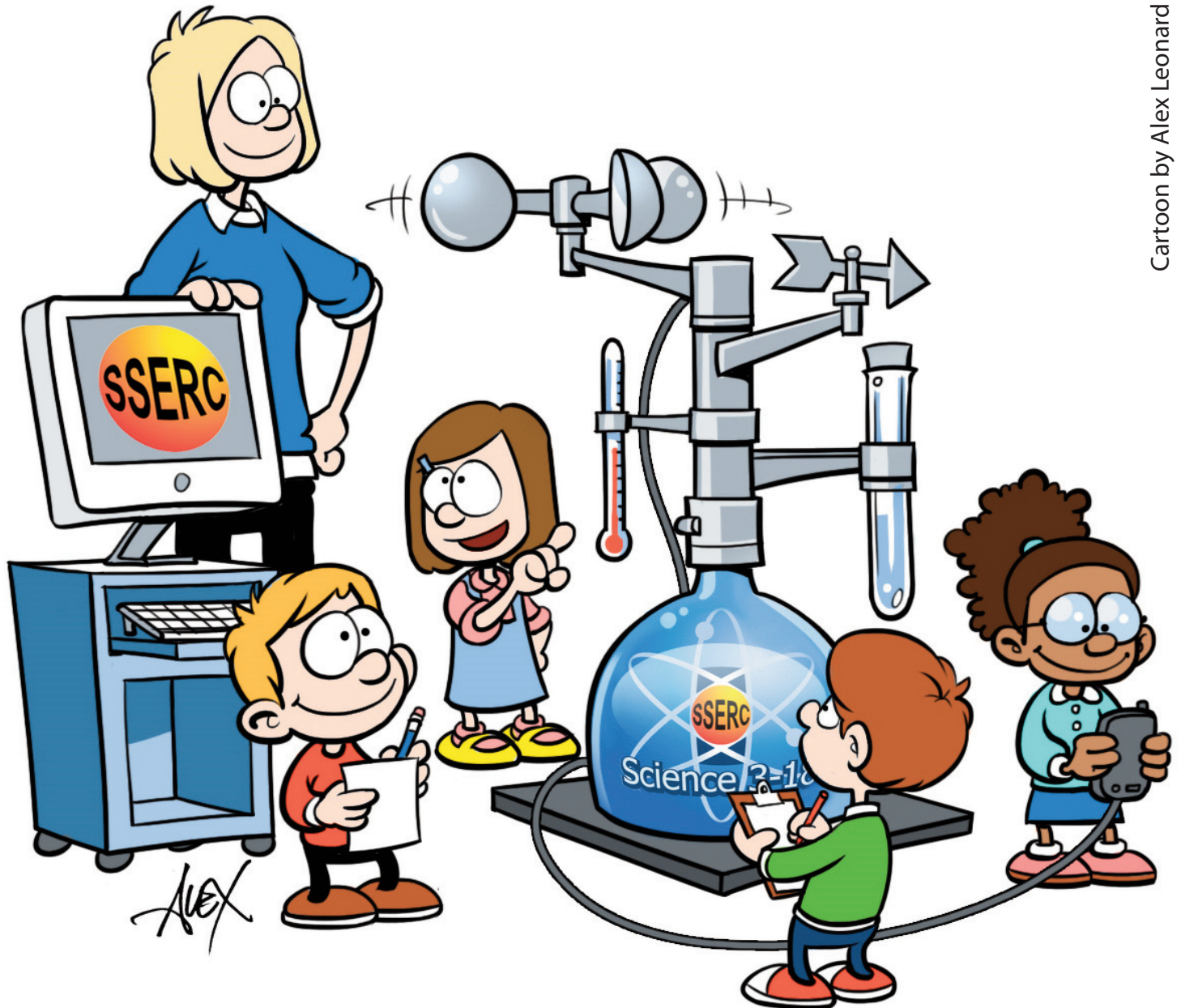




Primary Science & Technology Bulletin

Ideas and Inspiration for teachers in Primary Schools & S1/S2



Cartoon by Alex Leonard

Weather & Climate Cookalong Glow Meets

Weather & Climate Cookalong Glow Meets

Introduction - At the end of 2010 SSERC had the idea for a new and innovative style of CPD, loosely based on the popular Channel 4 TV show 'Cookalong Live'. Our answer to Gordon Ramsay was to second David Love, a Primary Teacher from Lochgelly West Primary in Fife, for two days a week until the end of March, to pilot the project with a cohort of 20 Primary schools. With considerably less swears words, at least when we were doing the 'live' bits, we sought to make the most of the Glow Meet technology as well as the CPD, scientific and technical expertise in SSERC. As we Scots are obsessed by the weather the subject chosen was 'Weather and Climate'.

