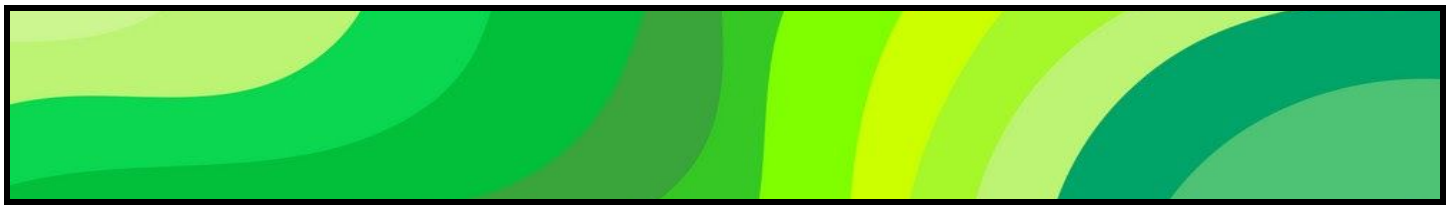
It’s Not Easy Being Green...Or Is It? (ODD ROOMS)

Content

Green plants are green because they contain a pigment called chlorophyll. Chlorophyll absorbs certain wavelengths of light within the visible light spectrum and absorbs light in the red and the blue regions of the visible light spectrum. Green light is not absorbed but reflected, making the plant appear green.

Chlorophyll is found in the chloroplasts of plants. There are various types of chlorophyll structures, but plants contain chlorophyll a and b. These two types of chlorophyll differ only slightly, but it can make a world of difference!.

Ok, so now we know WHY plants are green and how plants use the chlorophyll to promote photosynthesis, but that still doesn't explain the different shades of greens ranging from light green to a dark mottled green. Have you ever wondered why this happens? I mean, GREEN isn't always GREEN if you know what I mean? Take a look below, those are all shades of "green". Why does this happen?



Habitat (where the plant lives and how much sunlight it gets)

- Plants that get limited sunlight end up being darker and have a higher concentration of chlorophyll b. Chlorophyll b is much better at collecting energy from low intensity sunlight.
- Plants that get a lot of sunlight end up being a lighter shade of green, because they have a higher concentration of chlorophyll a.

Leaf Design (thick leaves vs. thin leaves)

- This gets tricky - you have thick "dry" leaves (like a rhododendron) and you have thick "wet" leaves like a cactus.
- Thick/dry leaves tend to be darker, because they have more density of the things that hold the chlorophyll (chloroplasts).
- Thick/wet leaves are lighter, because they are watery and have the chloroplasts spread throughout the leaf.

Leaf Age (young/new leaves vs. older mature leaves)

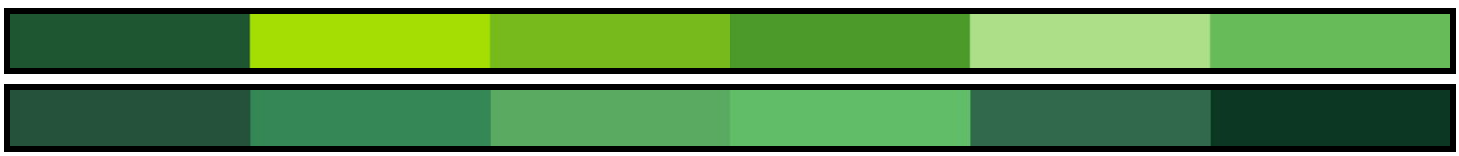
- Young leaves have yet to develop a fully functioning cell wall, and they don’t have the mechanisms for achieving photosynthesis as efficiently. This gives them a much lighter color.
- As most leaves mature, these systems become fully operational and produce a much darker color later in their life cycle.

Plant Deficiencies (the overall health of the plant)

- Just think about it, when you get sick, you can change color too! Plants are not different. Nutrient deficiencies, such as low levels of nitrogen, magnesium and iron, can make the plant go yellow or yellowish-green.

Outdoor Adventure Challenge

We have learned a TON about plants and why they are various shades of green, but let's see if we can find any of these various shades in late winter and early spring. With the range of shades in greens, consider what might have caused this to occur. Was it habitat, design, age, or deficiency?



Circles are Pointless (EVEN ROOMS)

Content

Before we even begin looking for a boatload of crazy shapes and patterns, we need to get an understanding for how our natural world is organized - and we can't do that without Fibonacci. In its simplest form, this sequence follows the pattern of adding numbers together in sequence. For example, 1, 1, 2, 3, 5, 8 is the start of the Fibonacci sequence. Can you see the pattern? First number added to second, second added to third, third added to fourth, and so on. Pretty cool! But it doesn't stop there.

I know, it can be a little unsettling to come to the realization that nature seems to be ruled by MATH! But here at Nuhop, math is our jam and we love seeing all of the amazingness that comes from the Golden Angle and Golden Ratio! But what about all of the natural things that are not sunflowers? What kind of geometric connection do they have?

Using the images below, let's take a minute to look at a wide range of natural elements and see if you can identify the hidden geometric shapes. Use the table to the right to try and broaden your search.

Alternate	Right Angle	Parallel Lines	Cube	Spiral
Octagon	Tangent	Opposite	Circle	Right Triangle
1, 1, 2, 3, 5, 8, 13, 21... Fibonacci	Hexagon	Obtuse Triangle	Straight Angle	Intersecting Line
Obtuse Angle	Square	Acute Triangle	Sphere	Cylinder
Acute Angle	Perpendicular Lines	Overlapping	Whorl	Cone

Which were the easiest to identify? Which could you not find? Do you have an idea of where you might be able to find those particular shapes?

Outdoor Adventure Challenge

It's time to venture outside and see if all these shapes actually exist in our own backyards. To do this we are going to complete a Nature Shape Audit. To complete our audit, we will need to do the following:

- Use the Nature Shape Audit linked to the right. This has 25 2D shapes that we will be challenging to find.
- Take the sheet with you outside and start searching!
- How many of the 25 can you find? You need to show the match to someone (or take a picture of it with your phone) for it to count.
- How many of the 25 can you find on one plant? You need to show the match to someone (or take a picture of it with your phone) for it to count.
- Race against a sibling or friend to see who can find the most the fastest. You need to show your competitor your match for it to count.
- On the back of the sheet, draw your own shapes that we missed.