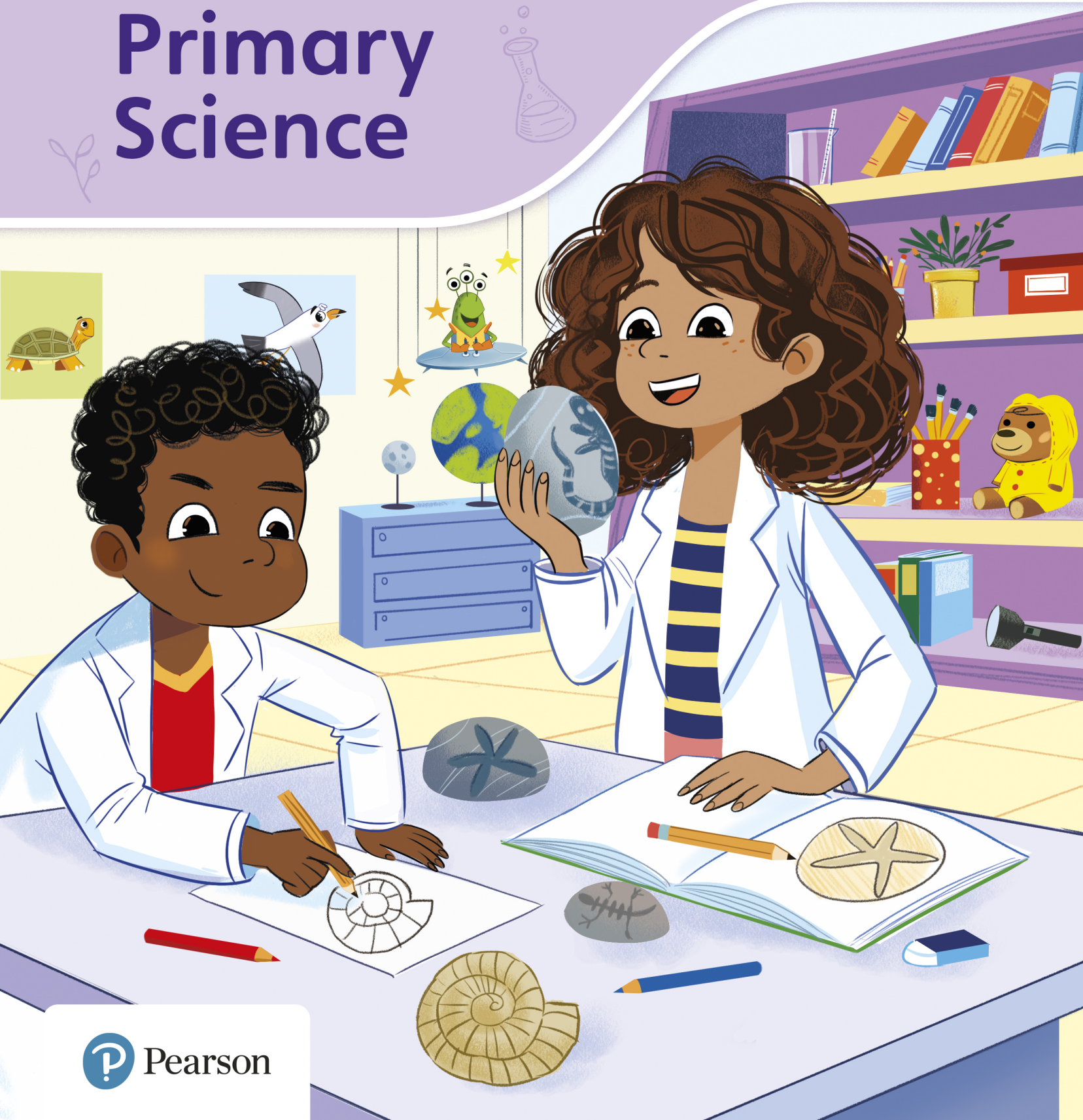
Pearson International Primary Science

Year 5
Textbook



Pearson

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6 Seeing and reflecting

We need light to see things, but how does light reach our eyes? Let's look into it.

