



Wider Curriculum Unit Plan for Home learning

Subject: Science

Unit: Light and Shadow

Year: 3

| | |
|-----------|--|
| Session 1 | <p>What is light?</p> <ul style="list-style-type: none">• What do you know, what questions do you have about light and dark?• Complete the KWL table below or make a voice note of what you know and what your questions are.• Watch the lesson introduction about What is light?• Complete the activities set out in the lesson. |
| Session 2 | <p>How can we see objects?</p> <ul style="list-style-type: none">• Complete the quiz and watch the lesson How can we see objects?• Complete the activities set out in the lesson.• Share your diagram of how you see objects with your teacher. |
| Session 3 | <p>What is the difference between day and night?</p> <ul style="list-style-type: none">• Complete the quiz and watch the lesson• Complete the activities set out in the lesson.• Watch the science museum video of where does the sun go at night.• Which explanation did you find easiest to understand? Why?• Have a go and use a ball and a torch to explain it to someone in your house. |
| Session 4 | <p>How are shadows formed?</p> <ul style="list-style-type: none">• You are going to go on a shadows hunt around your home (you could also hunt outside but only with an adult with you if this is allowed)• Make a list or take photos of the places you find shadows. You can use this table to record your results (or do so in your own way). Are they all the same? Why?• Complete the quiz and watch the lesson here.• Complete the activities set out in the lesson. |
| Session 5 | <p>How does the type of material effect the shadow?</p> <ul style="list-style-type: none">• Look at the picture of the lamp and the bottles in resources– use these words to explain what you can see: transparent, translucent, opaque. Check the definitions if you are not sure.• Explore transparency of different objects at home and a light source – create a collection of transparent, translucent and opaque objects. Put them in order and take a photo of transparent to opaque. Were there any that you weren't sure? Why• Answer the key question: How does the type of material effect the shadow? Draw a diagram to show the light gets through these types of materials – see resources. Explain how this effects the shadow.• What would it be like if everything was made of opaque materials? Explain your thinking - use diagrams or voice or video to explain your answer. |
| Session 6 | <p>How can you change the size and shape of a shadow?</p> <ul style="list-style-type: none">- If it is a sunny day, ask if you can go outside and investigate your shadow and the shadow of your parent too. Take some photos if you can. What do you notice about the size of the shadows? Can you have a shadow when it is not sunny? Explain.- If you can, go back to the same place at a different time of the day and see if your shadow is the same.- Complete the quiz and watch the lesson here- Complete the activities set out in the lesson. You will need a torch/phone light an object/stick/wooden spoon and a clear wall or screen. |

| | |
|-----------------------|---|
| <p>Session 7</p> | <p>How can you change the size of a shadow?</p> <ul style="list-style-type: none"> - Look at the concept cartoon, who do you think is right and why? Explain as a voice note or in writing. - You are going to carry out an investigation and record your results carefully. - You will need a ruler, a light source (eg torch, phone light, lamp). - Follow the method and recording in the investigation resource below. <p>Challenge: What happens to the size of the shadow if you change the angle of the light source (if you make it lower or higher)? How will you investigate this? Explain.</p> |
| <p>Session 8</p> | <p>Which materials are reflective?</p> <ul style="list-style-type: none"> • Complete the quiz and watch the lesson: Which materials are reflective? • Complete the activities set out in the lesson. |
| <p>Session 9</p> | <p>How are reflective materials useful?</p> <ul style="list-style-type: none"> • Do the eyes of a cat glow? Do you agree, disagree? Explain what you think. • Watch this video. Have you changed your mind? Add to or change your explanation. • Find 5 things which are reflect light in your house – draw or take pictures of these eg <i>bathroom mirror, kitchen foil, water, sunglasses, stripes on my trainers.</i> • Watch this video https://www.bbc.co.uk/bitesize/clips/ztcg9j6 • Why are reflective items useful for safety? Have a look in your home and local area for more examples – clothing, roads, signs, vehicles, labels etc • Draw a diagram to explain how you are seeing the object using arrows. light source, your eye and the object. • Explain your diagram as a voice note with your diagram or in writing. Share with your teacher. |
| <p>Session 10</p> | <p>How can nature teach us about design and invention?</p> <ul style="list-style-type: none"> • 'Cats Eyes' are an invention created by Percy Shaw in 1935 to make roads safer. • Watch this video to tell you more about his discovery and how cats eyes work. You can read more about it here and in the resource below: "Tail of Discovery". • Tell someone what you have learned about how cats eyes in the road work. • Although 'cats eyes' are not a light source, there are some animals which can create light eg fireflies and many fish. Scientists do not yet understand all about this but they are learning more. You can find out more here. <p>Challenge: How do you think nature could help science or give ideas for new inventions?</p> |
| <p>Session 11</p> | <p>What can help those who cannot see? What is Braille?</p> <ul style="list-style-type: none"> • Find out how children use braille here: https://www.bbc.co.uk/newsround/55234828 • Braille was invented over 200 years ago, find out more about the Frenchman Louis Braille who invented the system to help blind people read. Watch this video about his life here. • Show your learning about 'What is Braille and how does it help?' • You decide how you would like to show your learning about braille. • You could create a written or video presentation or a factsheet and what it has made you think about. Share your work with your teacher. |
| <p>Session 12</p> | <p>Assessment of learning</p> <ul style="list-style-type: none"> - Return to your KWL grid and questions from Week 1. - Review and add to your learning summary. - If there are questions you do not know the answer, where or how could you find out? - Complete the assessment questions in resource. - Check answers in a coloured pen. - Share with your teacher. |

Session 4

Shadows Observation Hunt:

Use this table or draw or photograph to show the range of shadows.
These are examples.

| Lightest (lots of light reflected) | lighter | light | dark | darker | Darkest (no light reflected) |
|---------------------------------------|-------------------------|-------|------|--------|---------------------------------|
| | Hand by computer screen | | | | Cup by torch |
| | | | | | |

What I noticed?

The clearest and darkest shadows were found.....

I think this because.....

The lightest shadows were

I think this is because.....

Something else I noticed was.....

Session 5

What do you notice?

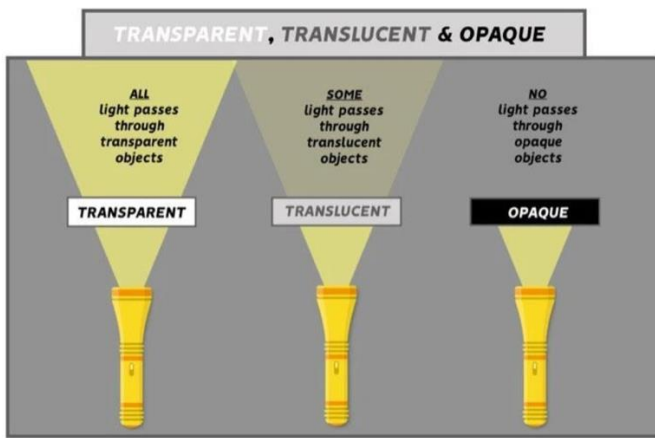
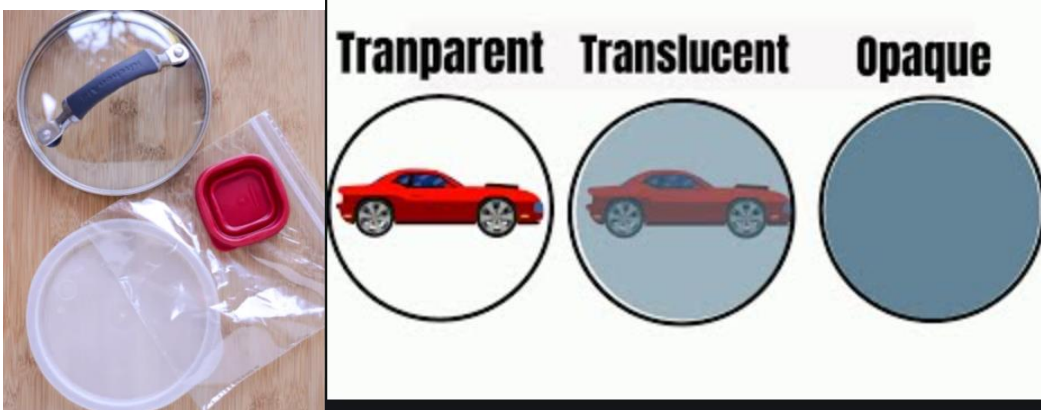


Translucent
Transparent
Opaque
Reflect
Light source
material

Session 5

Activity 2

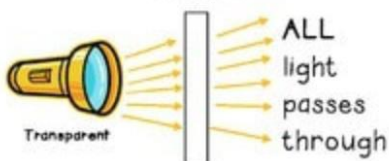
Find a selection of objects at home which are:



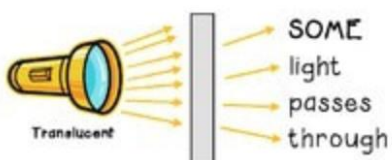
What difference does the material make to the shadow?

Draw a diagram to show this for your objects.

Translucent, Transparent & Opaque



So there are shadows.

