



SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

"Journeying together with Jesus Christ, we learn to love and love to learn."



Year Group: Year 3 & Year 4	Term: Spring 2 (Cycle A)	Topic: Light and Shadows
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National Curriculum Links (Ref: NC 2014)

Pupils in Key Stage Two should be taught to:

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows changes.

Working scientifically (LKS2 objectives)

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units and a range of equipment
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- use straightforward scientific evidence to answer questions or to support their findings.

Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.

Global Goal

This global goal would be perfect to fit with this unit of learning.





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Knowledge and Skills Objectives	Activity	Differentiation
<p><u>Lesson One</u> I know that dark is the absence of light.</p> <p>I recognise that I need light in order to see things.</p> <p><u>Working Scientifically</u> I can ask relevant questions and use different types of scientific enquiries to answer them.</p> <p>I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>I can use straightforward scientific evidence to answer questions or to support my findings.</p>	<p><u>Hook:</u> Copy of the text, The Dark by Lemony Snickett, a torch, and watch the trailer of The Dark by Lemony Snickett https://www.youtube.com/watch?v=zWoHwjpI89c</p> <p><u>Starter Question:</u> Ask the children; <i>What is 'The Dark'?</i> Discuss with Talking Partners before discussing as a whole class.</p> <p><u>Introduction:</u> Discuss with the children that dark is the absence of light. When we have not light at all, it is dark.</p> <p><u>Task 1:</u> Take the children to a darkened room/tent or give children a box with a cover blocking out light, just an eye hold to peer in. Ask the children what so they notice? Do our eyes see into the dark straight away? Where is the light? Reinforce that it is dark because there is no light – dark is the absence of light. Uncover some holes in the box, and ask the children to look again. What do they notice this time? Does it take our eyes a little bit of time to adjust? What is in the box? How do they think they could see the object?</p> <p>Next ask the children, <i>What is light?</i> Explain to the children that light is a form of energy, and because of light we are able to see things. Continue to explain that light comes from a light source. <i>Where does light come from?</i></p>	<p><u>Task 1</u> Explore dark in a darkened room/tent or use a box. <u>Note:</u> ensure the children are ok about the dark as some do not like it.</p> <p><u>Task 2</u> Sorting images of light sources <u>SEN</u> – Support the children with the social aspect of group work. Children to be in mixed ability groups.</p> <p><u>Task 3</u> Recording what they have found out. <u>SEN</u> – children to colour the light sources (natural/man-made) then write an answer to what is dark. <u>Main Task</u> – Children to record what they have found out.</p> <p><u>WAGOLL</u> Light is a form of energy. Light comes from lots of different sources. Some sources are natural and some are artificial or man-made.</p>



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Children to think for a moment. In groups, children to take it in turns to share their ideas, and if their group agrees with them, they jot it down onto a mind map, and continue going around the group sharing and gathering ideas. Use this as a pre-assessment task.

Take feedback from the groups, listing their ideas onto word cards for the working wall. Look at the words with the children and explain the term, 'sources of light'. Ask the children if we can group these light sources (natural/man-made or artificial).

Task 2:

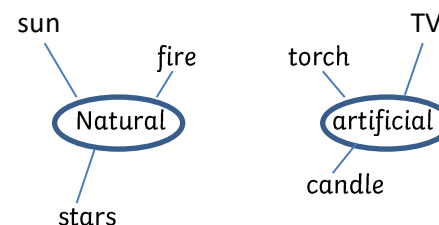
Give each group 2 sorting hoops and light source picture cards (include some non-light source images for deeper thinking). Children to sort the images according to what type of light source it is.

Take photographs of children working scientifically.

Invite children to share ideas, and to explain why the object mentioned was placed where it was.

Task 3:

Children to record what they have found out today. This can be in the form of tables, diagrams, pictures, written explanations. Model how you would like the children to present their learning in their books.



