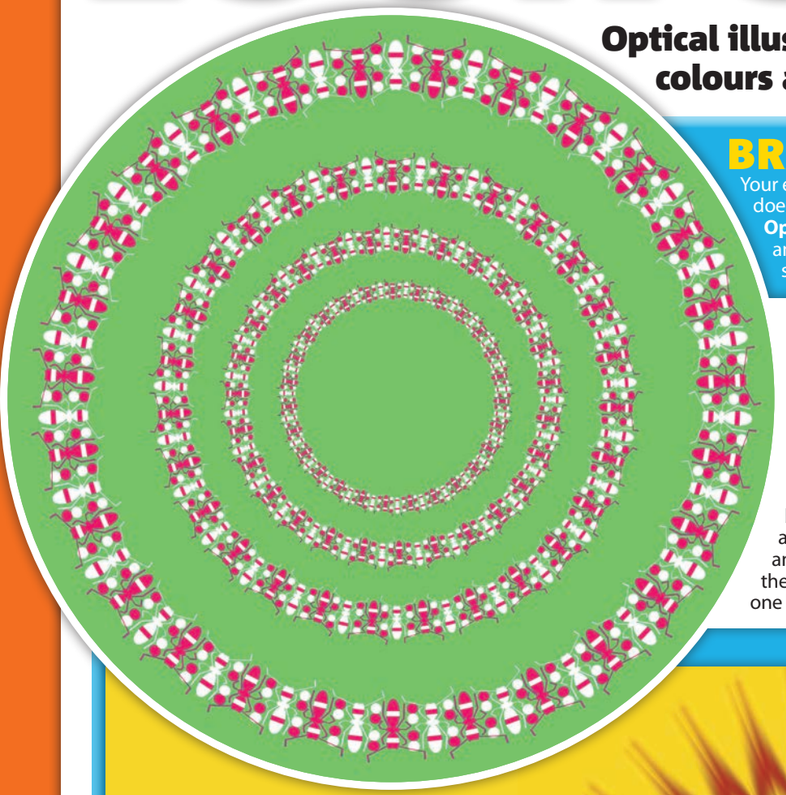
LOOK OUT!

Optical illusions, 3-D vision, crazy colours and cool creature eyes...



BRAIN BOGGLERS

Your eyes and brains are super clever – but that doesn't mean they can't be fooled. **Optical illusions** use colours, patterns and shadows to trick your noggin into seeing things that aren't really there…

SPOOKY SPIRALISER

The colourful ants in this image join together to create a spiral, right? WRONG! Look carefully and you'll see the image is actually made up of four **individual** circles.

WHAT'S UP?

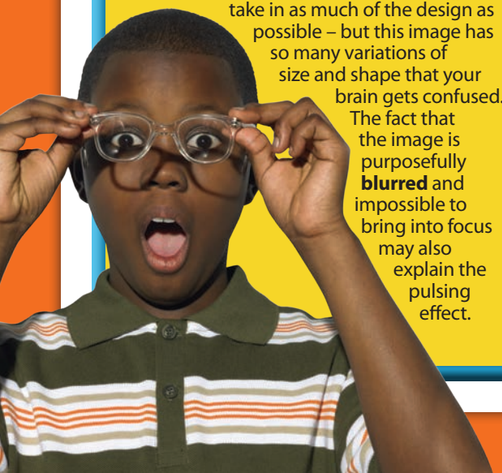
The coloured ants in each ring don't completely line up with each other. So your brain, **which likes to keep things ordered**, gets all confused. It tries to match up the coloured ants in the different rings and ends up seeing them as being connected, creating the illusion of one long spiral.

PULSING PICTURE

Let your eyes gaze at this image. It looks like **it's moving**, right?! In fact, it's probably making your eyes feel weird!

