



Oil in the Desert

The Arabian Desert covers an area of about 1 million square miles. Most of this region is too arid to farm. However, beneath the sandy wastes lie vast reserves of oil and natural gas. Oil rigs like this one bring that oil to the surface.

1. The Geographic Setting

Southwest Asia lies at the crossroads of three continents: Europe, Africa, and Asia. During ancient times, this location brought traders from distant lands to this region. Most traveled by land over dusty caravan routes. Traders from all over the world continue to come to Southwest Asia today. However, now many of them arrive in huge tanker ships and are looking for only one product: oil.

Oil: Southwest Asia's Hidden Treasure On the surface, Southwest Asia does not appear very welcoming. Much of the region is hot and dry. The Arabian Desert is so barren that some people call it "the place where no one comes out." However, hidden beneath the region's deserts are vast reserves of oil and natural gas.

More than half of the world's proven crude oil reserves lie under Southwest Asia. **Crude oil** is another name for petroleum as it is found in the ground. Proven crude oil reserves are known deposits that can be pumped to the surface at a reasonable cost.

Worldwide demand is high for oil and natural gas. **Developed countries** depend on these fuels to meet most of their energy needs. Modern forms of transportation run mainly on oil, and power plants burn oil and natural gas to generate electricity. Oil is also a raw material that is used to make plastics, medicines, and other goods. Some of the countries in Southwest Asia have grown rich meeting the world's ever-growing demand for oil.

Although Southwest Asia has large oil reserves, it lacks other resources. Fresh water, for example, is in short supply throughout the region. Moreover, oil is a **nonrenewable resource**, which means there is only a limited amount of it. Once the world's supply of oil has been used up, it cannot be replaced.

When the supply of oil is gone, the world will have to rely on **renewable resources**. This term refers to resources that will not run out or that can be replaced. Three examples of renewable energy resources are sunlight, wind, and **geothermal energy**, which is heat energy drawn from inside Earth. Waterpower and trees are two other renewable resources.

Many Ethnic Groups, One Major Religion Most of the people who live in Southwest Asia are Arabs, people who speak Arabic. Other major **ethnic groups** include the Kurds and the Persians. The Kurds live in parts of Turkey, Syria, Iraq, and Iran, and the great majority of Persians live in Iran.

Islam is the most important religion in Southwest Asia. Only one country in the region, Israel, does not have a Muslim majority. There are, however, several branches of Islam. Conflict among different ethnic and religious groups has led to unrest and violence.

In this lesson, you will look at how oil has shaped the development of 10 countries in Southwest Asia: Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen. These countries differ in area and population. However, each has large oil reserves, and each has used oil in different ways to meet the different needs of its people.

► Geotermis

crude oil petroleum as it comes out of the ground and before it has been refined or processed into useful products

nonrenewable resource a resource that takes so long to form that it can't be replaced. Oil, which takes millions of years to form, is such a resource.

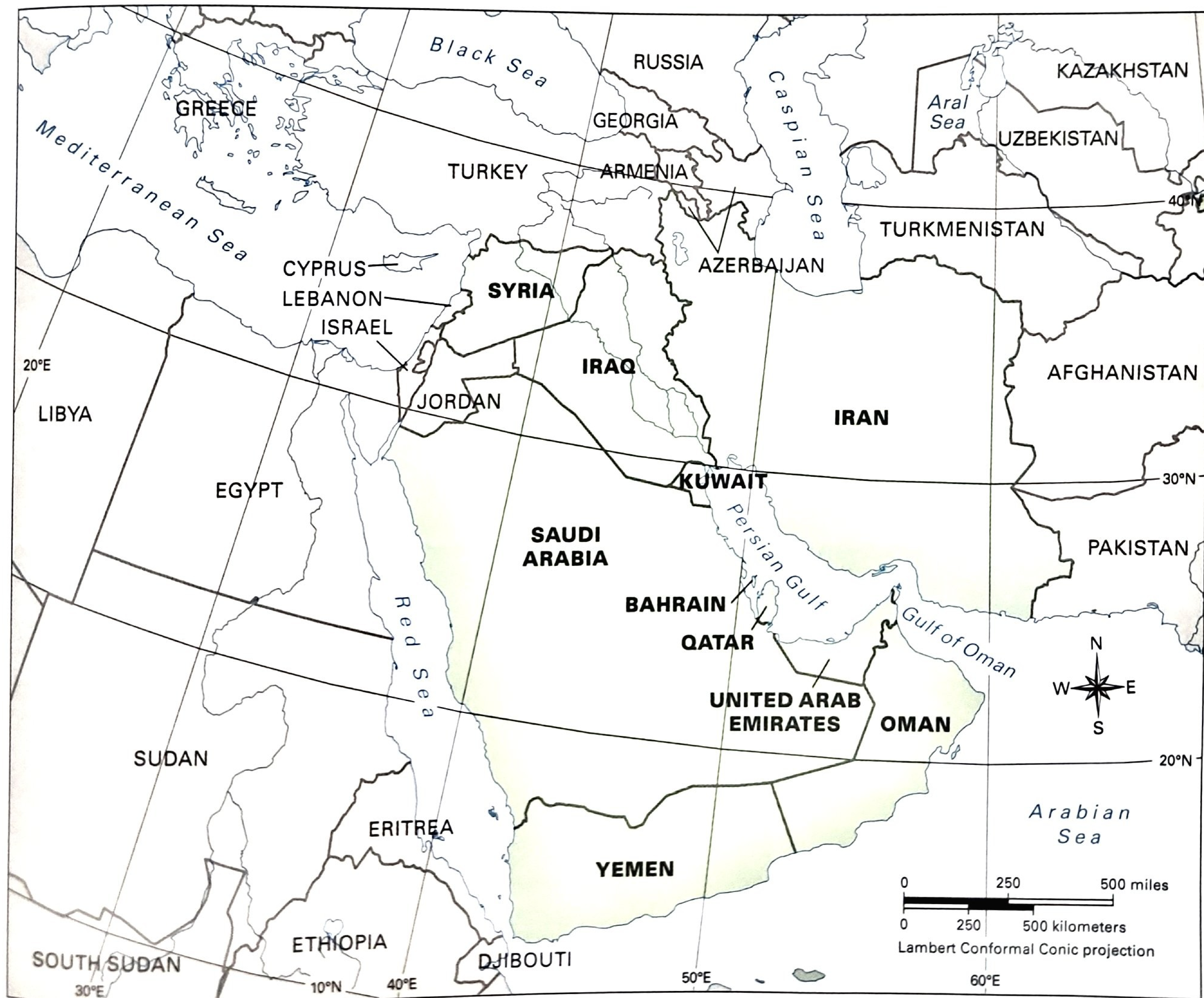
oil reserves oil that has been discovered but remains unused in the ground

renewable resource a resource that can't be used up or that can be replaced quickly as it is used up. Sunlight is a renewable resource that cannot be used up. Wood is a renewable resource that can be replaced by planting more trees.

