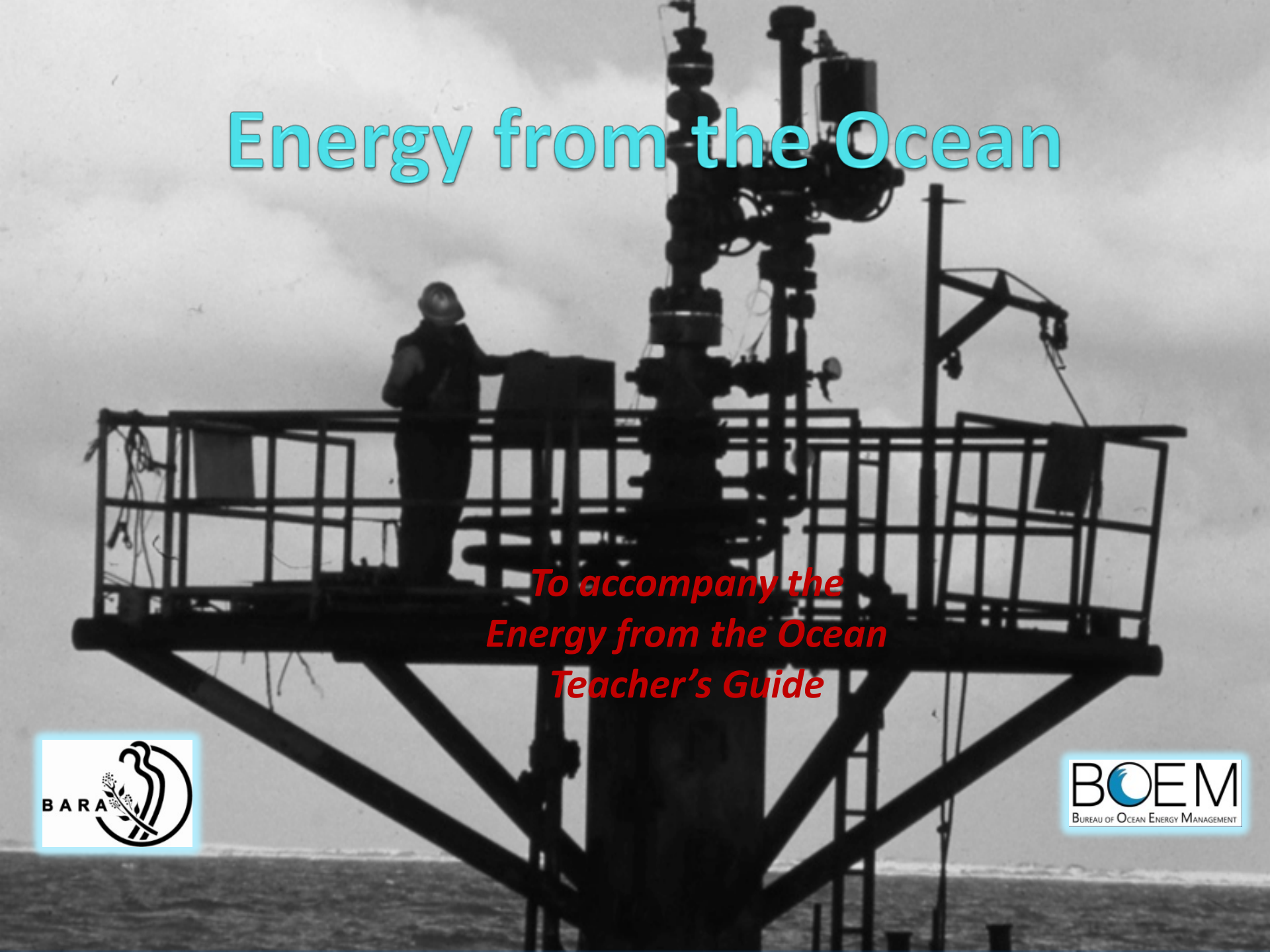


# Energy from the Ocean

*To accompany the*
*Energy from the Ocean*
*Teacher's Guide*

BARA

BOEM
Bureau of Ocean Energy Management

# Unit Introduction: Energy from the Ocean

| RENEWABLE ENERGY SOURCES | NON-RENEWABLE ENERGY SOURCES |
| --- | --- |
| | |
| | |
| | |
| | |

# Unit Introduction: Energy from the Ocean

Early rig on pilings in the Gulf of Mexico, living quarters nearest the camera. Photo taken by the Fox Co., San Antonio, TX

Source: Robert Cockerham, Offshore Oil and Gas History Project, 2003

# Unit Introduction: Energy from the Ocean

## The Gulf of Mexico Region


Source: Ben McMahan, Bureau of Applied Research in Anthropology, University of Arizona

# Unit Introduction: Energy from the Ocean

Kerr-McGee Rig 39, the Frank Phillips, working in the Gulf of Mexico in 1948

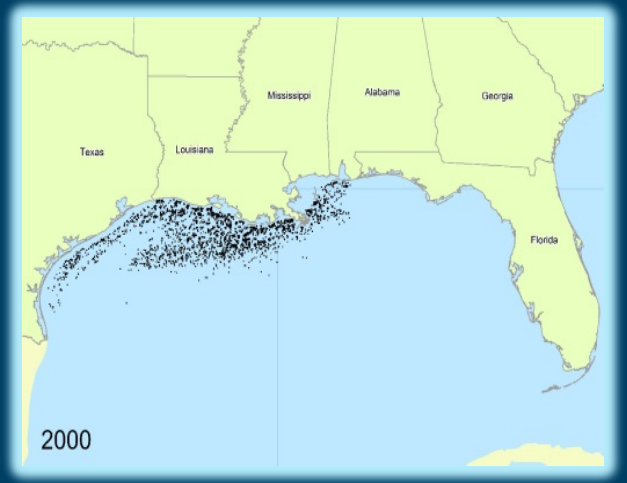
Source: Chester Pipsair, Offshore Oil and Gas History Project, 2005

# Unit Introduction: Energy from the Ocean

## Petroleum Platforms in the Gulf of Mexico, 1950-2000






Source: Bureau of Applied Research in Anthropology and Bureau of Ocean Energy Management
gulfoil.bara.arizona.edu/videos/progression

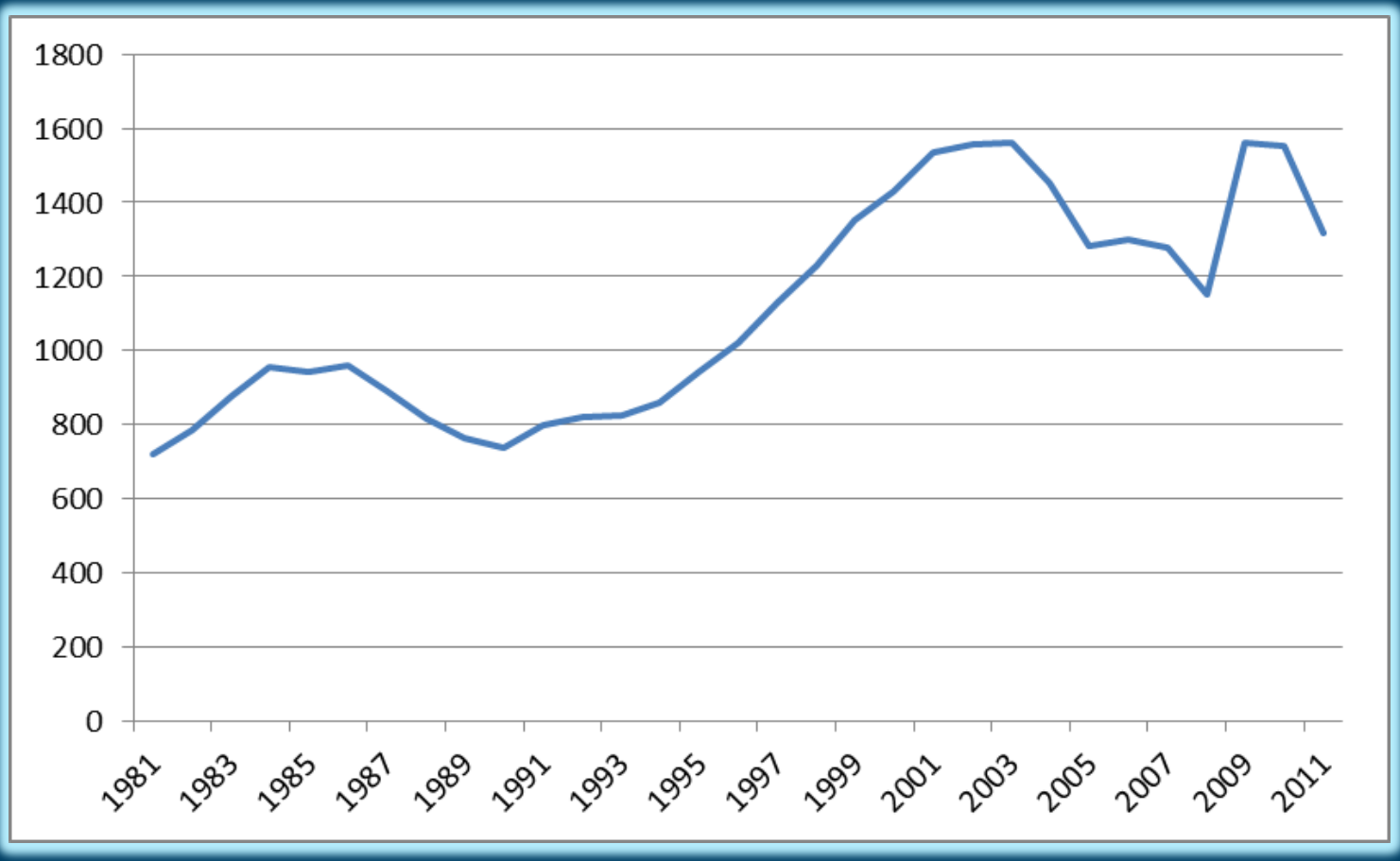
# Unit Introduction: Energy from the Ocean

## Petroleum Platforms in the Gulf of Mexico, 2010


Source: Bureau of Applied Research in Anthropology and Bureau of Ocean Energy Management
gulfoil.bara.arizona.edu/videos/progression

# Unit Introduction: Energy from the Ocean

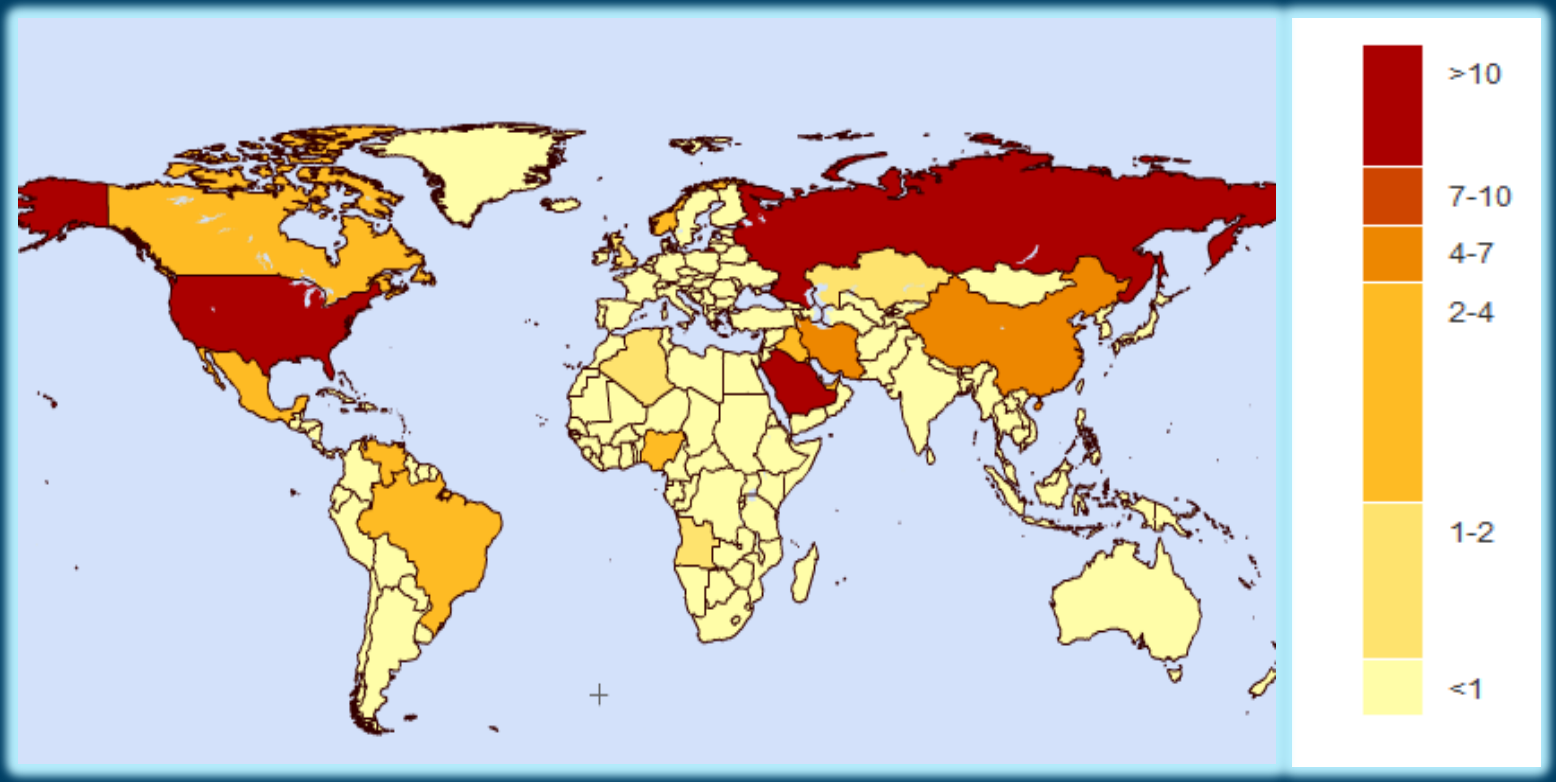
Gulf of Mexico Crude Oil Production
(thousand barrels per day annual average)