Light from a light source appears to travel in straight lines.

We see things because this light travels to our eyes.

Objects around us reflect light, which then travels to our eyes.

Light reflects off shiny surfaces. We use smooth, shiny surfaces to look at our reflection.

Look at the photograph above. The water is still, so it is reflecting light. Do you think you would see the reflection of the trees if there were waves in the water? Can you see shadows too?

Light in straight lines

These are some sources of light you have seen before.


torch


light bulb


lamp


Sun


fire

Can you think of any more?

We see things because light travels from a light source to our eyes. Let's look at how light travels.

Look at a bulb or torch through a cardboard tube or straw.

You can see the light. It travels to your eye.

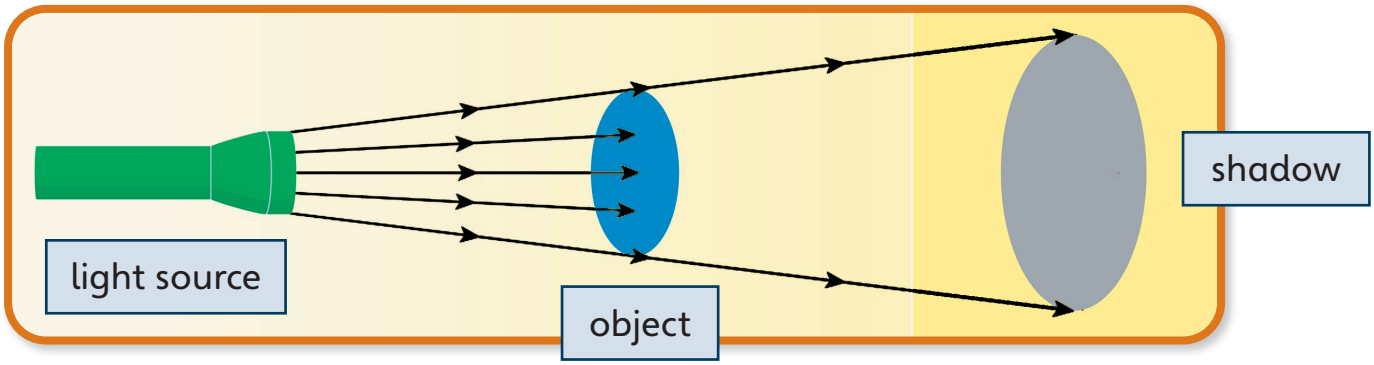
Now bend the tube and look again.

Can you still see the light?

Light travels in **straight** lines. It cannot **bend** around **corners**.

An opaque object blocks the pathway of light.

The light cannot bend around the object, so there is darkness in the shape of the object. This is how a shadow forms.



Light travels in straight lines from this car's **headlights**.

The light allows the driver to see what is in front of the car. The road at the sides of the car is dark.

Suggest where the light source is in this picture.

Why is the rest of the picture black?

Key words

straight | bend | corners | headlights

Shiny surfaces

Some objects are sources of light.

candle

torch

Shiny surfaces are not light sources.

They look shiny because they reflect a lot of light.

diamond

disco ball

When an object reflects light the light still travels in straight lines, but it changes direction.

The mirror reflects light from the torch. The light changes direction.

Scientists represent the direction that light travels in by using lines like this ⟶ to show rays of light.

Arrows on the lines show the direction that the light is travelling in.

