

Periscope by Michael Rosen

Topic: Light

Year 6

Learning Objectives:

Knowledge - 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.

Working Sci. -

Lesson 1 - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Lesson 2 - Recording data and results of increasing complexity using **scientific diagrams** and labels, classification keys, tables, scatter graphs, bar and line graphs.

Success Criteria:

Must - be able to **show** you how mirrors help you see things and give at least one example.

Should - be able to draw how the light travels in the periscope with the arrows in the correct position.

Could - tell you the angle the mirrors need to be at to get the most effective periscope.

Introduction/Direct Teaching:

- Read **Periscope** but **DON'T** tell them the title at this point and stop at the second to last line. Ask the children what might be a good present that would help solve his problem? If they don't guess periscope don't worry about it at this point.
- Tell them that there is a secret message under each desk, however they are not allowed to bend down and look at it, instead they have to think of something they could use to see what is under their table.
- Get them to think in groups about how people see things that are not directly in their line of sight? E.g. cars behind you when you are driving, dentist looking at your top teeth, when you are looking at the back of your hair. Hopefully at this point they will realise that mirrors are a big part of the solution.
- Can they use mirrors to read the secret message under their tables? Give mirrors to each child to see if they can read the message (maths mirrors are useful here. If not enough, fresh silver foil on card can also work as a mirror).
- You could write the word Periscope/Submarine/Reflection/Light under the table. When they reveal the words ask them if they can explain how that word is involved in seeing things that are not directly in your line of sight. Use more difficult words under the tables of the more able children.

Activity:

Lesson 1

- Once the children have explained how a periscope could be helpful for the child in the poem to see over the wall challenge them to make a periscope to help him out.
- Ask them try to reflect the light around their table using the mirrors they have. How do they think this would be helpful in a periscope? If possible let them do some secondary research to see how a periscope works or take a cardboard periscope apart to see where the mirrors are.
- In their groups get them to design their periscopes in the Group Books and tell you what resources they need to create the periscope. Make sure you allow them to design their own way rather than giving them a handout or template to use. If you have looked at nets in maths then you could use this knowledge here. (This could be the end of lesson 1 allowing you time to get the resources needed for them to make the periscope in lesson 2. If it is then get them to share their designs in the plenary and draw in the Big Book the direction light travels in a rear-view mirror, to read the secret messages under the table, at the dentist to see our teeth and looking at the back of our hair at the hairdressers).

Lesson 2

- Get the children to create their periscopes and test them out in different scenarios in the classroom e.g. to look round corners, under desks, over bookshelves etc.
- In their own books get them to draw their groups periscope designs but add in their eye and the direction the light travels in in order for them to see using the periscope. Make sure they add the arrow directions to show they direction the light travels in. * Big misconception is they put the arrows in the wrong direction. Correct way shows the arrow heads coming from the object they are viewing onto the first mirror then reflecting in a straight line down to the next mirror and then reflecting from this mirror into their eyes.

Differentiation

- Ask the more able to look at the best angle for the mirrors in their model periscope.
- If necessary after an initial attempt give them a template to support their periscope. Example in resource list.

Recording

Big Book / Group Book / Individual Book / Role Play/ Model

Type of Working Scientifically - Exploring / Obs over time / Pattern seek / Fair test /Identify, classify & group / Research

Plenary

- Lesson 1 - In the Big Book have some scenarios drawn out using mirrors e.g. using a rear-view mirror when reversing, dentist using a dental mirror, looking at the back of your hair, submarine. Get the less able to draw in the lines that the light travels and the middle ability to add the arrows and more able could add an angle.
- Lesson 2 - Review drawings from last time in Big Book and see if you can add any more detail. Ask them to tell you what the boy in the poem is hoping to get for his birthday now he can see over the fence.
- Ask some children to come up and role play the direction of the light in a periscope. They can use strips of paper/wool and other children can come and add arrow heads to show the correct direction the light travels.

Resources:

- Periscope poem by Michael Rosen (part of the Centrally Heated Knickers book)
- Small mirrors or small pieces of card with fresh silver foil wrapped over them. (If each child is designing their own periscopes or you are letting them take them home this may be the best mirrors to use in the final periscopes).
- Different sizes of mirrors to explore with e.g. hand-held mirrors for looking at the back of your head, dentist mirrors etc.
- An example of a real periscope - this is a cheap cardboard periscope costing £1.99 that can be taken apart to see how it works:
https://www.amazon.co.uk/MagiDeal-Technology-Physical-Invention-Periscope/dp/B07469QJV8/ref=sr_1_12?s=kids&ie=UTF8&qid=1520724093&sr=1-12&keywords=periscope .
- Paper strips/ wool for periscope role play.
- Arrow shapes for periscope role play.
- Protractors for more able to measure angle of mirrors.
- Junk material to make periscopes out of - hopefully after Lesson 1 the children will tell you what they need.

