Courtesy of the artist

Throughout this chapter, you've looked at types of color contrast that can be used to form color schemes, evoke different sensations, and create different effects. These contrasts are highly applicable. However, as a painter myself, I know that my best color choices happen when I'm responding in the moment, not thinking too hard about creating effects. Contrast of hue is an apt way to describe my color process because it's about the colors themselves.

IN THIS CHAPTER

- Understanding color's weight
- Exploring the phenomenon called chromeostereopsis
- Discovering the fluting effect
- Experiencing color's wetness and dryness

Chapter 7
Color Dynamics

Color dynamics involve the ways color effects how you experience compositions, perceive space, and read meaning into color. When you understand color dynamics, you gain more ways to use color in creative projects. For example, understanding that warm colors tend to advance (and cool colors tend to recede) gives you an advantage when your goal is creating depth. Understanding that certain colors have associations with dryness (and others have associations with wetness) helps when your goal is to evoke the qualities of a particular landscape.

In this chapter, you learn why many people are biologically inclined to see reds as advancing — and blues as receding. You also see how varying degrees of transparency creates different effects.

Feeling a Color's Weight

When we see different colors in context, their apparent lightness or heaviness becomes apparent:

- Dark and saturated colors appear to weigh more. They seem dense, thick, and substantial.
- Light and desaturated colors appear to weigh less. They seem airy, diaphanous, and transparent.

Figure 7-1 shows two colors: a dark blue and a tan color. Do you perceive one color to have more weight than the other?

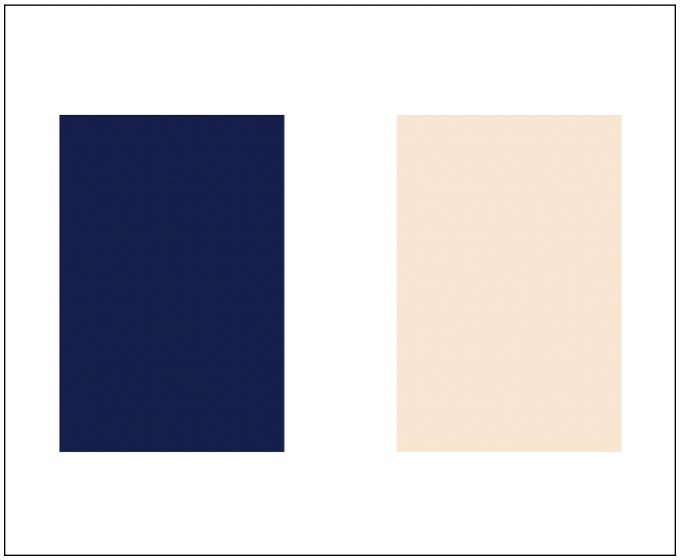


FIGURE 7-1: Two colors of different weights.

Figure 7-2, left, shows a stack of colors in gradation from the heaviest at the bottom to the lightest at top. Figure 7-2, right, shows these colors in reverse order. The position of the colors doesn't change their weight. In other words, a color doesn't appear heavier (or lighter) just because it's above a heavier (or lighter) color.

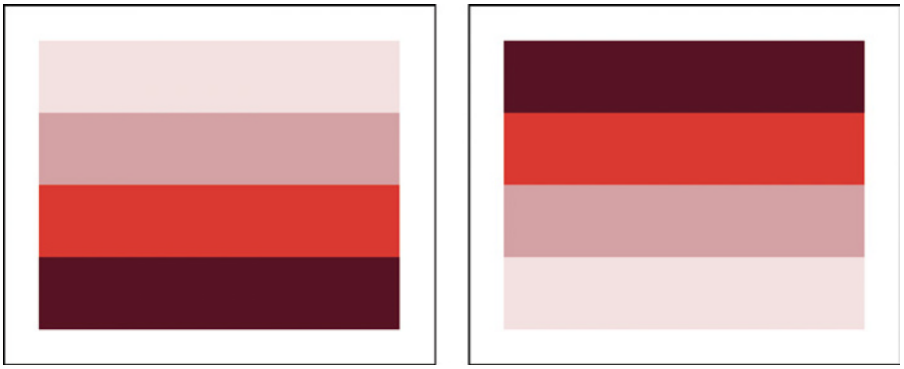


FIGURE 7-2: Heaviest colors at the bottom (left) and at the top (right).

Sky blues are typically associated with lightness, airiness, and openness. This obvious correlation has played out in innumerable landscape paintings throughout history.

Even though the actual color of the sky ranges from the blue-black of night to the reds, oranges, and pinks of sunset, these colors are considered weightier. In English, night is said to *fall.* Perhaps the linguistic concept has shaped the way dark colors like blue-blacks are perceived.

TIP

The weight of color has implications for any creative work that engages the viewer's sense of gravity. For example, color weight is crucial in landscapes when an artist wants to convey the massiveness of a mountain, as shown in Figure 7-3.

FIGURE 7-3: Katsushika Hokusai, *Shower Below the Summit,* between 1826–1833 (printed later), wood cut.

The Library of Congress

Odilon Redon's 1916 pastel *Vase of Flowers* (Figure 7-4) employs color weight in a balancing act. The tall, thin vase is rendered in darker tones that provide a counterweight to the burst of flowers above.

The flowers are anchored by the vase. The dark and saturated buds are weighty and seem to balance on their stems. The earthy brown below the vase creates a foundation for it and suggests the life-giving soil that originally gave forth the flowers. Less weighty colors of pink and yellow in the background suggest a rich airiness. Redon's feel for the weight of color gives this work tension, gravity, and atmosphere. In the context of representational artwork, darker colors describe shadows, which signify gravity and the contact point between surfaces.

Cleveland Museum of Art

FIGURE 7-4:
Odilon Redon, *Vase of Flowers,* 1916, Pastel; 33⅛ x 22$^{13}/_{16}$".

The notion of antigravity is another side of color's weight. Russian Avant-garde painter Kazmir Malevich is credited with creating the first truly abstract painting: an all-black square on a white ground painted around 1915. Malevich was a genius with an extraordinary imagination, whose interests included astronomy and the nature of the cosmos. Figure 7-5 shows Malevich's 1915 painting *Suprematism*. The dark and saturated shapes in this composition are not grounded; they hover in a white openness. The weight of the shapes speaks to their structure and mass, creating the effect of a space station suspended above gravity.

FIGURE 7-5: Kazimir Malevich, *Suprematism,* 1915, oil on canvas, the State Russian Museum, St. Petersburg, Russia.

Kazimir Malevich/Open Art Images

Watching Color Advance or Recede

The notion that some colors advance and others recede was described by Johann Wolfgang von Goethe in his 1810 book *Theory of Colours.* In the book, he describes yellow-red (that is, orange) as "penetrating" and blue as "retiring." Centuries before, Roman artists used red and blue color combinations in murals to create depth, as in the painting shown in Figure 7-6. Likewise, stained glass artists of the Middle Ages chose colors for their potential to advance or recede.

In the Roman example, two color dynamics are at play: receding and advancing color, and the weight of color. These two dynamics move the eye in different directions. The light, airy blue recedes in space, while the red columns advance. Simultaneously, the light, airy blue rises up, while the rich reds and brown shadows toward the bottom of the painting (worn away over time) have a grounding effect.

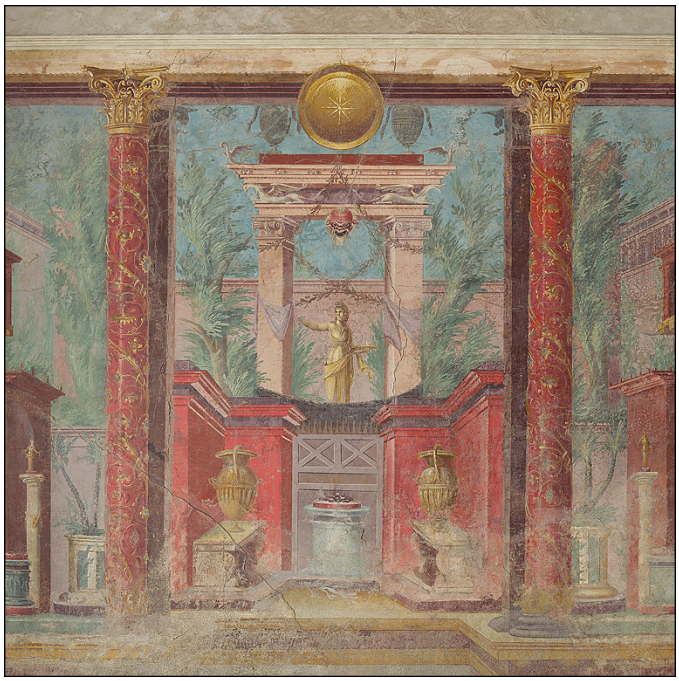


FIGURE 7-6: Cubiculum (bedroom) from the Villa of P. Fannius Synistor at Boscoreale, ca. 50–40 B.C., fresco, 8″ 8½″ × 10″ 11½″ × 19″ 1⅞″, Roman, Late Republic.

The Metropolitan Museum of Art

Here are the general guidelines for using advancing and receding colors:

- Warm colors (red, orange, yellow) tend to advance.
- Cool colors (green, blue, purple) tend to recede.

Do you remember the split color wheel in Chapter 6, with warm colors on one side and cool colors on the other? The same split color wheel can be applied to the notion of advancing and receding colors, with warms advancing and cools receding.

Look at the colors in Figure 7-7. Do some advance while others recede?

Where does the phenomenon of advancing and receding color come from? In part, it's associative. For example, the blue of the sky and the green of the landscape are often perceived as far away, so blue or green surfaces appear to possess a similar depth. Also, when perceiving an actual landscape, atmospheric perspective causes objects that are dark or saturated or both to appear lighter and duller. (For more on atmospheric perspective. see Chapter 6.) As an opposite example, the heat of fire seems to radiate toward us, so colors that evoke warmth tend to advance.

FIGURE 7-7: Advancing and receding colors.

Seeing Red and Blue: Chromostereopsis

In the preceding section, you learned that a color's association with fire makes us perceive the color as advancing, while a color's association with the sky or the landscape makes us perceive the color as receding. Another reason why you perceive color as advancing or retreating has to do with a phenomenon known as chromostereopsis.

TECHNICAL STUFF

Chromostereopsis is a result of our binocular vision (two eyes that perceive a single subject). The fovea, which is a small pit in each retina, contains a high concentration of photoreceptor cells (cells that enable you to see color). This tiny feature of the eye enables you to focus on small details while doing things like reading or driving. The fovea is located beside the optical axis, in opposite positions in each eye. This positioning results in a bending of light rays and thus a slight chromatic dispersion, contributing to the effect of seeing blue as receding and red as advancing.

The small rectangles in the center of the large rectangles in Figure 7-8 may be viewed differently. One rectangle is the opening in a window. The other rectangle floats upon a background color. Which is which?

According to the principle of chromostereopsis (which states that red advances and blue recedes), you understand how you're *supposed* to see the rectangles. However, be sure to take the time to test it for yourself, taking a few moments to really look.

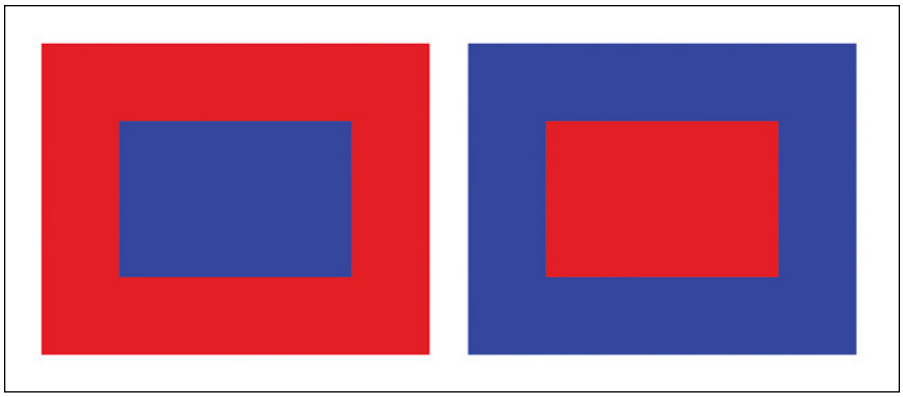


FIGURE 7-8: Chromostereopsis in action.

If you didn't perceive the red as advancing and the blue as receding, don't be discouraged! Congratulate yourself for recognizing your true perceptions. You might be part of a group of people who experience the opposite effect: blue advancing and red receding. Or you might be part of a group that doesn't experience any depth relationship between the colors.

The fact that people experience chromostereopsis differently — or not at all — has been known at least since Goethe recognized the phenomenon. Chromostereopsis is complex and depends on a multitude of biological and optical factors that effect individual perception.

For some viewers, chromostereopsis may enhance the sense of depth in the painting in Figure 7-9. The red clothing advances, while the blue landscape recedes. However, a number of other factors in the painting, such as scale and atmospheric perspective, also create a sense of space. Chromostereopsis may contribute to the depth in the painting in the context of other visual cues. This is why someone who does not experience chromostereopsis in the typical way might still perceive depth in the painting.

TECHNICAL STUFF

Chromostereopsis might be linked to evolutionary developments. For example, some species of butterflies have evolved spots on their wings that resemble blue or red eyes, as shown in Figure 7-10. To a predator, these eye spots resemble the advancing eye of an even larger predator.

FIGURE 7-9: Jean Hey, *Margaret of Austria,* c. 1490, oil on oak panel, 12⅞ x 9⅛″.

Metropolitan Museum of Art

FIGURE 7-10: A butterfly with eye spots.

shymar27/Adobe Stock

Experiencing the Fluting Effect

The *fluting effect* influences the way you see studies that show gradations of value and color. The effect is experienced as a difference of color intensity or light intensity (or both) in two areas of a single value or color. (The fluting effect is also addressed in Chapter 4.)

Look at the middle gray in Figure 7-11, holding your gaze for 10 seconds (one, one thousand, two, one thousand . . .). Do you see a difference between the left edge and the right edge of the middle gray? The fluting effect causes the left edge of the middle gray to appear light beside the black, while causing the right edge of the middle gray to appear dark beside the light gray.

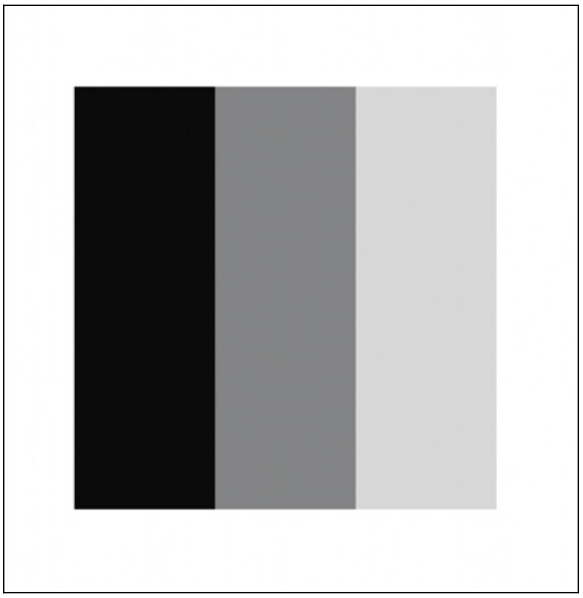


FIGURE 7-11: Fluting effect with value.

The fluting effect occurs also with color. Look at the middle gray in Figure 7-12, and hold your gaze for 10 seconds. The fluting effect causes the left edge of the gray square (beside the purple) to appear slightly greenish.

Simultaneously, the right edge of the middle gray (beside the green) appears somewhat purplish.

When multiplied, the fluting effect creates a sculptural look to vertical strips of color, as shown in Figure 7-13, left.

The term *fluting effect* is a reference to the grooved channels that the Egyptians and Greeks carved into their columns. These channels create a play of light on the column's surface, adding visual interest and calling attention to their verticality, as in the columns in Figure 7-13, right. The repeated grooves also evoke a sense of rhythm.

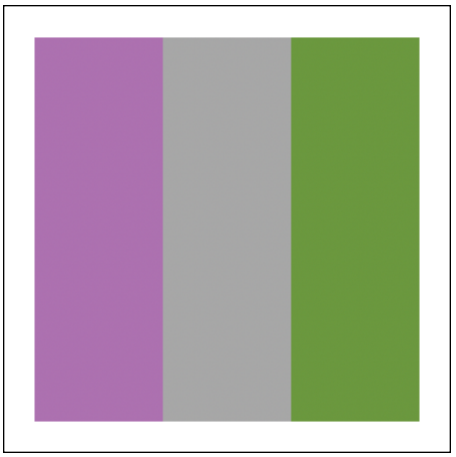


FIGURE 7-12:
Fluting effect with color.

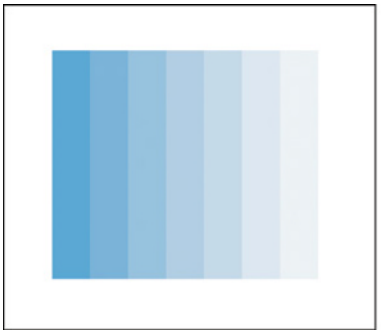


FIGURE 7-13:
Fluting effect (left), and columns with fluting (right).

Right: nyker/Adobe Stock

Sensing Color's Wetness or Dryness

You experience wetness or dryness in different parts of the body in ways that are central to everyday existence. Let's start with the mouth. You know the experience of thirst and the relief of thirst. You know the texture of food that is appropriately dry (such as a tortilla chip) and inappropriately dry (such as overcooked meat). Likewise, you know the texture of food that is appropriately wet (such as a moist piece of cake) and inappropriately wet (such as soggy lasagna).

Experiences of wetness and dryness in the mouth carry visceral associations as well as visual associations. Depending on the context, your desire or disgust mechanism might be triggered. For a thirst-quenched person, a dry tortilla chip — and it's light-yellow color — might appear attractive. For a thirsty person, that same light-yellow chip might appear less than desirable. Perception of texture is also at play, but color is part of the picture.

You experience wetness and dryness also in the largest sense organ: your skin. And in breathing, you constantly sense humidity or aridness. The perceptions of wetness and dryness are powerful and immersive experiences of everyday life. Here are the correlations between color and wetness or dryness:

- Wet colors (cool whites, cool grays, blue-greens, light blues, dark blues) evoke water and water-containing things such as plants and ice.
- Dry colors (reds, oranges, yellows, browns, neutrals) evoke fire and dry things such as sand, rock, and dried wood.

You may have noticed that the correlations for wet and dry colors correspond with color temperature. As you explore wet and dry colors, keep in mind that they're all somewhat subjective and culturally conditioned. If you have associations that don't match the guidelines here, honor yours!

In addition to bodily sensations, wetness and dryness are linked also to climate, geography, and a sense of place. Figure 7-14 shows images of two different biomes, with a strip of colors sampled from the images. These color strips could be used as a palette for artwork or a design.

FIGURE 7-14: Dry biome (left) and wet biome (right) and their colors.

Left: the_lightwriter/Adobe Stock. Right: Haico/Adobe Stock

Film directors, photographers, and landscape painters often use wet and dry color associations to express atmosphere and make the viewer see — and feel — location, climate, and weather.

The association between water and blue is widely exploited in the blue of swimming pools. And for centuries, Moroccans have used blue tiles for fountains, evoking the refreshment and rejuvenation of water, as shown in Figure 7-15.

FIGURE 7-15: A fountain in Chefchouen, Morocco.

Opacity: Hitting the Color Wall

An *opaque* color is one you can't see through; it covers completely. Opaque colors are sometimes referred to as flat colors or solid colors. When viewing an opaque color, your perception of the color is not changed by what is beneath the color. Think of the paint chips from the hardware store: Each is a tiny expanse of a flat, opaque color.

TIP

In the creative process, opaque colors are used to cover. Covering enables creators to change their work and move past mistakes, thus creating more flexibility and options in the creative process.

Opacity can be the property of a material (paint, fabric, Plexiglas, or paper) or an aspect of a digital image or video. Figure 7-16 shows a circle of opaque color blocking the view of a landscape. The eye stops at the opaque color.

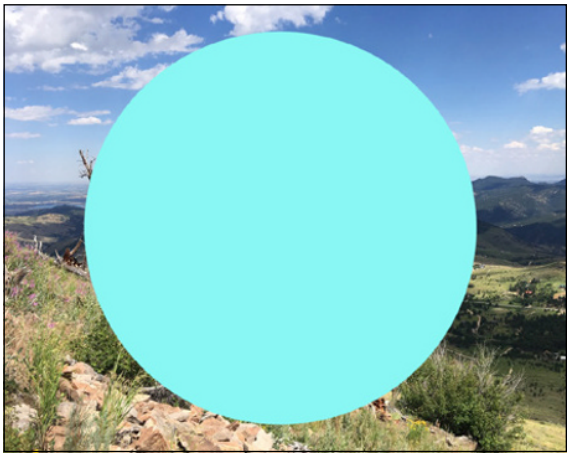


FIGURE 7-16: An opaque color over a landscape.

Transparency: Seeing Through Color

A *transparent* color is one you can see through. Transparency occurs because of *transmission,* which is the passing of light waves through a given material. When light passes through a material and the material is seen through, it is known as *actual transparency*.

A transparent color changes the color (but does not distort the form) of whatever is beneath it. If you've ever tried on a pair of color-tinted glasses, you've seen the effect of transparent color. Transparency creates dimension and depth as the eye moves through colors, often with dazzling effects. Figure 7-17 shows a landscape with overlays of transparent color.

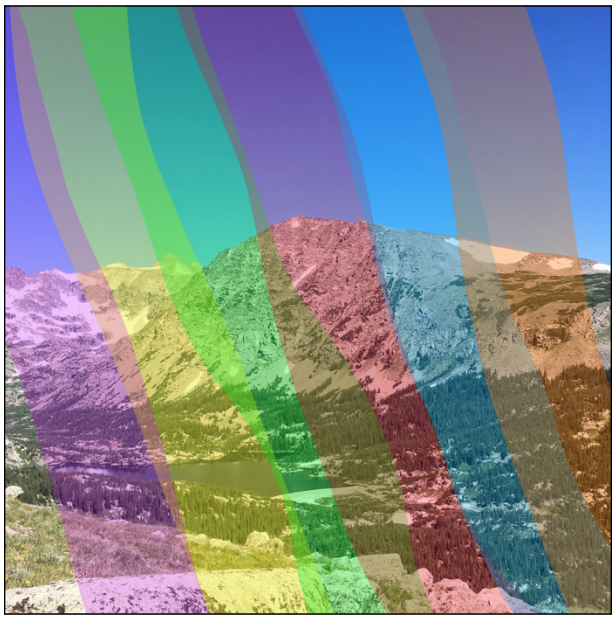


FIGURE 7-17: A landscape overlaid with transparent color.

Figure 7-18 shows solid colors (red, orange, yellow, green, blue, and purple) with transparent overlays (yellow, blue, red) at 50 percent transparency. The solid color viewed through the overlay is called the *mixture color.* Although the color is not mixed as it is on a painter's palette, the results are similar.

Because the study uses a 50 percent transparency, you see an even mixture between the solid color and the overlay colors. For example, the mixture between the solid green and the blue overlay results in a predictable blue-green.

ILLUSION OF TRANSPARENCY

Actual transparency is distinct from the *illusion of transparency,* which is when opaque colors are juxtaposed in way that creates the appearance of transparency. Color theorist Josef Albers includes an illusion of transparency exercise in his book *Interaction of Color.* The challenge is to find — among many pieces of solid color paper — a mixture color that reads as a blend of two parent colors. The exercise forces participants to examine the components of the colors they're working with, being careful not to select a mixture color that has any color other than what is in the parent colors. The exercise is good practice for observing the *dimension,* or components of color.

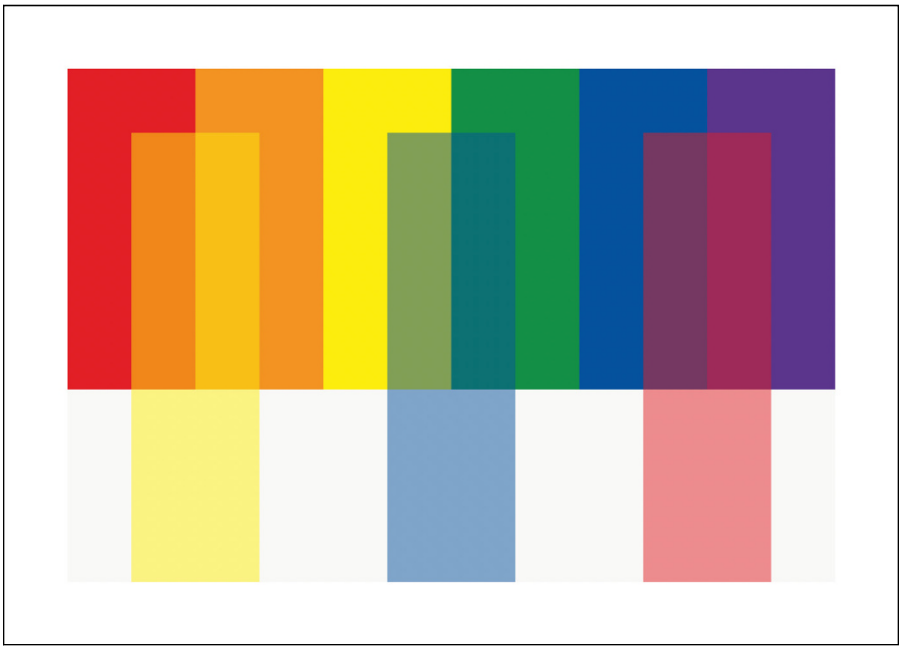


FIGURE 7-18: Overlaid colors at 50 percent transparency.

When the degree of transparency changes, the mixtures are different. Figure 7-19 shows transparent overlay colors with 15 percent transparency. In this study, the overlay colors are almost opaque, mixing only slightly with the solid color.

Figure 7-20 shows transparent overlay colors with 85 percent transparency. In this study, the overlay colors appear as a thin film over the solid colors.

FIGURE 7-19
Overlaid colors at 15 percent transparency.

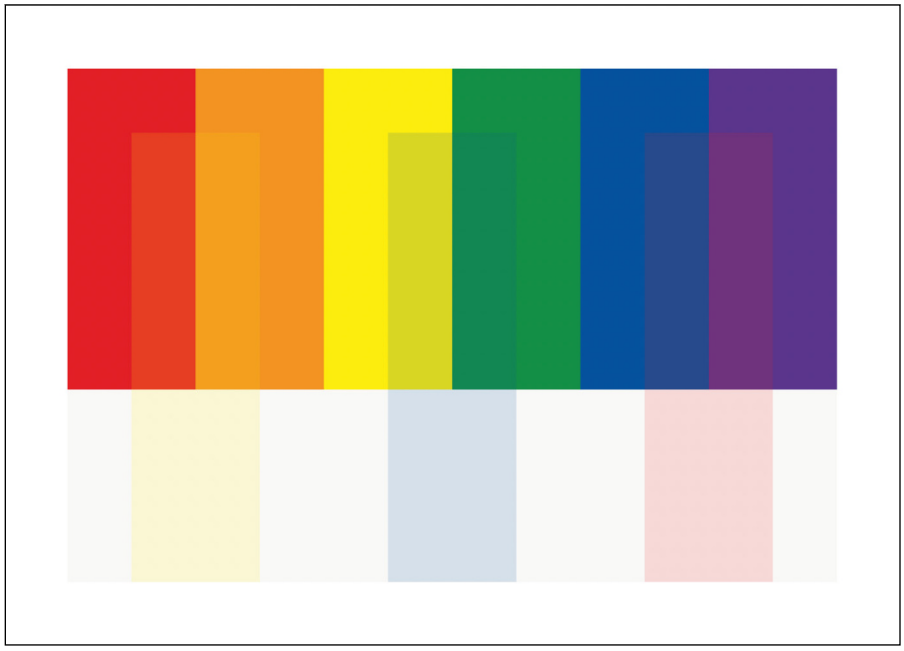


FIGURE 7-20:
Overlaid colors at 85 percent transparency.

