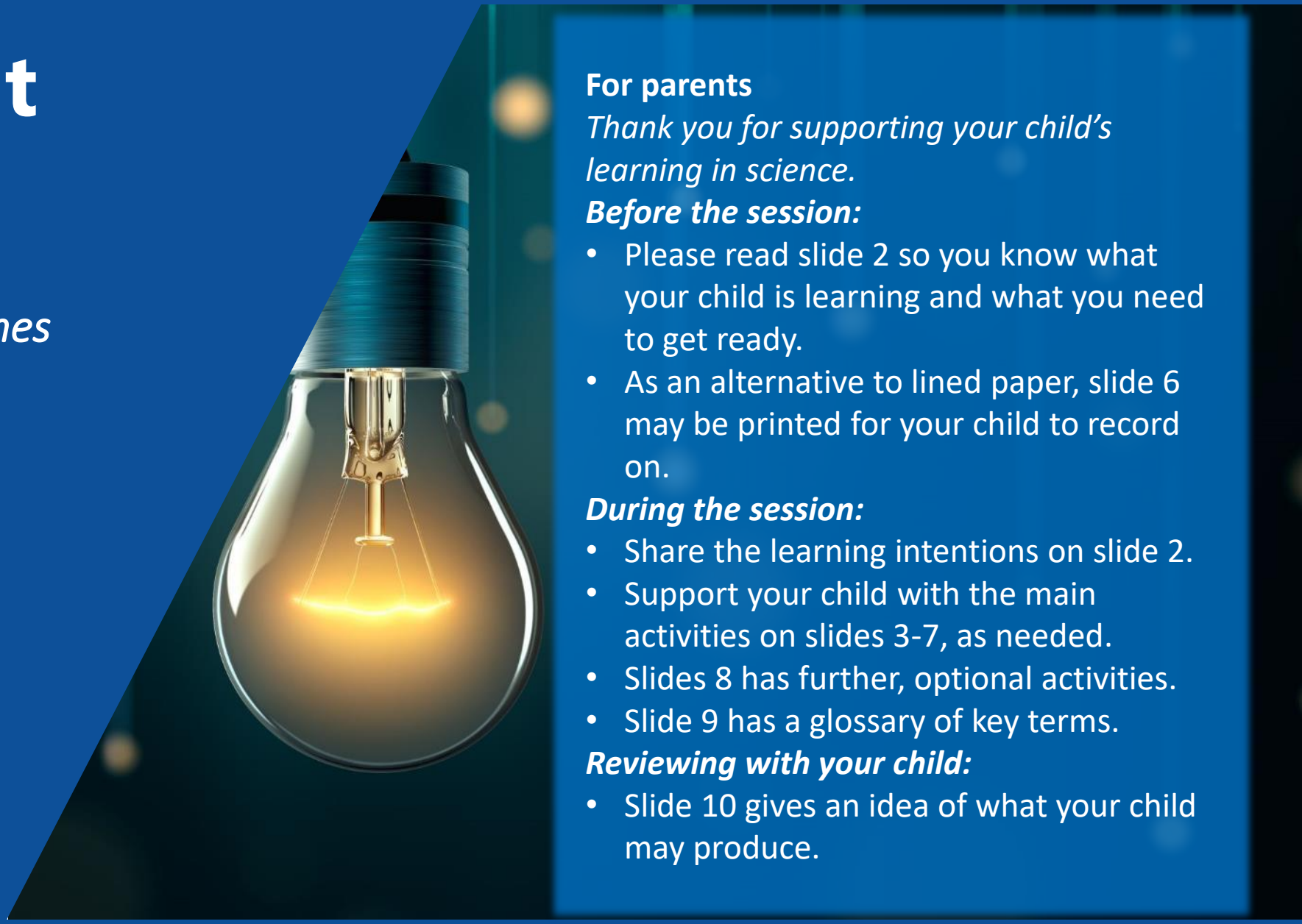
Year 6: Light

Light travels in straight lines

Year 6
Age 10-11



For parents

Thank you for supporting your child's learning in science.

Before the session:

- Please read slide 2 so you know what your child is learning and what you need to get ready.
- As an alternative to lined paper, slide 6 may be printed for your child to record on.

During the session:

- Share the learning intentions on slide 2.
- Support your child with the main activities on slides 3-7, as needed.
- Slides 8 has further, optional activities.
- Slide 9 has a glossary of key terms.