Source: U.S. Energy Information Administration

# Unit Introduction: Energy from the Ocean

**2011 World Oil Production**
*(millions of barrels per day)*




Major Oil Producing Countries in the World

Source: U.S. Energy Information Administration

# Module One: Energy from the Ocean

- Activity One: Barrel of Oil
- Activity Two: Career Connections
- Activity Three: Video: History of St. Mary Parish
- Extension: Petroleum Detectives

# What is made from petroleum?

Module One: Activity One

# Career Connections I

Module One: Activity Two

## Petroleum Engineer

Petroleum engineers are responsible for finding new ways to reach oil and gas below the earth's surface. These engineers also develop new methods to extract oil from wells that are no longer in use. They often design drilling equipment, oversee operations, and research and develop new drilling methods.

**Salary:** The median annual wage was $114,080 in May 2010; about $54.85 per hour.

**Education/Training:** Bachelor's degree in Engineering or Petroleum Engineering

**Work Environment:** Petroleum engineers spend some time on the drilling site, but they generally spend a majority of time in offices or in research laboratories.

**Related Jobs:** Marine Engineer, Material Engineer, Mechanical Engineer, Sales Engineer
Service, Tax Examiner, Payroll Manager

## Human Resource Specialist

Human resource specialists search for new employees, make sure applicants have the required skills for the position, and place workers in jobs. They also may have other responsibilities such as employee relations, payroll and benefits, and training.

**Salary:** The median annual wage was $52,690 in May 2010; about $25.33 per hour.

**Education/Training:** Bachelor's degree in Human Resources

**Work Environment:** Human resources specialists generally work in offices, but some, particularly recruitment specialists, travel extensively.

**Related Jobs:** Public Relations, Costumer Service, Tax Examiner, Payroll Manager

# Career Connections I

Module One: Activity Two

## Roustabout

Roustabouts are entry-level oil and gas workers. They follow plans designed by petroleum engineers. They operate the equipment that drills the well and that removes the oil or gas.

**Salary:** The median annual wage was $37,640 in May 2010; about $18.09 per hour.

**Education/Training:** Workers in oil and gas occupations usually must be at least 18 years old, be in good physical condition, and pass a drug test. Sometimes a high school diploma is necessary.

**Work Environment:** Oil and gas workers often work in remote locations outdoors and around heavy machinery, so they must follow precautions. Most work full time, and they often work overtime.

**Related Jobs:** Welder, Carpenter, Machine Operator, Industrial Mechanic

## Economist

Economists study how resources, goods, and services are made, used, and shared between people. Economists can make market predictions by studying historical trends. They create and use spreadsheets and databases, do statistical analyses, and design and develop computer models.

**Salary:** The median annual wage was $89,450 in May 2010. That is about $43.00 per hour.

**Education/Training:** A master's degree or Ph.D. is required for most economist jobs. However, some entry-level positions can be obtained with a bachelor's degree in economics.

**Work Environment:** Economists often work independently in an office. Some economists work from home, while others may be required to travel as part of their job.

**Related Jobs:** Mathematician, Budget Analyst, Survey Researcher, College Professor

# Career Connections I

Module One: Activity Two

## Purchasing Managers, Buyers, and Purchasing Agents

Purchasing managers are responsible for buying goods a company plans to use or resell. They must be good at negotiating for the company. Also, they evaluate sellers and product quality.

**Salary:** The median annual wage was $58,360 in May 2010; about $28.06 per hour.

**Education/Training:** Buyers and purchasing agents need a high school diploma and on-the-job training. After getting a bachelor's degree buyers and agents can become purchasing managers.

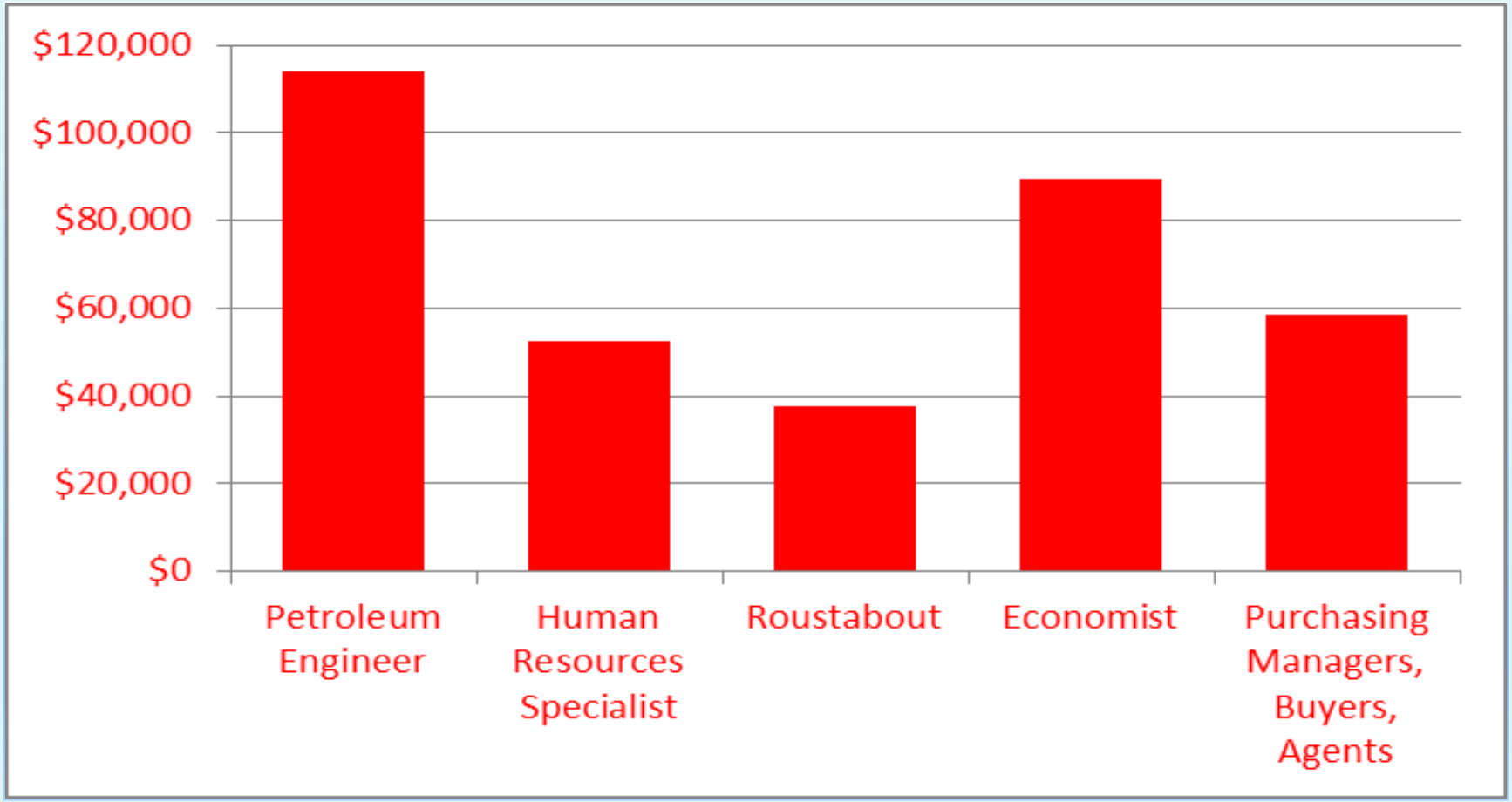
**Work Environment:** Most purchasing managers, buyers, and purchasing agents work full time. Many work more than 40 hours per week in an office.

**Related Jobs:** Sales Representative, Marketing Manager, Bookkeeping Clerk

## Analysis Activity

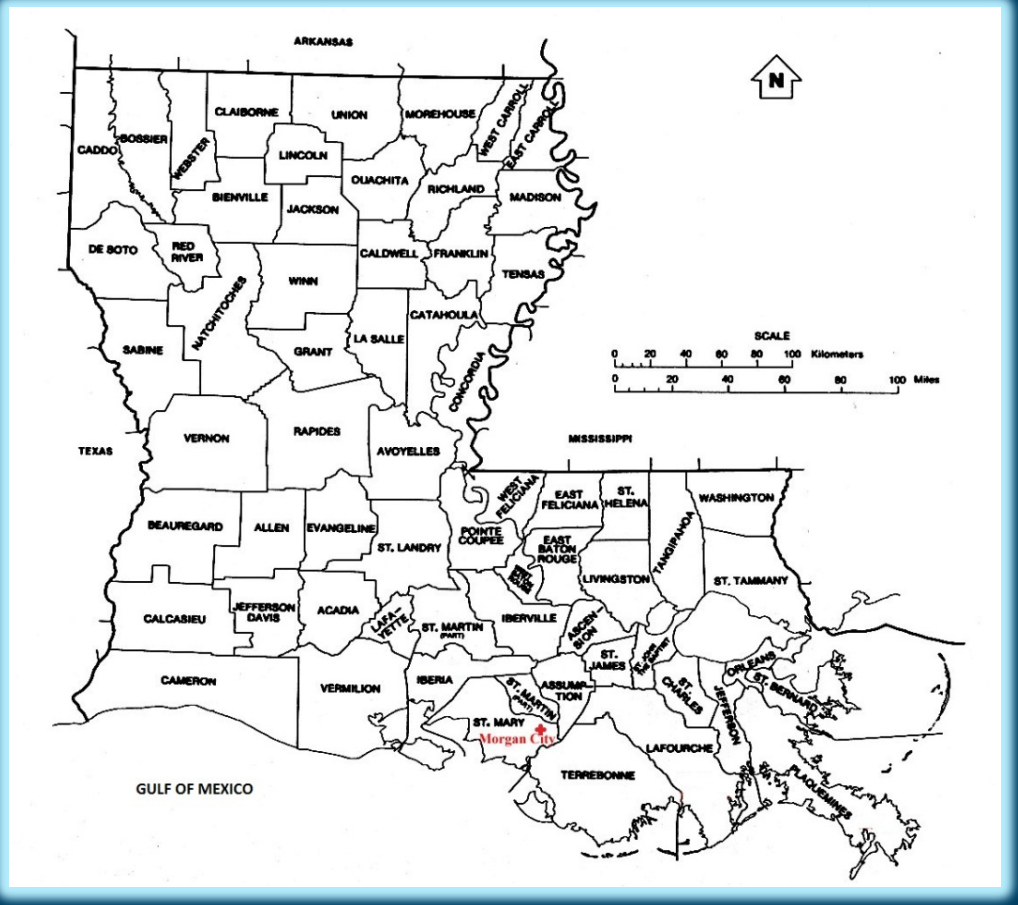
1. On a separate sheet of paper create a bar graph that shows the annual median salary for each of the occupations above.
2. Answer the following questions:
    a. What are the two most important factors you would consider in choosing a career?
    b. Which of the jobs described above is most interesting to you? Why?