Without light, we would not be able to see.
Dark is the absence of light.

Challenge:

Read the following text to find out more about light.

Light and How We See

What is Light?
Light is a form of **energy**. It travels faster than anything else in the world and always in straight lines.

Light travels at about three hundred thousand kilometres per second.

Sources of Light
A source of light is anything that makes its own light. This can be **natural** like the sun, fire or lightning. They can also be manmade like lightbulbs, torches and computers. Many people think that the moon is a source of light but it actually just **reflects** light from the sun.

How Do We See?
Light is very important in allowing us to see things. We can see when light is reflected into our eyes. Light travels from the light source, bounces off an object and then enters our eyes through the **pupil**. The **iris** in our eyes can change size depending on how much light there is. If it is too bright, the iris gets smaller to stop too much light damaging the eye. If it is dark, the iris gets bigger to let in as much light as possible. If there is no light at all, we cannot see anything.

Plenary

Resources



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<p>Copy of text, The Dark Torches Black out room/tent/boxes Objects for inside the room/tent/boxes Sorting hoops Images of light sources Copies of the reading text</p>		<p>Consolidate what light is. Watch the following video and then discuss what they have learnt today. https://www.youtube.com/watch?v=d65mdTJaJTI</p>
<p><u>Lesson Two</u> I can explore how light reflects from surfaces.</p> <p><u>Working Scientifically:</u> I can ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>I can setup simple practical enquiries.</p> <p>I can make careful observations.</p> <p>I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>I can report on findings from enquiries, including oral and</p>	<p><u>Hook:</u> a reflective jacket, a school bag with a reflective strip, a bicycle reflector, a range of objects made from different materials, torches, paper</p> <p><u>Starter Question:</u> Ask the children; <i>What is light?</i> <i>What is dark?</i> Discuss with Talking Partners before discussing as a whole class.</p> <p><u>Introduction:</u> Ask the children the following questions; <i>What Why can we see a table?</i> <i>Why can we see the carpet?</i> <i>Why can we see each other?</i> Discuss with Talking Partners. Invite the children to share their thinking. Explain to the children that light travels in a straight line. When light from a light source hits an object, it is reflected (bounces off). If the reflected light hits our eyes, we can see the object. The object itself is not a light source.</p>	<p><u>Task 1</u> Discuss reflective materials <u>SEN:</u> Support children with social aspect of group work.</p> <p><u>Task 2</u> Investigate different materials <u>SEN:</u> children to be supported in the writing of their prediction. During the investigation, they could be given a role in the investigation, such as, holding the torch. <u>Main Task:</u> Children to write a prediction with a detailed explanation. Children to work together, taking it in turns to ensure the investigation is completed fairly.</p> <p><u>WAGOLL</u> I think a metal spoon, a mug and a mirror are good reflectors of light. These objects are very smooth and shiny.</p>



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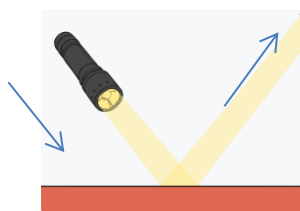
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written explanations, displays or presentations of results and conclusions

I can use straightforward scientific evidence to answer questions or to support their findings.

Light from the torch hits the object.



The light is reflected from the object.

Explain that some surfaces and materials reflect light well. Other materials do not reflect light well.

Task 1:

In groups, children to take it in turns to discuss any materials that they think reflect light well. Use this as a pre-assessment activity.

Explain to the children that reflective surfaces and materials can be very useful, such as;

- Reflective strips on coats or bags mean you can be seen at night. They are also useful for fire-fighters or builders who may work in a dark and dangerous environment.
- 'Cat's Eyes' help drivers see the road by reflecting light from headlamps.
- Mirrors let us see ourselves, and are also useful in cars, to allow drivers to see behind them.
- Retroreflectors are used for road signs so that drivers can see the signs from their car.

