Starting a science club – first steps and five ready-made activities

Anne Buckley outlines the steps for starting a science club … what path will you take?

A busy primary science leader will probably have thought many times about running a science club but not found the time to get things going. The purpose of this article is to provide an easy route into starting your first science club, with some initial advice and five activities to get your club up and running.

I started running science clubs in primary schools when I was making the transition from teaching in secondary to primary school. I was hooked by the opportunity to plan away from the science curriculum and devise and modify activities that were hands-on and creative. At the time (about 10 years ago now) there was much in the news about the decline in take-up of science, particularly physics A-level and some STEM degree courses. My experience of teaching secondary pupils had taught me that by this stage pupils' minds are often made up one way or another about science, and so the way to nudge them towards a scientific future is to engage them at the primary level.

How to start your club

I would start your club by offering it to a couple of year groups, such as a year 2 (age 6–7) club, year 3/4 (ages 7–9) club and then a year 5/6 (ages 9–11) club. Although the same activity can be repeated across age groups you can do more and expect greater independence with the older ones. I have always worked on the basis of around 15 children in a key stage 2 (ages 7–11) after-school club and 10 for key stage 1 (ages 5–7) if you are running it on your own. About an hour is the right amount of time to have a really good go at most activities. The silver lining to this is remembering it is a club, not a lesson; the children don't have to write anything down and you don't have to go through a formal planning process. I have usually run the club in a half-term block, with 5 or 6 sessions per group; this seems to be enough to make sure people come to every session. You may even have some STEM-experienced or enthusiastic parents who want to come and lend a hand, or, if it is a lunchtime

Figure 1

Box 1 Tower building

Challenge

Build a tower that can hold a marble 1 m off the ground using only 20 paper art straws and sticky tape.

Resources

A few marbles, 20 art straws per two or three pupils, a few rolls of sticky tape, 1 m ruler to judge.

Preparation

Make a couple of slides showing some towers.

Activity

1 Discuss the shapes of some well-known towers (e.g. Eiffel and Blackpool towers, electricity pylons, etc.) and also the smaller shapes that make them up. This could lead into a discussion about the strengths of different shapes. If you have time you could get the children to make some shapes out of straws and do some preliminary strength tests.

2 Give each pair a couple of straws so they can practise joining them up or, with younger children, suggest how they could join the straws.

3 Ask each pair to discuss their ideas and make a design drawing.

4 Give the children plenty of time to make the towers – they will take longer than you expect! Make sure there is time for the children to examine each other's towers and discuss why some were successful and others not. Don't allow the children to tape the towers to the floor!

Key words: Science club | Extracurricular

club, you could ask some enthusiastic scientists in years 5 or 6 to help.

Resources

You will probably find most of the resources you need around school, although an extra supply of plastic cups, sticky tape, masking tape, string, paper clips and paper plates is very useful! You might decide to have one activity in your block of sessions where the children are going to make and take home something that requires slightly more advance planning and purchasing some extra items, for example a bristlebot, periscope or balloon buggy. If this is the case, you can charge a small amount for each session that should cover it all as most activities won't really cost much at all. I think it is important to note that you don't have to provide amazing resources for every session. There will be real benefits to the children to being able to problem solve and experiment outside a formal lesson environment and without having to write down an account of what they do.

Five activities to start your club going

Boxes 1 to 5 provide a ready-made set of tried-and-tested activities that will not be too onerous to prepare or require too many resources. Please contact me for any mentioned worksheets, example risk assessments and further details.

Box 2
Cleaning pennies

Challenge

Find out which substances are best at cleaning pennies and see whether this has anything to do with how acidic the substance is.

Resources

Red cabbage indicator, vinegar, cola, lemon juice, orange juice, bicarbonate of soda, water, clear plastic cups, grubby looking pennies, kitchen paper, plastic spoons, safety goggles.

Preparation

Cook up some red cabbage and keep the cooled purple solution.

Activity

1 Ask the children what they know about acids and what they can be used for. Mention that there are acids in foods and also that acids can be useful. Some are stronger than others.

2 Children test a small amount of each substance with some red cabbage indicator and use a scale to decide how acid each one is (Figure 2; email me if you would like a copy of my ready-made sheet).


Figure 2

3 Distribute the grubby pennies. How could we clean them? Which substance do you think will be best? How could we do an experiment to show this?

4 Children carry out their own experiments (Figure 3). Discuss the fact that cola is actually quite acidic and relate this to the effect that drinking it has on our teeth.


Figure 3

Box 3
Balloon buggies

Challenge

Make and race a buggy that is powered by air.

Resources

Corrugated plastic board (e.g. Correx) or card for the buggy body, plastic straws, wooden dowel and plastic wheels (as available from Rapid Online, for example), 5 cm of PVC tubing, balloons, sticky tape. (This could be the one activity of the group for which you spend a bit more on resources if you can.)

Preparation

Cut the corrugated plastic board if you are using it. Cut the wooden dowel lengths.

Activity

1 A simple discussion of the forces involved in motion and different ways of powering vehicles is a good introduction to this activity. You can show pictures of streamlined vehicles and animals to get the children talking about what might affect how fast their buggy moves.

2 You may want the children to use a rectangular chassis to start with and leave time for them to modify their buggies. Figure 4 shows one way of making a buggy.

3 Once the children have tested their first buggy they can modify their designs (e.g. change the chassis shape or customise the buggy in other ways), measure how far the buggy goes or time over a set distance (Figure 5). A buggy 'grand prix' is a great way to finish off the activity.