Glow

The main purpose of Glow, Scotland's national intranet for education is "to enhance the quality of learning and teaching in the classroom by fully supporting Curriculum for Excellence (CfE)" [1]. Having tentatively tested our toes in previous Glow Meets we had just about mastered the 'techy' bit – getting the right versions of Java and Marratech software, working Glow usernames and passwords as well as headphones, microphones and cameras. Since SSERC's CPD reputation has been built on a foundation of good, solid, practical science and face-to-face contact with teachers, technicians and students, it was with some trepidation that we embarked on putting together something that would complement traditional CPD but reach a primary audience that may not be confident in their scientific skills.

Conscious of some of the technical difficulties experienced by previous Glow Meets we sought to minimise video bandwidth problems by shooting and editing video

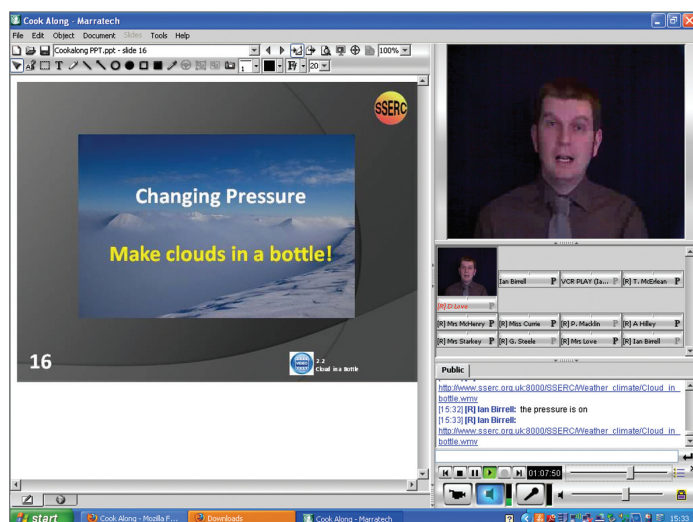


Figure 1 - Cookalong Glow Meet screenshot.



Figure 2 - Box of resources to support the activities.

beforehand. Participants on the Glow Meet were given a link so that they were able to follow the active demonstrations from our on-demand server which streams video and thereby cook along within their school.

The Cookalong Glow Meet

The screen layout for Cookalong uses the standard Glow Meet screen, consisting of three parts. In the top right is a video window in which you watch David, the presenter; to the left of the screen is the Whiteboard where David leads the participants through pages in a PowerPoint-like slideshow. At the bottom of the screen is the 'Public' dialogue box by which the presenters can communicate by text and also display the hyperlinks to view the appropriate video clips at the correct time. These can be viewed again at your leisure from the Weather Cookalong page.

Box of Resources

An important part of the Cookalong Project was the provision of a box about £45-worth of resources which were mailed out to the participating schools about a week before the actual Glow Meets. These provided the necessary equipment to construct, via Cookalong, a weather station, calibrated anemometer, barometers, hygrometers and experiments to demonstrate a 'Cloud in a Bottle' and 'the effect of pressure changes on marshmallows'. Cookalong was a closed Glow Group accessible only to participants in the trial. They had privileged access to all the resources (Figure 3) which support learning as part of this CPD, and ultimately the pupils, about weather concepts and how they can be demonstrated.

Although the activities were pitched for an average ability class, (middle stages i.e. P4 / P5) we tried to provide suggestions and resources for differentiable activities where appropriate. However, Cookalong was not intended to be an out-of-the-box scheme and therefore there are no lesson plans. Here we look at one of the high pressure/low pressure activities (Cloud in a Bottle) where we use a 2 litre plastic bottle with bung fitted with tyre valve, a foot-pump and some surgical spirit to show how clouds are formed :-

Cloud in a Bottle

Without oversimplifying the weather, the creation and dispersal of clouds and fog indicate air pressure changes, and it is quite possible to demonstrate these pressure changes to create a cloud and disperse it. Experiments to make clouds, in some cases, rely on a bottle with water vapour into which a lit match or taper is allowed to drop and extinguish. The principle in this experiment is that the smoke molecules and water vapour molecules bond creating a cloud. The difficulty with this concept is that it implies that clouds need smoke to form. Although some clouds do indeed contain other particles, they are not an essential component of a cloud. A better demonstration is to physically change the air pressure within the bottle, replicating real life pressure changes. Watch the video (Figures 4a & 4b) we used to support this activity [2].