Task 2

Explain to the children that we are going to investigate which materials are good reflectors.

I think a brick, a jumper and a book are not good reflectors of light. The objects have a lumpy or holey surface.

Results (include a table to show their results)

Task 3:

Write a conclusion

SEN: children to be supported in the writing of their conclusion. Use a scaffold if necessary.

Main Task: Children to write a conclusion

I found that materials that were shiny and smooth were reflective for example a metal spoon, a newspaper and a mug. The light easily bounced off these materials.

I found that materials that were dull and dark were not reflective for example cardboard, fabric and brick. The light did not bounce off, it was absorbed by the material.



Challenge:

Reflective materials are important to us. One of these is cat's eyes. How do cat's eyes work? Find out about the invention of the




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	<p>Show the children a range of objects made from a range of materials; cardboard box, school jumper, mirror, foil, a book, a spoon, a mug, carpet</p> <p>Ask the children to predict which materials/objects will reflect the light easier and why they think this. Children discuss with their friends. Take feedback, and model how to write a prediction. Children to write their prediction in their books.</p> <p>In order to test the materials, you will need to make a reflection tester. Attach a piece of white card to a torch:</p> <ol style="list-style-type: none">1. Cut a hole in the centre of the card and push the torch through so that the card fits snugly around the torch without you having to hold it.2. Shine the torch at the material you are testing.3. If the material reflects light well, you will see the reflected light shine through the white card and light it up.4. Record results in a simple table format.  <p>Before children write a conclusion, they need to understand why some reflect better than others.</p>	<p>cat's eye. Explain how it was invented and why. How has it helped people in life?</p>
<p>Resources</p> <p>Reflective jacket, School bag with reflective strip Torches White paper A range of objects/materials Result tables for sticking into books ipads</p>	<p>Show the children 2 diagrams; one showing reflection and the other showing absorption. Explain that if a material is dull and dark, the light is absorbed into it. If a material is smooth and shiny, the light is reflected.</p> <p>Pick up some of the materials, such as the spoon, and explain that when I look into a spoon, I can see my reflection. When I look at the cardboard box, I cannot see my reflection. Therefore the material has absorbed the light.</p>	<p>Plenary</p> <p>Consolidate what the children have learnt today. Recap vocabulary; reflective/reflected/reflection, absorb/absorption, Watch the following video – it helps to consolidate as well as introduces some new words such as luminous. It then starts to introduce the next steps in learning. https://www.youtube.com/watch</p>



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	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Reflection</p> </div> <div style="text-align: center;"> <p>Absorption</p> </div> </div> <p>Task 3: Model how to write a conclusion e.g. I found that materials that were _____ and _____ were _____ for example _____, _____ and _____. The light was easy to bounce off. I found that materials that were _____ and _____ were not _____ for example _____, _____ and _____. The light could not bounce off easily, and instead, the material absorbed it.</p> <p>For the HA children, they could draw the two diagrams into their books to support their explanation of what happened.</p>	<p>h?v=a8xt_m4iMYc</p>
<p>Lesson Three I can explain why shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Working Scientifically: I can ask questions and use different types of scientific enquiries to answer them.</p> <p>I can setup simple practical enquiries.</p>	<p>Hook: torches, silhouettes</p> <p>Starter Question: Ask the children; <i>How does light travel?</i> Discuss with Talking Partners before discussing as a whole class. To demonstrate how light travels:</p> <ul style="list-style-type: none"> • Punch holes in the centre of three equal-sized pieces of card. • Hold the pieces of card so that the holes line up. • Shine a torch so that the beam of light can travel straight through the holes. <p>What happens if you move one of the pieces of card so the holes don't line</p>	<p style="text-align: right;">Task 1</p> <p>Finding shadows SEN- Support children in outdoor learning, as this could be very stimulating or overwhelming for them.</p> <p style="text-align: right;">Task 2</p> <p>Matching shadows SEN- Provide fewer images for the children to match. Main Task –</p>



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I can make careful observations.

