Snow blind

Teacher Guidance

NC objectives

K: Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
WS: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Overview

Children will apply knowledge about how we see, and how light travels and is reflected, to a modern day application.

Key concepts

- Reflection
- How light travels

Resources / equipment

- Torches and other strong light sources
- A variety of sunglasses labelled with letters
- White card and black card
- Data loggers
- An optional writing frame has been provided for this assessment activity.

Outcomes

- Children write an explanation of how light is reflected from surfaces into our eyes so we can see.
- They explain why we need to protect our eyes from strong sunlight.

Teaching notes

- Introduce the assessment activity by asking children to think about being outside when it has just snowed or being on a winter sports holiday. Discuss how bright it can appear when snow has just fallen.
- *What do you think happens when moonlight reflects off snow? Is it still bright?* (Yes) Remind children that the Moon is not a light source, it is just reflecting the light of the Sun so it is actually a double reflection of light. Remind children that light travels in straight lines and when it hits a surface it is reflected (to a greater or lesser degree). When the reflected light hits our eyes then we can see.
- During the day, sunlight hits the surface of white snow and the snow actually increases the total amount of sunlight reflecting back to the eyes (when compared to ground without snow). Talk about how we need to protect our eyes from excessively strong sunlight.
- Explain that the snow isn't producing extra light it is just reflecting light from the Sun. Snow reflects light so well that people can get what is called 'snow blindness'. The light is so bright that the contrast of moving from inside to outside is so much that it takes a while for our eyes to adjust to the different light levels so we can see.
- Set up a demonstration using a data logger (or have children do this themselves if you have enough equipment) to explore the differences in reflected light from a white or a dark surface (to model snow-covered and snow-free ground). Explore the effects of placing sunglasses in front of the light sensor on the data logger. Discuss the effects. Ensure the sunglasses are labelled with a letter for clarity when referring to them.
- Draw a generic diagram of the path of light from a light source to an object and then into our eyes. Explain that children will write a paragraph for a product report on sunglasses, specifically explaining how light from the Sun behaves when it hits snow and why the team should wear sunglasses. Including a diagram of how light travels might make it easier to explain.

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Teacher Guidance

	Knowledge	Working Scientifically
Exceeding ARE	Recognise simple patterns in the data they have collected and be able to predict not yet known values from the patterns of their results. Able to explain how light travels in straight lines from a source and is reflected in terms of the journey of light from source to eye. Able to represent and explain this path using accurate diagrams.	Describe or identify evidence which supports or disproves scientific ideas, e.g. do pale colours always reflect light better than dark colours? Suggest reasons for limitations or inconsistencies in results from investigations and decide how these may impact on their conclusions. Refine a scientific question and test it. Compare their own results with others and suggest reasons why there may be differences.
On track for ARE	Able to explain that light travels in straight lines from a source where it enters the eye causing images to be seen. Able to describe and explain how objects and shiny surfaces can reflect light. Able to plan and carry out an investigation into which material reflects most light and report on their findings. Able to represent their ideas in drawings and diagrams.	Explore ideas and raise different kinds of questions about scientific phenomena. Refine a scientific question so that it can be tested. Understand a range of enquiries can be used together to explore an answer to a question. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Recognise some limitations of tests.
Working towards ARE	Understand that light travels in straight lines but that it can be reflected and change direction. Understand that we need light to see and that when light is blocked a shadow is formed. Able to describe and explain the results of their investigations in simple terms.	Explore and talk about their own ideas. Recognise connections between their original question, the results of their enquiry and whether they can answer the question.

N.B. Any children not hitting *working towards ARE* should come under *below ARE* when recording attainment in Active Learn Primary.