

# Is a green apple always green?



*Explore how light is needed to see colours.*

**Setting:** Indoors

**Time:** < 30 minutes

**Concepts:** light, optics

**Skills:** observing, comparing & contrasting

## Subject(s):

- ✓ Physics
- ✓ Life Sciences

## Ages:

- ✓ 6-8
- ✓ 9-11

## Materials:

- 1 banana
- Flashlight
- 1 green apple
- Red & green cellophane
- Red playing cards
- Shoe box

## What to do!

1. Place the apple, banana, and red playing card (face up) into the shoe box.
2. Place the green cellophane (filter) over the top of the shoebox. Shine the flashlight through the hole on the side onto the objects inside. Only green light passes through the cellophane. The red on the playing card goes dark. The yellow banana appears as a darker yellow with a green tinge. The green apple appears green.
3. Remove the green filter.
4. Place the red cellophane (filter) on the top of the shoe box.
5. Shine the flashlight through the hole on the side onto the objects inside. Only red light passes through the cellophane. The red on the playing card disappears. The background of the playing card turns red. The banana turns red. The apple turns red.

## What's happening?

Light travels in the form of a wave, and each colour has a distinct and different wavelength from another. White light is composed of all the different colours added together. In this activity, various filters are used to filter out parts of the spectrum of white light allowing us to see individual colours. The red filter works by absorbing most of the colours in white light letting only the red light through. This also works similarly with the green filter and green light. We see coloured objects for the same reason. A red tomato appears red because of materials in its skin that only reflect the red light back into our eyes. However, if we were to view the red tomato in blue light instead of white it would appear to be a totally different colour. Colour needs light - there is no colour if there is no light.

## Why does it matter?

In the human eye, there is special part called the retina, which is located in the back of the eye. The retina contains two special types of cells – rods and cones. Rods are more sensitive to dim lighting, while cones function best in bright light and allow us to see colour.

## Is a green apple always green?

Imagine you are staring at a banana. When light reflects off the banana, it hits the retina and depending on the wave lengths of light reflected, it determines what colour we see. Once the light hits the cones in our retina, it sends a signal to our brain and processes the information we are seeing: yellow!



### Investigate further!

- Try using different colours of cellophane
- Try mixing 2 of the cellophane pieces together. Can you predict what colour the objects will appear?