Intermediate Energy Infobook

A comprehensive classroom resource containing fact sheets that introduce students to energy, and describe energy sources, electricity, consumption, efficiency, conservation, transportation, climate change, and emerging technologies. The Infobooks can be used as a resource for many energy activities.

Grade Level:

Int Intermediate

Subject Areas:

Science Social Studies
Math Language Arts
Technology
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NEED Mission Statement

The mission of The NEED Project is to promote an energy conscious and educated society by creating effective networks of students, educators, business, government and community leaders to design and deliver objective, multi-sided energy education programs.

Teacher Advisory Board Statement

In support of NEED, the rational Teacher Advisory Board (TAB) is dedicated to developing and promoting standards-based energy curriculum and training.

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Energy Data Used in NEED Materials

NEED believes in providing the most recently reported energy data available to our teachers and students. Most statistics and data are derived from the U.S. Energy Information Administration’s Annual Energy Review that is published yearly. Working in partnership with EIA, NEED includes easy to understand data in our curriculum materials. To do further research, visit the EIA website at www.eia.gov. EIA’s Energy Kids site has great lessons and activities for students at www.eia.gov/kids.
Petroleum

What Is Petroleum?

Petroleum is a fossil fuel. Petroleum is often called crude oil, or oil. It is called a fossil fuel because it was formed from the remains of tiny sea plants and animals that died hundreds of millions of years ago. When the plants and animals died, they sank to the bottom of the oceans.

Here, they were buried by thousands of feet of sand and sediment, which turned into sedimentary rock. As the layers increased, they pressed harder and harder on the decayed remains at the bottom. The pressure and some heat changed the remains and, eventually, petroleum was formed.

Petroleum deposits are locked in porous rocks almost like water is trapped in a wet sponge. When crude oil comes out of the ground, it can be as thin as water or as thick as tar. Petroleum is called a nonrenewable energy source because it takes hundreds of millions of years to form. We cannot make new petroleum reserves.

History of Oil

People have used petroleum since ancient times. The ancient Chinese and Egyptians burned oil to light their homes. Before the 1850s, Americans used whale oil to light their homes. When whale oil became scarce due to overfishing, people skimmed the oil that seeped to the surface of ponds and streams. The demand for oil grew and, in 1859, Edwin Drake drilled the first oil well near Titusville, Pennsylvania.

At first, the crude oil was refined or made into kerosene for lighting. Gasoline and other products made during refining were thrown away because people had no use for them. This all changed when Henry Ford began mass producing automobiles in 1913. Everyone wanted an automobile and they all ran on gasoline. Gasoline was the fuel of choice because it provided the greatest amount of energy in relation to cost and ease of use.

Today, Americans use more petroleum than any other energy source, mostly for transportation. Petroleum provides 35.2 percent of the energy we use.

Producing Oil

Geologists look at the types of rocks and the way they are arranged deep within the Earth to determine whether oil is likely to be found at a specific location. Even with new technology, oil exploration is expensive and often unsuccessful. Only about 60 percent of exploratory wells produce oil. When scientists think there may be oil in a certain place, a petroleum company brings in a drilling rig and raises an oil derrick that houses the tools and pipes they need to drill a well. The typical oil well is over one mile deep. If oil is found, a pump moves the oil through a pipe to the surface.
Top Petroleum Producing States, 2013

About one-sixth of the oil the U.S. produces comes from offshore wells. Some wells are a mile under the ocean. Some of the rigs used to drill these wells float on top of the water. It takes a lot of money and technology to drill and find oil in the ocean.

Texas produces more oil than any other state, followed by North Dakota, California, Alaska, and Oklahoma. Americans use much more oil than we produce. Today, the U.S. imports about 41 percent of the oil it consumes from other countries.

From Well to Market

We can't use crude oil as it comes out of the ground. We must change it into fuels that we can use. The first stop for crude oil is at a petroleum refinery. A refinery is a factory that processes oil.

The refinery cleans and separates the crude oil into many fuels and products. The most important one is gasoline. Other petroleum products are diesel fuel, heating oil, and jet fuel. Industry uses petroleum as a feedstock to make plastics and many other products.

Shipping Petroleum

After the refinery, most petroleum products are shipped out through pipelines. There are about 95,000 miles (153,000 km) of underground pipelines in the United States transporting refined petroleum products. Pipelines are the safest and cheapest way to move big shipments of petroleum. It takes about 15 days to move a shipment of gasoline from Houston, Texas, to New York City. Petroleum can also be moved over water in a tanker.

Special companies called jobbers buy petroleum products from oil companies and sell them to gasoline stations and to other big users such as industries, power companies, and farmers.

Oil and the Environment

Petroleum products—gasoline, medicines, fertilizers, and others—have helped people all over the world, but there is a trade-off. Petroleum production, exploration, and the use of petroleum products may cause air and water pollution.

Drilling for and transporting oil can endanger wildlife and the environment if it spills into rivers or oceans. Leaking underground storage tanks can pollute groundwater and create noxious fumes. Processing oil at the refinery can contribute to air and water pollution. Burning gasoline to fuel our cars contributes to air pollution. Even the careless disposal of waste oil drained from the family car can pollute rivers and lakes.

The petroleum industry works hard to protect the environment. Gasoline and diesel fuel have been changed to burn cleaner. And oil companies work to make sure that they drill and transport oil as safely as possible.