

Colour-blindness and Camouflage

By Helene Share

Kyle's eyes play tricks on him!



Yeah, yeah, it's holiday! I am so excited that it is finally here, summer holiday! My family and I are going to the Kruger National Park. I cannot wait! I love being out in nature, looking at all the plants, insects and animals. Some of them are easy to spot, while others are almost invisible to us. Is it because most animals hide from humans? Is it because we cannot see very well? I know that colours play a part in what we can or cannot see. My dad is colour-blind, yet when we go on a game drive, he can spot animals much easier than the rest of us. I wonder why?

How eyes work

Our sense of vision (our eyes) is the main way in which our brain takes in information about the world. An eye works a lot like a camera, but its lenses are made of a clear jelly rather than glass. Like a camera, it uses the curved lenses to focus light onto a film. In our eyes, that film is the back of the eye, called the retina. A camera can focus by moving the lens in and out, but eyes use muscles to stretch the lenses. The picture formed on the retina is called an image and it is upside down.

The images captured on the retina are sent to the brain as electrical signals. The brain then uses the signals and identifies them as colours or shapes.

A leaf butterfly with its wings open.



Seeing colour

The human eye can see in colour because our retinas have small cells called rods and cones. Cones can see colours and fine details, but they need bright light to work. Rods work in very dim light, but they see in black and white only. When you try to see in the dark, only the rods are working and so the world becomes colourless. Switch on a light and your cones switch on too, showing the image in colour and with lots of detail. Some people however, are not so good at seeing colour. Often their clothes do not match and they might have been teased for being colour-blind. Colour-blindness does not mean that they only see in black and white. No, they find it hard to see the difference between colours. The cones inside the eyes work in combinations of red, blue and green. When the cones in the eye do not work properly, the brain gets the wrong information and a green leaf might look gray.

Camouflage

In some cases, even if you have the best eyesight in the world, it cannot help you spot certain animals or insects. They do not want to be seen! Animals like the leopard have the same colour as the field in which she lives. It becomes very difficult to see her in the bushes. We say that animals camouflage themselves. Some insects also use the camouflage trick to ensure that they are not easily spotted by their enemies. We call this mimicry. They pretend to be something they are not.

- * Leaf butterflies look brilliant when their wings lay flat – they come in all manner of colours and shapes. But when their wings fold up they look like leaves – sometimes green, sometimes brown, as if fallen and dead.
- * This Malaysian orchid mantis has cleverly adapted to resemble the striking white orchids (a specific type of flower) of the region.



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Nanotechnology and camouflage

Move over Harry Potter! Invisibility cloaks may just become a future reality. That's right. Scientists are working very closely with nanotechnology to make invisibility a reality.

A leaf butterfly with its wings closed.



Making a rainbow spinner

Here is a fun activity that you can try at home:

Stuff we need:

- * a pencil
- * a glass
- * white paper
- * cardboard
- * scissors
- * a ruler
- * coloured pens or crayons
- * glue
- * string



A Malaysian orchid mantis

What colour do you see?

Make lots of spinners with different colours.

When the spinner spins really fast, you see light reflected from all colours, but your brain can't separate them. You see a mixture of colours that appear as black or white. Your spinner may look grey to you because your colours are not pure.

Steps to follow:

1. Put the glass on the white paper and draw two circles on it. Then put the glass on the cardboard and draw another circle.
2. Cut out all three circles.
3. Divide the white paper circles into equal-sized sections (so that it looks like a pie), using a ruler, and colour each section a different colour.
4. Glue the two coloured-in circles on each side of the cardboard circle.
5. Carefully make two small holes, equal distances from the centre of the circle and about 1 cm apart.
6. Thread the string through both holes and tie the ends together.
7. Pull the string so that it is the same length on both sides of the spinner.
8. Slowly make circular motions with your hands until the string is twisted.
9. Stop the circular motion and pull your hands apart and then back in, causing the spinner to spin very quickly.



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