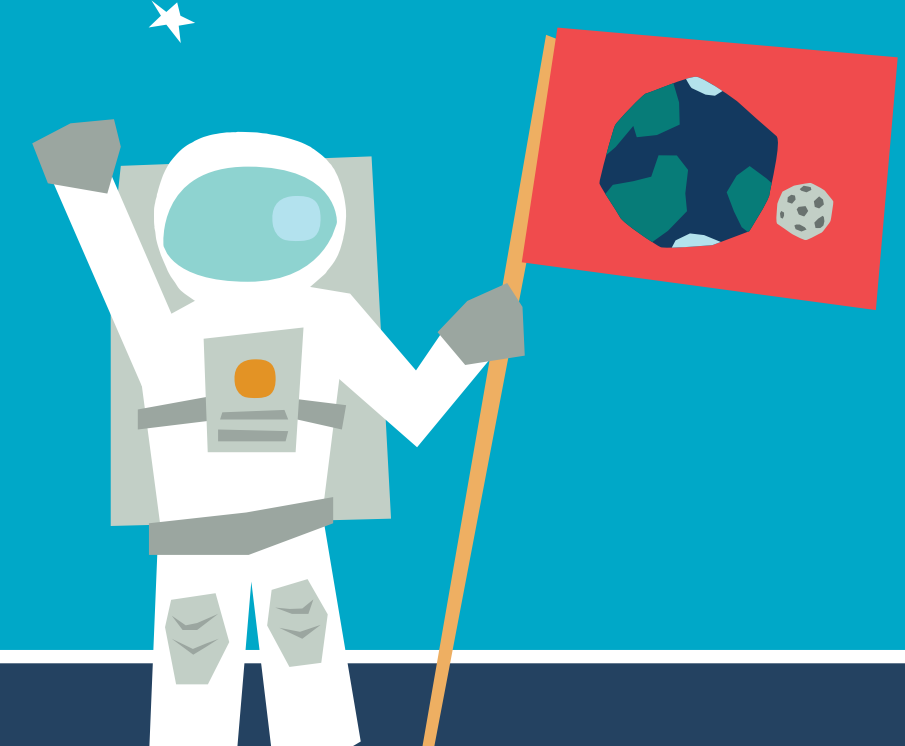
Winchester Science Centre
By Wonderseekers

Star Seekers

Pre-visit resources for KS2



KS2- Star Seekers

These activities are designed to be completed before you visit for your Star Seekers workshop. We recommend working through the activities from 1 to 3 but you are welcome to pick and choose depending on your group's prior knowledge and any ideas they may spark along the way.

To explore the stars we need to learn how we can study them, through the light they send millions of miles away. Through these activities, you will be exploring how light travels through the world. This will include how it creates shadows and how it moves around our world. We will also be exploring how we've used the light from stars to create images in our night sky.

Teacher Guide

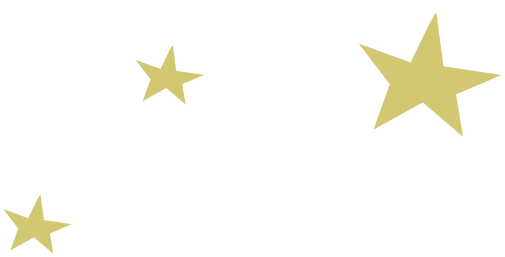
Learning Objective

- To understand how light travels.
- To explore how shadows work.
- To explore how humans have used the light from stars to form constellations.

Key Science

Light is a type of energy that can move through the world as a wave and is produced by a light source. This light source could be natural or artificial. These light waves travel through the world in straight lines, only changing direction if they are reflected off a surface. We use light to see as light reflects off objects and into our eyes. Not all light is reflected, some of it is absorbed into objects. This is how we get colour in our world as white light from the Sun is made up of all the different colours we find in the rainbow. As this light hits things in our world, some of the light is absorbed while some of it is reflected. The coloured waves of light that are reflected enter our eyes and our brain recognises them as different colours. Darkness in our world is created by an absence of light, this is the same for shadows as it is for the night sky.

Light is one of the most useful tools for scientists to study our universe. It travels across vast distances at 300 million metres per second. We capture the light from distant stars and planets in our telescopes to get a clear picture of these objects and learn all about them. From studying the light of different planets and stars, we have learned how large they are, what they are made of and even what gases they have in their atmosphere.