Reviewing with your child:

- Slide 10 gives an idea of what your child may produce.

Light

Light travels in straight lines

Key Learning

- We see things because **light** travels from a **light source** into our eyes.
- Light travels in **straight lines**.

I can…

- draw **ray diagrams** showing how **light** travels from a **light source** into an eye.

Activities (pages 3-7): 35 - 45 mins

Household items to support learning:

- two non-opaque coloured plastic cups/bowls
- access to a window and an indoor light

Use lined paper, a ruler and a pencil for recording. *Alternatively you may wish to print page 6 as a worksheet.*

Find out more… (page 8)

- You may like to model how light travels through different materials. For this you will need: the kitchen draining board, a marble, kitchen foil.

Explore, review, think, talk...

What do you already know about light and how it travels through materials?
(5-10 minutes)

- Cover your eyes with your hands and open your eyes. Talk or think about what you see and why.

- Uncover your eyes and look through a window. Talk or think about how things look and why.
- Next hold two plastic cups, one over each eye. What can you see now?

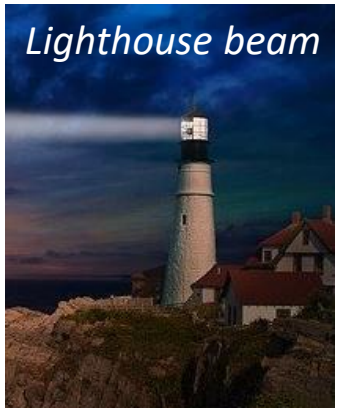
- Your hands are **opaque**. They block **light** travelling to your eyes, so it's **dark**.
- Glass is **transparent**. Light passes through glass easily, so you see a clear **image**.
- The cups are **translucent**, meaning that they let some light through. What you see is cloudy or blurred.

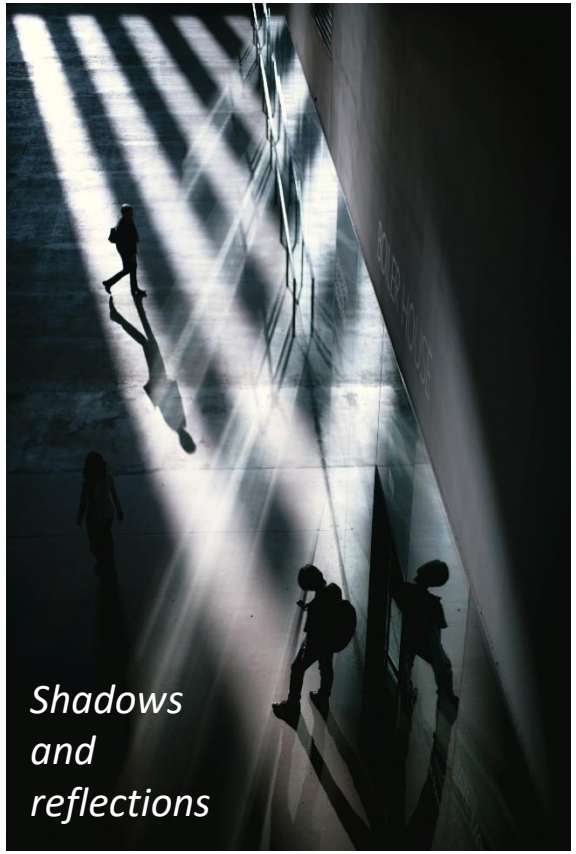
Now watch this short clip all about light
www.youtube.com/watch?v=a8xt_m4iMYc

Explore, review, think, talk...

What do you already know about how light travels?
(10 minutes)

Think or talk about what these pictures tell you about how light travels





Investigating how light travels and drawing ray diagrams

Observing what you can and can't see and representing how light travels
(5-10 minutes)

- Make a tube by rolling up a piece of paper.
- Hold it up to one eye like a telescope, and close or cover your other eye.
- Point this at a room light/lamp giving out light (*not the Sun*). Talk or think about what you can see through the tube.
- You can only see what is directly in line with the tube (and the inside of it). This is because light travels in a **straight line**, so the only light entering your eye has travelled along the tube. That's why we can't see round corners.

- We can draw a **ray diagram** to show the path of light travelling from a light source to your eye:

- The arrow shows the direction in which light travels from the **light source** into your eye.