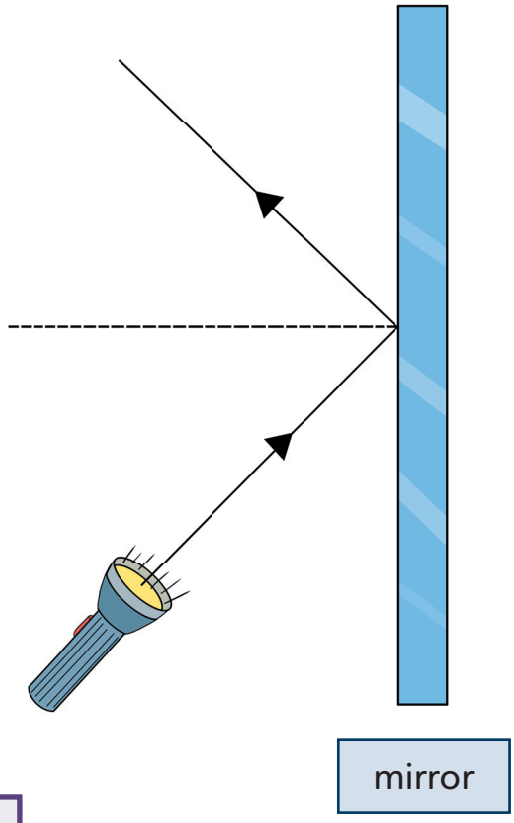
This is a **ray diagram** for a mirror reflecting light.

It shows what happens to the light from a torch when it reflects off the mirror.

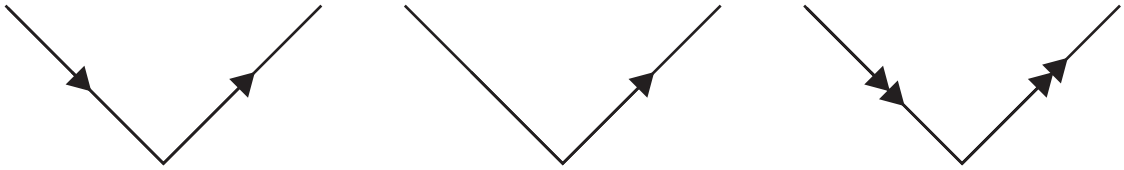
You can see that the light reflects at the same angle as it arrived.

When we draw a ray diagram we just draw **one** line to show each direction that the light travels in.

Only **one** arrow is needed on each part of the line.



Look at these examples:



correct incorrect incorrect

Key words

shiny arrows ray diagram

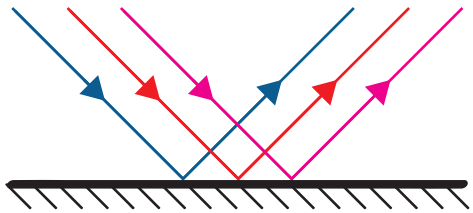
Reflecting light

All objects reflect light. We can see objects because they reflect light. Some surfaces reflect light better than others.

Shiny surfaces

Shiny surfaces are usually very **smooth**.

They reflect all the rays of light from a source at the same angle.



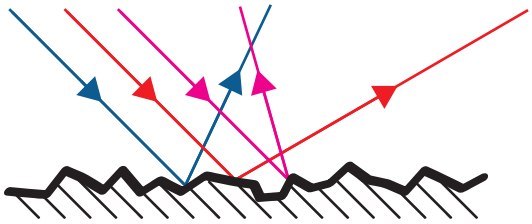
shiny surface

Look at the side of the kettle. You can see a reflection of the other objects.

Dull surfaces

Rough or **dull** surfaces do not reflect light well.

Any light that is reflected from them is **scattered** in many directions.



dull surface

Investigate shiny and dull surfaces with a torch.

What are the shiniest surfaces you can find?

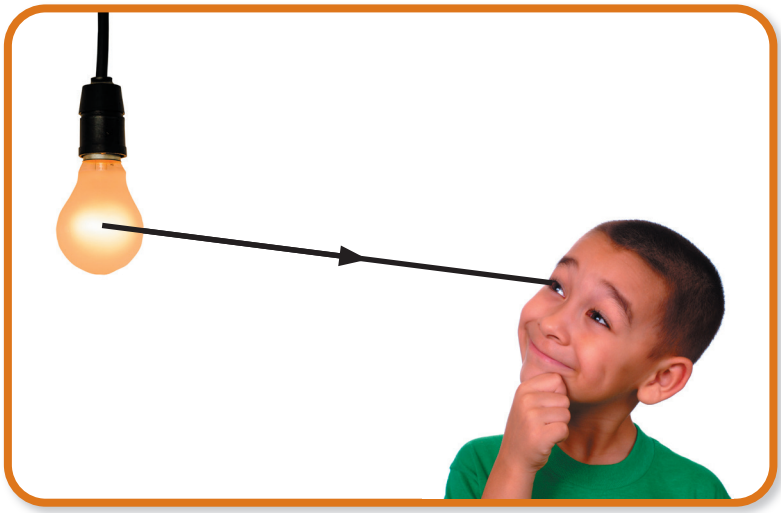
Where are there dull surfaces?