Major Oil-Producing Countries

The 10 Southwest Asia oil countries labeled in bold type possess about half of the world's known oil reserves. Notice that many of these countries border the Persian Gulf.

Southwest Asia



2. The Geology and Geography of Oil

For most Americans, oil comes from a gas station, which is where they typically purchase oil to lubricate their car engines. To power those engines, they also buy gasoline made from oil. In some regions of the United States, people also heat their homes by burning oil. The oil that Americans burn in their cars and homes took a long time to form, and more often than not, that oil has traveled a very long distance to reach this country.

Oil Was Formed Millions of Years Ago The oil that is pumped out of the ground today was formed a very long time ago. It began as tiny plants and animals that lived and died in the oceans. After they died, these creatures sank to the ocean floor. Most of their remains were eventually transformed into rock, and layer after layer of rock was formed in this manner. However, some of these plant and animal remains did not turn into rock. The weight of the water, heat from Earth's core, and chemical changes combined to transform some of the remains of these creatures into oil and natural gas.

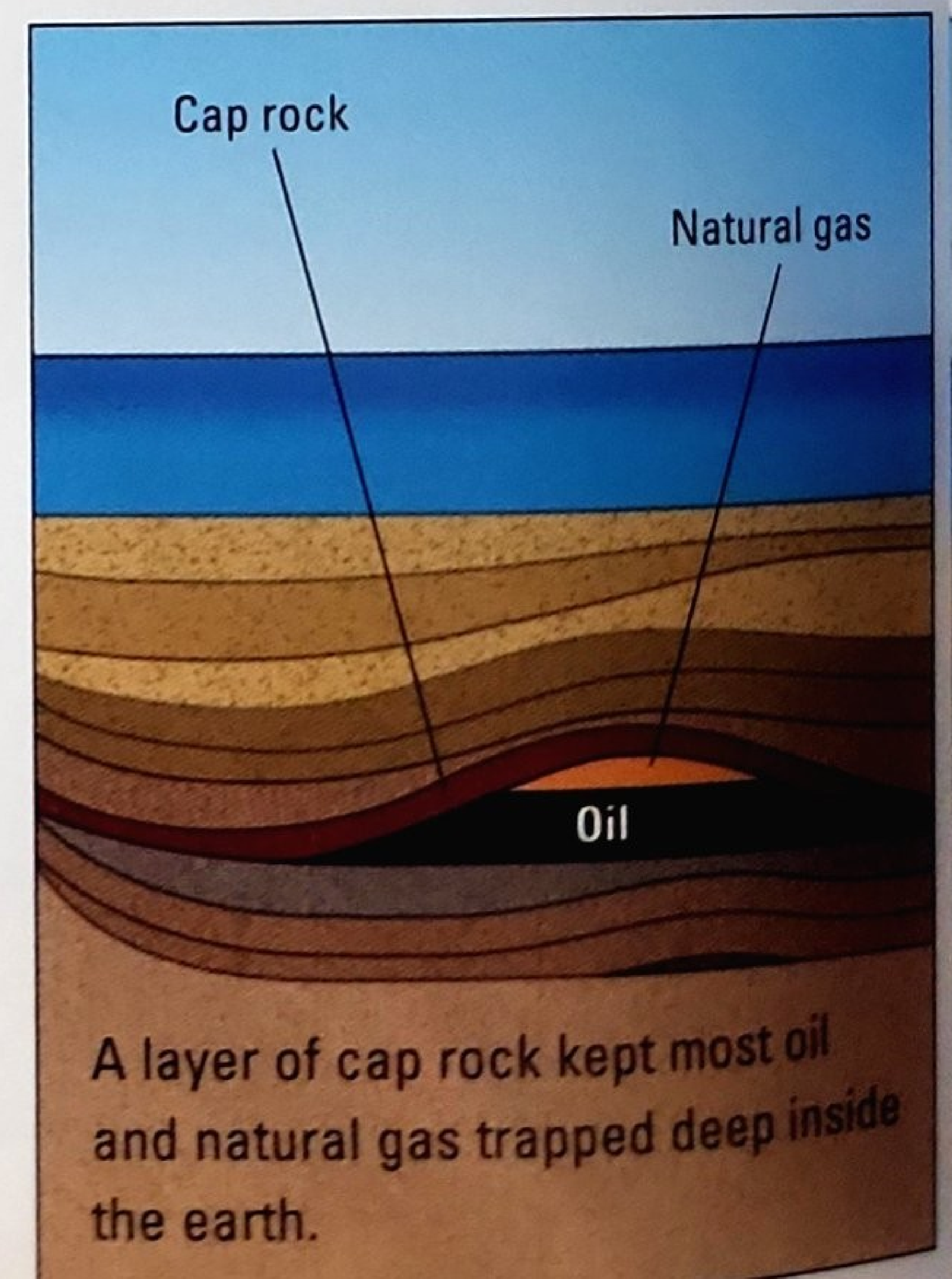
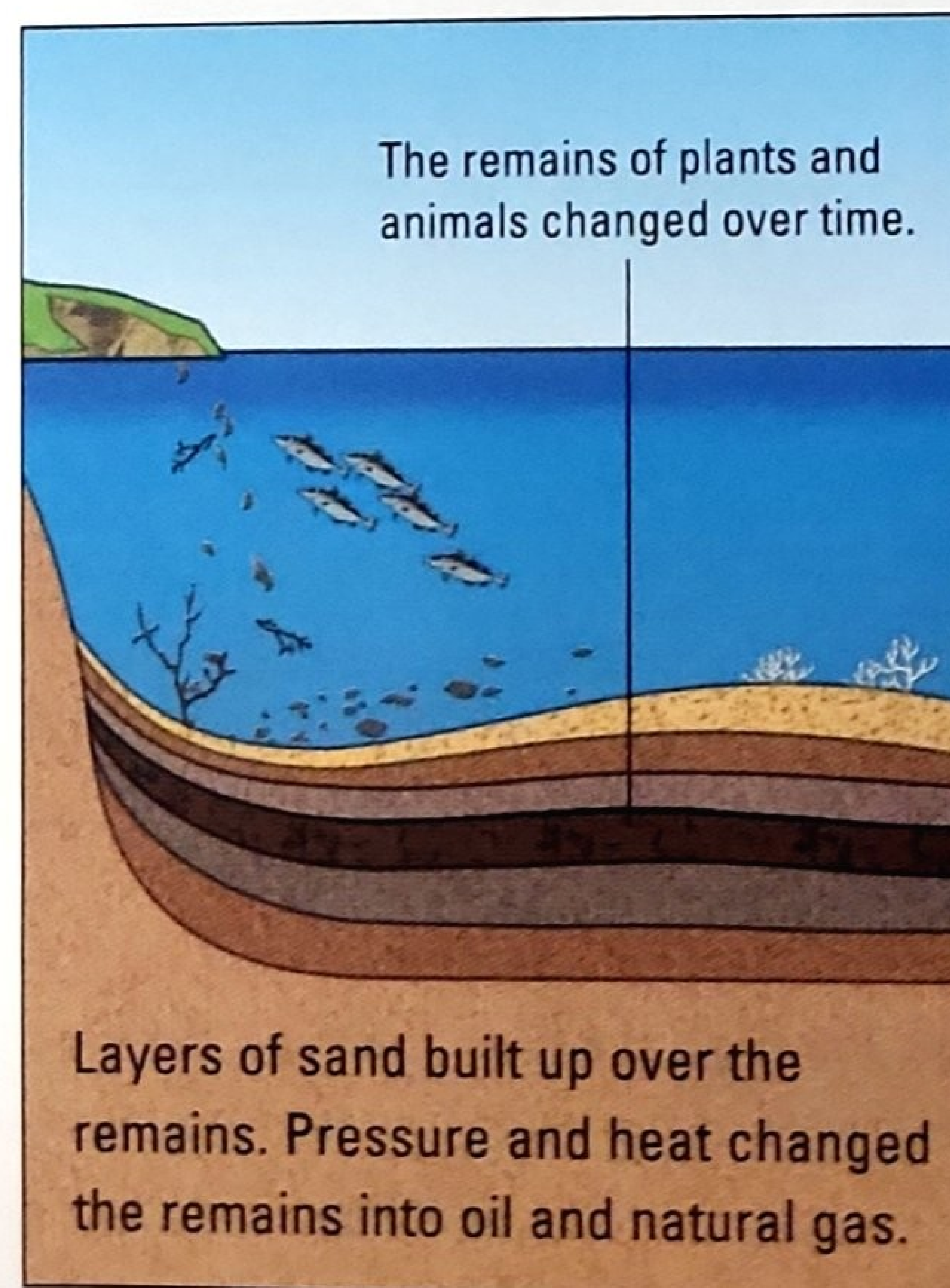
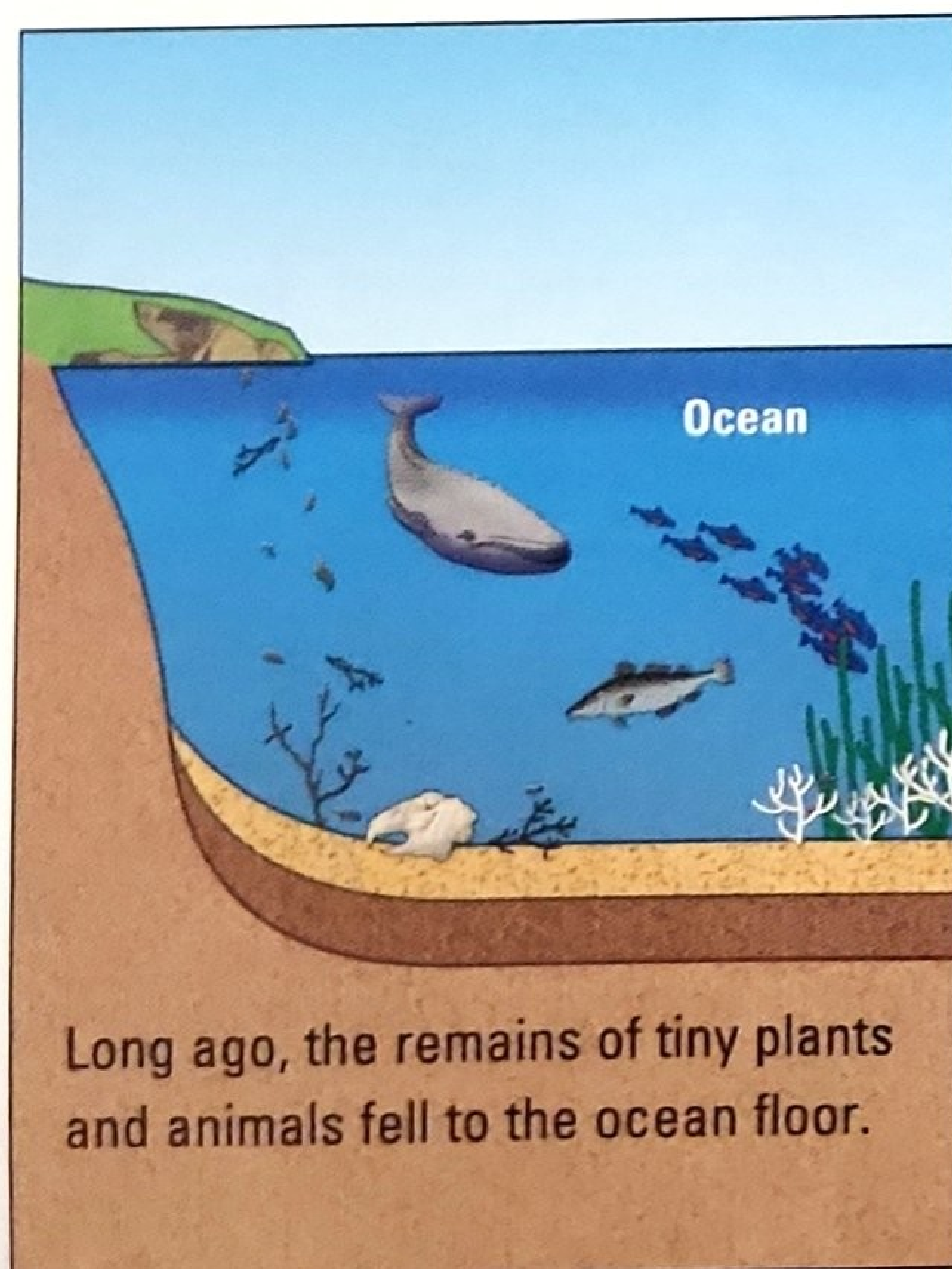
Over time, the oil and natural gas seeped into pores, or tiny holes, within the layers of rock. These pores may be too small to see, but they are large enough to hold oil and gas, in much the same way that a sponge holds water.