I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

up? When you moved one of your pieces of card so the holes did not line up, the card blocked the ray of light. This is because light can only travel in a straight line, so it cannot travel around the card.

Introduction:

At the start of the lesson, turn off the lights and close all the blinds. Make the room as dark as possible.

Switch on a torch and have it shining on an object. Ask the children what they notice. The object should be casting a shadow.

Explain that the shadow is the dark area on a bright surface. It is created because something is blocking a source of light. As we have previous learnt, light travels in a straight line. It cannot go around corners.

The object blocking the light is also opaque. Opaque is a material that does not allow light through it. Therefore as shadow occurs. A shadow's outline, called a silhouette, will have the same shape as the object blocking the light.

Task 1

If it is nice outside, go outside and go on a shadow hunt. If not, in the classroom, leaving the lights off but blinds open, children to find shadows in their classroom.

Whilst looking for shadows, ask the children to think about the following questions;

Where are the shadows?

What direction is the shadow?

How long?

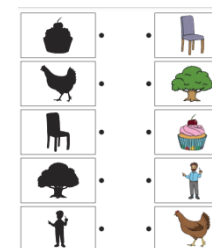
What shape? Why?

Where is the light source coming from?

Take photographs of the children exploring shadows and these to be stuck into their books.

Children to match object to silhouette.
Children to write about what makes shadows, demonstrating their understanding from the lesson.

WAGOLL



Shadows are created when an opaque object blocks the light from a source. The object leaves a silhouette on the bright surface. The object and the silhouette are the same shape.

Task 3:

Sorting materials

SEN – support children in the sharing and social aspect of group work.

Task 4

Recording their learning

SEN – Give them images of torches showing opaque, translucent and transparent for them to label.



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On return to the classroom, discuss what the children observed and invite them to explain their thinking.

Task 2:

Display on the IWB, shadow images. Invite the children to guess what object is making the shadow. How do they know?
Children to match object to the shadow.

Children to write about how shadows are formed,

Task 3:

Re-watch this video from lesson 2, https://www.youtube.com/watch?v=a8xt_m4iMYc.

Discuss with the children what is meant by opaque (can't see through it), transparent (can see through it) and translucent (can see a bit of the outline of the object).

Children to be given a selection of materials or objects. In groups, children to sort according to whether the material or object is opaque, transparent or translucent.

Task 4:

Children to write and draw what they have learnt about opaque, transparent and translucent.

Main task –

Children to draw three torches to show opaque, transparent and translucent.
Children to write about these.

WAGOLL



Transparent

Transparent materials allow light to pass through it, such as, plastic water bottles and sticky tape.



Translucent

Translucent materials allow some light to pass through it, such as, ice cubes and toilet paper.



Opaque

Opaque materials allow no light to pass through it, such as, chairs and books.

Challenge:

Children to read this text about shadows.
Write a fact on an A4 piece of paper for the working wall about shadows.

Can light travel through objects?
Light can travel through some materials but not others. Transparent materials let some light pass through. Translucent materials let some light pass through, but they block the light. Opaque materials will not let any light through. What are some examples of opaque materials?
What are shadows?
Shadows appear when an object blocks light from getting through. Because light only travels in straight lines, it creates an exact outline of it wherever it goes. Shadows have a similar shape to the object blocking the light. The longer objects move from side to side shadows wherever they move.
Shadows caused by light blocking the sunlight.






