Activity 1 - What is the purpose of practical work?

In this activity delegates think about a range of practical activities using a selection of practicals taken from typical KS1 and KS2, or KS3 and KS4 schemes of work.

These are illustrated by brief instruction sheets (below). Each instruction sheet provides a web link where full information can be found.

Working individually, each delegate attaches a label (e.g. a ‘Post-It’ note) to each practical to identify the key purpose or objective of the activity.

Working in small groups of three or four people, the labels are then classified under headings chosen by the group.

Note: If you are carrying out mixed primary-secondary CPD sessions you may find it helpful to print out the primary and secondary practicals on different colour paper.

List of primary practicals

1. Make friends with a tree
2. Peace at last
3. A light for
4. Making Sandcastles
5. Curtains
6. Can colours compete with the sun
7. Bone mystery
8. Design a seed
9. Paper towel magic
10. Bishops can fly
11. In control
12. Colour mixing
13. Look around you
14. Slugs
15. Investigating ice
16. Kites
17. Classroom percussion
18. Magic or magnetic
19. Moss mat
20. Paper planes

List of secondary practicals

1. Testing a leaf for starch
2. How much energy is there in food?
3. Preserving food
4. The causes of rusting
5. Melting and freezing stearic acid
6. Change in mass when magnesium burns
7. Law of reflection
8. Using ammeters
9. Experiments with magnets
10. Reaction between carbon dioxide and water
11. The Moon’s distance from Earth
12. Chemicals from seawater
13. Looking at a heart
14. Effect of size on uptake by diffusion
15. Measuring reaction time of a human reflex action
16. Preparing a soluble salt by neutralisation
17. Alkali metals
18. Identifying the products of electrolysis
19. Ticker-timers for investigating speed
20. Simple electromagnet
21. Student power
22. Earthquakes in the laboratory
23. Water expands when it freezes
24. Extracting metals with charcoal
Make friends with a tree

This outdoor activity for younger children encourages them to make observations using their senses and respond to the natural world. It develops the vocabulary for describing and comparing which leads to sorting, identifying and classifying living things. It can be developed into an extended study. It could also be used as an introductory activity for older children.

Photo from Nature Detectives, published by the Woodland Trust, free from http://www.naturedetectives.org.uk/download/trees.htm
Peace at last

This activity uses a story about all the sounds that keep Mr Bear awake at night to introduce a problem for the children to solve. They identify loud and quiet sounds and find ways to stop sounds from entering their ears. The activity gives young children the opportunity to carry out a simple investigation with a degree of independence.
Making Sandcastles

In this investigation children mix sand and water to find the ideal proportions for making a sandcastle. It promotes discussion as they agree on their criteria for identifying the best mixture. The activity can be used across the primary age range: younger pupils can make observations and simple measurements in a familiar context while older children are challenged by finding more sophisticated ways to collect and present measured data.
Curtains

This activity encourages children to investigate and find a solution to an everyday problem. They are presented with a letter from an individual, who works nights and is having trouble sleeping through the day, as his curtains do not block the sunlight entering the room. Using the knowledge that an opaque material would be the best for replacement curtains, the children test a collection of different samples, analysing the shadows formed and then recording the light levels with a data logger.
Can colours compete with the sun?

This activity explores undesirable changes. It involves planning and carrying out a fair test to investigate the fading of colours in sunlight and could be included in a unit of work relating to properties of materials or light. To make a judgement it is necessary to set up both control (paper samples kept in a dark place) and experimental (paper samples in the sun) groups. Hopefully, with skilful teaching and prompting the pupils will come to this realisation themselves. Six samples is ideal, representing a mixture of light and dark colours. Exposure time and paper location are considerations for fair testing. The pupils should be encouraged make predictions and suggest their own methods for recording and presenting findings.
Bone mystery

This activity presents children with a mystery to be solved when a skeleton is discovered during renovation work at a local site of historical interest. It requires children to make decisions about what data to collect, to measure accurately and to find patterns in their data. They will use their knowledge that the skeleton grows until adulthood. Using a model skeleton or suitable images discuss what measurements it would be possible to take from a living person in order to make comparisons with the skeleton. Pairs or groups of children decide what measurement to take and plan their investigation. They then make and record the measurements.
Design a seed