These studies are created digitally, so the degree of transparency is easily set to an exact percentage. When working with paint or material such as paper or fabric, the transparency is more of an approximation.

Different degrees of transparency imply different degrees of depth. Figure 7-21 shows a band of yellow overlaid with transparent strips of blue. As your eye moves from left to right, do you sense the strips receding? The more transparent the blue strip becomes, the farther away it appears.

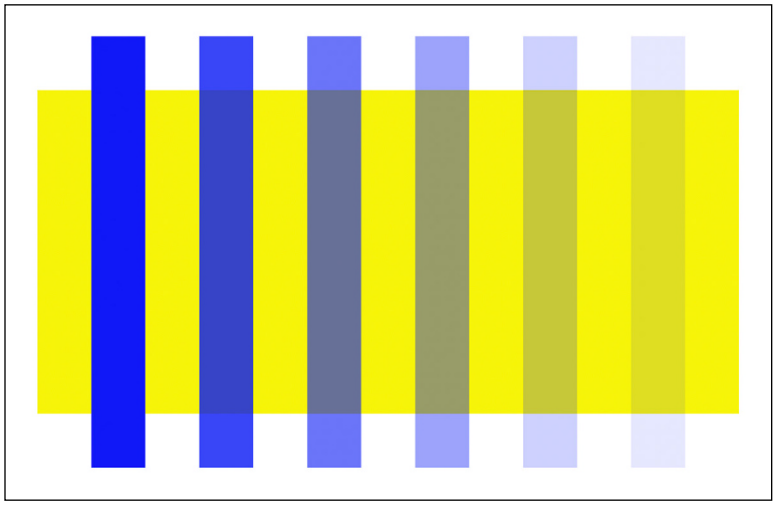


FIGURE 7-21: Strips of transparent blue over yellow.

The circles in Figure 7-22 are transparent overlays of white (above) and black (below) — at about 40 percent transparency — over solid colors. The white overlays appear as lighter versions of the solid colors, resembling spotlights. The black overlays appear as darker versions of the solid colors, resembling shadows.

TIP

For an exercise on exploring transparency with color cellophane, check out Chapter 13.

FIGURE 7-22: White and black transparent overlays.

Translucency: Obscuring with Color

As you just learned, transmission (the passing of light through a material) creates the effect of transparency. Translucency, on the other hand, allows only a certain amount of light waves to pass through, thus distorting and obscuring what is underneath. Privacy glass, frosted glass, and some kinds of Plexiglas are designed to be translucent. Figure 7-23 shows an effect akin to an orange-tinted translucent glass. Note the blurring effect that translucency has on the flower.

FIGURE 7-23: Translucency obscuring a flower.

REMEMBER

As a material property, translucency usually means that the material lets some light through, without being completely transparent. In painting mediums and varnishes, translucency refers to the degree to which the product dries clear.

3 Coloring Your World

IN THIS PART . . .

Get ideas for color palettes for creative projects.

Discover the cultural and personal meanings of color.

IN THIS CHAPTER

- Understanding monochrome palettes
- Discovering split complementary color
- Exploring autumnal colors
- Experiencing gradation palettes

Chapter 8
Color Palettes

Now that you know more about color, you're ready to apply your knowledge to your creative projects. Whether you're painting a portrait, decorating a room, designing a line of neckties, or planting a garden, the color palettes in this chapter can help you choose colors for your project.

The goal of this chapter is to help you make palettes that work. Just like machines or human relationships, colors have a way of working — or not working. Precisely why colors work (or don't) is difficult to put it into words because the visual faculty as well as a gut feeling are involved. We all see color differently, and gut feelings are subjective so they aren't always shared. Also, color tastes and preferences are culturally constructed and vary depending on custom

You're the judge as to whether colors work in a particular application, though most of us hope that our choices resonate with viewers, customers, and consumers.

Building a Palette

Painters aren't the only ones who build a palette. Designers, photographers, craftspeople, and other creatives devise palettes for their work. Before you begin any creative project, do some color brainstorming. What is your overall vision for the project? How abundant will color be in your project? How important is color for your project? (Keep in mind that *abundant* and *important* aren't the

same: sometimes, the less of a color, the more likely the color will be noticed.) What role does color play in the project? How will others experience the colors in your project?


TIP

After gathering your thoughts, find a way to make them visual. Research color by taking photos of colors you admire. Use swatches, sketches, or samples to gather pieces of color. Then put them on a mood board that hangs on your wall, in a folder on your desktop, or on a Pinterest page.


TIP

Want to make a mood board? Check out Chapter 13.

Next, it's time to decide on your *palette,* which is the specific set of colors that you'll work with. In the following sections, you look at some options.

Monochrome: seeing the power of one

Monochrome means one color. (the *chrome* in monochrome is from the Greek *khrôma,* meaning color.) Black and white images (such as black and white photography) are often referred to as monochrome, but this is not entirely accurate because black and white are values, not colors. Yet, the term monochrome remains widely used to describe black and white images, as a web search for the word monochrome confirms!


REMEMBER

A better definition of a monochrome is *an image made of different values of a single color.* Figure 8-1 shows a monochrome study of a single color, green. The differentiation in the study comes from the values in the single green color. This study is a *true monochrome.*

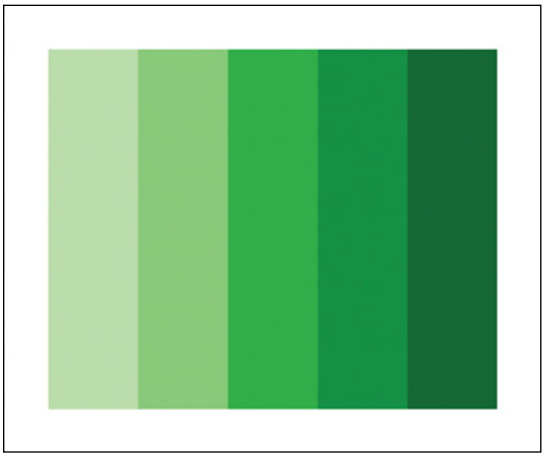


FIGURE 8-1: A true monochrome with green.

Monochrome palettes are unified and easy to put together because the colors are all related. However, monochrome palettes lack variety. This issue may be solved by including different colors that share a single color identity. For example, a set of different greens including yellow-based and blue-based greens forms an *expanded monochrome.*

Figure 8-2 shows an expanded monochrome palette. To increase the contrast between the green even more, the study includes very light tints of green (green + white) and very dark shades of green (green + black).

FIGURE 8-2: An expanded monochrome with greens.

Tones (hue + gray) are useful in creating even more variety in expanded monochrome palettes. Gray can change a hue in striking ways by dulling it and making it less familiar. Figure 8-3 shows an expanded monochrome palette with a wide range of tones made with different values of gray.

TIP

For an exercise on creating expanded monochrome palette, see Chapter 13.

Yellow deserves a special mention when it comes to monochromes. Yellow is the only color in the color wheel that turns into a totally different color — green or sometimes brown — when mixed with gray or black. An expanded monochrome with yellow shows colors that do not read as yellow. Figure 8-4 shows a monochrome with tints, tones, and shades of yellow; some of which read as distinctly green.

FIGURE 8-3: An expanded monochrome with tones of green.

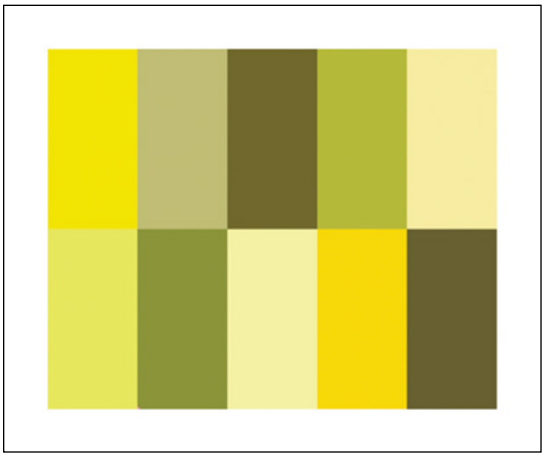


FIGURE 8-4: Expanded monochrome with yellow.

TIP

To make a darker yellow that doesn't sway green, a small amount of red will do the trick.

TECHNICAL STUFF

Monochromes have associations with old-fashioned forms of image technologies that produced single-color images. One example is 19th-century sepia-tinted photography. Another example is the cyanotype (blueprint). Cyanotype printing was developed in the 19th century and was widely used to make inexpensive prints and reproductions well into the 20th century. The British botanist Anna Atkins used this process to create images of natural subjects like algae and seaweed, as shown in Figure 8-5.

In America, monochrome painting was pioneered by artists such as Ad Reinhardt and Barnett Newman in the 1950s and 1960s. They were striving for a new visual language that didn't include traditional or representational subjects. Minimalism — the subsequent art movement of the 1970s — also brought monochrome to a new level of prominence that has since seeped into popular imagination. The Korean movement of the 1970s known as Tansaekhwa (also spelled Danseakhwa, meaning literally *monochrome painting*) included artists such as Lee Ufan and Park Seo-bo, whose work emphasized the flatness of their painting's surfaces.

The New York Public Library

FIGURE 8-5:
Anna Atkins, Laminaria digitata, from *Photographs of British algae: cyanotype impressions,* 1843.

Contemporary painter Eric Hibit (me!) uses an expanded monochrome palette in *Blue Oyster,* shown in Figure 8-6. Note the slightly purplish-blue in the shell's nacre, which contrasts with the other blues in the painting. This purplish-blue adds an exciting — if subtle — note to the blue harmony in the work.

Analogous colors: harnessing the power of three

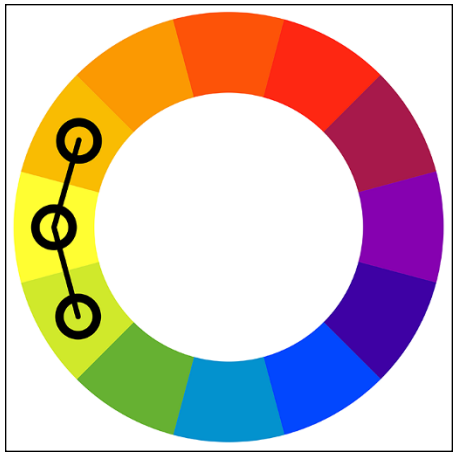
Analogous colors are three adjacent colors on the color wheel, as shown in Figure 8-7. The term *analogous* comes from the word *analogy,* meaning comparison. As a color palette, analogous colors are more diverse than monochromes, but they still hold together well because they're near each other on the color wheel. Analogous palettes have strong color diversity and colorfulness while still feeling like part of a whole.

FIGURE 8-6: Eric Hibit, *Blue Oyster*, 2018, acrylic on panel, 20 x 16″.

Depending on where you choose the three colors on the color wheel, analogous palettes can be entirely warm, entirely cool, or a mix of warm and cool colors. Either way, the color possibilities are limited, so the color range is not overwhelming. Figure 8-8 shows four possible analogous sets.

REMEMBER

Like monochrome, analogous colors can be expanded by adding white, gray, and black to produce tints, tones, and shades, respectively. Figure 8-9 shows an expanded analogous palette with red-orange, red, and red-purple.



Oleksandr Panasovsky/Adobe Stock

FIGURE 8-7: Three analogous colors on a color wheel: yellow-orange, yellow, and yellow-green.

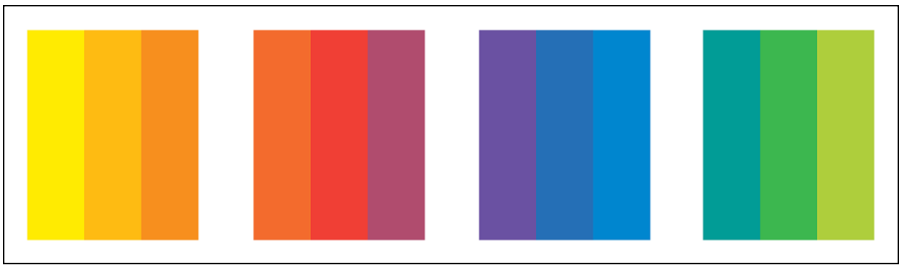


FIGURE 8-8: Analogous sets.

MysticaLink/Adobe Stock

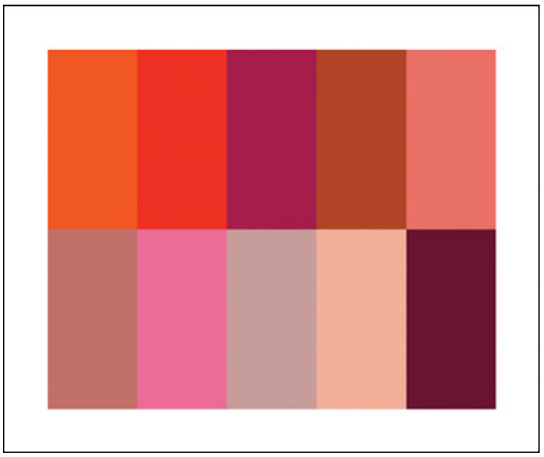


FIGURE 8-9: An expanded analogous palette.

Primaries and secondaries: palettes from the wheel

In Chapter 4, you discover how the color groups of primaries and secondaries are fundamental to how we think about color. Primary and secondary colors are classic color sets that hold together nicely as palettes.

TECHNICAL STUFF

Primary palettes (made from the primary colors of red, yellow, and blue) are common in European and American art of the 20th century. Pop artists such as Roy Lichtenstein and Andy Warhol depicted comic books and Brillo boxes (respectively) in their art as a commentary on American consumer culture, and those products used primary colors.

A *regular primary palette* includes color-wheel versions of the primaries. Simple enough. An *expanded primary palette* includes multidimensional versions of the primary colors. (For a refresher on the dimension of color, see Chapter 4.) Figure 8-10 (top strip) shows an expanded primary palette with primary colors

that contain varying degrees of black, white, and gray. Note how the yellows take on a green cast from the addition of black.

FIGURE 8-10: An expanded primary palette (top strip) and an expanded primary palette with secondary colors mixed in (bottom strip).

This primary palette can be further expanded to include dashes of secondary colors mixed into the primaries. Adding tiny amounts of secondary colors changes the colors slightly but noticeably. Figure 8-10 (bottom strip), shows the expanded primary palette with the following dashes of secondary colors mixed in:

red + purple

blue + green

yellow + orange

Expanded primaries have the appearance of regular red, yellow, and blue — but the colors are nuanced in surprising ways.

Think of a florist who places purplish-blue hydrangeas with yellow daylilies and red gaillardias, as in Figure 8-11. The arrangement holds together because of the primary palette, but it has an exciting purple twist!

A *secondary palette* includes orange, purple, and green. Figure 8-12 shows the secondaries in the upper-left three strips and an expanded secondary palette consisting of tints, tones, and shades of the secondaries. I think

FIGURE 8-11: Flowers with a primary palette.

secondary colors clash more than the primaries. To tone down this clash, I added white, gray, and blacks to the secondaries, making them a little mellower.

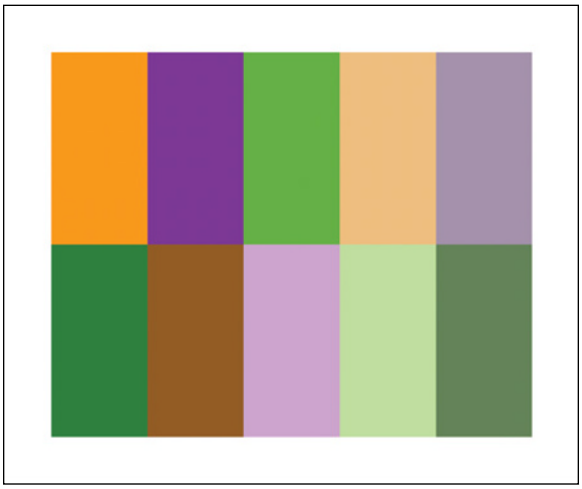


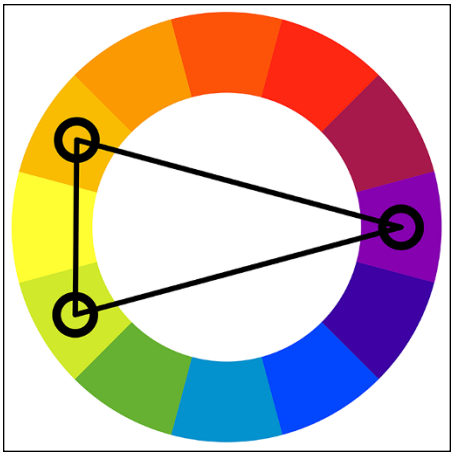
FIGURE 8-12: An expanded secondary palette.

Complementary color: splitting the difference

In Chapter 6, you learn about the dynamic and eye-catching effects of complementary color contrast. *Split complementary colors* are an exciting twist on the regular complementary pairs of red and green, blue and orange and purple and yellow.

REMEMBER

To find a split complementary color, choose a color on the color wheel and then find its complement: the color directly across from it. Then choose the two colors adjacent to the complement. Voila! You've made a split complementary set. Figure 8-13 shows a split complementary set consisting of purple, yellow-green, and yellow-orange.



Oleksandr Panasovsky/Adobe Stock

FIGURE 8-13: A split complementary set on a wheel.

Note that with a split complementary set, you have three colors (more colors to work with!) as opposed to the two in a regular complementary set. Also, split complementary colors have all the dramatic contrast of regular complementary colors, without appearing as obvious. See Figure 8-14.

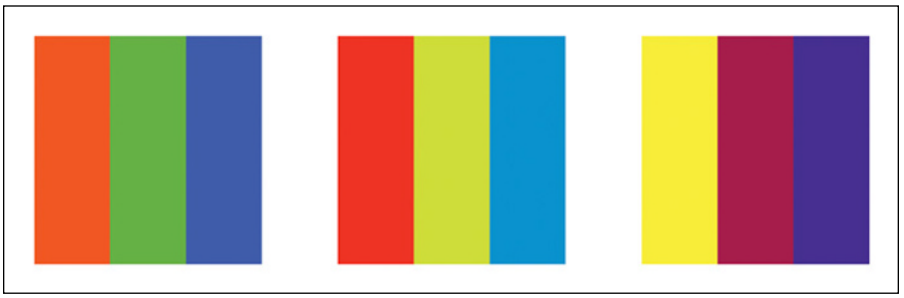


FIGURE 8-14: Split complementary sets.

Neutrals: using browns and grays

We have many words for neutrals because of how widely marketed neutral colors are in fashion and interior design. Tan, khaki, beige, taupe, champagne, and a myriad of other color names are neutrals. Color names aside, what exactly are neutrals?

Neutrals is a broad color category that includes the following:

- **Desaturated colors that have a lot of gray:** Remember, gray can be very light, a medium value, or very dark. Thus, neutrals have a wide range of light intensities.
- **Dark colors that have black:** For example, dark brown is made by adding black to orange.
- **Values:** black, white, and grays.

Figure 8-15 shows a range of neutrals: browns, tans, grays, and black.

Yellow, red, orange, and green-based neutrals are called *earth tones* for their association with rocks, ore, soil, and plants. Figure 8-16 shows earth tone neutrals.

REMEMBER

A hue can be neutralized by adding its complement!

Neutrals fit together nicely because they all contain gray or black (except for white itself, which is technically a neutral). Thus, neutrals are unified from the start! Neutrals of different colors (such as gray-green and gray-purple) can sit side by

side without the intense contrast you'd get from regular green and regular purple side by side.

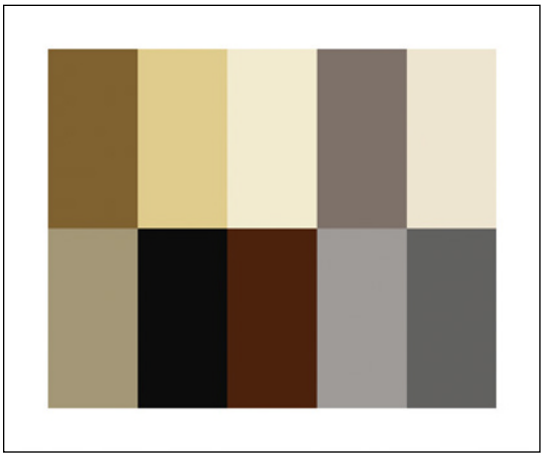


FIGURE 8-15: Neutrals with browns, tans, grays, and black.

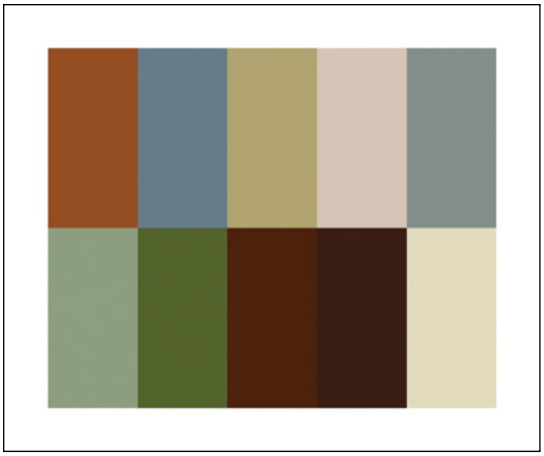


FIGURE 8-16: Earth tone neutrals.

Neutrals have a reputation for being soft, easy on the eyes, relaxing, and natural. Neutrals whisk you into a world apart from the brash, artificially colored one. However, neutrals can be bland and uninteresting, depending on the context. A celebrity's champagne-colored gown at the Oscars isn't likely to put you to sleep, but an overdose of beige in a bland waiting room just might.

TIP

When neutrals are bland and uninteresting, try juxtaposing then with saturated colors. Figure 8-17 shows neutrals with small amounts of saturated colors. Note how a small amount of saturated color balances well with larger areas of neutrals.

FIGURE 8-17: Neutrals juxtaposed with saturated colors.

Working with Nature's Colors

We humans have created a vast world of synthetic colors that overtake our senses. Smartphones, social media accounts, video games, billboards, and an endless supply of consumer products are made of vivid and often backlit colors. Such is the color of contemporary life!

However, nature provides another world of color. Nature shows us subtle colors in the gray-browns of sedimentary rock layers and the soft pink inside a conch shell. Nature also throws overwhelming color our way in the form of a vivid blue sky, the lush green of trees, and the spectrum of flower colors.

An effective strategy for creating palettes is to follow the color groups found in nature. Fruits, vegetables, animals, and the changing sky are potential sources of color inspiration. And you don't need to live in the great outdoors to get into nature's colors. Your local vegetable stand, florist, and tropical fish emporium are abundant sources of nature's color. In this section, you look at some nature-inspired palettes.

TIP

For an exercise on working with nature's colors, see Chapter 13.

Gradation palettes

Gradations of color are often found in plants, such as in the ornamental cabbage shown in Figure 8-18. The *polar colors* of the cabbage — the most vivid purple and the greenest green — are not in direct contact. Rather, a gradation of colors provides a smooth transition between the vivid purple and greenest green. The gradation is a visual bridge that makes the coexistence of the polar colors more palatable.

FIGURE 8-18: An ornamental cabbage with color gradations.

Look at the leaf colors in the calla lily in Figure 8-19. The simple, true green doesn't stop at the leaves but instead seeps right into the yellow flower. This seeping creates a smooth transition between the brightest yellow and the greenest green. Music for the eyes!

FIGURE 8-19: A calla lily with color gradations.

Flower-and-leaf color combinations

The particular green of a plant's leaves often enhances how we see a flower's color. Figure 8-20 shows four types of flowers with their leaves: nasturtium (orange), cranesbill geranium (purple), parrot tulip (multicolored), and rose (light yellow-orange).

FIGURE 8-20: Flower and leaf color combinations.

To the right of each image is a palette of six colors; the top three colors are from the flower, and the lower three colors are from the leaves. Note how wide-ranging the leaf colors are, from blue-green to dark red. I hope this opens your eyes to the diverse world of leaf colors!

Nasturtium leaves are a distinctly blueish-green, while the flower is orange. Because blue is a complement of orange, a powerful complementary color contrast is at play, making the flower stand out.

Nature pulls a similar complementary color move with the greenish-yellow leaves of the purple cranesbill geranium. Purple is the complement of yellow, so the leaves make the flower's purple that much more vivid.

Look at the leaf colors of the tulip. Unlike the geranium's greenish-yellow leaves, the tulip's leaves are a cooler (blueish) green. The cooler green finds its way into the tulip itself, with parts of the flower appearing almost blue-gray. Combined with the red and yellow also found in the petals, it's no mystery why this is called a parrot tulip!

Surprisingly, the leaves on the rosebush range from deep green to dark red-purple. The dark richness of these leaf colors contrast beautifully with the creamy colors of the rose.

TIP

See Chapter 13 for ideas on planting a colorful garden.

Autumnal color: blazing glory!

Who hasn't marveled at the magic of autumn's colors? It's a no-brainer to see the palette potential in an autumn landscape, but how do you go about creating such a palette?

REMEMBER

The overall effect of autumn's colors is warmth, as leaves change from summer greens to yellows, oranges, and reds. These four colors are adjacent on the color wheel. Depending on which three you choose, you end up with an analogous palette. Figure 8-21 shows a maple tree and it's analogous green-yellow-orange palette.

FIGURE 8-21: Autumn colors with an analogous palette.

Rich browns (from oak leaves, for example) and dark purple (such as that found in certain types of Japanese maple) add even more notes to autumn's harmonies in the expanded autumn palette in Figure 8-22.

Some trees turn a single color in autumn, resulting in an impressive monochrome display. Other trees shows a wide range of colors, as in the maple shown in Figure 8-23. This single tree contains greens, ochres, purples, and reds, as shown in the accompanying palette.

Many leaves are translucent, allowing sunlight to shine through. The effect of sunlight on autumn leaves is dazzling: Red leaves become pink, and yellow leaves become almost fluorescent. Dried in the pages of a dictionary (remember that old trick?), a leaf that looked vivid outdoors is likely to appear lifeless. The effect of rain on leaves also changes autumn colors, adding glossiness and shimmer.

FIGURE 8-22: An expanded autumn palette.

FIGURE 8-23: A maple tree in autumn.

The magic of autumn's colors was not lost on color theorist Josef Albers (see Chapter 5). The last few pages of *Interaction of Color* (his influential 1963 book on color theory) feature studies made with autumn leaves and colored paper. If you've ever walked through a New England college town in autumn, you know what inspired Albers to include the leaf studies: that colorful, chill-in-the-air mood of the back-to-school season. Albers gives no criteria for exactly how to go about making leaf studies. All we see in *Interaction of Color* are a few examples to inspire us to make our own!

Forgetting Everything You Just Learned: the Intuitive Approach

The palettes in this chapter are color groups that hold together and work, whatever those words might mean to you. (Remember, you're the judge!)

That said, a predetermined palette isn't always a realistic option when working with color. In the throes of creative work, you might need to abandon your plans and make spontaneous decisions, without having a logical reason for doing so. When you let intuition guide you, the results can be unexpected and surprising.

What is the *intuitive approach?* Start with a color that you like, and then add colors to it based not on predetermined color palettes but on what you think will work. Trust your eye. Follow your sensibility and enjoy seeing how it comes together. Add colors and replace colors based on your judgement of the colors themselves and how they work together.


TIP

Have confidence when working with color. Remember, there are no right or wrong answers. Embrace the subjectivity, keeping in mind that one person's "eww" is another person's "aah."

Researching color

As a regular practice, I snap pics of colorful things I admire. Most of the photos in this chapter were from images I shot with my iPhone's camera before I started writing this book. The practice of observing things in the world and collecting color data is called *color research*.

