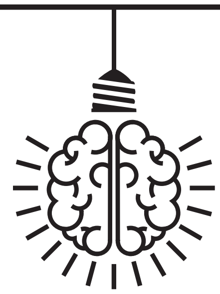
Teachers’ notes

- bringing Catalyst to life in the classroom



Discover ideas and resources to build on the issues covered in edition 34 of Catalyst.

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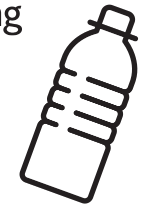
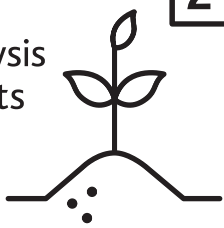




Disappearing Plastic

1

By Mark Langley, Science CPD Lead, STEM Learning

Matching article:
From oil to plastic – and back to oil?

Useful resource:
www.stem.org.uk/rx32rg

This activity is a classic demonstration, where a plastic (expanded polystyrene) is “dissolved” into a solvent (propanone). This can be used to elicit ideas from student about what is happening and also if we are truly dissolving the polymer; this could lead to a discussion about the challenges of converting a polymer back to its monomer- or to the original feedstock chemicals such as (crude) oil.

Perform a SWOT analysis on GM plants

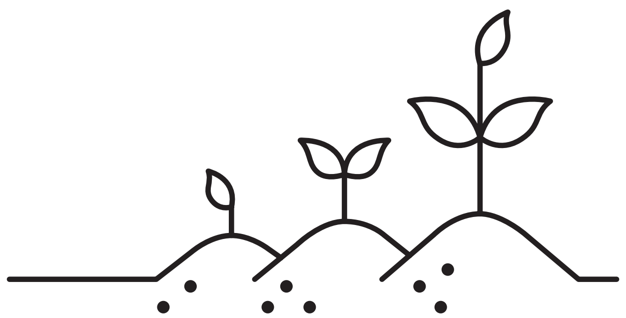
2

By Mary Howell, Biology Subject Specialist, STEM Learning

Matching article:
Explosive-eating GM plants are having a blast!

Useful resources:

- Model organism video and power point UKRC and student research task outline **www.stem.org.uk/rx35ag**
- Defence Dynamics simple student questionnaire and discussion prompts on GM **www.stem.org.uk/rxwmn**
- Collection of GM resources **www.stem.org.uk/lxcug**



It can be difficult to get students to engage in lessons about plants. There is also controversy about the possible risks and benefits of genetic modification of plants and whether we should do it at all. The novel context in this article provides a good opportunity to weigh up risks and benefits of GM, as well as providing a way to develop students’ understanding of what is involved in the process. There are also links that could be made to uptake of minerals by plant roots and the nitrogen cycle.

Ask your students to use the article and possibly other sources you have selected and prepare a SWOT analysis. Working in pairs or threes students can discuss and extract relevant information from the article. Simply divide a large sheet of paper or white board into four sections and use the article to make suggestions in each section, as follows: strengths – positive aspects and benefits of using GM, weaknesses – negative aspects and disadvantages of using GM, opportunities – external factors such as how well it compares to other solutions to the problem, or additional applications and threats – things that might prevent the GM being successfully implemented.

You could provide students with plasticine or play dough, string and paper and ask them to model the process of genetic modification and uptake of the explosive compounds by plants to answer questions such as: how do the genes from the bacteria get into the plants? Are the plants ‘eating’ the explosive?

Salad Bowl particle accelerator

3

By Adam Little, Physics Subject Expert, STEM Learning

Matching article:
Future circular collider

A detailed guide by Science in School can be found here:
www.scienceinschool.org/content/particle-accelerator-your-salad-bowl

Safety Note: CLEAPSS guidance GL190
science.cleapss.org.uk/Resource-Info/GL190-Using-electrostatic-generators-making-sparks.aspx

Most modern day accelerators use changing electromagnetic fields, electric fields are used to accelerate the particles and the magnetic fields control the beam of particles to ensure it remains on the right path.

