7 Using acids

Some common liquids have special properties. These liquids are called acids and they always cause irreversible change.

What do lemon juice and vinegar have in common? If you taste them they are both sharp and sour. The sourness is because they contain special substances called **ACIDS**. Acids are liquids that readily combine with many other substances and change them.

There are many natural acids. All of the citrus fruits contain acid, for example. This is called citric acid. Vinegar, which is usually made from apples, grapes or malted barley, contains acetic acid. These natural acids are all weak acids and do no harm to people.

Scientists can also make very strong acids, however, and they can be harmful. Car batteries, for example, contain a powerful acid called sulphuric acid.

Acids that fizz

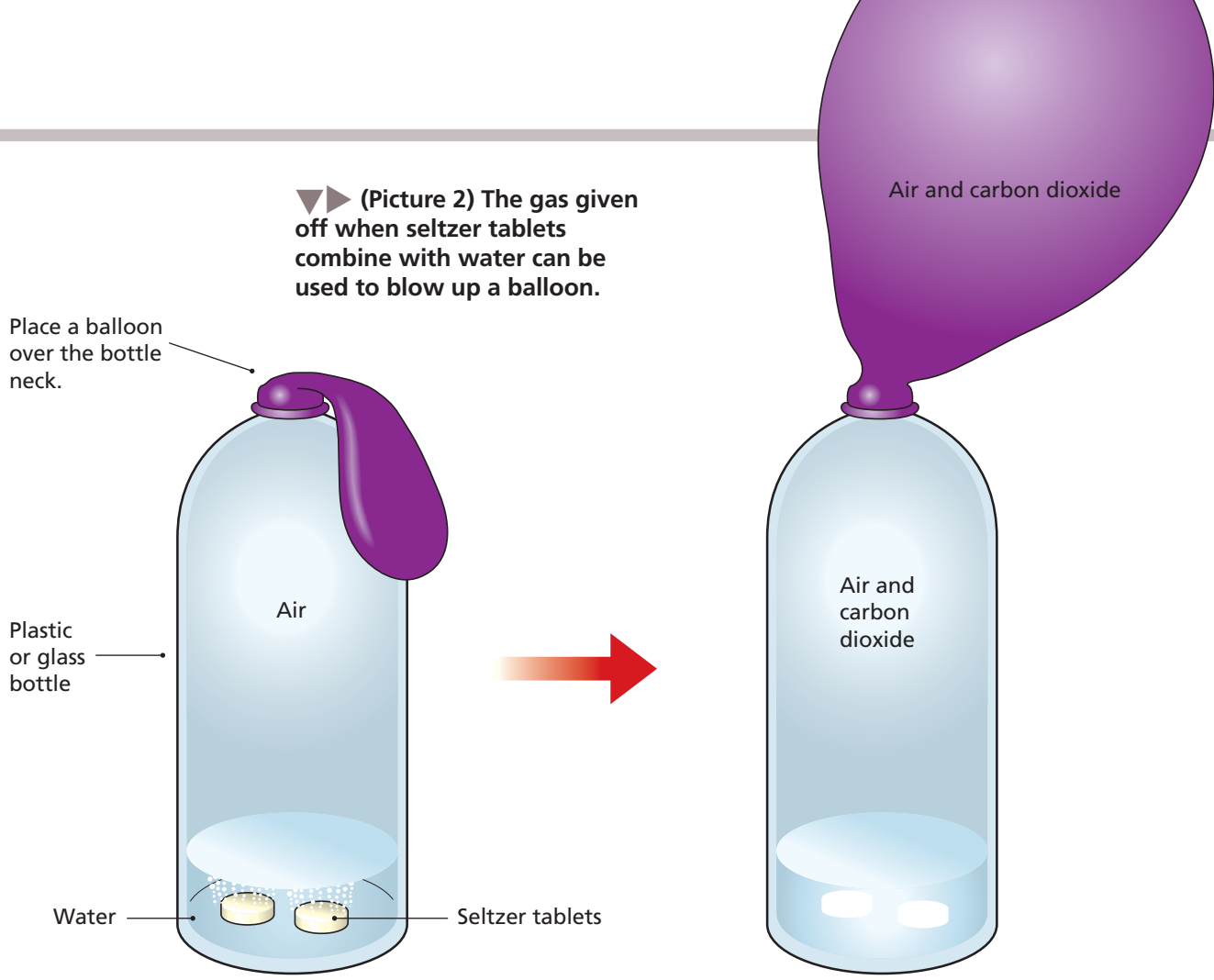
Acids can combine, or **REACT**, with other substances to release a gas. If vinegar is poured onto a piece of chalk, for example, it will fizz dramatically as a gas is released (Picture 1).

