



Careers in Energy

Students investigate energy-related careers through research, interviews, and job-shadowing.

Grade Level: 9–12

Subject Areas: English Language Arts, Family and Consumer Science, Science, Social Studies, Technology Education

Setting: Classroom, library, job site

Time:

Preparation: 30 to 45 minutes

Activity: Two 50-minute periods (one week if students choose to do job shadowing)

Vocabulary: Job shadowing

Major Concept Areas:

- Management of energy resource use
- Future outlooks for development and use of energy resources

Objectives

Students will be able to

- identify and describe different energy-related occupations and careers; and
- research the skills and education required for a particular energy-related occupation.

Rationale

Exploring energy-related occupations and careers through interviews or by working with people in such occupations helps students better define and make decisions about their own career options.

Materials

- Notebooks
- Copies of the following pages:
 - *List of Energy-Related Occupations*
 - *Job Shadowing Visit Report* (optional)
 - *Student Job Shadowing Visit: Business Representative Evaluation Form* (optional)
- Find additional resources related to this activity on keepprogram.org > Curriculum & Resources

Background

“What do you want to be when you grow up?”

“What are you going to do after you graduate?”

“So what are you going to do with the rest of your life?”

These familiar questions, asked at different stages in a person’s life, are variations of a fundamental question that many people wrestle with throughout their lives. With so many career opportunities and so many specialized jobs, it may be hard to decide what to do but it is important for students to be exposed to a variety of career choices before finishing high school. According to a 2015 Wisconsin CTEERS Concentrator Graduate Follow Up Report, nearly 20 percent of Wisconsin’s high school graduates go directly into the job market after high school. Energy is involved in everything society produces and does; therefore, considering occupations that are energy related offers a broad selection of choices.

There are many occupations directly related to energy development and use. The clearest examples of such occupations are those found in industries that develop, deliver, and distribute energy resources. These include the oil, natural gas, coal, and nuclear industries; electric and natural gas utilities; and the renewable energy industry that provides energy from the sun, wind, falling water, and biomass. Some of these companies are very large and employ thousands of people. Others, like renewable energy companies, employ fewer people, but may become more numerous in the future. Jobs associated with these companies range from scientists, engineers, and analysts to accountants, business managers, public relations specialists, lawyers, facility managers, maintenance workers, miners, railroad and pipeline crews, and truck drivers.

Another group of energy-related occupations is associated with products that use energy. These include designers, builders, manufacturers, and installers of appliances and heating, ventilation, and air conditioning equipment. Other occupations are associated with providing and managing energy used in buildings and industrial processes. These include architects, electricians, building maintenance managers, factory managers, and industrial engineers who work on improving manufacturing processes.

Changes in the way society develops and uses energy resources will affect energy-related careers. New career opportunities and possibly whole new occupations and industries may arise because of the need for greater energy efficiency, the increasing use of renewable energy resources, the continuing need for environmental protection, and the reorganization of electric and natural gas utilities due to deregulation and increased competition.

Where can students learn about energy-related occupations and careers? A good place to start is with their school's career or guidance counselor. In addition, the school library or public library will often have career directories and glossaries that provide job descriptions and general educational and training requirements. Reviewing job advertisements in newspapers provides familiarity with the current job market, salary offerings, and specific education and training requirements. Larger libraries may subscribe to energy-related business and trade

magazines, which often contain job advertisements. On-line searches can also be used to gather information on energy-related occupations. These searches are performed by entering into a search program key words that describe the type of occupation (see [List of Energy-Related Occupations](#) for examples), an energy resource, or the name of an energy company that the student is interested in. Students can further explore occupations by writing to the personnel offices of energy-related businesses for detailed job descriptions, by interviewing people who work in energy-related occupations, and by job shadowing, an activity where students spend one-half or one full day working with and observing someone on the job (see [Job Shadowing](#)).

A number of schools in Wisconsin have adapted a curriculum that integrates education with career preparation. This curriculum, known as "school-to-career" or "school-to-work," provides a system that eases students' transition from high school to further training or employment.

Exploring occupations and careers in energy not only helps students define and make decisions about their future employment options, but also shows them that many occupations are connected to energy development and use in ways they may not have realized. This, in turn, helps students see the important role energy plays in meeting the needs of modern society. And when changes occur in the way society develops and uses energy, students may find themselves in occupations that help create new opportunities and new occupations in the energy field in the future.



Procedure

Orientation

Ask students if they have thought about what occupations or careers they would like to be working in. Write some of their responses on the board. Ask students how much educational preparation and training they think they will need for these occupations. Write their responses next to the occupations already listed. Then discuss how these occupations or careers might be related to energy development and use.

Tell students that they will be investigating specifically energy-related occupations.



Steps

1. Have students choose two or three of the occupations from *List of Energy-Related Occupations* that interest them. They should list these choices in their notebooks.
2. Have students look up in a career directory or career glossary the occupations they chose and have them write a brief description of each occupation in their notebook.
3. Instruct students to research these occupations more thoroughly (see **Background** for suggestions for conducting research on occupations and careers). For each occupation students choose, they should determine the following:
 - How the occupation is related to energy development or use
 - The required level of education
 - The required skills and abilities
 - The setting and working conditions of the occupation
 - The geographic location of the occupation

Students should record this information in their notebooks. If possible, they should also include advertisements cut out or copied from newspapers and magazines.