# Annual Median Wage



# Perseverance & Petroleum: A Brief History of East St. Mary Parish

Module One: Activity Three




Map of Louisiana showing Morgan City and St. Mary Parish

# Perseverance & Petroleum: A Brief History of East St. Mary Parish

Module One: Activity Three


Look at the map. Why do you think the city got its original name Tiger Island?

# Perseverance & Petroleum: A Brief History of East St. Mary Parish

Module One: Activity Three

# Video Content Questions

Module One: Activity Three

1. List the two major industries in St. Mary Parish during the 19th century and early 20th century.
2. During what decade did these industries suffer? What was happening in the United States during this time that caused these hardships?
3. What accelerated the need for oil in the 1940s?
4. During this time many individuals made their living as fishermen. What advantage did they have as offshore oil was being developed?
5. Even though the gas and oil industry offered stable jobs for individuals, many people stayed in fishing. Why do you think they did so?
6. Why did Morgan City become a central player in offshore technology development?
7. Name two reasons for the increase in the construction of oil platforms in the 1970s.

# Video Reflection Questions

Module One: Activity Three

8. If you lived in Morgan City, would you want to work in fishing, gas and oil, both, or neither? Why?
9. What are some of the major industries in your community? How would you compare those industries to the fishing and petroleum industries of Morgan City? Discuss both similarities and differences.
10. The video states, “Despite changes to these industries over the years the tenacity of those who live here ensured the community’s survival.” What does it mean for people to have tenacity? What other words could you use to describe the people who live in East St. Mary Parish?
11. How would you describe the people in your own community? What challenges does your community face and how do people react to those challenges?

# Perseverance & Petroleum: A Brief History of East St. Mary Parish

Module One: Activity Three

Match the following words to their definitions.

_____ Tenacity

_____ Deepwater

_____ Embargo

A. In oil and gas exploration and production, refers to water of a depth of more than 1,000 feet

B. Not easily discouraged

C. An official ban on trade or other commercial activity with a particular country

# Petroleum Detectives

Review the list of items and decide if each one **is** or **is not** made from petroleum.

Identify 3 items at home or in the classroom that are made from petroleum and 3 items that are not made from petroleum. Add them to the list. Complete the inventory.

Use the chart below as a guide

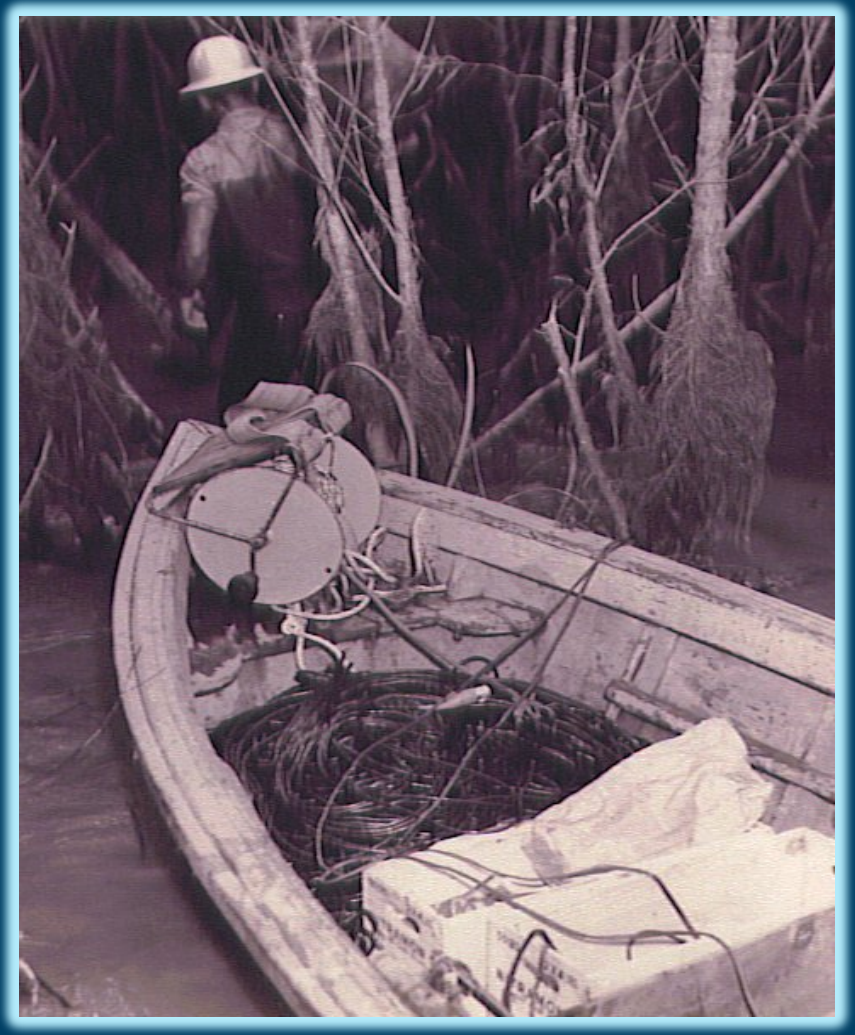
| Item | What material is the item made of? | What is this item used for? | Is this product made from petroleum? |
|---|---|---|---|
| Snorkel and Goggles | | | |
| Bananas | | | |
| 3-Ring Binder | | | |
| Golf Balls | | | |
| Leather Wallet | | | |

# Module Two: Finding Oil and Gas Under the Ocean

- Activity One: Exploring Under the Ocean Floor
- Activity Two: Career Connections
- Activity Three: Video: Exploring Coastal Communities
- Extension Activity: Explore Your Own Community

# Exploring Under the Ocean Floor

Module Two: Activity One



Early seismic vessel and equipment in Grand Lake, LA, 1949

Source: Houston Lejeune, Offshore Oil and Gas History Project, 2004

# Exploring Under the Ocean Floor

Module Two: Activity One

Seismic technician and portable seismic instrument, Grand Lake, LA, 1949

Source: Houston Lejeune, Offshore Oil and Gas History Project, 2004

# Exploring Under the Ocean Floor

Module Two: Activity One

Seismic surveyor in Grand Lake, LA, 1949

Source: Houston Lejeune, Offshore Oil and Gas History Project, 2004

# Exploring Under the Ocean Floor

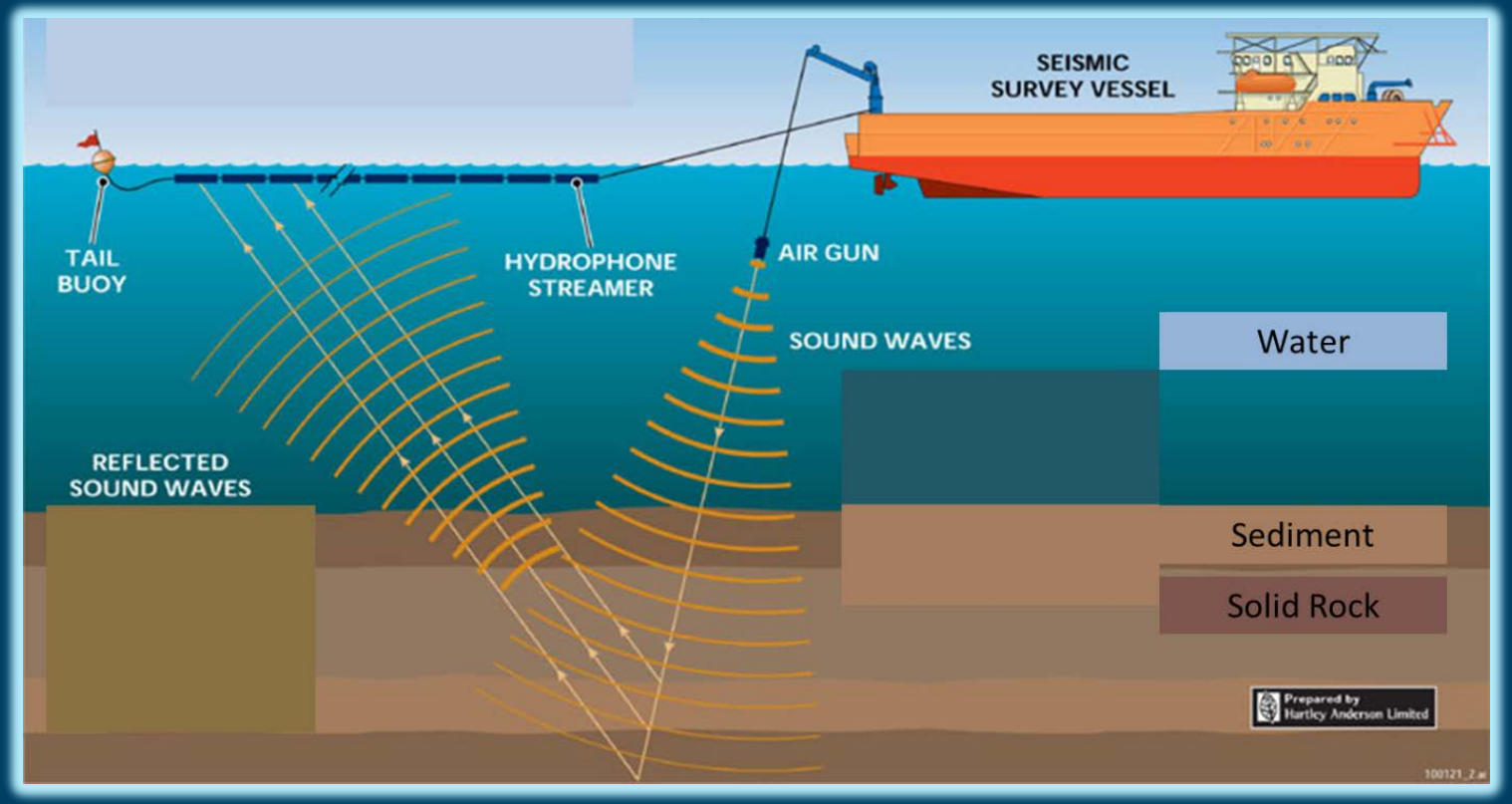
Module Two: Activity One

Seismic interpreters viewing the seismic record, 1950

Source: Houston Lejeune, Offshore Oil and Gas History Project, 2004

# Exploring Under the Ocean Floor

Module Two: Activity One




Offshore Seismic Model

Source: UK Department of Energy and Climate Change; modified from original image by Hartley  Anderson Limited

# Exploring Under the Ocean Floor

Module Two: Activity One

Imagine that you have just gotten jobs as doodlebuggers with a seismic company. You will be living on the seismic vessel for three weeks at a time and then coming home for one week in between shifts. You will be traveling by helicopter and can each carry 33 pounds with you on the flight. While you are on the vessel, you each will live in a cabin that is 10 feet by 10 feet in area. Make a list of everything you will take with you.

# Career Connections II

Module Two: Activity Two

## Marine Engineer/Naval Architect

Marine engineers and naval architects plan, construct, and sustain a variety of vessels, such as sailboats or submarines. Marine engineers work on the motorized systems, like steering. Naval architects work on the design of the vessel.

**Salary:** The median annual wage of marine engineers/naval architects was $79,920 in May 2010; about $40.00 per hour.

**Education/Training:** A bachelor's degree in marine engineering, naval architecture, or marine systems engineering is required. Employers also value practical experience, so many people also participate in programs that provide college credit for structured job experience.

**Work Environment:** Marine engineers and naval architects most often work in offices because they work with computer software and other tools. They often oversee vessel construction, so travel to shipyards is necessary. In order to maintain and test vessels they must go to sea.

**Related Jobs:** Drafter, Mechanical Engineer, Petroleum Engineer

## Geoscientist

Geoscientists study the Earth's composition, structure, and processes, to learn about the Earth's physical characteristics in the past, today, and the future.

**Salary:** The median annual wage of geoscientists was $82,500 in May 2010; about $39.66 per hour.

**Education/Training:** Most geoscientist jobs require at least a bachelor's degree. Sometimes states require geoscientists to have a license in order to offer their services to the public.

