

Using ICT in Primary Science

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1F Sound and hearing

Learning objective Children should learn that sounds get fainter as they travel away from a source.

Children should learn to measure distances using non-standard (or standard) measures.

Children should learn to make and record their measurements.

Resources Continuous sound source, e.g. alarm clock, buzzer, maracas, egg timer, whistle

PC and data-logger

Sound sensor

Activity

■ **Investigating sound**

Take children to a large quiet area, e.g. a hall.

Discuss number of recordings of the continuous sound and distance for each recording.

Choose a child to play the continuous sound and take a SNAPSHOT recording close to the child.


Repeat SNAPSHOT recordings at equal distances from the source, e.g. 5 metres/10 metres/15 metres or 5 paces/10 paces/15 paces.

Look at the SNAPSHOT data on the bar graph.

■ *How has the sound changed?*

■ *Where was the sound loudest?*

Print out a bar graph for each child to label distances, and where the sound was loudest/quietest.

Safety  Warn children that loud sounds can damage the ears.

Key words Loud/quiet, louder/quieter, loudest/quietest, sound, metre

Learning outcomes Children state that when they travel further away from a sound source it will get fainter (quieter).


2B Plants and animals in the local environment

Learning objective To know that there are differences between local habitats.
 To understand why animals/insects prefer to live in particular habitats.
 To be able to record their findings.
 To be able to draw conclusions from results.

Resources PC and data-logger
 Light and temperature sensors

Activity ■ ***Why do certain animals/insects prefer to live in particular habitats?***

Discuss where humans prefer to live and why.
 Ask the children to predict where they think the woodlice prefer to live, e.g. light or dark place.
 Go out and find some woodlice. Use the data-logging equipment to take a SNAPSHOT record of the light and temperature of the place in which they live. Compare these data with a SNAPSHOT of at least one other habitat.
 Use the information from the readings, back in the classroom, to conclude what conditions woodlice prefer.
 Discuss why woodlice might prefer to live in this habitat and why other habitats might not be suitable.

Safety  Safety issues of taking the children to different habitats
 Care of, and respect for, animals in the environment

Key words Predict, habitat, prefer, light, dark, temperature, conditions

Learning outcomes To be able to predict.
 To understand that different animals/insects prefer particular habitats because of the conditions in that habitat.

Follow up activities ■ *Investigate other animals/insects and their preferred habitats*

3F Light and shadows

Learning objective That children should learn that shadows are formed when an object blocks light from the sun.

Resources Large objects
Sun or other light source
PC and data-logger
Light sensor

Activity ■ ***Exploring shadows using light sources and objects.***
Identify shadows and record by drawing and writing that shadows are formed when an object blocks the light.
Use light sensor to record light from source unimpeded by object and blocked by object (using SNAPSHOT) Discuss findings.

Safety  NEVER look directly at the sun, can cause blindness.

Key words Light source, block, shadow, light travels
Light intensity
Transparent, translucent, opaque

Learning outcomes Children should realise that light can be blocked by objects and that shadows are formed which relate to the shape of the blocking object.
That children should use ICT data-logging to demonstrate that light is blocked by objects.

Follow up activities ■ ***Do all materials block the same amount of light?***
Use SNAPSHOT on the data-logger
Put a variety of materials between the light source and sensor, (transparent, translucent and opaque).
Record findings in a chart. Draw conclusions.

4C Keeping warm

Learning objective Turning the idea about how we might keep things cold into activity that can be investigated.

Resources Range of materials for making lids such as card, paper, plastic, cling film, etc.
Fizzy drink or coloured water
Containers
Data-logger
Temperature sensor

Activity

- ***Does putting a lid on a plastic cup keep our cold drink colder for longer?***

What are we going to change? *Whether or not the container has a lid.*
What are we going to measure? *The difference in the temperature.*
What are we going to keep the same? *Type of container, the amount of water, where the containers are in the room.*

Place the same amount of cold drink in two identical containers (plastic cups) and take initial SNAPSHOT temperature readings with the temperature sensor. Put a lid made out of some kind of material on one container. Take further SNAPSHOT readings after 30 minutes. The children can then compare the first and second temperatures for the liquid in each of the containers.

If this experiment is done by different groups the results can be compared and this will make the findings more reliable.

Safety  The children should not drink the fizzy drink.

Key words Temperature, thermometer, degrees, thermal conductor, thermal insulator, conduct, insulate, room temperature,

Learning outcomes The children realise that thermal insulators keep things cold and that adding a lid made with a thermal insulator will help to keep the drink cold.

Follow up activities

- *What material out of the selection I will give you will keep the drink the coldest?*
- *Do larger volumes of water keep colder for longer?*
- *Do different containers keep drinks colder for longer?*

4D Solids, liquids and how they can be separated

Learning objective Understand changes occur when some solids are added to water.
Make careful observations, recording results in tables and make comparisons.

Resources Sherbet
Small beaker
Spoon
Warm water
PC and data-logger
Temperature sensor

Activity ■ *What is the effect on the temperature when sherbet is added to water?*
Fill beaker with 50 ml of warm water.
Record temperature using AUTO TIME
Add approximately one spoon of sherbet to water and stir.
Stop recording when reaction stops.

Safety No known hazards.

Key words Reaction, dissolve, solution, solvent, temperature change

Learning outcomes Be able to describe different types of behaviour when different solids are mixed with water.


Follow up activities ■ *What is the effect on the temperature when bicarbonate of soda is added to vinegar?*

4F Circuits and conductors

Learning objective How to change the brightness of bulbs.
 To make suggestions about what can and be investigated and predictions about what will happen.
 To make comparisons indicating whether the results support the prediction made.

