

4A Moving and growing

4B Habitats

4C Keeping warm

4D Solids, liquids &amp; how they can be separated

4E Friction

4F Circuits and conductors

**Sequencing  
Ordering → Classifying****114-116** Grouping surfaces into high and low friction.**Measuring****92-94** Measure bone lengths.  
**96** Measure perimeter of head circumference.**96** Measure and calculate perimeter of habitats.  
**98-100** Time findings of minibeasts to contrast morning and afternoon finds.**92-94** Read thermometer scale measures in 2's, 5's or 10's related to bar chart recording scales.  
**98-100** Time temperature measurements in keeping cold things cold and warm things warm experiments. Recording digitally, e.g. 9.53 to 10.23, etc.**92-94** Suggest suitable units and measuring equipment to measure capacity.  
**98** Measure time for liquids to filter through solids in seconds, minutes and hours.**90** Teach kg and newton at the same point may be confusing mass and weight. Use force-meters calibrated 0.1 N to 1 N, and 1 N to 10 N.  
**90-94** Estimate and measuring distances travelled by objects on different surfaces.  
**96** Measure area of parachute shapes in cm<sup>2</sup>.  
**98-100** Estimate and measuring parachute drops in seconds.**Calculating****34-46** Use bone measurement data to calculate differences.**34-47** Working out differences between thermometer measurement readings.**90-94** Calculate differences between distances travelled by objects sliding on surfaces.**22-31** Calculate patterns in battery voltage in 1.5 V jumps.**Estimating****92-94** Estimate bone length.**92-94** Estimate temperature from previous thermometer readings.**Recording in list****114-116** Tally charts and frequency tables of minibeast and plant finds. Make a database.  
**114-116** Tally chart minibeast preferences.**Chart/table****114-116** Tabulate thermometer readings.**114-116** Tabulate changes that occur in solids when they are added to water.**114-116** Tabulate results of ease of moving different shapes through water.**114-117** Tabulate increasing voltage against brightness of bulb/loudness of pitch of buzzer/turn of motor.

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**Diagram**

**114-116** Carroll diagram: minibeasts with/without wings, with more than/less than 4 legs. Similarly with plant characteristics observed by children. Use and make simple key to identify minibeasts and plants. Food chain diagram.

**114-117** Plan or map of classroom temperatures. Carroll diagram of outside wall/inside against more than 20 °C and less than 20 °C.

**94** Record estimates and readings from scales to a suitable degree of accuracy to illustrate that liquid measured in different shaped containers has the same volume.

**114-116** Carroll diagram parachutes with area >50 cm<sup>2</sup>, < 50 cm<sup>2</sup>/longer than 5 seconds flight, shorter than 5 seconds flight.

**Graphs**

**114-117** Bar chart bone length.

**114-116** Bar chart of minibeast and plant finds per habitat and same species in different habitats.

**114-117** Bar chart thermometer readings in 2's, 5's, and 10's. Use ICT of temperature sensors to record changes within a classroom over time, or cool things keeping cool and warm things keeping warm.

**114-116** Record objects moving on surfaces as bar charts calibrated in 2, 5, 10 or 20 units. Graphing parachute drops.

**Pictogram**

**114-117** Pictogram of investigation into relative sizes of bones of adults and children and variation between children.

**114-116** Pictogram of minibeast or plant finds with symbol representing 2, 5, 10 or 20 units.

**114-116** Pictogram of distances travelled by shapes on different surfaces/in water/parachutes in air, in 2, 5, 10 or 20 units.

**Pattern/trend**

**114-117** Bar chart of bone length to suggest patterns in data from generally taller or shorter than average individuals.

**114-117** Where and when are most woodlice found? Do any plants grow in all habitats?

**114-117** How can water be kept warm for the longest time? When does something melt? Do all things melt after the same amount of time?

**114-117** Notice that objects slide most easily on smooth surfaces. Notice large parachute drop more slowly.

**114-117** When are bulbs brightest, buzzers loudest, motors fastest?

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**Interpretation of data**

**114-117** Who has the longest arms, children or adults, boys or girls? Are adults heads bigger than children's heads?

**114-117** What are minibeast preferences? Where do particular plants thrive?

**114-117** Where is it warmest?

**114-117** Explain how evidence collected answers the question, e.g. *If I have to make the slope steeper before it moves then the surface stops it sliding. Or, it will slide best on the surface where the reading on the forcemeter is smallest. Or, the shape of an object affects its movement through water.*

Explaining the slow drop of large parachutes in terms of air resistance.

**114-117** Why aren't all bulbs equally bright?

**Predict from data**

**114-117** Bar chart of bone length to predict estimates of arm bone length or head circumference of individuals.

**114-117** Use graphs to predict numbers of minibeasts and plants in similar habitat, using minibeast and plant preferences. Predict what effects would be if conditions in habitats changed, by using ICT simulation.