Draw two *labelled* **ray diagrams** showing how a **light ray** travels in **straight lines** from a **light source** to your eyes. In 1) use a torch for the light source and in 2) a candle.

Tips:

- Use a ruler for your straight lines.
- Always draw an arrow on each line showing the direction that the light is travelling in.
- Only draw one **light ray** from each light source (even though light is normally emitted in lots of different directions).

I can draw **ray diagrams** showing how light travels from a **light source** into an eye.

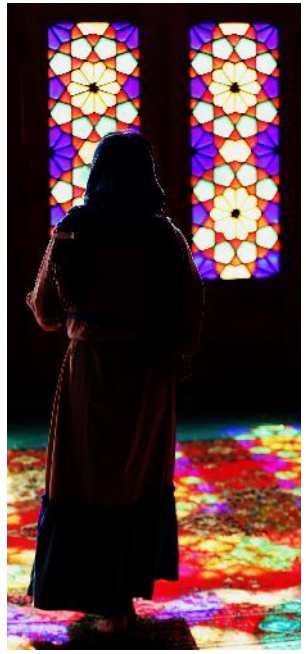
1)

2)

Think and find out more…

Explore what questions you have about light and find more about it.
(15 minutes)

- What questions do *you* have about **light**? Here are some pictures that might help you think of some…





- Watch this short clip and write down 10 new things you learn.

www.youtube.com/watch?v=a8xt_m4iMYc

- Learn more about the speed of light and find out how long it takes for the Sun's light to reach Earth.

https://kids.kiddle.co/Speed_of_light *and/or*
www.youtube.com/watch?v=Z2ii1ydXKZY *(0.5 - 3 mins)*

- Find out about the invention of the electric light bulb.

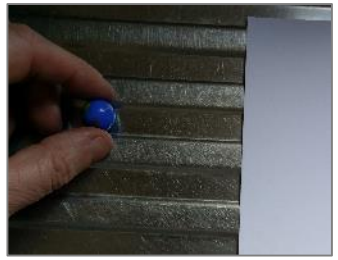
www.dkfindout.com/uk/science/amazing-inventions/light-bulb

Take it further... Modelling light rays in materials

Observing a model of light travelling though different types of material
(Optional - 10 minutes)

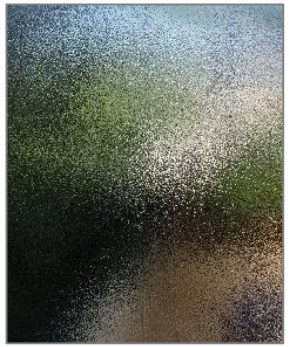
You could model a light ray hitting **transparent**, **translucent** and **opaque** materials. To do this:

- Roll a marble along a groove on your kitchen draining board and place something solid in its path. Which property does this represent?
- Now place a flat piece of paper in the marble's path. Which property does this represent?
- Finally smooth some kitchen foil into the grooves of the draining board along part of the marble's path. What happens to it now?


Light rays are affected when they hit something:

- When a **light ray** hits an **opaque** material it is **reflected** and/or its energy is absorbed. Light cannot travel through an **opaque** material.
- When light hits a **translucent** material only some of it goes through. The light rays that continue change direction in an unpredictable way. This **scattering** blurs the **image**.



- When a light ray hits a **transparent** material at right angles, its direction remains the same. This means we see a clear **image** through air and windows.

Glossary of terms

dark *(scientific)*: Dark is the absence of light. ***(everyday)*:** Almost no light.

image: An **image** is a picture of how you see objects when light from them reaches your eyes.

light: Light is the form of energy that makes it possible for us to see things with our eyes.

light ray: A **light ray** is a straight line showing the direction of travel of light.

light source: A **light source** emits (gives out) light. It can be natural or man-made.

opaque: Opaque materials/objects block all light.

ray diagram: A **ray diagram** is a drawing showing the straight-line paths that light travels in from a light source to the eye, often reflecting off objects on the way.

reflect: Light **reflects** when it 'bounces back' off a surface or object. All objects **reflect** some light otherwise we couldn't see them.

scatter: If a light ray **scatters** it changes direction to a different random direction.

straight lines: A **straight line** continues in the same direction and does not curve.

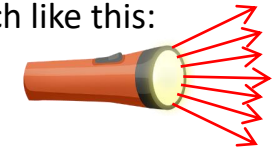
transparent: Transparent materials look clear, as all light passes through them.

translucent: Translucent materials block some of the light and scatter the rest. This makes the images appear blurred.