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Resources		Plenary
<p>Torches Card with 3 holes in Paper Objects Matching sheet</p>		<p>Consolidate what creates a shadow. Play a quiz.</p> 
<p><u>Lesson Four</u> I can investigate the size of shadows.</p> <p><u>Working Scientifically</u> I can ask questions and use different types of scientific enquiries to answer them.</p> <p>I can set up simple practical enquiries.</p> <p>I can make careful observations.</p> <p>I can record findings using simple scientific language, drawings, labelled diagrams and tables</p> <p>I can report on findings from</p>	<p><u>Hook:</u> torches, objects</p> <p><u>Starter Question:</u> Ask the question; <i>What is meant by opaque, transparent and translucent?</i> Children to discuss with their Talking Partner before discussing as a whole class.</p> <p><u>Introduction:</u> Explain to the children that they are going to investigate shadows.</p> <p>Explain to the children that they are going to place a piece of paper on the wall. Then, using a torch, they are going to shine it onto an object so that the shadow/silhouette casts onto the paper. The children will draw around the shadow before moving the light source away from the object. Ask the children what do they think is going to happen to the shadow? Why? Children to make a prediction.</p> <p><u>Task 1:</u> In groups, children to</p> <ol style="list-style-type: none"> 1. Attach a piece of paper to the wall. 	<p><u>Task 1</u></p> <p>Investigating shadows <u>SEN</u> – support children in the sharing and social aspect of group work. Give children a specific role within the investigation. <u>Main Task</u> – Children to write a prediction independently. Children to work in mixed ability groups – taking on a specific role. Children to complete results table.</p> <p><u>WAGOLL</u></p> <p>I predict the shadow will be bigger when the object is nearer to the wall. When a light source is close to the object the light is blocked and cannot shine around the edge of the object easily. When a light source is further away, the light has more space to shine and therefore casts a true shadow.</p>



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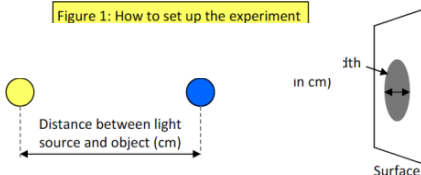
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enquiries, including oral and written explanations, displays or presentations of results and conclusions.

2. Place an object between the torch and the paper on the wall. Children to measure the distance from wall to object to torch.
3. One child to shine a torch at object. (Note: The child holding the object must not look at the torch or into the light)
4. One child to draw around the shadow. Measure the width of the shadow.
5. Complete the table of results.
6. Move the light source away. Measure the distance.
7. Repeat.

Figure 1: How to set up the experiment



Following the investigation,, discuss what they noticed. What happened to the size of the shadow? What happened to the colour of the shade?

Children to stick in their completed results.

Task 2:

Model how to draw a line graph to show the result. Children draw their own line graph on squared paper.

Task 3:

Model how to write a conclusion, for example,

The nearer the object is to the light source the _____.

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

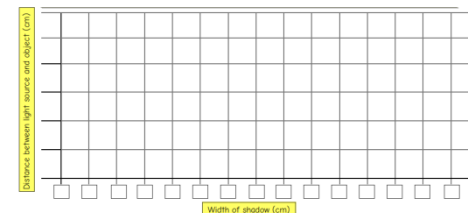
Task 2

Make a line graph

SEN – Depending on need, either have a pre-drawn graph for completion or provide a geoboard in which together you can model how to create a line graph through labelling the axis and using pegs and elastic band.

Main Task - Children to use squared paper to draw an axis developing the skill of using a ruler. Then children to label axis, write a title and plot points.

WAGOLL





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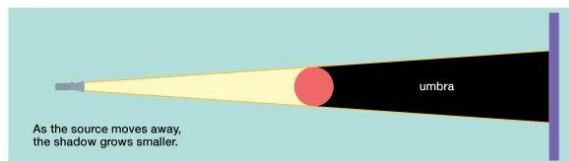
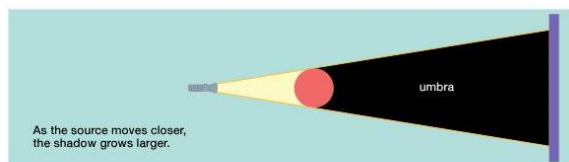
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The further away from the light source the _____.
To get the biggest shadow you need to _____.

