

How Do We See Things?

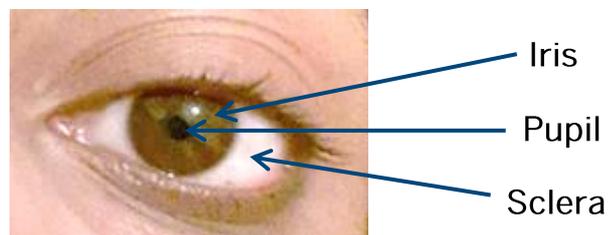
Key Stage 2

Topics covered: Light travels in straight lines, reflection, the eye, light can damage our eyes

Before you get started make sure you watch our video 'Seeing The Invisible'
<https://vimeo.com/163255189>



We see things when light enters our eyes. The pupils in our eyes change size to let more light in when it's dark or less light in when it's bright and this is important because too much light can damage our eyes. Not all objects give off light and so we see some objects because light reflects off their surface and into our eyes.



Teacher notes:

Activity 1: Light and Pupil Size

- Give each student (or pair of students) a mirror and close all the curtains/ blinds in the room or take the students into a dark room.
- Start with the lights on and ask the students to look at the size of their pupils with their mirror.
- Then turn the lights off for 15 to 30 seconds and turn them back on again. Instruct the students to look at how their pupils change size in their mirrors as the lights are turned back on. Repeat several times if needed.

Questions to ask the students:

1. What did you notice happened to the size of your pupils when the lights were turned off and you were in darkness?

A: pupils were larger in the dark and smaller in brighter light.

2. Why do you think the pupils in your eyes change size?

A: Light enters our eyes and hits the retina (inside surface / back of the eye). If the light is too intense it can damage the cells on the retina. The pupils get larger in the dark to allow more light in so that we can try and see objects around us. The pupils get smaller when it's brighter to reduce the amount of light hitting the retina and therefore protect the cells from damage.

Extra info: The size of the pupils is controlled by muscles in the iris (coloured part of the eye). These muscles contract (tense up) in the dark to make the pupils bigger and relax in bright light to make the pupils smaller.

Activity 2: Light and Reflection

- Discuss how we see things and the reflection of light before doing this activity using the questions suggested below.
- Hand out copies of the worksheet on the following page or display the images on the board.
- Instruct students to pick out one image which correctly shows how we see the Sun and one image which correctly shows how we see the Moon.

Extension – instruct students to try and explain why the other four images are incorrect in terms of what they know about light.

Questions to ask the students (before the activity):

1. How can you see the person sitting next to you?

A: A light source gives out light which travels in straight lines and reflects off the person beside you before entering your eyes allowing you to see them.

