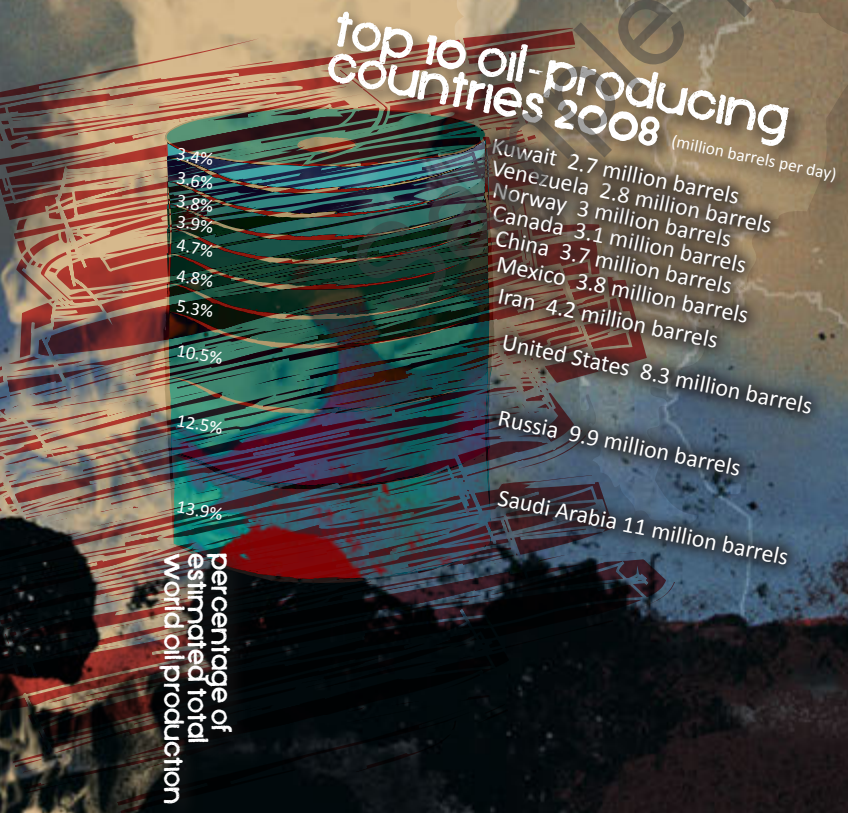
tectonic plates
tectonic action

clarify

Over time, as the Earth heated up and cooled down, and as volcanoes erupted and earthquakes **rumbled**, the Earth's tectonic plates shifted. This caused continents to drift and vast chunks of land to rise from the sea, releasing pockets of oil. In some places, lakes of oil formed; elsewhere, oil springs or **seepages** appeared. The Middle East was at the centre of a lot of that tectonic action, as what was once ocean floor rose to become desert sands.

Ancient races had no idea of the wealth that oil would bring to their descendants, but they quickly found uses for the **sticky**, **thick**, black substance. They used it as medicine for wounds, to make their canoes waterproof, to seal roads and for building walls. They also burned it for light and to evaporate sea water to make salt.



A supposition is an idea or opinion that is formed on the basis of limited evidence, rather than real proof. Find any examples?

supposition

In Asia, the ancient Chinese used hollow bamboo to bring oil to the surface, and there is evidence that Native Americans found ways to get oil from under the ground, too. But most of the world's supplies lay **untouched** and **untapped** while people still used animals for farming and transport, burned wood on their fires and whale oil in their lamps, and used wind power to sail on the sea.

opinion

In your opinion, is it possible to return to a world of the past with limited oil consumption? Why/why not?

the exploration process

It wasn't until the late 1850s that oil production began on a bigger scale. Whale oil was in short supply and it was already known that crude oil could be refined to produce kerosene (paraffin) – it was just a matter of finding a ready supply.

kerosene
geologists
geophysicists
seismologists
magnetic fields

clarify

In the United States in 1859, **Edwin L Drake**, a former Pennsylvanian railway conductor, built a wooden derrick – a tower for hoisting drilling pipes – and started drilling for oil. People laughed at him, but not for long. Soon, **rickety derricks** were being built all over Pennsylvania.

In the early days of oil production, people drilled where they found seepage and hoped for the best, but scientists are now important players in the search for fossil fuels. Geologists, geophysicists and seismologists use instruments such as gravimeters, magnetometers and seismographs to assist in the search for oil.

A **gravimeter** measures very tiny fractional changes within the Earth's gravity. Different rocks have different densities, which affect readings on a gravimeter. A low reading might indicate the presence of less dense, porous rocks such as sandstone, which could contain oil.

research

What information can you find about Edwin L Drake?

exploring for oil using a vibrator truck

A vibrator truck is positioned over a potential oil trap.

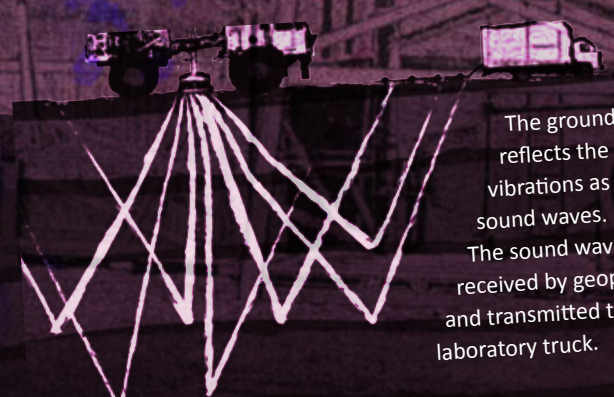
The vibrator truck pounds the ground with a big metal plate, sending vibrations into the ground below.

What questions can you generate about the first oil derricks?

question generate

A **magnetometer** measures changes in the Earth's magnetic field. That field is affected by the type of rock beneath the surface and sedimentary rocks usually have weaker magnetic fields than other types of rocks.

Seismographs measure the speed of vibrations caused by earthquakes and underground explosions as they travel through the Earth. Geophysicists can map the depth and shape of many potential oil traps by recording the changing speeds of vibrations as they encounter different types of rocks. Explosives are often used to create the big bangs that trigger these vibrations, but sometimes, instead of dynamite, vibrator trucks armed with big metal plates will be used to thrash the ground to create vibrations.



The ground reflects the vibrations as sound waves. The sound waves are received by geophones and transmitted to a laboratory truck.

How would you compare the roles of geologists, geophysicists and seismologists in a visual summary?

visual feature