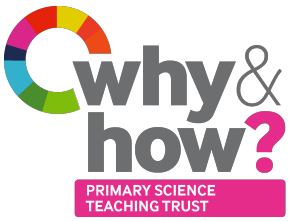
child-led enquiry

Alison Eley and Rufus Cooper

ASE January 2018

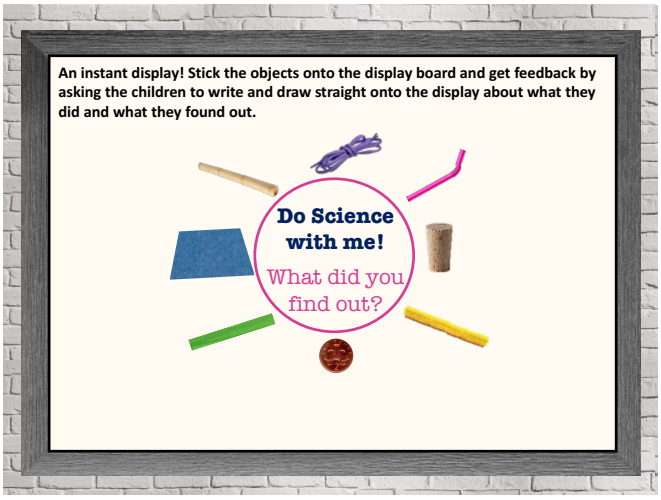


In this workshop we will consider:

1. What we mean by child-led enquiry
2. What good child-led enquiry looks like in practice
3. The role of the teacher in making it happen

"Do Science with me!"

What outcomes might you see?
And what would your objective have been?



‘Working scientifically’ **must always be taught through and clearly related to substantive science content** in the programme of study.

Is it possible to do this using a child-led approach to enquiry?

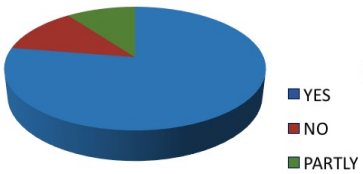
What would be the teacher’s objective in a child-led enquiry?
That the child becomes a better or more independent investigator

What would be the child’s objective in a child-led enquiry?
That they find out something they really want to know

Independent investigation: some classroom research ….

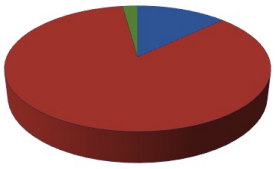
beginning stages

Have they planned and done an investigation appropriate for their question?



end stages

Have they attempted to explain their findings and link them to science they already know?



Frameworks for starting children off with their own enquiry ..

- Give them a challenge or problem to solve

Open ended challenges

The teacher sets up a challenge
The children choose the direction

Have a go:
KS1 – use anything in the bag to make a musical instrument
KS2 – use anything in the bag to be scientific investigators

- Go on an observation walk

Garden Walk …. what do you notice?

Observational walk around school garden
"I wonder why …..?"
"I wonder what …….?"
"I wonder how ……?"

↓

Children chose one of their questions to investigate

↓

Children with similar questions helped each other review at each stage

Examples of Y5 investigations:

How many different shaped leaves are there in the garden?

Where in the garden do dandelions grow?

What happens if a plant has no leaves?

What happens to leaves when they don't get any light?

A study of the strawberry plant

Frameworks for starting children off with their own enquiry ..

- Make the most of links to other curriculum areas

"A teabag with more room to move."

"At last a teabag that behaves like a teapot."

- Present them with a conflict

"My friend said that snails like eating paper better than their normal food but I don't believe her."

- Use teacher demonstrations or illustrations to show them something unexpected

Why does lemonade make me burp?

- Make the most of awe and wonder moments

Wonderful shadows
www.youtube.com/watch?v=Uiyeq3xLJEw&list=RDUiyeq3xLJEw&t=81

Perpetual spinner

Why does lemonade make me burp?

Alison Eley and Rufus Cooper, January 2018

Key Questions: What happens when things dissolve? Can gases dissolve in liquids? Can solids dissolve in liquids other than water? Why can't we see sugar when it is dissolved in water? Why is it useful that gases can dissolve in water? How can we get back a solid or a gas from a solution? What is a saturated solution? How much gas can dissolve in a certain amount of water?

Concepts covered: Some gases can dissolve in liquids and these can be recovered from the solution. Fizzy drinks contain gas dissolved under pressure. Gases dissolved in water are essential to sustaining life in aquatic environments.

