6 Brittle materials

Some materials break very suddenly. They are brittle.

Everyone knows that you have to be careful with some materials or they will break. Tap a china cup, or a drinking glass, too hard and it will shatter into many pieces. Chocolate is brittle too, which is why it breaks into chunks.

We use the word **BRITTLE** for a material that breaks suddenly (Picture 1).

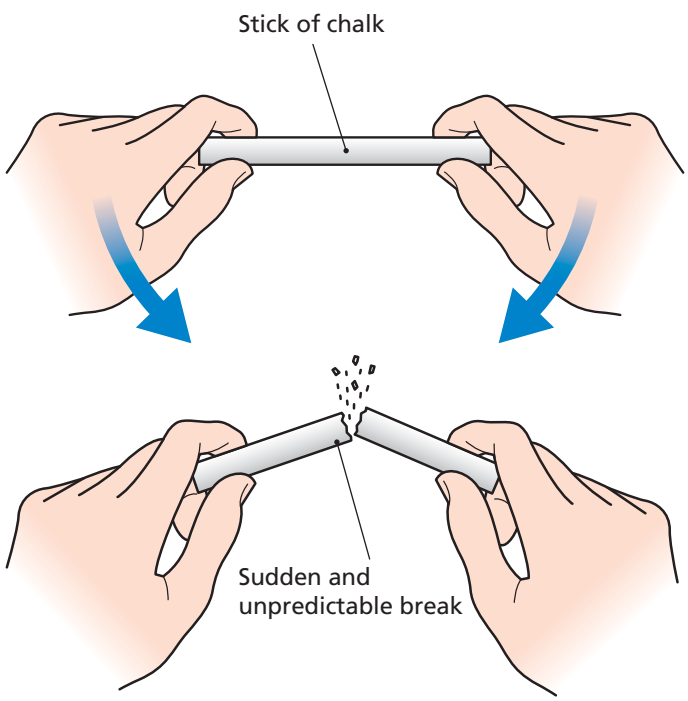
Brittle materials are held together inside so tightly that they can't move. So when the materials are pulled, twisted or struck a blow, the 'glue' holding them together simply snaps.

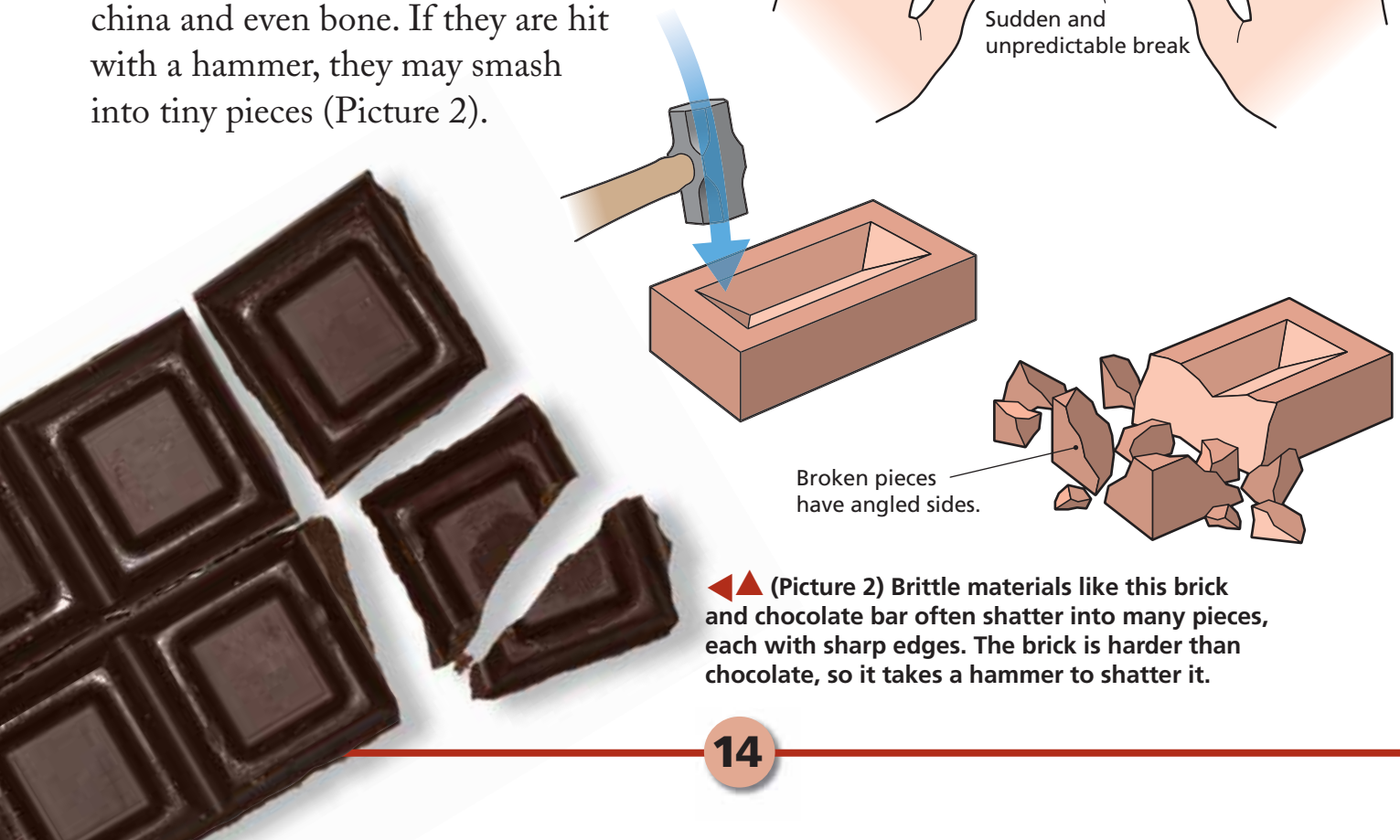
Which materials are brittle?

Many brittle things are also hard. Brittle materials include glass, rock, concrete, china and even bone. If they are hit with a hammer, they may smash into tiny pieces (Picture 2).

Ice and a few plastics are also brittle (Picture 3), but very few metals or fibres are brittle.

▼ **(Picture 1) A stick of chalk is brittle. It will snap if bent.**





◀▲ **(Picture 2) Brittle materials like this brick and chocolate bar often shatter into many pieces, each with sharp edges. The brick is harder than chocolate, so it takes a hammer to shatter it.**

Why are brittle things used?

You may think something that smashes easily is useless. But we use glass and china all the time. We put up with their brittleness because their other properties are so good. Glass, for example, may be brittle, but we use it because we can see through it (it is **TRANSPARENT**). Some spectacles use lenses made of glass.

Brittle materials are only weak when twisted or pulled or struck (Picture 4).

We can make brittle materials less likely to break by combining them with other materials. Builders, for example, put steel rods inside concrete (this is called reinforced concrete). Car makers sandwich sheets of plastic between glass in windscreens. This stops the windscreen from shattering during an accident.

▲ **(Picture 3) A computer is protected by a hard plastic case. The case is brittle and will smash when dropped or hit.**

Summary

- **A brittle material will snap without warning.**
- **Most brittle materials are hard.**
- **Brittle materials are usually strong.**
- **Brittle materials can be made tougher.**

▼ **(Picture 4) If a stone hits a window, the window is not able to bend, so it snaps, leaving a jagged hole.**