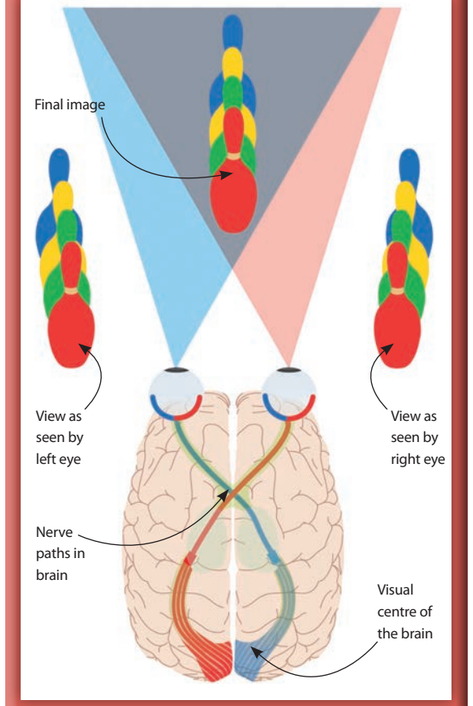
WHAT'S UP?

Your eyes are **moving constantly**, trying to take in as much of the design as possible – but this image has so many variations of size and shape that your brain gets confused. The fact that the image is purposefully **blurred** and impossible to bring into focus may also explain the pulsing effect.



SEEING IN 3D!

Unlike **squirrels**, **horses** or **goldfish**, whose eyes are on opposite sides of their heads, humans' eyes face **forwards**. This is called **binocular vision**. Each eye takes in *almost* the same scene, but from a slightly different angle. The two views are then joined together in the brain (see below) to help you figure out how far away things are!



TRY IT!

Test out your binocular vision by holding a **finger** straight up in front of your face, **10cm** away from your **eyes**. Then close your eyes **one at a time** to look at the finger. It will **appear to move**! Now move your finger away from your eyes – you'll notice that as your finger gets farther away from your face the view from each eye gets more similar.

CRAZY COLOURS!

With training, humans can detect up to **ten million different colours**, all made up of mixtures of red, green and blue. But some people are '**colour blind**', which means they have trouble distinguishing between shades. The most common type of colour blindness is **red-green**. About 10 percent of people can't detect the **number 8** in this picture…

WILD EYES!

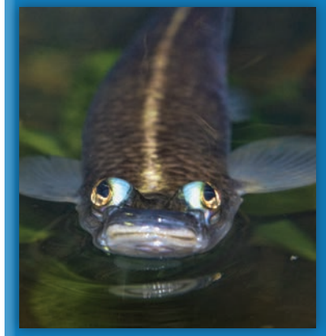
Check out some of the most peculiar peepers in the animal kingdom…

CHAMELEONS

Swivelling around within protective cones, chameleons' eyes work **independently**, giving them 360° vision. But they also work **together** (see left), helping them catch prey.

JUMPING SPIDERS

Eight eyes (including some on the *back* of their heads) help these spiders pounce with amazing accuracy. **Front side** eyes detect motion, while the bigger eyes see more detail.



FOUR-EYED FISH

These funny fish only actually have *two* large eyes, but the **pupils are divided in half** – the upper part looks **above** the surface while the lower half can see **underwater**!

DRAGONFLIES

Covering their heads like helmets, dragonflies' huge **compound** eyes can see at **super-fast speeds**. They are made up of **30,000 lenses** whose images are joined up by the brain.

GOATS

Grazing animals like goats have **elongated pupils**, which give them a **wider point of view** – handy for scanning the ground for approaching predators!

MANTIS SHRIMP

These super shrimp have the world's most complex visual system! Experts think they have up to **16** types of **colour receptor cells**. Humans have three and dogs just two.

DID YOU KNOW...?

The biggest eyeballs ever studied belong to the mysterious colossal squid! They're about 27cm in diameter – almost as long as this mag!

Seeing in 3D diagram taken from *SuperHuman Encyclopedia*, out now, **dk.com**
Optical illusions taken from *Xtreme Illusions 2*, published by National Geographic Kids Books;
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