



EXPLORING ENERGY Program Quiz

Name _____

Directions: At the end of the program there is a quick quiz. You can answer the questions on this sheet.

1. How are potential and kinetic energy different from each other?
2. What are the seven main forms of energy?
3. The law of conservation of energy states that energy is neither created nor destroyed. What does this mean?
4. What are nonrenewable resources? Give some examples of nonrenewable resources.
5. What are renewable resources? Provide some examples.
6. What are some of the problems associated with burning fossil fuels?
7. Why are nonrenewable resources also called fossil fuels? How were they formed?
8. Why is the conservation of energy so important?
9. What are some things people can do to conserve energy?



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EXPLORING ENERGY Pre-test

Name _____

A. Directions: Give a definition for each of the following terms.

1. potential energy
2. kinetic energy
3. friction
4. air resistance
5. mechanical energy

B. Directions: The following questions need a short answer.

1. Give a definition for nonrenewable resources and identify some of these resources.

2. What are renewable resources and what are some examples?

3. How are potential and kinetic energy related?

4. How does a roller coaster demonstrate potential and kinetic energy in action?

5. Give a description for each of these renewable resources.
 - a. solar energy
 - b. wind energy
 - c. geothermal energy
 - d. biomass energy
 - e. hydropower



EXPLORING ENERGY

Energy Transformations

Name _____

Directions: Describe what is happening during these energy transformations.

1. After lunch a boy rides his bike to his friends house.

Chemical energy transforms to mechanical energy.

2. A driver fills his car with gas and then drives three hundred miles.

3. The electric toaster is plugged into the outlet and is used to make dinner.

4. Sunlight shines on a tree.

5. Coal is burned in the furnace of a power plant.



EXPLORING ENERGY

Post Test

Name _____

Part A Directions: Answer the following multiple choice questions by circling the correct answer.

1. Energy is the ability to do _____
a. work b. power c. acceleration d. speed
2. The fuel used in a rocket is energy stored as _____
a. mechanical energy b. nuclear energy c. chemical energy d. electromagnetic
3. Energy of motion is _____
a. kinetic b. potential c. chemical d. solar
4. A rubber band stretched between two fingers is an example of _____
a. kinetic energy b. potential energy c. chemical energy d. solar energy
5. An energy resource that uses the heat from the earth is called _____
a. solar b. geothermal c. wind d. hydropower

Part B Directions: Answer the following short-answer questions in the space provided.

1. Almost all energy can be traced to the sun. Explain how this fits in with the food we eat.
2. What are the nonrenewable energy resources?
3. Name the renewable energy resources.
4. What are some of the problems associated with the burning of fossil fuels?
5. What are some of the ways individuals can conserve energy?



EXPLORING ENERGY

Consumption by Source

Name _____

We use energy from many different energy sources in our daily lives. Energy sources can be classified as either renewable or nonrenewable sources. Renewable resources can be replenished in a relatively short period of time. Nonrenewable resources are in limited supply. They are resources that were formed over millions of years. During prehistoric times, small microscopic animals and plants died and sank to the bottom of ancient seas. Sediment built up over millions of years creating tremendous pressure and changing these remains into sources of energy.

Here is a chart that describes the percentage of consumption in the United States for various sources of energy.

Directions: Identify each energy resource as either renewable or nonrenewable. Then answer the question at the bottom of the page.

Source of Energy	Percentage of Use	Renewable	or	Nonrenewable
Petroleum	38.5%			
Natural Gas	22.9%			
Coal	22.8%			
Uranium	8.2%			
Biomass	3.0%			
Hydropower	2.4%			
Propane	1.6%			
Geothermal	.3%			
Solar	.1%			
Wind	.1%			

1. What can you determine from the information in this chart?



EXPLORING ENERGY

Examples of Energy

Name _____

Directions: Look in magazines and newspapers to find pictures of things that use energy and cut them out. Cut these labels out and paste them to pieces of construction paper. Then paste the pictures you have cut out onto the same piece of construction paper as the kind of energy it represents.

Mechanical Energy
(muscle power or the energy of motion)

Electrical Energy

Heat Energy

Light Energy

Sound Energy

Chemical Energy

Nuclear Energy



EXPLORING ENERGY

The Height of a Dropped Weight

Name _____

Purpose: To determine how speed and height relates to the energy of a dropped weight.

Materials: two rulers fish weights twine block of wood two books

Procedures:

1. Set the ruler on a desk or table so that about three inches of the ruler hang over the edge.
2. Use books to hold the ruler in place.
3. Tie a fish weight to one end of the twine.
4. Tie the other end of the twine to the part of the ruler hanging over the edge of the table. The weight should be about 3 centimeters off the floor.
5. Make a mark on the floor where the weight hangs down straight.
6. Place the block of wood on that mark so that it is standing up.
7. Lift or pull back the weight so that it is about 10 centimeters off the floor.
8. Release the weight and watch it hit the block of wood. Measure how far the block goes from the mark on the floor you made before. Record below.
9. Repeat this with other dropping heights. Record data in the chart below.

Observations:

Distance block is hit	10cm drop	20cm drop	30cm drop	40cm drop

Conclusions: Compare the different trials. Which drop height caused the block to be hit the furthest?



