

Year 6, Topic 4, Switched on Science



Let it shine

Key Vocabulary

- Light ray
- Cornea
- Pupil
- Iris
- Lens
- Reflection
- Symmetry
- Rainbow

In this topic you will:

- know that light travels in straight lines
- explain how a shadow is formed
- investigate shadows
- understand how you see things
- explore how light behaves when it is reflected
- present findings in a variety of ways
- explore how white light can be split up.

Unit 1: Going straight

Can you:

- describe how light travels?
- explain how a shadow is formed?
- explain how you alter the size of a shadow?
- explain what factors alter the size of a shadow?
- identify and control variables in an investigation?

Let's think like scientists

- What is light?
- How fast does light travel?
- Does it bend or travel in straight lines?
- Are there different kinds of light?
- Can you have black light?
- Can you have shadows on dull days?
- Where can you see shadows?

Right or wrong?

Are these ideas right or wrong?

We see things because light comes out of our eyes.

Light can travel around corners.

We can see features on shadows.

Answers

- No. We see things because light enters our eyes.
- No. Light travels in straight lines : unless gravity from a very large Sun bends it as it passes by.
- No. Shadows are not lifelike.

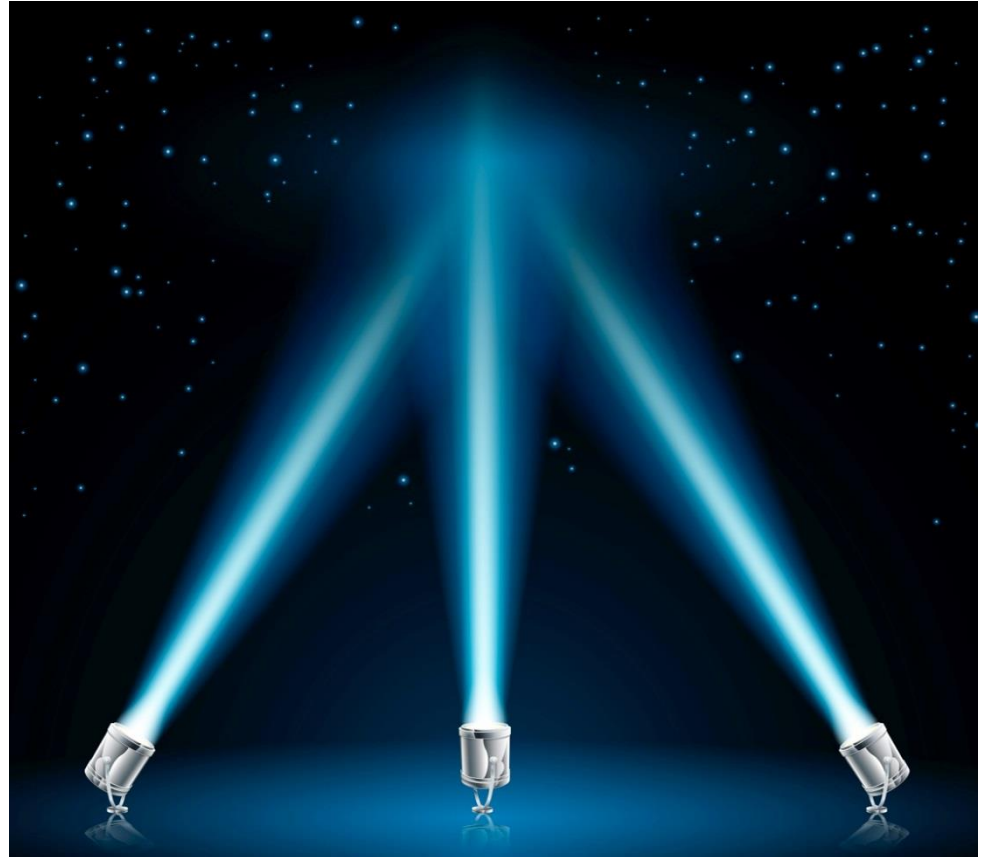
Did you know?

Insects can see ultra-violet light which we cannot see.



Did you know?