**Work Environment:** Most geoscientists split their time between working in offices and laboratories, and fieldwork. Fieldwork can require a wide-range of travel to sometimes isolated locations and irregular working hours.

**Related Jobs:** Environmental Engineer, Atmospheric Scientist, Hydrologist

# Career Connections II

Module Two: Activity Two

## Social Scientist

Social scientists study society and how people behave and influence the world around them. Oil and gas development can provide jobs and money for people but can also disrupt existing activities such as fishing and tourism. Social scientists can help companies assess needs in the communities where they do business and develop corporate social responsibility program.

**Salary:** The median annual wage of $75,160; about $36.14 per hour.

**Education/Training:** At minimum it is necessary to possess a master's degree in an appropriate subject (anthropology, sociology). Strong interpersonal and analytic skills are essential.

**Work Environment:** Social scientists work in a variety of settings. They can work with local and federal government, universities, and/or research and development institutions. Social scientists spend time in the field doing participant observation and interviews. They also spend time in an office analyzing data and writing reports.

**Related Jobs:** Political Scientist, Geographer, Survey Research

## Seismic Interpreter

Seismic interpreters analyze data from seismic surveys. The data are gathered from pulses of sound energy that are sent down through layers of rock beneath the earth's surface. The energy that bounces back is recorded. Seismic reflections come back in different strengths, according to whether the subsurface material is sand, shells, water, or oil. The data are then processed by data processors and sent to seismic interpreters for analysis.

**Salary:** Senior Exploration Seismic Interpreter median annual salary is $110,773; about $53.25 per hour.

**Education/Training:** A strong academic background, together with good technical, IT and mathematical skills is essential for all candidates. At minimum it is necessary to possess a bachelor's degree in an appropriate subject (geophysics, geology, geo-technology, physical or applied sciences and mathematics).

**Work Environment:** Seismic interpreters spend most of their work hours in the office analyzing seismic data to produce reports, scientific papers, maps, and other documents. Some fieldwork is required and may include travel to remote locations.

**Related Jobs:** Chemist, Mudlogger, Research Scientist

# Career Connections II

Module Two: Activity Two

## Oceanographer

Oceanographers use science and math to study and teach the complex relationships between different bodies of water, the atmosphere, and the biosphere. They are involved in areas such as mineral use, transportation of goods, fisheries, coastal development, weather prediction, and development of renewable energy sources.

**Salary:** The median annual salary for oceanographers is $72,660; about $36.33 per hour.

**Education/Training:** Most positions require a master's degree and often a doctoral degree (PhD). It is beneficial to have experience with computer and mathematical modeling, boat handling, scuba diving, and first aid.

**Work Environment:** Oceanographers can work for universities, industries, and government. They often work with teams on vessels using scuba gear to collect samples of water, soil, and living organisms from the ocean. Lab work is required to analyze samples and create computer models to help explain their results.

**Related Jobs:** Marine Scientist, Water Engineer, Hydrographic Surveyor

| | Bachelor's Degree Only | Postgraduate (Master's or Doctoral) Degree |
|---|---|---|
| Indoor | | |
| Outdoor | | |

### Analysis Activity

Fill out the matrix for each of the five jobs listed above. Put a job in more than one cell if necessary.

### Critical Thinking

Can you think of one additional occupation for each of the squares?

| | Bachelor's Degree Only | Master's or Postdoctoral Degree |
|---|---|---|
| Indoor | **Geoscientist**<br>**Seismic Interpreter**<br>**Naval Architect** | **Oceanographer**<br>**Social Scientist** |
| Outdoor | **Geoscientist**<br>**Seismic Interpreter**<br>**Naval Architect** | Oceanographer<br>Social Scientist |

# Exploring Coastal Communities

States and Cities along the Gulf of Mexico


Source: Ben McMahan, Bureau of Applied Research in Anthropology, University of Arizona

# Exploring Coastal Communities

Match the following words to their definitions. Write the correct letter on each blank.

**____ Tradeoff**
**____ Economy**
**____ Revenue**
**____ Levee**

A) Income; often of a company or organization and of a substantial nature.

B) An embankment built to prevent the overflow of a river.

C) The wealth and resources of a country or region, especially in terms of the production and consumption of goods and services.

D) A balance achieved by two desirable but incompatible features; a compromise.

# Exploring Coastal Communities

BROWNSVILLE, TX

Pop. 180,000

- Top industries: drilling rig construction, ship building, and offshore support
- Population density: 1,187 people per square mile
- Located on the US/Mexico border

LAROSE, LA

Pop. 7,300

- Top industries: fishing, shipbuilding, offshore support
- Population density: 652 people per square mile
- Levee for hurricane protection

MOBILE, AL

Pop. 195,000

- Top industries: tourism, fishing, offshore support, and aerospace
- Population density: 1,687 people per square mile
- Location of two state universities

1. In which community would you want to live if you were moving to the Gulf of Mexico region? Why?
2. What are some of the pros and cons of living in a small city?
3. What are some other factors that you would consider if making the decision to move?

# Explore Your Own Community

Module Two: Extension Activity

## Community Profile

City Name, State: Ottawa, IL

Population: 18,755

Industries: Construction, Retail, Manufacturing, Sand and Gravel Production

Education: Ottawa Public School System, Marquette Academy Catholic Schools, Illinois Valley Community College

Historical Landmarks: Reddick Mansion and Washington Park

Natural Landmarks: Fox River and Illinois River

Attractions: Illinois & Michigan Canal, Ottawa Riverwalk, Buffalo Rock State Park

Famous Events or Residents: Annual River Fest, Lincoln-Douglas Debate (1860)

Mark the map where your community is located.

Create a community profile for your hometown.

# Module Three: Reaching Oil and Gas

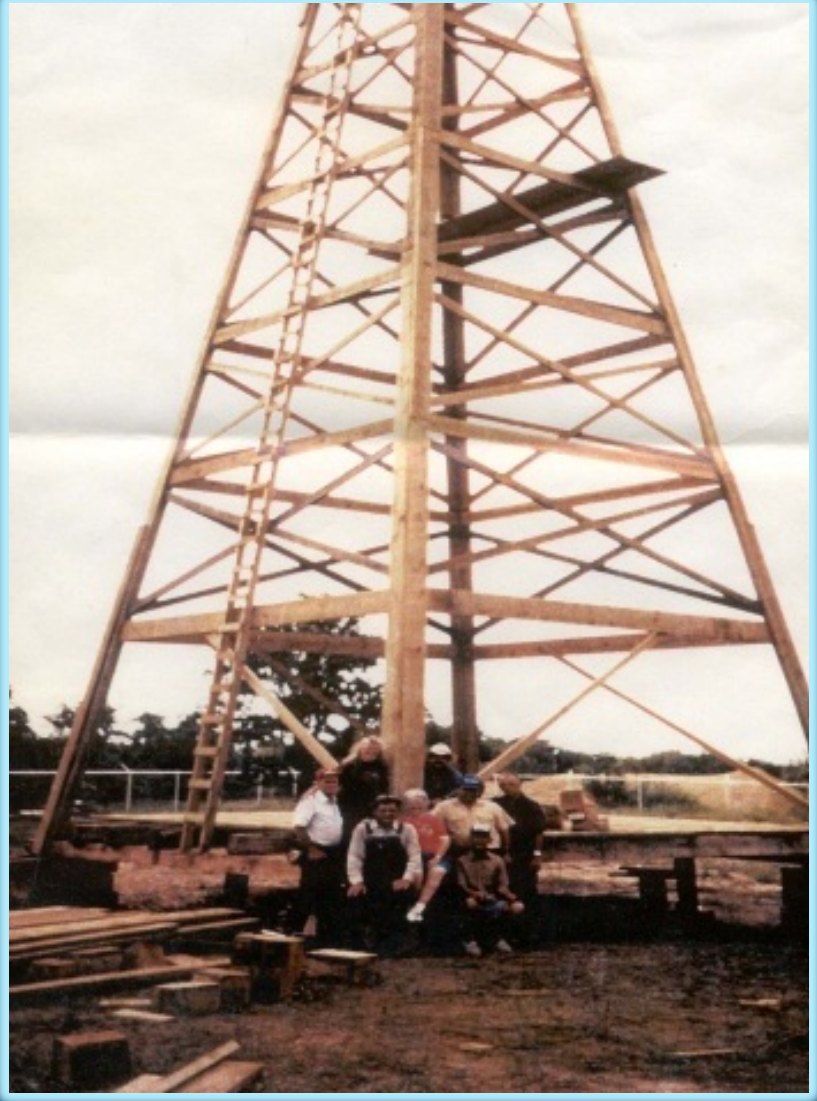
- Activity One: Drilling Offshore
- Activity Two: Career Connections
- Activity Three: Audio: First Day Offshore
- Extension Activity: Create an Energy Company

# Drilling Offshore

Module Three: Activity One

Onshore wooden derrick from about 1918

Source: Robert Shivers, Offshore Oil and Gas History Project, 2002



# Drilling Offshore

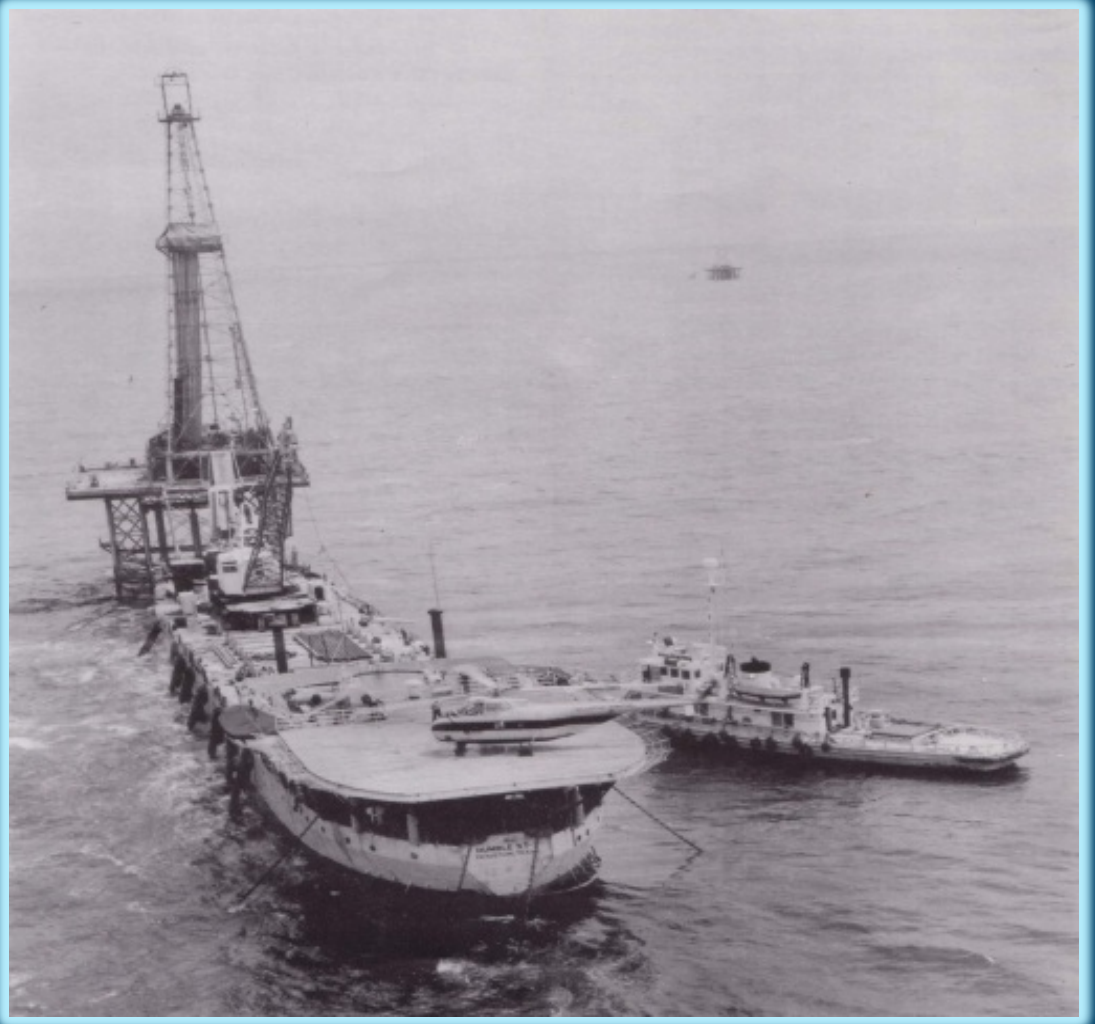
Module Three: Activity One

Derricks built on the end of piers extending into the Gulf of Mexico

Source: Jerry Shea, Offshore Oil and Gas History Project, 2001

# Drilling Offshore

Module Three: Activity One



Surplus World War II Land and Ship Tanks converted to living quarters and connected by ramp to drilling rigs in the Gulf of Mexico, 1950s