Pour a small amount of warm water into the bottle, push in the bung tightly and inflate foot pump 5 times. Pull out the bung, dropping the pressure, and a faint cloud appears. Repeat, but this time inflate 10 times. Pull the bung out – you will note a slightly more opaque cloud appears. Repeat the experiment using surgical spirit rather than water.

Back to [Weather Cookalong - March 2011](#)

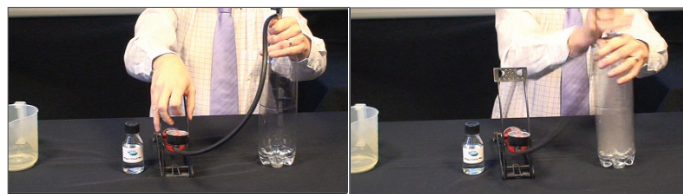
Cook Along
Weather and Climate Documents: All Documents

Select a View
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Actions
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| Edit | Type | Name | File Size |
|------|------|--|-----------|
| | | Curriculum for Excellence and Cookalong (PDF file) | 239 KB |
| | | Resource 1.1 - Customise your Science Museum Weatherstation (PDF file) | 574 KB |
| | | Resource 1.2 - Wind Speed Calculator (Excel file) | 128 KB |
| | | Resource 1.3 - The Beaufort Scale (PDF file) | 134 KB |
| | | Resource 2.1 - Marshmallow pressures (PDF file) | 403 KB |
| | | Resource 2.2 - Cloud in a bottle (PDF file) | 295 KB |
| | | Resource 2.2 - How clouds are formed (PDF file) | 296 KB |
| | | Resource 2.2 - How fog is formed (PDF file) | 376 KB |
| | | Resource 2.2 - Measuring Cloud Cover | 146 KB |
| | | Resource 2.3 - Make your own water glass | 319 KB |

Figure 3 - PDF & Excel resources to support the activities.



Figures 4a & 4b - Cloud in a bottle video to support the Cookalong.


How does it work?

Even though we don't see them, water molecules are in the air all around us. Airborne water molecules form what is called water vapour. When the molecules are bouncing around in the atmosphere, they don't normally stick together.

Pumping the bottle forces the molecules to squeeze together or compress. Releasing the pressure allows the air to expand, and in doing so, the temperature of the air briefly becomes cooler. This cooling process allows the molecules to stick together (condense) more easily to form tiny droplets. Clouds are nothing more than groups of tiny water droplets!



The reason the surgical spirit (an alcohol) forms a more visible cloud is because alcohol evaporates quicker than water. Alcohol molecules have weaker bonds than water molecules, so they let go of each other more easily. Since there are more evaporated alcohol molecules in the bottle, there are also more molecules able to condense. This is why you can see the alcohol cloud more clearly than the water cloud.

Clouds form when warm air rises and its pressure is reduced. The air expands and cools, and clouds form as the temperature drops below the dew point. Invisible particles in the air in the form of pollution, smoke, dust or even tiny particles of dirt help form a nucleus on which the water molecules can attach.




Cloud in a bottle

You will need

- 1 x 2 litre plastic bottle
- Foot pump
- Rubber bung with car tyre valve
- Jug of warm water  **Caution - scald risk**
- Surgical spirit  **Caution - flammable liquid**

How to make a cloud in a bottle

- Pour a small amount of warm water into the bottle, push in the bung tightly and inflate foot pump 5 times.
- Pull out the bung, dropping the pressure, and a faint cloud appears.
- Repeat, but this time inflate 10 times.
- Pull the bung out – you will note a slightly more opaque cloud appears.
- Repeat the experiment using surgical spirit rather than water.



(picture from science4science.com)

Figure 5 - PDF resource support.

What else was covered on the Weather & Climate Cookalong?

