

Energy Squares

A QUICK LOOK AT ENERGY SQUARES

Based on tic-tac-toe, **Energy Squares** reinforces students' knowledge of energy sources and energy-related topics.

GRADES: 3–12

PREPARATION: LOW

TIME: 30 MINUTES

GET READY

Before class, make nine nametags for the celebrity energy guests. Next, make a transparency of the game board found on page 40. Cut out X and O shapes from black construction paper. There are five questions provided for each guest. Most likely, only three or four questions will be needed, so choose the ones you feel are most important. You can also come up with alternative questions appropriate to the grade level of the students playing the game.

ENERGY NAMES

Peter Petroleum

Natalie Natural Gas

Chris Coal

Reba Renewable

Uri Uranium

Christy Conserve

Paul Propane

Elaine Electricity

Herman History

GET SET

- Choose nine students to act as energy guests for the game. Provide each guest with a nametag and stand him in front of the room. Another student acts as the game show host.
- Divide the remaining students into four teams. Each team must choose one spokesperson.
- Only two teams can participate at one time—decide which two teams will play in the first round and which two will play in the second round.
- Flip a coin to determine which first round team begins the game. The winner of the coin toss decides who goes first, and the losing team chooses either X's or O's as their symbol. Repeat this procedure with the second round team.

GO • ENERGY SQUARES

Give the students the following instructions for how to play the game:

- This game is similar to tic-tac-toe. The goal is to get three X's or O's in a row on the game board. The first two teams will play each other and then the remaining two teams will play. The winners will face off in the final championship round.
- The first team chooses a guest and his or her accompanying square on the game sheet. The guests' names correspond to the topic of the question they will be asked. The host asks the guest a question and the guest answers to the best of his knowledge and ability. It is now the team's responsibility to decide whether or not they agree with the answer given by the energy guest. If they answer correctly, the team's symbol is placed in the square. However, if they answer incorrectly, the other team's symbol is placed in the square. After each question, it is the other team's turn to choose a guest.
- When choosing guests, keep in mind that this game is played like tic-tac-toe. You are trying to get three of your symbols in a row while blocking your opponents from doing the same thing. Play continues in this manner until all squares are filled with either X's or O's. One final rule—when a team is going for the winning square to get three in a row, the team members must answer the question correctly. If the question is answered incorrectly, the other team does not place its symbol in that square. Again, this is only applicable when one of the teams is going for the winning square. In case neither team succeeds in getting three in a row, the team with the most symbols on the board wins.

QUESTIONS AND ANSWERS FOR PETROLEUM

1. What is the major use of petroleum in the U.S.? *Transportation*
2. What is the major product produced during petroleum refining? *Gasoline*
3. How many gallons of oil are in one barrel? *42*
4. True or false—Alaska is the nation's top oil producing state? *False, Texas is*
5. What percentage of U.S. petroleum supply is imported—25%, 33%, 50%, or 66%? *66%*

QUESTIONS AND ANSWERS FOR NATURAL GAS

1. How is natural gas usually transported? *By pipeline*
2. True or false—Natural gas is a light yellow color? *False, it's colorless*
3. What is the major use of natural gas by a family? *Home heating*
4. What is the chemical name for natural gas? *Methane*
5. True or false—Natural gas is measured in, and sold by, gallons? *False, by cubic feet*

QUESTIONS AND ANSWERS FOR COAL

1. What is the major use of coal? *Producing electricity*
2. True or false—Canada is the world leader of known reserves of coal? *False, the United States is*
3. How is coal mainly transported? *By railroad*
4. Is coal the youngest or the oldest fossil fuel? *The youngest*
5. Most U.S. coal is produced from which type of mining, surface or underground? *Surface*

QUESTIONS AND ANSWERS FOR RENEWABLES

1. What type of solar cell produces electricity directly from sunlight? *Photovoltaic cell*
2. Renewables supply approximately what percentage of total U.S. energy demand—1%, 6%, or 30%? *6%*
3. Which renewable source of energy is NOT a result of the sun's energy striking the earth? *Geothermal*
4. True or false—wind is the result of uneven heating of the earth's mantle? *False, uneven heating of the earth's surface*
5. Which energy source gets its energy from garbage and agricultural wastes? *Biomass*

QUESTIONS AND ANSWERS FOR URANIUM

1. Which western state may be the site of the nation's first nuclear waste repository? *Nevada*
2. True or false—the isotope of uranium that splits is U238? *False, its U235*
3. What is the name of the subatomic particle that causes nuclear fission when it strikes U235—an electron, a neutron, or a proton? *A neutron*
4. Plus or minus ten years, in what year did America's first nuclear power plant go into operation? *1957*
5. In what part of a nuclear power plant does nuclear fission take place? *The reactor*

QUESTIONS AND ANSWERS FOR CONSERVATION

1. Which letter of the alphabet is used to measure the value of insulation? *R value*
2. True or false—incandescent light bulbs provide the same amount of light that fluorescent bulbs do for one-fourth the energy? *False, it's exactly the opposite*
3. After home heating and cooling, what is the most energy-consuming job in the home? *Heating water*
4. What two items are used to seal cracks around windows and doors? *Caulking and weather stripping*
5. As the energy efficiency rating of an appliance increases, the amount of energy it requires to operate: increases, decreases, or remains the same? *Decreases*

QUESTIONS AND ANSWERS FOR PROPANE

1. Is propane used mostly in metropolitan or rural areas? *Rural*
2. By what quantity is propane sold? *By the gallon*
3. What physical state does propane turn into when it's stored under moderate pressure or cooled to -45° F.? *A liquid*
4. Propane comes from processing which fossil fuels? *Natural gas and petroleum*
5. Is the weight of propane lighter than, heavier than, or equal to the weight of air? *Heavier than*

QUESTIONS AND ANSWER FOR ELECTRICITY

1. How is electricity used, measured, and sold? *By the kilowatt-hour*
2. Plus or minus five cents, what is the cost of a kilowatt-hour of electricity? *8.3 cents*
3. Is electricity produced by rotating wires in a magnetic field in a turbine or a generator? *A generator*
4. In the summer, during what time period does the demand for electricity peak—6:00 a.m. to noon, noon to 6:00 p.m., or 6:00 p.m. to midnight? *Noon to 6:00 p.m.*
5. What is the leading energy source used to generate electricity? *Coal*

QUESTIONS AND ANSWERS FOR HISTORY

1. Whose motorized vehicle created a great demand for gasoline? *Henry Ford*
2. Where was the nation's first hydroelectric power dam plant built in 1895? *Niagara Falls*
3. Who invented the steamboat, Robert Fulton or Edwin Drake? *Robert Fulton*
4. Who invented the light bulb and other electrical devices? *Thomas Edison*
5. After World War II, this energy source replaced coal as the number one energy source. *Petroleum*

ENERGY

squares

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| Peter Petroleum | Natalie Natural Gas | Chris Coal |
| Reba Renewable | Uri Uranium | Christy Conserve |
| Paul Propane | Elaine Electricity | Herman History |