Color research can be done with a specific palette in mind, such as autumn leaves, or intuitively, by simply observing and responding to color in your immediate environment. I hope the palettes in this chapter inspire you to go out and create your own.


TIP

In the section on developing your color vocabulary in Chapter 4, I encourage you to slowly observe colors in your world and then name them according to your preference. Gathering samples of colors — either in a pic or in another form (such as a paint chip or a fabric swatch) — is an effective way to expand your color knowledge.

The power of your color limitations

Your color palettes are shaped by the colors you have access to in your chosen medium. In painting, you're bound by the colors of the pigments in your paints. In quilting, you're bound by the colors in the fabrics available to you. These factors create a distinctiveness to the colors you choose.

For example, assume that a quilter must choose only one of the blue denims in Figure 8-24 and is planning to juxtapose the denim with swatches of saturated red and yellow to make a primary palette quilt.

FIGURE 8-24: Pieces of a hypothetical quilt.

Depending on which denim the quilter chooses, the overall look of the quilt will change. For example, the dark denim would contrast strongly with the bright red and yellow, creating a bold look to the overall design. The lightest denim would not provide as much contrast with the red and yellow, creating a softer look. Both quilts would be different, but each would be beautiful in its own way!

IN THIS CHAPTER

- Understanding color in advertising
- Exploring color's meaning in visual art and poetry
- Discovering your color personality type
- Experiencing color and mood

Chapter 9
Using Color to Convey Meaning

When I decided to write a chapter about color and meaning, the phrase "color psychology" popped into my head. It's a phrase I'd heard before, and I associated it with how color is used in advertising to make consumers buy this or that. Although color psychology is about color's effect on consumers, it's also about so much more. Color has the power to convey meaning in many facets of our lives and in numerous contexts.

In advertising (such as logos and product packaging), the psychology of color refers to the influence color has on your choice to remember, connect with, and buy a service or product.

In culture (for example, workplaces and nationalities), the psychology of color refers to a shared meaning of color — what it represents to you and your community.

In visual art (such as painting and sculpture), the psychology of color has to do with artists' psychology — their emotional state, mood, and concepts behind their work — as well as the effect that the color in the work has on viewers. And of course, color in visual art is shaped by culture, community, and tradition. All these factors affect how we perceive color in visual art.

In individuals (for example, their clothes and home), the psychology of color refers to personal color tastes, preferences, associations, imprints, and life experience.

In this chapter, you look at commonly understood, conventional meanings of color. You learn about color in logos and branding, and color's role in consumer culture. The link between color and food is explored. You also look at how color relates to emotion and mood. Importantly, you learn that color has no fixed meaning, and the potential gaps between widely accepted color meanings versus the meanings individuals hold.

Color and Consumer Culture

It should come as no surprise that color is used in packaging and advertising to influence us to purchase goods and services. Or maybe it does come as a surprise! Just like forgetting about the air we breathe, the world of consumer culture can be invisible in a "perpetually there" kind of way. Take a step back and look at the advertising machine, and you'll see plenty of colors at its core.

The fact that you don't commonly think about the colors used in advertising is a big part of its effectiveness. You've seen the color — and received its meaning — before you even had a chance to think about it. And it's not just huge organizations that exploit color's meaningfulness: A local mom-and-pop shop can be just as effective in their color marketing as the biggest multinational corporation.

Color and company logos

Logos are symbols that corporations use to identify themselves and their products. Logos work because they create a strong association in the consumer's mind between the brand identity and the product. Logos assure consumers that they're buying from an established brand with a wide-reaching reputation. These factors make it more likely for a consumer to buy a product.

Color plays an enormous role in brand identity in corporate logos. Often, color is integral to the shapes or letter forms in the logo. Think of the Pepsi logo, and you'll likely conjure red, white, and blue as much as the shapes of the logo itself: a circle with curves in the center. This is the power of color in logos: It's associative and helps you remember the logo. What other colorful logs can you recall? Many, I bet!

You know that colors have strong associations with things, ideas, and emotions. Each color has positive and negative associations, both of which are considered

when advertisers make choices about how to market themselves and their products A quick internet search yields dozens of charts that categorize logo colors with color associations. (Have a look yourself.) The following list is compiled from several charts:

Color	*Positive*	*Negative*
Red	Passion, love, power, strength	Anger
Orange	Enthusiasm, dynamism	Caution
Yellow	Joy, energy, sunlight, warmth	Anxiety
Green	Nature, growth, refreshment, health	Illness
Blue	Water, sky, trust, strength	Cold
Purple	Status, wealth, magic	Frivolity
White	Purity, innocence, cleanliness	Emptiness
Gray	Restraint, quiet, neutrality	Dull
Black	Power, mystery, calm	Death
Brown	Earthiness, ruggedness, comfort	Dirtiness
Pink	Femininity, youth, flowers	Excessive sweetness

REMEMBER

When considering this list of color meanings, it's important to remember that colors don't have intrinsic, fixed meanings. For example, blue doesn't inherently mean "trustworthiness," but somewhere along the way (because of tradition or sheer repetition of the association with trustworthiness) blue became associated with that meaning in Western culture. Eventually, the link between blue and truth came to seem irrefutable.

How effective are these color meanings in advertising? Sticking with blue's trustworthiness as an example, you can't overlook that blue prevails for many companies offering financial products (a sector in which trustworthiness is especially desirable): PayPal, Venmo, Citi Group, Bank of America, Chase, American Express, and ING. A number of these companies use blue with red or orange: warm colors associated with dynamism and power. After all, who wants a bank that's all trustworthiness but no action?

Some logos don't always appear in the same color; rather, they are *color-flexible*. Nike's distinctive "swoosh" logo is black on the company website, but the color-flexibility of the logo allows it to appear in a wide ranges of colors (suited to different ages, genders, and tastes) on different types of apparel, such as sneakers, hats, and T-shirts.

Color and brand identity

Brand identity is the power of a company to communicate itself (and its products and services) to consumers. Brand identity includes logos, product packaging, retail design, company uniforms, and any other visual representations of the company. Color is key in brand identity because it's an effective way to unify all the facets of an organization. Imagine if the Starbucks employee's aprons, the straws, and the logo on the cups were all different colors. The sense of a strong brand identity — normally held to together by green — would be diminished.

In this section, you look at a few examples, and explore the meaning and associations that a brand identity's color conveys.

Tiffany & Co. uses an unmistakable light-blue color for its packaging and retail design. What does "Tiffany blue" convey? For a company known for engagement and wedding diamonds, Tiffany & Co.'s somewhat skylike blue conjures *clarity*: one of the principle markers of a diamond's quality. However, Tiffany blue is not quite a sky blue; it's a little greenish. Like blue icing that turns a bit greenish from the yellow of butter, there's something delicious about Tiffany blue. Jewelry is often celebrational, like cake! Besides diamonds, Tiffany & Co. sells gold jewelry and plenty of gold-colored accessories, and the warmth of gold is stunning against the coolness of Tiffany blue.

United Parcel Service uses a characteristic brown color for its trucks and uniforms, with accents of golden yellow. What does "UPS brown" convey? Obviously, the cardboard color of most packages is a good reason for a shipping company to use brown. It's a simple, matter-of-fact connection that makes sense to consumers. As for the brown UPS truck, there is something toy-like about its resemblance to the boxes that it holds. How endearing! On uniforms, the brown is understated and conveys an earthy reliability. There's nothing flashy about the brown of a UPS uniform, yet small gold accents on the logo emblazoned on shirts (and trucks) convey a hint of pride, as if to say, "We are the gold standard of shipping."

Target uses an abrupt, saturated red for signage, store design, uniforms, and shopping carts. What does "Target red" convey? As the purveyor of housewares, clothes, electronics, food, sporting goods, and seemingly everything else, Target needs a strong, unifying identity to hold their brand together. Of course, the name itself — Target — is goal oriented. The bull's-eye evokes certainty, power, strength, and efficiency. Target and its red color shields customers from the overwhelmingness of the in-store experience, as a place where you might get lost (and forget what you came in for). Also, Target sells products that often have brightly colored packaging themselves, so the bold red color unifies the highly disparate shopping experience. Like your actual red Target shopping cart, Target red is the metaphorical umbrella under which your favorite products are carried.

Color and brand identity are not new. In previous centuries, rulers used color to assert their power and the unifying force of their leadership. In medieval England, the white and red Tudor rose (see Figure 9-1, top) was formed to show the union of two ruling houses: The House of Lancaster (represented by the red rose at bottom left) and The House of York (represented by the white rose at bottom right). The Tudor rose also symbolized the end of the War of the Roses, a long and bitter civil war that divided England for more than a century. Subsequent Tudor monarchs such as Henry VIII and Elizabeth I used the Tudor rose in palace décor and royal portraits to assert the Tudor "brand."

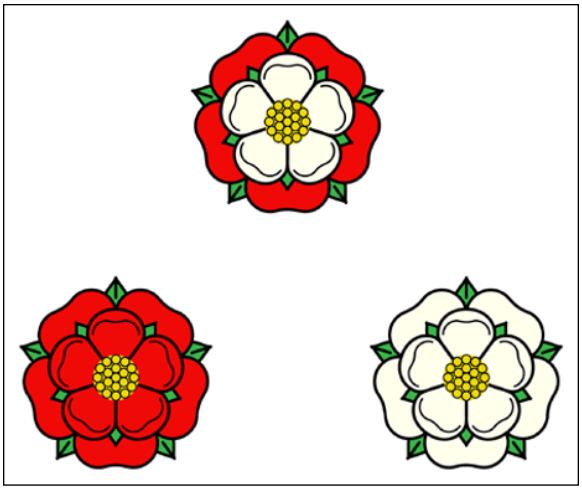


FIGURE 9-1: The Tudor rose (top) with the red rose of Lancaster (bottom left) and the white rose of York (bottom right).

xenial/Adobe Stock

Influencing Your Taste Buds with Color

Do you eat to live, or live to eat? Either way, food is a meaningful part of life that brings both sustenance and pleasure. Restaurants and food manufacturers use color to persuade you to buy their products. Depending on your age, tastes, budget, and health-consciousness, the colors you encounter when you reach for your next food purchase will vary greatly. Different food groups, cuisines, and ingredients have wildly different colors that carry different flavor associations.

Color and flavor associations

The link between color and flavor has been depicted by artists for centuries. Roman mosaics and Egyptian wall paintings show different foods in their colorful glory.

During the Northern Renaissance in Europe, food (along with flowers and objects such as vases) were an important subject for artists working in the still-life genre.

An outstanding example of a food painting from this period is Jacob van Hulsdonck's "Still Life with Meat, Fish, Vegetables and Fruit," from the early 17th century, which is shown in Figure 9-2. The work is a symphony of food color, including the emerald green of artichokes, the fresh white of the asparagus, the rich brown of the cured ham, and the light yellow scoops of butter. I'm not one for pigs trotters, but the color is delicious to my eyes: a somewhat bready but slightly pinkish tone, offset by sprigs of light green.

FIGURE 9-2: Jacob van Hulsdonck, *Still Life with Meat, Fish, Vegetables, and Fruit,* c. 1615–20, oil on panel, the reverse prepared with gesso; 28⅛ x 40 $^{15}/_{16}$ ″.

Cleveland Museum of Art

Moving on from the general cornucopia of color in van Hulsdonck's paintings, *food palettes* are specific color groups made by sampling colors of different food types. I've devised three food palettes for this chapter, as shown in Figure 9-3. My palettes are based on cheeses, vegetables, and cakes, but the food palette possibilities are limitless.

The first item on the menu is a cheese palette. Note how the colors in the palette have a predominance of yellows.

FIGURE 9-3: Three food palettes based on cheeses, vegetables, and cakes.

Top: QMETHODS/Pixabay. Middle: Medienservice/Pixabay. Bottom: Author's image.

Next course is a vegetable palette. Check out the vibrancy and the complementary red-green contrast!

For dessert: a cake palette. The light colors of the icing contrast deliciously with the chocolate browns.

You could use food palettes for devising color schemes for just about any project. I think a living room — or a summer dress — in cheese colors might be quite lovely!

TIP

For instructions on creating your own food palette, see Chapter 13.

Color and taste preferences

Whatever your food preferences, the color of food is an important aspect of its allure. Color also indicates freshness, ripeness, and palatability. Besides providing pleasure and nutrition to us individually, food is part of culture and tradition, bringing people together and building community.

Have you ever loved a color because of its resemblance to the color of a food you enjoy? Color preferences and taste preferences often go together! As a painter myself, I can't count the times I've mixed a color and thought "Yum, salmon sashimi," or "Oh, vanilla frosting," or a myriad of other color and taste preferences.

What are your taste preferences, and how do they shape the way you experience and use color? If you're inspired to buy drapes for your living room because they're the same color as your morning latte, you've discovered the link between color and taste preferences.

Contemporary artist Kemar Keanu Wynter uses the color of food to generate palettes for abstract paintings. Figure 9-4 is a painting titled "ZZ01(Eggs and Salted Tomatoes on Grilled Toast)". In this work, you see the yellow of eggs and a surprising green. (I was expecting red because of the mention of tomatoes in the title, but maybe they're green tomatoes?) Note the flecks of dark in the green triangles on the left. Like a dash of pepper or crumbs from the edge of the toast, the dark color adds flavor to the green.

The painterly blending in Wynter's work should be noted; it is similar to the blending that happens in kitchens, when flavors mix – or don't mix – in varying degrees. Delicious!

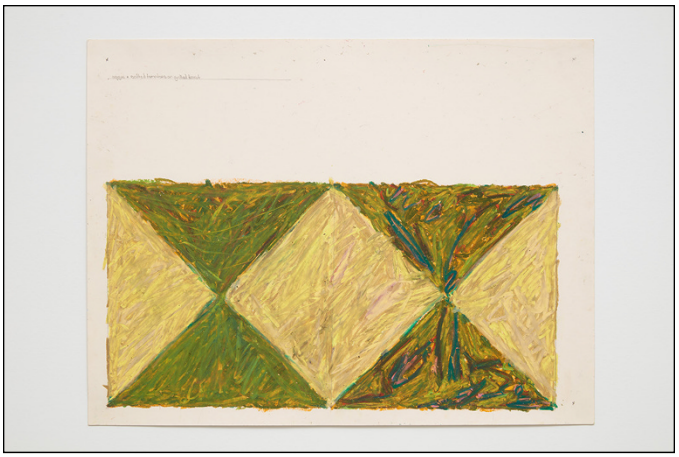


FIGURE 9-4: Kemar Keanu Wynter, *ZZ01 (Eggs and Salted Tomatoes on Grilled Toast),* 2020, graphite and oil pastel on French card paper, 19 x 25″.

Courtesy of the artist and Klaus von Nichtssagend Gallery, New York.

Affecting Emotions and Mood with Color

The experience of emotion and mood may be described in words, but the experiences of emotion and mood come before language. For example, the experience of anger might be described but the actual experience of anger is a psychological and physical sensation that is not rooted in language.

Likewise, color perception is outside language. We have a word for *red,* and we might describe red as being like a tomato or an apple. After we've exhausted our words, the experience of red remains a visual experience: A sensation that can't be fully conveyed with language.

REMEMBER

The link between emotions, moods, and colors stems in part from the fact that they share a non-linguistic origin. When working creatively with color, be prepared to move beyond conventional meaning and embrace your responses, whatever that means to you. When you look at a vivid orange sunset, or the expanse of blue ocean, or a massive gray mountain, or the green of a clover, what do you feel? Do you experience emotions? Moods? Before you put your experiences into a painting, poem, or photograph, an authentic response is required!

If you have no response, that's okay too. Responses to color have a way of sneaking up and surprising us when we least expect it. Be aware: Powerful responses to color don't always come from the real world. The colors in your dreams and in your imaginings are also potential sources of inspiration.

Note that emotion and mood are not the same. *Emotion* is a psychological (and sometimes physical) feeling such as sadness or happiness. *Mood* is more like a

lens tinged with emotion through which we see the world. Moods are also linked to different time periods, places, and events in ways that make them different from emotions.

Despite their differences, emotion and mood are mysterious and not always within our control. Try as we may, emotion and mood can't be completely suppressed not conjured at will. The mysterious nature of emotion and mood is what makes them so intriguing.

Color and emotion

A good way to understand color and emotion is with art that explores links between the two, as in this poem by Emily Dickinson:

> A Light exists in Spring
> Not present on the Year
> At any other period —
> When March is scarcely here
>
> A Color stands abroad
> On Solitary Fields
> That Science cannot overtake
> But Human Nature feels.
>
> It waits upon the Lawn,
> It shows the furthest Tree
> Upon the furthest Slope you know
> It almost speaks to you.
>
> Then as Horizons step
> Or Noons report away
> Without the Formula of sound
> It passes and we stay —
>
> A quality of loss
> Affecting our Content
> As Trade had suddenly encroached
> Upon a Sacrament.

In a nutshell, the poem "A Light Exists in Spring" refers to the color of sunlight in springtime that is bright and visible from far away. Let's call that sunlight a sunbeam. As the season changes, the particular quality of the early-spring sunbeam disappears. Dickinson compares experiencing the loss of the sunbeam,

which she experiences bitterly, as fundamentally inappropriate or wrong, using the metaphor: "As Trade has suddenly encroached / Upon a sacrament."

Getting so upset about a sunbeam sounds pretty irrational, right? And to compare it's passing to being like encroachment on a sacrament sounds a bit extreme, doesn't it? Why all this drama over a sunbeam that she knows is going to come back next year anyway?

I believe that Dickinson was in touch with the part of herself — an emotional, even irrational part — that experienced the disappearance of the sunbeam deeply. There is even a hint of anger over the loss, a feeling that the sunbeam is gone and it's not fair! The poem is powerful because she is describing a state of loss — and emotion — that most adults would unthinkingly and automatically suppress (or dismiss). With profound insight and intelligence, she is giving voice to a part of herself — and a part of us — that simply feels loss, not the part that rationalizes or reconciles loss. And we all feel loss (even over small things) whether we acknowledge our feelings or not.

In exploring the link between color and emotion for yourself, try being a bit Dickinson-like. Turn to the part of yourself that experiences color emotionally. Where does color take your imagination? How do you feel when it appears or — as is the case in Dickinson's poem — disappears? Start journaling about your color experiences, keeping track of your responses to the colors you observe.

The ability to observe and respond to refined emotional states, subtle colors, and careful insights are tremendous strengths! Dickinson observed the color of a light — and its passing — as a way to muse upon loss, which is a fundamental part of human experience. Artistic genius in action, inspired by color!

Art history offers limitless opportunities to explore the link between color and emotion. *Expressionism* is an modern art movement with origins in northern Europe at the beginning of the 20th century. As its name implies, Expressionism valued the expression of the artist's emotions and subjective feelings over recognizable or realistic subjects. The expressionists used color to convey the inner worlds of thoughts, feelings, and emotions, as you can see in Figure 9-5, a German Expressionist painting by Ernst Ludwig Kirchner titled *The Visit — Couple and Newcomer.*

One can only guess at who these people are and the exact nature of this visit. Is the man walking up the stairs — neatly dressed in a suit — welcome or unwelcome? Is he a doctor, a relative, or an interloper? The bright yellows, oranges, and reds in the painting speak to an atmosphere of heightened anticipation as the visitor enters the room.

FIGURE 9-5: Ernst Ludwig Kirchner, *The Visit — Couple and Newcomer,* 1922, oil on canvas, 47½ x 47⅝″.

National Gallery of Art

The visitor and the woman appear to be locked in a tense gaze. The pink color in both of their faces (the same pink that appears to be reflected on the stair railing and in the wall) seems to draw them together. Are they blushing at the sight of each other? By contrast, the face of the man sitting on the blue and orange chair is a duller pink, which makes him appear to smolder as he takes a drag off his cigar or pipe.

Other colors in the painting contribute to an overall high-key sense of excitement: the flashes of green near the window (perhaps referring to a verdant expanse of landscape outside the tiny window) and the vivid blues that make up the clothes and upholstery. Of course, none of these colors are realistic. But they convey a psychological reality — a set of feelings and emotions — that is quite palpable. You don't know exactly what is going on in this work, but you experience the emotions nonetheless: anticipation, excitement, tension. In the context of this painting, the colors convey these emotions.

Soon after it began, Expressionism quickly spread across the globe and influenced artists for decades to come. Expressionism gave voice to artist's emotional reality. It's the reason we believe that the inner world of the artist is visible in the artwork. Unlike the conventional color meanings in consumer culture, color in fine art is not clearly defined. And thank goodness! Color in fine art lets artists — and viewers — form individual associations with colors and build personal meaning. The American Expressionist Mark Rothko famously said that his yellow paintings were somber, while his gray paintings were joyful! Defiantly and courageously, Rothko established his own set of color meanings.

REMEMBER

Despite what artists may say about their colors, viewers are not required to understand — or agree with — an artist's color meanings. Color in art is wide open to interpretation. If you confronted one of Rothko's huge yellow paintings, how would you feel? There is no wrong answer.

Thus is the freedom of color in art. Freedom is crucial for the health of individuals and the health of culture. We live in a world of dictated meaning and painfully conventional ideas about color. Extraordinarily precious are the pockets of culture where we are free to build our own meaning with color. By making your own decisions about color's meanings, you're exercising freedom and inspiring others to do the same. Worthwhile work indeed!

Color and mood

Your personal moods are private psychological experiences that shape the way you see the world. In visual culture, color is used to embody and express mood in a way that is sharable and consumable.

TECHNICAL STUFF

How is mood different than emotion? While emotions tend to be experienced in shorter-term bursts in response to events and circumstances, moods are comparatively longer-lasting and subtler. While a person experiencing anger might scream out in a momentary cry of emotion (and just as quickly recover emotional equilibrium), a person in an angry mood might seethe or ruminate over a long period of time. (When moods last or recur over a long time, they can become personality traits like grumpiness or cheerfulness.) The longer-term, subtler quality of mood means there is more time to experience more of the world while simultaneously experiencing the mood. In this way, mood can be like a lens through which the world is perceived.

Of course, we experience — and retain memories of — a wide range of personal moods. Thus, we're receptive to moods presented in artwork, film, and other visual experiences — and color often plays an significant role in conveying mood. Figure 9-6 shows a photograph of the ruins Whitby Abby, a 7th-century monastery in England. As a fragment of its original glory, the ruin evokes a mood of mystery: What exactly did it look like when it was built? In spite of its hollowness, its architectural beauty is still visible in its gray-brown walls. The colors in the photograph enhance the overall mood: The dull sky is heavy and somber, and the transition from green to brown grass speaks to wistfulness and a loss of vitality.

Contemporary photographer Tiffany Smith uses daylight and bright saturated color to capture the spirit of Caribbean locations and the people who live there. In the portrait in Figure 9-7, a woman in a bright skirt and rich brown shirt smiles slyly at the camera, as if knowing something we don't. Behind the woman is an out-of-focus expanse of sun-dappled green that serves as a shimmering

backdrop for the portrait. Bags of red fruit add another contrasting color note in the picture. The color in this photograph infuses it with an upbeat, even glamorous mood.

FIGURE 9-6: A photograph of Whitby Abby, England.

TimHill/Pixabay

FIGURE 9-7: Tiffany Smith, *Jamaican Apple,* 2014, archival inkjet print, 16 x 20″.

Photo by Tiffany Smith

Moods are also transportive, whisking us away into different spheres of experience. A classic example is the use of color in *The Wizard of Oz.* A tornado blows Dorothy out of gray Kansas and into the color-drenched, magical world of Oz. To this day, viewers are transported by the color of Oz, which somehow seems as novel as you might imagine it seemed to a viewer in 1939 — before color film was common. Of course, different genres of film tend to use color differently. In the 1973 horror classic *The Exorcist,* the overall color is muted, with lots of darks to heighten the terrifying plot as it unfolds.

Moods are elusive and not easily conjured at will. But visual cues, including color, set the stage for our moods to take shape. Think of how the colorful decorations at a birthday party invite guests to participate in the mood of the event!

Getting Personal with Color

Answer the following questions:

- What color is on the walls in your living room?
- What colors are you wearing right now?
- What color is your car?
- What color is your favorite kitchen utensil?
- What color is your favorite pair of sneakers?
- What color are your bedsheets?
- What color is your favorite purse, backpack, or briefcase?

Your answers show what kinds of colors you tend to surround yourself with. Are your colors all neutrals like black, white, gray, brown? Or are your colors bright and saturated? Or are your colors a mixed bag of neutrals and bright colors? If none of these three descriptions apply, come up with your own way to describe your colors.

Whether you thought deeply about it or not, you probably made a decision about the color of several of the items in question. However, the range of color choices that were available to you were decided by someone else. Marketing teams, designers, and consumer researchers select colors for manufactured items, which are presented to us as choices.

In our culture, color is strongly associated with identity. Culture dictates what is appropriate and not appropriate for different types of people. Color taboos around

gender and age are especially powerful. Imagine an adult man answering "pink, magenta, purple" as the colors of these items. If that makes you the slightest bit uncomfortable, you've uncovered just one of many color taboos! Color taboos are culturally constructed, and do not point to any intrinsic color meanings.

Color personality types

Color personality types describe the color tendencies of individuals, and how they use color. The four main color personality types are outliers, expressives, conformists, and iconoclasts.

Color outliers are people who use color in a way outside of what is stereotypically appropriate (or considered "normal") for their identity group. For example, suppose a middle-aged heterosexual man who is also a surfer purchases a pink and purple surfboard. He would be expressing his identity as a color outlier with that particular purchase (although he may not behave like a color outlier with other purchases, for example in his choice of clothes for the office).

Color expressives are people who use consumer culture to express themselves. Color expressives believe that the choices offered to them by consumer culture gives adequate opportunity to express themselves. Color expressives view consumer culture as a palette, and their life is the canvas! The person who decorates their home with great thought as to the precise colors therein is a color expressive. The kid who is going through an orange phase and demanding orange everything is a color expressive, too.

Color conformists are people who make personal color choices based on how well those choices mesh with what is expected of them in a larger social context. Although they appear to disregard color, color conformists may be the choosiest color personality of all. After all, the decision to eschew color is as much a decision as the decision to embrace color. Watch out for color conformists. Their taste for color is sometimes frighteningly refined. For example, a color conformist might know whether a particular shade of khaki is still too light and summery for Sunday brunch in mid-April.

These color personalities are not fixed in stone. People assume different color personalities as they move into different stages of life and assume different roles. And, of course, color personalities overlap. A color outlier might be a color expressive, too. The corporate executive in the classic navy suit who chooses a weirdly chartreuse necktie is a color conformist and a color outlier at the same time! In this way, most of us are *color fluid.*

Color iconoclasts are people who want to tear down color taboos. Idealists at heart, color iconoclasts believe individuals have free choice and will express color

preferences authentically if allowed to do so. Color iconoclasts are rare in our world. People in the arts and humanities have more freedom to be color iconoclasts. They also have the tools and knowledge to make paintings, set designs, films, and other cultural products where color can roam free.

As a painter, I identity as a color iconoclast and a color outlier. However, in my clothing, I am painfully color conformist. And probably like you, ultimately color fluid!

Color and group identity

If you walk in the financial district of New York City during lunch hour, you'll see a sea of predictable colors in what people wear: plenty of gray, blue, and white. Black (associated with evening wear such as tuxedos or service sector uniforms of waiters and security guards) is not common. Brown (too earthy for the glamourous word of high finance) is noticeably absent. Accessories such as ties and socks offer opportunities to make a small but noticeable color statements. What do gray, blue, white — and small amounts of colorful colors — signal, and to whom is the signal sent?

The colors of business attire is crucial for assimilation into the workplace culture. The colors say: "I'm a part of this culture. I belong. Part of my belonging comes from the fact that I am not doing or wearing anything anomalous." The colors of business attire set a tone in the workplace: We are alike, and we are on the same team. The colors of members of any group function similarly, from the anti-fashion fashions of an alternative music band to bridesmaid dresses at a wedding. Color and group identity is everywhere: From the teeniest local club to nation states, humans associate colors with their tribe.