Light travels in straight lines.



Light cannot travel around corners

- The candle light travels through the straight tube



- No light can be seen when the bent tube is used



Did you know?

- Light travels at 299,792 km every second in air.
- That is around 1000 times faster than the speed of sound and roughly 10000 times faster than the speed on urban roads.
- It travels at slower speeds in liquids and solids.

Draw some rays of light

Make your own ray box.

Dim your classroom.

Shine a light through the slits and make it light up a screen.

Draw chalk marks showing how the light travels.

Use the ray box to make a shadow.

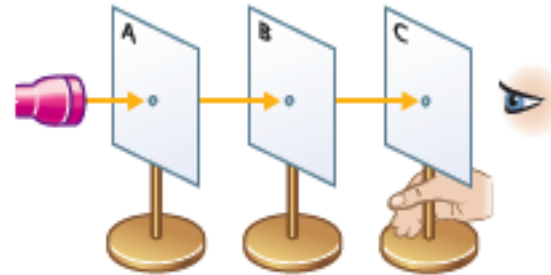
How do the rays travel now?

Can you explain?

In this test you can see the light.

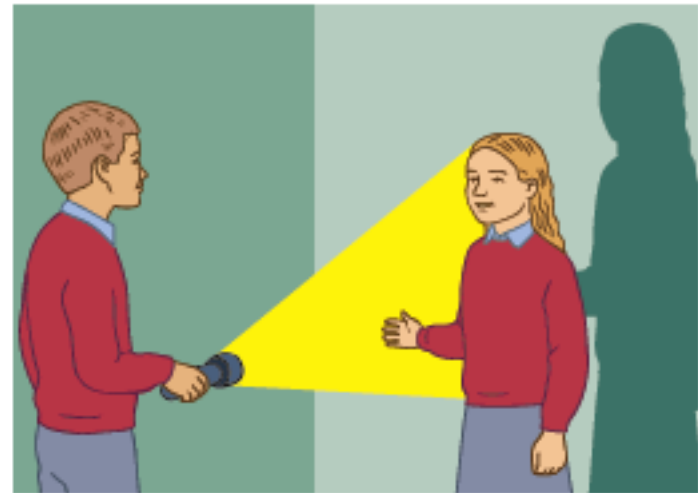
Can you explain why?

Draw a similar diagram but one in which you would not see the light.



How are shadows formed?

- Shadows are formed when an object blocks light.
- The light from the torch lights up the wall.
- The girl blocks some light causing the dark shadow to form.
- The shadow has no detail



Investigate shadows

Plan a fair test to investigate what affects the size of a shadow.

What equipment will you need?

What factors will you

- Keep the same
- Change
- Measure

How will you record and make sense of your results.

Use ray diagrams to help explain your observations.