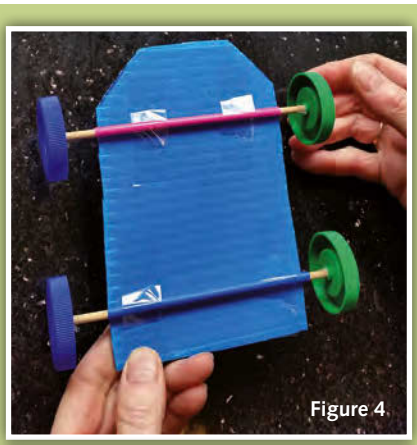
Figure 4


Figure 5

Box 4 Roman and Egyptian glue

Challenge

Make some glue that ancient people used and test how it compares to other modern glues.

Resources

Per pair: 50 cm^3 warm milk, 10 cm^3 vinegar, measuring cylinder, filter funnel and paper (or cut a small plastic bottle in half and use the half with the narrow neck, upturned with some kitchen roll inside), 2 plastic cups, half teaspoon of bicarbonate of soda.

Also have available: plastic teaspoons, paper plates, strips of paper or ribbon, string, weights or pennies, other glues to test.

Preparation

Heat up milk in a microwave until it is warm (not hot) and leave in a thermal mug until you are ready to use it.

Activity

1 Discuss with the children what they think ancient glues might have been made out of and used for.

2 The measurements for the quantities of milk and vinegar are approximate but if you have measuring cylinders the children can measure these out themselves.

3 When they add vinegar to milk, the milk will curdle and form curds and whey; the casein is in the curds. Discuss with the children how you could separate the two.

4 Filter the curds from the whey using whatever equipment you have (Figure 6). The whey can be discarded. The children need to scrape the curds off the paper and collect them in a clean beaker. Half a teaspoon of bicarbonate of soda is added to the curds to neutralise any vinegar left over. Ask the children to stir the paste well and their glue is ready to test.


Figure 6

5 The children can then use their glue to stick down either a piece of ribbon or a paper strip onto a paper plate. They can use some other test glues to do the same to make a 'stickometer' (Figure 7).

Figure 7

6 You can get ideas from the children as to how they could test the different glues using the stickometer (Figures 8 and 9). If you have time you can do the testing on another day or you can ask the children to have a go at home.


Figure 8

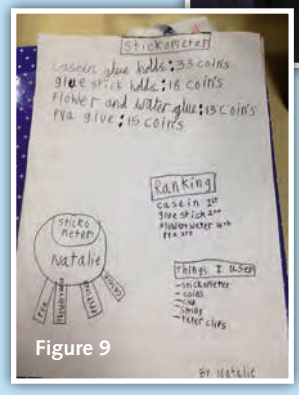

Figure 9

Box 5 Roller coasters


Figure 10

Challenge

Make a marble go as far as you can on a foam rollercoaster.

Preparation

Find some photos of roller coasters. Buy some foam pipe insulation.

Resources

Hula-hoop, photos of roller coasters and velodrome cyclists, round plastic bottle and marble, cup tied to long string in two places at top, ping pong ball, foam pipe insulation, scissors, masking tape, marbles, rulers. Optional: large blocks/boxes.

Activity

1 Try out the hula-hoop; how does it stay on?

2 Show a round plastic bottle (no lid) with a marble in it. Turn it upside down. How can I make the marble stay in the bottle? Ask one of children to have a go. If you spin the bottle fast enough the marble will not fall out!

3 Spin a ping pong ball around slowly in the cup by the attached string; the ball falls out. Spin it quickly and it doesn't fall. Show photos of a roller coaster and velodrome cyclists; why don't the people fall off? Ask for ideas.

4 Get children to work in teams of three or four and start building their roller coaster. They will need to use masking tape to join and secure the foam piping tracks. After they have had a short while to investigate, share ideas and problems they have tried to overcome.

5 Hopefully they will have found out for themselves that the smoother the joints between tracks the faster the marble goes. Trial and error should reveal how high they need the track at the beginning to get round a loop. After they have done this they could experiment with further hills, loops and varying the diameter of the loop (Figure 10).

Benefits of running a club

A science club will raise the profile of science in your school and give the children the opportunity to further develop their enquiry skills and confidence with activities beyond the science curriculum. You will be surprised how some children who have not had the confidence to attend other after-school clubs sometimes flourish in a science club.

As a teacher you can try out demonstrations and investigations that can then be used in your lessons and follow your own interests! You can take extra time to focus on child-led enquiry, project work, making things and entering local or national competitions which you might otherwise not have had time for.

What are you waiting for?

Where to go for more ideas

- **CREST Star Awards: www.crestawards.org/run-crest-awards/crest-star.** Tailor-made science club ideas; your pupils can receive an award for a small fee, when they complete a certain number of activities:
- **Science Sparks: www.science-sparks.com.** Emma Vanstone, creator of this site, has also just published a new book with lots of ideas that can be adapted for science clubs.
- The **Surfing Scientist: www.abc.net.au/science/surfingscientist.** I love some of the ideas from this Australian website. There are lots of ideas for experiments and also some demonstrations.
- **Discover Primary Science and maths: www.primaryscience.ie/activities_advanced_search.php**. I like the way the activities are set out on this Irish website.
- **Science Snacks: www.exploratorium.edu/snacks**. Lots of ideas to develop as investigations or use as short activities or demonstrations.
- **The Quirkles: www.quirkles.com/quirkles-resources.cfm**. Exploring science through phonics – for KS1 ideas in particular.

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