The men in Figure 9-8 are at a University of Alabama football game. To express their group identity, they've painted themselves red. However, their red color is not the glue that binds them; their relationship with the college and with each other binds them. But red is an important symbol of their connection and reflects their need to tell the world: We are on the same team, and our colors show it!

Subjective color

I hope this chapter has helped you better understand the different ways in which meaning and color are linked in culture, in art, and within the individual. I end with a description of subjective color, which I think is the most important idea in the chapter. I want you to leave the chapter with subjective color and its definition firmly in mind.

FIGURE 9-8: Fans at a University of Alabama football game.

The Library of Congress

REMEMBER

Subjective color is the idea that color can mean anything to anyone at any time. This idea is supremely important because it's freeing. If you want to embrace culturally determined modes of color meaning, that's perfectly okay. But inventing your own color meanings is also okay and even encouraged. New ideas come from freedom, and we all need more freedom in our lives!

Each person lives in their own color world. You and I may look at the same green color, but we "hold" that color differently. It repels one and attracts another; it is discarded by one and saved by another. Even if we both save the color as among our favorites, it will be contextualized by other preferred colors.

Like the yellow that expressionist painter Rothko considered somber, we all hold unique associations with color that can never be incorrect. The world may tell you that red means romantic love, but if you think red means altruism, you're not wrong. Celebrate the inconsistency between what you're told and what you believe! Color is probably not the only department in your life in which such a conflict exists.

4 Color at Work

IN THIS PART . . .

Become acquainted with color systems such as Pantone and CMYK.

Learn about color in painting, drawing, dyeing, collage, and digital.

IN THIS CHAPTER

- Understanding digital color systems
- Exploring standardization color systems
- Discovering Munsell's color tree
- Experiencing Pantone's color of the year

Chapter 10
Systems of Color

With the advancements of science and industry in the 18th and 19th centuries, more and more colors were discovered, observed, created, and named. With this growth came the need to categorize and communicate about color effectively.

The human eye is capable of perceiving about a million different colors as well as very subtle distinctions between similar colors. Given the vastness of color and the subtleties of differences between colors, how can color be communicated in a consistent manner? How can color be organized to achieve certain aesthetic effects? Certainly, these questions motivated those who developed the first color systems.

Early color systems created the foundation for the color systems we use today: from the paint chips in the hardware store to the digital color picker in Adobe Creative Suite programs.

Understanding the Types of Color Systems

There are two different types of color systems. *Standardization systems* specify, categorize, number, or name colors with the intention of communicating exact colors. For example, the comparatively early color system *Werner's Nomenclature of Color* used color swatches and precise written descriptions of color (along with color comparisons with different specimens) in an attempt to standardize color

for all readers. What exactly is greenish-gray? It's the color of the feathers on this-or-that bird, and it's the color of the bark of this-or-that tree! *The Atlas of the Munsell Color System*, published in the early 20th century, numbered colors according to a set of three characteristics: value, hue and chroma. The Munsell system remains widely used today.

Application systems are not concerned with standardization. Rather, they present specific ways to use color. For example, Itten's color contrasts (covered in Chapter 6) explain how to use color according to binaries (such as light or dark, warm or cool, saturated or desaturated) to achieve different effects. Mary Gartside's system uses color blots to guide users in color mixing to achieve a convincing sense of light and shadow on the painter's subject. Despite being written over 200 years ago, some of Gartside's ideas remain surprisingly applicable.

The color dictionary of Sanzo Wada combines a standardization system with an application system. He provides readers with a numbered set of colors along with examples of how the colors might be used as color combinations in fashion, housewares, and other manufactured objects.

Standardization Color Systems

The standardization systems available today are advanced and reach across the globe. A designer in New York can specify a color, and a manufacturer in Asia can know exactly what color the designer wants. As long as all players are using the same system, color remains consistent. Even if the designer and manufacturer see color differently (due to biology, light conditions, or the variable color on their computer monitors), the requested color is specified by numbers that guarantee a perfect match. However, color standardization hasn't always been so clear cut.

Werner's color nomenclature

In 1805, the renowned geologist Abraham Gottlob Werner wrote *A Treatise on the External Characters of Fossils* (in Werner's day, *fossil* meant *mineral*). The book had detailed descriptions of the properties of different minerals, such as weight, brittleness, smell, taste (!), and color. In an age before color reproductions, written descriptions of color (which often included comparisons to things the reader was likely familiar with) were an important way to communicate information about color. Werner's writing about color shows his sheer determination to communicate very specific colors to his readers. For example, here's his description of a color he calls leek-green:

Leek-green; is a dark green colour inclining to a little brown, and which appears to be a mixture of dark grass-green, a little brown, and a very little ashes-grey. Its name is taken from the leek. It nearly agrees with the sap-green of painters. Of this colour we have Prasium from Breitenbrunn, near Schwartzberg in Saxony, most Jade, Asbestus from Zölitz, Actynolite from Krebsberge near Ehrenfriedensdorf.

It's amusing to imagine Werner studying a leek and thinking about what colors make up its green. Werner wrote dozens of color descriptions, and his book demonstrates tremendously thoughtful, even poetic, color observations.

The Scottish painter and teacher Patrick Smythe admired Werner's approach to color, and used his system of matching colors to minerals as the starting point for his own book, adding comparable colors found in plants and animals. Smythe also added small color swatches next to each of the 108 colors in the book. Smythe's book, titled *Werner's Nomenclature of Colours*, was published in Edinburgh in 1814. It soon became a widely used reference for artists and scientists of the day. Charles Darwin himself used it to record colors of specimens while on expeditions.

It's remarkable that such a small catalogue of colors was once thought to be a comprehensive color system. To leaf through *Werner's Nomenclature of Colours* is to peer into a time before the proliferation of color that we know today. A time when the yellow of a goldfinch or the blue of a flax flower were some of the most vivid colors people saw in their lifetime. I speculate that color perception was subtler in Werner and Smythe's day, and that small instances of colorfulness were exceedingly precious.

Munsell color system

Atlas of the Munsell Color System was written by Albert Henry Munsell and published in 1913. Born in 1858, Munsell was an American painter and teacher who observed the need for a standardized system of color. Munsell's big idea was to divide color into three distinct characteristics: hue, value, and chroma. Using these characteristics, Munsell created a three-dimensional color space that captures the true vastness of color and the subtle differences between similar colors.

As you might recall from Chapter 4:

Hues are is fully saturated color (such as colors from the color wheel)

Values are is white, black, and all possible grays in between

Tones are hue plus grays

When Munsell uses the term *chroma,* he is referring to *tones.* Hues that are mixed with increasing amounts of gray (regardless of the value of the gray) become less intense. This lessening of intensity is also known as *desaturation.*

Figure 10-1 shows a cutaway section of Munsell's three-dimensional color tree, which — like a tree — might be thought of as a very irregularly shaped globe. As you can see, the central pole is a grayscale, the north pole is white, and the south pole is black. Between is a gradation of values.

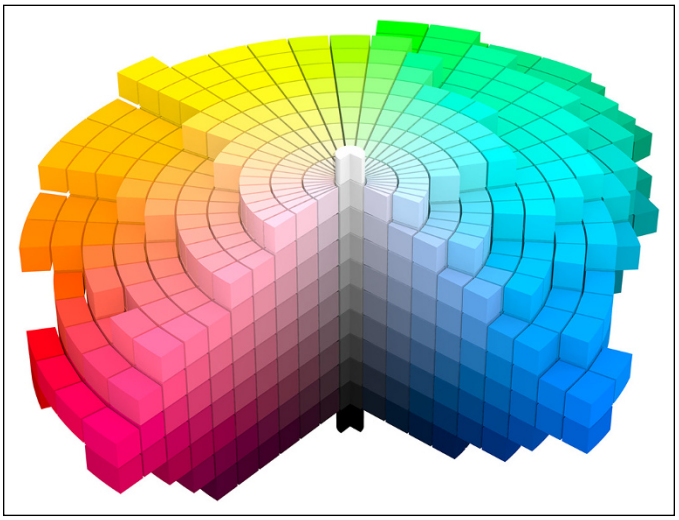


FIGURE 10-1: The Munsell color tree.

SharkD/Wikimedia Commons/CC BY-SA 3.0

Closest to the central pole are the least saturated colors, ranging (vertically) from darkest to lightest. In individual continuums (which may also be called branches) originating from the central pole, each color colors becomes increasingly saturated (in incremental steps) toward the surface of the tree. Hues are found at the end of continuums (or branches) that originate at values similar in light intensity to the hue.

As described in Chapter 4, hues themselves have different light intensities. For example, purple is the darkest hue, and yellow is the lightest hue. In Munsell's color tree, a certain number of incremental steps exist from the hue of yellow to the light gray that corresponds to yellow's light intensity. A different number of incremental steps are between the hue of purple and the gray that matches its light intensity. Thus, the branches are different lengths, resulting in an overall shape that is aptly called a tree.

Figure 10-2 shows a pages from *Atlas of the Munsell Color System.* You see different hues (from top to bottom: yellow, green, blue, red, purple) extended out from the value corresponding to the light intensity of each hue. You also see the incremental steps between the hues and the values at the pole.

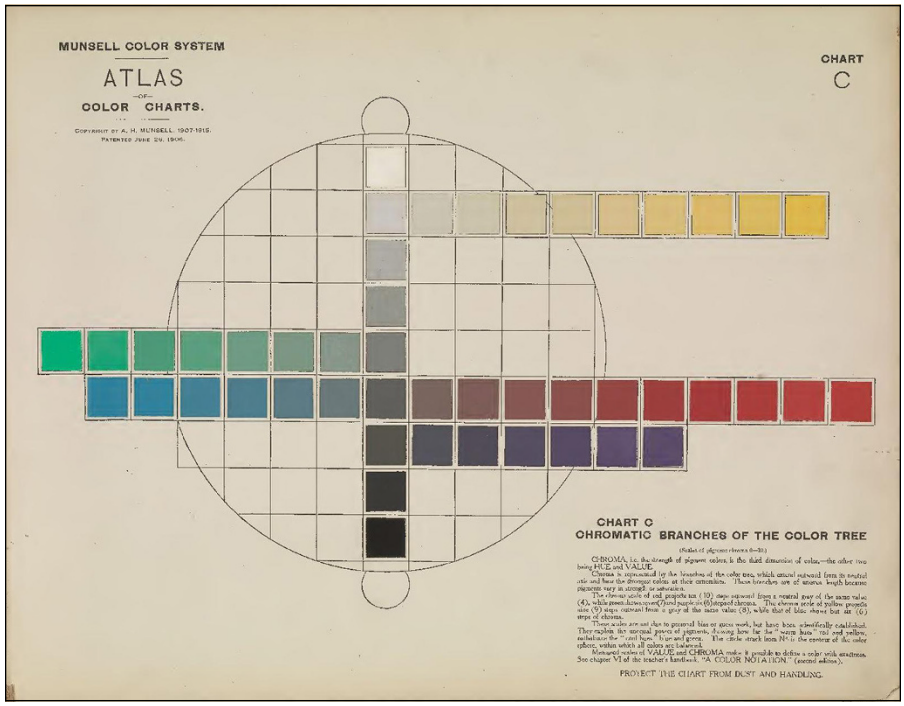


FIGURE 10-2: Cross-sections of Munsell's color tree from *The Color Atlas.*

Jacob Rus / Wikimedia / CC BY-SA 3.0

The beauty of Munsell's system is that it shows how hues are changed by the addition of different values of gray in standardized, incremental steps. A vast number of colors are identified this way. Because each step is individually numbered, we can quantify exquisitely subtle differences in color.

The standardization of color in the Munsell system enables different manufacturers to easily specify and reference color. For example, suppose that a company selects a particular orange to use when producing spatulas. Every player in the chain of manufacturing (designer, dye-makers, fabricators, package designers) uses the same numbered color, ensuring precision and consistency throughout the process.

The Munsell system is widely used also by scientists and researchers. The United States Department of Agriculture uses the Munsell system to identify soil samples.

For example, soils rich in the mineral hematite are reddish in color, while soils containing the mineral jarosite are pale yellow. The trusted Munsell system is used also at archeological sites and in criminal investigations.

The Munsell system has also shaped the way color is used in digital applications. Look at the color picker from Adobe Photoshop in Figure 10-3. As you can see, color is broken up in a distinctly Munsellian way: hue at the upper right, value at far left (from top (lightest) to bottom (darkest)), and the wide range of different chroma in the center area of the picker.

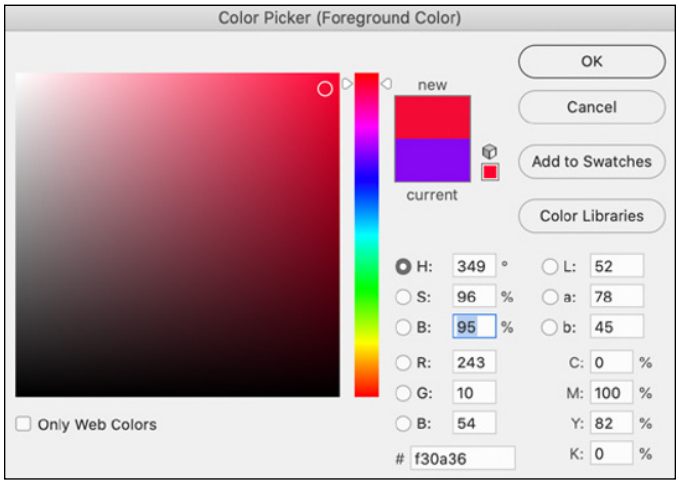


FIGURE 10-3: Color-picker in Adobe PS.

Color-aid color system

Color-aid is a color system that you can get your hands on, literally! Widely referred to as "color-aid paper," Color-aid comes in sets of 220 or 314 sheets of paper, each printed with a different color. Do you remember the sense of wonder when you opened your first box of crayons? Opening a box of Color-aid creates a similar "I'm unlocking a world of color" feeling. And Color-aid even smells like crayons, too!

Color-aid sheets in the package are arranged like a spectrum. Fan out the sheets and behold the beauty of the individual colors. Impossibly smooth and utterly matte, you can almost sink into the colors. The matte surface prevents reflections, so Color-aid paper can be illuminated by direct light sources without any distractions. The only thing you see is color! It should be noted that Color-aid paper picks up scratches easily and may show oil from fingers. Best to handle Color-aid with clean hands and pick the sheets up from the sides if possible.

Flip a piece of Color-aid over, and you'll see letters and numbers printed on the back. Consult the accompanying instruction booklet to decode! In a nutshell, hues are indicated with letters like R (red), O (orange), and Y (yellow). T stands for tints (hue + white), S for shades (hue + black), and P for pastels, which in Color-aid code means tones (hue + gray). Numbers correspond to increasing whiteness, blackness, or grayness (for example, T3 is lighter than T2). Also in the Color-aid pack are LT (light tints), LP (light pastels), DS (dark shades), and EX (extra hue, meaning very saturated hues that are additional to the 24 major hues). Color-aid also contains a sheet of black, a sheet of white, and more than 15 grays.

Color-aid is limited in comparison to the hundreds of thousands of colors that the human eye can see. Still, the perception of color without the variables of digital (screen calibration, brightness, make and model of device) make Color-aid a valuable way to work with and learn color in our digital age.

Color-aid has been around since 1948. Josef Albers himself (the color theorist covered in Chapter 5) used Color-aid in his classes. Color-aid continues to be widely used in color theory classes today, as shown in the student works in Figure 10-4. The beauty of Color-aid is that it enables the quick sampling and comparison of a wide range of colors.

FIGURE 10-4: Student work with Color-aid.

Courtesy of Zoe Reifel

Color-aid is useful for creators who want to make palettes and try color schemes before working color out in their chosen medium. Easily cut with scissors and adhered with a glue stick, Color-aid is easy to collage together or combine with other media. Painters like me have it around the studio as a creative tool. Stuck on color? Choose a color aid sheet at random and see where the color takes you.


TIP

Color-aid can be used to build color awareness and color vocabulary. Can you visualize what an orange-yellow with some dark gray might look like? If you can't, you probably have more to learn about color's components. Studying the codes on the back of Color-aid sheets can help you do that.

Pantone color systems

With millions of users all over the world, *Pantone* is perhaps the most widely used color system. Pantone is known for precise color standardization across many different materials and surfaces. Each Pantone color has a number, which is used across suppliers to specify colors. The color of your favorite silicone kitchen gadget or cotton T-shirt may have been specified with Pantone colors.

Pantone has different systems for different industries. *Pantone Matching System* (PMS) is for graphics (print and digital). *Fashion, Home + Interiors System* (FHI) is for clothing, home goods, fabric, paint, cosmetics, and accessories. Pantone also carries Munsell Color Systems used for industrial, scientific, and government organizations. Each of Pantone's systems offers products such as color sample books (in both paper and fabric), fan decks, and digital tools. These tools are behind the scenes of the colors of everyday life!

In addition to offering color solutions, Pantone influences color trends. For over 20 years, Pantone has released the Pantone color of the year, which (according to Pantone's website) is selected based on careful analysis of global events and trends such as art, fashion, design, socio-economic conditions, emerging technologies, and even sporting events. For 2022, that color is Veri Peri, a particular shade of bluish-purple (the *peri* is short for *periwinkle*, known to be a bluish-purple). Executive Director of the Pantone Color Institute Leatrice Eiseman elaborates on Veri Peri:

As we move into a world of unprecedented change, the selection of Pantone 17-3938 Veri Peri brings a novel perspective and vision of the trusted and beloved blue color family, encompassing the qualities of the blues, yet at the same time with its violet red undertone, Pantone 17-3938 Veri Peri displays a spritely, joyous attitude and dynamic presence that encourages courageous creativity and imaginative expressions.

Eiseman & Associates

Past colors of the year have included Classic Blue (2020, a somewhat dark, slightly dull blue), Living Coral (2019, a warm pink), and Greenery (2017, a yellow-green). Pantone's website is worth visiting to check out current and past the colors of the year. You can also find fashion trend reports and articles about color, along with a myriad of products for designers and industry experts.

Application Color Systems

You now know that standardization systems make color identifiable and consistent for a multitude of users. However, these systems don't give users any information about how to work with color. In this section, you look at *application systems*, which do just that: provide users with ways to apply color using a variety of methods and approaches.

Mary Gartside's color blots

In 1808, British watercolorist Mary Gartside wrote the lengthy titled: *An Essay on a New Theory of Colours, and on Composition in General: Illustrated by Coloured Blots Shewing the Application of the Theory to Composition of Flowers, Landscapes, Figures &c.* This was a second and "improved" edition of a previous 1805 edition; Figure 10-5 shows a blue color blot from the 1805 edition.

FIGURE 10-5:
Mary Gartside's blue color blot.

An accomplished painter and a devoted teacher, Gartside wrote her book with her students in mind. Gartside guides readers through the complex world of color and provides practical advice for its use. She addresses color perception and space. For example, she writes that light colors (and warm colors) advance, while dark colors (and cool colors) recede. In keeping with her

observations, Gartside suggests adding light colors (and warm colors) to areas of subjects that project out, while using dark colors (and cool colors) for distance. In another section, Gartside describes colors that form a bridge between other colors according to the "harmonious succession" of colors as they appear in the rainbow:

. . . Yellow to Green, and from Green to Blue, or in a like manner, from Yellow to Orange, from Orange to Red, from Red to Violet, and from Violet to Blue. Thus the eye travels gradually from one to another of the three primitive colors, without being offended by too quick a transition from one to the other, which would be the case, were it not for the intermediate tints of Green, Orange, and Violet.

Sound familiar? That's because Gartside described what is commonly called *analogous colors:* three adjacent colors on the color wheel (covered in Chapter 8). Analogous color continue to be a widely used rule for applying color in art and design today.

Gartside's book contains hand-painted watercolor blots, each named after the predominant color they contain. (In my research, I viewed a copy of the later edition at the New York Public Library. The watercolors are beautiful and retain their vividness after more than 200 years!) The blots were intended to be used primarily as a guide for painting flowers. Surprisingly abstract for 1805, the blots were carefully painted to show smooth transitions between colors.

Look at the Crimson blot in Figure 10-6. The lightest pink at the center of the blot indicates the highlight color for a red rose; the slightly darker red surrounding the highlight color provides a transition to the next darkest color, and so on. Like the "harmonious succession" of colors in the rainbow (which Gartside also referred to as "harmonizing tints"), the transitional colors in the blots are easy on the eye and not too abrupt. This is a key by which painters can mix their paints.

FIGURE 10-6:
Mary Gartside's crimson color blot.

Gartside's book is amusingly conservative by today's standards (she warns against colors "promiscuously jumbled together") but is also a noteworthy example of a colorist's attempt to provide a structured way to work with color. By providing readers with an abstract blot (rather than a painting of a flower itself, with all its color properly applied), Gartside gave her readers some leeway to work color problems out for themselves, allowing for more freedom and improvisation than might be allowed otherwise.

TIP

For tips on making your own Gartside style color blots, refer to Chapter 13.

Sanzo Wada's dictionary of color

The Japanese publisher Seigensha Art Publishing, Inc. recently released *A Dictionary of Color Combinations,* a reissue of Japanese artist Sanzo Wada's multivolume color combination dictionary originally published in the 1930s. Sanzo Wada was born in Japan in 1883 and studied both traditional Japanese and Western-style painting. A successful artist, his interests branched out into craft, design, and color. Motivated by a lack of a standardized color system in Japan, he established the Japan Standard Color Association in 1927, with the aim of compiling traditional Japanese colors (and their names) with color samples. *A Dictionary of Color Combinations* was born!

The dictionary contains combinations of two, three, four, five, and seven colors. The combinations are based on two main color contrasts: similar tones and contrasting tones. More contrasts are born from these, such as dark similar tones and bright contrasting tones. The combinations are grouped according to the months of the year, kimonos, clothes, lacquerware, wrapping paper, and other categories. Printed opposite the combinations are images of objects in which the color combination is used. The back pages of the dictionary include multiple swatches of each color in the book, so the reader may cut and create their own color combinations. Figure 10-7 shows one of my color combinations, with swatches cut directly from Wada's book. I simply selected colors that I liked.

Kandinsky's color

The Russian modernist artist Wassily Kandinsky (1866–1944) is known for inventing a world of abstract shapes and colors that express sound and mood. In his 1912 book *On the Spiritual in Art,* Kandinsky devotes a section titled *Effects of Color* to color and its characteristics. Kandinsky's section on color doesn't give directives for how to use color. However, he does attribute specific meanings and descriptions to different colors, implying that they are to be used for creating specific effects. For this reason, I include Kandinsky under the application color system heading.

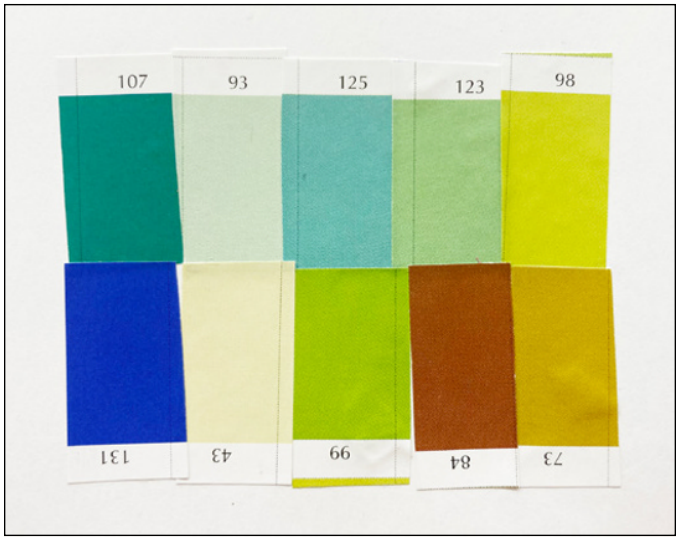


FIGURE 10-7: My color combination from Sanzo Wada's dictionary.

WARNING

Kandinsky writes about color with an air of seriousness that is quite commanding. His ideas are also problematic because he attributes moral associations with colors in a way that doesn't feel flexible or contemporary. However, approached with a casual frame of mind and taken with a grain of salt, Kandinsky can enliven and awaken your thoughts about color.

Kandinsky saw colors as "doing" this or that. In other words, he saw colors as verbs. He also categorized all colors into four so-called sounds: cool, warm, light, and dark. He begins by comparing yellow and blue, which embody the warmest (and lightest) and coolest (and darkest) "sounds." Figure 10-8 shows a yellow and blue circle. Kandinsky sees yellow as eccentric (spiraling out from itself) and blue as concentric (spiraling into itself). Likewise, yellow advances and blue recedes. As the combination of these two dynamic colors, green expresses tranquility and stillness, as if the "sounds" of yellow and blue have cancelled each other out.

For Kandinsky, gray is motionless, red is triumphant, brown is restrained, and orange is the sound of a viola. But rather than taking Kandinsky's word as gospel, consider how you might form your own associations and meanings with color. Do you see color as a movement or a sound? Your answers could form your own color system, made of your personal and subjective experiences of color.

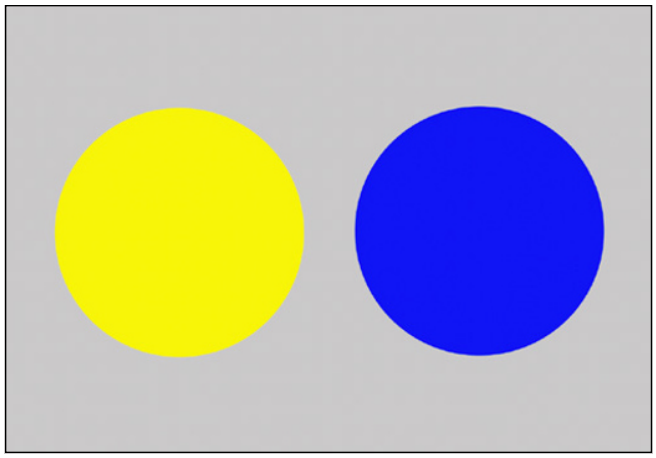


FIGURE 10-8: Kandinsky's eccentric yellow and concentric blue.

Checking Out Digital Color Systems

Digital color systems are used in digital devices and for digital output, such as color printing. The number of colors possible on digital devices exceeds an unthinkable 15 million colors. Because digital devices are backlit, the colors often appear brighter and more stimulating than color observed in the non-digital world. (Although observing the colors in stained glass or the color of the sky at sunrise might make you think twice about what I just wrote.)

When working with color in digital formats, it's important to know the unique aspects and limitations of the color systems at play. For example, let's say you shot a digital image of the sunrise, with all its vivid color. When you print that image on a piece of paper, you may be disappointed to see that the colors are less spectacular than in the fiery, glowing image on your desktop. The disparity of image quality has to do with two different color systems at play and the *gamut* (or color range) of each color system.

RGB color system

Digital devices such as phones, computers, and cameras use a color system based on the mixing of light. As described in Chapter 3, the primary colors when mixing light (as opposed to mixing substances such as paint) are *red*, *green*, and *blue*. And when these primaries are all mixed together, the result is white light.

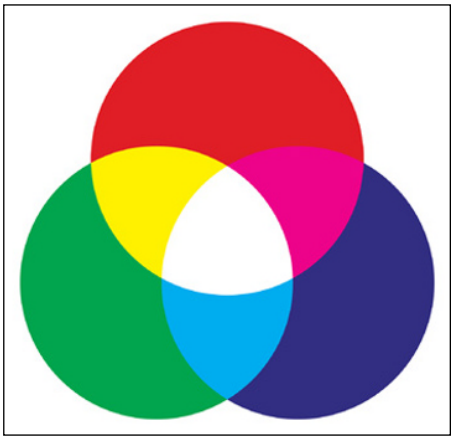
Color mixing with light is known as *additive color mixing* because the different wavelengths of lights are added to create new colors:

green + red = yellow

red + blue = magenta

green + blue = cyan

Figure 10-9 shows additive color mixing.



petrroudny/Adobe Stock

FIGURE 10-9:
Additive color mixing.