Key words

smooth | rough | dull | scattered

How do we see objects?

We see things because light travels from light sources to our eyes.

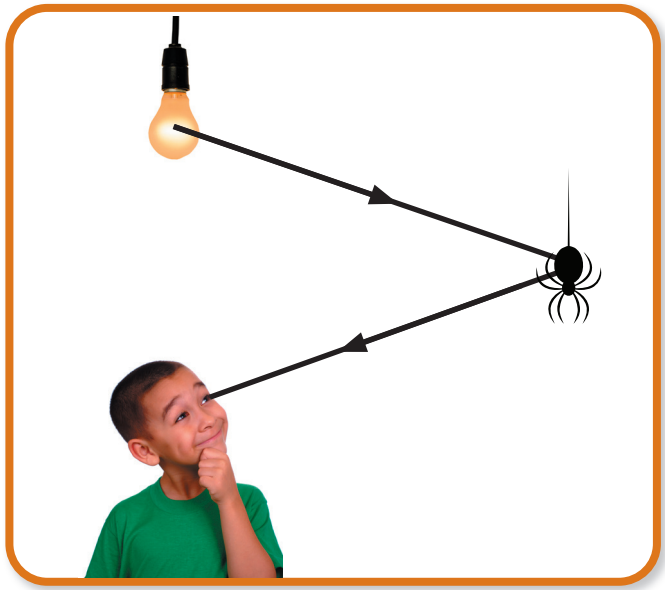


We also see things when light travels from a light source to an object.
Light that reflects off the object travels to our eyes.

Light travels from the light bulb to the spider.

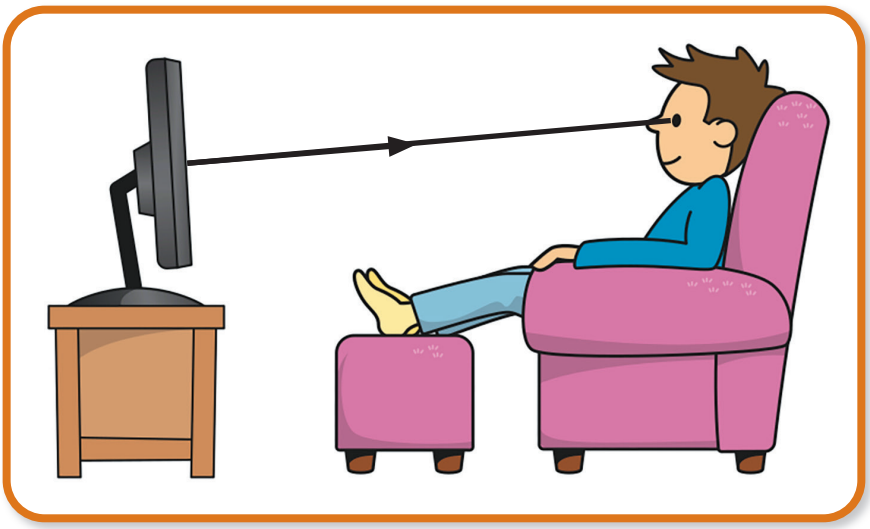
Light is reflected off the spider into the eye.

The person sees the spider.



If the light is **switched off**, the person cannot see the spider.

Here are two more **examples**.



Light travels from the television to the person's eyes.

Light travels from the lamp to the book. It is reflected off the book into the person's eyes.

What objects can you see in your classroom? Where is the light travelling from?