Curriculum Links

- Recognise that they need light in order to see things and that darkness is the absence of light
- Notice that light is reflected from surfaces
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye

Key terms

Satellite – An object that orbits (goes around) another object. They can be man-made or natural.

Telescope - A piece of equipment that can make faraway objects appear bigger, so scientists can study them. We use them to look at things in space.

Energy – The ability to do work. It comes in many forms, such as heat, sound, movement, and light.

Light - A type of energy that allows us to see things. Light comes from sources such as the Sun, a lightbulb, or fire. Darkness is the absence of light.

Reflect – When light bounces off something. When light bounces off a mirror, you can see a reflection.

Visible light – Light that human eyes can see.

Ultraviolet – A type of light that human eyes can't see, which waves a little faster than the colour violet. The Sun emits ultraviolet light, and it can be dangerous to humans. It has so much energy that it can burn our skin, which is how we get sunburn.

Absorb – To take in energy. Dark-coloured materials absorb more heat than light-coloured materials.

Electromagnetic spectrum - All the types of light waves lined up in order of lowest energy (longest wavelength) to highest energy (shortest wavelength), starting at radio waves and ending at gamma rays. Visible light is in the middle.

Frequency & Wavelength - Frequency is how fast something "waves" (how fast the wave goes up and down per second). Wavelength is the distance between the peaks of the waves. Waves with high frequency have a short wavelength (e.g. ultraviolet light), waves with low frequency have a long wavelength (e.g. infrared light).

Activity 1 – Sources of light (5 minutes)

Overview

Explore different sources of light, and see if you can group them into the primary sources and secondary sources of light. Primary sources create their own light, whereas secondary sources reflect light from another source. For example the Sun is a primary source as it makes its own light, while the Moon is a secondary source as it reflects the sunlight.

You will need (per group)

- Light sources cards.

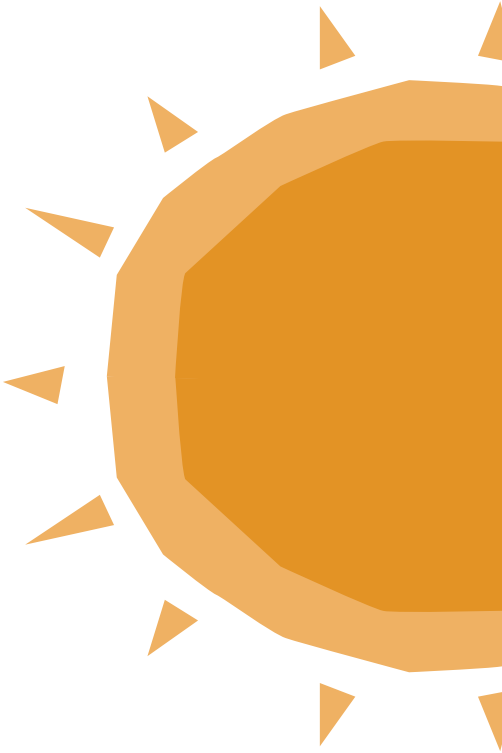
Instructions

1. Discuss the definitions of primary and secondary light sources with the children using some examples. Ask if there are any source of light that they already know.
2. Using the cards on page 8-10, have the children sort them into Primary and Secondary sources in groups.
3. Bring the class back together and share your answers. Come up with a correct grouping together.

Take it further

See if you can group them further into natural vs. artificial:

- **Natural** - Sun, other stars, bio luminescence (animals that glow) and lightning.
- **Artificial** - Light bulbs, lasers, car headlights, etc.



Activity 2: Beams of Light (10 minutes)

Overview

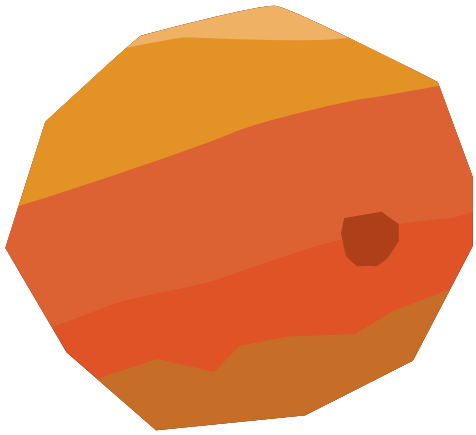
All animals need light to see but light waves only travel in straight lines. This means for us to see light has to hit an object and reflect back into our eyes. This activity will get the students to play a game where they have to navigate as a light wave.

