

COMMONWEALTH OF AUSTRALIA

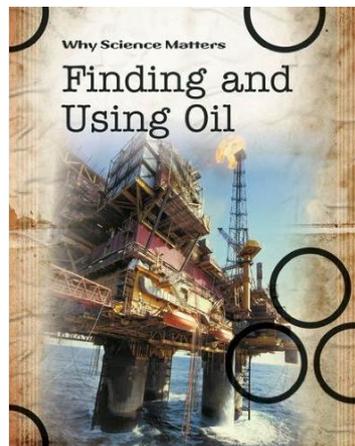
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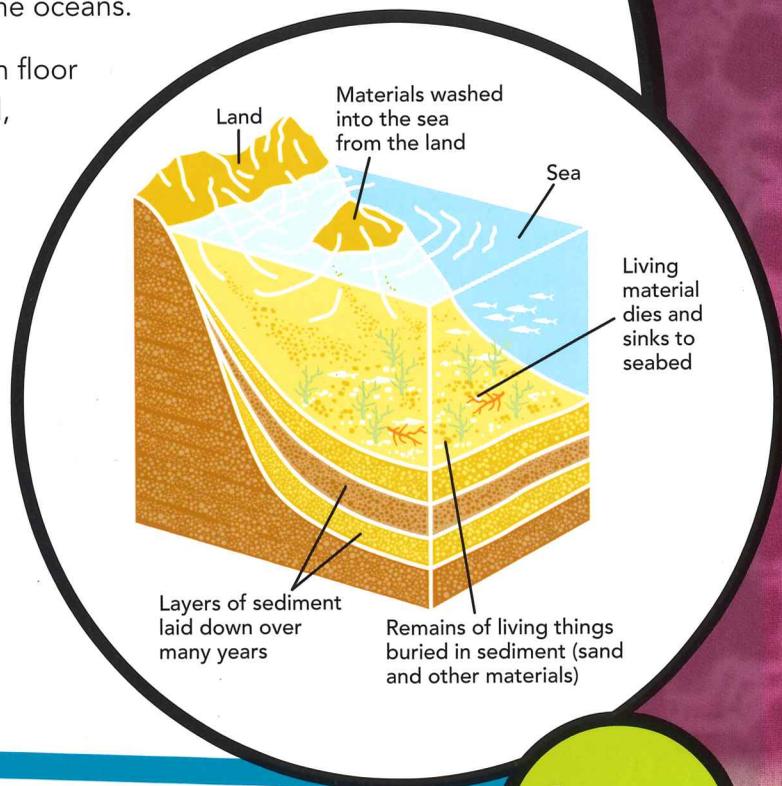
Coad, J. (2009). *Finding and using oil*. Oxford: Heinemann Library.

Where did oil come from?

Oil is a **fossil fuel**. It is made from the fossilized remains of living things. Between 500 and 150 million years ago, conditions in parts of the Earth were favourable for oil formation. At this time, seas and swampy areas were rich in microscopic plants and animals. When these tiny living things died, they either settled straight to the seabed, or rivers and streams carried their remains, mixed with mud and sand, towards the oceans.

The dead creatures sank to the ocean floor and became covered with mud, sand, and other minerals. They did not decompose quickly as dead things do on the Earth's surface. This is because they were buried rapidly and no oxygen was present.

Over millions of years, the layers of sediment built up and the mixture was compressed and heated. At temperatures of more than 70°C (158°F), the dead creatures gradually decomposed into the simple chemicals we now find in oil.



CASE STUDY

A different view of oil formation

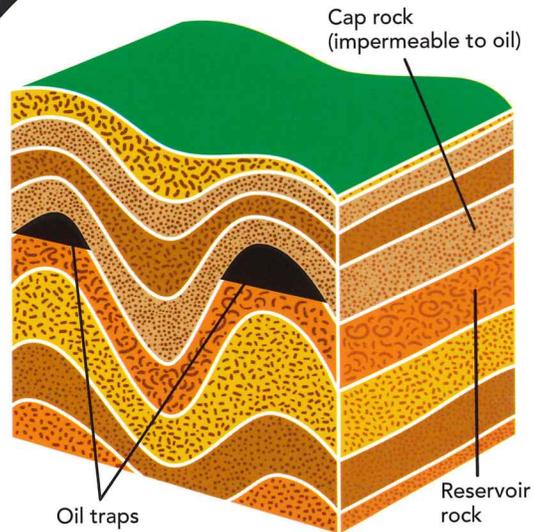
There is good evidence that oil came from living things but we cannot prove it. Although most scientists accept this theory, some do not. They believe the chemicals that make oil have always been in the Earth's crust. They believe that hydrogen and carbon were turned into the chemicals in oil under the high temperatures and pressures found deep inside the Earth during its formation. Over time they have gradually leaked up to the surface through cracks in rocks. We'll call this the inorganic theory – because it doesn't involve any living things.

Caps and traps

Sedimentary rock such as sandstone or limestone formed with the oil over millions of years. These rocks have pores – tiny holes and spaces between the particles that make up the rock. Oil soaked into the **porous rocks** leaving them saturated like a wet sponge. We call them **reservoir rocks**. Porous rocks also soak up water. Oil is less dense than water and will tend to rise to the surface. Oil will keep rising until it reaches a “cap rock”. Cap rocks are **impermeable**. This means that liquid cannot soak through them. Clay is a good example of a cap rock.

As the Earth’s crust (rocky surface layer) folded over, oil traps were created. This process took many, many thousands of years. Oil traps are places where reservoir rock is covered by cap rock and the oil cannot escape.

There must be an impermeable layer of rock capping the reservoir rock so the oil cannot flow away. The reservoir can be under great pressure in the Earth’s crust. If we drill through the cap, oil could squirt out.



THE SCIENCE YOU LEARN: TYPES OF ROCK

There are three types of rock:

- *Igneous rock* is formed when molten material inside the Earth solidifies.
- *Sedimentary rock* is formed when deposits of sand, silt, and other materials are compressed together.
- *Metamorphic rock* is rock that has been changed by heat and pressure deep within the Earth’s crust.