The color system for your digital devices is known as *RGB*: red, green, and blue. Even before the digital age, the RGB system was used in film photography to create color images. Figure 10-10 shows an image separated into its RGB layers. When those layers are placed on top of one another, the colors mix and form the naturalistic colors you see in the top-left image.

REMEMBER

In addition to the monitors of the digital devices themselves, images opened up in digital imaging programs such as Adobe Creative Suite use RGB color. When you create or work with images in Creative Suite, you're dealing with the RBG color system and the millions of colors available. (You can change settings to work with a lower number of colors for certain purposes; more on that later.)

CMYK color system

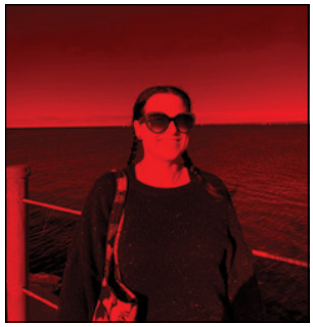
Unlike the RGB system (which uses light to mix color) the CMYK model uses substances such as inks or dyes to mix color for printing. As described in Chapter 3, the primary colors when mixing substances (as opposed to mixing light) are blue, red, and yellow. And when these primaries are all mixed together, the result is a dark, neutral color close to black.

Color mixing with substances is known as *subtractive color mixing* because the substances are absorbing (subtracting) some wavelengths of light and reflecting others. Instead of the classic color wheel primaries blue and red, CMYK uses cyan and magenta together with yellow. Black (represented by K) is also used:

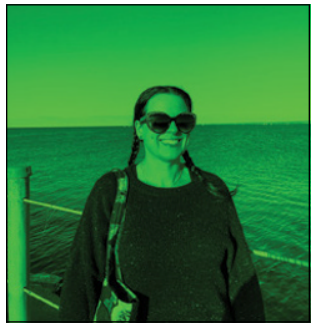
cyan + yellow = green

cyan + magenta = blue

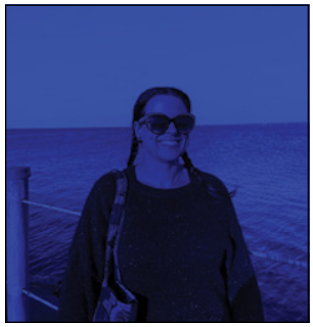
magenta + yellow = red



magenta + yellow = red



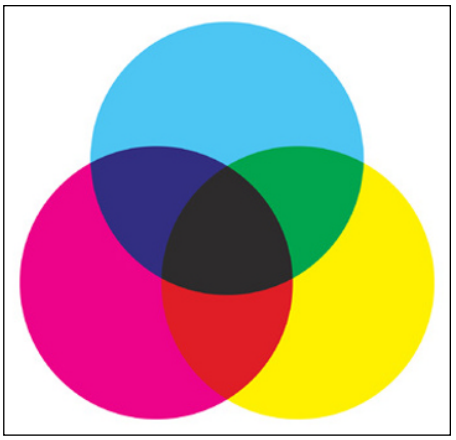
cyan + yellow = green



cyan + magenta = blue

FIGURE 10-10: An image with RGB color separations.

Figure 10-11 shows subtractive color mixing with CMYK.



petrroudny/Adobe Stock

FIGURE 10-11:
Subtractive color mixing.

Why does K represent black in CMYK? The K refers to the term *key* in traditional color separation printing. The key plate holds the most image details of all the other plates, which are all aligned with the key plate. In such printing, the key plate is always black.

The CMYK color system is used in *half-tone printing,* a process in which tiny dots of color are applied to a surface in a range of possible densities. A dense printing of a single color of dots results in the appearance of a solid color. A less dense printing of the same color dots appears as a much lighter color. This is because the whiteness of the paper mixes optically with the color of the dots. For example, a dense printing of magenta dots appears fairly saturated, while a less dense printing of magenta dots appears as a light pink.

When colors are overlaid in halftone printing, they mix optically, resulting in a wide range of possible colors. For example, if magenta dots of 20 percent density (resulting in a light pink) overlay yellow dots of 20 percent density, the result is a color that might be called peach or light orange. In halftone printing, the denser the dots and the more colors are layered, the darker the result. When cyan, magenta, and yellow are densely printed and layered, a color close to black is the result. However, cyan, magenta, and yellow inks are more expensive than black ink itself, so black ink is included to cut costs.

Figure 10-12 shows an image separated into CMYK layers. Note how much cyan, magenta, yellow, and black is in each layer.

Despite the wide range of colors possible in CMYK, the range is comparatively low compared to RGB colors. The color range of a given system is known as a *gamut.* When a color is not possible within a given system, it is said to be out of gamut. Many RGB colors are out of gamut of the CMYK system.

To remedy out-of-gamut colors, digital programs such as Adobe Creative Suite offer a CMYK setting. The setting limits the amount of colors available within the image, thus approximating how it will look when printed with the CMYK system. Purples, greens, and oranges are the trickiest colors to translate from RGB to CMYK. Depending on the scale and scope of the printing, a Pantone color can sometimes be used to specify certain colors.

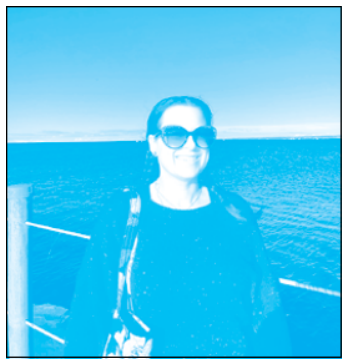


FIGURE 10-12: An image with CMYK color separations.

IN THIS CHAPTER

- Understanding artist's paints
- Exploring color in different mediums
- Discovering natural and synthetic dyes
- Experiencing digital tools for color

Chapter 11
Creating with Color

Your work with color depends in large part on the medium you work in. Different paints, dyes, drawing materials, and collage materials contain different pigments and have different material properties. These factors produce different color results. And of course, digital color has its own unique set of properties. Thus, magenta watercolor paint may look different than magenta oil paint, which looks different than the backlit magenta on your computer screen. In this chapter, you learn how different mediums carry color and some tips for achieving strong color results in these mediums. Specific manufacturers, products, and web links are included.

Color is a big part of the mediums covered in this chapter, but it is by no means the whole story. It's best to consult books on the mediums themselves for more information about tools, techniques, and best practices.

WARNING

Care should be taken when working with any and all art materials. Read all warning labels. Protect yourself against exposure to dangerous substances by following the protocol on the manufacturer's packaging and website or wherever product information is provided.

Painting with Professional Artist's Paints

Professional artist's paints are the high-quality paints used by fine artists and hobbyists. These paints include oils, acrylics, and watercolor. These paints are made of different components: *pigments* (a substance which gives paint its color)

and *binders* (a colorless substance that suspends the pigments and gives paint its body and stickiness; binders are also known as *vehicles*). In the drying process, the binder and the pigment harden into a *paint film* on the painter's chosen surface. The surface that a painter works on is known as a *support*. Common supports for painting include canvas, wood, and paper.

REMEMBER

Not all oils, acrylic, and watercolors are high quality; more on paint quality shortly!

Professional artist's paints such as oil paint, acrylic paint, and watercolor are considered traditional mediums for artists and hobbyists to work with. Oil and watercolor have been around for centuries, while acrylic is a product of the 20th century. Today's painters select their medium based on the medium's potential to achieve desired effects as well as on personal preference. For example, some painters don't like the smelly solvents of oils, and therefore choose acrylics.

In professional artist's paints, colors are usually named by the pigment that produces the color. For example, *cadmium red* is the pigment for that color, and the product is labeled as such. (Colors are not named with descriptive language such as fire-engine red, although that would be an apt description of cadmium red.) When browsing different types of paint, you'll notice that many colors (for example phthalocyanine green) have the same names in acrylics, oils, and watercolors. This is because these different types of paints all use the same pigments. Even though the pigments are the same, the color may look different due to the varying qualities (such as opacity) of the different types of paint. Even so, it's good news that different paints share common pigments. Once you know colors in one type of paint, another paint is familiar territory.

TIP

A bewildering number of artist's paint colors are available. Here is a list of essential colors to get you started, whether you are working in oils, acrylics or watercolors:

- Cadmium red medium
- Cadmium yellow medium
- Ultramarine blue
- Phthalo blue
- Phthalo Green
- Dioxazine purple (quinacridone purple in watercolor)
- Carbon black (ivory black in watercolor)
- Titanium white

Many colors can be made with these basic colors. After you gain some experience with color mixing, you may start buying other colors to experiment with. More on color mixing soon!

Oil paint

The binder for oil paint is *linseed oil*, which is pressed from the seeds of the flax plant. Oil paint dries slowly as the oil oxidizes to form a hard film. Unlike water-based paints, oil paint does not shrink when it dries. The drying times of oil paint depend on the thickness of the application and the mediums that may have been added to the paint. (More on oil mediums in the next section.)

The long drying times allow artists to develop the work slowly and blend colors over time. Thus, artists have more versatility to achieve realistic effects such as gradations of shadow and highlights. Oil paint lends itself particularly well to blending, especially when fine-bristle brushes are used. Oil paint may be applied in thin, translucent layers known as *glazes.* With glazes, painters can achieve extraordinarily subtle nuances of color and realistic effects of light and shadow, as in the painting in Figure 11-1.

The Metropolitan Museum of Art

FIGURE 11-1:
Hans Holbein the Younger, Hermann von Wedigh III, 1532, oil and gold on oak, 16⅝ x 12¾″.

WARNING

Oil paint in not water-soluble, so you must use paint thinners to clean brushes and equipment. Fumes from oil paint and thinners are hazardous and flammable. Read all warning labels and exercise caution when using oil paint.

Since it's invention centuries ago, oil paint has been used in countless techniques and approaches, from highly realistic to completely abstract.

Oil mediums

Mediums are substances added to paint that change the quality and consistency of the paint. These factors affect the paint's color. Here are a few mediums with their properties:

- **Gamsol** is a low-odor oil-painting solvent. Oil paint may be thinned with Gamsol (but use sparingly because thinning oil paint too much prevents the formation of a solid paint film). Gamsol is also used for cleaning brushes and palette knives.

- **Linseed oil** is the binder for oil paint and is sold as an oil-painting medium. Adding linseed oil to your paint increases the gloss and transparency of the paint. Linseed oil also slows the drying time of oil paint.
- **Cold wax** and **impasto mediums** increase paint thickness and cause paint to retain marks from brushes and palette knives. (*Impasto* is the painting technique of using thick paint applied with a palette knife.)
- **Stand oil** is linseed oil that is thick and runny. Stand oil levels brushwork and slows drying.

Acrylic paint

The binder for acrylic paint is *acrylic polymer,* which is a substance with large, chain-like molecules. When the water evaporates from acrylic paint as it dries, the molecules form stable structures that lock the pigment in place. Because of the stability of the molecular structures, dry acrylic is extraordinarily strong; it is scratch resistant and does not flake. Acrylic paint is also quite flexible and bends easily when dry. Other advantages of acrylics include fast drying time. (A thin coat of acrylic paint may dry in a little as 10 minutes; thicker applications take longer.) Wet acrylic paint cleans up easily with soap and water. And since water is the vehicle for acrylic paint, no smelly solvents are required (as with oil paint).


REMEMBER

Wet acrylic paint is water-soluble. However, dry acrylic paint in not water-soluble and is permanent. In other words it does not reconstitute with water. Also, acrylic paints and mediums shrink considerably as they dry, due to the water content leaving the paint.

Acrylic mediums

Acrylic mediums are acrylic-based products that can be added to acrylic paint to change the quality and consistency of the paint. As with oils, these factors affect how color is perceived. For example, let's say you use matte medium to make your yellow paint thinner and more translucent. When you paint over an area of dry blue paint with the yellow translucent paint, a green is created, as shown in Figure 11-2! As in oils, this translucent overlay of color is a glaze.

FIGURE 11-2:
An acrylic glaze.

REMEMBER

The degree of translucency or opacity and thickness or thinness has to do with the proportion of paint to medium. For example, adding a 95 percent to 5 percent ratio of matte medium to paint (respectively) creates a high degree of translucency. Adding 95 percent paint to 5 percent matte medium probably won't create any translucency; it will only *extend* (add more body to) the paint. Painters often add a little medium to paint to extend their colors.

Figure 11-3 shows a painted chart with horizontal bands of white glazes. The band at the bottom has white paint with just a little matte medium. The bands have progressively less medium going up.

FIGURE 11-3: White glazes with different degrees of translucency.

Here are some of the most commonly used acrylic mediums, along with their properties:

- **Acrylic gel (matte):** thickens paint, increases translucency, dries matte
- **Acrylic gel (gloss):** thickens paint, increases translucency, dries glossy
- **Acrylic matte medium:** thins paint, increases translucency, dries matte
- **Acrylic gloss medium:** thins paint, increases translucency, dries gloss
- **Acrylic molding paste:** thickens paint, increases opacity, satin finish

Note that properties of acrylic mediums vary based on the manufacturer's products; check the labels for properties and performance.

In addition to adding mediums, acrylic paint can be thinned considerably with water. In this way, acrylic paint can be used much like watercolor.

Watercolor

The binder for watercolor is *gum arabic,* a substance harvest from trees. As with acrylic paint, watercolor paint is water soluble. Unlike acrylic, watercolor is soluble with water after it dries. In fact, watercolor paint is often sold in *cakes,* which are dried, cube-like formations that the painter reconstitutes with water when painting.

Watercolor paint is very thin and transparent. Traditionally, watercolor paint is applied to white or light-colored paper. The whiteness of the paper shows though the transparent color, along with any underlying colors. The transparency of watercolor is part of its beauty: veils of color may be overlaid to create light-infused highlights and rich effects, as shown in Figure 11-4.

FIGURE 11-4: Watercolor.

Watercolor dries quickly, because water is absorbed into the paper and evaporates as well. Due to its transportability, easy clean-up, and compatibility with paper, watercolor is well-suited for working outside the studio and while travelling.

REMEMBER

Dried watercolor can be reconstituted with water.

Differences in paint quality and cost

Acrylic, oil, and watercolor paint are produced by a wide range of manufacturers, with varying degree of quality and cost. High-quality artist's paints are expensive because the paint is loaded with large amounts of high-quality pigments. Colors are richer, more vibrant, and highly saturated. As a teacher, I recommend that students use high-quality paints so they fully grasp the potential of the colors while they are learning. Here are some examples of high-quality paints:

Acrylic paint: Golden Artist Colors

Oil paint: Williamsburg Handmade Oil Colors

Watercolor: Daniel Smith

For other high-quality artist's paint brands, ask at your local art supply store.

Medium- and low-quality paints are sold in art stores that also carry high-quality paint. Sometimes, medium- or low-quality paints are labeled *student grade* or *student paint.* Medium- and low-quality paint are also carried at discount stores, grocery stores, and toy stores. Paints for kids are generally low-quality paints. For some activities, medium- or low-quality paint is preferred. The backdrop for the school play isn't going to end up in a museum, so budget paint is the way to go. And of course, paints made for kids are often non-toxic, but check the label to be sure.

Paint compatibility

Some paints may be mixed together when wet, others not. For example, wet oil paint and wet acrylic paint are not compatible when mixed together. (The result is a gloppy mess akin to a mix of oil and water.) Wet acrylic and wet watercolor are compatible, but are not commonly mixed because the two paints have different properties that are usually desired for separate applications.

Some paints can be applied over top of each other after they dry. For example, oil paint can be applied over acrylic paint. However, acrylic paint does not adhere to oil paint. Acrylic may be used over watercolor. Watercolor is not suitable for use over oil or acrylic. (Watercolor prefers the porousness of paper). I recommend that beginners avoid using different types of paint in a single artwork because the learning curve for working with a single type of paint is steep enough! Best to keep things simple (and believe me, learning about just one type of paint is not so simple).

Color mixing

Out-of-the-tube color, as its name implies, is color used directly out its container. Depending on the color, out-of-the-tube color is beautiful just how it is! Color theorist Josef Albers (covered in Chapter 5) never mixed color. For you, out-of-the-tube color is always an option.

Mixed color is color that has been combined from two or more out-of-the-tube colors. Even with the list of essential paint colors recommended previously, innumerable mixed colors are possible. Some mixed colors are slightly different that out-of-the-tube colors (by mixing a tiny bit of another color). Other mixed colors are unique.

Skillful color mixing take practice. The more you do, the more you see how colors change when combined with other colors. Also, you learn about proportions: how much of one color to add to another to achieve the mix that you want.

TIP

When mixing color (acrylics and oils) use small amounts of paint in the sizes of a Hersey's kiss, a chocolate chip, or the head of a pin. Observe how color changes with these small amounts of paint. Watercolors are concentrated in relatively tiny tubes, so use the head of a pin as the maximum size.

The basic color wheel (in Chapter 4) is a reference for how colors mix. However, you may be surprised at the colors you see when you mix certain colors. In acrylics, oils, and watercolors, mixtures made from reds and blues (which in theory make purple) are often quite dark and sometimes even brown in character. Mixtures made from blue and yellow often give a duller green than one might expect. The painted color wheel on the left in Figure 11-5 shows the results of color mixing with primaries only: cadmium red, cadmium yellow, and ultramarine blue.

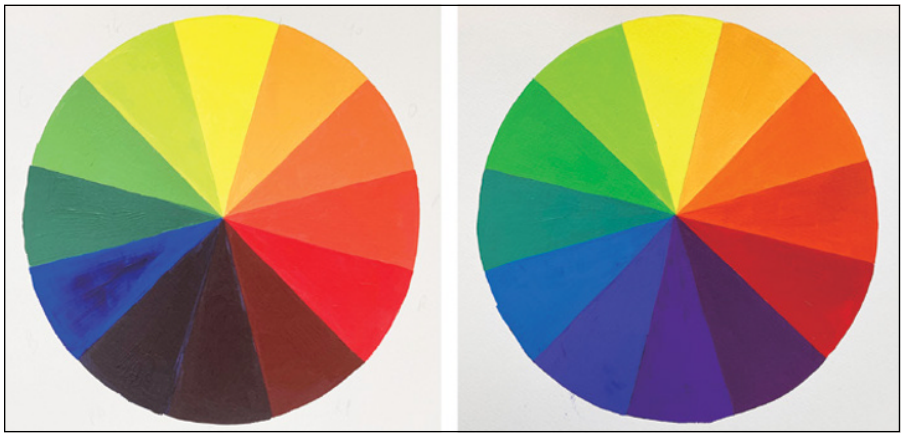


FIGURE 11-5: Painted color wheels.

The painted color wheel also shows differences in translucency and opacity among different colors. Ultramarine blue is somewhat translucent, so the white of the paper shows through in some areas. Cadmium yellow and cadmium red are more opaque, giving a more even appearance to the color.

Thankfully, paint manufacturers produce many colors with many different pigments that give the specific colors you might be looking for. The painted color wheel on the right in Figure 11-5 shows a colors wheel mixed from a wider range of colors including dioxazine purple and phthalocyanine green.

By the way, oranges made from red and yellow generally come out as expected.

In Chapter 4, you learn that *tints*, *tones*, and *shades* are made by mixing *hues* (color wheel colors) with white, grays, and black (respectively). When mixing colors,

use this knowledge to create the colors you desire. For example, pink is made by mixing red and white; brown is made by mixing orange and black; a dull green is made by mixing green and gray.


REMEMBER

Besides mixing hues with gray, tones can also be made by adding the complement of a hue. For example, a green can be made into a tone (made duller) by adding red, its complement.

Painting with Other Kinds of Paints

The world of paint is not limited to professional artist paints and their low-cost alternatives. This section covers paint sold in hardware stores and specialty stores. These paints are manufactured mainly for use on surfaces in homes and businesses. However, these paints are used also by artists for their affordability and particular properties.

Enamel

The term *enamel* is used to describe paints that dry to form hard and often glossy paint films. Enamel paint comes is acrylic, oil, and latex and is used for a variety of applications. Interior wall and trim paint, exterior paint, fingernail polish, and household gloss are a few examples of enamel paints. Perhaps the most popular enamel paint is Testors, known for their tiny rectangular glass bottles.

Enamel paints have been widely used by artists. The American abstract expressionist painter Jackson Pollock used enamel and latex paints from cans to create his famous drip paintings. The runny enamel and latex paint enabled Pollock to drip long tendrils of paint over the surface of his canvas, an effect that would have been impossible with traditional oil paints. Pablo Picasso used a household enamel paint known as *Ripolin* throughout his career. In addition to the unique effects these enamel paints offered Pollock and Picasso, the allure of using a non-traditional material also played a part in the choice to use enamel paints.

Spray paint

Spray paint or *aerosol paint* is paint that comes in a pressurized can with a push-button nozzle for dispensing the paint. Besides the paint itself, spray paint contains a *propellant* (which creates the thrust that pushes the paint out of the can) and a *pea* (the little hard sphere in the can that helps mix the paint when the can is shaken). And is there anything more satisfying than the sound of the pea rattling inside the spray can?

For utilitarian purposes, spray paint is good for surfaces that would be laborious to paint with a brush, such as wicker furniture, shutters, and fencing. Spray paint is used also when a smooth, brushless coating is desired, such as for auto body painting, metal furniture, and decorative objects. Spray paint comes in many colors and finishes, including metallic, reflective, fluorescent, matte, satin, and gloss. When selecting a spray paint, choose the paint designed for your specific purpose. For example, some spray paints are suitable for metal, others for plastic; some are for indoors, others for outdoors. Spray paints may be oil-based, acrylic-based, or vinyl-based. Check the label for what paint to use on what surface.

Spray paint is widely used for the growing genre of *street art*, outdoor wall paintings and murals that often contain graffiti-inspired lettering as well as large-scale images. The New York neighborhood of Bushwick, Brooklyn is known for its street art, as shown in Figure 11-6.

FIGURE 11-6:
Street art in Bushwick, Brooklyn.

Local paint shop Low Brow Paint & Supply carries everything you need to paint a mural, including a wide variety of spray paints made especially for street artists. The main difference between typical spray paints (such as Krylon) and street artist's spray paint is that the latter is not as runny. That means less dripping as the paint is applied to vertical surfaces.

The paint manufacturer Montana-Cans produces a wide range of spray paint for street artists. Montana Gold Colors are low-pressure cans, so the paint spray is gentler and may be applied more accurately. Montana Black Colors are high-pressure cans, so the spray is more powerful and covers faster. (Gold and Black are the names of the lines of paint; both lines come in a wide variety of colors, not limited to gold or black.) Street artist's spray paints can be fitted with custom nozzles that broaden or narrow the spray. Narrower spray is preferred for finer detail work. And for really big coverage, the manufacturer MTN produces MAD MAXXX. With an oversized spray can and an extra wide nozzle, MAD MAXXX sprays over a width of nearly 12 inches. That means you can cover a huge area quickly, or create super-wide lettering!

WARNING

Spray paint contains hazardous substances and should not be used indoors without proper respiratory protection. Always read and follow the manufacturer's safety instructions.

Interior Painting

Paints used on interior walls, interior doors, moldings, and floors are known as *interior paint.* Most interior latex paint is acrylic based and water-soluble. (When wet, the paint cleans up easily with water.) It dries fairly quickly and, like artist's acrylic paint, is not water-soluble when dry. Interior paint comes in a variety of finishes including matte, satin, eggshell, semi-gloss, and high-gloss. Deciding on paint finishes is part functionality and part aesthetics. Matte paints are not as washable as gloss paints. Thus, gloss paints are better for high-traffic areas such as hallways. Gloss paints are traditionally used on moldings, doors, and high-touch surfaces because they are washable and more resistant to scuffs and scratches. Sometimes paints with contrasting finishes are played off one another for aesthetic effects (for example, matte walls with semi-gloss moldings).

Choosing interior colors

Color selection is a big part of working with interior paint. Unlike a sweater that can be easily taken off, changing paint color on your walls is a significant expense and time commitment. Living with a color you don't like is not an option, so be sure about your choice before you commit. Feeling risky with color? Try out the color in throw pillows.

When selecting an interior paint color do the following:

1. **Select one of the following color families: dark, medium, light, or bright.**

   Stick with light colors to make small spaces feel larger. Dark colors tend to close spaces in. Darks are best used when you desire a feeling of intimacy and solemn quietness. Medium colors tend to feel rich without closing in as much as dark colors.

   Bright, saturated colors can be fun, but their novelty can wear off after a short time. Consider bright colors for rooms you don't spend too much time in, such as powder rooms or pantries. Bright colors work well also on a single wall in a room. Keep in mind that bright colors tend to reflect, and that color reflection may interfere with activities like applying makeup or reading.

2. **Choose warm or cool.**

   Within these families of light, dark, medium, and bright colors remain hundreds of choices, so to further narrow the possibilities, decide on warm or cool. This is especially helpful when choosing neutrals, many of which are distinct in their color temperature. For example, a gray with a lot of blue is distinctly cool, while a beige with plenty of orange is distinctly warm.

Warm colors are inviting; they advance and immerse you in a feeling of warmth. Warm colors can be appetizing and give a feeling of familiarity. Colors with a yellow tinge can feel aged, even antique. Cool colors are crisp and clean; they recede and seem to open out into space. Blues especially evoke the openness of sky and water. Cool colors are refreshing and rejuvenating, like stepping into the cool morning air.

3. **Select a color based on your personal preference.**

   After you've decided on warm or cool, the color selections are not as vast. Use your personal taste to zone in on a handful of colors!

4. **Test, reselect if necessary, and choose your final color.**

Painting a test square

Buy sample-sized containers of your handful of colors. Using a 1-inch flat brush, paint a 2-foot-by 2-foot area directly on a wall in the room where you plan to apply the color. Apply the paint evenly, with strokes going horizontally. When the paint dries, apply a second coat vertically. The two coats with strokes going in opposite directions should give fairly good coverage. Be careful not to apply the paint too thickly or let it drip, lest the test square show under your final coat! Paint dries lighter or darker, so wait for the second coat to dry before making any judgements about the color.

WARNING

Dark colors (such as dark red and dark green) often require a tinted primer to achieve opacity. Ask the person mixing your paint if the color you purchased requires a tinted primer, and follow the manufacturer's instructions.

Behold the test square. Compare it with your paint chip. It probably matches, but don't be surprised if the color looks different than what you expected. Paint chips are small, and colors often appear different when seen in larger areas. The light in your room, the time of day, objects in the room, and the existing wall color might affect your color perception. Color is relative, and it changes in context (for more about the relativity of color, see Chapter 5).

Even with my outline for choosing a color (and painting a test square), the truth is that color selection is a moving target. It's important to honor this fact when painting, and "roll" with it.

Don't disregard white as a viable option for your walls. You'll still have some choosing to do among the many cool and warm whites that are available. Color can be added to a room in many other ways, such as with upholstery, drapes, decorative objects, and artwork!

TIP

For an exercise to help you identity the best room colors for your home, see Chapter 13.

Time to paint!

Interior painting is an art unto itself. I know this because I did interior painting for some of my first jobs after college. With practice, I became fairly skilled at it. And I was amazed by the speed and accuracy of the professional painters I met, who didn't even use drop cloths! Unfortunately, I can't fully dispense my knowledge of interior painting in this chapter because it would be veering off the topic at hand: color!

The key to a beautifully painted room is to start with a smooth surface. Walls should be repaired, patched, sanded, and dusted in preparation for painting. If you're painting over a dark color or newly hung, absorbent sheetrock, a primer is recommended. A primer is a paint-like material that hides and seals what's underneath. Paint rollers, trays, brushes, and tape are common materials for painting walls, moldings, and floors. When you're ready to paint, it's best to consult a book about painting or look online for resources.

