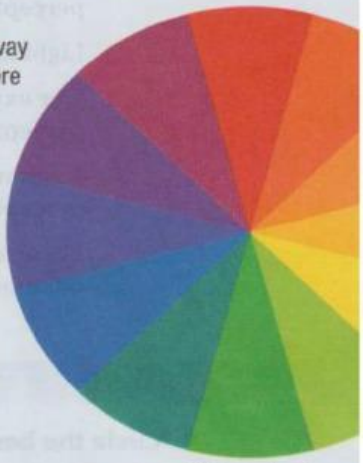
# IS BLUE ALWAYS BLUE?

1 Choosing color is part of almost any home project. But the wrong color can ruin it. Color is not as simple as it seems. There is actually complex science behind the way we see color. You don't need to get a PhD to choose a good color for your kid's room. But here are a few basics about color that might be helpful.

2 Colors are among the first things that children learn to name. But colors do not exist in the same way that a tree or a rock exists. Our brains create our **perception** of color when light hits our eyes. There are many **factors** that **affect** how our brains see color.



*Color wheel*

## Light

3 Light affects our color perception. In very low light, color disappears altogether, and everything looks black, white, and gray. Bright light affects color, too. This is because there is always a little bit of color in light, and different colored light changes how colors look. **Vision** scientist Mark Fairchild likes to tell a story about his very young daughter to illustrate this point. At dinner one night, she became very upset because her macaroni and cheese was white; she wanted yellow macaroni and cheese. Fairchild fixed the problem by blowing out the candle on the table. Like magic, the macaroni and cheese became yellow. He knew that the problem was not the dinner; it was the candlelight, which was yellow. Yellow light on yellow macaroni and cheese makes it look white, but in regular electric light, the same macaroni and cheese looks yellow.

## Expectations

4 Another factor that affects our perception of color is our expectations or memory. We see what we expect to see, especially if we are not looking carefully. In the situation described above, most parents might say to their children: "Don't be silly! That macaroni and cheese IS yellow!" The parents bought and prepared the food, so they know what color it is. When they see it, even in candlelight, their brains tell them what the real color is. The little girl, on the other hand, relies on her **senses** to tell her the color. She does not know what to expect, so her brain does not correct the color for her.

5 For another example of how expectations work, ask a few people about the color of water. Most people will say it's blue. A child's drawing of water is almost always blue. But if you look at water, it is seldom really blue. Water is often more green than blue. Often, it is clear. But we have learned that water is blue, so the picture in our memory is blue. It is what we expect, so it is what we see.

## Anatomy

6 Some people see color differently because of the anatomy[1] of their eyes. About 8 percent of men and 0.5 percent of women are colorblind, which means that they do not see differences between, for example, red and green. They are missing the part of the eye that helps them see those colors.

7 Eye anatomy also changes as people get older, and one common change affects color vision quite strongly. As we get older, the **lenses** in our eyes sometimes become yellow, and this makes it hard for older people to see blues and purples. It is like looking through yellow sunglasses, which makes blues and purples less bright.

## Surrounding Color

8 **Surrounding** colors can affect color as well. A pale green dot might look gray on a bright green background. But that same dot will look very green on a red background. Colors are usually brightest when they are next to their opposite. So, for example, reds look brightest next to green, and blues look brightest next to orange. Colors that are directly across from each other on the color wheel are considered "opposite."

9 Understanding the science of color perception is important to many professionals. But there are many ways amateur designers can use this knowledge to make their everyday projects better as well. For example, always bring a sample of the color you are matching to the paint store so that you don't rely on your memory. **Consider** the **context** for your color. Remember that the lighting and surrounding colors affect the color you choose. Think about who needs to be able to see the color: if people with color vision problems are involved, you might need to change your choices. And finally, be sure to consider your dining room lighting when you serve dinner.

[1] **anatomy:** the structure of a body, or of a part of a body