### Energy: 4.C.1

Introduction to Energy

Grade Level	4	
Sessions	1 – approximately 50- 60 minutes	
Seasonality	N/A	
Instructional Mode(s)	Whole class	
Team Size	N/A	
WPS Benchmarks	04.SC.PS.02	
	04.SC.PS.09	
MA Frameworks	3-5.PS.4	
	3-5.PS.11	
Key Words	Energy, Heat, Magnetism, Mechanical Energy, Sound Energy, Electrical	
-	Energy, Heat Energy, Magnetic Energy, Light Energy, Electricity, Wind,	
	Water, Wood, Food, and Natural Gas	

### Summary

The students will be introduced to many different forms of energy through lecture and example. The student will then be given the opportunity to name the different types of energy that are available in their home. This lesson is meant to be delivered after the Sound Unit.

### Learning Objectives

2002 Worcester Public Schools (WPS) Benchmarks for Grade 4

<u>04.SC.PS.02</u> Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change.

<u>04.SC.PS.09</u> Describe and model the basic structure of the atom, e.g., carbon and oxygen.

### Additional Learning Objectives

- 1. <u>3-5.PS.4</u> Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change.
- <u>3-5.PS.11</u> Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relate the rate of vibration to the pitch of the sound.

### Required Background Knowledge

None

### Essential Questions

- 1. What are three forms of energy?
- 2. What are three sources of energy?

### Introduction / Motivation

Ask the students what energy is. Take answers from the class then read the "What is Energy" poem to the class.

### Procedure

The instructor will:

- 1. Begin with the Introduction / Motivation (7 min.)
- 2. It is up to the discretion of the teacher if the energy test is treated as a pre-test and a post-test or strictly as a quiz after the lesson is completed (15 min.).
- 3. Present the class with the Forms of Energy List (without descriptions) and ask the students for examples of each type of energy (10 min.).
- 4. Present either the forms of energy list with the descriptions or the forms of energy list with the descriptions and pictures (7 min.).
- 5. Talk about the sources of energy. Go over the pictures on the Forms of Energy pages pointing out the source of energy for each picture (10 min.).

### Materials List

Materials per class	Amount	Location
None	N/A	N/A

Materials per student	Amount	Location
None	N/A	N/A

### Vocabulary with Definitions (in alphabetical order)

- 1. *Electrical Energy* Energy created by the flow of electric charge (electricity).
- 2. *Energy* The capacity for work. There are many different forms of energy such as heat energy, mechanical energy, electrical energy, magnetic energy, and sound energy.
- 3. *Heat* Movement of atoms (particles).
- 4. *Light* Comes from the sun.

- 5. *Magnetic Energy* Having the properties of a magnet. Capable of being magnetized or attracted by a magnet.
- 6. *Mechanical Energy* Energy of motion (i.e. wind, cars moving, riding a bike).
- 7. *Sound* An invisible wave through the air produced by strings vibrating (music, voices).

### Assessment / Evaluation of Students

The instructor may assess the students in any/all of the following manners:

1. Evaluate the students performance on the Energy Quiz, Sources of Energy Worksheet, or Energy Search Worksheet

### Lesson Extensions

The instructor may choose to present either of the worksheets (Sources of Energy Worksheet or Energy Search Worksheet).

### Attachments

- 1. Energy
- 2. Energy Answers
- 3. What is Energy?
- 4. Forms of Energy
- 5. Forms of Energy Definitions
- 6. Forms of Energy Mechanical
- 7. Forms of Energy Sound
- 8. Forms of Energy Electrical
- 9. Forms of Energy Heat
- 10. Forms of Energy Magnetic
- 11. Forms of Energy Light
- 12. Sources of Energy
- 13. Heat Energy
- 14. