6 week STEM clubs

co-ordinated by merseySTEM

# POLYMER WORMS
## Focus: Chemistry

Sodium alginate is one of the structural polymers that help to build the cell walls of plants like brown seaweed and kelp. It can be extracted for a wide range of uses. Alginate is a common food additive, E400, used as a thickener, stabiliser and gelling agent. Calcium alginate (a cross-linked polymer) is used in wound dressings for slow healing wounds like leg ulcers, which can continue to bleed and weep for a long time. Part of the blood clotting mechanism involves calcium ions and on contact with blood the calcium alginate releases calcium ions in exchange for sodium ions. These extra calcium ions can help the blood to clot and encourage healing. It is easy to remove any excess calcium alginate when the dressing has to be changed.

**AIM**

***To investigate whether polymer worms can be useful.***

## Equipment:

- 10cm$^3$ sodium alginate suspension or Gaviscon®
- 2 x dropping pipette
- 1 x forceps
- 2 x 150cm$^3$ beakers
- 100cm$^3$ sodium chloride solution
- 100cm$^3$ calcium chloride solution
- Labels for the beakers

## Instructions:

1. Put on eye protection
2. Put the calcium chloride solution into one of the beakers and the sodium chloride solution into the other. Label the beakers clearly.
3. Using the pipette, squirt the sodium alginate or Gaviscon® into the calcium chloride solution. You are aiming to make 'worms,' although you can make beads if you prefer.
4. Using forceps, remove a few of your worms straight away and put them into the beaker of sodium chloride solution.
5. Swirl both beakers gently and observe what happens to the worms in each one. You can remove and squeeze the worms as well as observing their appearance. You will need to wait a few minutes for all the reactions to be complete.

## Discuss:

1. What happens when the sodium alginate is dropped into the calcium chloride solution?
2. What happens to the polymer worms when you add them to the sodium chloride solution?
3. What could be used to rinse excess calcium alginate from a wound when a calcium alginate dressing is removed?
4. Research 'cross-linking polymers'.

Tweet or email your conclusions or your findings to:

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