4. Ask students to select one of the energy-related occupations or careers they have researched and find out more about it by doing one of the following:
 - Interview someone who works in the occupation
Students contact a person who works in a specific occupation and ask to interview him or her about a typical day at work. Here are some questions for the students to ask:
 - How did you get interested in this work?
 - What kind of education or training did you need?
 - What other skills do you need?
 - What do you like the most/least about your job?
 - When entering this field of work, approximately what pay scale can one expect?
 - Describe the general setting and the working conditions of your job.
 - Describe a typical day on the job.
 - Describe how your occupation is related to energy development or use.
 - Job shadowing
Discuss the information found on the *Job Shadowing Visit Report*. Provide students who are interested in job shadowing with copies of the *Job Shadowing Visit Report* and the *Student Job Shadowing Visit: Business Representative Evaluation Form*. Have students share their job shadowing experience with the class after they complete their visit.

Closure

Have students share with the class what information they found on the occupations they chose. Ask them if they are more likely to pursue an energy-related occupation or career than they were before they began this activity. Discuss with students the importance of energy-related occupations in our society, and how all our lives depend on them.

Assessment

Formative

- Did students provide adequate definitions and job descriptions for the energy-related occupations they were interested in?

- Were the occupations students chose to investigate adequately related to energy development and use?
- How thoroughly did students research information on educational background, salary, etc. for the occupations they chose?

Summative

- Have students pretend they are applying for one of the jobs they researched by writing a resumé or filling out a mock job application.
- Have students make a list of their daily activities and identify an energy-related occupation that helps make their activities possible.

Related KEEP Activities

Almost any activity in the guide can be linked to this activity. Some notable connections are “Get That Gasoline,” “Fuel That Power Plant,” and “Why Use Renewable Energy?” Use “Energy Futures” to have students project what occupations may be available for them when they graduate.



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Job Shadowing

Job shadowing involves student observing a professional in a field of work that is of interest to them. The shadowing can be for all or part of the day and some times students are given small tasks during the day. The date is arranged ahead of time and the professional understands that students should gain insight into a “typical” work day; the student should be act responsibly and use this opportunity to gain insight into the reality of a potential career. The professional should not feel obligated to glamorize the workplace or to entertain the students; this experience is meant to provide realistic career information that will help students make career decisions and provide a thought-provoking experience outside of the classroom.

Desired student learning outcomes of the experience include the following:

- An in-depth awareness of interests, aptitudes, and responsibilities related to possible careers.
- An appreciation of job skills such as dependability, adaptability, flexibility, responsibility, and good human relations;
- Ability to make informed decisions related to the career areas they are exploring.
- A comprehension of the importance of continued formal and informal learning experience, including on-the-job training.
- Enhanced interactions with the business community.

Following are a few strategies and suggestions for job shadowing protocol:

- Students agree to do any assigned duties they are capable of handling; it is helpful if students understand how such duties fit into the overall execution of a particular career.
- Students agree to be punctual and to complete the time commitment.
- Each student fills out a *Job Shadowing Visit Report* (see sample) and returns it to the teacher. The report will be evaluated to determine how well the student functioned during the experience.
- Encourage students to send thank you notes to the business or organization.
- Have the professional complete an evaluation of the job shadowing visit (see sample entitled *Student Job Shadowing Visit: Business Representative Evaluation Form*).

Other Tips:

- Challenge students to list in their notebooks energy-related jobs that may be in demand ten to 20 years from now; this list can help identify potential employers and careers of interest to students.
- Invite the school guidance or career counselor or someone who works in an energy-related occupation to speak to the class or to individual students about potential career opportunities in the energy field.
- Begin setting up contacts early, months before the potential job shadowing date.
- Prepare a document explaining the importance of job shadowing and its purpose to share with employers and students.
- It is beneficial for students to observe and be involved in as much of the total process as facilities, duties, and schedules allow.
- Any problems or feelings of discontent the businesses or students may have should be relayed to the teacher as soon as possible.

List of Energy-Related Occupations

Professional Careers

This list covers careers that require extensive academic training or practical training. These occupations include many of the jobs that require undergraduate or graduate school education.

Architects	Engineers	Meteorologists
Astronomers	Geographers	Petrologists
Biochemists	Geologists	Physicians
Biologists	Geophysicists	Physicists
Chemists	Guidance counselors	Systems analysts
Dietitians	Historians	Teachers
Drafters	Industrial designers	Urban and regional planners
Economists	Landscape architects	Wood science & technology careers

Power Mechanics and Transportation

This list relates to careers regarding power mechanics and transportation.

