Pipelines in Your Neighborhood and Contacting 811

Subjects	Social Studies, Technology
Duration	Preparation: 5 minutes Activity: 30 minutes
Setting	Classroom or computer lab
Objectives	1. Understand the purpose of underground pipelines in your state. 2. Understand the purpose of above ground pipeline markers. 3. Understand the purpose of calling 811 before you dig.

Materials

- Computer with projector or individual computers for student use
- Paper
- Pencil

Scientific Terms for Students

- **Transmission pipeline:** These are large pipes that are used to transport crude oil and natural gas from gathering systems to refining, processing or storage facilities. Transmission pipelines also transport refined petroleum products and natural gas to customers, for use or for further distribution. Transmission pipelines may be as large as 56 inches in diameter, but most are 20 to 30 inches.
- **Distribution pipeline:** Smaller, lower pressure pipelines that deliver natural gas to customers
- **Hazardous material:** Something that is dangerous to living things, such as toxic chemicals

Instructor Background

In the United States nearly 3 million miles of underground pipelines move natural gas from wells to residential and commercial customers. If all the natural gas pipelines in the United States were connected to each other, they would stretch to the moon and back six times.

Two basic types of pipelines transport natural gas. High-pressure pipelines (larger than 6 inches in diameter) transport natural gas long distances from production areas to local markets. These pipelines account for over 200,000 miles of pipeline that move gas from state to state and within the boundaries of individual states.

Smaller pipes owned by local distribution companies deliver natural gas to end users such as homes, businesses and natural gas vehicles. To find natural gas pipelines on or near your property, you must contact 811 to have them located.

You can find the location of pipelines in your area. The U.S. Department of Transportation has a mapping site, which shows the larger pipelines in local communities. Follow the steps on the student sheet to see where pipelines are in your neighborhood.

Classroom Activity

1. Begin a classroom discussion on transmission and distribution pipelines and what products they provided to homes and businesses.
    - Are some pipelines located above ground or buried?
    - How do we know where they are located?
2. How is society protected from leaks and potential hazardous materials in pipelines?

Wrap-up

1. Summarize the need for transmission and distribution pipelines vs. the risks associated with pipelines located in populated areas.
2. What can society do to mitigate the risks?

Student Sheet Answers

Answers may vary but should contain similar verbiage.

6. c. Pipelines can deliver larger volumes of product than by truck or railway. The product is protected from weather and potential traffic delays or accidents.

6. d. By contacting 811, utility companies will come out and mark underground pipelines in your yard.

Natural Gas Safety Questions

1. To show the approximate location of buried utilities
2. City officials and emergency responders need to know what products pipelines are carrying, where they are located and how they can affect the public in an emergency.
3. Contact 811 before you dig or remove dirt from your property every time regardless of any knowledge you may have about location of underground utilities.
4. Plan your project. Contact 811. Wait for the marks. Protect the marks. Dig with care.
5. Yes, yes, yes, yes, yes, no, yes, yes, yes

National Standards Addressed

Disciplinary Core Ideas	Cross Cutting Concepts
ESS3.A: Natural Resources • Resource availability has guided the development of human society. (HS-ESS3-1) • All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2)	**Influence of Science, Engineering and Technology on Society and the Natural World** • Modern civilization depends on major technological systems. (HS-ESS3-1),(HS-ESS3-3) • Engineers continuously modify these systems to increase benefits while decreasing costs and risks. (HS-ESS3-2), (HS-ESS3-4) • New technologies can have deep impacts on society and the environment, including some that were not anticipated. (HS-ESS3-3) • Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ESS3-2)

Student Sheet – Pipelines in Your Neighborhood and Contacting 811

Two basic types of pipelines transport natural gas. High-pressure pipelines (larger than 6 inches in diameter) transport natural gas long distances from production areas to local markets. These pipelines account for over 200,000 miles of pipeline that move gas from state to state and within the boundaries of individual states.

Transmission pipelines are large pipes that are used to transport crude oil and natural gas from gathering systems to refining, processing or storage facilities. Transmission pipelines also transport refined petroleum products and natural gas to customers, for use or for further distribution. Transmission pipelines may be as large as 56 inches in diameter, but most are 20 to 30 inches.

Smaller pipes are owned by local distribution companies. Distribution pipelines are smaller, lower pressure pipelines that deliver natural gas to customers. To find natural gas pipelines on or near your property, you must contact 811 to have them located.

You can find the location of pipelines in your area. The U.S. Department of Transportation has a mapping site, which shows the larger pipelines in local communities. Using a computer, follow the steps below to see where pipelines are in your neighborhood.

1. Go to the Department of Transportation's National Pipeline Mapping System (NPMS) Public Viewer at *pvnpms.phmsa.dot.gov/PublicViewer/* (you may have to search for National Pipeline Mapping System and click on "Use Public Map Viewer").
2. Choose your state and county at the bottom of the page.
3. On the next page, make sure all three of the following have checkmarks in the map layers box.
   - Blue - "Gas Transmission Pipelines"
   - Red - "Hazardous Liquid Pipelines" (to move any substance that could be dangerous if not transported and stored correctly)
   - Gold - "Highly Populated Areas"
4. Lastly, select the "+" icon (magnifying glass with a +) to zoom closer to your neighborhood. If you zoom too close, you will not be able to see the pipelines.
5. You can switch between map and satellite view.
6. Answer the following questions:
   a. Is the area in which you live considered a populated area?

   b. What kinds of pipelines are found in your neighborhood: gas or hazardous liquid or both?

   c. Why do you think natural gas is transported through underground pipelines rather than trucked on highways or transported by trains?

   d. How can you find out where the smaller distribution pipes are in your own yard?

Many buried pipelines used in the transportation of natural gas, petroleum products or other hazardous materials are identified by above ground pipeline markers. Pipeline markers are located along certain pipeline routes and identify the approximate location of the pipeline. Here are examples of some of these markers:

Natural Gas Safety Questions

1. Why are there above ground pipeline markers?

2. Why would city officials and emergency responders benefit from knowing where natural gas pipelines are?

3. Research and summarize the national call 811 before you dig message.

4. What are the five steps to safe digging?

5. Answer yes or no if you would need to contact 811 after reading the following statements.

   I would contact 811 before:

   a. putting a new mailbox box near the street in front of my house. _____
   b. removing a tree (roots and all) from my property. _____
   c. using a backhoe to put in a new septic or sewer line from the street to my house. _____
   d. building a fence near the property line of my home. _____
   e. digging a trench for concrete for a new building on my property. _____
   f. mowing the lawn on my property. _____
   g. farming (preparing soil, planting or harvesting) newly purchased land near a road or highway. _____
   h. for electrical work, placing a six-foot copper ground rod for lightning into the ground. _____
   i. replacing the sidewalk along a busy street in the downtown area of a city. _____

Wrap-up

1. Summarize the need for transmission and distribution pipelines vs. the risks associated with pipelines located in populated areas.
2. What can society do to mitigate the risks?