Model through diagrams how the light hits the object and how the light casts its shadow.



Task 3

Write a conclusion

SEN – Support children in the writing of their conclusion or provide a scaffold for them.

Main Task – Children to reflect on the investigation and what they have learnt. Children to write a conclusion independently.

WAGOLL

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

The further away from the light source the smaller the shadow.

To get the biggest shadow you need to place the light source nearer to the object. This happens because the object appears bigger and the light has got to get around a larger shape. Whereas, when the object is further away, the object appears smaller.

Children to draw a diagram to support this understanding.

Challenge:

What do you think would happen if the light source stayed in the same position but the



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		object moved? Predict and investigate.
<p>Resources</p>		<p>Plenary</p>
<p>Torches Objects Plain paper Copies of tables and graphs for children to complete Pencils</p>		<p>Consolidate what they have learnt today.</p> <p>What have they learnt about shadows? What else would they like to know about shadows?</p>
<p><u>Lesson Five</u> I can investigate the length of shadows.</p> <p><u>Working Scientifically</u> I can ask questions and use different types of scientific enquiries to answer them.</p> <p>I can set up simple practical enquiries.</p> <p>I can make careful observations.</p> <p>I can record findings using simple scientific language, drawings, labelled diagrams</p>	<p><u>Hook:</u> boxes, torches, metre sticks</p> <p><u>Starter Question</u> Ask the children ; <i>Why does it appear that the sun travels across the sky during the day?</i> Children to discuss with their Talking Partner before discussing as a whole class. Watch this video to help explain this https://youtu.be/GXoNwiU2ojM</p> <p><u>Introduction:</u> Following the video ask the children; <i>Does the height of the light source affect the length of shadow?</i> Children to discuss with their Talking Partner before discussing as a whole class.</p> <p><u>Task 1:</u> Explain to the children that they are going to explore what happens to the height. Model with an torch in the off state what height means.</p>	<p><u>Task 1</u></p> <p>Write a prediction <u>SEN</u> – support children in the writing of their prediction or provide a scaffold for writing. <u>Main Task</u> – Children to write independently using the modelled write for support.</p> <p><u>WAGOLL</u> I predict a shadow will be longer when the light source is the lower. When a light is low in the sky the shadow will spread out from the object making it longer. When a light source is high in the sky it shines down directly on an object and the shadow doesn't go anywhere.</p> <p><u>Task 2</u></p>



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and tables

I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

I can use straightforward scientific evidence to answer questions or to support their findings.

Invite the children to predict what will happen to the shadow of an object when the height is altered.

Model how to write a prediction before the children write a prediction in their books.

Task 2:

Model how to make this investigation fair and discuss possible roles of children within the group.

Children to carry out the investigation by changing the height of the light source shining at the opaque object – every 30cm?

Children record the length of the shadow cast in a table.

Following the investigation, discuss with the children what they found out? Did they find any patterns?

Task 3:

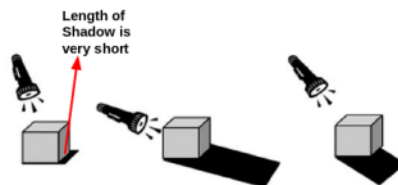
Model how to take the data and produce a bar graph.

Children to create a bar graph to show their results.

Task 4:

Discuss what they found out. Discuss the angle of the light source shining on the object.

Model how to write a conclusion. Children to write a conclusion into their book. Show a diagram that will explain this too.



Carry out the investigation

SEN – Support children with the social aspect of group work.

Give children a specific role to do.

Main Task - Children to work in mixed ability groups

Task 3

Making a graph

SEN – Provide the children either with a pre-drawn axis or use blocks/lego to make a bar graph.

Main Task –

Children to use squared paper. Draw and label an axis, then use their data to draw the bars. Children to give their graph a title.