Drawing with Color

The allure of drawing with color is its ease and immediacy. You can jump in and out of creativity with no extra supplies to cart around, no setup, and little clean up. For many people, their first experience with art is drawing with color, thanks to the crayon box. If you drew with crayons as a kid, drawing with color might just take you back!

Line is the predominant characteristic of all forms of drawing. Lines may stand alone to show contours, or overlap and build up to create a sense of mass. Drawing with black and white requires a variety of mark-making to differentiate areas of the drawing. Drawing with color, there are even more options to differentiate, emphasize, and embellish.

Color pencils

Color pencils contain pigments, waxes, and binders to create the color tip that you draw with. These substances behave differently than the graphite in normal pencils. Color pencils don't erase very easily and can leave a waxy finish on the paper. Color pencils come in a wide range of qualities, price points, and colors.

The color of color pencils can be controlled by applying different degrees of pressure. Heavy pressure gives richer, more saturated color. Lighter pressure gives fainter color. Although color pencils don't blend like paint, color pencil can be mixed to create new colors. Figure 11-7 shows a color wheel made with only three color pencil colors: red, yellow, and blue. The secondaries and tertiaries are created by drawing different combinations of primaries over one another.

FIGURE 11-7: Color wheel made with red, yellow, and blue color pencils.

Before the widespread use of color photography, black-and-white photographs were sometimes colored to look more lifelike. Combining color pencil with the graphite of regular pencils can give a similar color-over-gray appearance and be quite charming. Figure 11-8 shows the effect of combining graphite with color pencil.

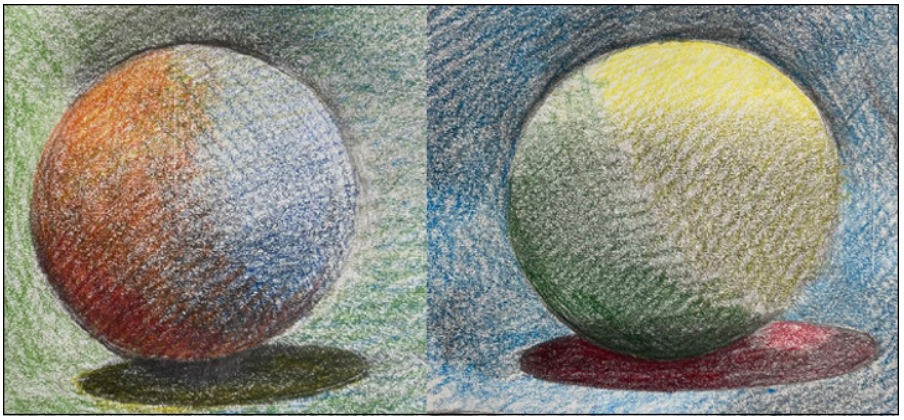


FIGURE 11-8: Color pencil over graphite pencil.

REMEMBER

When applied with heavy pressure, color pencil develops a waxy surface on the paper. Graphite does not adhere well to the waxy surface. On the other hand, graphite gives a metallic surface when applied with heavy pressure, to which color pencil does not adhere. When combining color pencil and graphite, it's best to use heavy pressure in areas you know you won't be going over with another type of pencil.

Acrylic markers

Acrylic markers contain a cartridge of acrylic paint that soaks into a hard fiber tip. A pumping action (made by pressing and releasing the tip repeatedly) moves the acrylic into the tip, making the marker ready for use. Like spray paint, acrylic markers contain a pea for mixing the paint as the marker is shaken.

Paint manufacturer Molotow produces the ONE4ALL line of acrylic markers in dozens of color. ONE4ALL markers are opaque and stick to many kinds of surfaces, including canvas, paper, cardboard, cotton, wood, and concrete. Exchangeable tips are available for creating lines of different shapes and widths. Figure 11-9 shows one of my drawings with ONE4ALL acrylic markers on paper. Note the smoothness and consistency of the line.

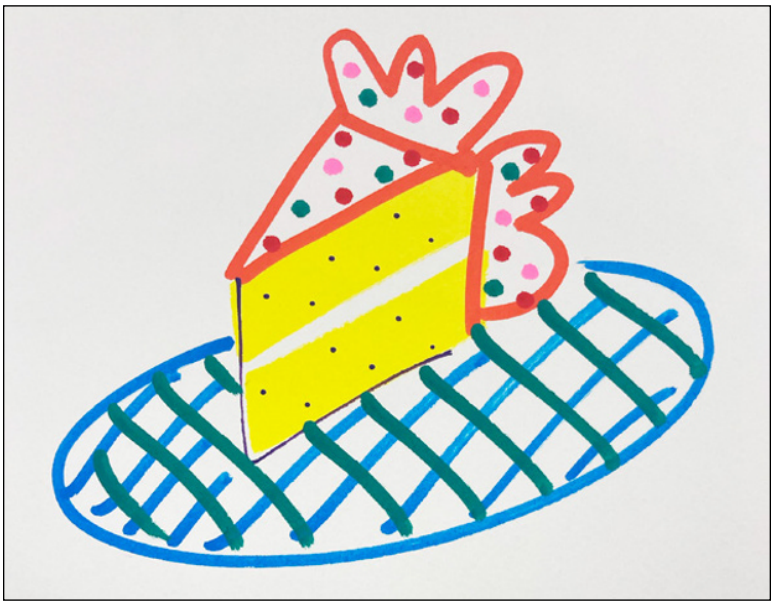


FIGURE 11-9: A drawing with acrylic markers.

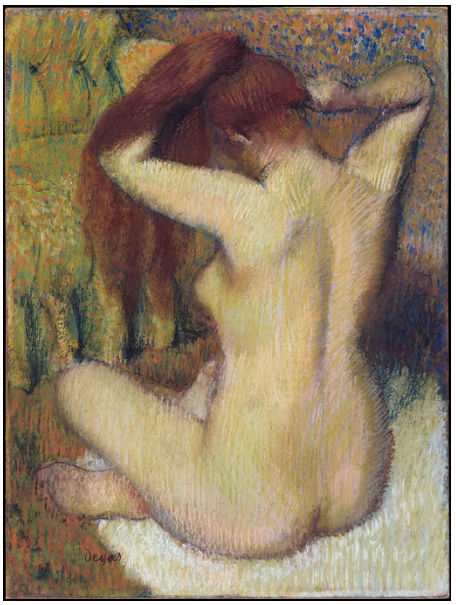
Pastels

Like paint, *pastels* are made with binders and pigments. Pastels are formulated to harden into little rods of color used for drawing. Although pastels have been around for centuries, the medium wasn't popular until the French impressionist painter Edgar Degas created his extensive series of bathers and dancers in pastel. See Figure 11-10.

Two types of pastels are available. *Dry pastels* (also called *soft pastels*) are chalky, dusty, and easily blended. *Oil pastels* are softer and stickier than dry pastels and don't generate dust. Oil pastels can be blended with linseed oil and paint thinner (such as Gamsol) for increased fluidity and blending. Some oil pastels are very soft and feel very painterly when applied; others are a little drier. In both dry pastels and oil pastels, you can mix colors by painting one on top of the other. Colors may be blended with a rag, a paper towel, or gloved fingers.

WARNING

Dust from dry pastels may be hazardous. Read the manufacturer's safety instructions.



The Metropolitan Museum of Art

FIGURE 11-10:
Edgar Degas, *Woman Combing Her Hair,* ca. 1888–1890, pastel on light-green wove paper, now discolored to warm gray, affixed to original pulpboard mount, 24⅛ x 18 ⅛″.

Pastels are like crayons for adults, especially when purchased in a pack! Pack size can range from 6 pastels to well over 100. The manufacturer Sennelier makes an oil pastel set in 120 colors, and the manufacturer Holbein makes a soft pastel set in a whopping 144 colors. Big sets like these are seductive, but in truth a modest set of 12 or 24 will give you plenty of color-mixing options. Pastels are also sold individually, so you can also browse and grab colors piecemeal as you like.

Open your pack of pastels and behold the colors. Where do they take you? Color is associative: It conjures ideas, memories, imaginings. With pastels, it's easy to get creative with color and let your ideas flow. Figure 11-11 is an imaginary landscape I made with oil pastels. The yellows, oranges and reds in the pack made me think of sunset; the red-brown made me think of mountains, and light blue made me think of water. Blending with a paper towel softened some of the edges and allowed me to merge color where I wanted.

FIGURE 11-11: Imaginary landscape with pastels.

Dyeing

Many things in our world are colored with dyes: textiles, hair color, printing inks, and industrially made products. Here I focus on dyes used in fibers and textiles.

A *dye* is a colored substance that bonds molecularly to the material to which it is applied. Dyes are different than pigments, which lay on top of the material to which they are applied (and are carried in a binder such as acrylic polymer or linseed oil).

For the molecular bonding of the dye and the material to take place (and for a color to thus be permanent, or *fast*), specific conditions must be present in the dye bath. Depending on the type of dye and the material receiving the dye, heat or the addition of different chemicals or both are sometimes required. *Mordants* (from the Latin *mordere*, "to bite") are chemicals that help bind the molecules of the dye to the material receiving the dye. Mordants accomplish this by forming complex molecules that link the dye molecules to the molecules of the material. Because of this molecular bond, colorfast dyes do not wash out, rub away, or fade. Mordants may be added before, during, or after dyeing (depending on the dyes and mordants used). Chemical compounds that include metals such as aluminum, copper, and potassium (known as *salts* of metals) are used as mordants. Tannic acid is also used as a mordant. Depending on the chemical composition, mordants may affect the color of dyes. For a selection of dyes and mordants, visit `www.dharmatrading.com`.

WARNING

Use caution when working with dyeing materials. Always read and follow the manufacturer's safety instructions.

Working with natural dyes

Since prehistoric times, people have used natural dyes from flowers, leaves, bark, fungi, and roots. In the 18th and 19th century, the development of synthetic dyes largely replaced natural sources in many parts of the world. With today's growing consciousness about the natural world, there's a resurgence in interest in natural dyes.

WARNING

Not all natural dyes are more ecological to use. Some natural dyes require more heat and water to achieve permanence, as well as mordants. Some sources of natural dyes are themselves toxic. Care should be taken when using natural dyes. Consult a book or trusted internet source for information before attempting to dye yourself.

Contemporary artist Nichole van Beek uses natural dyes in the creation of her abstract works on paper. With a background in acrylic painting, van Beek transitioned to natural dyes to lessen the environmental effect of her art practice and explore natural sources of color. The painting in Figure 11-12 was made with colors from marigold, cochineal (from an insect), indigo, and longwood (from a tree). Nichole van Beek uses inks made by Botanical Colors (`https://botanicalcolors.com/`), a company that makes natural inks, dyes and other products for working with natural colors.

Courtesy of the Nichole van Beek

FIGURE 11-12:
Nichole van Beek, *Solar Power,* bio-based ink on paper, 11 x 14″.

Working with synthetic dyes

Many types of synthetic dyes are commercially available, and *fiber-reactive dyes* are some of the most popular. These dyes form chemical bonds with the material receiving the dye and are thus colorfast. The art supply company Jacquard Products manufactures Procion MX,

a fiber-reactive dye for cotton fabric. Jacquard Product's website has instructions and videos for a variety of projects (including tie-dye), PDFs with instructions for dyeing, and a color-mixing chart. The Jacquard Dye Road Map PDF found at `www.jacquardproducts.com` lists all their dyes and how they can be used.

Do you remember Rit dye, that old grocery store favorite for tie-dyeing? After more than 100 years, Rit is still going strong and has rebranded itself as the hippest dye for the 21st century. The cool Rit website (`www.ritdye.com`) includes comprehensive instructions for how to dye sneakers and jeans, and how to dye clothes with *ombre* colors (color areas that gradually fade into other colors). Rit also has instructions for *ice dyeing*, a process where powdered dye is sprinkled over cubes of ice on fabric. As the ice melts, the color pools in interesting ways. Rit recommends a sprayable fixative (Rit Colorstay Dye Fixative) and microwaving fabric after dyeing to set the color.

Collaging with Color

A *collage* is an artwork made of papers that are cut and glued in place. (The word *collage* comes from the French verb *coller*, meaning "to glue.") The history of collage goes back centuries. In the late 18th century, a British aristocrat named Mary Delany created "paper mosaicks": botanically accurate representations of flowers made with finely cut pieces of paper. With the proliferation of color printing in the 19th century, scrapbooking became a fashionable pastime in Victorian England, often including unlikely and humorous combinations of collaged images.

It was not until the early 20th century in Paris that avant-garde artists Pablo Picasso and Georges Braque created their "glued-papers": collages including newspaper clippings, sheet music, and wallpaper.

Even in our digital age, colorful paper is ubiquitous. Collage is an irresistible medium for those who want to dig into materials and enjoy tactility. And no drawing or painting skills are required.

Collaging with found images

The materials for collage with found images are probably in your environment already: papers from magazines, product packaging, and mail. Papers for collage may be hunted for and found in many places: thrift store bookshelves, discarded books at libraries, magazines in your neighbor's recycling. Science and nature magazines such as *National Geographic* and fashion magazines like *Vogue* contain lush, colorful imagery that's great for collage.

Found images are already part of visual culture. Thus, the meaning inherent in your work with found images links to the original source. For example, let's say you cut a figure from a fashion magazine. You're now working not only with the image you selected but also with the culture of the fashion industry as a whole. The fashion industry sets standards of beauty that affect the way people feel and think about their bodies, identity, and status. To work with an image from the world of fashion is to confront those meanings and contend with them. Depending on the particular realm of culture that your sources originate from and how you arrange the pieces, collage can be thought-provoking and culturally engaging. No other medium is as shockingly quick to engage with — and comment on — our culture than collage.


TIP

The world of images is vast, so how can you narrow your choices when cutting images from found materials? I suggest that you cut away any typography and focus on images themselves. Next, try making a typography collage using only lettering!

Organizing by color

One way to bring focus to your collection of found images is to organize by color. For the collagist, creating folders for different colors brings focus to the workspace and allows for quick searching. When making a collage with found images, try sticking with one or two color groups. Color helps different images relate.

When organizing by color, use images from different kinds of publications to create variety. For example, you might find a wide range of blues in a food magazine. Yet, images from this single source still feel homogeneous. Why not juxtapose the blue food images with blue images found in a discarded anatomy book or blue images from an old atlas? With collage, a variety of sources creates striking contrast and a surprising look.

Painting paper à la Matisse

Another approach with collage stems from the innovations of French artist Henri Matisse. In the 1940s, Matisse began to work on his famous cutouts, made with large sheets of colorfully painted paper. With a huge pair of scissors, Matisse snipped abstract figures, flowers, leaves, shapes, lines, and patterns. With the help of assistants, he pinned the papers together and had them glued in place to create commanding, mural-scale collages.

Begin by selecting paper to paint; white paper works well. Medium-weight drawing paper is perfectly suitable and cuts easily. Bristol paper is a bit heavier but still cuttable. Even cheap printer paper is suitable for painting. Different papers absorb paint, curl, and wrinkle in different ways. (After drying, most are easily flattened between the pages of a heavy book or by bending in the opposite direction of the curling.) Test for yourself how paper responds to paint and decide which you prefer. I encourage you to embrace the wrinkles and curls: It's part of collage! Working with a number of paper types can create a welcome variety in your collage.

The process of painting paper yields brushstrokes and puddles of color that add unexpected character to your color, as in the painted sheets in Figure 11-13. To paint paper, use water-based paint such as acrylic or watercolor. Add some water to make the paint spreadable. Apply color directly on the surface of the paper with a wide brush, and allow to fully dry before cutting.

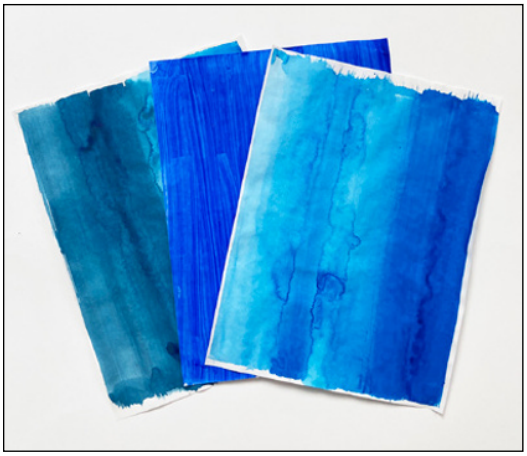


FIGURE 11-13: Painted paper, ready to cut for collage.

REMEMBER

Acrylic is more opaque than watercolor. Acrylics and watercolors result in different colors due to their varying degrees of transparency.

Colors can be pieced quickly when collaging with painted paper. Color combinations can be tested and changed with ease. If painting paper is not your thing, plenty of colorful papers are available for purchase. Good old-fashioned construction paper comes in varying colors, and some brands have surprisingly rich color. Other options include origami paper and Color-aid paper. (Color-aid is covered in Chapter 10.) These papers have different weights and respond to glue differently. Test for yourself.

Cutting, tearing, gluing

Whether you're working with found images or painted paper, cutting and gluing is a big part of the collage process. Every paper type responds to cutting and gluing differently, so experiment to find what works best.

Free cutting is just like it sounds. Simply start cutting into your paper and see where it goes. Free cutting is good for creating abstract shapes and following outlines that you imagine. Free-cut shapes can become hard to glue in place when they become intricate and gangly, so find a happy medium between simplicity and complexity.

Contour cutting is cutting along the *contour*, or edges, of a shape or figure in an image. Try cutting along the edge of a figure, moving your scissors carefully as you follow the edge. The resulting cutout will appear magically plucked from its context and can be placed in a new context. This technique often results in unexpected combinations of images that are fun to create and behold.

Tearing is the most tactile way to work with collage. Tears can be made violently or with great care. Experiment with the speed of tearing and observe the different edges that result. Different papers tear in their own unique ways, some more ragged than others. Often, the two torn edges of a single piece of paper will have two edges: one showing the white inside of the paper and the other the clean torn edge, as in the paper in Figure 11-14. When composing, consider how to work with the torn edges, as the inclusion of white edges effects color perception.

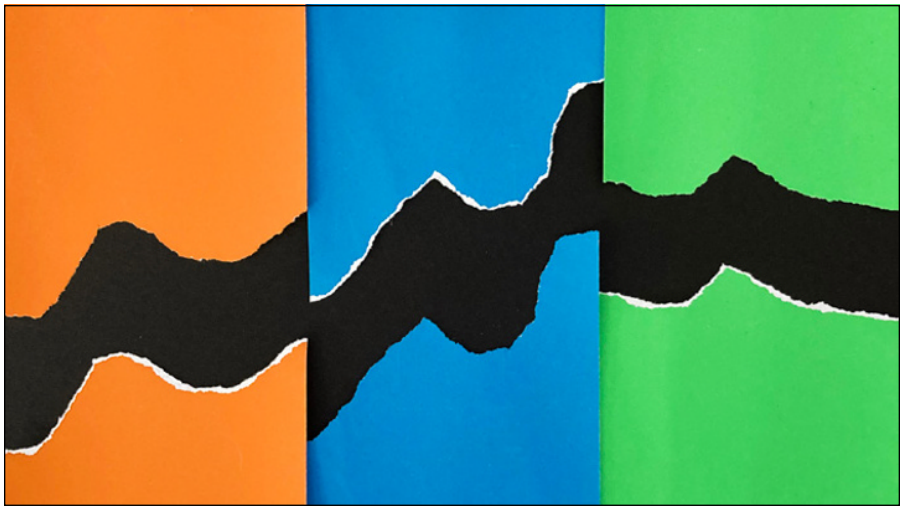


FIGURE 11-14: Torn edges in collage.

Gluing collage is most easily done with glue sticks. Unlike water-based glues that tend to curl paper, glue sticks keep papers nice and flat. The drawback to glue sticks is that they are not permanent and will likely not last long. Acrylic matte medium is excellent for gluing collage and is permanent and long-lasting. However, matte medium will curl paper until you lay it flat. Matte medium requires a brush to apply and is messier than a glue stick. With practice, you'll learn the right amount of medium to use for the specific types of paper you're gluing down.

Working with Color Digitally

Working digitally opens a world of color possibilities. Whether capturing images with a phone or a digital camera, countless ways exist to adjust and add color to change the appearance, mood, and flavor of images. Many options for changing color and adding filters are right in your smartphone. Plenty of apps are available to change the color of images, as well. And of course, programs such as Adobe Photoshop present even more options for working with color in digital images.

Note that color work with digital doesn't have to begin with a digital photo. Effects that resemble painting, drawing, pastel, and other media are available in Photoshop. Working with digital tools allows you to create and change images in ways impossible with analog media.

Color work with digital photos

White balance is a key concept in color photography, be it film or digital. *White balance* describes the degree to which an image is cast in a given color temperature. All light has a color temperature. Sunlight at midday is considered the standard for color-balanced light: It is neither warm nor cool, but perfectly balanced. Under balanced light, whites read as pure white, untinged by any particular color. Light from a candle flame is very warm, so whites appear in an orange cast. Light from an overcast sky is very cool, so whites appear in a blueish cast. Depending on the conditions in which you shoot, your images may have color temperature variation.

Figure 11-15 shows the Kelvin scale, which measures color temperature.

Smartphone cameras are fairly good at compensating for external conditions and creating white-balanced images. For some images, white balance still needs to be adjusted. Image edit tools such as the warmth filter (as in the iPhone screenshots in Figure 11-16) allow you to change white balance. For creative reasons, some photographers prefer images to be either warm or cool, sometimes drastically so.

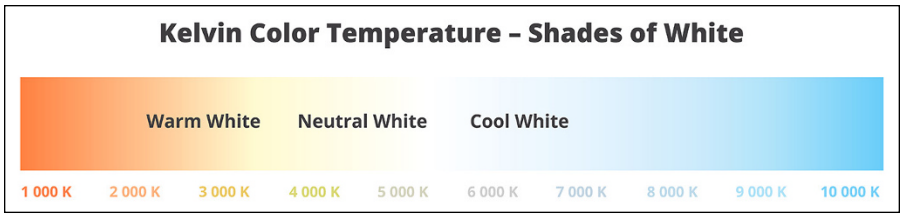


FIGURE 11-15: Kelvin color temperature scale.

petrroudny/Adobe Stock

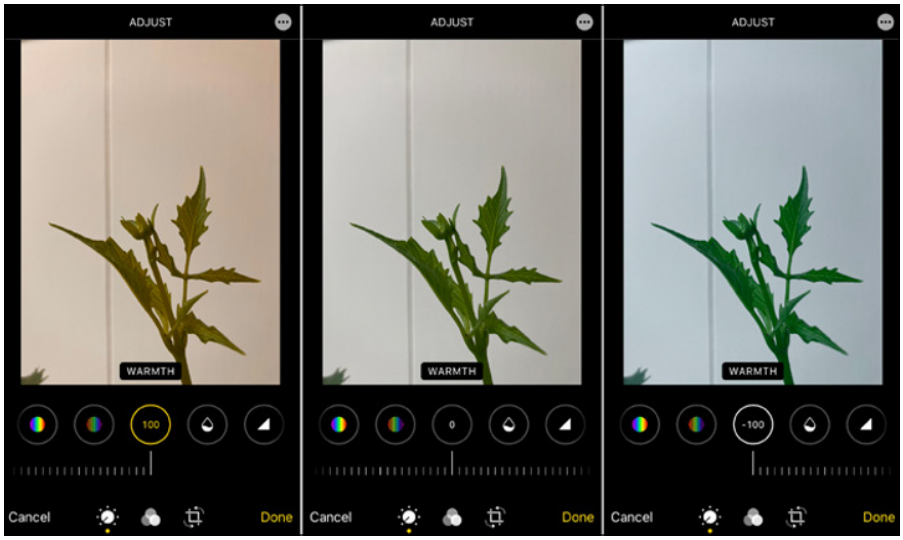


FIGURE 11-16: A photo with warm, neutral, and cool color temperature.

In addition to the warmth filter for adjusting white balance, smartphones have tools for adjusting saturation, brightness, and contrast:

- **Saturation** is the degree of color intensity. When saturation increases, colors become richer and more vibrant. For example, a dull red becomes a bright red as it becomes more saturated.
- **Brightness** is the degree of lightness. When brightness increases, highlights blow out and become whites, darks become dusty gray, and colors become lighter.
- **Contrast** is the degree to which darks are fully dark and lights are fully light. When contrast increases, darks become darker and lights, lighter. High-contrast images have drama. Low-contrast images feel mellow.

The terms saturation, brightness, and contrast are used across platforms to describe color in images, so they apply to smartphone tools, many apps, and advanced systems such as Adobe Creative Suite as well.

Digital Photography For Dummies by Julie Adair King is an excellent source of information about best practices for shooting and image editing.

Altering color in Photoshop

In Adobe Photoshop, the tools for adjusting white balance, saturation, brightness, and contrast have a greater range and have more options for color adjustments. Figure 11-17 shows a grid of a single image with different color alterations made in Photoshop.

FIGURE 11-17: A grid of images showing various changes in Photoshop: brightness, temperature, saturation, and hue.

The following list shows how each image in the grid has been changed from the original, which is in the upper left:

1. Original image
2. Increased brightness
3. Increased brightness
4. Increased warmth by increasing yellows and reds
5. Increased coolness by increasing blue and cyan
6. Tinted by increasing magenta
7. Decreased saturation
8. Increased saturation
9. Maximum saturation
10, 11, 12. Altered colors using the hue tool

You can find the tools for brightness and contrast, hue and saturation, and color balance (for adjusting warmth and coolness and tinting with magenta) on the Adjustments tab, which is on the Image tab in the toolbar, as shown in Figure 11-18.

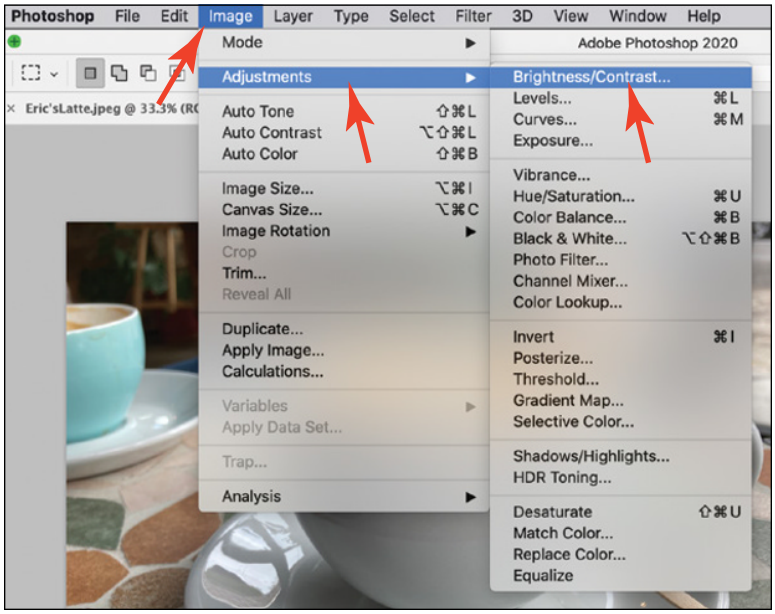


FIGURE 11-18: Finding tools for brightness, contrast, color balance, hue, and saturation in Photoshop.

Digital painting

Digital painting is the process of using an application's tools to work with color, line, shape, and other visual elements. Digital painting is possible in Adobe Photoshop, Adobe Illustrator, Adobe Fresco, Procreate, and many other apps.

One way to make a digital painting is to begin with a blank document and apply color, just like you would with a traditional canvas. Figure 11-19 shows two digitally-created paintings. If this image looks familiar, that's because it's from Chapter 6. Here, the colors have been changed with the hue slider tool in Photoshop.

Another way to make a digital painting is to paint over a photographic image. The top image in Figure 11-20 shows the previous coffee cup image overpainted with lines and dots of color. When painting over a photo, let the contours in the photo inform where you put color. Leaving areas unpainted lets the viewer see what's underneath. A conversation is created between the photo and the painting. Completely covering the photo with your digital painting is also an option.

