

# Chaotic chemical changes literacy task

## Everything changes – but why?

With chemicals, change is mainly because of heat or cold. Which can lead to a few chaotic chemical mix-ups...

Have you ever wondered why some solid objects are bendy and others are tough? Well, here's why:

In every solid object the atoms are bonded together. But what matters is the way the atoms are arranged.

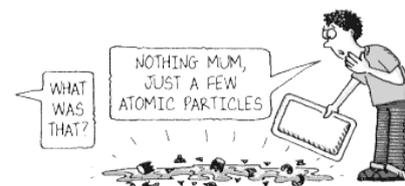
If they're in stretchy strings the object will be stretchy like an elastic band. This means you can squash them together quite easily.

In very hard materials such as diamonds the atoms are arranged in a very tight framework.

In softer materials such as graphite – which is used to make pencil lead – the atoms are arranged in loose layers that rub off easily when you write.

In china the atoms are closely packed and joined tightly together. But if just one atomic join breaks, the china will crack.

In a metal the atoms are surrounded by a crowd of jostling electrons. (they're a bit like teachers in a playground at break-time.) the electrical force of the electrons keeps the atoms in place. But each atom can move a bit and that is why you can bend a metal – if you're very strong!



## Here are five mad facts about water molecules:

- ① Snow and hail form when water molecules join up and freeze in the sky. Hailstones are made when lumps of ice swirl around in a cold cloud getting larger and larger. The largest hailstone was the size of a football.
- ② In very cold places from northern Canada to Siberia some lakes freeze solid. The freezing starts with a single ice crystal that grows and grows. So, by the end, each frozen lake has become one giant ice-crystal.
- ③ As water freezes it expands and crushes anything it traps with a force of 140kg per square cm... enough to sink a ship or crush a man to death.

- ④ You can make snowballs because snow is partly melted ice, which can be squished. In the Antarctic, the snow is too hard and powdery for snowball fights.
- ⑤ As ice melts the molecules take in heat energy and wobble. Finally, they wobble free and float around.



## Questions

- ① Create an information leaflet showing the different ways atoms can arrange in materials and how this affects their properties.
- ② Distinguish between how atoms are arranged in graphite and an elastic band.
- ③ How are hailstones formed?
- ④ What effect does heat have on particles in any material?

### Your turn

Below is a guide to some important elements. Imagine you are a scientist who has just discovered three new elements, a solid, a liquid and a gas. Continue the guide by adding your three elements.