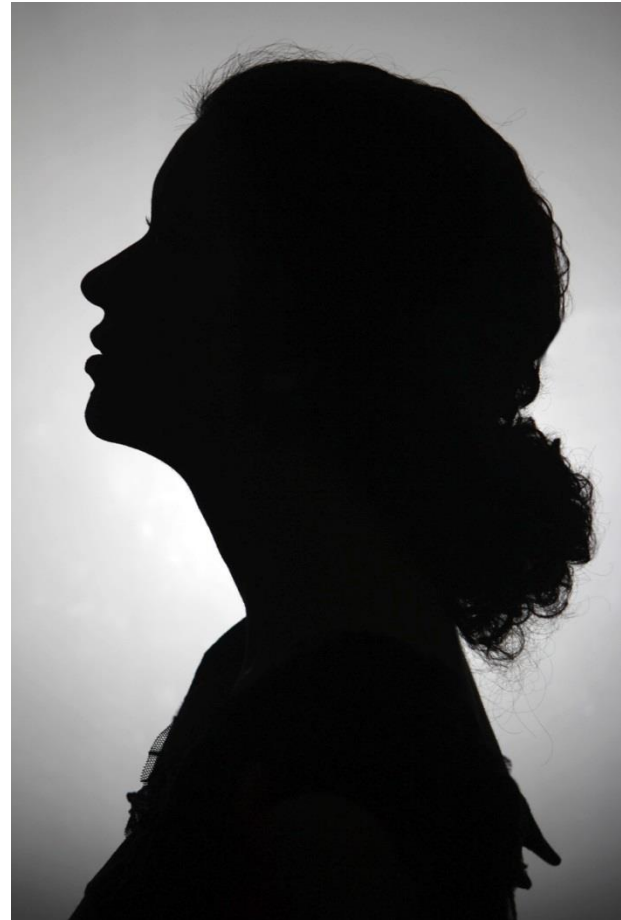
The shape of shadows

- Shadows always have the shape of the objects that form them.



Silhouettes

How would you make a
silhouette of yourself?



Unit 2: Reflecting on seeing

Can you:

- explain how you see things?
- draw a diagram showing how you see things?
- present ideas from experiments in a variety of ways?

Let's think like scientists

- Why do some animals have much larger eyes than humans?
- Can owls really see in the dark?
- How is a camera like a human eye?
- Who made the first mirrors?
- How does a periscope on a submarine work?

Right or wrong?

Are these ideas right or wrong?

You can see around corners.

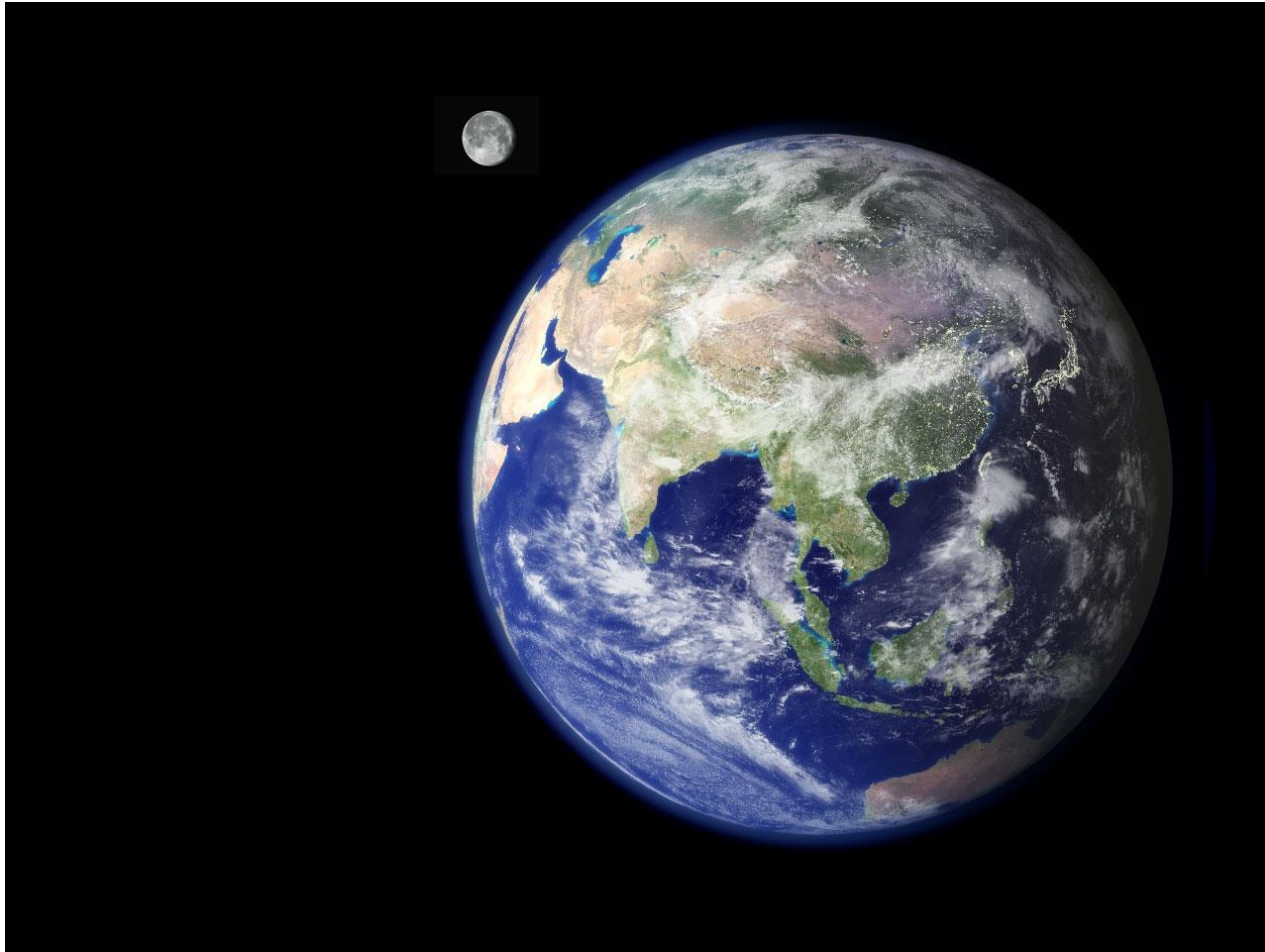
We have hidden laser beams in our eyes that help us see.