WAGOLL

Task 4

Write a conclusion

SEN - support the children in the writing of this or provide a scaffold.

Main Task – Children to write a conclusion



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independently; use the modelled text for support.

WAGOLL

The lower the light source, the longer the shadow.

The higher the light source, the shorter the shadow.

The length of a shadow is affected by the angle of the light source on the object.

Children can draw an image of this to support their understanding.

Challenge:

What is a sundial? Children to find out about sundials using ipads.

Plenary

Consolidate what they have learnt today. Then ask the children, what is a sundial? Explain that a sundial is the oldest known instrument or equipment for telling time. The surface of a sundial has markings for each hour of daylight. As the Sun moves across the sky, another part of the sundial casts a shadow on these markings. The position of the shadow shows what time it is.

Resources

Torches
Objects e.g. boxes
Metre sticks
Paper
Pencils
Copies of tables and graphs




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		<p>Model how to make a sundial and set the task of making and using a sundial for homework.</p> 
<p><u>Lesson Six</u> I know light from the sun can be dangerous and that there are ways to protect their eyes</p> <p><u>Working Scientifically:</u> I can make systematic and careful observations.</p> <p>I can record findings using simple scientific language, drawings and labelled diagrams</p> <p>I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p>	<p><u>Hook:</u> a large pair of sunglasses, a model of the eye</p> <p><u>Starter Question:</u> Ask the children. <i>What is the sun?</i> Discuss with Talking Partners before discussing as a whole class.</p> <p><u>Introduction:</u> Remind the children that our main light source is – the sun. Ask the children, Why is the light from the sun dangerous? Discuss with Talking Partners before discussing as a whole class.</p> <p><u>Task 1:</u> Explain to the children that you are going to show them some things the sun does – they have to decide if they think the sun is a hero or a villain. Using Vote with your Feet, children to make a choice. Following each choice, discuss the children’s thinking.</p> <p>Watch this video to explain what happens https://youtu.be/g1gpi9yUpmA (It goes into detail about the eye which the children do not know – this is focused on in year 6 but good to be introduced to in Year 3/4)</p>	<p><u>Task 1</u> Is the sun a friend or a foe? <u>SEN</u> – support children if they find these moving around activities overwhelming.</p> <p><u>Task 2</u> UV light investigation <u>SEN</u> – Support the children with the social aspect of group work. Give the children a role within the investigation</p> <p><u>Task 3</u> Looking at the eye <u>SEN</u> – Support them in the discussion of what they can see; introduce and reinforce new vocabulary.</p> <p><u>Task 4:</u></p>



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	<p>Discuss with the children what UV light is. The sun emits (gives out) rays of light.</p> <p>We can't see all the types of light that come from the sun. One of the types of light is called UV (ultra violet) light and it is invisible to humans, however, we can see and feel its effects. Some UV light is blocked by the atmosphere (ozone layer) however, the rest reaches us here on Earth. The amount of UV light that reaches us depends on different things.</p> <ul style="list-style-type: none"> • It is stronger at midday and in the summer. • If there are no clouds there is more UV light. • It also gets stronger nearer to the equator. • The location can make a difference too - water, sand and snow all reflect UV light, making it stronger. <p><u>Task 2:</u> Explain to the children that we are going to set up an investigation; the investigation will be a measurement over time (we won't get the results until after the holidays).</p>	<p>Create a poster <u>SEN</u> – Depending on ability, provide the children with a template or produce a poster alongside one another, modelling each step. <u>Main Task</u> – children independently make</p> <p><u>Challenge:</u> What is a rainbow? Children to find out using ipads</p>
<p>Resources</p>		<p>Plenary</p>
<p>Sun glasses Model of eye Mirrors Paper Colours Torches Prisms Black paper Bright paper</p>	<p>Explain to the children that they are going to work in a group to set up an investigation to see the effects of UV light. Here are the instructions:</p> <ol style="list-style-type: none"> 1. Cut out several shapes from black card. 2. Place them on a piece of coloured paper, and position them in a sunny spot for a week. 3. When you take the shapes off, observe what you can see. <p>(The paper under the shapes should still look the same. The UV light could not get to the paper under the shapes, so the paper under the shapes has not been damaged by the UV rays.)</p> <p><u>Task 3:</u></p>	<p>Explain that UV light is invisible. However some light is visible. The visible spectrum is the name for the light that we can see. We call this light 'white light'. However, white light is made up of the colours of the rainbow. Have they ever seen a rainbow (except those in the sky) before? Where? Explain that each colour has a different wave length. Violet being the shortest and red being the longest. When light is refracted or passes through an object the colours pass</p>



