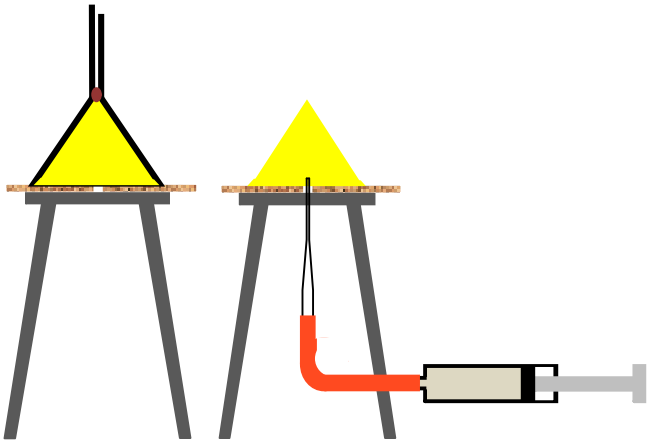
# Volcanoes and dykes/ jelly and cream – radial dykes
## Intruding cream radial 'dykes' into jelly 'volcanoes' until they erupt

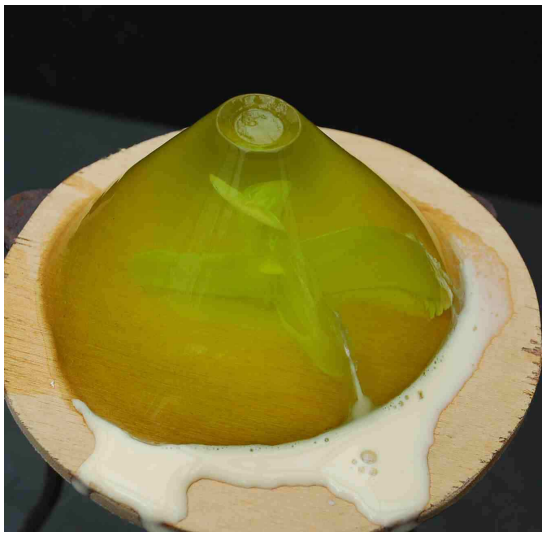
Show how magmas inject into volcanoes from below causing volcanic eruptions, often forming radial dykes. Make small conical jelly (jello or gelatin) 'volcanoes' in advance by making up the jelly as normal, pouring the liquid jelly into inverted filter funnels with clay (Plasticine™) stoppers and allowing it to set. Prepare a wooden base with a small central hole. Turn one of the jelly volcanoes out onto the wooden base, so that the hole is at the centre of the base

Fill a syringe with a suitable liquid (single cream or evaporated milk works well) and use a rubber tube to connect the syringe to a glass or plastic pipette. Put the volcano base onto a support, and insert the narrow end of a pipette into the jelly 'volcano' from below.

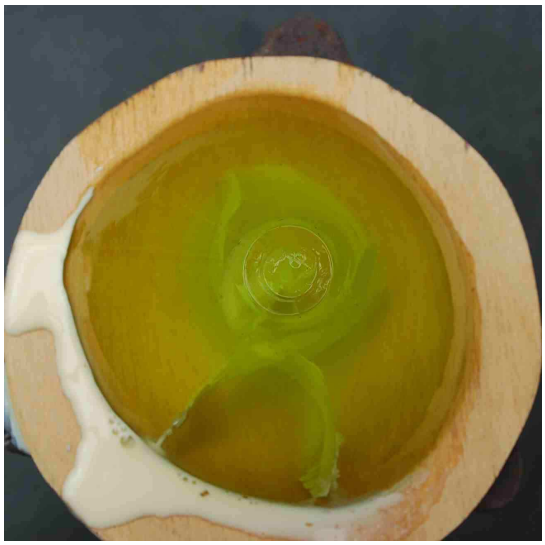
Squeeze the syringe gently and watch the liquid 'intrude' into the base of the volcano, often forming radial dykes. Continue squeezing gently until an 'eruption' occurs, as a 'summit' eruption, or more commonly, a 'flank' eruption on the side of the volcano.

Clear up the result – e.g. by eating it.





Radial 'dykes' and two flank eruptions, from the side.



