

Career Connection

Work on the frontiers of science...

There is something truly exciting about the idea of reaching miles below ocean and rock and tapping into the energy source that drives the world. As a **petroleum engineer**, you will work on land or offshore to produce oil and gas. You will be challenged to design and build wells that are among the most complex engineering projects on earth. And you will keep the energy flowing to light and heat our homes, fuel our transportation systems, and keep our industries operating.

Facts True or False?

After a well has produced for some period of time, the amount of oil and gas it makes will remain constant.

FALSE. All oil and natural gas wells are depleting resources. This means their production will always begin falling at some point until it reaches zero.

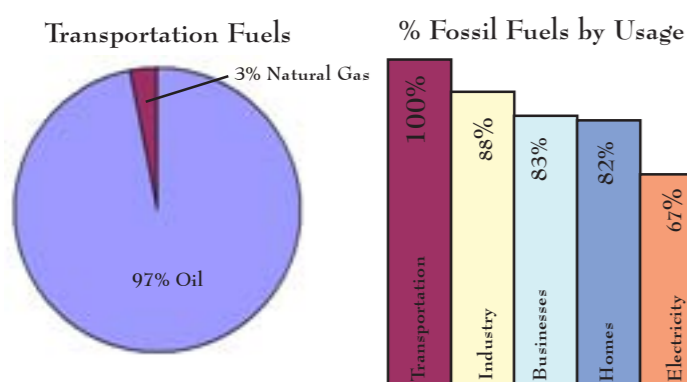
Graphic Organizers

Circle and Bar Graph

Data displayed visually in graphics, charts, graphs, and tables can be found everywhere in our world.

It is important for students to not only be able to interpret visual displays but to create their own ways to show data.

Our Economy Runs on Fossil Fuels



National Standards

Physical Science

- EXPLORE THE LAWS OF MOTION AND THE EFFECTS OF FORCES ON MOTION
- UNDERSTAND GRAVITATIONAL FORCE

Earth and Space Science

- EXPLORE MOVEMENT OF MATTER BETWEEN RESERVOIRS

Inquiry Science

- CONDUCT INVESTIGATIONS
- FORMULATE SCIENTIFIC EXPLANATIONS AND MODELS USING LOGIC AND EVIDENCE

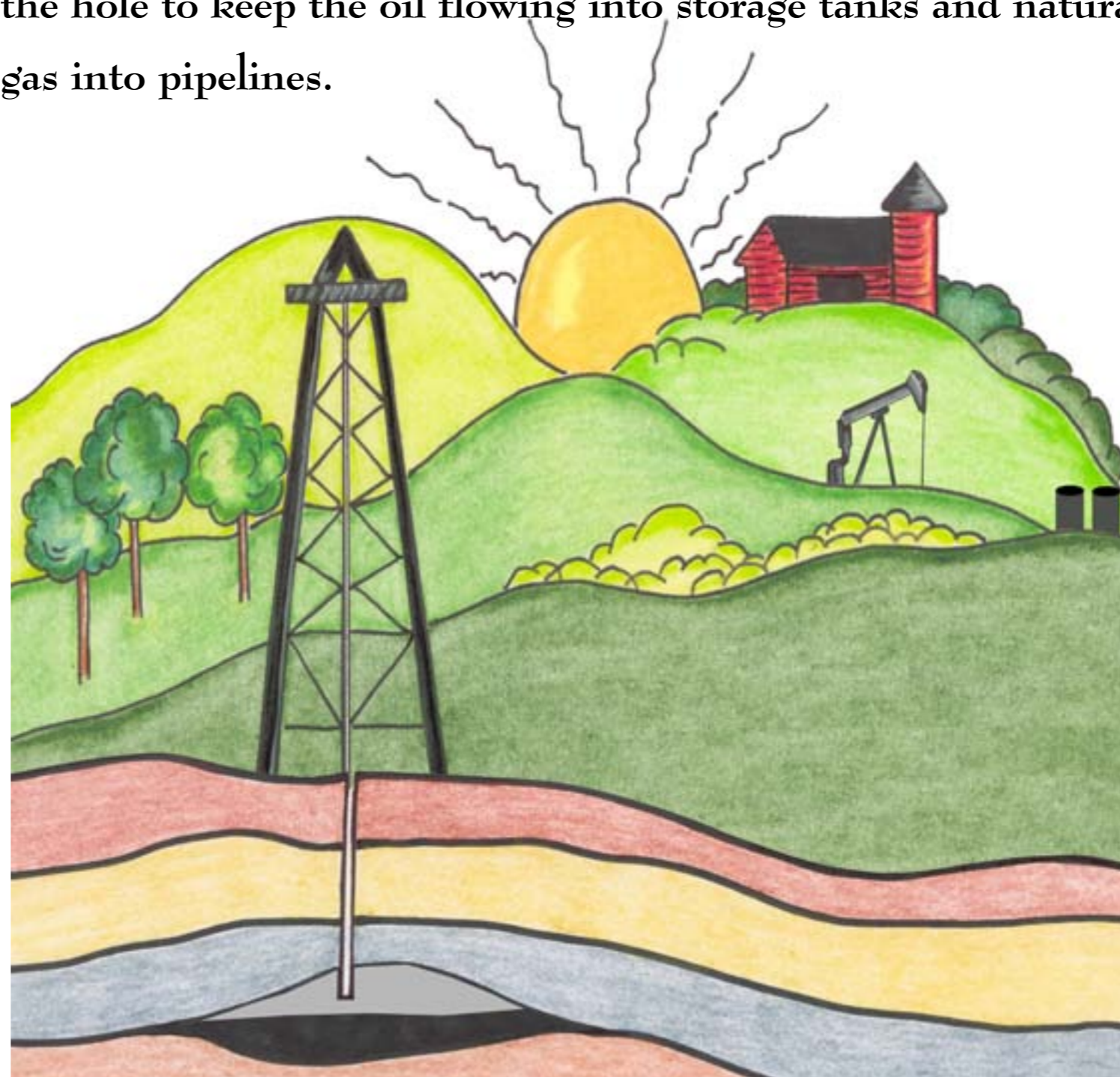
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Drilling & Production