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	<p>Introduce the children to the eye. Explain that the eye is made to let light in; this is how we see. Give the children a mirror and get them to identify the pupil? It looks like a black circle.</p> <p>Light enters the eye through the pupil. Get the children to look closely at their pupil in the mirror. Then get them to close their eyes for 30 seconds, then open them and look at their pupil. What do you notice?</p> <p>Explain to the children that the pupil grows bigger in the dark to allow more light to enter the eye, and gets smaller in bright light. Light enters the eye through the pupil.</p>	<p>through at a different rate and why we see a rainbow. Use the prisms to demonstrate this. Let the children play with making a rainbow!</p> <p>Consolidate all learning on light.</p>
Resources		
<p>Images of animal and their skeletons Animal skeletons to sort and animal skeletons to stick into their book Sorting hoops Animal pictures (pairs)</p>	<p>Explain that if too much light comes through the pupil, it can damage the retina. It causes pain, so that you instantly close your eyes, or turn away from a bright light. Explain and stress that it is very important that they never look directly at the sun, as the light can damage your eyes very quickly. Also explain how bright lights indoors can also damage your eyes, so you should never look at them, or shine lights into anyone's eyes.</p> <p><u>Task 3:</u> Ask the children, <i>How can we protect ourselves from the sun?</i> Children to discuss with their Talking Partner before discussing as a whole class.</p> <p>Discuss with the children that we can wear hats, cover up and wear sunscreen. To protect our eyes we can wear sunglasses. Discuss how some sunglasses have a UV rating to show how well they block UV rays. Explain how it is important that they have sunglasses with a high UV rating. Stress how some sunglasses don't have a UV rating - these are really just toy sunglasses and don't protect your eyes. In fact, because they</p>	



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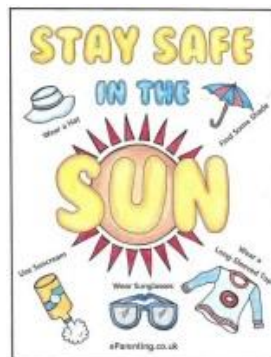


have dark lenses but no UV filter, the pupil opens wider, actually letting in more UV rays!

As well as doing this, the following will help us to look after our eyes;

- Wrap around sunglasses are best, as they cover more of the eye.
- Also wear a hat with a wide brim to shade your eyes.
- Have regular eye tests to check your eyes.
- Even if you are wearing sunglasses and a hat, you should still never look directly at the sun.
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Explain to the children that they are going to create a poster all about keeping eyes safe. Discuss the facts they can include. Model an example.



Applied Write Opportunities:

A poster on sun safety

Enrichment Opportunities:

Visit a sundial



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Key Vocabulary

Tier Two: light source, dark, absence, reflect, reflective, sunlight, Sun, bounce, glare, travel, shadow, block, length, width, height, strength, darker, lighter, fainter, brighter, partial, materials, shiny, sunglasses, shade, shield, line graph, bar graph, rainbow, protect, heat, energy, angle

Tier Three: fluorescent, cats-eyes, opaque, transparent, translucent, cast, invisible light, visible light, spectrum, ultra violet (UV), waves of energy/light, pupil (eye), radiation