Resources Batteries (1 cell 1.5 V, 2 cells 2.5 V, etc.)
 Battery holder
 Crocodile clips/wires
 Bulbs and bulb holders
 Shoebox with lid
 PC and data-logger
 Light sensor

Activity ■ ***What happens to the brightness of the bulb as more batteries are in a circuit?***
 Place bulb in box with light sensor, all wires exit box through the side to the battery holder and logger.
 Connect one battery into the circuit.
 Take SNAPSHOT reading of light intensity.
 Repeat, changing the number of batteries in the circuit.

Safety  Avoid using rechargeable batteries for circuit work as they can get very hot if short-circuited.

Key words Circuit, bulb, battery
 Using expressions 'what if', 'might', 'could', when making suggestions.

Learning outcomes Suggest how the brightness of a bulb might be changed and predict what will happen.
 Make comparisons between the results of the tests. *With two batteries the bulb is much brighter.*


Follow up activities ■ ***What would happen if to the brightness of the bulb if two or more bulbs were in the circuit?***

5D Changing state

Learning objective To learn that the temperature of boiling water is 100 °C.
To identify patterns in data and use these to make predictions.
To decide whether the evidence supports their predictions.

Resources Heat resistant container of water
Heat source
Chart or graph of temperature of water as it is being heated
PC and data-logger
Temperature sensor

Activity ■ *What happens when you heat water?*
Show the children a chart or graph of water being heated with temperature rising 5 °C every minute from 20 °C to 45 °C. Discuss.
Ask them to predict what next five readings will be.
Show similar chart or graph from 90 °C and again predict next five readings.
Use temperature sensor to carry out the same investigation (AUTOTIME).
Compare results with predictions.
Discuss what results show about boiling.

Safety  Take care with boiling water and heat source.

Key words Temperature, boiling point, degrees, Celsius, prediction

Learning outcomes Identify patterns in data and use this to make predictions.
Know that boiling point of water is 100 °C.
Know that continuing to heat water at boiling point will not result in it getting any hotter.

Follow up activities ■ *What happens when water cools?*

5F Changing sounds (i)

Learning objective To know that sound travels through different materials.
To understand that some materials allow sound to travel through them better.

Resources Buzzer, or other sound source sealed in plastic bag
Tank of water
Box of sand
Empty box
PC and data-logger
Sound sensor

Activity ■ ***Which materials allow sound to pass through it most easily?***
Show children the different materials and ask them to make a prediction
As a control, measure decibels when the buzzer (sealed in its bag) is sounded in the air (SNAPSHOT). Repeat twice more and record on a chart.
Repeat the activity sounding buzzer under water, in sand and in empty box. Each time take three readings, calculate the median.
Discuss findings and put into order of how well the sound travelled.
Compare findings with their predictions.

Safety No known hazards.
Warn children that loud sounds can damage the ears.

Key words Decibel dB, material, median, compare, predict, sound sensor, reading.

Learning outcomes That different materials allow sound to pass through them.
That sound passes better through some materials.
To record their findings on a chart.
Generalise that sound can travel through solids, liquids and gases.

Follow up activities ■ *Test other materials*

5F Changing sounds (ii)

Learning objective To be able to plan a test to measure how well different materials muffle sound.
 To be able to make a prediction.
 To be able to make their test fair.
 To be able to record their findings.

Resources Buzzer or other sound source
 A range of materials, e.g. bubble wrap, foam sheeting, artificial fur, woollen material
 An empty box
 PC and data-logger
 Sound sensor

Activity ■ **Which material is the better sound insulator?**
 Show the children a range of materials and ask them how they could find out which would be best for muffling a sound, make a prediction.
 Ask the children to devise an investigation to test which material is best. Ask them to think about how they will make their test fair, what they will use as a sound source, what they will vary.
 Discuss children's' ideas and formulate class investigation.
 Test each material in turn (SNAPSHOT). Each time take three readings, record, calculate the median.
 Discuss findings.

Safety No known hazards.

Key words Decibel dB, material, median, compare, predict, sound sensor, reading.

Learning outcomes To be able to predict and give a reason for their prediction.
 To devise and carry out an investigation.
 To record their findings and draw a conclusion from them.

Follow up activities ■ *Use secondary sources, e.g. Internet to find out about which materials are used in industry for soundproofing.*

6G Changing circuits (short unit)

Learning objective Understand that the brightness of a bulb is altered by changing the wires in a circuit.

To suggest a question to investigate, to decide what to do and what equipment to use to test this.

Resources

Battery
 Battery holder
 Crocodile clips, wires of varying length
 Bulb and bulb holder
 PC and data-logger
 Light sensor

Activity

■ ***Tell children that someone has suggested putting various lengths of wire into a circuit to alter the brightness of bulbs.***

Ask children to suggest a question to investigate this, decide what to do and what equipment they will use.

Build a circuit having battery and holder, bulb and holder, with a break in the circuit that has two crocodile clips into which the different lengths of wire can be inserted.

Insert different lengths of wire and take a SNAPSHOT recording to measure the brightness of the bulb each time.

Safety



Avoid using rechargeable batteries for circuit work as they can get very hot if short-circuited.

Key words

Complete circuit, component, cell.

Learning outcomes

Be able to make a generalisation, e.g. the thinner the wire, the dimmer the bulb.

Follow up activities

■ ***Does the **thickness** of the wire affect the brightness of the bulb?***