

CATEGORY: VENEZUELA: NOW

CONCEPTS: NATURAL RESOURCES, economy, geography, transportation

ACTIVITY: READING ABOUT AND MODELING THE PETROLEUM ROUTE.

Venezuela is one of the major petroleum exporting countries in the world. In this unit students will read a brief history of the petroleum industry in this nation. A description of the steps involved in exploiting petroleum is also included along with an idea for making a model oil field and petroleum route.

OBJECTIVES: Students will be able to describe the role of petroleum in Venezuela, both historically and at present. They will also be able to enumerate and describe the major steps of the petroleum industry from drilling and transporting to refining. By making a three-dimensional model petroleum route the class will be able to visualize this process.

MATERIALS: Copies of the reading on the history of oil in Venezuela  
A cardboard box  
Construction paper or thin cardboard sheets  
Paint, scissors, pens, scotch tape or glue  
Copies of the reading on the oil process

PROCEDURE:

- A. Reading - Have the students read the handout on the history of petroleum in Venezuela. Discuss in class. A good exercise for clarifying the reading would be to have students make new sentences using the key or new words that are underlined in the text.

seepage	royalty	petrochemical industry
asphalt	oil field	non-renewable resource
pitch	refinery	export profits
gout	crude oil	concessions
drilling	by-product	pipelines
diversify		

Students can also play a trivia game based on the reading plus the description of the petroleum exploitation process.

- B. Model oil route - Use a cardboard box with two of the sides cut out. Draw in and paint the different layers of rock on the sides. On the top of the box, tape or glue miniature wells, refineries, etc. The easiest way to do this is to draw the symbol for each item on a folded cardboard tab and glue or tape to the box top.

**LEVEL: MIDDLE GRADES**

Source: Gibbs, Virginia G. *Latin America: Curriculum Materials for the Middle Grades*. Center for Latin America, University of Wisconsin-Milwaukee. 1985. 1989.

Also paint in the land, sea, and pipelines. Use the reading on "The Petroleum Process" to describe the different elements in the model. The reading can either be copied and handed out to all students or explained orally by the teacher.

VOCABULARY: petroleum, derrick, boring, bit, separator, natural gas, supertanker, kerosene, lubricating oil, ointment. (See also Procedure A.)

RELATED ACTIVITIES:

1. Students can learn more about the importance of petroleum in their lives by making lists of all the products they can find at home and at school which come from petroleum and its by-products. These lists can be shared in class to make a master list which can be posted on a bulletin board.
2. Using library books and encyclopedias students can find the names of the major petroleum producing countries of the world and then locate these on a map.
3. A good discussion can revolve around what it means to the United States to be so dependent on one natural resource that is non-renewable and also imported in large quantities from distant countries. Prior to this discussion they might interview family and friends about the oil crisis of 1973 and how it affected their lives.

RESOURCES: The New Book of Popular Science, Canada: Grolier Incorporated, 1980. Growing Up with Science, Westport, Connecticut: H. S. Stuttman, 1984. International Petroleum Encyclopedia, Tulsa, Oklahoma: PennWell, 1983. Anibal R. Martinez, Chronology of Venezuelan Oil, London: George Allen and Unwin Ltd., 1969.

## A BRIEF HISTORY OF PETROLEUM IN VENEZUELA

### The Beginnings

The discovery of huge deposits of petroleum has changed the face of Venezuela. Although petroleum was not of vital importance until our own twentieth century, it has been used in Venezuela for centuries. Even before the European conquest of Latin America, Indians were aware of its existence and used the oil for medicine and for light. They found the oil in areas of seepage (places where the oil came to the surface of the land). At these areas of seepage they also found asphalt and pitch, which they used to waterproof their canoes and seal their baskets. Deer and other wild animals often got caught in the sticky pitch so the Indians hunted very successfully near the areas of seepage.

When the first Spaniards arrived, they learned from the Indians to use oil and pitch in the same ways: as medicine, for waterproofing, and as a source of light. Gonzalo Fernández de Oviedo was the first European to write about Venezuela's oil deposits. In his book, General and Natural History of the Indies, written in 1535, he calls oil a "nectar" and says it is very useful for curing diseases, particularly ones caused by cool weather. Then, in 1539, the first barrel of oil was shipped from Venezuela. It was sent to Spain to help cure the king's gout, a common illness of the times.

During colonial times, French and English pirates, who roamed the Caribbean and attacked Spanish settlements, often raided the Lake Maracaibo region of Venezuela to get pitch for repairing their ships. Later, in the nineteenth century, oil from seepage areas was sent to some cities and towns and used for street lights. Oil was, until the twentieth century, a product of only minor importance. Venezuela was chiefly an agricultural country.

### The Petroleum Boom

The modern petroleum industry was born a little over a century ago when "Colonel" Drake built the first oil well in the United States. Since then it has become one of the most important industries the world has ever known. In Venezuela, large scale petroleum production began in 1917. The oil deposits in the country had been declared property of the nation of Venezuela in 1783, so drilling for oil was controlled by the government. Since the government itself did not have the equipment and technology to drill for oil, it created a system of concessions. These concessions gave large private companies the right to drill, produce and export the oil of a specific area. These companies did have the know-how, the equipment and the money needed to develop the oil industry. In return for a concession, a company paid a royalty (a percentage of its profits) to the nation. This system of concessions was used by most oil-producing countries.

In Venezuela, the largest concessions were granted to three companies of the United States: Gulf, Shell, and Jersey. When export began in 1917, about 300 barrels of petroleum were sent abroad every day. Soon the growing importance of cars and trucks all over the world created a great need for large quantities of oil. Companies explored certain regions of

Venezuela and discovered many large oil deposits, including a giant oil field on the eastern shore of Lake Maracaibo.