**114-117** Estimate intermediate results of bulb brightness in partially completed table.

**Shape and space**

**110** Use ramps at 45°.

**104** Make different 3D shapes to drop in water to test water resistance.

5A Keeping healthy

5B Life cycles

5C Gases are around us

5D Changing state

5E Earth, Sun and Moon

5F Changing sounds

**Measuring****99-101** Hour clock notation of weekly diet.**91** Use standard metric measure of ml to measure water requirements of seeds and plants.**93-95** Draw seeds to nearest millimetre of accuracy.**99-101** Use timeline notation to contrast length of time to adulthood of different animals and humans.

Length of typical life cycle.

**93-95** Measure mass (not weight) of air on digital balance of balloon uninflated and inflated.**93-95** Accurately measure water to millilitres and check observations when pouring water onto sponge/ball bearings/loosely packed soil.**93-95** Pour water onto soils and measure the volume.**99-101** Time evaporation and condensation examples, water heating and cooling using 24-hour notation.**99-101** Measure using 24-hour clock notation to track Sun movement changes.**91** Measure shadow stick length in millimetres.**91** Use standard measures to express how far sounds have travelled, lengths of plucked strings and columns of blown air.**Calculating****70-71** Use calculator to work out foods which are rich in oils/fats and sugars/starches.**40-47** Pour water on to equal quantities of different soils and measuring the volume which sinks into the soil by subtracting the volume left in the measuring jug.**Recording in list****117** Find mode of seen numbers in a number of examples of the same species of fruit.**99-101** Use 24-hour clock notation to track Sun movement changes.**Chart/table****113** Discuss the chance or likelihood of all the seeds germinating and how to use this information to design a fair test.**112-117** Contrast sound sources and media they have travelled through to present information logically.**Diagram****112-117** Revision of Year 4 pulse rate to heartbeat on two criteria Carroll diagram.

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**Graphs**

**112-117** Graphs of pulse rates at rest, after exercise, for an individual and between individuals. Intermediate graphs of pulse rate during rest, exercise and recovery.

**112-117** Graphing how many seeds grow in different conditions.

**112-117** Evaporation graphs against time.

**112-117** Make a graph of the temperature of a container of water as it is being heated at minute intervals. Graphing how long water and other liquids take to evaporate (and condense) in different conditions against time. Graphing heating and cooling of water against time. Graph room temperature over time.

**112-117** Bar charts of shadow length, possibly generated by ICT light sensor.

**Pattern/trend**

**112-117** Which was the most common range of pulse rates? What were the highest and lowest pulse rates? Were these very common? Mode in the data.

**112-117** Identify key factors in germination and growth when finding trends and patterns in data of how many seeds grow in different conditions.

**112-117** Identify key factors in evaporation when finding trends and patterns in data of how long water takes to evaporate (and condense) in different conditions or other liquids compared with water. Graph rate of evaporation and condensation at a range of temperatures.

**117** Likelihood of Sun rising in West or shadow length being shortest at end of day.

**112-117** Are higher sounds, when blowing across bottle tops, made by more or less water or air?

**Interpretation of data**

**112-117** Who is the fittest person?

**112-117** When do liquids evaporate most quickly?

**112-117** Will heated water temperature continue to rise forever?

**112-117** Interpretation of data to decide on when Sun rises at different times of year and in which direction. The effect of apparent movements of the Sun on shadow stick position through a day, length at different times in a day and different seasons.