At times, some of this oil or gas has risen to Earth's surface. However, most of it remains trapped underneath a layer of **impermeable rock**. Impermeable means "preventing the passage of liquid or gas." Geologists call this layer a cap rock because it functions like the cap on a container, keeping most of the oil and natural gas contained deep inside the earth and preventing them from escaping.

Oil Is Found in Pockets Deep in the Earth A great amount of the world's oil lies buried under Southwest Asia. One reason for these large deposits is that millions of years ago this area was under water. The sea that covered the region contained the tiny plants and animals that were transformed into oil.

From Sea Creatures to Crude Oil

The oil we use today was formed millions of years ago. It began as tiny creatures and plants that sank to the bottom of the sea, and as they decayed, parts of their remains slowly turned into oil. Because oil formation is so slow, oil is a nonrenewable resource.



Another reason that oil formed underneath Southwest Asia has to do with the movement of Earth's crust. You read in Lesson 17 that Earth's crust is broken into giant sections called **tectonic plates**. These plates continue to drift very slowly over the surface of Earth. When two tectonic plates collide, they may create pockets where oil can form, which is what happened in Southwest Asia very long ago. The Iranian Plate and the Arabian Plate bumped up against each other, creating spaces where oil and gas were formed and trapped.

It takes extensive effort to remove oil from underground pores and pockets. Oil companies must drill through the cap rock to get at the oil underneath. Then they pump the oil up to the surface, but sometimes this pumping process is not successful. When that happens, petroleum engineers inject water or gases into the well, creating added pressure to force the oil out of the rocks. This process is called fracking.

The oil that reaches Earth's surface does not look much like the gasoline or oil that people purchase at their local gas station. Crude oil is usually combined with water and natural gas when it emerges from the ground. Oil companies have to refine this crude oil to make it into gasoline and other useful products. Some other petroleum products are asphalt, plastics, and wax used to make candles.

Oil Is Not Distributed Equally Because very specific conditions were necessary for the creation of oil, it is not surprising that these conditions existed in some places but not in others. Southwest Asia was one of the regions where an enormous amount of oil formed long ago.

Within Southwest Asia, however, the **distribution** of oil is uneven. Saudi Arabia is the largest country in this region, and it also has the most oil. In fact, around 18 percent of the world's proven oil reserves lie under its desert sand.

Kuwait, in contrast, is a tiny country. Saudi Arabia could contain 120 Kuwaits and still have space left over, but little Kuwait holds almost 7 percent of the world's known oil reserves. Other countries in Southwest Asia, such as Syria and Yemen, have less oil, but they still have more oil than most other countries in the world.