By the beginning of World War II, Venezuela had become the biggest oil producer in the world and was exporting about 560,000 barrels of oil daily. Since the Arab countries entered the petroleum market, Venezuela has lost its position as number one, but it is still a very important oil exporter. In 1984, Venezuela produced over 2,000,000 barrels of oil a day. Although this is certainly a lot of oil, it is important to realize that in the same year the United States consumed 15,400,000 barrels a day!

### The Good and the Bad

The importance of the oil industry for the people of Venezuela cannot be exaggerated. People are employed on the oil fields and also the refineries, where petroleum is purified for use as a fuel. When the original crude oil is refined, some of the by-products can be used in the development of a petrochemical industry which makes plastics, motor oil, parafin, floor wax and many other products which can be exported. Many people are employed in these industries, too. The money from petroleum has helped make Caracas one of the most modern cities in Latin America. Cities and towns have sprung up near oil fields or along the pipelines which carry oil to ports for shipping. A whole network of transportation has been created to connect the areas of petroleum wells, refineries and ports.

It may seem strange, but one of Venezuela's biggest problems is also petroleum. About 90% of Venezuela's export profits come from petroleum and its products. This is a dangerous situation. If the world price of petroleum drops very low, or if a cheap substitute is suddenly found for petroleum, the country will suddenly earn much less money. The economy might collapse: there would be little money to keep industry and business going, to pay salaries, to run the government, to pay for education, to repair roads and so many other things.

Venezuelans also know that petroleum is a non-renewable resource. In other words, when it is used it is gone forever. Every day there is less petroleum in Venezuela. For this reason, the country is trying to diversify its economy, which means that Venezuela is using the money it earns now in petroleum to create or improve other industries which do not depend on oil. These industries include agriculture, food processing, consumer goods (shoes, clothing, appliances), and the computer industry. They hope to make petroleum less and less important in their nation's economy, so that once the oil is gone the country will still prosper. Venezuela is called a petroleum country but we can say that the government and people of Venezuela are using the oil to free themselves from oil.

## THE PETROLEUM PROCESS

1. Petroleum Formation

We do not know exactly how petroleum was formed. It is generally believed that many thousands of years ago countless small animals and plants from the sea dropped to the ocean bottom. Layers of these remains were covered by other layers of mud. As time passed, the weight and pressure of these many layers turned the animal and plant remains into petroleum. Exactly how this happened we don't know and this is one of the reasons people cannot make petroleum.

2. Finding the petroleum

Most petroleum is now found far beneath the earth's surface, usually under a great amount of solid rock. Since it is very expensive to drill so deep, oil companies spend a great deal of time exploring for good oil sites. Scientists locate oil deposits through their knowledge of the kinds of rocks and rock formations that may accompany petroleum. They also test areas with sound waves, magnetic devices, and shock waves to discover the different layers of rock underground. Computers use all the information to decide on the possibility of petroleum in the area. Petroleum is usually found in upward folds of layered rock. Even with these many tests, scientists can only make a good guess. If there is oil it will only be found for certain by drilling.

3. Drilling for oil

The first steps in setting up a modern oil well are building a platform for machinery and a steel tower called a derrick, which is used for raising and lowering drilling equipment into the well. Derricks are very tall: some are higher than a fifteen-story building.

The actual well is drilled by boring a hole into the earth. To do this a hard steel point called a bit is rotated very quickly, cutting through rock and going deeper and deeper into the ground. The bit is fitted inside a pipe, and as it goes deeper, new pieces of pipe are connected to make a single long line of pipe. Since the bit gets very hot from drilling against the rock, a special kind of mud is forced through the pipe, down to the bit and up again. This cools the bit and also carries small pieces of drilled rock to the surface.

Once oil is reached the bit is removed and steel pipe replaces the drilling pipe. Oil flows to the surface through the steel pipe by natural pressure from underground. Natural gas is found mixed with the petroleum and as they both rise to the surface they begin to separate. At the top of the well they enter a separator which completes the process. The gas-free oil can then be piped into large tanks. The gas is either burned (if there is very little) or it is sent to a natural gas plant where it is converted into different types of gas which can be used for heating, cooking and fuel.

4. Transporting the oil

In the early days petroleum was transported in barrels by wagon, train, or boat. Now, however, many oil fields are very far from cities and areas of industry so the most common form of transporting oil is by pipeline (overland) and tanker ship (over water). Hundreds of thousands

of miles of pipes cross oil-producing countries. These take the oil to cities, refineries and ports from where the petroleum is sent to other countries. Tremendous tankers, some called supertankers, can carry millions of barrels of oil across the sea from oil-exporting countries like Venezuela to oil-importing countries like the United States. Occasionally a tanker will have an accident and the petroleum which spills and covers the water kills the fish, birds, and marine plants for many miles.

5. Petroleum refining

Petroleum directly from the ground is not pure. It is made up of many different combinations of two elements: hydrogen and carbon. When there is a lot of carbon the oil is very heavy and becomes asphalt. Oil with little carbon is light and can be used as gasoline. Kerosene and lubricating oil are somewhere between asphalt and gasoline. In order to use petroleum we must separate these kinds of oil. This is called refining.

Refining is a complicated process that involves heat, chemicals and pressure. In large refining factories that look like silos the crude oil is heated. Pressure and sometimes chemicals are added and soon the oil divides into its different types. The heavier type stays closer to the bottom. The lighter oils float to the top area of the refinery. Pipes take different types of oil to new storage tanks.

Refineries can be located near the oil fields or many miles away. Industries are often created nearby because some of the oils that are refined can be used for making a variety of things, from plastics to ointments to roofing materials. All the products of refining are again transported to the areas where people need them. Eventually, petroleum products run our cars, heat our homes, provide plastic for lunch bags and hundreds of other daily uses.

