

YEAR 6 LIGHT PLANNING

Class:

Term:

Subject: Science

Unit: Light

Differentiation and support (Detailed differentiation in weekly plans.) SEN: write up investigations on writing frames. Support from more able partners in mixed ability work. Additional adult support. GT: provide headings for experiment sections. Encourage predictions conclusions that draw on scientific knowledge. Provide extension activities to apply their own knowledge and to research information independently	English: writing up experiments in sequence using technical language, using dictionaries, listening for information in video clips, extracting information from texts, sequencing steps in a process, Maths: drawing results tables and graphs, measuring angles and lengths, concave and convex ICT: videos, online games, Art & D+T: drawing a diagram, making a kaleidoscope, a pinhole camera and a telescope PSHCE & RE: working with others, festivals and celebrations involving light and safety with regards to light
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Note: Shadow puppets are not used in this Year 6 Unit because they were used in the Year 3 Unit on Light

TO DO IN ADVANCE OF THE START OF THE UNIT:

Lessons 2 and 7 require items of equipment that may not be readily available in school. Send letter to parents at the start of the half-term requesting what is needed

Several lessons have activities that require testing well in advance to see what works best with the equipment available (this is indicated at the top of each lesson plan)

Try to get a local optician to come and speak to the children and to bring some equipment if possible. Do this after lesson on lenses

Source convex and concave lenses and mirrors if possible

Year 5 and 6 'Working scientifically' learning objectives:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

W	Learning objective	Teaching activities	Resources	Assessment: Success Criteria
1a	<p>To understand how we see things</p> <p>(30 mins)</p>	<p>Intro:</p> <p>Ask the children to think of situations / times when they cannot see anything (when it's dark and when we close our eyes)</p> <p>Ask the children why they think we cannot see in these situations i.e. what is missing</p> <p>Explain that we need light in order to be able to see things</p> <p>Revise what a light source is and what natural and man-made / artificial mean (children should have covered these things in Year 3)</p> <p>Ask the children to think, pair, share some examples of natural and man-made light</p> <p>Revise how the Moon is not a light source; instead it reflects light from the sun</p> <p>Explain that we are going to be learning about how we see things and how our eyes work</p> <p>Watch the video clips on how we see things: https://www.bbc.co.uk/bitesize/clips/zy7bwmn (if the link does not work, Google 'BBC Bitesize clips The human eye and how it works')</p> <p>https://www.youtube.com/watch?v=cFVbLnXWn6A – watch up to 1 min 23 secs (if the link does not work, Google 'YouTube Bill Nye The Science Guy on The Eyeball')</p> <p>Ask the children if they have heard of the term 'blind spot'</p> <p>Explain that we have a 'blind spot' where the optic nerve exits each eye</p> <p>Explain Lesson 1b also</p> <p>Main:</p> <p>Children given the steps in the process of how we see things in a jumbled up order; they need to cut them out and stick them in the correct order (Alternatively children could write the steps in the correct order in their books)</p> <p>Children to start Lesson 1b on parts of the eye when they complete this activity</p> <p>Plenary (can be used after Lesson 1b):</p> <p>Close / collect in books</p> <p>Have competition in pairs / small groups to see how many steps in the process the children can remember</p> <p>Ask the children if they think that all animals see the world in the same way</p> <p>Ask them to suggest what differences there might be in the vision that each animal has</p> <p>Watch the video on how animals see at https://www.youtube.com/watch?v=6hYaT4gvjNc (if the link does not work, Google 'YouTube How Animals See The World')</p> <p>Ask the children which of the animal vision adaptations they would most like to have and why</p>	<p>Check videos open and play OK and skip and / or close ads</p> <p>Worksheets</p> <p>Scissors</p> <p>Glue</p>	<p>MUST: correctly order <i>most</i> of the steps in how we see correctly</p> <p>SHOULD: correctly order <i>all</i> of the steps in how we see correctly</p> <p>COULD: finish more quickly so that they have time to add more information to their diagram of the eye</p>