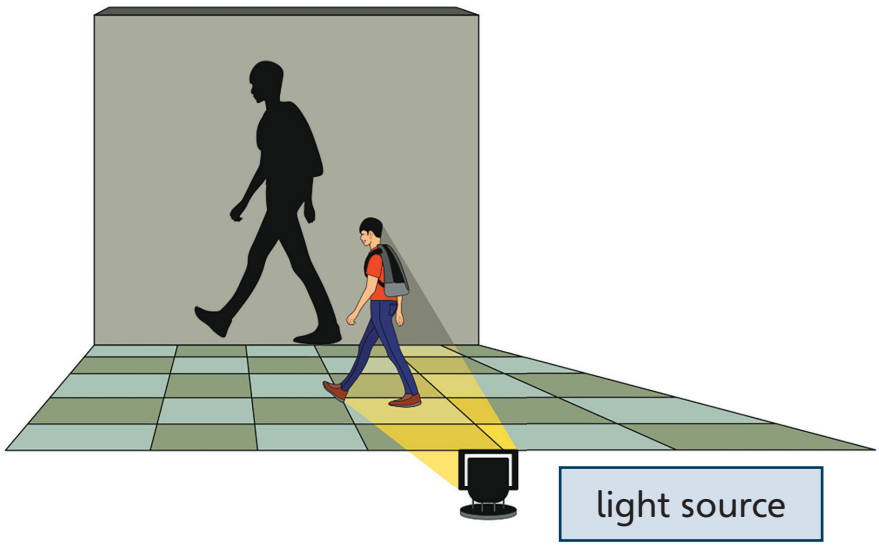
Key words

switched off | examples

Shadow or reflection?

Shadows

Shadows are formed when opaque objects block light. Light cannot go around the object. There is a dark area the same shape as the object.



Shadows are the same shape as the opaque object, but the size of a shadow can change.

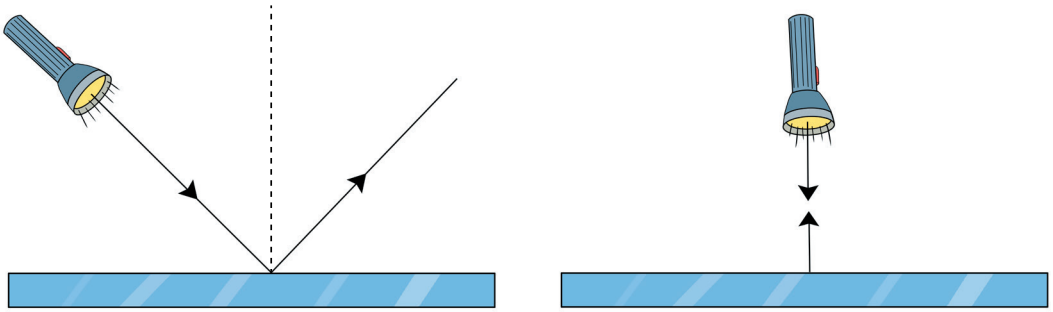
Investigate shadows using **shadow puppets**.

Can you make the shadows different sizes?

Reflection

Light travels in straight lines.
When light hits a surface it changes direction.

We know that smooth, shiny surfaces reflect light well.
Light is reflected off the surface at the same angle as it hits it.



smooth, shiny surface

Dull, dark or rough surfaces do not reflect light well.
Light that is reflected is more scattered.

Which of these objects reflect light well?

Key words

shadow puppets

Investigating safety clothing

Have you seen people wearing clothes like these?

People wear them to stay safe.

In sunlight, during the day, the bright **colour** is very easy to see.

At night, when it is dark, the **stripes** reflect light from a source.

During the day, the **jacket** helps people to be seen when they walk or work somewhere hazardous.

Think of some places where people need to be seen easily during the day.

These **workers** need to be seen in a dark tunnel.

When there is a dim light you can still see the orange part of each jacket.

When it is dark, the stripes reflect light from a torch.

Work with a partner to plan an investigation to find out which is the best **safety clothing** to wear at night.

What will you use as a dark place?

What light source will you use?

How will you decide which clothing is best?

Can you think of a scoring system?