You will need

- Optional: A mirror.

Instructions:

1. Explain that light travels in straight lines, it can't go around corners. To explain this further we are going to play a game, pretending to be beams of light!
2. Ask students to spread out and find a space in the room.
3. The teacher will call out instructions:
    - Walk in a straight line like a beam of light.
    - When you reach a wall, reflect, turn and 'bounce off' like light hitting a mirror. The students will have to pick a new angle to bounce off at.
    - Challenge the students to try to bend around a corner. Can you? You can't, unless you've reflected off something!
4. Bring everyone back in for a discussion around what happens when light meets something shiny, like a mirror for example. If you do happen to have a small mirror, you can use this to reflect light around the room. In this case, because the mirror is so reflective the light reflects the image right back.



Activity 3: Shadow Games (10 minutes)

Overview

When light hits an object, it can be reflected off, but if the object is opaque, it will create a shadow. The shadow that is created will always be on the opposite side of the object from the source of light. This activity will get the children to consider how shadows are created.

Instructions:

1. Pick one student to stand in the middle of the room, they are going to be the Sun.
2. Ask another student to stand somewhere else in the room and ask where the shadow will fall.
3. Ask others to point where they think the shadow will fall.
4. Move the student closer to or farther from the Sun and ask:
    - What happens to the shadow? (It gets bigger if they are closer, as they block more of the light)
    - What if the student is see-through? Will there be a shadow? (No – transparent materials don't block light.)
5. You can then take over as the Sun and let students gather around you to predict where their shadow will fall and how big or small it will be.

Activity 4 – Constellation Making

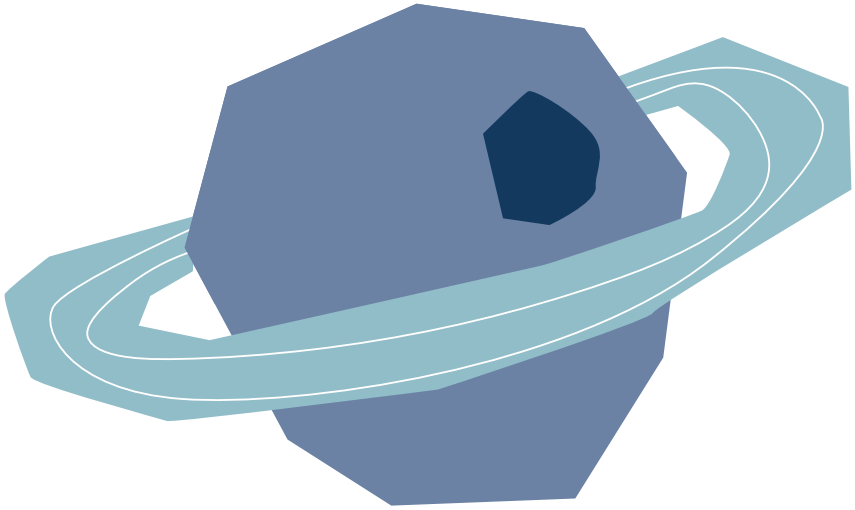
Overview
Natural sources of light have fascinated humans for centuries, especially the stars we find in our night sky. We have looked up at the stars and formed pictures of different stories and characters called constellations. In this activity the students will create their own constellations.

You will need

- Black card.
- Torches.
- Scissors.
- Pencils.
- Optional – constellation pictures.

Instructions
Optional: Show the class some pictures of constellations, ask them if they can spot any creatures or objects in the stars.

1. Give each student their own square of black card. On this card they will be drawing their own constellation.
2. When drawing, the students should mark where the stars are with a cross and draw out the lines of their picture.
3. Once their constellation is drawn, use scissors to poke holes in the card where the stars are.
4. Once everyone's constellation is ready, place the black card on top of the torches and turn off the lights.
5. Turn on the torches and you should see the constellation illuminated on the ceiling of the classroom.



Sun

Moon

Fire

Lightbulb

Lasers

Stars

Lightning

Saturn's ring

Snow

Bioluminescence

Aviators

Water

Windows

Metals