Source: Philip George, Offshore Oil and Gas History Project, 2001

# Drilling Offshore

Module Three: Activity One

Steel platform with drilling rig in the Gulf of Mexico, 1950s

Source: Roy Smith, Offshore Oil and Gas History Project, 2002

# Drilling Offshore

Module Three: Activity One

Drilling barge working off the coast of Buras, Louisiana, 1950s

Source: Donald Naquin, Offshore Oil and Gas History Project, 2001

# Drilling Offshore

Module Three: Activity One

A submersible drilling rig in the Gulf of Mexico, 1970s

Source: Lynda Miller, Offshore Oil and Gas History Project, 2006

# Drilling Offshore

Module Three: Activity One

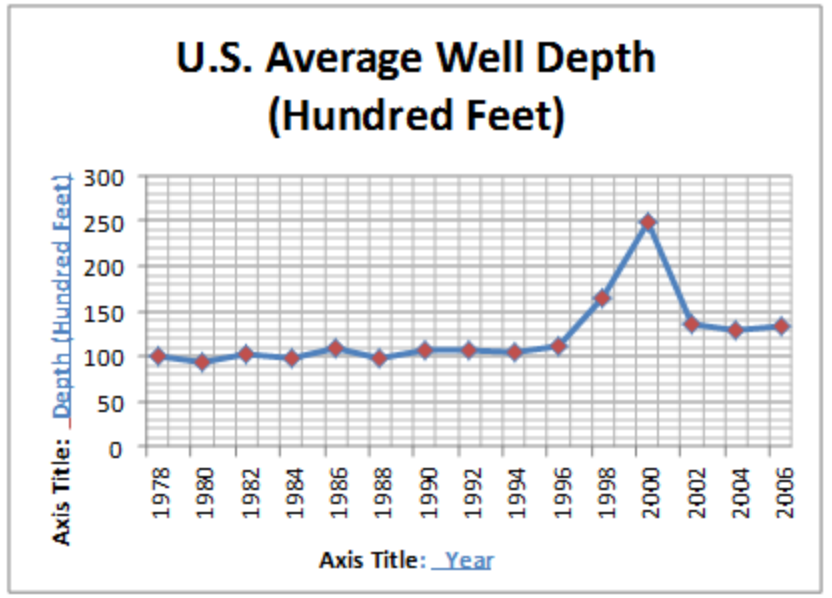
Types of Offshore Oil and Gas Structures

Source: Bureau of Ocean Energy Management

# Drilling Offshore

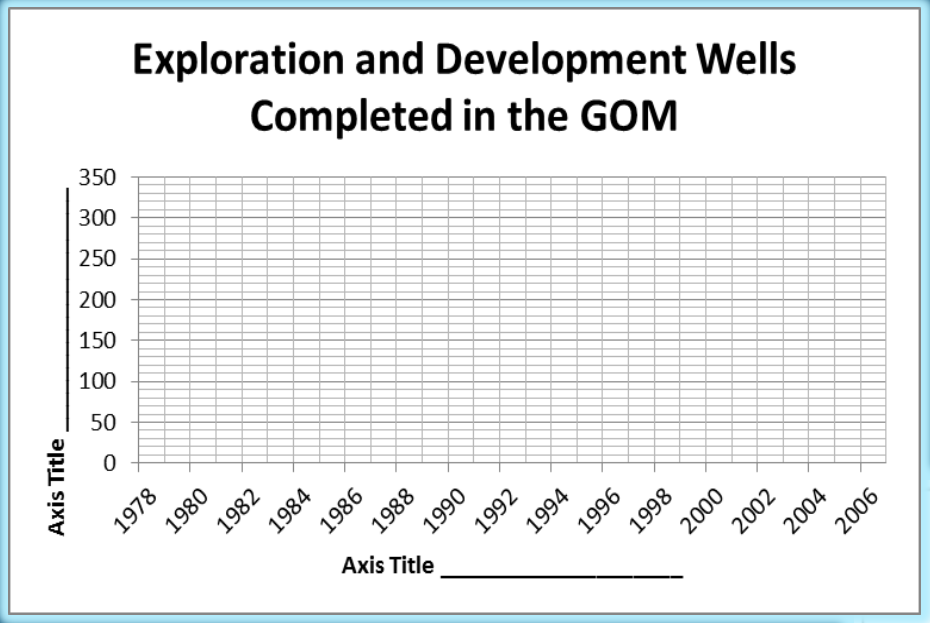
Module Three: Activity One

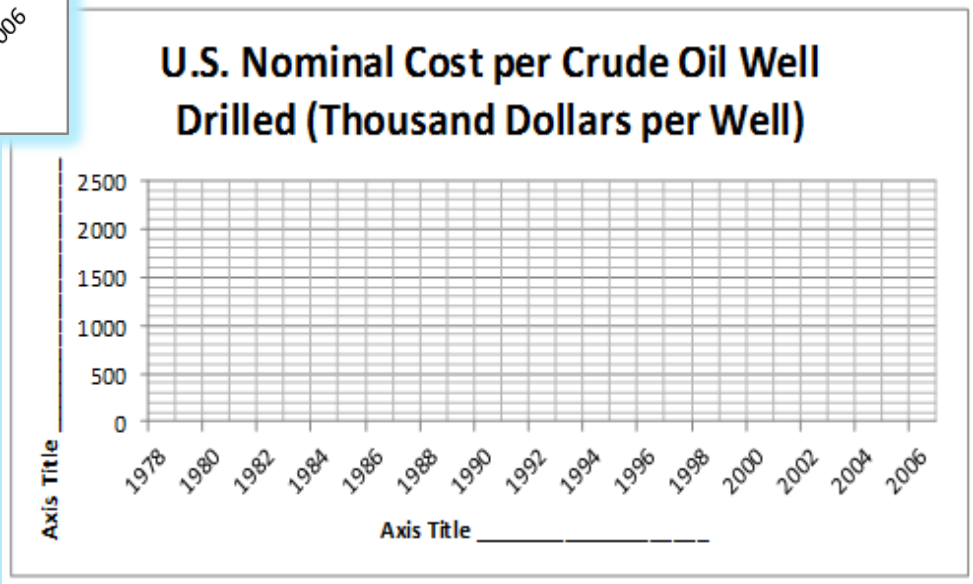
| Date | U.S. Nominal Cost per Crude Oil Well Drilled (Thousand Dollars per Well) | U.S. Average Well Depth (Hundred Feet) | Exploration and Development Wells Completed in the GOM |
|---|---|---|---|
| 1978 | 208 | 99.5 | 2800 |
| 1980 | 272.1 | 93.5 | 233 |
| 1982 | 347.4 | 103 | 307 |
| 1984 | 262.1 | 97.5 | 324 |
| 1986 | 284.9 | 109.5 | 227 |
| 1988 | 279.4 | 99 | 195 |
| 1990 | 321.8 | 107.5 | 174 |
| 1992 | 362.3 | 106.5 | 135 |
| 1994 | 409.5 | 105.5 | 163 |
| 1996 | 341 | 111.5 | 194 |
| 1998 | 566 | 165 | 137 |
| 2000 | 593.4 | 249 | 156 |
| 2002 | 882.8 | 136 | 169 |
| 2004 | 1441.8 | 128.5 | 96 |
| 2006 | 2238.6 | 134 | 112 |



# Drilling Offshore

Module Three: Activity One



# Drilling Offshore

Module Three: Activity One

**1979** First fixed platform is installed beyond 1000 feet water depth.

**1992** US Energy Policy Act requires new energy efficiency standards which lead to a surge in research and development as well as investments in alternative fuels and natural gas production.

**1995** Congress passes the Deepwater Royalty Relief Act which lowers the amount of money companies must pay the government for oil produced on leases in federal waters and provides incentives for exploration in deeper water.

**2000** The *Hoover-Diana*, a 63,000-ton deep-draft caisson vessel, goes into operation in the Gulf of Mexico. A joint venture by Exxon Mobil and BP, this production platform is mounted atop a floating cylindrical concrete tube anchored in 4,800 feet of water. The entire structure is 83 stories high, with 90 percent of it below the surface. Within half a year it is producing 20,000 barrels of oil and 220 million cubic feet of gas a day. Two pipelines carry the oil and gas to shore.

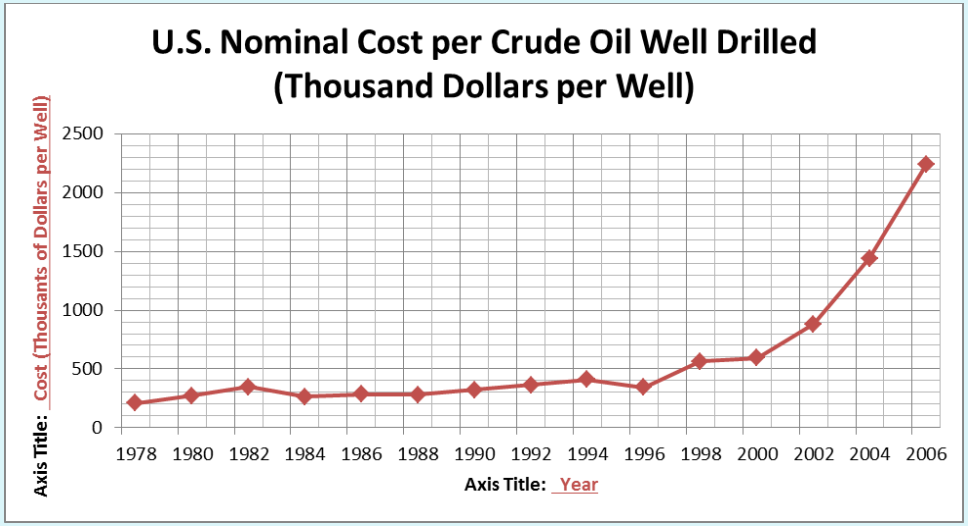
1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006

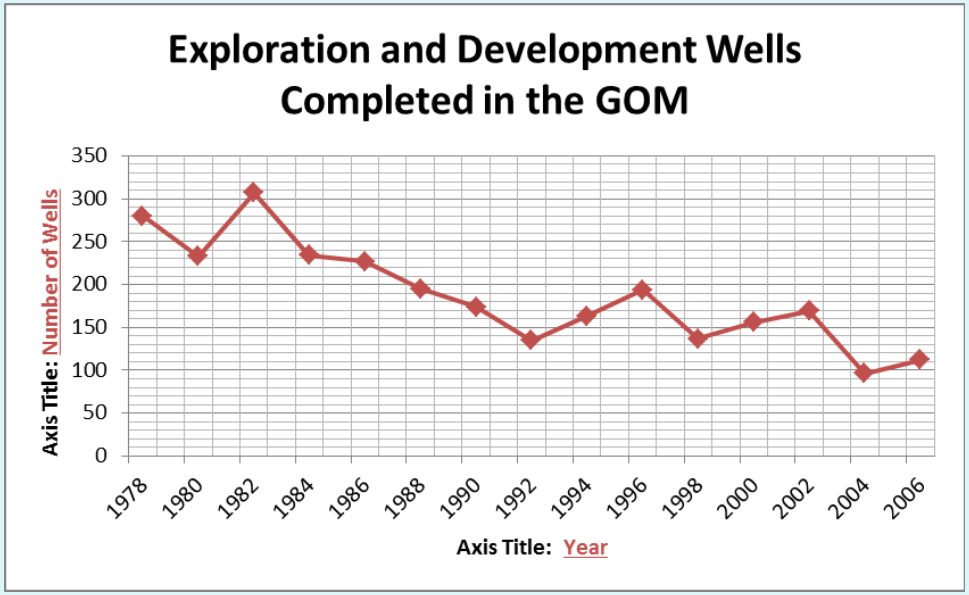
**1990s** The combined efforts of private industry, the Department of Energy, and national laboratories result in the introduction of several new tools and techniques designed to reduce the costs and risks of drilling, including reducing potential damage to geological formations and improving environmental protection.

