3. Mixing the medicine

1 ½ hours

The focus of the session is tablet production. Children grind the active ingredient and combine it with others, before moulding into a range of tablet shapes.

OBJECTIVES

- Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.
- Planning different types of scientific enquiries to answer questions.

RESOURCES

(Per group of 3-4 children, unless otherwise stated)

- Activity sheets 6 and 9
- Crystals from Activity 2
- Teaspoon(optional use of pipettes for measuring the water)
- 3 heaped tablespoons of plaster of Paris
- Water (200 ml approx.)
- Modelling clay (enough to make three marble sized moulds) Marble
- Multi-link cube
- Clay tools
- Disposable/protective gloves
- Freezer bag (or similar)
- Beaker (or yogurt pot)
- Rolling pin
- Digital camera (optional)

ADVANCED PREPARATION

You may wish to use groups of 3 children, so each child makes one shape. Alternatively, all children can make 3 shapes.

Time is needed to remove the crystals from the Petri dishes. This can be difficult for the children, and it may be preferable to ask a teaching assistant to do this prior to the lesson, or helping each group in turn to do so.

Teacher assistant support for this activity is useful. The plaster sets quickly, and some children may need adult help in spooning the mixture into the moulds.

Addition of a small quantity of PVA glue to the plaster of Paris mixture will prevent the finished tablets from being too crumbly.

INTRODUCING THE ACTIVITY

Two key ideas are explored in this activity:

1. Only a small fraction of the tablet cures illness (the 'active ingredient').
2. Moulds are used to make tablets of different shapes and sizes.

Give the children their crystals from the last activity and Activity sheet 6. Ask children to record (drawing or digital images) their observations, ensuring that they record the shape, relative size, colour and texture of the crystals.

Using the images or drawings from Activity 2, ask children to compare how the ingredients have changed. These changes could include: bigger crystals, not all the same size, all white, no fine powder, etc.

Remind the children of the industrial story by re-reading the letter, Activity sheet 5, and asking the children questions such as:

- This is the active ingredient of the new medicine, would it be safe to give it to a sick dog now? Why do you think this?

No, because:

- Too little might not cure the dog, too much might be dangerous.
- The wrong dosage could poison the dog.
- It may have dangerous side effects.
- The best way to administer the medicine is not known.
- The number of doses needed and how long to administer the medicine for is not known.

Explain that the medicine company would then decide the best type of medicine to make e.g. a syrup, spray, tablet, injection etc. (refer back to section 4 of the life-cycle of a pet medicine, Activity sheets 3-4).

Tell the children that they are going to make a tablet. Read through the rest of Activity sheet 9 that explains that they will mix the active ingredients with other materials to make a tablet that is hard and holds together and is a suitable shape for the animals to swallow without discomfort. Explain that tablets contain the active ingredient and other ingredients to give flavour, colour and to bind it together.

MAIN ACTIVITY

Tell the children that, before they make the tablets, they will need to find the best tablet shape. This must be an easy shape for a pet to swallow. The children can use multi-cubes, marbles, beads, fingers, etc to make impression in the modelling clay. If possible, the different shaped moulds should have a similar volume. This can be helped by giving the children similar sized lumps of modelling clay to use. Remind the children that they are trying to make the most suitable shape for a pet to swallow and not necessarily a novel shape. They can record their shapes on Activity sheet 6. These shapes will probably be much larger than the tablets used in real life.

Provide children with the recipe for making the final tablet (Activity sheet 9). Using a freezer bag and rolling pin the children follow instructions to powder the active ingredient so that it will bind to the excipient. Children can repeat the 'finger test' to check that the ingredient is consistently fine. They then mix with the given amount of plaster of Paris powder. (See Appendix 2 for information about how they create the shape in industry.)

Water is then added to the powder to give a smooth, yoghurt like consistency. This must be spooned carefully into the moulds making sure it is pushed into every corner. This needs to be done quickly before it begins to set.

PLENARY

Explain to children that testing of the different shapes will be carried out in the next activity when the tablets have set.

Show a copy of 'The lifecycle of pet medicines' chart (Activity sheet 3) and ask the children to think about which part of the process they are working on (the formulation). Explain that it would be the job of the scientists in the medicine company to work out the best way to make the tablets.