Radial 'dykes' and two flank eruptions, from the top.
(*Photographs by Peter Kennett*)

## The back up

**Title:** Volcanoes and dykes/ jelly and cream – radial dykes.

**Subtitle:** Intruding cream radial 'dykes' into jelly 'volcanoes' until they erupt.

**Topic:** A simulation of the intrusion of magma into a volcano, usually forming radial dykes before erupting.

**Age range of pupils:** 8–80 years

**Time needed to complete activity**: 10 minutes

**Pupil learning outcomes:** Pupils can:
- describe how liquid can intrude a simulated volcano;
- describe the pattern often formed by the dyke-like intrusions that form before simulated eruption.

**Context:**
A demonstration of dyke-formation that can be used in the classroom, lab or field. Note that it may be necessary to loosen the 'volcanoes' by dunking the mould into hot water for a few seconds if they don't turn easily out of the mould.

Radial dykes are commonly associated with some volcanic intrusions, as shown below.

*This file is in the public domain because it was created by NASA.*

The central vent and radial dykes of Shiprock, New Mexico, USA.
Left: Satellite view.
Below: View from the ground of the remnants of the central vent to the left and one of the dykes cutting across towards the right.

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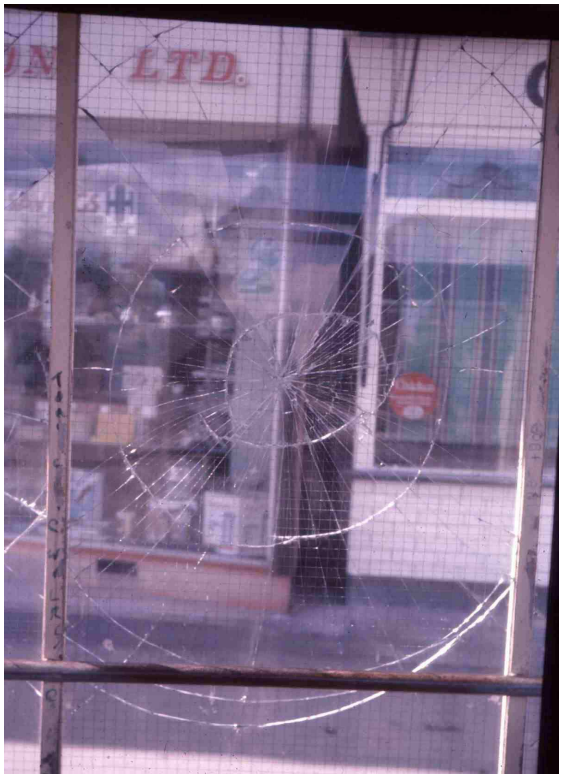
**Following up the activity:**
Ask the pupils to measure and plot the dyke directions on a compass rose; then repeat the activity several times, plotting the data each time to highlight the radial pattern.

**Underlying principles:**

- Magmas are liquid rocks often contained in magma chambers (like the cream/milk in the syringe).
- Magmas intruding volcanoes can cause radial fractures, resulting in radial dyke swarms.
- Such magma may sometime break the surface to cause fissure eruptions, but the dykes themselves are only revealed after erosion of part of the volcano itself.
- The pattern of fractures is similar to that seen when a pane of glass is hit by a hard object, as in the photograph. Only the radial fractures develop in the jelly, but in a real volcano the concentric fractures also become injected by magma to form cone sheets of igneous rock.

**Thinking skill development:**
As pupils view several examples, they should be able to construct the radial pattern that results. Cognitive conflict may be caused when pupils realise that volcanoes have an internal 'plumbing' system rather than one main vent.

Metacognition arises from discussion of what has happened and bridging is involved when the results of the activity are applied to features in the real world.



Fracture patterns in wired glass in a bus shelter after a brick had been thrown at it. (*Photograph by Peter Kennett*)

**Resource list:**
NB All items need to be carefully cleaned first, if the 'volcanoes' are to be eaten later.

- filter funnels with clay (Plasticine™) plugs
- jelly (jello or gelatin)
- 15 cm square(ish) board with hole in middle
- a support for the board, e.g. a tripod
- syringe, rubber tube, pipette (glass or plastic, e.g. from a dropping bottle) to fit hole
- single cream, evaporated milk, or similar
- a jug of hot water to loosen the jelly in the mould

**Source:** John Rodgers, Queen Elizabeth Grammar School, Penrith, Cumbria, published in King, C. (2003) Post-16 'Bring and Share' goes from strength to strength: ESTA Conference in Manchester, September 2003. *Teaching Earth Sciences* 28 (3/4), 11-16.