1b	<p>To know the parts of the eye and their functions</p> <p>(30 mins)</p>	<p>Intro: Explain independent work Tell children to pause and rewind / replay information as they need to If completing the worksheet on a PC or laptop, tell children to copy and paste the text box and line that is already there, not to create new lines and text boxes of their own (this is because the existing text box and line have been formatted to fit the most information on the diagram without being too small) If completing diagram on paper, remind the children to:</p> <ul style="list-style-type: none"> • use a ruler to draw lines • write in smaller handwriting so that they can fit more information around the diagram <p>Main: Children given a diagram of the eye, with the main parts labelled Children to:</p> <ul style="list-style-type: none"> • find out about the parts of the eye already labelled on the diagram • find additional parts of the eye to label, and find out information about each of these <p>Children to use the following sources: http://quietube7.com/v.php/http://www.youtube.com/watch?v=syaQgmx5i0 (if the link does not work, Google 'YouTube Kids Health Videos How Your Eyes Work') http://quietube7.com/v.php/http://www.youtube.com/watch?v=gvozcv8pS3c - from 42 secs to 2 mins (if the link does not work, Google 'YouTube A Journey Through the Human Eye: How We See') http://quietube7.com/v.php/http://www.youtube.com/watch?v=fn6v3SkH0LI - from 1 min 40 secs to 3 mins 40 secs (if the link does not work, Google 'YouTube IGCSEBiology1 How The Human Eye Works') https://www.nei.nih.gov/learn-about-eye-health/nei-for-kids/visual-system (if the link does not work, Google 'The Visual System National Eye Institute') https://www.nei.nih.gov/learn-about-eye-health/healthy-vision/how-eyes-work (if the link does not work, Google 'eye diagram National Eye Institute') https://www.bbc.co.uk/bitesize/topics/zgdmsbk/articles/z7by92p (if the link does not work, Google 'BBC bitesize How does the human eye work?')</p> <p>Plenary: Display a labelled diagram of the eye, with the labels hidden by numbered boxes For each numbered box, ask the children to think, pair, share what the name of the part of the eye is, and any information that they know about it</p>	<p>PCs / laptops</p> <p>Headphones</p> <p>Worksheets and rulers (if completing on paper)</p>	<p>MUST: know the names of the <i>main</i> parts of the eye and their function</p> <p>SHOULD: label <i>some additional</i> parts of the eye and add some information about each of them</p> <p>COULD: label <i>more additional</i> parts of the eye and add some information about each of them</p>
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2	<p>To observe phenomena related to light and how we see</p> <p>To record what they observe</p> <p>(1 hour)</p>	<p>Need to prepare and test activities well in advance of lesson</p> <p>Intro: Explain that light can behave in ways that we might not expect and that how we see things is not as straightforward as it might seem Show children a pencil and then place it in a jar or a bowl of water (the pencil should appear to bend due to refraction) Show the children some of the optical illusions at https://www.nei.nih.gov/learn-about-eye-health/nei-for-kids/optical-illusions (if the link does not work, Google 'optical illusions National Eye Institute') Explain independent work</p> <p>Main: Children to move around the tables completing the following activities:</p> <ul style="list-style-type: none"> • Light through water – children shine a torch through a jar of water at different angles and predict, estimate and measure the angle that the light will leave the water • Coin in water – a child places a coin in the bottom of an opaque cup and moves back enough so that the coin is just out of sight. Another child slowly fills the cup with water and the coin gradually comes back into view. Example at https://www.youtube.com/watch?v=JVxIHbIFje4 • Target with mirrors – children to shine a beam of light on to a 'target' card through: <ul style="list-style-type: none"> ○ a 'challenge' card (a card with a hole in the middle) from increasing distances ○ a series of 'challenge' cards ○ a 'challenge' card at an angle ○ various combinations of the above • Coloured filters and Prisms – children to look at a range of different coloured card through a range of different coloured filters and to shine a torch through a prism • Making periscopes – children to make a periscope using the video instructions at http://quietube7.com/v.php/http://www.youtube.com/watch?v=Bnjin5e4LTmE • Mirror writing – children to try to write words and trace over shapes by looking not at the paper, but at a reflection of where they are writing / tracing in the mirror • Reflections – children to <ul style="list-style-type: none"> ○ shine a torch on some smooth foil and some crinkled foil ○ shine a torch on still water and choppy water ○ look at their reflection in still water and in choppy water ○ look at their reflection on both sides of a spoon <p>Children to complete worksheets to record what they observe and find out</p>	<p>PowerPoint</p> <p>Worksheets</p> <p>See separate equipment list</p>	<p>MUST: complete the activities and record their observations</p> <p>SHOULD: help a less able partner</p> <p>COULD: understand and remember the explanations for some of the observations</p>