Here are some clips of the other activities we covered in the Cookalong videos and resources :-

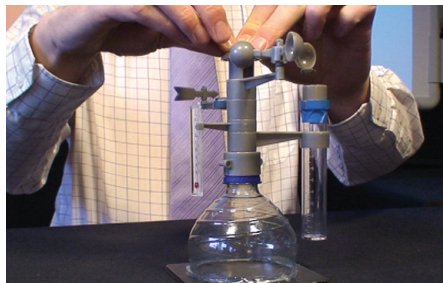


Figure 6 - Weather station.

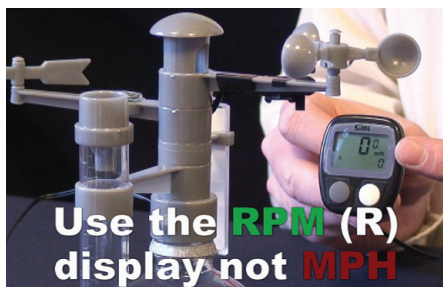


Figure 7 - Mini anemometer.

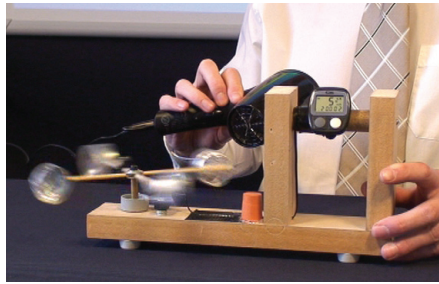


Figure 8 - Anemometer test-rig.



Figure 9 - Marshmallows under pressure

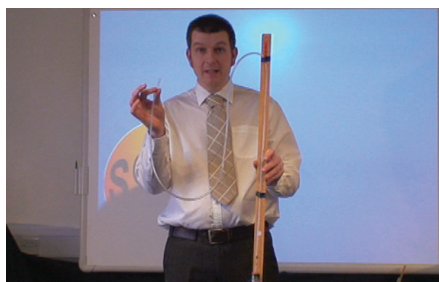


Figure 10 - Water-glass barometer



Figure 11 - Toricelli barometer.

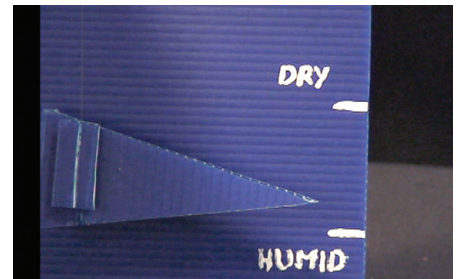


Figure 12 - Hair hygrometer

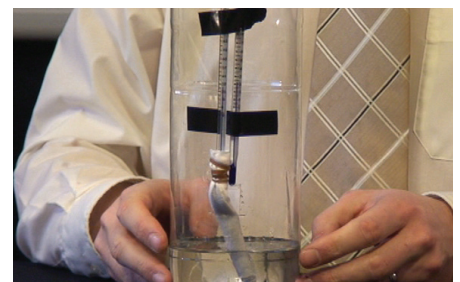


Figure 13 - Wet & dry bulb hygrometer.

How did the Cookalongs go down and what's next?

Aside from web security software in some authorities (e.g. Websense) blocking the video streaming from the SSERC server the first two Cookalong sessions were very well received – “Thank you for the fantastic cookalong CPD session last week Simple and effective. Please can we have more CPD like this.” - Jo Clark, Port Ellen Primary School. Encouragingly we heard that many teachers had colleagues in either their own or other local schools join them for the Cookalongs. If you want to check whether your school is

capable of receiving the videos from SSERC, try to follow the link shown in [2] below. We hope to run another four Cookalong sessions over the course of the year. If you are interested in participating in future “Weather & Climate Cookalongs” then please contact ian.birrell@sserc.org.uk with your Glow username and e-mail address. Depending on future funding arrangements there may be a cost-only charge for the box of resources ca. £50. Finally, we are indebted to Peter Macklin, Sarah Burton and Neil Stewart of LT Scotland who guided us through the joys of Glow and the Glow Meet

technologies. We’ve now got new technology to learn, as the old Marratech software is going to be gradually superseded by Adobe Connect. See more about it on the Glow website [3].

References

- [1] <http://www.ltscotland.org.uk/usingglowandict/glow/whatis/storysofar/index.asp>
- [2] http://www.sserc.org.uk:8000/SSERC/Weather_climate/cloud_in_bottle.wmv
- [3] <http://tinyurl.com/new-Glow-Meet>