Opportunity for skills development/application: making accurate measurements, supporting findings with information from research, drawing conclusions consistent with the evidence, recognising the value of the nature of scientific investigation in real world contexts

What the children do in the investigation:

1. Read the letter from the child to the lemonade factory.
2. Talk about what makes fizzy drinks fizzy – what does it do to you? Where do the bubbles come from? How many are in there?
3. Weigh a 500ml bottle of lemonade – record this mass and mark the initial level of the liquid on the bottle with a marker pen.
4. Set up the apparatus (teacher should demonstrate this, plus see diagram for help). Make sure the clip is clamped round the rubber tubing. Remove the lid of the bottle and replace firmly with the bung with rubber tubing attached. Half fill the tank with cool water. Submerge the measuring cylinder under the water to release all the air from it, then stand it upside down in the tank. Put the end of the rubber tube under the water and into the measuring cylinder. Remove the clip and gently shake the bottle, holding the bung down. When all the water has been displace, stop shaking and replace the clip. Keep a record of the volume of gas released. Note that the clip needs to clamped round the tubing between each gas release.
5. Repeat the above until all no more gas comes out, and then add up the total gas released
6. Weigh the now 'gasless' bottle and compare with the original mass. Look at the change in level of the liquid – estimate this as a volume.
7. Find out (internet or other) the average volume of a child's burp and work out how many burps they would expect to do after drinking the whole bottle of lemonade.
8. Write a letter from the factory back to the child explaining why they burp, and how many burps they would be likely to do per litre.

Resources: per group - lemonade bottle, clear plastic tank, diagram of how to set up equipment rubber tubing attached to bung, clip, measuring cylinder, electronic weighing scales

Health and safety: ensure bung is securely pushed into bottle top, make sure the children hold the bung when they shake the bottle, that they do not shake the bottle too hard or point the bottle towards another person.

This investigation is adapted from Feasey, R. and Gallear, B. (2000) *Primary Science and Numeracy*, ASE 'How many burps in a pop bottle?'