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3	<p>To understand how the size of shadows changes relative to distance from a light source</p> <p>Investigation: What happens to the size of a shadow as distance from a light source changes?</p> <p>All Year 5/6 'Working scientifically' learning objectives (see top of unit plan)</p> <p>(1 hour 30 mins)</p>	<p>Test the below experiment a week or so in advance of the lesson to find suitable distances to move the torch depending on the particular torch and particular object being used</p> <p><i>Experiment: Give the children the distances to move the torch back from the light source, based on advance testing. In pairs / groups, children to move a torch further and further away from an object that blocks the light and casts a shadow (use a rectangular object with straight sides, such as a block of Lego)</i></p> <p>Ask children to think, pair, share what a shadow is (covered in Year 3) and what they can remember about shadows e.g. their shape depends on the shape of the object blocking the light</p> <p>Aim and prediction Discuss what investigation we could carry out using the equipment Think, pair, share (explaining what we will be doing if children don't suggest it in a timely way) Think, pair, share what might affect the size of the shadow (the variables in the investigation) Why are we going to repeat each trial more than once with different sized torches and / or blocks of Lego? (more reliable results)</p> <p>Method Think, pair, share what we would need to do to make a 'fair test'. Plan a fair test, with these conditions being the same <i>for each set of trials</i>:</p> <ul style="list-style-type: none"> • The torch • The brightness of the light from the torch • The object blocking the light • The increments that the torch is moved back each time • The height of the torch from the table / ground • The height of the object from the table / ground • The brightness of the room • The distance between the object and the wall (or other place where the shadow is being measured) • The angle of the torch • How the size of the shadow is measured e.g. top to bottom or side to side <p>Discuss how changing these things would be unfair and why this is the case. Explain controlled, independent and dependent variables for G+T</p>	<p>Torches (different sizes if available)</p> <p>Objects to block light e.g. Lego blocks (different sizes if available)</p> <p>Rulers</p> <p>Investigation frames</p> <p>Graph frames</p>	<p>MUST: plan and carry out an experiment by using an investigation frame, <i>with</i> adult support</p> <p>SHOULD: plan and carry out an experiment by using an investigation frame, <i>without</i> adult support</p> <p>COULD: link predictions and conclusions to scientific knowledge and use scientific language</p>

		<p>Investigation and Results Model how to draw a results table. What will it need to include? Carry out the investigations</p> <p>Revise how to calculate averages (if using more than one torch and / or object) Discuss whether we should use a bar graph or a line graph? Why? (we can use a line graph because distance and size are continuous types of data) Model for children how to draw a line graph (if necessary) Revise how to use tick list on investigation frame for drawing a graph correctly</p> <p>Conclusion Think about:</p> <ul style="list-style-type: none"> • Did our predictions match our results? Why / why not? • What scientific language could we use? • Evaluation – how could we have made a better 'fair test' / how could the investigation be improved? • Reliability – did we get the same result each time we repeated the test? If not, why not? Did other pairs / groups get similar results to us? If not, why not? 		
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To access the complete version of this [Year 6 Light planning](http://www.saveteacherssundays.com/science/year-6/592/light-planning/), with every resource needed for each lesson, visit:

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