Layers (in digital applications) are like layers of stacked cellophane. Layers can be painted on and rearranged to change the order of overlapping. Adjusting the opacity of layers is another way to work with color in digital painting. The image on the bottom in Figure 11-20 has the same overpainting as in the figure above, but with reduced opacity. By reducing opacity, the overpainted marks are reduced in intensity, becoming softer accents in the image rather than bold marks over top.

To adjust the opacity of a layer, click the opacity slider on the Layers tab, shown in Figure 11-21.

So much more is possible with digital painting. Many books and online courses are available to learn more. It's best to do your own research and find one that suits your needs.

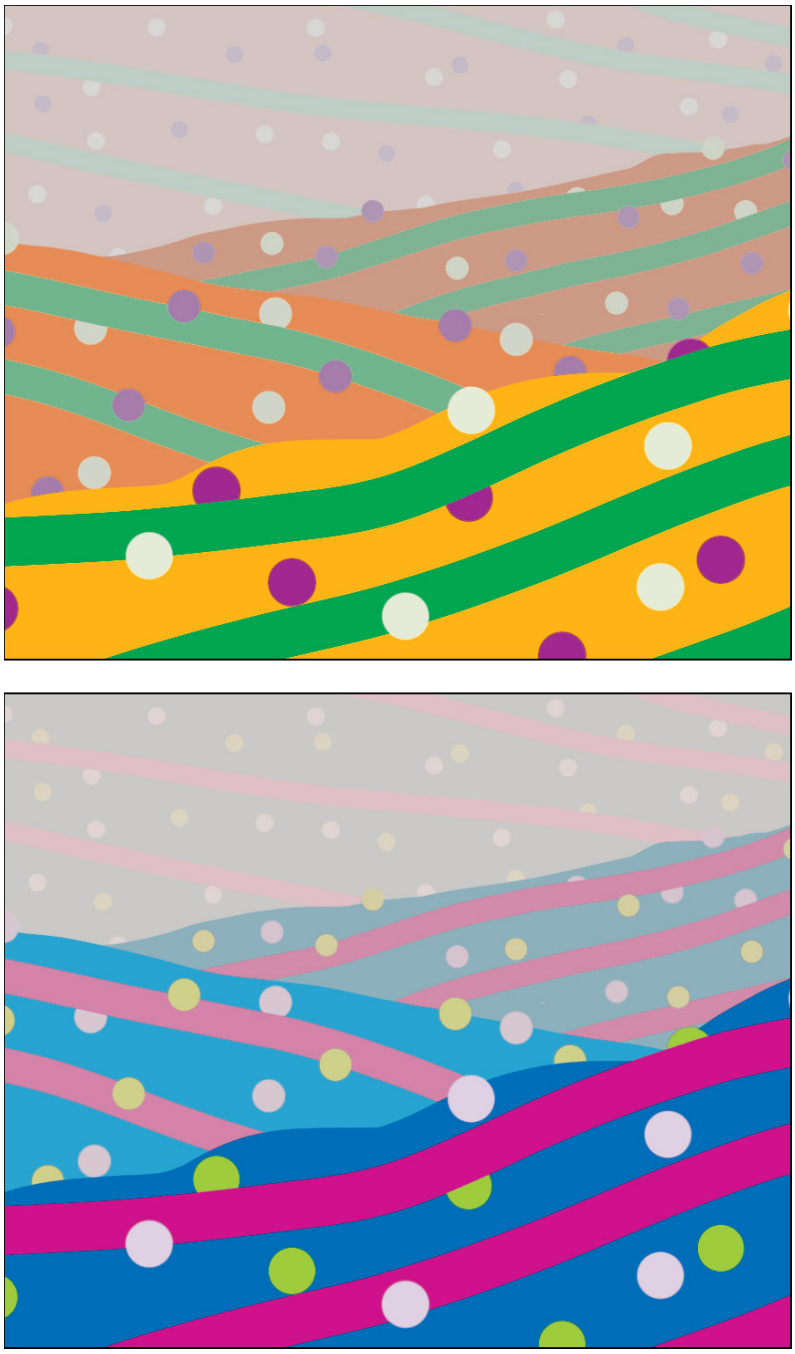


FIGURE 11-19: Digital painting from scratch.

FIGURE 11-20: Digital painting over photographic image.

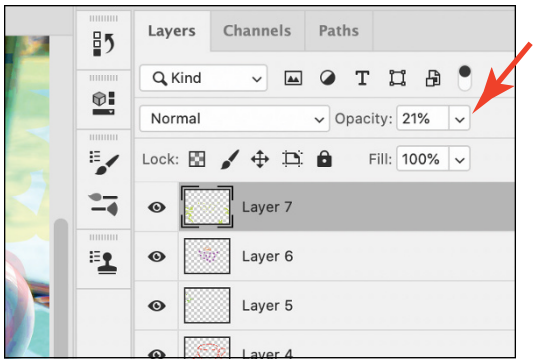


FIGURE 11-21: Opacity slider in Photoshop.

5

The Part of Tens

IN THIS PART . . .

Find out about the color in ten careers such as design and film.

Kickstart your color creativity with ten artistic exercises.

IN THIS CHAPTER

- Understanding the role color plays in different fields
- Exploring how creative types work with color
- Discovering pro color tips
- Experiencing color inspirations

Chapter 12
Ten Colorful Careers

For many careers, color is key. Professionals who call themselves interior designers, garden designers, and graphic designers don't always refer to themselves as colorists, but they are! A *colorist* is anyone who works effectively with color, whether or not they have formal training. Basic color theory is sometimes learned in school, but learning about color in a professional field often takes years of direct experience — and plenty of trial and error.

There are different types of color knowledge. *Factual color knowledge* includes tangible facts about color, such as the color wheel or analogous colors. *Inspired color knowledge* is not based in facts but rather stems from an individual's inspirations about color and particular color desires. People who have inspired color knowledge think that color is important, and they have strong feelings about color. Inspired color knowledge is another way of saying someone has a flair or a sense for color.

Inspired color knowledge is instinctual (an innate and untaught knowing of how to work with color) or learned (by being shown examples and by exploration, practice, and experiment). People who are successful colorists often merge their factual knowledge with their inspired knowledge, giving them a wide range of versatility and more options when it comes to problem solving. For example, an interior designer knows that a cool analogous palette will unify the colors of a living room, but exactly which colors to use and how to play them off one another requires another level of curiosity and inspiration.

In this chapter, you read about professionals in ten different fields for whom color is a key aspect of their work. They share their take on color, their color training and experience, and practical tips for working with color.

Marcie Bronkar, Textile Designer

Color was always innate to me. I never read about color theory.

New York–based textile designer and visual artist Marcie Bronkar creates lavish patterns for upholstery, window treatments, and linens. Her fabrics have appeared in interiors featured in *Architectural Digest*, *Veranda*, *House Beautiful*, *Luxe*, and *Dwell*. Bronkar's lines of fabrics — Home Couture and Cloth & Paper — are available through Quadrille, a carrier of premium designer fabrics. Bronkar's designs are inspired by historical examples of textiles from all over the world, and color plays an important role, as shown in Figure 12-1. "My textile prints are known to be custom-colored, classic. I never work from 'the latest.' I work from historical references I respect to offer a modern sensibility," says Bronkar. View examples of Bronkar's textile designs at `www.marciebronkar.com`.

Marcie Bronkar / Home Couture / Quadrille

FIGURE 12-1:
A detail of one of Bronkar's textiles, Lorraine Printed Linen.

Bronkar's love of color and design started when she was young, watching early technicolor films "with glorious, glamourous color," as she recalls. Her formative experiences with film — as well as growing up in New York City — created a foundation for Bronkar to teach herself much about color. She learned more about color from direct observation than from studying at art schools, where she was taught only "the six ranges of color value from black to white."

Bronkar's painting practice is separate from her work as a textile designer but not unrelated. "I suppose my love of color and mixing formulas and the process

of painting itself has aided my career as a textile designer. At this time, I work with acrylics because they are fast drying, which works brilliantly for the layering process." Purple plays an important role in Bronkar's palette. "I use variations on purples (plum, aubergine, lavender, lilac, orchid, magenta, mauve) to tone down my hues. I add purples to almost every color I mix. The passionate, regal shade of purple is the ultimate neutralizer. A touch of reddish-purple adds depth!" You can see her art website at `https://marciebronkarart.com/`.

Bronkar's textile designs are research based, and she has an extensive collection of documents and fabrics that she has purchased over the years to aid in her research. Prized possessions include 18th-century French textiles (prints and brocades), as well as 17th-century Venetian vestments. One of Bronkar's most popular fabric designs was based on an 18th-century net embroidery with gold thread for which Bronkar "gets requests for custom color all the time." Books also inform Bronkar's work, such as *Werner's Nomenclature of Colours* (covered in Chapter 10) and Kassia St. Clair's 2017 book *The Secret Lives of Color.* "A great read for color history and tales," says Bronkar. "My default color in painting has always been Payne's gray, and it was fun to read about."

Mood boards play an important role in Bronkar's design work. A *mood board* is a collection of visual elements (such as colors, textures, and images) that are assembled to set the visual mood of a project. "Mood boards," says Bronkar, "are a marketing tool required by manufacturers and clients to see the direction or theme you are suggesting for a collection or a space. But they are also brilliant for branding purposes. I scan though hundreds of images in publications (such as travel publications), pictures I have taken, colors I have mixed, and use them for the mood boards, which are created digitally." Bronkar's color mood boards, which you can view at her design website at `www.marciebronkar.com/`, tell color stories in mellow grays, striking blue-and-orange combinations, and sparkling greens.

When introducing color in your home, "follow your heart," Bronkar suggests. "If in doubt, rely on the hundreds of books and images on the internet that can give you much guidance and inspiration. It's impossible to fail these days, with so much available online. Start by searching for your favorite color or favorite two colors. If you don't have favorite colors, just search for 'interiors in blue and white.' There are many beautiful examples of those."

"Keep an open mind and don't be afraid to experiment. You'll arrive at the place you need to be with color. It will hit you when it occurs. It will speak to you, I believe."

Paul Bronkar, Film Colorist

When I was very young one of my favorite things was to color in my coloring book. And I remember thinking that coloring is something I would love to do every day.

Film colorist Paul Bronkar, based in New York, helps motion picture directors and videographers achieve the right color for the final version of their films. Bronkar has worked on color for films such as *Winnie the Pooh, Rocky Balboa,* and *The Princess Frog.* He has also worked on color for music videos by Destiny's Child, Madonna, Sting, and Wyclef Jean, and on the restored versions of Disney animations such as *Fanatsia* and *The Lion King.* Working with advanced color-editing software such as Blackmagic Resolve, Baselight, and Lustre, Bronkar often sits with his clients in real time, adjusting colors scene by scene on a large monitor or in a theater. "Color is usually the last place where all the work for the past X amount of years comes to a conclusion," says Bronkar.

Bronkar's post-production color work (after footage has been shot) occurs in two forms. *Color correcting* is the process of making the color of the footage appear realistic and unaltered, such as making dark footage appear brighter. *Color grading* is the process of adding color to the color-corrected footage. In color grading, dramatic color changes can be made to any person, place, or thing in the footage. "Today, one can get very specific adjusting color in a small part of the image," says Bronkar.

Color manipulation is a crucial step in the filmmaking process, as Bronkar says: "Color sets a tone and strikes a mood in everything. My first objective is to build a rapport based on my ability to show filmmakers their options beyond their vision. Once I have their confidence, I work with the color."

"As a film colorist, I manipulate saturation, value, hue, and contrast to create the intended 'look' of the filmmaker's vision," says Bronkar. Just about any colors can be changed, from the color of an actor's dress to the color of the sky in the background. "I have heard countless times that this is the favorite process through the long grind of creating a film," says Bronkar. Color manipulations can be overt or practically invisible to a viewer. "There are imperceptible color changes in every film I work on, but these changes have a big impact. The darkening of a corner, adding more blue to a sky, and countless other things can be done to direct the attention of the viewer to the intended focus point of the story." An example of Bronkar's color work is shown in Figure 12-2.

Bronkar's career in film colorizing took shape though direct experience in the industry. "I started in NYC as a bicycle messenger delivering commercials on

¾-inch tape to advertising agencies. Always networking and joining whatever organization would have me. I had NO experience. I had taken a film-editing class at The New School before I got the bike job, but other than that I didn't study filmmaking. And before then, I worked as a Porche mechanic in California. I always had an interest in technical stuff." Bronkar's technical interests continue to give him an edge in his rapidly evolving industry. "The technology is in a constant state of development, especially with AI on the forefront."

FIGURE 12-2: Still frames from *Happy Birthday Charlie* (a film by Nina Martinek), before and after Bronkar's color corrections.

Courtesy of Nina Martinek, Director

Sensitivity to his client's creative vision make Bronkar a sought-after film colorist. "The rising sun, the full moon, even the smell of lilac can be evoked by manipulating color. The question is, What is the desired emotional effect? Every project has its challenges; I embrace the challenge. This is what makes what I do so very interesting. There are no two projects the same. I get nerves on every project no matter the budget or how big the stars. The first few hours are usually the most intense especially with new creatives. I always remind myself not to get frustrated, to be kind, and don't blow it!"

As for suggestions for those who want to break into the field, Bronkar says, "Get a job in the industry. Period. A college degree is an advantage, but it IS NOT NECESSARY. You are already computer literate. Just keep learning. And follow these three rules: 1. Don't blow out the whites. 2. Don't completely darken the blacks. 3. EXPERIMENT." To see Bronkar's filmography and more examples of his work, visit his site at `www.postworks.com/paul-bronkar-colorist` and his IMDB page at `www.imdb.com/name/nm0111448/`.

Richard A. Chance, Illustrator

For some reason I have a personal beef with the color green: grass, turtles, money. I stay a little longer adjusting colors around green to make it work.

Illustrator Richard A. Chance knows plenty about the nuts and bolts of working with color. Chance has created colorful art for *Bloomberg Businessweek*, *Refinery 29*, *Variety Magazine*, *The New Yorker*, *The Baffler*, *Playboy*, and many other publications. Chance is an accomplished digital draughtsman who tackles a wide range of subjects, such as people (portraits, hands, full figures), animals, food, interiors, and objects. Known for his versatility and responsiveness to the context in which his illustrations are placed, Chance creates art that communicates main ideas and draws readers in. Even the most fascinating books and articles are just pages of black and white type, in need of some colorful help to get people interested! With proven success, Chance's colorful illustrations accomplish this. View examples of Chance's work at `https://richardachance.com/`.

Chance grew up in Brooklyn and describes himself as "that kid running across the street to go to the deli to get something for my mother." Chance studied graphic design in college, but found color intimidating. He says: "I had a few color theory lessons but I avoided it all throughout college. I stuck to black-and-white drawings until a professor said something about color that made coloring way more simple. He said, 'Blue pushes things back and red brings things forward.' I'm paraphrasing, but that's the gist of it. I've applied that rule ever since. It's easy to

test it with Photoshop. It allows me to change the color really quick and add layers of red or blue to bring more attention to something, or camo an object because it's too distracting."

Another color breakthrough for Chance came when he changed the color of the shadows in his art. He explains, "In the beginning I used a pastel color palette and it made my drawings really 'light.' The black shading I placed on top of the light colors made it look weird to me. I hit my stride when I excluded black from my palette and shaded with colors that were harmonious to the color scheme that's in the drawing itself, making things more cohesive," as in the dance club illustration in Figure 12-3.

FIGURE 12-3: Chance's illustration of a dance club.

Richard A. Chance

In his evolution, Chance made an important discovery about limiting colors in his work: "Early in my career I would drop every color I liked into a drawing and it made it really busy and hard to read. Even when I was given a palette from an art director, I found myself wanting to include every color in the drawing. I learned that sometimes a monotone color scheme can be as effective as a really colorful drawing. I try to not include more than six different hues in a drawing." As for achieving mood and tone with color, "For a sad article, I avoid my normal colorful palette and bring the saturation down, focusing on a small set of blueish-purple colors."

Color is key in portraiture, where proportions and facial features are usually considered to be the elements that create resemblance. Chance provides the

following example of color conveying personality and resulting in a successful portrait. "Recently I was commissioned to do a portrait of a famous guy. The art director wanted me to show the personality of the famous guy. When I sent sketches to the art director he wasn't really sold (side note: the preliminary sketches I send to art directors are colorless). After I added the colors to the sketch to create the final version, the art director was pleased with it. The color I used helped show the personality of the person I was drawing, and it helped sell the idea to the client. And I'm pleased with it. I don't think about color in the preliminary sketch stage. But that assignment made me realize that color can help make the concept stronger in the eyes of the viewer."

As for tips for working with color, Chances suggests, "Find colors that you know work and keep them in a folder on your desktop. The folder is your starting palette, and it grows from there. Most painters have a set color palette that is recognizable. This approach also works for illustrators who are trying to build a style; their style can heavily rely on a set color scheme and get work because of it." Also, when working with color, "it's helpful to know what the color means to you or what it represents in real life. People will pick up on it because we share a similar experience with that color and it helps communicate the emotion or objective of the drawing itself."

Jamie Drake, Interior Designer

My life's affair with color has been a long one, and the marathon has been made of one sprint after another.

Interior designer Jamie Drake beautifies some of the poshest addresses in the world. His New York firm Drake/Anderson (`www.drakeanderson.com`), which he partners with Caleb Anderson, has been featured in *Architectural Digest, The Wall Street Journal, Elle Décor,* and many other publications. Known for creating interiors that incorporate lush textures, rich colors, and bold forms, Drake's rooms are fierce, luxurious, and eye-wateringly gorgeous, as shown in Figure 12-4.

Drake's expert work with neutrals can be found in the silvery grays, warm whites, and earth tones that predominate in many of his interiors. Sometimes, Drake stealthily works color into his interiors in surprising ways. In one example, bright pink piping hugs the contours of gray upholstery; in another instance, dark blue trim dresses up the bottom few inches of simple white drapes. Other times, color is the immersive backdrop in which the drama of the room can play out: Walls of malachite green, golden yellow, and salmon pink are all found in Drake's interiors. "Color is probably my favorite tool in my box to evoke mood and set a

tone. Whether intimate and sexy, or optimistic, airy, and expansive, color can evoke what I want instantly," Drake says.

Drake's love of color began at an early age with his favorite crayons and color pencils. His father had a printing business that Drake recalls as "an otherworldly experience . . . the deep hues of the tins filled with viscous inks was intoxicating to me." As a youth he took art classes in drawing, painting, and printmaking, and enjoyed collage and silkscreen. Drake went on to study at Parsons School of Design. Soon thereafter, he established himself as one of New York's most sought-after designers.

Image courtesy of Drake/Anderson; photograph by Marco Ricca

FIGURE 12-4:
A Drake/Anderson interior.

Travel is a big source of inspiration for Drake: "The magic of seeing Morocco's souks for the first time and its stalls filled with spices and herbs of all colors; the streets of India, with women wrapped in saris saturated with the most glorious hues; the ancient marble floors of St. Marks in Venice, their rich tones and veins weathered to softened tones. The lavish silk brocade that swathes Marie Antoinette's bedroom at Versailles never ceases to make my eyes pop — sunflowers, pansies, roses, lilacs tied together with peacock feathers by ribbons — ravishing!"

For Drake, color inspiration can also be found in the most ordinary of places: "sidewalks, piles of detritus (garbage), construction sites, and crushed automobile junkyards." Even New York City sidewalks offer something for Drake, "with their neutrals and all their shades of gray, greige, taupe, and dust, often sparkling with what seem to be crushed diamonds! Crushed cars, their enameled steel carcasses acquiring the patina of age. Finding color inspiration is never a challenge for me."

For those working with color, Drake warns against being too timid. "Allow YOU to shine through and embrace your choices. Be bold, and try to include what you really love." As for color coordination: "The term clashing colors is a rather dated notion that strikes fear in people's minds. If someone suggests that a combination

is clashing, it really is just their personal aversion to the combination and needs to be explained as such."

Leatrice Eiseman, Color Specialist

Working with color is always a challenge, and that is what makes it so fascinating.

Leatrice Eiseman is a color specialist and color consultant who is widely known as "the international color guru." (Visit her website at `https://leatriceeiseman.com/`.) She heads the Eiseman Center for Color Information and Training, an organization she founded for the dissemination of knowledge about color through classes, seminars, and books. As a color consultant, Eiseman helps successful companies make important decisions about color for product development, logos, and identification; brand imaging; websites; packaging; interior and exterior design; and any other application where color choice is critical to the success of the product, promotion, company image, or environment. Eiseman is also executive director of the Pantone Color Institute, where she heads the committee that researches and decides the Pantone Color of the Year. Both the *New York Times* and *Fortune Magazine* have named Eiseman a "top decision maker" for her work in color. She has written numerous books, including *The Complete Color Harmony Pantone Edition* and *Colors for Your Every Mood.* The fan deck from another one of Eiseman's books, *More Alive with Color,* is pictured in Figure 12-5.

Eiseman's passion for color began at an early age. "I had great encouragement from my family. My father designed and tailored ladies' coats; two of my aunts were fashionistas," recalls Eiseman. "My mother was a demon with the paintbrush, as she preferred changing the colors of the interior of our home annually. I was always allowed to choose whatever colors I pleased for my room, with the provision that when I wanted to change the colors, I had to supply the grunt labor to get it done! My family trusted my judgement and often asked for my advice on color combinations."

"I took every color theory class I could find at university level as teachers often have different opinions and views on the subject, and I thought it important to hear varying concepts and methods. Much was also learned on my own, through various books, periodicals, psychological abstracts, and other available information. I took many design classes and my degree is in psychology with a minor in business. I also went to graduate school and earned certification in counseling from UCLA. All of these endeavors helped me gain more knowledge involving color."

FIGURE 12-5: The accompanying fan deck for Eiseman's book *More Alive with Color.*

Courtesy of Eiseman & Associates

Undoubtably, Eiseman's knowledge of color theory has been foundational for her entrepreneurial ventures. As a lifelong learner, Eiseman is dedicated to staying current with developments in the understanding and use of color in the world today. "As much of my work involves teaching and color consulting for various industries, I must keep my eyes and ears open to many resources, especially regarding color trend direction. What are we seeing in the world around us that inspires color usage and combinations? I look at nature, visual art, entertainment, travel destinations, industrial design, new technologies. Most importantly, I investigate the significant socio-economic issues and how specific events can impact color."

In addition to her hunger for intellectual knowledge about color, Eiseman understands that color is filled with subjective and emotional meanings that are different for each person. When working with color, she factors in human psychology, taste, and personal preferences. Eiseman explains "Color is an irresistible influence that tugs at you and appeals to your emotions, often on a very visceral or subliminal level. From infancy through adulthood, the color of your clothing or your environment affects and expresses your deeper impulses, although this is not aways readily verbalized or even understood. Some of what people know about color is gleaned though education and experience. However, reactions to color and mood are often innate and instinctive."

Color can even hurt — and sometimes heal. For one of Eiseman's personal clients, a wine-red color brought back painful memories of the loss of a loved one. Eiseman recalls, "We had a conversation about the color and how acknowledging the shade could bring back positive associations and memories attached to her lost love. I advised her to bring the color back into her life in various ways — through her clothing, some interior furnishings, on the tabletop, or wherever else she could experience the color more intimately. She followed the advice and it opened up a long-buried source of memories that now bring her joy instead of sadness."

Not all color hurts can be healed, especially in the business world where color can make or break fortunes. Eiseman recalls one instance where color was a fork in the road for a company that did not choose well. "A very large computer manufacturer came to me for consultations on the possibility of taking computers from the world of putty and gray into the realm of more vibrant color. This was in the very late 90s and I truly felt consumers were ready to take that step and it would certainly glean a lot of attention, publicity, and a boost in sales. I carefully developed the rationale for the choice and it took them six months to make up their minds. Ultimately, they decided that color was too big a step for them and they stayed with their tired color palette. Within the next few months, the iMac was introduced and the first color was a blue-green — the very shade that I had recommended to my client and they had nixed! Needless to say, Apple had a winner and released several more colors to follow."

Eiseman is passionate about teaching others about color, to pass on her knowledge and experience. For those who want to learn more about color — or become color consultants themselves — Eiseman offers numerous classes in which she covers basic color theory, the psychology and emotional aspects of color, color trends and forecasts, and consumer response to color. As color consulting is a service business, she includes pragmatic advice for how to go about setting up a business, where to look for opportunities, and how to negotiate fees and work with clients.

As for books, Eiseman suggests *More Alive with Color,* "my book based on a color theory called the Color Clock that explains the significance of your eyes, hair, and skin tones and how they relate to colors found in nature. These are your colors, and they best enhance your appearance and confidence level. The Color Clock is included also in an online training program based on the book that is suitable for professionals in the fashion, styling, image consulting, cosmetics, floral, event planning, and hair-styling fields. It's also good for non-professionals who want to learn more about how to use a color system that will help them make the right choices."

Aura Friedman, Hair Colorist

Color is magical.

Los Angeles–based hair colorist Aura Friedman has been setting trends in the world of beauty and fashion for years. She has colored the hair of renowned musical artists such as M.I.A., Sky Ferreira, and Lady Gaga and acclaimed fashion models such as Charlotte Carey and Soo Joo Park. Friedman has colored hair for magazine editorials in *Harper's Bazaar, Vogue, InStyle,* and other publications. Friedman is known for achieving precise color results for people with diverse skin colors and complexions. She is also known for working with color in surprising ways, testing the bounds of what is expected while being sensitive to the color needs of her individual clients. You can see examples of her work at `www.aurafriedmancolorist.com`.

Friedman's connection to color began when her parents named her Aura — a prescient choice for a girl whose livelihood would be defined by color. "In high school, I took art classes, but I struggled with representational drawing. But my teacher said that my work with color was impeccable. So I used my talent with color to achieve the three-dimensional look I couldn't quite get with black-and-white drawing. I used watercolor pencils (color pencils that blend with water) and I added colorful highlights and shadow. I discovered how to create depth in my art."

Friedman's love of art blossomed into a desire to become an art therapist. Although she didn't pursue art therapy as a career path, her core desire to listen and help people found full expression in her work as a hair colorist. "Beauty school gives a very basic outline of color theory as it relates to hair color, but not enough," says Friedman. "Hair colorists learn from working closely with experienced colorists, in an apprentice-style arrangement." With her foundational training in place, Friedman went on to innovate in her field. "Anyone can be a blonde or a redhead. I became known for making Korean women platinum blondes."

In hair coloring, dark hair (such as black hair) must be lightened before a lighter color can be applied. In the process of lightening dark hair, the hair's undertone is revealed. The colors of the undertone are known as *contributing pigments* because, in dense concentration, they contribute to the hair's natural color. For example, the underlying pigment of black hair is dark red, and the underlying pigment of light blonde hair is pale yellow. Hair colorists use an *underlying pigment chart* (see Figure 12-6) which attributes numbers to these different pigments, from 10 (lightest) to 1 (darkest). Hair color in the bottle is numbered, so colorists know which dye is usable over which hair color.

FIGURE 12-6: An underlying pigment chart for hair color.

Tetiana/Adobe Stock

Friedman explains, "When coloring hair, you're either neutralizing or enhancing. Neutralizing means playing down the color; making it more neutral. Enhancing means playing up the color; making it more vivid. Color theory comes into play when a more neutral hair color is desired. For neutralizing, green dye is used on hair that has red undertones (as green and red are complementary colors, they mix to a neutral middle color). Purple dye is used on hair with yellow undertones to tone down brassiness (and of course, purple and yellow are compliments)."

The challenge of hair coloring isn't always about changing one hair color to another. "Clients often come in with hair that is already colored, as well as roots in their natural color. I'm faced with two problems: changing the natural color and working with the dyed hair so it matches. It's a balance. Also, the trick with hair coloring is knowing what different kinds of hair can take. Dyes can chisel into the hair and change its texture. Porosity of hair also determines how it takes color," Friedman says.