**112-117** Sounds travel more effectively through solids.

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**Predict from data**

**112-117** I know how long I take to recover from 2 minutes of exercise. How long would it take after 3 minutes?

**112-117** Predict how many seeds grow in different conditions.

**112-117** Predict how long water would take to evaporate or condense in hotter/drier air or in wider container etc.

**112-117** Ask children what the next reading will be from the water heating or cooling graphs.

**112-117** Use data of shadow stick length to predict next week's readings.

**Shape and space**

**109** Recognise positions and directions using Sun rising and setting and direction of shadow stick information.

6A Interdependence and adaptation

6B Micro-organisms

6C More about dissolving

6D Reversible and irreversible changes

**Counting****33** Use percentages to express how much of a food sample is mouldy.**Measuring**  
(using spread sheets where possible to calculate test results)**91** Use imperial and metric measures to read fertiliser labels.  
**97** Calculate the perimeter and area of simple compound shaped habitat that can be split into rectangles.**93-95** Revisit use of thermometer in setting up yeast growth experiments. Use thermometers with increasing accuracy and difficulty in scale reading.**93-95** Suggest suitable units and measuring equipment to estimate and measure capacity of liquid in evaporation, condensing and dissolving tests. Record estimates and readings to scales of 1 ml in 10 ml measuring cylinder.**93-95** Measure changes, e.g. how vinegar and bicarbonate of soda release a gas that inflates a plastic bag, by how much. Measure volumes of water retrieved by filtering and evaporation.**Chart/table****112-117** Interrogate a database of animals within a non-local habitat to extrapolate tabular, chart and graphical presentations to be interrogated by other groups.**112-117** Diary of mould changes over two week period in quantitative form, time using 24-hour clock and mould/unaffected food as percentage.**112-117** Design tabulation to show the mass of different solids dissolving in same amount of water.**Diagram****112-117 (extension)** Having constructed a food chain, represent the numbers of animals at each level in frequency table for another group to interrogate and assign to different levels, with numbers decreasing at higher levels in the chain.**Graphs****112-117** Read a conversion graph of metric and imperial measures to compare fertilisers.**115-117** Draw line graph, time (*y*-axis)/ area of mould growth (*x*-axis).**112-117** Produce line graph of tests to show salt (or another solid) dissolved faster when the water was hotter. (*y*-axis: temperature, *x*-axis: time). Line graph showing different sugars dissolving over time. (*y*-axis: time, *x*-axis: mass of solid).**Pattern/trend****112-117** Contrast food chain information and extrapolate similarities and differences.**112-117** Extrapolate a trend of speed of dissolving to heat of water for all solids and of which solids dissolve quickest.**Interpretation of data****112-117** Interpret Year 4 graphs about soil permeability and explain what they show.**115-117** Interpret time/ mould growth for different foods and different growing conditions.**112-117** Interpret the fastest dissolving sugar. Read off what might happen at intermediate temperatures when dissolving contrasting sugars or a range of different solids. Show a table of different masses of different solids, e.g. salt, sugar, baking powder, bath salts and sherbet completely dissolving in the same amount of water, rank solubility.

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**Predict from data**

**112-117** (*extension*) Predict from food chains numbers of animals at previous or higher level from data.

**112-117** Extend curves of line graphs of salt dissolving at different temperatures or contrasting sugars curves.

**Shape and space**

**109** Draw habitat perimeter to scale.

6E Forces in action

6F How we see things

6G Changing circuits

5/6H Enquiry in environmental and technological contexts

**Measuring**  
(using spreadsheets where possible to calculate test results)

**93-95** Record newton measurements from scales with reasonable accuracy.

**93-95** Measure shadow length in millimetres.

**90-95** Measure the length of leaves.

**Chart/table**

**114-117** Record data of elastic band stretch with different weights and times taken for differently weighted spinners to fall. Find the mode and range in the data. NOTE a clearer test of air resistance slowing moving objects would be to change the size of the spinner wings of a standard size spinner. The test suggested leads children to form a misconception that heavier objects fall taster.

**112-117** Make a summary table of ways current in a circuit changes the brightness of bulbs or speed of a motor.

**112-117** Tabulate pressure pad observations and dandelion data.

**Diagram**

**112-117** Diagram of burglar alarm.

**Graphs**

**115-117** Draw a line graph to represent a series of measurements of the length of an elastic band (*y*-axis) with different weights attached (*x*-axis), or the weight of paper clips (*x*-axis) against time taken for a spinner to drop (*y*-axis).

**112-117** Graph differences in leaf colour and length.

**Pattern/trend**

**115-117** Identify trend in the line graph that the heavier the weight the more it stretches an elastic band, and the more paper clips a spinner has the quicker it falls. Extrapolate patterns.

**112-117** Work out relationship between size of shadow to distance from light source.

**112-117** Explain differences in component performance in terms of scientific understanding of changes in the circuits, e.g. batteries added together are more powerful than a single battery. Some batteries have higher voltages than others. Bulbs of higher voltage need more power to burn brightly. A motor will turn more powerfully with a greater power source. Too much power can 'blow' a bulb. Long wires are not as effective as short ones in an otherwise identical circuit.

**112-117** Identify trends and patterns in data of dandelions growing in two different locations. Look critically at the results to decide how strongly they show a trend particularly in relation to sample size.  
**112-117** Adjusting pressure pad design in light of trends and patterns in collected observations.

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5/6H Enquiry in environmental and technological contexts

**Interpretation of data****112-117** Interpretation that shiny surfaces reflect light better than others.**112-117** Other groups to interpret tabular information about a method they haven't directly tested to change the current in a circuit. For example, adding batteries together, the length of the wire, the thickness of the wire, the voltage of a single battery or the voltage of the component in the circuit.**112-117** Describe limitations of their dandelion investigation.  
**112-117** Evaluate enquiries into dandelion distribution and burglar alarm design.**Predict from data****114-117** Use elastic band stretching and spinner falling line graphs to make predictions for other weights/numbers of paperclips at either end of the graph's scale, or at an intermediate point.**112-117** Fill in missing information in a graph to suggest possible size of a shadow made at an intermediate distance from the light source.**112-117** Extrapolate from summary tables of results, e.g. 1.5 V battery and 4.5 V. What a 3 V battery would do. Intermediate tests that haven't been carried out.**Shape and space****111** Measure angles of light travelling when bouncing off mirrors. Measuring angle of light source to shadow position.