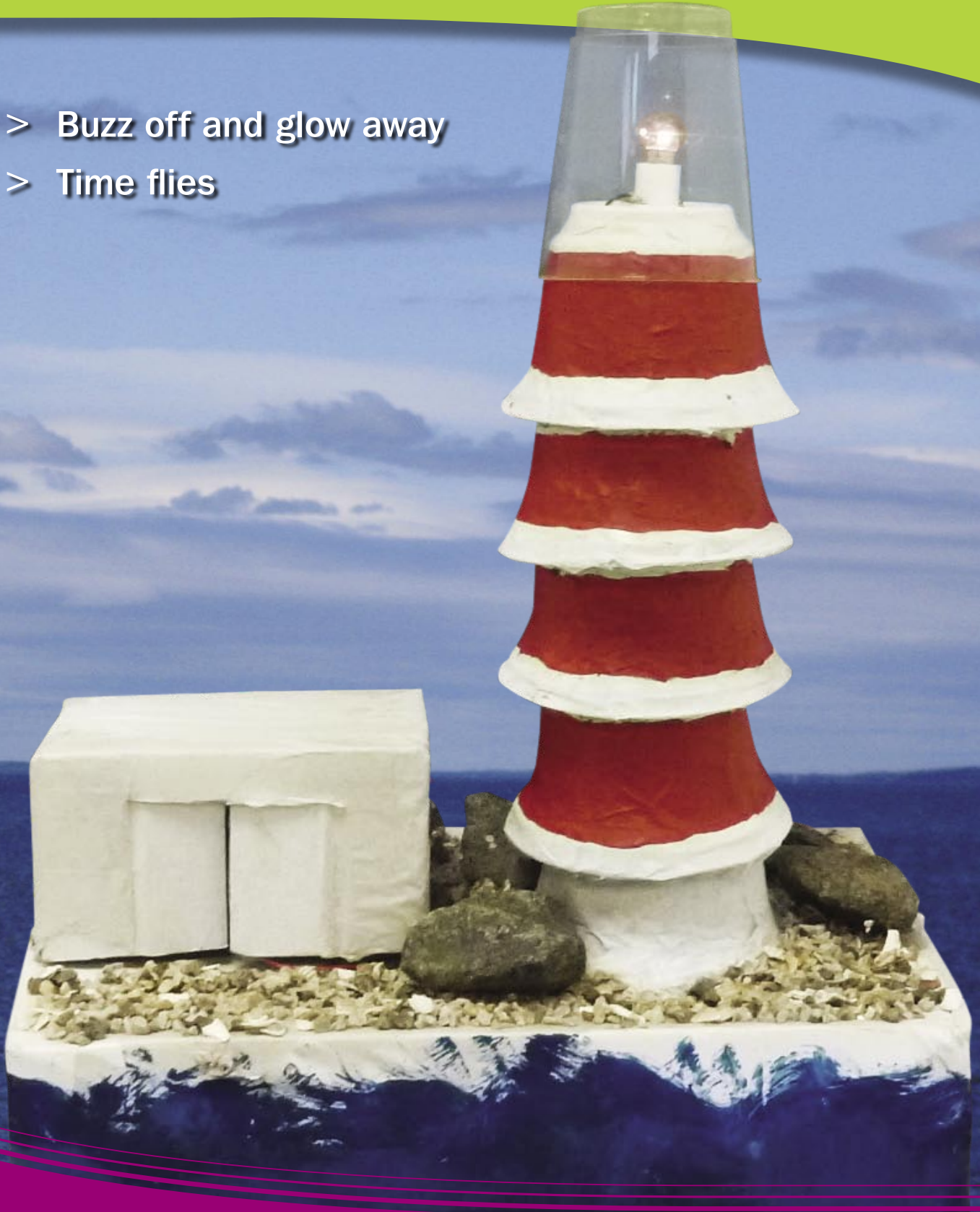


Primary Science & Technology *Bulletin*



Ideas and inspiration for teachers in Primary Schools and S1/S2

- > Buzz off and glow away
- > Time flies



Buzz off and glow away

An important aspect of teaching about electric circuits is offering learners an opportunity to use their knowledge and skills in a practical way and this is a requirement of the curriculum at both first and second levels [1].



Figure 1 - A simple circuit.



Figure 2 - Teddy with lamp for nose.

- I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model - SCN 1-09a.
- I have used a range of electrical components to help to make a variety of circuits for differing purposes. I can represent my circuit using symbols and describe the transfer of energy around the circuit - SCN 2-09a.