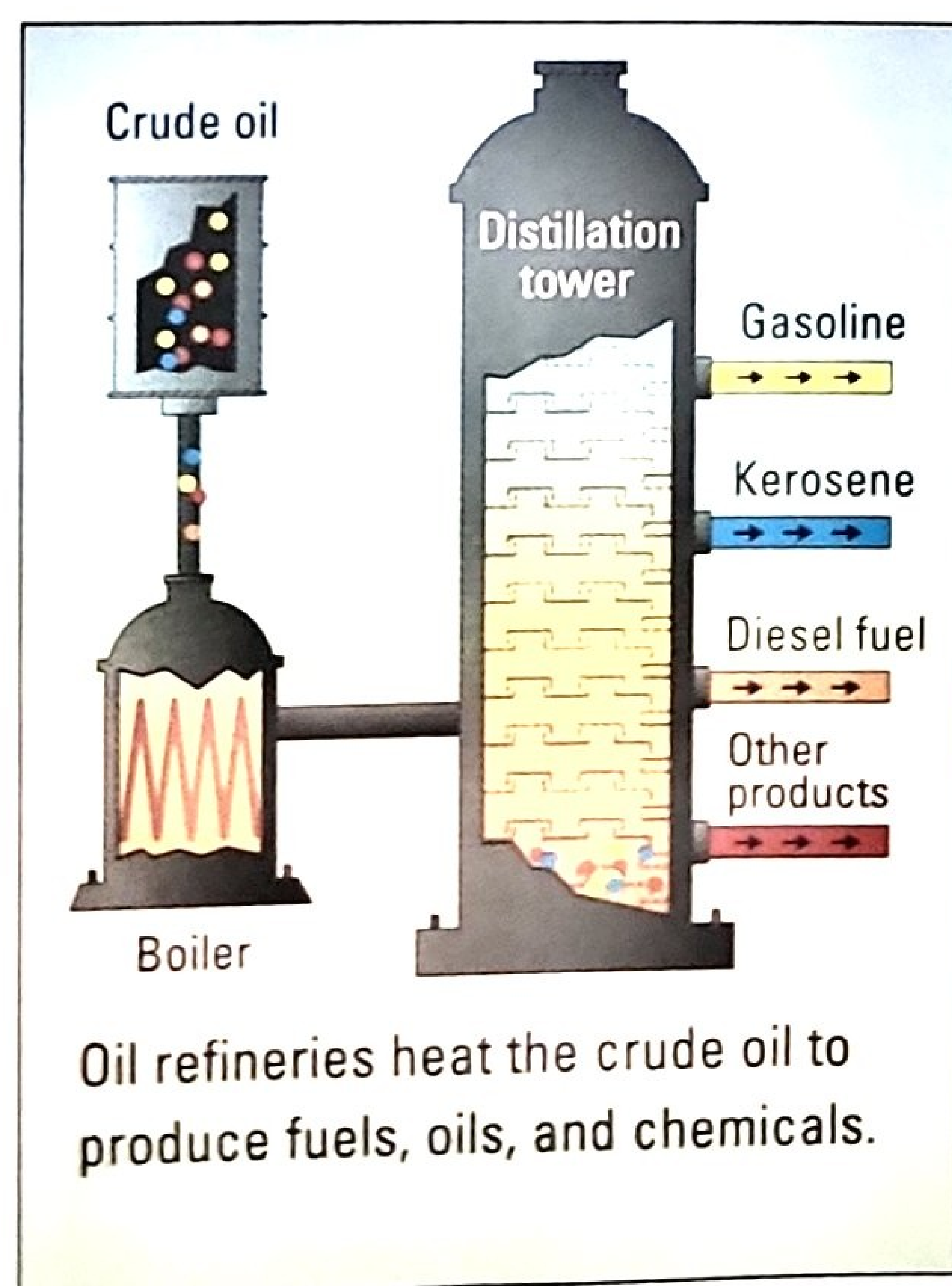
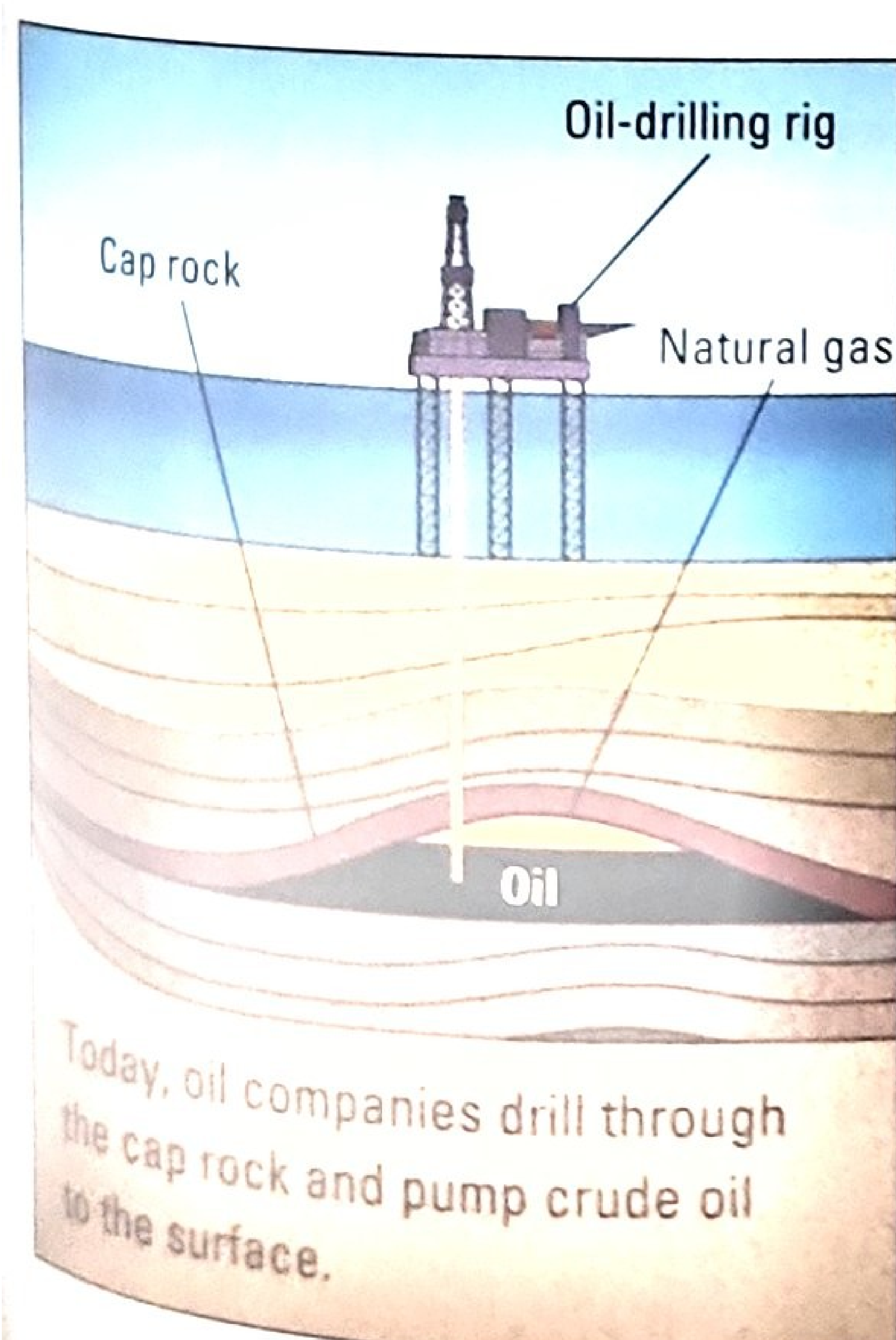
Oil Reserves in Southwest Asia

| Country | Proven Oil Reserves (in millions of barrels) |
|----------------------|---|
| Saudi Arabia | 269,000 |
| Iran | 157,800 |
| Iraq | 143,000 |
| Kuwait | 104,000 |
| United Arab Emirates | 98,000 |
| Qatar | 25,000 |
| Oman | 5,300 |
| Yemen | 3,000 |
| Syria | 2,500 |
| Bahrain | 100 |