If you add a seltzer tablet (the sort sold by chemists as fizzy antacid tablets) to water, gas bubbles are produced. You can see the gas bubbles fizzing in the water, and you can hear them breaking the surface. The gas is a new substance, and it escapes to the air, so an irreversible change has taken place.

▲ **(Picture 1) When vinegar is added to a piece of chalk fizzing occurs. The gas is carbon dioxide.**

To see how much gas is produced, put two seltzer tablets into a bottle with about half a cup of water in it, and quickly fit a balloon over the top. As the gas is produced, the balloon will inflate (Picture 2).

The seltzer tablet contains two substances, both in solid form. One is baking powder, and the other is a solid form of citric acid. (Both substances are harmless, which is why you can drink the fizzy liquid as a cure for indigestion.) When they are in solid form, they will not combine. When the tablet goes into the water, the baking soda and the acid dissolve and then combine to produce



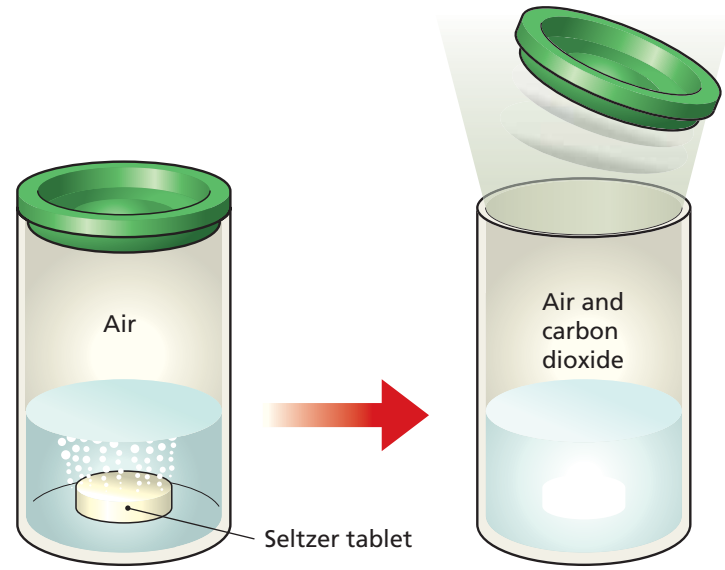
▼▶ **(Picture 2) The gas given off when seltzer tablets combine with water can be used to blow up a balloon.**

carbon dioxide gas, which expands into the air and blows up the balloon.

If you ask an adult to put a seltzer tablet and a small amount of water into a plastic 35mm film canister, you can see an even more dramatic demonstration of the power of this chemical reaction (Picture 3). Ask them to part-fill the canister with water, and quickly fit on the snap-top lid. Then shake, stand well back and wait for the pressure of the gas to blow the lid off the canister!

Summary

- **Acids combine with many other substances.**
- **Strong acids can be dangerous to handle.**
- **Some reactions give off gases.**



▶ **(Picture 3) If you ask an adult to place a seltzer tablet and water in a film canister, the top will blow off like a cannon.**

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