Once learners can safely construct a simple circuit (Figure 1) there are lots of possible models and games that can be built.

At the simplest level learners may incorporate this circuit within a picture as in the example in Figure 2 where the teddy bear has been given a "light up" nose. There are many other pictures where a lamp could be incorporated e.g. an Advent wreath or a Christmas tree. These are most effective when the circuit can be hidden.

A more advanced activity could involve making a quiz board (Figure 3). The pins on the front are wired at the back of the board (Figure 4) in such a way that the bulb lights when correct pairs of pins are touched with the crocodile clips.

The questions for the quiz board could relate to any topic and so this activity lends itself to

an interdisciplinary project, giving a context to learning about electrical circuits.

The same circuit can be used in more complex models, for example, a lighthouse (Figure 5). In this case a switch has been incorporated into the circuit so that the light can be turned off and on.

Although switches can be purchased it is simple to make one using a piece of card, 2 split pins and a paperclip (Figure 6). Moving the paperclip so it is no longer in contact with the split pin breaks the circuit.

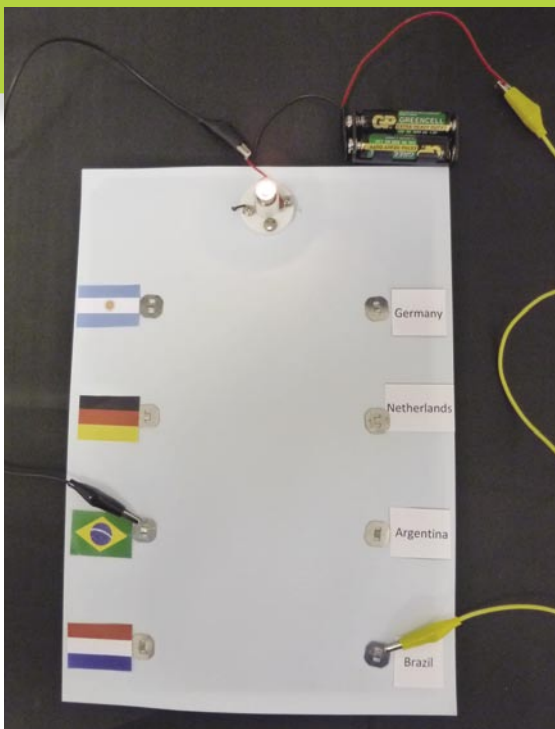


Figure 3 - Quiz board.

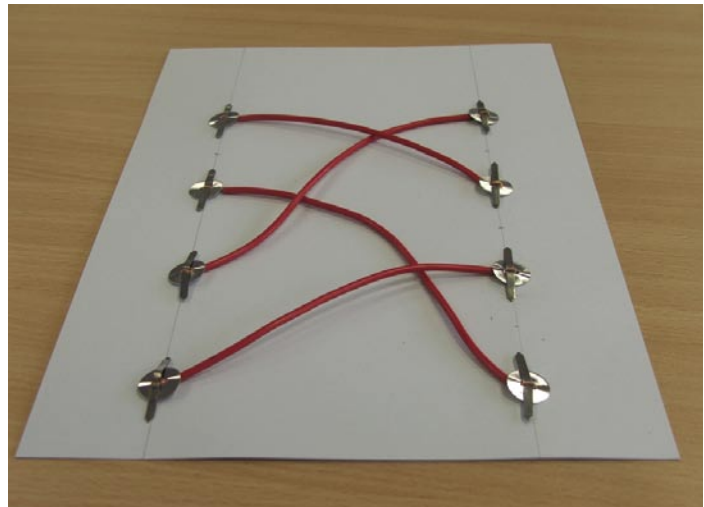


Figure 4 - Wiring at the back of the quiz board.

Using a buzzer instead of a bulb in the circuit, learners can make a Buzz Off game (Figure 7) where the objective is to take the loop around the wire without touching it. Touching the wire completes the circuit and the buzzer sounds. We have used this game to carry out an investigation to see if players improve with practice. Care must

be taken when using wire to avoid injury (see video instructions via link below). A form of easily bent wire is available from Mindsets online [2].

It is a good idea to remove the batteries if a game or model is not being used for some time, even overnight, to save the batteries from running down and to avoid the risk of a short circuit.

Full instructions for making the games and models featured in this article can be found on the SSERC website http://tiny.cc/sserc_buzzoff. To access these video instructions follow the link and log on to the SSERC website, using your password. If you are new to the SSERC website then please contact us at registration@sserc.org.uk (using a workplace email) to register. You might also like to check out more activities covered in previous SSERC bulletins which outline fruit batteries [3] and squishy circuits [4].