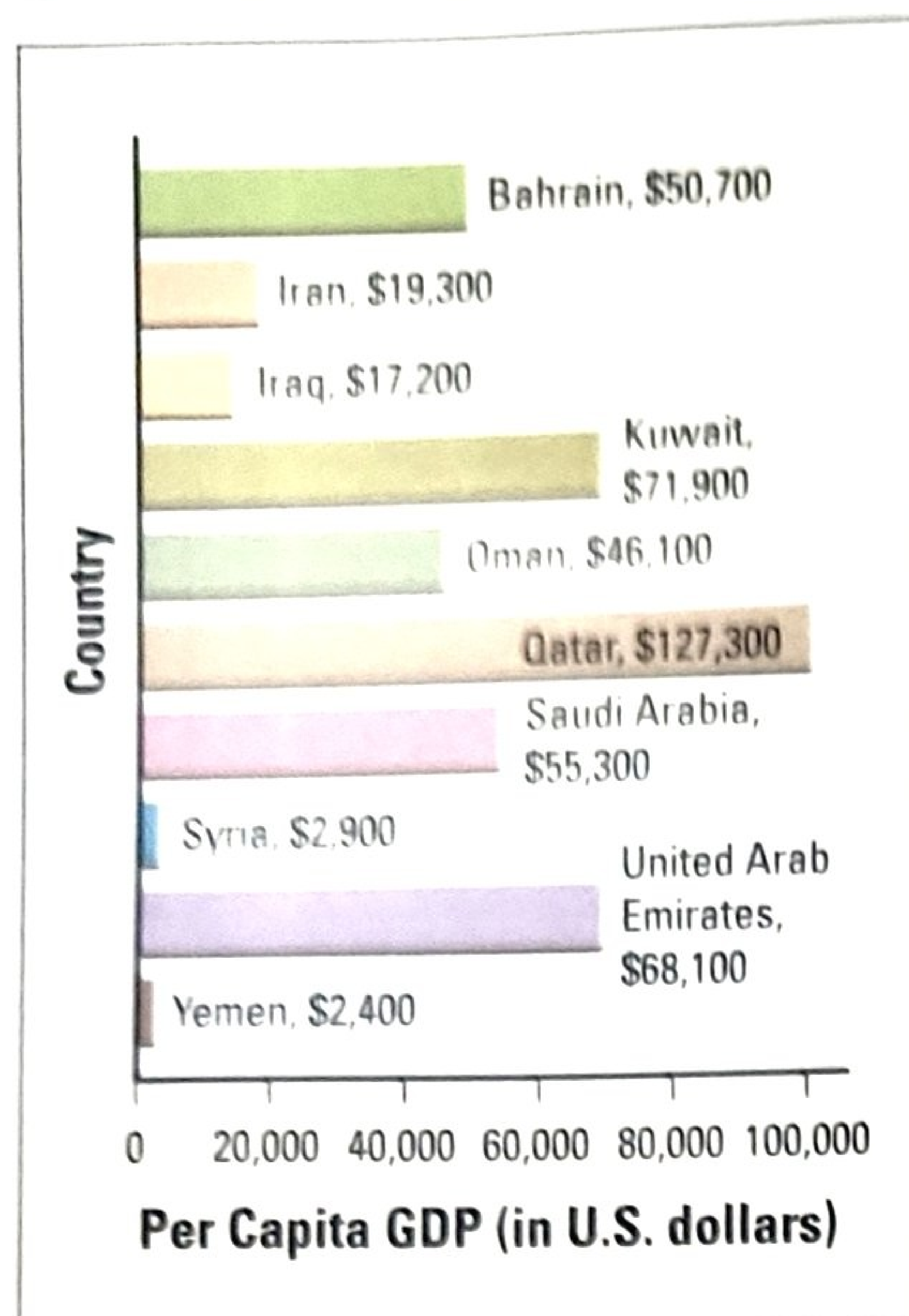
Source: Central Intelligence Agency.

Who Has the Oil?

The table lists the proven oil reserves of 10 Southwest Asian countries. Proven reserves are deposits that oil companies know they can pump to the surface at a reasonable cost.



Per Capita GDP of Southwest Asian Oil Countries, 2016



Source: Central Intelligence Agency.

Wealth from Oil

This bar graph compares the per capita GDP of 10 Southwest Asian countries. Per capita GDP shows how rich one country is compared to another, but it does not show whether a country's wealth is being divided evenly among its people.

Rich and Poor

Oil has brought great wealth to some people in Southwest Asia. However, as these images show, that wealth is not distributed evenly. Some people are fabulously rich, whereas others are desperately poor.

3. Oil Wealth and People's Well-Being

Oil has made the royal family of Saudi Arabia extremely wealthy. Consider the multi million dollar extravagant vacation the royal family took in 2015. King Salman and about 1,000 guests visited the town of Vallauris on France's Mediterranean coast. To prepare for the three-week visit, the king had an elevator built to carry him between his villa and the beach below. Among the expenses were rooms in luxury hotels for the hundreds of guests who did not stay in the villa and around 400 cars and drivers to cater to the visitors.

Few people in Saudi Arabia have such a luxurious lifestyle. Just as some countries have more oil reserves than others, some of the people living in oil-rich countries have much more wealth than others.

Oil Has Made Many People Better Off In general, oil money has improved the lives of many people in Southwest Asia. Since 1970, **life expectancy** has increased by more than 20 years. During that same period, the number of infants who die in their first year of life, or the **infant mortality rate**, has fallen by around 85 percent.

There is no doubt that oil has made some countries rich, but just how rich? There are two common methods to measure a country's wealth. The first method is to examine a country's **gross domestic product**, or GDP. As you read in Lesson 7, GDP is a measure of all the goods and services produced by a country each year. The second method of determining a country's wealth is to look at the **per capita** GDP, which measures the average income of the people in a country. To calculate this per-person GDP figure, divide the total GDP by the number of people in the country.