As for determining the best hair color for her clients, Friedman uses what she refers to as a *make-up artist's approach*: "I look at skin color, eye color, and eyebrow color when determining what hair color will work best. Everyone has so much going on with eye color and skin tone, there is plenty to work with. Hazel eyes have gold an amber, so warmer tones can work well."

Friedman's work has helped shape the modeling careers of some of her clients, thus changing their lives, but color is transformative for anyone. As Freidman says, "I believe in the power of color to uplift. Color can be a catalyst for change in people's lives, and people identify with colors that will help them. People come to me with a strong need to reinvent themselves, to have a rebirth, and to express themselves. Anything is possible with color!"

Jay Jones, Garden Designer

I first perfected power-clashing in my wardrobe as a teen and, later in life, in the garden.

Garden designer Jay Jones is the man behind Jay Gardens (`www.jaygardens.com`), a business that creates innovative gardens for urban spaces. From backyards in Brooklyn to rooftops in Tribeca, Jones transforms outdoor spaces to green sanctuaries in the midst of big-city life, as shown in Figure 12-7. Jones works on every aspect of garden design: creating renderings, digging up and leveling earth, installing surfaces such as brick and stone, creating planters, constructing fences and fountains, and of course, planting innumerable types of trees, bushes, plants, and flowers. In addition to running his own business, Jones worked as head gardener at Voelker Orth Bird Sanctuary and Victorian Gardens Museum in Flushing, Queens. In this role, Jones redesigned the museum's century-old garden.

Jones's interest in color was intertwined with a bourgeoning interest in gardening. "I was drawn to beauty and art from a young age," Jones explains. "I was always drawing and coloring. I remember being fascinated by all the colors and names on my Crayola crayons. Those big boxes of crayons were definitely my first introduction to color theory. I loved how the colors were organized by shades. After a long coloring session, I would obsess with getting all the crayons back in the exact order that they came in originally." Along with his coloring, the young Jones was also doing a lot of gardening with his family. "I remember burying fish heads in my mother's garden and marveling at how they'd make the plants grow."

Jones moved to New York city with the dream of becoming a fine art photographer. While attending School of the Visual Arts, he made extra cash watering gardens on the rooftops of Manhattan. The watering gig blossomed into a full-fledged career and the eventual establishment of his company, whose mission is to "create flowering gardens and tranquil urban oases."

FIGURE 12-7: A portrait of Jones in the garden.

Courtesy of Jay Jones

"I think the beautiful thing about a garden — with all its colors, textures, and smells — is the mood it can strike. That's the magical thing about gardens. Depending on the plantings and the season, the mood can be romantic and sultry, a place where two people can fall in love. Or the mood can be sad or nostalgic. And the colors in the gardens can evoke these moods for visitors," says Jones.

"One big challenge in garden design is that all the plants have seasons. They bloom at different times and leaf color changes. You may have two plants whose foliage is wonderfully complementary, but if they both bloom yellow at the same time, you'll lose a lot of impact. Knowledge of a plant's flower color and leaf color, and how the leaf color changes throughout the season, is key when planning what to plant with what."

Jones states that the colors of plants are not always as straightforward as we might think. And he encourages us to look closer. "Most things are not just one color, so start training your eye to see all the colors. Try to go as deep as possible. The red barn is beautiful, but it's weathered so it's not just pure red. Maybe some parts are brown, and that looks nice. Or there is moss growing on the roof and there is a patch of buttercups in front of the barn. Begin to notice how colors work together. Try to look at plants the same way. The flower is red, but what other colors are there? Maybe on the leaves there is a subtle streak of mint green that you don't really notice right away. If you put another plant nearby that has mainly

mint green leaves, then suddenly the mint green on the red-flowered plant really jumps out. And you have two plants that look great together."

For those who want to break into the gardening biz or for the weekend gardener, Jones suggests, "Go look at every garden you can. Botanical gardens, private gardens, parks. Look at magazines and garden books. If something speaks to you, don't just say 'I love that.' Go deeper, really LOOK, and ask why it appeals to you. What is it about the specific colors, shapes, and textures of what you're looking at that excite you?"

As for taking risks in the garden, Jones's position is refreshingly casual. "The nice thing about gardening and plants is that it's not permanent, so don't be afraid to be adventurous. If you don't like it, you can move it. Don't be rigid."

Keisha Prioleau-Martin, Painter

I would say my palette evokes excitement, joy, and serenity.

Painter Keisha Prioleau-Martin (`https://keishaprioleaumartin.cargo.site`) revels in color, and her canvases show it. The figures in Prioleau-Martin's paintings dance and move in ways that make us know they are alive. And the color in her work heightens the action. Foregoing conventional skin tones, Prioleau-Martin's figures are yellow, pink, purple, orange, blue, or green. The emotional state of her figures is open for interpretation, but the colors communicate joy, revelation, and ecstatic experience. Like the French painters known as *Fauvists* (meaning "wild beasts"), Prioleau-Martin uses color to capture joie de vivre. With a BFA from SUNY Purchase College under her belt, Prioleau-Martin is developing an exciting career. She is making strides with her paintings and exhibiting at galleries such as Olympia in New York's Lower East Side and Underdonk in the artist-filled Bushwick neighborhood in Brooklyn.

"I remember feeling angry about wearing pink at age 7. And I enjoyed seeing people wear green on St. Patrick's Day. In college, the decorations in my rooms were warm and I announced that my favorite color was yellow because it reminded me of being in the sun. Recently, I've been happy around green because I want to lay in the grass", says Prioleau-Martin. "My inspiration for color comes from fashion, toys, nature, and intuitively putting colors together."

An important breakthrough for Prioleau-Martin occurred with a concept known as *local color*, which is the color of an object under neutral and even illumination, without reflections or shadows from other objects or any colored light sources. Realist painters often mix color with great precision to match the local color

of their subjects. Painters working in less realistic ways may forego local color, working with color more freely. Prioleau-Martin is an example of the former, as she explains, "I hit my stride with color while working on my thesis project in college. I was encouraged to use color in ways other than as it existed in my surroundings. I ditched local color." This revelation defined Prioleau-Martin's subsequent work, in which she applies color with a refreshing sense of freedom. Not only has she ditched local color, but color itself is not localized in her work. Color does not stay in one place; it melts from bodies into clothing into backgrounds and back again, as shown in Figure 12-8. Prioleau-Martin's figures are not merely painted; they *are* color and project colorfulness into their worlds. From her artist's statement, "The boundaries between figures and environment are blurred. Painterly marks capture the fluidity of those boundaries, as well as the moment of captured, unbounded joy."

Courtesy of the artist

FIGURE 12-8:
Keisha Prioleau-Martin, *In a Starlit Humm,* 2019, acrylic on canvas, 68 x 50″.

Prioleau-Martin offers a few technical insights into her painting practices. "I use paint with a high volume of pigment added to it." (See the high-quality paints described in Chapter 11.) "Some of the pigments I select are transparent by nature, so I use these whenever I create transparency. Recently, I've been really interested in putting transparent colors over opaque colors to find new unexpected ranges of other colors," Prioleau-Martin says. As for setting up her palette: "I find it helpful to add one color at a time. Start with two colors, then slowly add a third." While Prioleau-Martin's work can be described as unboundedly colorful, she does practice restraint to create a sense of focus to her palette. "When I started limiting my palette, I learned more quickly."

Fanny Singer, Food Aficionado

Shop in season at the farmers markets and let the color lead the way!

California-based writer, art historian, entrepreneur, and food aficionado Fanny Singer is the author of *Always Home: A Daughter's Recipes and Stories* (Knopf), a loving memoir about growing up as the daughter of renowned chef Alice Waters. Together with her mother, Singer published *My Pantry — Homemade Ingredients That Make Simple Meals Your Own.* Singer illustrated *My Pantry* with carefully made ink-wash paintings to accompany individual recipes and a colorful watercolor for the front cover. Singer also writes about art and culture for publications such as *WSJ*, *Apartamento*, and *Frieze.*

In 2016, Singer co-founded Permanent Collection, a line of home goods that offers kitchen utensils, dinnerware, linens, accessories, as well as provisions like honey, tea, and jam. As a lover of food, Singer's Instagram account is a veritable "daily bread" of gastronomic inspiration (such as the basket of vegetables in Figure 12-9) and also includes beautiful images of art, décor, and flowers. (Visit her website at `https://fannysinger.com/Info`.)

Courtesy of Fanny Singer

FIGURE 12-9:
Singer's basket of fresh farmer's market vegetables.

Over email, Singer answered my questions about color and food, topics I knew she'd have a lot to talk about.

Q: What were your formative experiences with color that shaped your appreciation for color and food today?

A: I grew up with an artist for a father and a cook for a mother, both of whom, in distinct ways, were intensely engaged with aesthetics. My father — who would describe his work as formalist, probably — was a devotee of minimalism and color field painting. He introduced me early on to artists like Sol LeWitt, Jo Baer, Brice Marden, Blinky Palermo, Carmen Herrrera, Robert Mangold, all of whom engaged color in very specific ways. My mother's approach to color was more about creating environments she

found comfortable or hospitable — for instance, placing intense focus on the riotous Renaissance still life–worthy floral arrangements that greet guests in the dining room of her restaurant, Chez Panisse.

Q: Why do you think the color of food is so important?

A: For one, color in food expresses true biodiversity. The idea that carrots should be orange, for example — instead of purple, white, yellow, and red (all colors they come in naturally) — boils down to how foods began to be marketed as our crops became increasingly industrialized for commercial markets. So, on a fundamental level, color speaks to nutrition and the health of the soil; the more colorfully we eat, the more vitamins, minerals, and nutrients we're accessing and the more health we're helping to keep in the land. But color in cooking is also virtually always a guarantee of flavor, whether it's slices of brilliant orange kumquat in a leafy green salad or pink rose petals scattered over a cake.

Q: How does the color of food set a tone or strike a mood in regard to seasons?

A: Every season has its palette, which is to some extent what you'd expect (fewer vibrant colors in the winter; a rainbow of colors in the summer). But there are some wonderfully subversive ingredients, like all the colorful citrus or petal pink or deep burgundy colored radicchios we get in the winter. People naturally gravitate toward brighter, fresher, crunchier fare in the spring and summer and warming, softer, heartier, nuttier dishes in the autumn. I think these moods and inclinations are largely driven by deeper, even primordial, circadian rhythms, but you see them reflected in how menus are put together season to season.

Q: Colors in restaurant interiors: How does décor and dinnerware affect your experience of food?

A: Lighting is everything! It's probably been my mother's number one obsession at Chez Panisse (after the quality of the ingredients). I believe in warm lighting in dining spaces always; I think it makes food taste more nourishing, and it certainly makes the environment feel more embracive and generous. But I also believe in a colorful table. I love flowers on the table, and bright, pigmented candles and also prefer colored plates to offset ingredients in interesting ways: greens, blues, and yellows are my favorite. I always have beeswax candles burning; they create the best quality of light.

Q: What color and food inspirations have you gleaned from travel?

A: I love eating foods that are local to wherever I'm traveling. There's some about sampling an ingredient that is very specific to a region that helps you decipher something about that place's terroir, helps you glean something of the deep

history of the land and its stewardship. And when you taste something that has been growing for centuries in a region, you can really taste *why*! I'll never forget the bright red tomato and dark green cucumber salads I ate in Georgia [the country] that were tossed with purple basil leaves and pounded maroon walnuts, or the taste of the huge middle-yellow lemons of Amalfi — such distinct color, aroma, and flavor, like no other lemon.

Q: Have you ever experienced a surprising dissonance between color and flavor? Or the opposite: a perfect harmony between color and flavor?

A: There's a variety of raspberry that my mom has been growing in our backyard in Berkeley for more than 30 years, an heirloom variety that is small and so delicate that it barely survives the trip from garden to kitchen; you just have to eat them standing among the canes. I don't think I've tasted anything that so completely tastes as it feels it ought to than those raspberries do: delicate, jammy, and deeply aromatic with a dusky ruby red color that gushes a bloody pigment stain onto your fingers if you press them too vigorously.

Q: As an art historian, what are your favorite examples of color and food in visual art?

A: Wayne Theibaud illustrated the Chez Panisse *Desserts* cookbook from 1985, so I've always had an outsized affection for his pastel impasto renderings of confections, and I love the yellows of cheeses and the vitreous greens of grapes that feature in so many Dutch Master tabletop still lives, but one my favorite painters of food is a contemporary Japanese figurative artist named Ulala Imai. She is a terrific colorist — she always seems to evoke the *spirit color* of a given food, if not the most veristic one — but she also paints food in such a way that I can genuinely imagine holding it and eating it. I still can't get a painting she made of a ham baguette sandwich out of my head.

Gabriele Wilson, Graphic Designer

Color is as important as typography or image.

Graphic designer Gabriele Wilson is known for creating exquisite brand identities, book cover designs, package designs, and more. Her clients include the publisher Alfred A. Knopf, Phoenicia Diner, Blue Marble All Natural Ice Creams, The Museum of Modern Art, and Victoria's Secret. With exceptional versatility and bespoke attention to detail, Wilson creates intelligent design solutions that communicate boldly and stand the test of time. In Wilson's designs, color plays an essential role that can't be overlooked.

Wilson's interest in color and design began when she was very young. "Our home was full of colorful patterned upholstery, art, and flower arrangements. I remember decorating my room with primary colors and Marimekko prints. I don't think I ever gravitated toward pink," Wilson recalls. "As an art minor in college, I was inspired by how artists like Georgia O'Keefe and Mark Rothko use color in their work. I learned color in a formal way by studying the color theory of Josef Albers in graduate school." (Albers is covered in Chapter 5.)

Wilson, who is based in Berlin, began her career in New York, where she became known for designing book covers. Years later, she continues to enjoy designing book covers because the form offers opportunities to be adventurous with color, as shown in Figure 12-10. "Color is a critical tool to depict the tone of writing. I can use color to make something look masculine, feminine, neutral, dark, happy, empty, serious. In my designs for *The Common* (a literary journal), I wanted to create the sense of a common place for the writers to meet, so to speak. Each issue features a common object (such as a ping pong paddle, a cassette tape, an eraser, and a fork) photographed on a flat color background. Twenty issues later, the colorful designs continue to be eye catching in stores and online (where things appear smaller than a postage stamp). I believe that the colorfulness of the designs has contributed to the success of the journal."

Courtesy of Gabriele Wilson

FIGURE 12-10:
Book cover by Gabriele Wilson, *The Commons.*

While enjoying the buzz that color can bring to her projects, Wilson is weary of potential pitfalls. "Typography needs to be legible on book covers. Readable type is key. Don't use fluorescent colors for designs that might sit in a bookstore window. Sunlight causes fluorescent colors to fade. This happened to me! The book cover looked great for the first few months and then the title disappeared. Also, I would never use red type on a green background, because complementary colors tend to vibrate and make the type hard to read."

As much as Wilson embraces color, she also knows that its absence in some areas of a design can have a greater effect. "Right now there is a trend towards very colorful book covers. One thing I don't see in this cover trend is subtlety or contrast. Everything comes forward at once and it is a bit exhausting to look at. The eye doesn't have a break. Balancing vivid color with neutral colors like whites or grays give color more space to play out. In this way, color can have more impact when used less." Wilson is also cautious about using color stereotypically, such as using pink on a book about women's history.

Color research is key to Wilson's design practice, and she encourages designers to do the same. "If a novel takes place in the 1970s, the designer can rely on typical colors from that time period so the colors are historically accurate," she says. "I did the graphics and overall brand strategy for the Phoenicia Diner in the Catskills. The slogan was "Come for the mountains, stay for the food." I wanted to use colors inspired by the national parks and nature rather than colors one might expect at a 60s diner (orange and turquoise), so the overall color scheme from the logo to counter stools was a combination of fur green and an earthy charcoal brown. In this project, color was completely concept-driven, rather than being decorative."

In some of Wilson's designs, color is meant to recede, allowing the product itself to advance. "I worked on the brand revival for a shoe company called Palter DeLiso. The company dated back to 1927 and was considered a pioneer in the American luxury market. My job was to update the brand for today but stay true to its roots. I chose a muted palette of gray, salmon, white, and gold. Many of the shoes were sleek and colorful so I felt it was important to have elegant and somewhat quiet packaging for the shoes to shine." To see an example of the Palter DeLiso packaging and more of Wilson's work, visit `https://gabrielewilson.com/`.

IN THIS CHAPTER

- Understanding your color tastes and preferences
- Exploring new ideas to explore color creatively
- Discovering new color concepts
- Observing colors in the world

Chapter 13
Tens Ways to Kickstart Your Color Creativity

The exercises in this chapter are spin-offs from color concepts described throughout the book. Each exercise is an independent exploration, so do as many (or as few) as you like, in any order. No matter what your medium, the exercises are ways for you to reframe your thinking about color, shake up your process, get some new inspiration — and kickstart your color creativity!

These exercises are not instructions for finished projects. Rather, they're ideas that you can develop however you like. Whether you're teaching a class on color theory and looking for ways to spark your students' imaginations or working on your own, these open-ended exercises can help.

Everyone's color sensibility is different. The exercises are meant to reveal your color preferences and tastes, build color observation skills, and simply enjoy the experience of working with color.

Exercise #1: Building Your Color Vocabulary

Move through the world with your eyes open to color. Using your smartphone, capture colors that speak to you. Zoom in on the exact color that interests you, excluding superfluous material from the frame or use the crop tool to zone in on color.

After gathering colors, save them in a folder on your phone or desktop. Name each color. You could use a simple descriptive term (for example, calling a color *spinach* because that's the source of the color) or a more creative one (for example, calling the same green color *jungle life* because that's where the color takes your imagination). Either way, the term should be memorable. Title each file with the color name you've chose, such as spinach.jpg.

The colors and their names will become part of your color vocabulary. These colors may be used as jumping off points for creative projects.

Exercise #2: Mixing Cellophane

Cellophane comes in sheets and rolls. Both are useful for this exercise. Using scissors, cut the cellophane into simple shapes, such as circles, triangles, squares, and rectangles, roughly the size of the palm of your hand. Use clear tape to affix the cellophane to a window that gets bright sunlight. Explore mixing colors by overlapping different pieces of cellophane. Use white printer paper (which is translucent) over and under the cellophane to see how the color changes.

Exercise #3: Exploring Nature's Colors

Nature's colors are all around us. Mountains, fields, and beaches are potential sources of color inspiration. For those who live in cities, your local fruit and vegetable stand or flower shop can provide colorful connections to nature.

Pick a subject as your focus, such as leaves, rocks, or seashells. Collect physical specimens or use a camera to capture them. Alternately, cut a small square in the middle of a white piece of paper and use it as a viewfinder to zone in on an area of color.

Observe the color of your specimens. If you look close enough, you may find more color variety than you first thought. For example, seashells often have different colors inside and outside, and shell colors range from dark to light: a surprising range. Many plants also have a range of colors. Look closely!

Exercise #4: Planting a Colorful Garden

You can plant a colorful garden indoors with containers or outdoors in the ground. Select plants for their color. Leaves come in innumerable greens. Play light greens off dark greens, and yellow-greens off blue-greens. Contrasting greens will make each plant stand out and make the whole arrangement appear lush. When arranging the plants, create depth by putting dark greens in back and light greens in front. As for the color of flowers, try bold combinations such as blue hydrangeas with yellow rudbeckia, or purple alliums with orange daylilies! And remember that plant colors change with the season. Keep an eye on how the greens of certain plants change from spring to summer, and how the brightly colored flowers look against the greens.

Exercise #5: Expanding Monochromes

Get ahold of some old books and magazines. Choose a single hue as your focus: red, orange, yellow, green, blue, purple, gray, white, black, or neutral. Cut out areas of your chosen color. Select dark, light, and saturated versions of your hue. Cut away all typography and extraneous colors.

Lay our your pieces of color and observe the contrasts between the dark, light, and saturated versions of your hue. The more expanded the monochrome, the less it will read as one hue. But because the collection of colors originates from a single hue, the group will feel unified nonetheless.

Exercise #6: Concocting a Food Palette

Choose a food that you enjoy. It could be a course (such as breakfast or dessert), a type of cuisine (French or Japanese), or an ingredient (spices or vegetables). Find images online or take your own pictures, and gather them together. Use the images as inspiration for a creative work, such as an abstract painting in the colors of an

ice cream sundae, or a summer dress in the colors of sushi, or a kitchen painted the color of an omelet, with accents the colors of toast and jam?

Exercise #7: Crafting a Color Blot

In Chapter 10, you discover that Mary Gartside used color blots to explore color. You can too! Choose any medium — markers, color pencils, acrylic, oil, collage, pastel — and apply a small area of color in the middle of a white sheet of paper or canvas. Expanding out from the center, freely add colors side-by-side. Let them bleed or blend as much as you like. By adding colors to the blot, you'll gain color-mixing experience. Discover unexpected juxtapositions and combinations of color as the blot expands.

Exercise# 8: Creating a Personal Palette

You live in your own color world. Colors carry meanings and associations that are important to you. Choose colors for each of the following categories:

- **Childhood colors:** What colors do you recall from your childhood? Take a moment to think about your room, home, or favorite toy or clothing, or the first time you saw a color and how it affected you. Often, the colors you grow up with make a lasting impression — see how many you can recall.
- **Chosen colors:** What are your favorite or preferred colors? For example, what colors do you include in your home, wardrobe, or most important possessions? Consider how these preferences change over time, and from season to season.
- **Cultural colors:** What are the colors of groups you are part of? What are the colors of your cultural background, ancestry, or heritage? How about the colors of religious groups, or even the colors from popular culture that you identify with?

The result is your personal palette — colors relevant to you in your own particular way. Try working your colors into your life in new ways. For example, does a new look at your cultural colors inform new color choices for your wardrobe, home, or artwork?

Exercise #9: Adding Color to Your Home

The rooms of a home are psychologically charged and represent different parts of the self. The kitchen represents nourishment and connecting with family. The bedroom represents sleep, the dream world, connections to the unconscious, and sex.

For each room in your home, make a list of your activities and associations. Looking at the list, visualize the colors that best suit each room's activities and associations. For example, if the kitchen represents the hearth — and heart — of your home, and the main activities are cooking together, what colors come to mind when you imagine these associations and activities? A warm, nutty brown color? A happy, heartwarming orange?

Exercise #10: Making a Mood Board

A *mood board* is a surface onto which different colors are placed to give an overall impression, or mood, to a set of colors. Fodder for mood boards include swatches, clippings, and just about anything that contains color. Mood boards are usually created at the beginning of a project as a way to get inspiration and spark imagination.

Items are typically attached to white or colored *foam core* (a stiff material available at office supply stores and art stores) using pins or tape. You could instead use just about any surface, such a recycled cardboard or found papers, for a mood board.

Focus on a general group of colors, such as greens or neutrals. Search through magazines, books, and fabrics to find colors. Digital items can be printed and then affixed to the board. If you're familiar with a program like Adobe Photoshop, you might want to create a digital mood board.

After you've gathered your items, enjoy placing them on the board to find contrasts and connections between the colors. Edit out what you don't want, and hone your choices to strike the mood!

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About the Author

Eric Hibit (born in Rochester, NY) is a visual artist based in New York City. He attended the Corcoran College of Art + Design (BFA,1998) and Yale University School of Art (MFA, 2003). In New York, he has exhibited at Morgan Lehman Gallery, Dinner Gallery, Deanna Evans Projects, One River School of Art + Design, Tiger Strikes Asteroid, Underdonk Gallery, Ortega y Gasset Projects, Zurcher Studio, C24 Gallery, Anna Kustera Gallery, and Max Protetch Gallery. He has exhibited nationally at Weatherspoon Art Museum in Greensboro, NC, Adds Donna in Chicago, Curator's Office in Washington, DC, Geoffrey Young Gallery in Great Barrington, MA, The Cape Cod Museum of Art, Satellite Contemporary in Las Vegas, NV, The University of Vermont, Bedford Gallery in Walnut Creek, CA and internationally in Sweden, France, and Norway. His work has been covered by the *Washington Post,* the *Village Voice, Hyperallergic, Newsweek,* the *New York Times,* and the *New York Post.* Hibit has taught studio art at Drexel University, The Cooper Union, Suffolk County Community College, 92NY, Tyler School of Art, NYU, and Hunter College. Artist residencies include Terra Foundation in Giverny, France (2003), UNILEVER Residency in New York (2015), and Kingsbrae International Residency for the Arts (2019) and Green Olives Arts in Tetouan, Morocco (2019). Publications include *Dear Hollywood Writers,* with poet Geoffrey Young (Suzy Solidor Editions, 2017) and *Paintings and Fables* with Wayne Koestenbaum, a limited edition artist's book (2017). He is currently co-director of Ortega y Gasset Projects, an artist-run gallery based in Brooklyn, where he has curated four group exhibitions since 2014.

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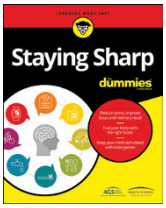

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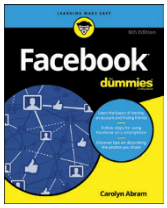

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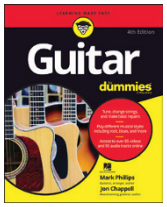

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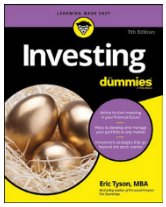

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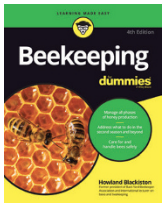

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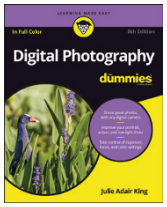

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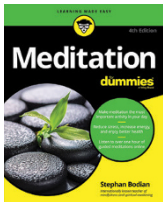

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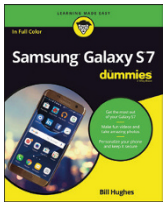

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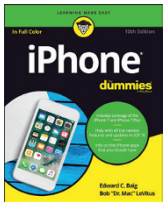

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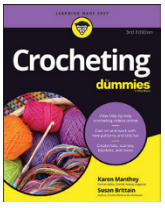

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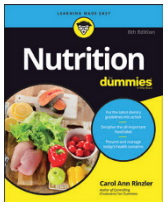

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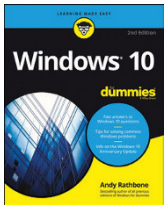

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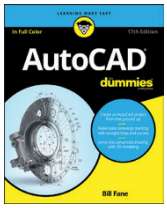

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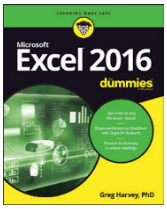

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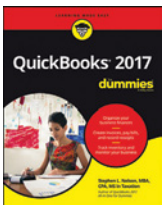

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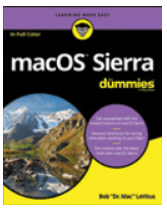

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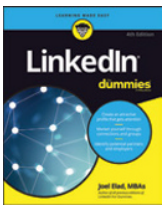

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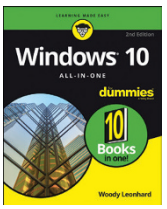

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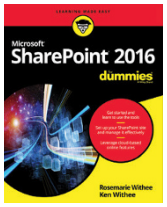

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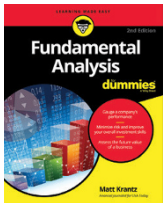

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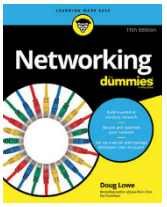

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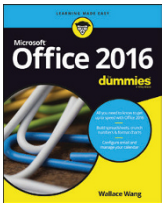

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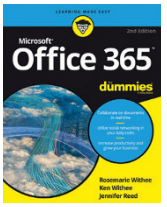

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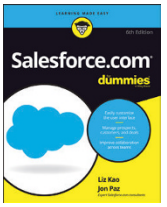

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