Possible learning outcome for reviewing your work:

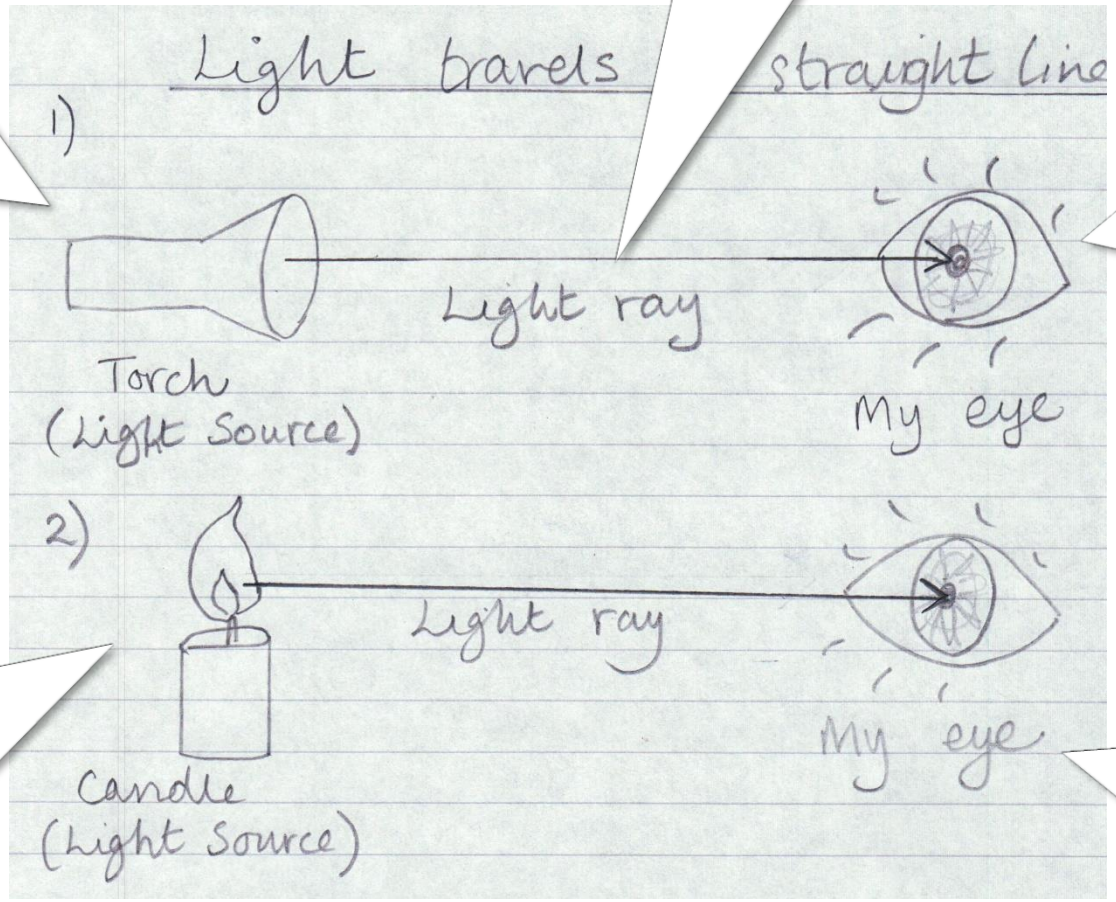
I can draw **ray diagrams** showing how light travels from a **light source** into an eye

The **light source** is a torch in the first diagram.
The **light ray** comes out of the front of the torch. It should be drawn touching the torch.
In real life light rays are emitted (given out) in many directions from the front of the torch like this:



In the second diagram the **light source** is a candle.
The **light ray** should be shown starting from the flame (not the middle of the candle). It should be drawn touching the flame.
In reality light rays are emitted (given out) in all directions from a candle flame like this:

<u>Always</u> use a ruler to represent light rays, since light travels in **straight lines**.



You can either draw an eye or a face, but the **light ray** <u>must</u> point towards the eye. In order to see anything, light either emitted by the object (or light from a **light source** reflected off an object) <u>must</u> enter the eye.

In a labelled diagram all the important things should be labelled. If the diagram looks too crowded, you can move your words to the edges of the page and use arrows to indicate what object they relate to.