Kitchen science (Foundation & KS 1)

SUPPORT NOTES

This interactive show demonstrates how we can explore and test some simple science ideas with the equipment to be found in most kitchens. And we might make a mess at the same time!

Purpose of these notes

These notes are intended to provide teachers with a brief overview of the main demonstrations and concepts presented in the show, and to suggest some topics for discussion or follow-up after the show. The notes will sometimes discuss concepts that are beyond the grasp of most KS 1 pupils, but we hope this information will be helpful for teachers in tailoring their explanations for different groups and in dealing with some of the 'challenging' questions pupils come up with.

We also hope that the show will encourage teachers to integrate some of the ideas and techniques that they find useful into their own teaching. If you would like any more information about any of these topics please get in touch with us.

safety information

Although each demonstration presented in the show only involves equipment found in most kitchens, each activity has been subject to the normal risk assessments. It is important to emphasise that if any of the demonstrations are to be used or adapted for classrooms they should, of course, be thoroughly assessed by each teacher in advance. *Pupils repeating the experiments at home should be encouraged to involve their parents or carers for reasons of both safety and education.*

Format of the show

The intention is to present science in a way that will enthuse the audience and perhaps make them *think differently* about some of their attitudes towards science. The show is fast-paced with a lot of audience participation through volunteers, questions and audience-voting. It presents science as a way of asking questions about how our world works and then using simple experiments to test out our ideas.

The familiarity and simplicity of the equipment involved has several advantages:

- the easy availability of the equipment will hopefully encourage pupils to try to repeat these activities safely in class with their teachers or at home with their families;

- the pupils are less likely to be distracted by the strange or unusual equipment sometimes used in science experiments;
- the familiarity of the objects will help pupils to connect the science concepts discussed with their everyday lives and to see that they use "science" in many places outside school eg cooking is all about chemistry;
- the simplicity of the equipment may help to give teachers the confidence to search for other engaging science activities using equipment from around the home.

A selection of some of our favourite "kitchen science" demonstrations will be used in the show – the exact demonstrations used will depend on the length of the show, the age and background of the audience, and any particular topics requested by the teachers.

Curriculum connections

Our shows are designed to support and enrich the science strand of the revised NI curriculum learning area *The World Around Us* for Foundation Stage and Key Stage 1. The topics covered in the show are concerned with the properties of materials and how these properties can change over time.

Floating and sinking fruit

key ideas

- if an object has more weight than the same volume of water it will sink in water (we say it is more dense – more weight for its size);
- if the object has less weight that the same volume of water it will float in water (it is less dense);
- some fruit contains pockets of air that act like "arm bands" to help the fruit float.

explanation

This voting game encourages pupils to think about "the rules" that they can use to help them predict whether an object will sink or float. Sometimes small objects (like the kiwi fruit) will actually sink whilst larger objects (like the apple) float. The concept of "how heavy an object is for its size" (its density) is quite challenging for many children at this age to fully understand.

Peeling the orange to try to make it sink seems like a strange idea – aren't we making it lighter by taking away the skin? Although the orange is slightly lighter without its skin it is also smaller, and without the air pocket underneath its skin, it is actually heavier for its size than before. So it now sinks. This is a good example of why we have to test each of our ideas out with experiments in science, rather than dismiss them out of hand.

more activities

Collect together a variety of common objects or foods and get the pupils in small groups to predict whether they think each object will float or sink, and explain why. They can then test their ideas. A class discussion can lead them towards the *rule* of "how heavy is it for its size?

Amazing raisins

key ideas

- objects sink or float depending on how heavy they are for their size compared to the liquid;
- fizzy drinks have a gas dissolved inside them;
- when gas bubbles attach themselves to an object they can make it less dense so it floats.

explanation
When the raisin is dropped in the lemonade it is denser than the lemonade so it sinks; bubbles of gas (carbon dioxide) gather around the raisin at the bottom of the jar making it less dense than the lemonade so it rises; at the surface of the liquid these bubbles burst so the raisin sinks again; this 'up and down' cycle repeats itself until the gas bubbles stop forming.

more activities
- Try experimenting with dropping different objects in the lemonade. What is it about the objects that change how well they go up and down – their weight; their size; their shape; or the surface of the objects?
- Does this experiment work better with different brands of lemonade – what might this suggest about the taste of the lemonade when we drink it?