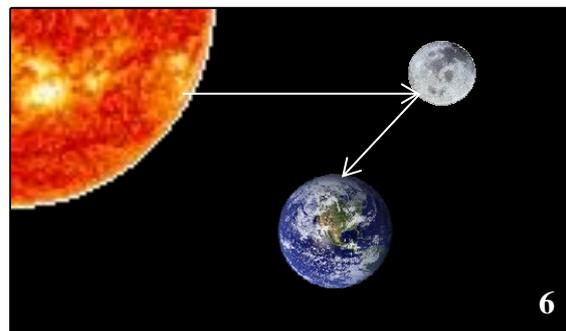
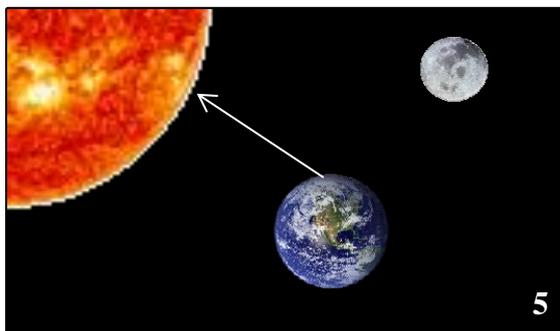
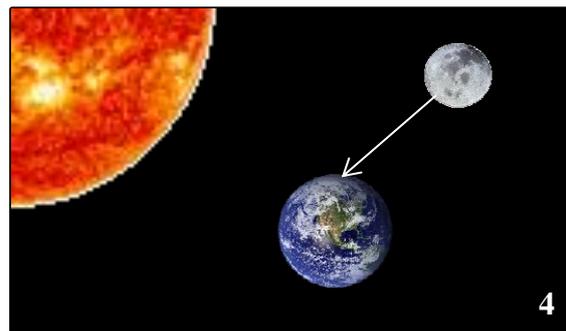
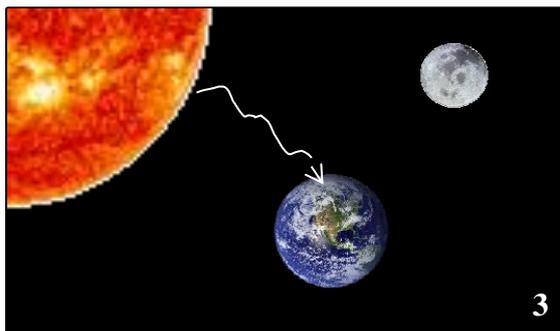
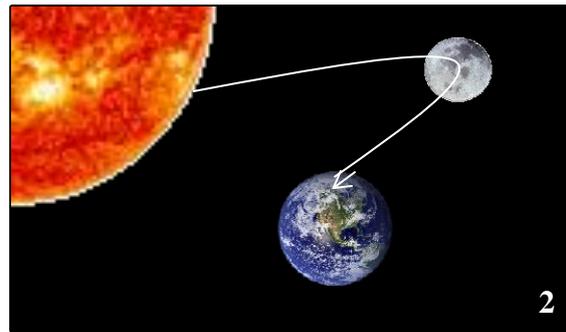
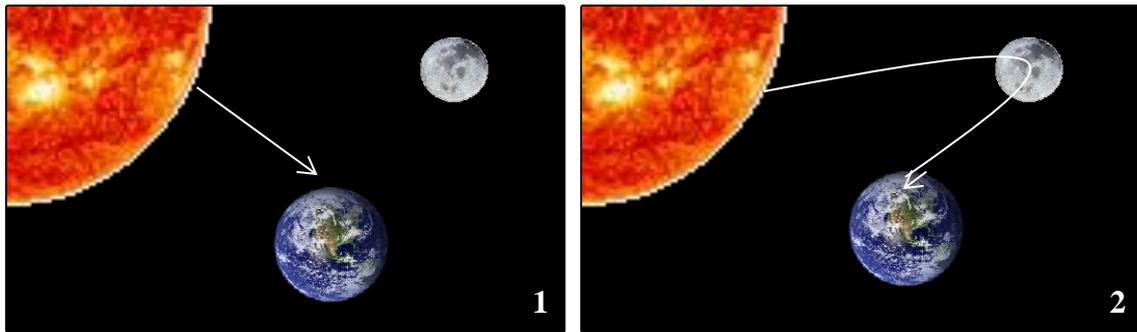
2. Why can't you see that person in the dark?

A: Not all objects (e.g. people) give out their own light. Light needs to reflect off an object for us to see it and in the dark, there is no source of light.

How do we see things?

Which one of these images correctly shows how we see the Sun?
Which one of these images correctly shows how we see the Moon?

Why are the other images wrong?



Teacher notes:

Demonstration

The Sun produces its own light so it can be seen as long as we are facing it. The Moon does not make its own light – we can only see it when the Sun's light reflects off its surface.

The images show a tellurian being used in a dark room. This can be demonstrated similarly using a torch (Sun), large ball (Earth) and small ball (Moon).

For more information, activities and a video demonstration on the phases of the moon go to:

<http://www.rmg.co.uk/discover/teacher-resources/moon-watch>



How Do We See Things?: **ANSWERS**

Key Stage 2

Activity 2: Light and Reflection

Correct images

- 1 – How we see the Sun
- 6 – How we see the Moon

Incorrect images and reasons

- 2 – Light travels in straight lines (not in curved lines)
- 3 – Light travels in straight lines (not as a zig-zag)
- 4 – The Moon does not make its own light. Light needs to be reflected off its surface and into our eyes for us to see it.
- 5 – Light must enter our eyes for us to see it.