



Medium Term Unit Planning

Topic Name: Science Light and Shadows

Learning outcome:

By the end of this topic the children will have a good understanding of how lights and shadows are made, how they effect each other and why we have them here on earth, but also that they are different in different places on earth.

Hook: Zudon is from a planet with no light and he wants to know how lights work on earth so that he can take some back to his own planet.

Topic Showcase (e.g. display, museum, performance, presentation)

Presentation to Zudon explaining light and how it works.

Oracy: Presentation to Zudon explaining light and how it works.

Key Vocabulary: Light, white light, visible light, colour, spectrum, refraction, Reflect, mirror, reflection, image, concave, convex, Transparent, translucent, opaque, shadow,

Key Texts (whole class reading/end of the day book/Talk for Writing Texts etc.):

The Dark by Lemony Snicket, Smoot: A Rebellious Shadow by Michelle Cuevas, My Shadow by Robert Louis Stevenson, How Does A Lighthouse Work? By Roman Balyaev

Citizenship/Community Opportunities:

(Focus – change in attitude/increase knowledge and awareness/make a difference)



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The children will have an increased knowledge of the wider world around them and how we have light. There is also opportunity to compare to other places that have less light at different times in the year. Can discuss fears of the dark and how this effects people.

Experiences/Visits/Visitors

Main Subjects covered: Science (physics)

Subject 1 Threshold concepts

- **Work scientifically**
This concept involves learning the methodologies of the discipline of science.
- **Understand the Earth's movement in space**
This concept involves understanding what causes seasonal changes, day and night.
- **Understand light and seeing**
This concept involves understanding how light and reflection affect sight.

Notes:



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Lesson title and learning Intention	Threshold concepts (success criteria)	Milestones (success criteria)	Lesson structure/differentiation
1. What is light? Discover through active investigation that without light you cannot see. Learn through investigation that light travels in straight lines. Actively investigate the nature of white light through a number of practical activities.	- Work scientifically This concept involves learning the methodologies of the discipline of science. - Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. - Understand light and seeing This concept involves understanding how light and reflection affect sight.	- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. - Identify differences, similarities or changes related to simple, scientific ideas and processes. - Use straightforward, scientific evidence to answer questions or to support their findings. - 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	- Activities - Actively investigate the nature of darkness, light and sight with a torch, a cardboard box and pencil holes. - Use findings to draw conclusions on how light travels and our dependence on light to see. - Design a stage front for shadow puppet theatre to use in the coming sessions. - Learn that white light is composed of a spectrum of coloured light through 3 different investigative tasks.



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		blocked by a solid object. Find patterns in the way that the size of shadows change.	
2. Reflectors and light Know what a light source is and that the sun is a light source which is so powerful that it will damage your eyes if you look at it (even with sunglasses). Predict and then investigate which colours show up best and least in the dark. Investigate the effect of shining a torch on various objects including reflective materials.	- Work scientifically This concept involves learning the methodologies of the discipline of science. - Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. - Understand light and seeing This concept involves understanding how light and reflection affect sight.	- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. - Identify differences, similarities or changes related to simple, scientific ideas and processes. - Use straightforward, scientific evidence to answer questions or to support their findings. - 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	- Activities - Recap on prior knowledge by playing an active quiz game. - Predict and then investigate how well different colours and materials reflect light in a simulated dark cave. - Record findings by sorting and classifying colour samples, noting observations and drawing conclusions. - Paint shadow puppet theatre to make it attractive and exciting for audiences.



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		there are ways to protect their eyes. ○ Recognise that shadows are formed when the light from a light source is blocked by a solid object. ○ Find patterns in the way that the size of shadows change.	
3. Mirror Mirror Investigate how light is reflected by different surfaces, looking for similarities and differences and noting observations. Investigate the nature of reflections in mirrors through a variety of practical tasks including mirror writing, navigating mirror mazes and multiple mirror reflections.	○ Work scientifically This concept involves learning the methodologies of the discipline of science. ○ Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. ○ Understand light and seeing This concept involves understanding how light and reflection affect sight.	○ Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. ○ Identify differences, similarities or changes related to simple, scientific ideas and processes. ○ Use straightforward, scientific evidence to answer questions or to support their findings. ○ 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.	○ Activities ○ Actively investigate the use of coloured acetate filters for mixing beams of coloured light and to look through. ○ Use all previously gained knowledge and skills during this block of sessions to create a fabulous shadow puppet performance.



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		- 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 a solid object. - Find patterns in the way that the size of shadows change.	
4. Shadows Investigate how objects made from different materials cast shadows. Understand how a shadow changes depending on the object's orientation.	- Work scientifically This concept involves learning the methodologies of the discipline of science. - Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. - Understand light and seeing This concept involves understanding how light and reflection affect sight.	- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. - Identify differences, similarities or changes related to simple, scientific ideas and processes. - Use straightforward, scientific evidence to answer questions or to support their findings. - Recognise that they need light in order to see	- Activities - Actively investigate how different objects cast shadows by playing a guessing game. - Understand opaque, transparent and translucent and the shadows these objects cast. - Investigate how the orientation of an object affects the shadow by making hand shadows. - Create jointed shadow puppets controlled with a flexible stick connection.



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		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 a solid object. ○ Find patterns in the way that the size of shadows change.	
5. Let's investigate Actively investigate how shadows change as the light source is moved. Take measurements and look for patterns in data to answer scientific questions.	○ Work scientifically This concept involves learning the methodologies of the discipline of science. ○ Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. ○ Understand light and seeing	○ Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. ○ Identify differences, similarities or changes related to simple, scientific ideas and processes. ○ Use straightforward, scientific evidence to	○ Activities ○ Make and attach a tissue paper screen to their puppet theatre in groups. ○ Freely explore the effect of moving the light source on shadows in their theatre. ○ Look for patterns and try to answer questions. ○ Take accurate measurements of the length of shadows whilst controlling



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6. What a performance? Actively investigate the use of coloured acetate filters for mixing beams of coloured light and to look through. Use all previously gained knowledge and skills	- Work scientifically This concept involves learning the methodologies of the discipline of science. - Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night.	- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. - Identify differences, similarities or changes related to simple,	- Activities - Undertake a quiz on all learning on light and shadows covered in this block of sessions. - Investigate mixing beams of coloured light by covering torches with different coloured acetate.



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during this block of sessions to create a fabulous shadow puppet performance.	○ Understand light and seeing This concept involves understanding how light and reflection affect sight.	scientific ideas and processes. ○ Use straightforward, scientific evidence to answer questions or to support their findings. ○ 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 a solid object. ○ Find patterns in the way that the size of shadows change.	○ Investigate looking through different colours of acetate to filter different coloured light. ○ Work on producing their own shadow puppet play with puppets they have made.
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