Bigger and better bubbles

- Your task

Using the materials and equipment provided make:

1 The longest lasting bubble.
2 The biggest single bubble.
3 Lots of small bubbles.

Safety

Do NOT blow bubbles into eyes (it stings!).

- A wet, soapy slippy floor is dangerous so mop up any spills and watch where you put your feet!
- Do NOT put bubble mixture in your mouth!

Based on a suggestion by I. Carpenter/R. Lewin.

Time

120 minutes.

Group size

3–6.

Equipment & materials

Eye protection may be used if there is concern about soap stinging the eyes but is not essential.

General
Length of thickish wire – 1 metre (or various sizes of wire hoops), pliers, fly-swat. Filter funnels, yoghurt pots, plastic lemonade bottles, pipe cleaners, small syringes, glass droppers, measuring jug, bowls, scissors, stopclocks, 30 cm rulers.

4 or 5 different brands of washing up liquid, kitchen soap, glycerine, sugar, salt and water. (**NB** For younger students the problem can be simplified by giving no choice of detergent, and no glycerine. For all but the oldest the glycerine is best avoided, or there will be too many variables.)

Health & Safety notes

This is an open-ended problem solving activity, so the guidance given here is necessarily incomplete. Teachers need to be particularly vigilant, and a higher degree of supervision is needed than in activities which have more closed outcomes. Students must be encouraged to take a responsible attitude towards safety, both their own and that of others. In planning an activity students should always include safety as a factor to be considered. Plans should be checked by the teacher before implementing them.

You must always comply with your employer's procedures and in some cases may decide that a particular activity is inappropriate in your situation. Further information on Health and Safety should be obtained from reputable sources such as CLEAPSS [*http://science.cleapss.org.uk/*] in England, Wales and Northern Ireland and, in Scotland, SSERC [*https://www.sserc.org.uk/*].

It is the responsibility of the teacher to carry out a suitable risk assessment.

Curriculum links

Surface tension.

Possible approaches

"Good experiment for a hot sunny day outside!" Lots of variables to consider. Agreement must be reached on how to measure bubble size – in one school 7-8 year old students decided to catch the bubble on a hoop and hold it near a ruler. (You might also have a session on bubble blowing without recording.)

For an article that describes the preparation and use of a bubble chamber, in which students can view a bubble from the inside out, see Chemistry for kids: "Invitation to Chemistry through a Large Soap Bubble Chamber" Sanae Sato, J.Chem.Educ., July 1988, Vol 65, p616.

Evaluation of solution

Each group could, when required to do so by the judges, use their optimum solution to blow three bubbles. Any bubble surviving for at least 10 seconds could be measured. In addition each group could present a visual display showing how they arrived at the optimum solution.

Judges should look for an understanding of the need to control variables and a systematic approach to the problem. Marks for the display could be added to those of bubble size to identify a "winning group".

Record sheet

(for 7–10 year olds)

How can we best measure the biggest bubble?

Ideas from …… group:

……

……

Experiment 1

Who blew the biggest bubble in …….. group.

Mark the winner with a red *

Name:

1 …… 2 …… 3 …… 4 …… 5 …… 6 ……

Piece of equipment best for making biggest bubbles was: large wire hoop medium wire hoop small wire hoop plastic bottle top yoghurt tub pot

Any other? –

Experiment 2

Who blew the longest–lasting bubble?

Mark the winner with a green *

Name:

1 …… 2 …… 3 …… 4 …… 5 …… 6 ……

Time bubble lasted:

1 ….. 2 ….. 3 ….. 4 …… 5 ….. 6 ……

Best mixture for blowing bubbles contained

..... cm^3 washing up liquid + ….. cm^3 water. How did your group arrive at these quantities?

……

……

Experiment 3

Make a list of the pieces of apparatus you used to see which was best for blowing lots of small bubbles. Mark the one your group found best using a blue *

1.
2.
3.
4.
5.
6.

Extension work

Invent a bubble-making machine so there is no need to blow one bubble at a time using your 'lung power'.

Credits

Health & safety checked May 2018

Page last updated October 2018