Figure 6 - Easy to make switch.



Figure 5 - Completed model lighthouse.

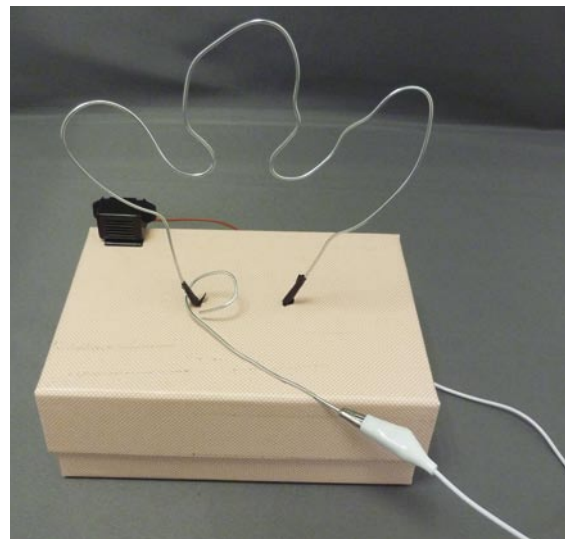


Figure 7 - Completed "Buzz Off" game.

References

- [1] www.educationscotland.gov.uk/learningteachingandassessment/curriculumareas/sciences/eandos/index.asp (accessed 28th July 2014).
- [2] www.mindsetonline.co.uk (search Easi-bend wire) (accessed 28th July 2014).
- [3] http://tiny.cc/SSERC_P53 (accessed 28th July 2014).
- [4] http://tiny.cc/SSERC_P55 (accessed 28th July 2014).

Time flies

If you have recently attended a residential SSERC CPD course you may well be familiar with the Veho VMS-001 USB digital microscope [1, 2] (Figure 1).

In terms of versatility and value for money, the Veho is difficult to beat - see SSERC Primary Bulletin 61 [3]. We have been putting this useful little magnifier to further use lately - this time experimenting with time lapse photography.

Observation is one of the key skills in science inquiry, and is described in the Curriculum for Excellence Sciences: principles and practice document [4] "Observing and exploring involves careful observation of how something behaves, looking for changes over time and exploring 'what happens if...?' and 'how could I...?' questions."

Observing changes over time forms an integral part of exploring the world around us and learners will be very familiar with time lapse techniques used in many documentaries and TV programmes. Here at SSERC we have been exploring a simple and easy way to produce very effective time lapse films in the classroom. Using Webcam Timelapse 2.0,

Figure 1 - The Veho VMS-001 USB microscope.



a free software package from TNL Soft Solutions [5], we have been able to record various events and phenomena and present them in a time condensed manner, meaning that even the shortest attention span is no impediment to observation over time.

The program requires a digital camera to be attached to the computer and it recognises the Veho as such a device. The finished videos are made from a series of still images, like a digital flick-book. The advantage of this mechanism is that clips can be created without having to make use of the video function of the MicroCapture software that comes with the magnifier. In the past we have had difficulty extracting video clips of greater than 30 seconds from

MicroCapture - due to the large file size - but with Webcam Timelapse 2.0 this is no longer a consideration.

Given that the Veho can be used to view objects and organisms at up to x200 magnification a broad range of filming opportunities exists. Among other projects, we have observed the germination of seeds and growth of plants over the course of several days, we have filmed ice gardens melt over the course of a few hours and even set up a Veho to film a "Forces Funtime" session at one of our Primary Residential courses in May 2013 - we then marvelled at the speed and intensity of our delegates as they moved around the various activities! All of these events were condensed into snappy videos lasting less than 20 seconds.

Time lapse video has proved to be an engaging way to approach science inquiry from a different angle, and this free software download adds another dimension to the already multi-talented Veho microscope.

A set of instructions for Webcam Timelapse 2.0 is available on request from SSERC [6].

References

- [1] <http://www.misco.co.uk/> (accessed 25th April 2014).
- [2] <http://www.amazon.co.uk> (accessed 25th April 2014).
- [3] <http://tinyurl.com/Primary-61> (accessed 25th April 2014).
- [4] <http://www.educationscotland.gov.uk/learningteachingandassessment/curriculumareas/sciences/principlesandpractice/index.asp> (accessed 25th April 2014).
- [5] <http://www.tnlsoftsolutions.com/timelapsehome.php> (accessed 25th April 2014).
- [6] Contact sts@sserc.org.uk for an electronic copy.