Per capita GDP varies extensively from country to country for many reasons. The United Arab Emirates and Kuwait, for example, both have a high GDP from selling oil. Because both of these countries have small populations, they also have a per capita GDP that is relatively high. Countries with larger populations, such as Saudi Arabia and Iran, have to divide their GDP among many more people, thereby resulting in a lower per capita GDP.

Bahrain, in contrast, has far smaller oil reserves than the other oil-rich countries of Southwest Asia. Nevertheless, its per capita GDP is quite high because the country earns much of its GDP by processing, instead of pumping, crude oil. Bahrain's wealth has also increased as a result of the country's development into an international banking center.



Per Capita GDP Does Not Tell the Whole Story Per capita GDP is an average, which assumes that a country's wealth is divided equally among its citizens. In reality, however, some people may be extremely rich, whereas many of their fellow citizens remain quite poor. Accordingly, per capita GDP does not always reflect the general well-being of the people of a country.

Another method of measuring how well people are living in a country is the United Nations' Human Development Index (HDI). As you read in Lesson 9, the HDI examines a country's per capita GDP along with other factors that reflect the general quality of life. One of these factors is life expectancy. Another significant factor is education. How many of the people are literate—that is, how many know how to read? How many of the children receive a high school education? When these numbers are evaluated, countries are ranked from best to worst, with 1 being best.

Based on the HDI, Bahrain is fourth among the oil-producing nations of Southwest Asia in terms of living well. Although Bahrain does not have the most oil or the highest per capita GDP in Southwest Asia, the country does use its wealth to educate its population. Almost all of its young people, both boys and girls, are literate. Bahrain also invests in health care. The infant mortality rate in Bahrain is one of the lowest in Southwest Asia. As you have read, the infant mortality rate is the number of deaths of babies under age one that occur for every 1,000 births in a year.

Oil Has Not Improved Life for All Money from selling oil has not eliminated poverty in Southwest Asia. Yemen, for example, remains one of the 40 poorest countries in the world. Its population is nearly the same size as the population of Saudi Arabia, but its oil reserves are only a little more than 1 percent the size of those in Saudi Arabia. This means that the amount of oil produced by Yemen each year has not been sufficient to pull its people out of poverty.

Other Southwest Asian countries have made considerable money from oil, but they have not used that money to improve people's lives. For example, Iraq has the third-largest oil reserves in the region, but from 1979 to 2003, a dictator named Saddam Hussein controlled Iraq's oil income. He spent most of Iraq's oil wealth building an army, buying weapons, and fighting wars. Very little of the money went to make life better for ordinary Iraqis.

HDI Ranks in Southwest Asia, 2016

| Country | World Rank |
|----------------------|------------|
| Qatar | 33 |
| Saudi Arabia | 38 |
| United Arab Emirates | 42 |
| Bahrain | 47 |
| Kuwait | 51 |
| Oman | 52 |
| Iran | 69 |
| Iraq | 121 |
| Syria | 149 |
| Yemen | 168 |

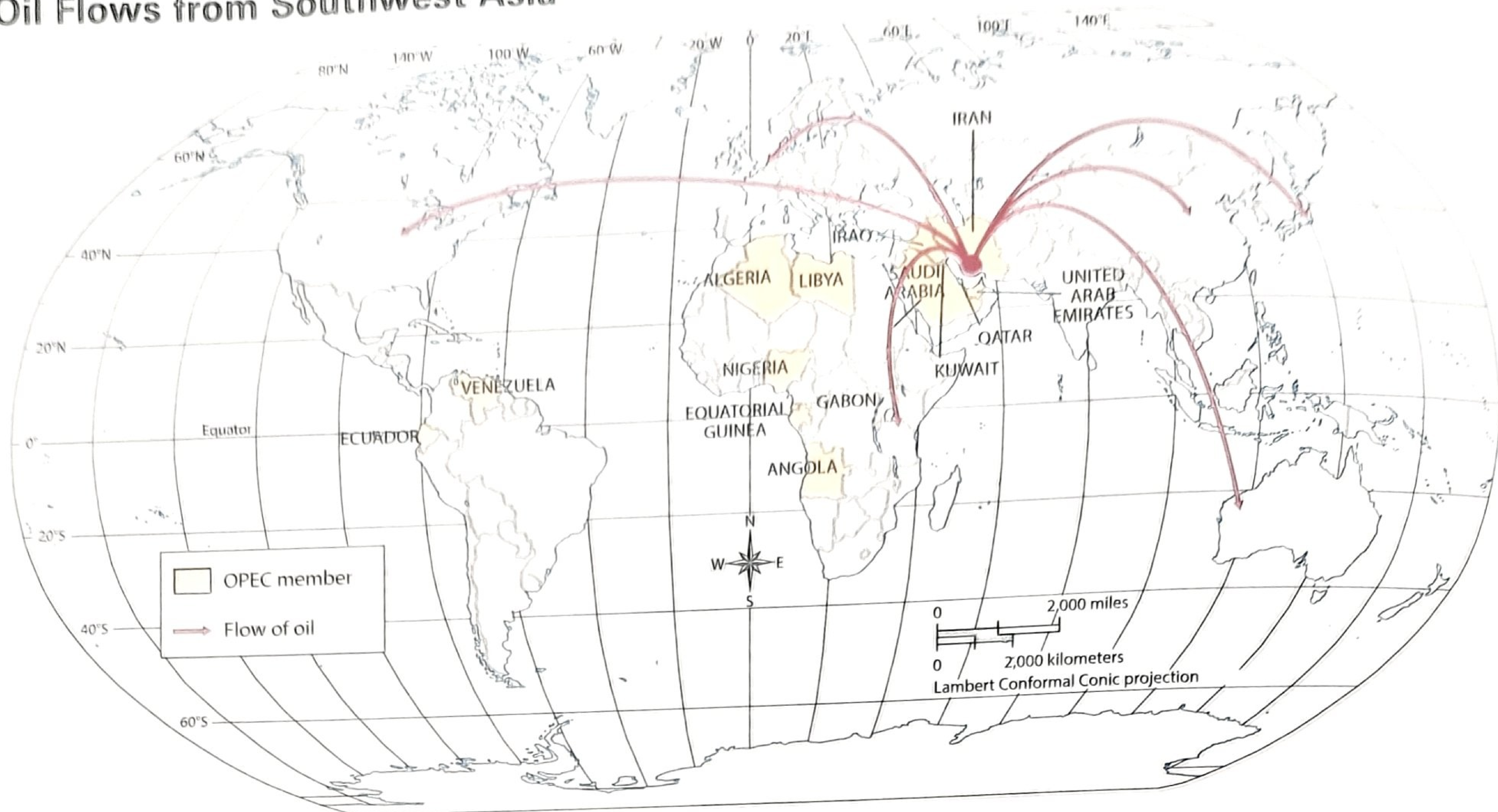
Source: United Nations Development Programme, "Human Development Reports."

