Making iron

Iron is one of the most useful materials, but it starts out inside rock. Releasing it requires heat and chemical reactions.

How do people get grey iron metal out of hard brown rock? The answer is to cause the rock to change.

The first people to discover how to do this began the period called the Iron Age. They were probably using some iron-rich lumps of rock as the stones to contain their fire. As the fire burned, the stones must have got hotter and hotter until the rock started to soften and the iron flowed out. As the iron solidified, they found that stomping on it with another stone would change its shape.

In this way, they discovered that the secret of getting iron from rock is to heat it. You can't do this with most iron-bearing rocks, only with those that have exceptionally large amounts of iron in them. Such rocks are called **ORES**. And even with ores, you can't get a very pure form of iron.

This explains why you don't see people getting iron from hearths today. Instead, they use giant towers called blast furnaces.

The blast furnace

A blast furnace (Picture 1) is a chemical factory designed to let pure iron flow out of rock. This is an irreversible change. To do this, two things are needed: the rock must be hot enough for the iron to melt, and unwanted substances must be separated from the iron.

Millions of tonnes of iron are produced each year, so the amount of ingredients going into the furnace is huge. They are all tipped in at the top: iron ore (which is iron combined with oxygen), coke (a smokeless form of coal made mostly of carbon) and limestone. The coke is then set alight and air is pumped in at the bottom to stoke the fire.

Inside the furnace, all kinds of chemical reactions take place. The coke and the iron ore become white hot. The carbon from the coke combines with the oxygen from the iron ore, leaving the iron behind as pure metal. The limestone combines with other, unwanted substances and, being less dense than iron, floats on the melted iron. Finally, the pure iron is allowed to flow from the bottom of the furnace (Picture 2).

Summary

- **Iron is found naturally combined in rocks.**
- **Heating iron ore with coke and limestone releases the iron.**

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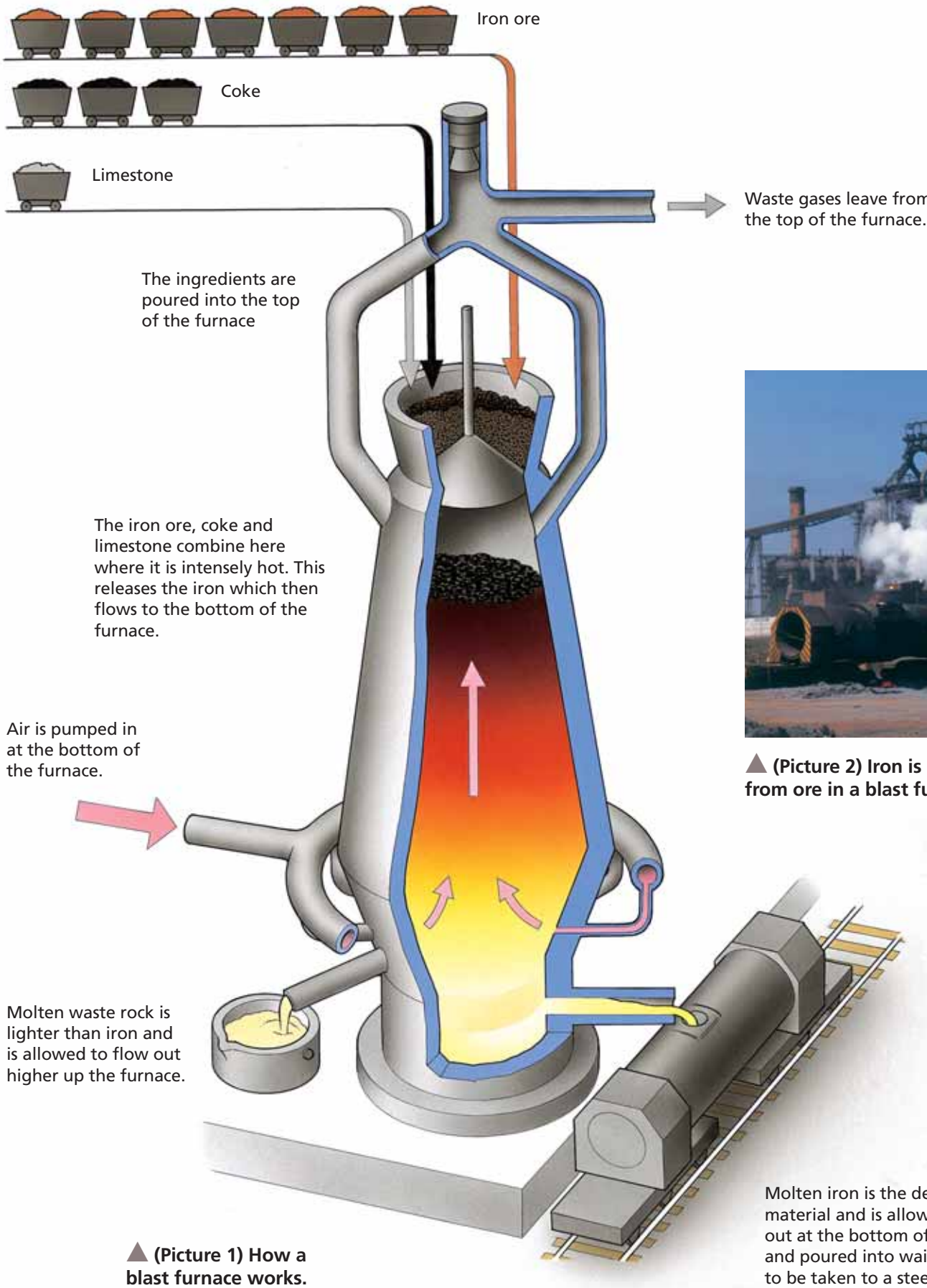

▲ (Picture 1) How a blast furnace works.

▲ (Picture 2) Iron is separated from ore in a blast furnace.