Light travels very fast in straight lines.

Answers

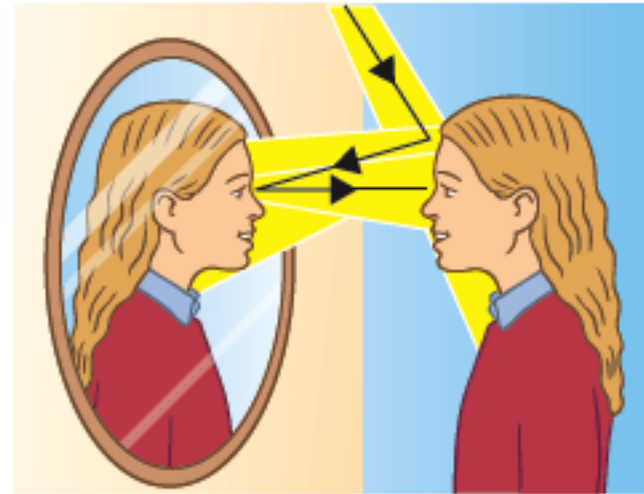
- No. Not without a periscope.
- No. Super heroes in films might but we do not!
- Yes. Both facts are true.

Light takes 1.255 seconds to get from
the Earth to the Moon



How are reflections formed?

- Reflections are light bounced off a shiny surface.
- Some light rays hit the girl's face hit the mirror.
- They bounce off the mirror and travel to her eyes.
- The rays in her eyes help her see her reflection.



Investigate reflections

Investigate all the reflections you can see in your school.

What equipment will you need?

How will you record the reflections you find?

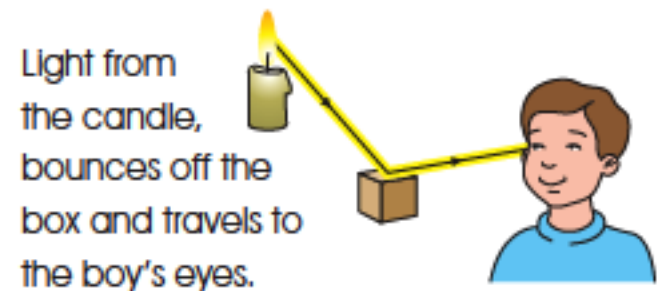
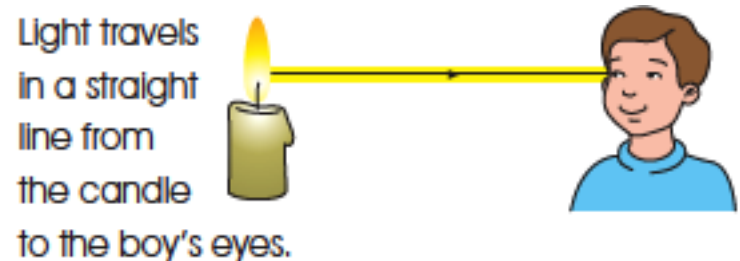
Use ray diagrams to help explain your observations.