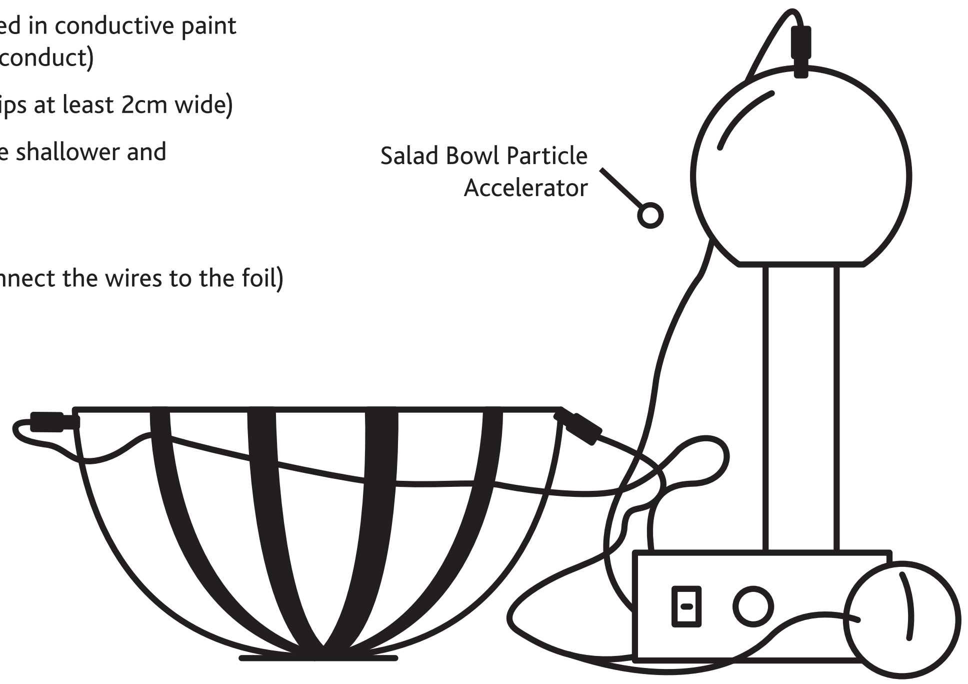
Students can create and construct their own accelerator using a ping pong ball coated in metal, some aluminium foil, a salad bowl and a Van de Graaff (VDG) generator. A VDG is used to supply the energy needed to propel the particles. This activity is good to get students thinking about electric fields, charges and you could even get them looking at angular velocity or momentum.

Equipment

- Van de Graaff generator
- A ping pong ball coated in conductive paint (nickel or graphite to conduct)
- Aluminium foil (in strips at least 2cm wide)
- Plastic salad bowl (the shallower and smoother the better)
- Electrical wires
- Crocodile clips (to connect the wires to the foil)

Method

1. Cut two 2cm wide strips of aluminium foil that fit from one edge of the salad bowl, across the centre and to the lip of the other side. Place one perpendicular to the other making a cross at the bottom of the bowl, and narrow the strips in the middle where they cross.
2. Cut four 1cm wide strips of aluminium foil and round off the tips at one end. Add these in the gaps between the original going close too but not touching the centre. These strips need to also go over the lip of the bowl and half way down the outside.
3. Place a 1cm wide strip all the way around the outside of the bowl connecting up the four 1cm wide strips.
4. Connect the high voltage to one of the 2cm wide strips that cross in the centre.
5. Connect the earth wire to one of the 1cm wide strips that are connected on the outside.
6. Drop the ball covered in conductive paint into the bowl and switch on the VDG.
7. Observe what happens, and don’t forget to discharge the VDG when you have finished.



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Thank you

We hope you enjoyed Catalyst, and matching teachers' notes. If you have any feedback, or ideas for topics you'd like to see covered in future editions, please email:

catalyst@stem.org.uk

STEM Learning's work is made possible by the generous support of the Wellcome Trust, Gatsby Charitable Foundation, the Government our partners in Project ENTHUSE and other funders of related STEM projects.

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