EXPLORING ENERGY

The Mass of a Dropped Weight

Name _____

Purpose: To determine how mass relates to the energy of a dropped fish weight.

Materials: two rulers twine two fish weights block of wood two books

Procedure:

1. Set the ruler on a desk or table so that about three inches of the ruler hang over the edge.
2. Use books to hold the ruler in place.
3. Tie 2 fish weights to one end of the twine.
4. Tie the other end of the twine to the part of the ruler hanging over the edge of the table. The weights should be about 3 centimeters off the floor.
5. Make a mark on the floor where the weights hang down straight.
6. Place the block of wood on that mark so that it is standing up.
7. Lift or pull back the weights so that they are about 10 centimeters off the floor.
8. Release the weights and watch them hit the block of wood. Measure how far the block goes from the mark on the floor you made before. Record below.
9. Repeat this with other dropping heights. Record data in the chart below.

Observations:

Distance block is hit	10cm drop	20cm drop	30cm drop	40cm drop

Conclusions: How does the data from this experiment compare with the data on the sheet about dropping distances and only one fish weight?



Galileo Galilei was nineteen when he noticed a lamp suspended from a church ceiling swing back and forth. He was fascinated by the nature of the swings and later conducted many experiments related to pendulums.

Purpose: To discover some of the properties of pendulums. What effects the number of swings of a pendulum within a minute? Is it the height the pendulum is released? Is it the weight at the end of the pendulum? Is it the length of the pendulum?

Materials: strings of various lengths
Washers or fish weights

PART A: HEIGHT OF RELEASE

Procedures:

1. Cut a piece of string of any length and attach a washer or a weight to one end.
2. Hold the other end in one hand and with your free hand pull the weighted end of the string up to be released in a pendulum swing.
3. Release the weighted end and count the number of complete swings the pendulum makes in exactly one minute. You may have to have someone else do the timing for you. Record the number of swings on the chart marked Part A on the next worksheet.
4. Repeat this procedure at least two more times but change the height at which you release the weighted end of the string.

PART B: LENGTH OF STRING

Procedures:

1. Cut pieces of string of various lengths to make pendulums.
2. Tie a washer or a weight to one end of each string.
3. One at a time, test each pendulum for the number of complete back and forth swings it makes in a minute's time.
4. Record results on the chart marked Part B.



PART C: WEIGHT AT THE END OF THE STRING

Procedures:

1. Use a single length of string for this experiment.
2. Tie a washer or weight to one end and record the number of complete swings made by the pendulum in one minute.
3. Now add another weight and count the number of swings in a minute. Record your findings on the chart marked Part C.
4. Repeat this a couple more times adding additional weight each time.

Observations:

Part A: Height of Release

height of release	number of swings in one minute
low release	
middle release	
high release	

Part B: Length of String

length of string	number of swings	length of string	number of swings

Part C: Weight at End of String

number of weights	number of swings	number of weights	number of swings

Conclusions: What do these findings tell you about pendulums?



EXPLORING ENERGY

Renewable and Nonrenewable Resources

Name _____

Energy resources are divided into two categories; renewable and nonrenewable resources.

Nonrenewable resources include coal, petroleum (oil), natural gas, propane, and uranium. Most of the energy used in the United States comes from these nonrenewable resources that are often referred to as fossil fuels.

Renewable resources include solar, biomass, wind, geothermal, and wind energy resources.

Directions: Fill in the following table with advantages and disadvantages for each of the energy resources.

Energy Resource	Advantages	Disadvantages
Fossil Fuels (coal, petroleum, natural gas)		
Nuclear		
Hydropower		
Solar		
Wind		
Biomass		
Geothermal		



Directions: Here are some questions to answer concerning fossil fuels.

1. Fossil fuels are considered nonrenewable energy resources. What does that mean?
2. Why are these resources referred to as fossil fuels?
3. Give examples of fossil fuels and include how they are used.
4. What are some of the problems associated with the use of fossil fuels?
5. What are some of the problems associated with a dependence on fossil fuels?

**Questions:**

1. Why is it so important to conserve energy?
2. What is acid rain and how is it produced?
3. What are the greenhouse effect and global warming? How are they potentially harmful?
4. Why is the burning of fossil fuels so harmful to the environment?
5. Identify ways for conserving energy. What are some of the ways that people can conserve energy on a regular basis?



Directions: With your team create an audio or television public service announcement. The idea is to share information about a specific topic and then give suggestions for improved use.

Select from the list of topics and then determine your approach for creating an audio or video commercial.

List of topics:

Fossil Fuel Problems
Renewable Energy Resources are the Future
Greenhouse Effect Issues
Global Warming
Acid Rain
The Need for Energy Conservation
Ways to Help With Energy Conservation

Preparation:

1. Use brainstorming to generate ideas. Record ideas on index cards.
2. Choose the ideas, which you feel are the best.
3. Arrange the index cards in an order for the presentation.
4. Look at each card and decide what props you will need, who will perform which parts, and any music or sound effects you will need.
5. Based on the cards write a script.
6. Identify the locations you will want to use during the production.
7. Gather the necessary audio or video equipment.
8. Rehearse the script.
9. If you are doing a television commercial you may want to consider title cards or other poster board graphics to help draw attention to key concepts or terms.