Key words

colour | stripes | jacket | workers | safety clothing

End of topic questions

Seeing and reflecting

1 This is an old photograph.

It shows lots of people watching an outdoor event.

Some people cannot see over the heads of taller people in front of them. Look at what they are holding. It is called a **periscope**.

A periscope is a piece of equipment that lets you see over a person or a wall, or around a corner or an object.

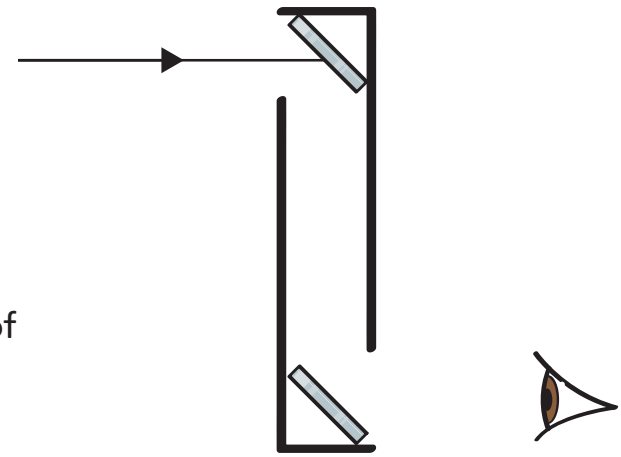
This is what their periscope looks like inside.

It is made of a cardboard tube and two mirrors.

The eye shows where you look through it.

a) Can you see where the mirrors are on this diagram?

b) Can you see a ray of light entering the top of the tube?

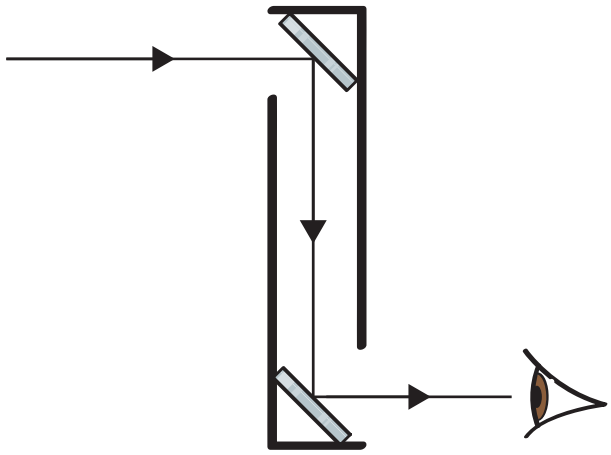


This diagram shows a ray of light from an object travelling to the top mirror.

The ray of light is reflected down to the bottom mirror.

Follow its path with your finger.

When the ray of light is reflected from the bottom mirror to the person's eye, they can see the object.



c) What might the light source be that shines on the object?

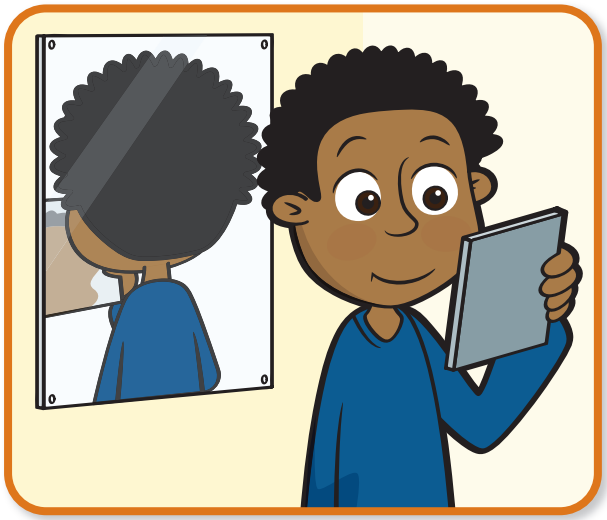
Other uses of two mirrors

2 a) Where do you see mirrors like this on a car?

b) What are they used for?

3 Can you use two mirrors to see the back of your head?

Look into one mirror while your partner holds the other one behind your head.



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