How do you see things?

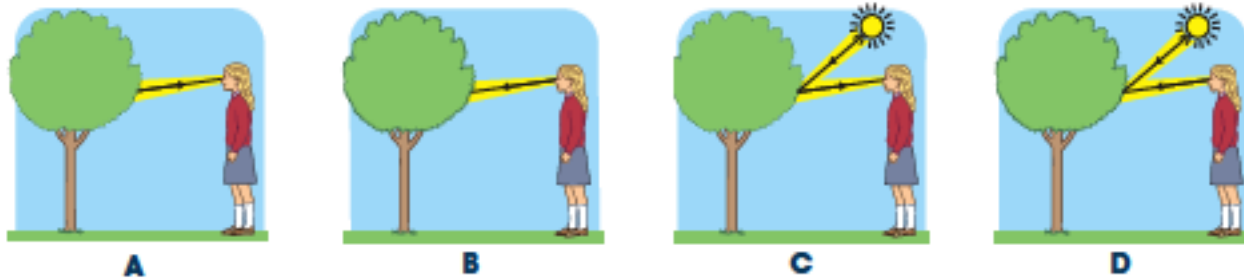
You see things because light enters your eyes.

Sometime it comes straight from a light source. You see the light source.

At other times it comes from a light source and then bounces off an object. You see the object.

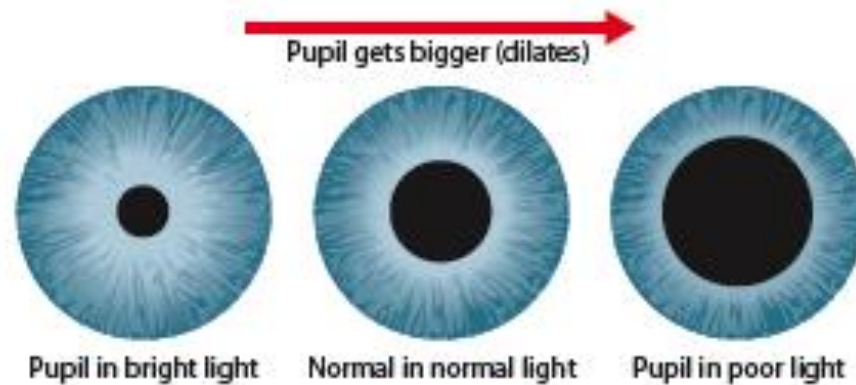


Which is right?



Only one of these diagrams correctly shows how the girl sees the tree. Which one is it?

Did you know?



The pupil in your eye gets bigger when there is poor light, so it lets more light in.

Unit 3: Never a dull moment

Can you:

- explain the colours in white light?
- explain how light appears to bend in water?
- know what a spectrum is?
- know what causes a rainbow?
- know a variety of places you can see light split into its spectrum?

Let's think like scientists

- Who discovered light's spectrum?
- What is a prism?
- What is a rainbow?
- How are rainbows caused?
- Why are soap bubbles coloured?
- What is the best way to split daylight into other colours?
- Are there actually 7 colours in the rainbow?

Right or wrong?

Are these ideas right or wrong?

Light is made of light of one colour.

Mirrors are the only thing that can bend light.

Sir Isaac Newton was the first person to split light into its spectrum.

Answers

- No. The light you see is made of an infinite number of colours all mixed together.
- No. Mirrors do not bend light : they reflect it.
- Yes. He was a very famous English scientist.

Sunlight can reach a depth of around
80m in the Ocean



Bending light

A glass or perspex block can change the direction of a light ray.

Light changes direction as it passes from air into the block.

Once it emerges the other side it changes direction again.

Bending Pencil

The pencil looks closer to the surface than it really is.

This is because the water bends the light.

The light appears to come from a point above where the bottom of the pencil really is.



The colours of the spectrum



There are seven main colours in the spectrum and many more in between.

Rainbows



Rainbows have many colours, not just seven as most people think!

Colours on soap bubbles

Colours form on soap bubbles.

The bubble causes white light to split into many colours.

You can probably see all the colours of the spectrum!

