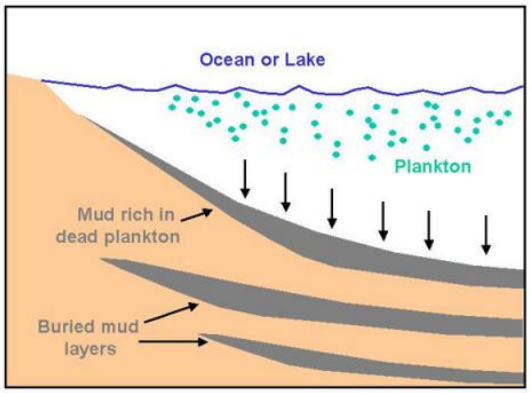
OIL - HOW IS IT FORMED?



When prehistoric plankton died, their remains sank to seabeds and lakebeds. Over geologic time, those sediment-deposited remains were deeply buried in the earth. Under the right conditions, those fossil remains were "cooked" and further transformed into a fossil fuel we call "oil." This illustration, from NOAA (the U.S. National Oceanic and Atmospheric Administration), depicts an overview of how the transformation cycle begins. Image by J. Bratton.

Oil is a naturally produced fossil fuel. Fossils, according to the American Museum of Natural History, are "evidence of prehistoric life that is at least 10,000 years old." Oil, in other words, takes a really long time to form.

How are the remains of ancient plants and animals transformed into oil which fuels the modern world? The Society of Petroleum Engineers has created an educational web site which summarizes this very slow, naturally occurring process:

> *Millions of years ago, prehistoric plant and animal remains washed into the seas along with sand and silt. Layer upon layer of the organic materials piled up on the sea bottom. These thick layers were buried with layers of mud, sand, and silt that trapped the organic material.*
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> *Without air, the organic layers could not rot away. The mud thickened and pushed down on the organic material with increasing pressure. The temperature of the organic material also increased as other processes in the earth heated it. The mud sediment was buried by more sediment.*
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> *The sediment changed into rock as the temperature, pressure and anaerobic bacteria* [microorganisms that can live without oxygen] *increased. The plant and animal remains were "cooked" by this process and slowly changed into crude oil. Crude oil is held inside the rock formation, similar to how a sponge holds water.*
>
> *Not all organic material turned into oil. There must be a trap of nonporous rock to keep the oil from seeping out along with a salt or clay seal to prevent the oil from rising to the surface. With these conditions, only 2% of the organic material became oil.*

People have used oil for thousands of years. It can seep from its original location, under a seabed, and rise to the top of the ocean (because it is lighter than water).

It can also seep from its location, underground, where it becomes visible on the earth. That is how ancient civilizations discovered oil long before oil rigs and derricks were ever envisioned.

In today's world, too many people depend on oil to wait for natural seepage. It is used to fuel cars and planes. It is used to make plastics, medicines and household goods.

But ... oil is a scarce, hidden-from-view resource, so how do we even know where to find it? And ... once it's located, how do we extract the raw material so it can be transformed into usable products?

See Alignments to State and Common Core standards for this story online at:
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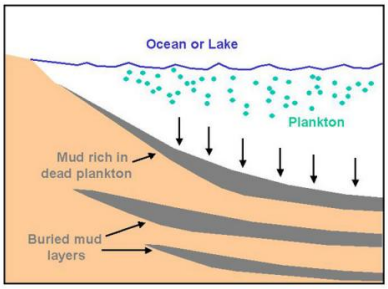
Media Stream



How Oil Is Formed

Image by J. Bratton from NOAA (National Oceanic and Atmospheric Administration). Public Domain.

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