**2005** Congress passes the 2005 Energy Policy Act, which establishes a coastal impact assistance program for the states of AK, CA, AL, LA, MS, and TX to receive a portion of revenues from petroleum taken from the outer continental shelf.

# Drilling Offshore

1. What caused the increase in the number of exploration and development wells between 1994 and 1996?
2. Between what years did the Gulf of Mexico see the largest increase in average well depth?
3. What caused the change in well depth?
4. Between what years did the Gulf of Mexico see the largest increase in the cost per well?
5. What caused the increased cost?



# Career Connections III

Module Three: Activity Two

## Driller

The driller is in charge of an individual drilling crew and running the rig while he or she is on duty. Most of the time, his or her job is to monitor the rig's activity, while the automatic driller drills the hole. The driller must be familiar with how gas and fluids act under high pressure and is responsible for interpreting the signals given off by the well to ensure that the well stays under control.

**Salary:** The median annual wage for a driller was $51,310 in May 2010; $24.67 per hour.

**Education/Training:** Gas and oil drillers learn their skills on the job. A driller must have the technical knowledge to operate the drill equipment and the experience to recognize problems before they get out of hand.

**Work Environment:** A person who wants to become a driller should be able to work under stress and be prepared to travel far from home. The work also requires a high degree of physical fitness and tolerance for harsh weather conditions.

**Related Jobs:** Roustabout, Well Control Services, Cement Crew

## Tool Pusher

A tool pusher coordinates and supervises all operations on an oil or gas drilling rig and is responsible for all drilling crews. The tool pusher sets the workers' schedules, inspects the rig, and instructs and monitors the crews, making sure that the workers are on task at all times.

**Salary:** The median annual salary for a supervisor in charge of extraction in the oil and gas industry was $80,241 in 2012; about $38.56 per hour.

**Education/Training:** Most tool pushers begin their careers as laborers on rigs and advance within their companies to managerial positions with years of experience and proven leadership skills.

**Work Environment:** A drilling rig can be a dangerous place to work. It is the tool pusher's job to ensure that the rig is operated safely and efficiently. The tool pusher has an office on the rig.

**Related Jobs:** Rig Manager, Motorhand, Supervisor

# Career Connections III

Module Three: Activity Two

## Roughneck

A roughneck is a laborer in the oil rig hierarchy. A roughneck is assigned to help the members of a specific drilling crew. His or her job entails a strong will to work and also the ability to work as part of a team. The roughneck inspects and maintains equipment and ensures that it is working properly.

**Salary:** The median annual salary was $31,770 in 2012; about $15.27 per hour.

**Education/Training:** Roughnecks must be at least 18 years old, be in good physical condition, and pass a drug test. Roughnecks learn most of what they need to know through on-the-job training, but knowledge and experience in welding, electronics, and mechanics is a big plus.

**Work Environment:** Work schedules and conditions vary by the location and type of rig.

**Similar Jobs:** Construction Laborers, Steel Workers, Millwright

## Derrickman

The position of the derrickman varies greatly from one drilling rig to another. The derrickman almost always reports directly to the driller. The name derrickman comes from the position that he or she normally occupies, which is at the top of the derrick. From this position the derrickman guides the stands of drill pipe, which are typically 90 ft (27 meters) long, into the fingers at the top of the derrick while removing the drill string (tripping the pipe) out of the hole.

**Salary:** The median annual salary was $47,060 in 2012; about $22.63 per hour.

**Education/Training:** Someone who wants to become a derrickman usually starts as an apprentice on the rigging team and works into this position.

**Work Environment**: A person who wants to become a derrickman should prepare for travel far from home. The work also requires a high degree of physical fitness and tolerance for harsh conditions such as extreme heat.

**Related Jobs:** Mud Engineer, Crane Operator, Gauger

# Career Connections III

Module Three: Activity Two

**Occupational Health and Safety Technician**

Occupational health and safety technicians collect data on the safety and health conditions of the workplace. Technicians work with occupational health and safety specialists to conduct tests and measure hazards to help prevent harm to workers, property, the environment, and the general public. Some large offshore oil and gas structures have occupational health and safety technicians on site at all times while others only have technicians on site on special occasions such as inspections.

**Salary:** The median annual wage of technicians was $45,330 in May 2010; about $21.79 per hour.

**Education/Training:** Occupational health and safety technicians can enter the occupation through two main paths. The first and most common is through on-the-job training. The second path is with formal education, such as an associate's degree or certificate.

**Work Environment:** Occupational health and safety technicians work in a variety of settings, such as offices and on rigs and platforms. Their jobs often involve considerable fieldwork and travel.

**Related Jobs:** Construction and Building Inspectors, Environmental Science and Protection Technician, Fire Inspectors and Investigators

# Career Connections III

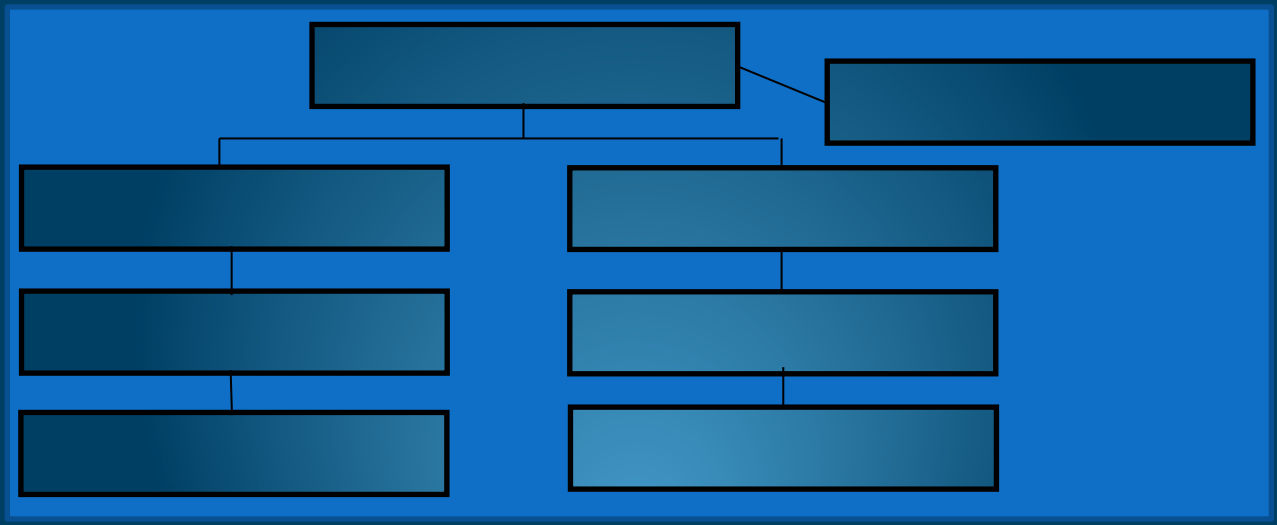
Module Three: Activity Two

**Analysis Activity**

An organizational chart is a diagram that shows how an organization is structured and the relationships of the positions within the organization. On a separate sheet of paper copy the drilling rig organizational chart and write the name of each position where it belongs in the rig hierarchy. Hint: There are two drilling crews on this rig, so three of the positions appear twice in the chart.

## Answer the following questions:

1. If you were working on a drilling rig, which position would you want in the rig hierarchy? Why would you choose that position?
2. What characteristics do you believe are most important for a tool pusher? Why?
3. Draw an organizational chart of the people who get paid to work at your school. Include the principal, two teachers, a custodian, and two people who work in the cafeteria.



# Working on a Drilling Rig: First Day Offshore

Module Three: Activity Three

**Raymond “Rainbo” DeFelice**

Mr. DeFelice was born in 1932 and began roughnecking during his summers off from high school. After returning from the Korean war in 1955 he began working for Offshore Drilling Company. Mr. Defelice got a job with Exxon in 1956 as a roughneck. He worked himself up to workover superintendent by 1977. He took early retirement in 1986.

# Working on a Drilling Rig: First Day Offshore

Module Three: Activity Three

**David Jefferson**

After Mr. Jefferson finished high school, he began working short stints at Martin Chemical and Allied Van Lines in Lafayette. After six years with Bienville Furniture out of New Iberia, he was able to get a job as a land roustabout with Texaco in 1967. He requested a transfer to a rig when he learned that he would have to work on rigs to advance within the company. A month and a half later he was working on rigs, and within five years he had advanced first to derrickman and then to relief driller. Soon he advanced to driller, and in 1980 he went offshore as a drilling supervisor. He returned to work on land in the early 1990's when he was sent to West Texas to supervise a crew there. He retired in 1999 as a drilling supervisor for the offshore district.

# Working on a Drilling Rig: First Day Offshore

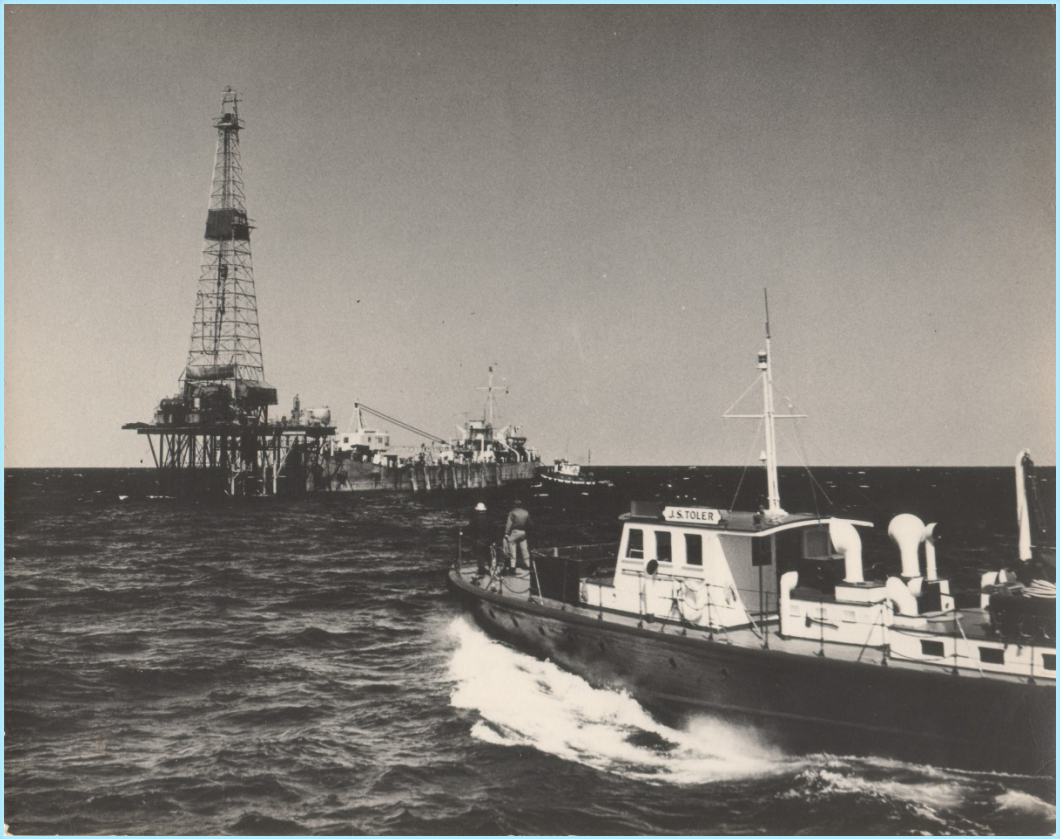
Module Three: Activity Three

**Ferrel Chauvin**

Mr. Chauvin was born in 1932 in Chauvin, LA. After serving in the Army from 1952-53, he joined Mobil as a kitchen hand, then became a roustabout, and then a roughneck. He went to work for Texaco in 1954 and worked his way up from being a derrickman, mud engineer, and driller, to a senior drilling supervisor before his retirement on December 31, 1989.