This activity involves designing a seed, which has come from a newly discovered plant. It stimulates discussion on how the seeds are dispersed as well as providing a link to the topic of germinating and growing seeds. It requires some creative thinking and also gives opportunities for developing literacy and presentation skills. In order to be successful pupils will draw on knowledge and understanding gained through fieldwork, making close observations and drawing conclusions.
Paper towel magic

This is a demonstration to help pupils understand, as part of an introduction to gases, that there is air occupying all the 'empty' spaces around them and that it has volume. Show the tank, cups and paper towels to the pupils. Challenge the pupils to put a scrunched up paper towel into the water and bring it out dry. Let them demonstrate some of their ideas.

Scrumch a paper towel into the bottom of a dry cup. Invert the cup and lower it into the water until it is completely submerged. Lift it out and ask pupils to check that the towel is completely dry.
Bishops can fly

Students are challenged to make a piece of A4 paper float across the classroom. They are allowed to cut and fold the paper in any way they wish but are not allowed to apply any force when releasing the paper.

The only forces that can act on the paper as it falls are gravity and the resistance caused by air particles. This leads to the systematic exploration of the physical and material phenomena of balance, friction, forces, gravity and the properties of common materials. The activity starts with a problem solving approach and then with further exploration leads to the identification and testing of trends and patterns, followed by the communication of the processes used and tentative explanations developed.
In control: changing the brightness of a lamp or the speed of a motor

In this extended enquiry older children investigate how varying the length of resistance wire in a circuit affects the brightness of a bulb. They consider how an electric lamp dimmer can be made and decide how much wire they need to use to make an effective device.
Colour mixing

This activity presents a simple 'interview challenge' which requires the scientific skill of measuring using a graduated cylinder. It is designed to develop the children's ability to measure volumes of liquid, interpret data and follow directions. Although this activity for older pupils develops measuring to a high level of precision it can be adapted for younger children by scaling up quantities and using larger containers or measuring cylinders with larger divisions / graduations.

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<tr>
<th>Test-tube</th>
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<th>Volume of liquid (ml)</th>
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Look around you

Take advantage of good weather with these short activities, designed to help your children develop their observation skills in the environment. The resource includes ideas for making up an investigation kit of easily obtainable ‘bits’ for each child, and simple ideas of how to use them to find out more about the world around them. If you do not want to make up a kit you could provide the resources for each activity as you do it.
Slugs

Adopt a slug and discover more about an apparently uninteresting and unattractive animal. This unit on slugs would fit into any topic or theme involving small invertebrates - ‘minibeasts’. The three part unit consists of: Slug Search, Adopt-a-Slug, Slug Defence
Investigating ice

Use a very large piece of ice (e.g. a washing-up bowl size) and do the following at regular time intervals: Wrap paper strips round the ice, open them up and put them straight onto the wall as columns for a bar chart; pour the melted water into a straight-sided container and build a column of centicubes (or similar blocks) up to the level of the water.
Kites

'Kites' explores the variety of kite designs around the world, together with the scientific principles that keep kites aloft. It provides a fun way of exploring some types of forces. There is a strong multi-cultural element through looking at kites around the world. There are also strong links to the design and technology curriculum. The activity provides another context for the development of pupils' literacy skills.
Classroom percussion

In this activity, pupils identify the different types and materials of tuned percussion instruments (such as the glockenspiel), explore vibration, pitch and volume, explore amplification and think about the responsible use of tropical timber.
Magic or magnetic

In this activity, pupils devise a magic trick where they can pick up paperclips at a distance. They will observe which materials are not attracted to a magnet and classify a range of materials, including metals eg gold, copper, aluminium, as magnetic or non-magnetic.
Moss mat

A new bathmat made of moss is kept alive by the water that drips from your body as you dry. It feels soft underfoot and does not smell when it gets damp. Each piece of moss is cut into a foam frame, which prevents the moss from spreading or growing out of control.

In this activity children compare moss plants to daisy plants. They will consider the habitats these plants prefer and use their knowledge to decide which would be most appropriate for use in the bathroom.
Paper planes

This activity gets pupils designing paper planes and devising rules for their own class competition. Through so doing, they will cover ideas about air resistance and fair testing.