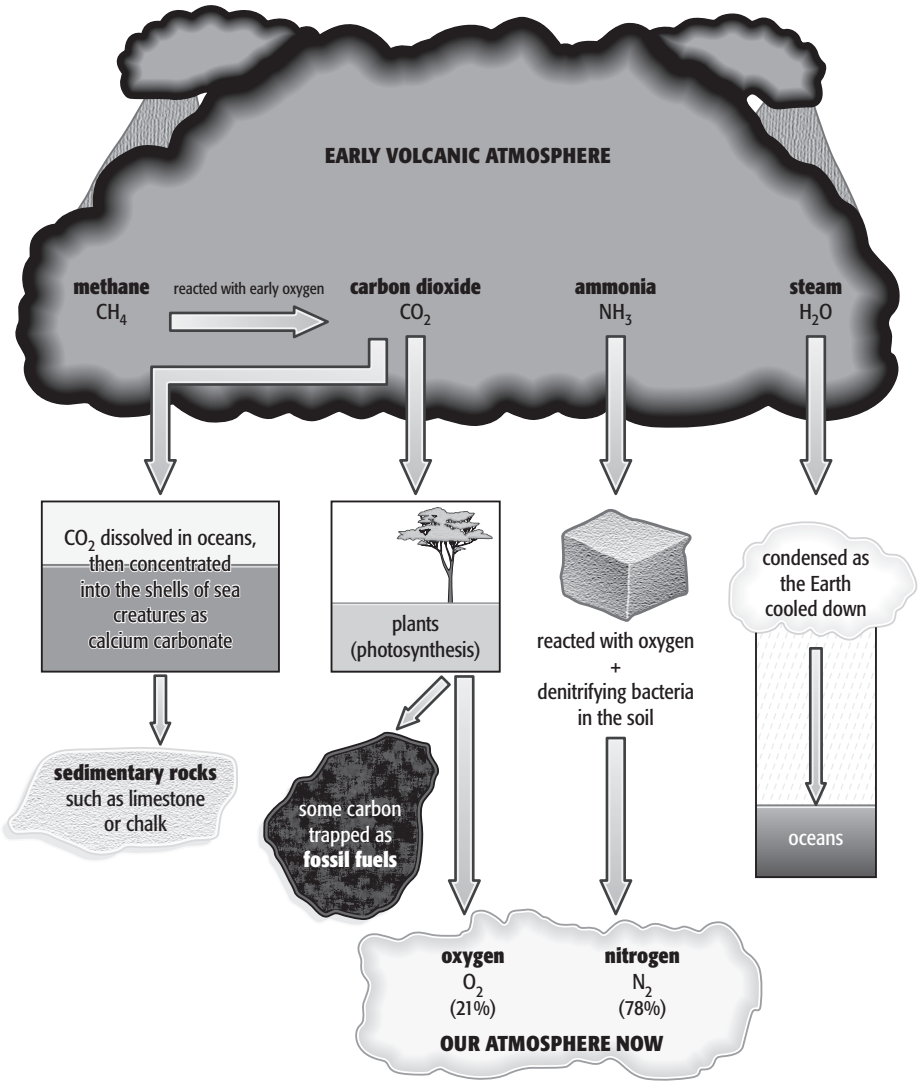
Worksheet 1.4

What happened to all the carbon dioxide?



The early atmosphere of the Earth was rich in carbon dioxide. This carbon dioxide did not just vanish into nowhere. All the carbon is still stored in the Earth.

Much of the carbon dioxide was used by plants in photosynthesis to make food which in turn formed their structure. Some of the plants were eaten by animals and the carbon became part of their structure.

When these living things died, they often became buried by sediment at the bottom of swamps, lakes and seas. Here they slowly changed due to heat and pressure and became the fossil fuels we know today: coal, petroleum and natural gas.

Carbon dioxide dissolved in the water of seas was also used by shellfish to build their shells. These shells are made from calcium carbonate. The shells together with corals, also made from calcium carbonate, slowly changed over time into the sedimentary rock limestone.

Limestone is one of the most common rocks in the Earth's crust. It is found all over the world from the bottom of the deepest sea to the top of the highest mountain. The fossil remains of shells and corals can often still be seen in it.

This worksheet is concerned with how we use one of these carbon-containing, raw materials.

Limestone

Limestone has many uses. It is used as it is for building and it is chemically changed to make cement, lime, glass and many other chemicals. It is also used in the extraction of iron in the blast furnace. In many of these uses, some of the carbon dioxide is released back into the air.

Why is this a problem?

When limestone is heated, this reaction takes place:

$$\underset{\text{limestone}}{\text{calcium carbonate}} \xrightarrow[\text{HEAT}]{} \underset{\text{lime}}{\text{calcium oxide}} + \text{carbon dioxide}$$

Lime is used in the making of steel.
Lime reacts with water and the reaction produces a great deal of heat.

$$\underset{\text{lime}}{\text{calcium oxide}} + \text{water} \rightarrow \underset{\text{slaked lime}}{\text{calcium hydroxide}}$$

Slaked lime is used by farmers to treat soil which is too acidic.

The reaction of lime with water is used in self-heating food and drink cans where the can itself heats the contents when opened.

Heating limestone with clay makes cement. Mixing cement with sand and water makes concrete.

Millions of tons of limestone are extracted from the ground each year by digging quarries. Local residents often complain about the dust, noise and the destruction of beautiful scenery.

Using the information given above, list the good things and the bad things about removing limestone from the Earth.