# Working on a Drilling Rig: First Day Offshore

Module Three: Activity Three




Crewboat heading out to rig in the Gulf of Mexico, 1950s

Source: Roy Smith, Offshore Oil and Gas History Project, 2002

# Working on a Drilling Rig: First Day Offshore

Module Three: Activity Three

Working around a Christmas tree

Source: Percy Rhodes, Offshore Oil and Gas History Project, 2003

# Working on a Drilling Rig: First Day Offshore

Module Three: Activity Three

Drill pipe stacked on the inside of a derrick

Source: James “Cecil” Broussard, Offshore Oil and Gas History Project, 2003

# Working on a Drilling Rig: First Day Offshore

Module Three: Extension Activity

1. What challenges did Raymond Jefferson face on his first day of work offshore? What advice would you give him?
2. Mr. DeFelice's boss told him, "You got to be kind of rough with this stuff because if you are not rough with it, it is going to be rough with you." What do you think this statement means? How would you feel if your boss told you this on your first day of work?
3. What was David Jefferson's biggest challenge on his first day? What advice would you give him?
4. Mr. Jefferson says, "I took to it like a duck to water. I adjusted to it pretty quick because I liked it." Describe a time you were faced with a challenging task that you were able to overcome.
5. What was Ferrel Chauvin's biggest challenge on his first day offshore? What advice would you give him?
6. What are some similarities and differences between Mr. DeFelice's, Mr. Jefferson's, and Mr. Chauvin's first days offshore?
7. What do you think would be the most challenging aspect if you were working offshore? Why?
8. Describe your first day of school. What were some challenges and rewards of that day? How did you overcome those challenges?


# Create a Company

Module Three: Extension Activity

You have been trying to start an energy company, and you recently gained interest from investors. They want to see a business plan to see if they are willing to give you the money to start your venture. Fill out the necessary information for your investors.

**Company Logo:**

**Company Name:** _____

**Location:** _____

**Slogan:** _____

_____

**Products Services Provided:** _____

_____

**Mission Statement (3-5 sentences):** _____

_____

_____

_____

**Who are your competitors?** _____

**How would you make your company stand out from your competitors?**

_____

_____

**Describe your responsibilities as the Chief Executive Officer (CEO):**

_____

_____

_____

_____

**Business Card:**

# Module Four: Technology and Ocean Energy

- Activity One: Technology Timeline
- Activity Two: Career Connections III
- Activity Three: Audio: Technology Changing Over Time
- Extension Activity: Technology Interview

# Technology and Ocean Energy

Module Four: Activity One

Platform with living quarters, constructed for 10-14 feet of water, 1955

Source: Jake Giroir, Offshore Oil and Gas History Project, 2001

# Technology and Ocean Energy

Module Four: Activity One

Platform with living quarters to left, escape capsule hanging off the back, crane and compressor building, 1980s

Source: Philip George, Offshore Oil and Gas History Project, 2001

# Technology and Ocean Energy

Module Four: Activity One


Man talking into a two-way radio

Source: Tom Angel, Offshore Oil and Gas History Project, 2002

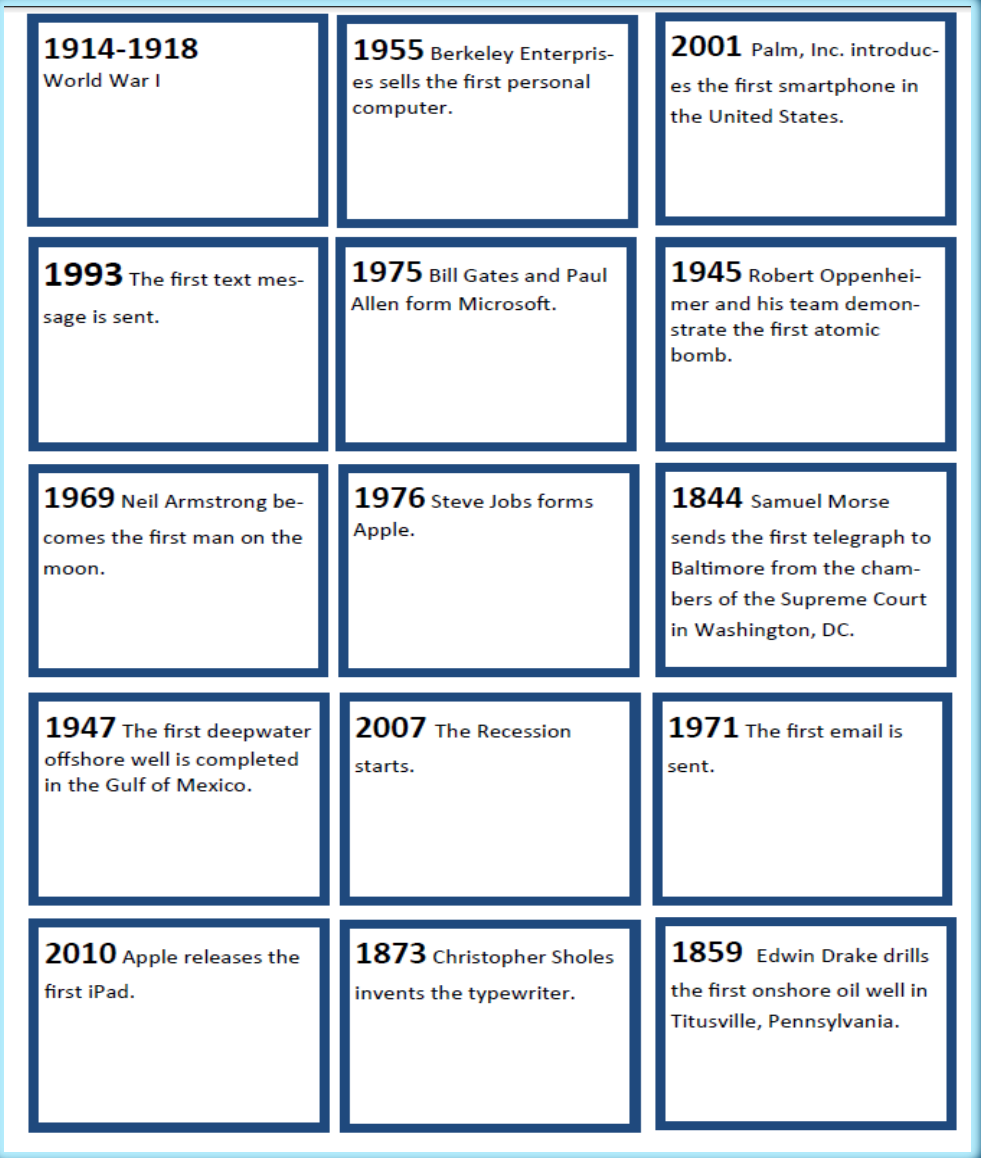
# Technology Timeline

| | | |
|---|---|---|
| **1892** Frank and Charles Duryea build the first gas powered automobile. | **1995** The Internet becomes available to the public. | **1907** The first drive-in gasoline station opens in St. Louis. |
| **1870** John D. Rockefeller forms Standard Oil Company. | **1945** President Truman issues an Executive Order asserting Federal ownership of the continental shelf. | **1926** John Baird demonstrates the first successful television. |
| **1903** The Wright Brothers' take their first successful flight. | **1876** Alexander Graham Bell invents the telephone. | **1864** Samuel van Syckel builds the first pump-operated oil pipeline in Pithole, Pennsylvania. |
| **1968** ARPNET (Advanced Research Projects Agency Network) introduces the first version of the Internet by connecting 4 computers. | **1939-1945** World War II<br>1940 – US puts an embargo on oil exports to Japan.<br>1941 – Japan attacks Pearl Harbor. | **1882** Thomas Edison demonstrates electricity. |

Module Four: Activity One

1. Copy down each event.
2. Draw pictures or add interesting facts about the event in the squares (using the internet or an encyclopedia if available).
3. Create a timeline by finding the earliest date, measure each year equally up to the present year on a strip of paper, and attach the squares to the timeline at the appropriate year.

# Technology Timeline




Module Four: Activity One

4. Create three additional squares to mark recent technology developments.
5. Identify all events related to communication.
6. Identify all events related to oil and gas.
7. Which three events would you consider the most important technological advances and why?

# Career Connections IV

Module Four: Activity Two

## Gauger

An oil gauger is sometimes referred to as a petroleum pump system operator. This person gauges the value and amount of oil in pipelines and in storage tanks. Gaugers regulate the flow of petroleum through the pipelines and lower thermometers into tanks to record temperatures. A gauger is responsible for minor alterations and maintenances.

**Salary:** The median annual wage in 2010 was $61,260; about $29.45 per hour.

**Education/Training:** A gauger must pay attention to detail and understand the metric system. He or she must be able to operate a computer and stay current with changing oil field technology.

**Work Environment:** Gauging requires alertness and strength to climb tanks, move heavy equipment, and make repairs. A gauger must work in all types of weather conditions, during the day or at night.

**Related Jobs:** Pump System Operator, Refinery Operator

## Production Foreman

An oil field production foreman oversees operations at the well site. Foremen can do everything from running an installation to making repairs and keeping records.

**Salary:** These oil field workers earned a mean annual wage of $81,870, or $39.03 an hour.

**Education/Training:** Production foremen usually are experienced workers with several years on the job and training in operating specific machines. Often, a Bachelor's Degree and 2 to 5 years of experience is required.

**Work Environment:** Production Foremen must always focus on the safety of the crew. They need to have a positive attitude, possess leadership skills, and be able to work in inclement weather conditions.

**Related Jobs:** Safety Engineer, Construction Management, Extraction Foreman

# Career Connections IV

Module Four: Activity Two

## Helicopter Pilot

Offshore helicopter pilots work for the oil and gas industry taking workers to and from the mainland.

**Salary:** These pilots make a median annual salary of $68,02; about $34 per hour.

**Education/Training:** Pilots that work in the oil industry are often required to have 1,500-2,000 hours of pilot-in-command time.

**Work Environment:** As with most corporate helicopter pilot jobs, these pilots do not work a regular 40-hour workweek. The average pilot works a 7-day on, 7-day off rotation. Oil platforms can often be several hundred miles offshore. Helicopter pilots sometimes make many trips back and forth between the platforms and shore, and sometimes they are needed to fly between platforms to transport workers or supplies.

**Related Jobs:** Commercial Pilot, Air Traffic Controller, Helicopter Mechanic

## Vessel Captain

Vessel captains operate and maintain vessels that take cargo and people over water. They may work along the coasts or on the inland waterways only in the United States or they may travel to and from foreign ports across the ocean.

**Salary:** The median annual wage was $46,610 in May 2010; about $22.41 per hour

**Education/Training:** Captains must obtain licenses and various types of certification. The education and training requirements vary by the type of vessel. Captains start out as deckhands and then work their way up through experience and by earning additional licenses. Most water transportation jobs require the Transportation Worker Identification Credential (TWIC) from the U.S. Department of Homeland Security and a Merchant Marine Credential (MMC).

**Work Environment:** Work schedules and conditions vary by the type of vessel. The captain often works a 21-day on, 7-day off rotation and works a 12-hour shift while on the vessel.

**Related Jobs:** Heavy Vehicle Operators, Ship Repair and Fabrication

# Career Connections IV

Module Four: Activity Two


## Analysis Activity

One of the challenges of working on an offshore production platform is getting to and from work. Vessel captains and helicopters are responsible for transporting workers safely. Draw a line down the middle of a piece of paper. Write “Vessel Captain” on one side and “Helicopter Pilot” on the other. Refer to the job descriptions and write down three things about each job. Then think about three additional things that you would experience in each job and write them down. Circle best thing about each job and put an X through the worst thing about each.

# Working Offshore: How Technology Changed Over Time

Module Four: Activity Three

## Lillian Miller Espinoza-Gala

Ms. Lillian Miller Espinoza-Gala was born in Iowa and lived there on a farm until her family moved to Bayou Black, Louisiana in 1960. In 1973, at age 23, she began working offshore in the Gulf of Mexico. She had taken part in the peace movement during the Vietnam War. She was home from college trying to find a job and make enough money to go back to school. Her father, who had worked at McDermott since 1961, came home one day and told her about a catering company that was hiring women. Ms. Espinoza-Gala applied for the job and ended up going to the personnel office every day for a month until her father convinced a superintendent to give her a chance for at least one hitch. She was sent out on her first job with several other women and was the only one to survive the hitch.