Measuring Well-Being

The Human Development Index measures the well-being of a country's people. This table shows the ranks of most of the oil-rich countries in Southwest Asia. Note that Bahrain ranks fourth in this region but 47th in the world.



Oil Flows from Southwest Asia



OPEC and Oil Flow

This map shows the members of OPEC, the Organization of the Petroleum Exporting Countries. It also shows where the oil-exporting countries of Southwest Asia send their oil. The United States alone uses one-fifth of the world's oil. That's an average of 2.5 gallons of oil per person every day.

4. The Price and Flow of Oil

Thick black smoke filled the sky, darkening what had otherwise been a bright, sunny day. Kuwait's oil fields were on fire. The year was 1991, and Iraq had invaded Kuwait the previous in an effort to gain control of its oil reserves. This invasion led to a conflict known as the Persian Gulf War. When the war ended, retreating Iraqi troops torched some of Kuwait's oil wells.

The Persian Gulf War was one of many conflicts over oil in Southwest Asia. These conflicts have involved both oil-exporting countries and oil-importing countries.

Oil-Exporting Countries: Working to Control the Price of Oil Most oil-exporting countries depend on oil sales to support their economies. Therefore, one of their goals is to have a steady supply of oil flowing out of their countries. In return for their oil, they expect a steady flow of money to come into their countries.

To ensure a steady supply of oil and a steady income, several oil-exporting countries formed the Organization of the Petroleum Exporting Countries (OPEC) in 1960. In 2017, OPEC had 14 member countries. Six members were Southwest Asian countries, but the organization also included eight oil producers from outside the region: Algeria, Angola, Ecuador, Equatorial Guinea, Gabon, Libya, Nigeria, and Venezuela. Meanwhile, not all of the Southwest Asian oil producers belong to OPEC. Bahrain, Yemen, Oman, and Syria have not joined the organization.

OPEC wants oil prices to be steady—not too high and not too low. If too much oil is offered for sale, there will be less competition among buyers to purchase the oil they need. As a result, prices will drop too low. On the other hand, if too little oil is offered for sale, there will be more competition between buyers, causing prices to rise too high. In order to keep prices steady, OPEC members have agreed to regulate how much oil they will sell.

However, two realities limit OPEC's ability to control oil prices. First, OPEC cannot control all of the world's oil sales because its members produce only around 40 percent of the world's crude oil. The rest of the crude oil comes from non-OPEC countries such as Russia and Mexico. Second, OPEC members do not always act as a united group. For example, sometimes some members refuse to follow OPEC decisions on how much oil to sell.

Oil-Importing Countries: Working to Protect the Flow of Oil Other countries depend on the flow of oil from Southwest Asia to fuel their economies. The United States, Japan, and many countries in Europe are huge oil importers and therefore have a strong interest in protecting the flow of oil around the world.

As you have read, Saddam Hussein, the dictator of Iraq, ordered his military to invade neighboring Kuwait in 1990. This invasion gave Saddam Hussein control of Kuwait's oil fields. Fears grew that the dictator would target Saudi Arabia next. If Iraq were to take over Saudi Arabia, Hussein would control much of the world's oil supply. If he then decided to cut off oil sales, many oil-importing countries would suffer severe energy shortages.

The United States and many other countries formed a coalition, or alliance, to drive Iraq out of Kuwait. Some members of the coalition were oil-importing countries that did not want their oil supplies threatened by Iraq. Others were oil-exporting countries that feared losing control of their oil reserves to Iraq.

The coalition went to war in 1991 to drive Iraqi forces out of Kuwait. The Persian Gulf War lasted just a few weeks, but in that time, Kuwait was freed from Iraqi control. The coalition victory sent the world a clear message: as long as oil is the world's main source of energy, countries that import oil will work to keep it flowing.

Summary

In this lesson, you learned that crude oil forms deep within Earth. Much of Earth's oil lies under Southwest Asia, but these oil reserves are not distributed evenly among the region's countries. Likewise, the wealth from oil sales is not distributed evenly among the citizens of these oil-rich countries.

You also learned that oil is a nonrenewable resource. Eventually, the world will run out of oil. Some countries are already developing their renewable resources to meet some of their energy needs. One example is solar energy, which is energy from the sun that can be converted into heat or electricity. As oil runs out, other countries will have to follow their example. Think about this as you examine the map of solar energy in the next section.

Oil Fields in Flames

Oil is so valuable that countries have gone to war over it. In 1990, Iraq invaded Kuwait to take control of Kuwait's oil reserves. A coalition of countries drove Iraq's forces out of Kuwait, but they were not able to prevent Iraqi soldiers from setting more than 730 oil wells in Kuwait on fire. It took eight months to put out these raging fires.

Top Contributors to Persian Gulf War Costs

Country

United States

Saudi Arabia

Kuwait

United Arab Emirates

Japan

Germany

United Kingdom

South Korea

Sharing the Cost of War

Many countries shared the costs of the 1991 Persian Gulf War. About two-thirds of the money came from oil-exporting countries that wanted to protect their oil reserves. The rest came from oil-importing countries that wanted to protect the flow of oil into their countries.

