TAP 527- 4: Fission analogues

1. Controlled energy release

Air filled balloons can be used to show the difference between the controlled release of energy and an uncontrolled explosion, to mimic the controlled chain reaction or the diverging chain reaction (used in a nuclear bomb).

Inflate two balloons and tie the necks. On one stick a piece of sellotape about 5 cm long. When holding the balloon by the neck, have the sellotape facing upwards. Take a good-sized pin (a ray tracing optics pin is ideal). Burst one balloon with the pin – the uncontrolled energy release.

To ham up the demo, now claim that by pushing the pin very carefully into the balloon it is possible not to burst the balloon and thus achieve a controlled energy release. Slowly push the pin into the sellotaped portion of the balloon. Stop when the pin is still sticking out of the balloon. Then remove the pin slowly. Keep checking during the rest of the lesson to monitor the slow deflation of the balloon.

2. Diverging chain reaction

Set up dominoes on edge in the form of a triangle, so that when a domino at the apex is pushed over, it hits two dominoes, they hit 3, which hit 4, and so on.

Alternatively:

Drill a piece of wood with a triangular array of small holes to hold matches, 'live' end upper most. Arrange the spacing so that one lighted match can ignite its neighbours in the next row. Ten rows are ample.

Set the board upright, with the apex of the triangle at the bottom. Light the match at the apex, and see the diverging chain reaction.

⚠ !	**Safety assessment!**
	Try it by yourself first to see what to expect. Have a fire extinguisher handy (it helps to hype up the demo). Beware any heat or smoke alarms that might be activated.

Extinguish by blowing out – ask if anybody in the audience has a birthday today, or close to the actual date, to volunteer.

For a controlled chain reaction: use a simple line of dominoes or matches.

Practical advice

These analogues are provided so you can make a choice of demonstration(s) or activities.