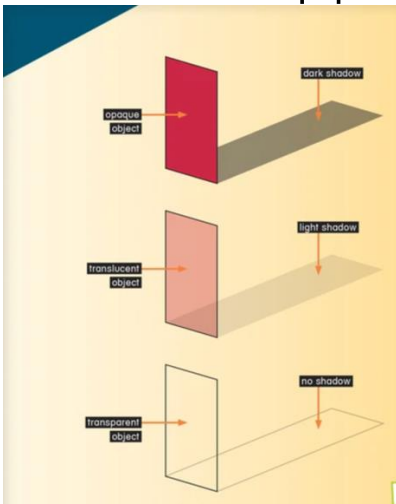


So there are shadows.



So there are shadows.

Session 5 support



Session 9 Concept Cartoon Shadow Screen



Session 9 Investigation

Method

Set up the investigation as shown in the diagram. Measure how far the light source is from the object. Measure the width of the shadow at its widest point. Record this information in the table. Move the light source further away from the object. Record this new distance. Predict and measure the width of the shadow. Repeat until you have 6 measurements.

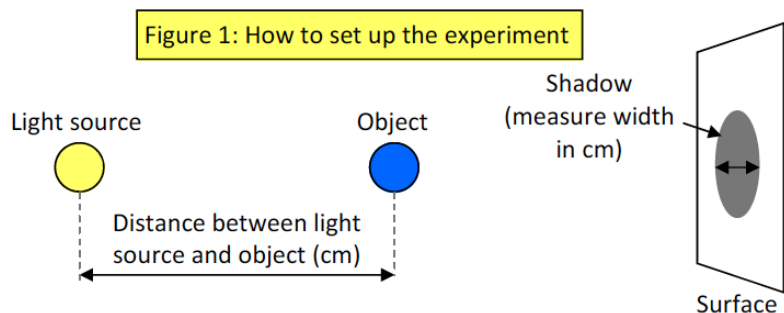


Table showing the width of shadow cast by an object

| Distance between light source and object (cm) | Width of shadow at its widest point (cm) | |
|---|--|-------------|
| | Prediction | Measurement |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Complete:

The nearer the object is to the light source the the shadow becomes.

The further away from the light source the object is shadow is. To get the biggest shadow you need to.....

Challenge: If you change the angle of the light source.....

.....

▶ TAIL OF DISCOVERY

CAT EYES LEAD TO A BRIGHT IDEA

BACK IN 1933, a cat possibly saved a man's life—and gave him a bright idea. One night, Percy Shaw was driving home along a dark road, winding around the curves with not a single streetlight to guide him. Suddenly, he saw a flash of light in his rearview mirror. Curious, Shaw stopped and got out of the car for a closer look. The light turned out to be the glowing eyes of a cat. It was an unusual sight, but also a very lucky one for Shaw. As he returned to his car, Shaw discovered that he had been driving down the wrong side of the road. If he had continued, he could have missed his turn and driven off a cliff!

Shaw was quite a mechanical whiz, and seeing the cat's glow-in-the-dark eyes got him thinking. If he could make lights that reflected brightly in the dark, just like a cat's eyes, that invention would improve safety.

He set to work, creating a reflector, a piece of glass that would reflect the glow of headlights back at the driver. He figured that if the reflectors were small and placed along the edges and middle of a road, then drivers would be able to stay in their lane more easily. Called Catseye reflectors, they had a cast-iron base that contained a piece of rubber to hold each glass reflector in place.

Catseye reflectors are still used on many roads today, but the original idea is also seen in reflective road studs—white marks along the center or sides of a lane. Today's roads are safer, thanks to one lucky inventor and a bright-eyed cat.



◀ THESE REFLECTORS ON A ROAD LOOK JUST LIKE A PAIR OF CAT EYES

A CAT'S EYES DON'T ACTUALLY GLOW IN THE DARK.

They reflect the light already available. Eye shine is caused by the tapetum lucidum, a part of the eye that is its own reflective layer. When light shines into a cat's eyes, the tapetum lucidum reflects the light like a mirror, allowing the cat's eyes to capture more light than an eye without this special part. This gives the cat the appearance of glowing eyes. Eye shine allows animals to see their prey when hunting at night.

Session 12

End of Unit Assessment:

Review and add to your KWL lesson 1 ideas.

Circle all the things that are a light source.



a window



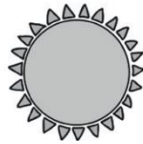
a mirror



the Moon



a candle



the Sun



a torch

What is dark?

.....

Join up these words to the correct explanation:

Word

Transparent

Translucent

Opaque

Explanation

Lets **some** light pass through but you can't see clearly through it.

Does not let light pass through at all.

You can see clearly all the way through.

Fill in the blank space in this sentence:

Light travels in a line from a light source to an object.

Explain how a shadow is made:

.....

.....

.....

How do you make a shadow bigger?

.....

.....

Draw a scientific diagram to show how we see objects?

(You choose the light source and object)

What happens if you shine a torch on a shiny surface?

.....

.....

Why do you think road signs are made out of reflective material?

.....

.....