Slime

key ideas
- vocabulary associated with pushes and pulls – squeeze, squash, etc.
- materials that we call liquids usually change shape when we give them a push or pull; they also take the shape of their container eg water, milk;
- materials that we call solids do not change shape when we push or pull them eg frozen ice cream, a chair;
- some materials fall in between solids and liquids – sometimes they behave like a solid and at other times they seem to be a liquid eg the cornflour slime.

explanation
The cornflour and water mixture is a very unusual substance. The water allows the cornflour grains to flow and move if you do anything to the cornflour slowly. If you push or pull the cornflour mixture quickly, however, the water does not have time to move to let the cornflour grains flow, and the substance turns solid immediately.

more activities
The usual properties of this substance have to be felt to be believed so get the pupils to mix some of their own cornflour slime. The correct mix requires very little water – stir slowly until you get the right consistency. As you might expect this can get very messy, so you will find that newspaper on the tables and aprons are sensible precautions. The pupils can stir, poke and punch the bowl of slime for themselves – first fast then slow.
Making the slime outside works even better. Then they can then actually pick it up and try the slime race as they "pass the parcel" of slime as far around the circle as they dare!

Film can rocket

key ideas
- vitamin tablets fizz when they react with water and start to dissolve – they give off bubbles of a gas;
- gases take up more space than liquids or solids;
- if you try to contain the gas as it is produced the pressure inside the container will increase until it explodes with great force;
- to have a 'fair test' in an investigation you have to keep all the factors that might affect the investigation the same except for the factor you are testing.

explanation
As the gas is given off from the tablet inside the film can it starts to push harder and harder against the sides and top of the can. This is like shaking a can of coke. When this pressure gets too much for the lid to contain, the film can will explode up into the air at great speed as the gas rushes out. The gas moving out in one direction creates an opposite force on the can, pushing it upwards – just like a space rocket.

activity
Ask the pupils to list as many factors as possible that might change the time it takes the can to explode. Help them to devise a simple investigation to test if each factor speeds up, or slows down the reaction, or has no effect.
It is important to supervise this activity carefully so that the explosions only happen under your control - the flying can/lid could cause a serious eye injury if a pupil was looking directly over it when it explodes. If any cans do not explode be careful when you "disarm"

The Fountain of fizz

key ideas
- fizzy drinks have a gas dissolved inside them;
- shaking the lemonade bottle causes the gas to come out of solution in the form of lots of bubbles;
- the holes on the surfaces of some sweets encourage bubbles to form very quickly in lemonade;
- the pop-up sports bottle top will only open when the pressure inside the bottle has built up enough;
- the narrow opening in the bottle top means the fountain of lemonade will be higher when it "explodes".

explanation
Sweets like *Refreshers* fizz when we suck them. When these sweets are added to lemonade they encourage the gas trapped inside the liquid to come of solution quickly – producing lots of bubbles. This pressure builds up inside the bottle until it forces the pop-up top to open and a spectacular fountain of lemonade is forced out.

activity
If you're feeling adventurous you could help the pupils to experiment with different brands of lemonade and sweets to see which produce the highest or longest running fountains. Best done outdoors wearing a raincoat!
If your pupils would like to see this demonstration done in a much bigger and more beautiful way, you can show them 100 coke bottle fountains going off to music at: www.eepybird.com - it's well worth watching.

Sources of more ideas

There are lots of simple kitchen science experiments to try. Most science experiment books for children contain at least a couple. Some useful books devoted to "science cookery" activities are:
- "Kitchen science", Christopher Maynard (Dorling Kindersley);
- "Science magic in the kitchen", Richard Robinson (OUP);
- "Science experiments you can eat", Vicki Cobb (Harper Trophy).