7 Uplands Road
Spritetown
Whiteshire

The Manager
Lemonade factory
Fizzville

6th January 2017

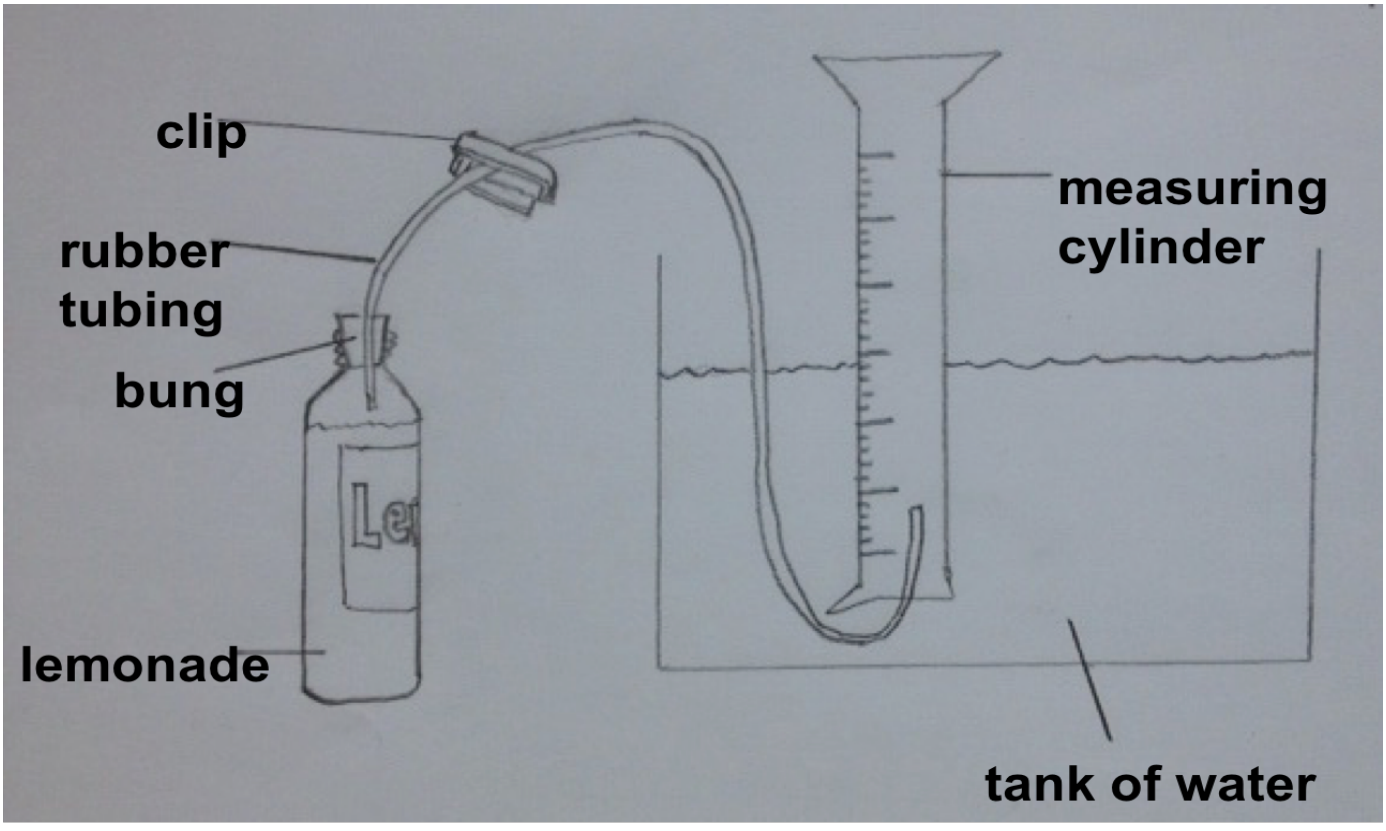
Dear Sir or Madam,

Please can you help me? My favourite drink in all the world is your Superfizz Lemonade. I used to drink a bottle a day and it made me feel marvellous. Only the problem is, my dad does not agree. He says it makes me burp and that this is unacceptable. He says my burps are too loud and that I do too many and that it is more than he can stand. Personally I don't think this is a great problem but he won't listen. He has thrown away the earplugs that I kindly bought him, and he says that from now on he is going to buy me strawberry milk instead of lemonade. This is a disaster. I thought you might be able to help save the situation. Please can you tell me why I burp after I have drunk your lemonade? And please can you tell me how many burps you would expect me to do after drinking a litre bottle of your lemonade? If I can explain this to my dad he might change his mind.

Yours faithfully,

Barry

B. Elcher, aged 10



The Primary Science Teaching Trust's International Conference is a conference specially for **primary science** educators.

Our three day programme will include:

keynote speeches ∗ practical workshops ∗ reflective seminars ∗ science shows talks ∗ social events ∗ a primary focussed exhibition

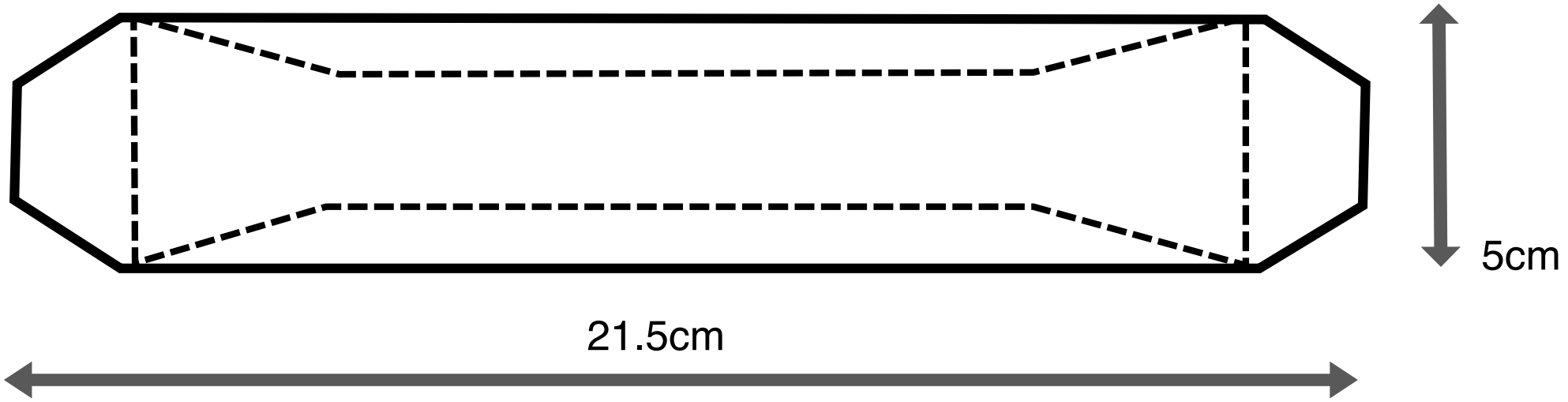
Our call for programme proposals opens in April 2018 and will close in September 2018.

Bursaries for teachers

We are very fortunate that several organisations have generously donated funding for bursaries to enable teachers to come to our Primary Science Education Conference 2019.

Teachers will need to apply for a bursary through our conference website. Applications will open on 23rd May 2018 and close on 21st November 2018. Please register your interest at https://www.primaryscienceconference.org/ to receive notifications and reminders about our bursaries.

Perpetual spinner template



Cut around the edge of this template, using thin paper (a telephone directory page is ideal)
Fold along the dotted lines
Fold both ends upwards at 90 degrees,
Fold one of the long sides up at 45 degrees and the other long side down at 45 degrees.

Give it a go cards – cut them up and make into a fold out 'book'

Give it a go!	5.5 hours contact teaching a day (roughly)…	5 days a week…
39 weeks a year…	equals 1072.5 hours a year… let's call it 1000 hours…	Trying something new for one hour will only impact on 0.1% of your class' total teaching for that year.
We lose more time walking to assembly! Take the risk, enjoy the risk and don't use the loss of teaching time as an excuse not to try something new!	Choose a different pathway for an hour… who knows where you'll end up.	**Take a risk!**

"question drop" cards

What have you discovered?

What did you NOT discover?

What are the key words you would use to describe what you have done?

What sort of science have you been doing?

Why did your investigation turn out the way it did?

What could you do differently next time?

What was the most interesting thing you found out?

How could you use the information you discovered?

What new questions do you have after your investigation?

What would you like to find out next? How will you do this?