What is a solid?

A SOLID is made up of very tiny PARTICLES that hold together very strongly.

What do these have in common: a metal coil, a metal gear box, a tub of margarine, a clay animal, paper and wool?

The answer is they are all solids (Picture 1). A solid is any substance that cannot change shape freely. You may be able to push or pull it into a new shape (as when you scrape over the margarine with a knife, make wood fibre into paper or make a fleece into wool), but once put in that new shape, it will not change by itself.

Clay animal

A metal coin

▲▼ (Picture 1) These materials are different in many ways, but they are all solids.

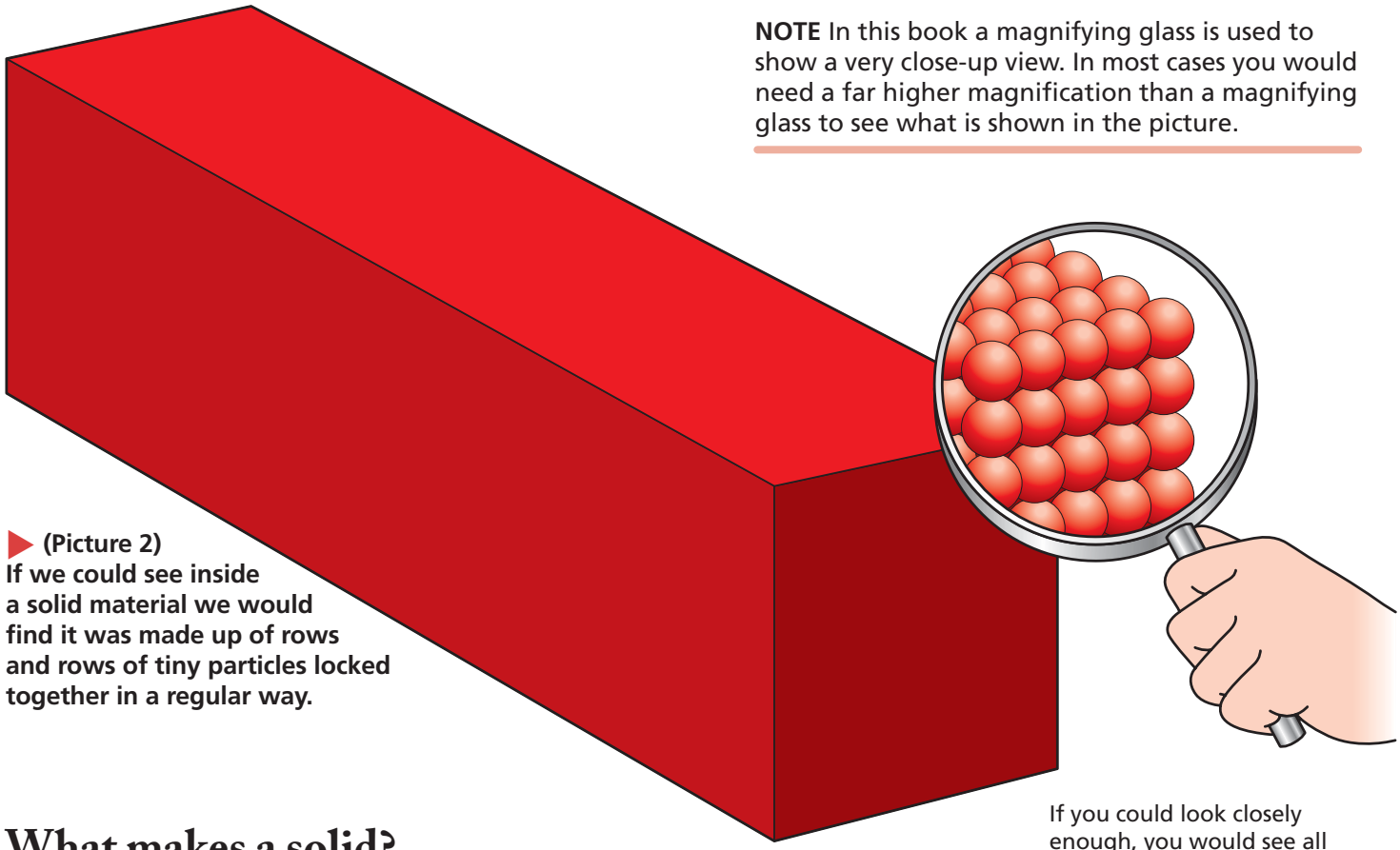
Wood fibre used to make paper

Metal gears

Wool

Margarine

NOTE In this book a magnifying glass is used to show a very close-up view. In most cases you would need a far higher magnification than a magnifying glass to see what is shown in the picture.



(Picture 2)
If we could see inside a solid material we would find it was made up of rows and rows of tiny particles locked together in a regular way.

If you could look closely enough, you would see all of the particles in a solid arranged in regular patterns.

What makes a solid?

Solids do not move unless they are pushed or pulled because they are made of tiny particles that are stuck tightly together (Picture 2).

Why some solids are flexible

You can change the shape of some solids just by pushing or pulling them. These solids are **FLEXIBLE**. When you push or pull a flexible solid, you unstick some of the particles it is made from. This allows the particles to slide past one another. Once you stop trying to change its shape, the particles stick back firmly together again.

How solids change

When you warm a solid, its shape can be changed more easily. For example, when butter comes out of the fridge, it is a hard block, but in a warm room it soon becomes softer. When steel is heated in a furnace it becomes softer and can more easily be squashed or beaten into a new shape. Both soft and hard forms of these materials are still solids because, until they are **FORCED** into a new shape, they will not change shape on their own.

Summary

- **A solid keeps a fixed shape unless it is pushed or pulled into a new shape.**
- **Most solids are hard and strong, but some are soft and flexible.**