

# Year 3 – Summer 2– ‘Light’

## NC Science – Light

Pupils 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 change

### I can explore specular and diffuse reflections

Chn to explore specular and diffuse reflections and how they can be used in everyday life.

Chn to be shown two materials. One that is specular and one that gives a diffuse reflection. What do you notice about the two surfaces? They both reflect light but how are they different?

Children to use these materials to create their own definitions for specular and diffuse reflections.

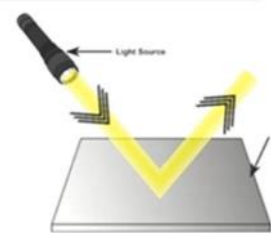
Once children have concrete definitions for diffuse and specular reflections, they will complete a round robin around different stations in the class room or outside if the weather is suitable.

On each station, will be an object a material that emits either specular or diffuse reflections. Chn to explore the objects and group the objects into either category in their books.

Which reflection do you think we see most? Why?

Would do you predict would happen if most objects emitted specular reflections instead of diffuse reflections.

Why is it important that certain materials do emit specular reflections?



### I can define reflection and investigate which surfaces reflect light

Children to explore what reflection means and to identify reflective and non-reflective materials and define what is meant by reflective and non-reflective.

Chn to experiment with different given materials and sort them into a table with the headings reflective and non-reflective materials.

Do chn notice a pattern in the dominant materials of reflective and non-reflective materials. Recap transparent, translucent and opaque definitions.

### I can define refraction

Children to continue their learning through investigating for themselves what refraction is and then creating their own definition.

Begin by recapping reflection and explain to the children that as scientists they are going to explore independently what refraction is.

Chn to complete a simple experiment with a glass of water and a pencil. Chn to observe what appears to have happened to the pencil. Chn to work together to come up with a definition for refraction without teacher support. Once children have decided on a sensible definition, chn can then draw a diagram showing refraction taking place.

Once all children are confident with what refraction means they will then complete their own mini investigation to prove their definition. <https://www.rookieparenting.com/refraction-of-light-simple-water-experiment/>

**PREDICT:** What do you predict will happen to the arrow given what we know about refraction?

**PRESENT and PROVIDE:** Children to provide a conclusion to their experiment. What happened and why? Children should present their findings in a diagram.

### I can investigate how shadows are formed

By the end of the lesson children will recognise that shadows are an area of darkness formed when the light from a light source is blocked by an object, predominantly an opaque object Chn to investigate how objects made from different materials cast shadows. Children to conduct their investigation shining a torch on different objects.

**PLAN and PICK:** what materials are you going to use? What are you going to keep the same? How will you conduct your investigation to ensure it is fair?

**PRESENT:** chn to create a table and organise materials under appropriate headings. E.g. Dark shadow/ light shadow

**PROVIDE:** Was your prediction correct? What did you find out? Recall learning about reflection. Are there any similarities between materials that reflect light well and materials that create shadows?

### I can investigate how shadows change

Investigation  
Children to investigate how shadows change when the distance between the object and the light source changes. Use objects and torches and set up the investigation with objects at different distances and observe what happens to the shadow created.

**POSE and PLAN:** Chn to work in groups to brainstorm possible enquiry questions. Chn can pick their own enquiry question so long as it fits with the overall investigation aim,

Children to list the equipment needed and method that will be taken.

**PREDICT:** Chn to write their prediction in a table as to what will happen to the size and (width) of the shadow as it moves away from the light source.

**PRESENT:** Chn to carry out the investigation and complete their table showing the actual measurement (width) of the shadows cast at different distances from the light source Chn to then present their data in a bar chart..

**PROVIDE:** Was your prediction correct? Can you explain why the size (width) of the shadow increases the closer it gets to the light source?

### I can investigate which colours reflect light better

In this lesson, children will draw on all of their prior knowledge to solve a problem. They will receive a letter from somebody who works night shifts and needs to be able to block light from coming into his bedroom.

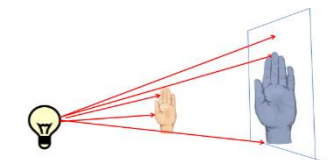
Remind chn that opaque materials are the best materials for blocking out light and that we can identify opaque materials by the dark shadow they cast.

Chn to then work in groups and test the different materials following the Ps along the way to identify the most suitable material.

**PICK and PLAN:** How are you going to conduct your investigation to keep it fair? What should stay the same?

**PRESENT:** chn to choose how to present their findings based on the darkness of the shadows cast by each material and will then present their results to the writer of the letter who will choose a winning group.

**PROVIDE:** Which material was the most suitable? Do you think your results are reliable? What would make the investigation more accurate? What if you layered the same material more than once? Do you think you could have found a more appropriate material?



### NC Working Scientifically (LKS2)

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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, using a range of equipment, including thermometers and data loggers



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Chn to be given different scenarios where they must chose the most appropriate material.

For example: What material would be most suited a safety vest? Street signs?

<https://www.bbc.co.uk/bitesize/clips/ztcg9j6>

- 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
- using straightforward scientific evidence to answer questions or to support their findings.