Ms. Espinoza-Gala overcame the challenges of working in a male-dominated environment and, due to her interest in drilling and mud engineering, she was recruited into the petroleum technology program at Nicholls State University, working 7 days offshore and going to school during her 7 days at home. After a few weeks in the class, in 1974, she was hired by ODECO (Ocean Drilling & Exploration Company) as their first female production roustabout. She was recognized by ODECO that same year as the first female roustabout to work offshore outside the galley in the Gulf of Mexico. She graduated in 1977 with an associate's degree in petroleum technology. She advanced to gauger. Her career in the oilfield ended in 1981 when she suffered a near-fatal accident trying to bring a well into production. She returned to school in 1986 and earned a Bachelor’s degree in 1988. She then got a job with Channel 3 News in Lafayette, LA. She also did extensive work in coastal restoration and education.

# Working Offshore: How Technology Changed Over Time

Module Four: Activity Three

**Ronnie Rhodes**

Mr. Ronnie Rhodes was born in 1950, in Houma, Louisiana, and spent almost his entire life there. He was drafted to go to Vietnam, but was released due to a shoulder injury. He was married in 1971, and that same year started as a roustabout for Unocal Oil Company. Mr. Rhodes moved up the ranks and become a production foreman by the late 70's, in charge of three offshore oil fields. In the mid-1990s he was moved to construction foreman, a position he held until being forced into retirement in 2003, when his company was bought out and management positions were liquidated.

## Lillian Miller Espinoza-Gala Transcript:

Ms. Espinoza-Gala: I admired Doc Laborde so much for building the first movable offshore drilling rig. I do feel that ODECO and Tidewater Marine, which were one in the beginning, along with Kerr McGee… I mean, that's the same enterprising spirit that built this country, that gave us all the new technology that we have. So it goes back to the roots of democratic government, the roots of everything that America stands for, the whole trip West. I mean, people risked their lives when they got in those covered wagons to go west. And a lot of them didn't make it. It even goes back to my ancestors that came over on the Mayflower. They had turned their back on a whole way of life to come over here so they would have the kind of freedom, so that they could use their minds to live in a place where they'd have the freedoms and the ability to determine their life. The offshore technology could not have been developed in any other country – other than the United States – where creativity wasn't rewarded. Another thing about the oil field, starting with Spindletop in 1901, when after ten days of a gusher, when the whole thing caught on fire, for ten days even the president of the United States went to see this incredible thing, all this oil coming out. And everybody thought, "Wow, this is really something." And then suddenly, it's a fire and people lose their lives and they're pressed into trying to figure out a solution. Every new advance in the offshore industry, I think, did lead to costing people's lives. I mean, blood was shed for every new advancement. But that's even true in the space industry.

**Ronnie Rhodes Transcript:**

Interviewer: I'm hoping that you could tell me a little bit about some of the new technologies, the materials and the strategies that you witnessed and participated in, coming into this area in the early seventies as things started moving into deeper water and so forth, if you could talk a little bit about some of that.

Mr. Rhodes: Sure, I might have a little bit I could share about that. One thing that sticks out in mind, right off the top of my head, is communications. Back in the early seventies when I came into the industry, the only way that we could communicate was by two-way radio, VHF radio. This communication was obtained from the platform site to the home base, due to radio towers being set in different locations, signals being set forth and so forth. So, we didn't even have telephone hookups back then, from offshore to inshore, much less computers, or transmitters of any kind. So you can imagine the type of communication we may have had, which was pretty extraordinary back then. [Laughs] And it was interesting. But it's amazing, when I look back and I see how we actually were able to accomplish the things that we did with the lack of communication we had. We just had good people doing good jobs, and you know, we prided ourselves on that type of stuff, and we were a team. And we had people that really worked hard, and worked together, and was able to get a lot of good things accomplished.

**Ronnie Rhodes Transcript:**

Interviewer: Were there certain kind of elements of the workforce, some of the older hands that might have been too resistant to computers [because] they came up with a very different way of doing work? Did that start pushing some people out? It seems like this technology, not everybody was prepared or equipped for that. Is that true?

Mr. Rhodes: You're absolutely right. It most definitely did. The people that I trained under, in 1971, never touched a computer, never saw a computer, never wanted to. So naturally they resisted it, the change. They felt threatened because of the computer coming into play. They felt like they had a lack of education, for one. Not having computer knowledge, not knowing that the company was willing, and not only willing but did provide all the training necessary that we needed to operate these computers. They were scared, you know. The early-timers, or the old-timers in that case, were frightened because of the computer age coming into play. And I was one of those, [though] not so much as someone that was in the field ten years prior to me going there. I didn't have computer training either, but I was not as resistant to the change. I knew that it was going to be coming into play rapidly. I knew technology was coming and I didn't fight it as much as some of the older-timers did, but yeah, they resisted it.

## Ronnie Rhodes Transcript:

Mr. Rhodes: I don't want to paint a worse looking picture than it actually was for us, for these old-timers, 'cause these people were pioneers. And they did what they had to do with what was available to them, and it's amazing.

Today, everything is given to us, you know. We press a button, we press an F1 key on a computer, and it does something for us. They didn't have that back then. They used a slide rule, they used a calculator, a calculator that you had to spin by hand to get it to another set of numbers, okay? [Laughs] They used their mind, they figured things out. They were able to figure a well test by long-hand, which is unheard of today. You got a little computer that does all this for you. You press in some parameters, you give it a little information, and it spits out whatever the well is making, whatever the formation of the well is producing, the GOR, the gas-oil ratio, the cut, you know. People did a well test by hand back then, and I feel like the accuracy was pretty comparable to what these computers are telling us today, I really do. Yeah, you'd be amazed.

# Working Offshore: How Technology Changed Over Time

Module Four: Activity Three

## Analysis Questions

1. Ms. Espinoza-Gala mentions “the roots of our democratic government, the roots of everything America stands for.”

   a. How would you describe America’s “roots”?

   b. Historically, what are some of the characteristics of our country and the people who helped shape it?

   c. Are these characteristics still present today? Why or why not?

2. Mr. Rhodes said he finds it amazing what they were able to accomplish using only a two-way radio.

   a. Think about and list all of the ways you communicate with others (email, phone, text, etc.).

   b. How would your life be different (both positive and negative) if you could only communicate with others using a two-way radio?

3. Mr. Rhodes talks about how some people were resistant to technological changes, like computers.

   a.What changes have you been resistant to in the past?

   b. What was the result?

   c. How did you deal with this change?

# Technology Interview

Module Four: Extension Activity

**Interview a family member who is at least 30 years old about his or her experience with changing technology.**

**1. Copy down the interview questions.**
**2. Record the interviewee's answers on a piece of paper.**

Relationship to Interviewee: _____

Interviewee's Occupation: _____

Interviewee's Year of Birth: _____

3. What does technology mean to you?
4. What do you think has been the biggest change in technology since you have been alive?
5. What other changes in technology have you witnessed?
6. How have technological changes affected your job?
7. How have technological changes affected you personally?
8. What positive and negative effects have you seen with technology?
9. Do you think people today are better, worse, or the same at adapting to changing technologies and why?
10. How does technology make you more or less creative?
11. What is a technology you could not live without and why?
12. If you could eliminate one current technology what would it be and why?
13. If you could invent a new technology what would it be and why?

# Sample Résumé

Module Five: Activity One

**First Name - Last Name**
**6 Pine Street, My Town, Florida**
**home: 904.555.5555 cell: 566.486.2222**
**email: seacrest@aol.com**

**Education:**

My Town Middle School
2005 – Present
My Town, Florida

**Work Experience:**

*Pet Sitter*
2005 – Present
- Provide pet sitting services including dog walking, feeding, and yard care
- Ensure pets are given proper amount of exercise and nutrition

*Child Care*
2005 – Present
- Provide child care for several families after school, weekends, and during school vacations
- Responsible for safety, feeding, bathing, and housekeeping

**Achievements:**

- National Honor Society: 2005, 2006, 2007
- Academic Honor Roll: 2005-2007

**Volunteer Experience:**

- Big Brother / Big Sisters: 2005-present
- Food Drives: 2005, 2006, 2007
- Run for Life: 2006

**Interests / Activities:**

- Member of My Town Tennis Team
- Girl Scout
- Piano

**Computer Skills:**

- Proficient with Microsoft Word, Excel, and PowerPoint, and Internet

# Résumé Checklist



- Your Name
- Address
- Phone and/or Fax Number
- Email Address
- Web Page Address
- Job Objective/Career Goal
- Education
- Employment History
- Achievements/Awards
- Volunteer Experience
- Hobbies and Leisure Activities
- Computer Skills

# Writing Tips



- Start with educational background
- Start with your most recent education and work history and work backward
- Do not write in 3rd person, but avoid the overuse of “I”
- Include dates
- Do not include your age
- Use hobbies and activities to enhance your image especially if they are directly tied to your job objective (for example, if you are applying to be a naval architect you might include sailing or drawing)
- Do not discuss salary or hourly wages
- Be honest
- Keep your résumé to a single, one-sided page

# Job Interview

Module Five: Peer Interview

- Tell me a little bit about yourself.
- Why do you want to work for our organization?
- How did you find out about this position?
- Why do you think you are qualified for this position?
- What are your future plans for your education and career?
- What are some of your greatest strengths?
- What is your greatest weakness?
- Do you prefer to work alone or with other people?
- What extra-curricular activities do you participate in?
- How would the company benefit with you as an employee?
- Do you have any questions about the organization?
- Do you have any questions about the position?

**Create three of your own questions**

# Job Interview

Module Five: Peer Interview

Tell me a little bit about yourself.
Choice A: I am a student at Bright Middle School. I play sports and have a few good grades.
Choice B: I am currently enrolled at Bright Middle School. I play basketball, volleyball, and am on the debate team. I have good grades, and enjoy school.

Why do you want to work for our organization?
Choice A: The organization and I would both benefit if I were given this position. The organization's mission of discovering new frontiers aligns with my interests and skills.
Choice B: I like the uniforms.

How did you find out about this position?
Choice A: My mom told me to apply, so here I am.
Choice B: I was referred by one of your current employees and then read more about the position on your website.

Why do you think you are qualified for this position?
Choice A: I have done stuff like this before. I think I can do it.
Choice B: I have experience that has aided in the development of my organization and communication skills. I would take my responsibilities seriously and complete them to the best of my ability.

# Job Interview

Module Five: Peer Interview

What are your future plans for your education and career?
Choice A: I do not have any plans. I cannot decide what to do next. I might go to college where ever my boyfriend goes.
Choice B: I plan to attend high school, and complete a college degree. I would like to further my professional development through an internship.

What are some of your greatest strengths?
Choice A: I get along with just about everyone I meet, and I am incredibly organized.
Choice B: I am not sure I have any.

What is your greatest weakness?
Choice A: I do not have any weaknesses.
Choice B: Sometimes I tend to assume people know the things that I know, so I am working on my communication skills.

Do you prefer to work alone or with other people?
Choice A: I like working with other people so we can gossip and because it makes the job less boring.
Choice B: I like working with a team because other people bring skills to the table that I may not have, which increases the quality of the service or product.

# Job Interview

Module Five: Peer Interview

What extra-curricular activities do you participate in?
Choice A: I like to watch TV and play videogames.
Choice B: I play on two sports teams, and I am a member of the debate team at school. I also volunteer on the weekends at a soup kitchen for my church.

How would the company benefit with you as an employee?
Choice A: I am a team player who works well with others, and I try to give my all every day.
Choice B: I don't know. You tell me.

Do you have any questions about the organization?
Choice A: What do you like most about your job?
Choice B: No, I think I know everything about the company.

Do you have any questions about the position?
Choice A: How many days per year can I call in sick?
Choice B: As an employee how can I exceed your expectations?

# Peer Evaluation

Module Five: Peer Interview

| Name of Interviewee: | Name of Interviewer: |
|---|---|
| Position applicant is applying for: | |
| Please rank the candidate using the following system:<br>(1) Superior (2) Good (3) Average (4) Fair (5) Poor | |
| How well did the interviewee maintain eye contact throughout the interview | |
| Rate the interviewee's persuasiveness. Did he or she explain him or herself clearly and thoroughly? | |
| Rate his or her willingness to learn new things. | |
| Does he or she have the necessary skills for the position? | |
| Did he or she express interest in the job? | |
| Does he or she show potential to grow the organization? | |