

Science

Knowledge and Skills Organiser: Light and Sound (Y3, Y4, Y6)



Our Science Knowledge and Skills organisers are primarily a planning guide for the teachers. They include the statutory statements (**Subject Knowledge to be covered**) and the non statutory guidance (in blue). They offer suggestions (in red) for how these statements might be taught **working scientifically** – which is a requirement of the National Curriculum.

The Knowledge and Skills Organisers map out how and when these areas are taught and help to build a clear, progressive scientific statement of intent for our children as they progress through the school.

We have added additional ideas and guidance for the teachers, which they can choose to use and interpret i.e. how the local area might be used, key questions and ideas which might be pursued, outdoor learning opportunities and cross curricular links as these are features we recognise are important in terms of our holistic curriculum provision.

Parental/ carer support:

By mapping out our curriculum in this way we hope that these documents also help parents and carers support the learning of their child/ren by

- Showing the knowledge being covered
- Offering some suggestions which might also be investigated at home
- Sharing key vocabulary, which can be discussed to ensure your child's understanding
- Suggestions of places to visit

Science skills (**Working Scientifically**) to be covered

- asking relevant questions and using different types of scientific enquiries to answer them
- **setting up simple practical enquiries, comparative and fair tests e.g looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.**
- **making systematic and careful observations and, where appropriate, taking accurate measurements using standard units,** using a range of equipment, including thermometers and data loggers
- 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.

Subject Knowledge to be covered:

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 (e.g Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves.)

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 (e.g They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.

Outdoor Learning:

Shadow measurements on sunny day over time. (chalk drawn around shadow, observe movement and length)

Year 3 – Light Topic:

Key Vocabulary for topic

light	sunlight
See	dangerous
Dark	protect eyes
Reflect	shadow
Blocked	surface
Solid	natural
Artificial	star
Torch	sun
Candle	moon
lamp	

Possible Questions

Can you see round corners?
How could we see round corners and over objects? (periscopes)
Plan an investigation to direct light across the room. (Mirrors)
Can you show the angle light is reflected off a mirror. (torch and paper-draw angle)
What happens to the shadow when the object is moved in front of the light?

Cross -Curricular links

DT- Shadow puppets, periscopes
Computing – research, light dangers

Science skills (**Working Scientifically**) to be covered

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests e.g **finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.**
- **making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers** and data loggers
- 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.

Subject Knowledge to be covered:

Identify how sounds are made, associating some of them with something vibrating
recognise that vibrations from sounds travel through a medium to the ear

Find patterns between the pitch of a sound and features of the object that produced it
find patterns between the volume of a sound and the strength of the vibrations that produced it

Recognise that sounds get fainter as the distance from the sound source increases

Find patterns between the volume of a sound and the strength of the vibrations that produced it

Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world

Year 4 – Sound Topic:

Outdoor Learning:

How does sound travel across a medium?
How does distance affect sound?

Local Links

Science museum

Key Vocabulary for topic

Pitch Sound Volume Vibrate Sound waves
Volume Source

Possible Questions

What is a sound?
How is a sound made?
How do we hear sounds?
How do sounds change?
What can we do to help those who are hearing impaired?
How do we measure sound?
Does sound travel underwater?
How does the pitch change underwater. (recorder)

Cross -Curricular links

Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world
– History -Did the Egyptians have music?
How did they make it?
Music – Listen to music and use sound wave representations to interpret the music.
World music – instruments from other countries
DT – make ear muffs, make instruments

Science skills (Working Scientifically) to be covered

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary – e.g designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur).
- 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 – e.g deciding where to place rear-view mirrors on cars;
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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

Subject Knowledge to be covered:

Recognise that light appears to travel in straight lines

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

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

Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Year 6 – Light Topic:

Outdoor Learning

How can Mr Cooper see what is happening on the playground without needing to turn around at his desk?

Spying from the Forest school

Subject specific vocabulary

Reflection, refraction, light source, periscope
Spectrum, rainbow
Opaque, transparent, translucent

Possible Questions

How does light travel?
Can we bend light?
How does our eye work? How do we see?
Do all animals see in the same way?
How are rainbows created?
How are shadows created

Cross -Curricular links

DT – Create a pin-hole camera, shadow puppets