Aeronautical and aerospace technicians	Car-rental agents
Air Force aircraft mechanic	Driving instructors
Aircraft mechanics and engine specialists	Facilities maintenance workers
Auto parts department managers	Motor carrier inspector
Automobile sales workers	Municipal traffic and fleet director
Automotive technicians	Race Car Mechanics
Automotive technicians	Semi truck drivers
Avionics technicians	Space shuttle flight engineers
Bicycle repairer/salespeople	Tire sales and service representatives
Boat mechanics	Transport operations managers
Bus company managers	

Building Construction and Remodeling

The following list relates to careers involving building construction and remodeling.

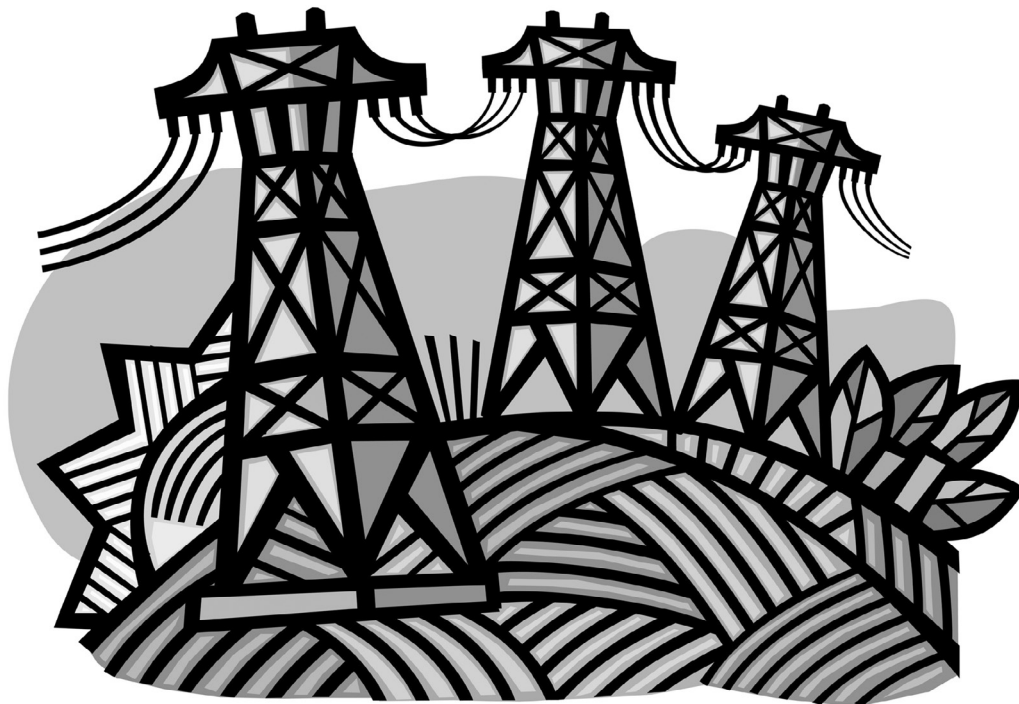
- Appliance repairers
- Carpenters
- Furniture designer/builders
- General contractors
- Home design consultants
- HVAC mechanics
- Plumbers
- Refrigeration mechanics
- Renovation contractors
- Roofers
- Solar energy systems designers
- Timber framers

List of Energy-Related Occupations

General Energy Related Careers

The list below is a general list of careers related to energy. A variety of education and training is necessary for these career choices.

Aerial photographers	Machine tool operators
Business/Computer analysts	Mason
CAD/CAM technicians	Nuclear industrial technicians
Coal mining operatives	Petroleum drilling occupations
Computer repairers	Petroleum refining workers
Construction workers	Plastics technicians
Diesel mechanics	Pollution control technicians
Electric line servicers	Power plant occupations
Electricians	Pyrotechnists
Electronics technicians	Robotics technicians
Energy-conservation technicians	Semiconductor development technicians
Farm equipment mechanics	Special effects animators
Fire fighters	Telecommunications technicians
Industrial workers	Television repairers
Ironworkers	Water treatment instrumentation technicians
Landscapers and grounds managers	Website designers
Logging and industry workers	Welders



Job Shadowing Visit Report

Student's Name _____ Grade Level _____

Referring Teacher _____

Name of Company Visited _____

Address of Company Visited _____

Date and Time of Arrival _____ Departure Time _____

Name and Title of Contact Person _____

Name of Career(s) You Shadowed _____

Schedule of events (what you did)

What you learned

What you enjoyed most

What you enjoyed least

Job Shadowing Visit Report

Student's Name _____ Grade Level _____

Evaluation

How was the job you shadowed associated with energy development and use?

Do you think the visit was worthwhile? Why?

Was the experience what you expected? Explain.

Were any of your future career plans changed or reinforced by this experience?

Would you recommend this type of experience to other students? Explain why or why not.

Student Job Shadowing Visit: Business Representative Evaluation Form

Your Name and Title _____

Business or Industry You Represent _____

Name of Participating Student _____

Date of Visit _____

Was student properly prepared for the visit? Yes No

Was the student's behavior appropriate? Yes No

Was student's visit worth your time? Yes No

Please make any comments and suggestions pertinent to the success and/or improvement of this program.