of Natural Gas and Oil



Once the geoscientists find a possible trap, a drilling rig is used to bore a hole (about the size of a soccer ball) several thousand feet deep to learn if the trap actually contains oil and gas. Next, sensitive electronic instruments, called logging tools, are lowered into the hole. These tools send data back to the surface through an electric line. The geoscientists then analyze these data to identify rock types and whether a trap contains water, oil, or natural gas. If a reservoir is large enough, the oil and gas is produced to the earth's surface. When drilling is finished, the drilling rig is removed and a pump is placed over the hole to keep the oil flowing into storage tanks and natural gas into pipelines.



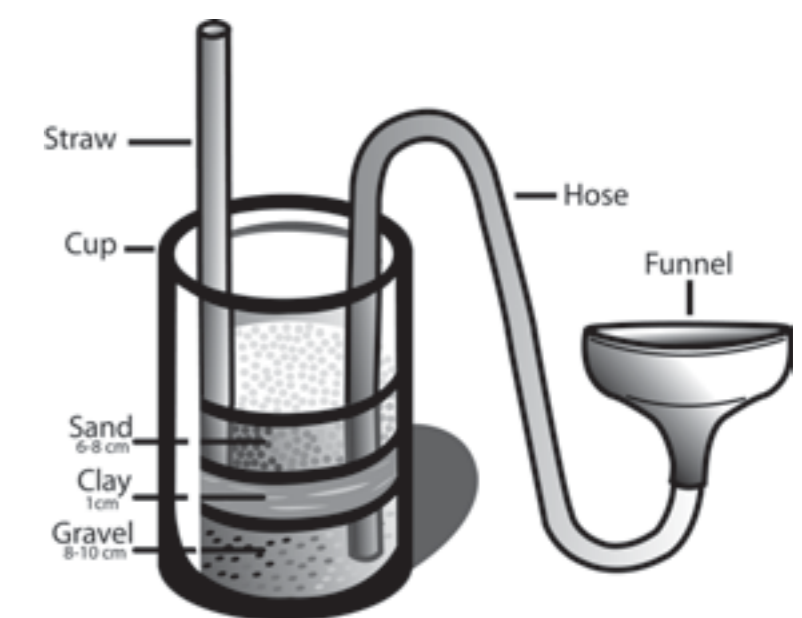
Experiment

A Model Oil Well

Demonstrate how scientific principles affect the flow of fluids to the surface.

Materials:

- Clear glass or plastic container about the size of mayonnaise jar
- 2 straws
- Aquarium gravel
- Clay or modeling dough
- Sand
- 12-15 inches flexible rubber tubing
- Funnel to fit on end of tubing
- Water



Procedure:

- Fit one straw with the rubber tubing and funnel.
- Place the straws at opposite sides of the container, next to the outside so the fluid may be observed.
- Place the aquarium gravel/sand in the bottom of the container and fill to a height of 8-10 cm. Carefully pack a layer of clay (1 cm is sufficient) on top of the gravel and seal around each piece of tubing against the inside of the container. Add a layer of sand (6-8 cm) on top of the clay layer.
- Fill the funnel with water while holding the funnel below the level of the gravel.
- Slowly raise the funnel and observe the flow of water.
- Add more water as needed and continue to raise the funnel. Observe the results.
- Using your mouth, force air into the funnel and observe what happens. Blow harder and observe.

Questions and Explanations:

- What scientific principles are at work in this experiment when you raise and lower the tubing and the funnel?
- What scientific principles are at work when you blow into the tubing?

Reflection:

- How can these scientific principles help the oil and gas industry retrieve the oil?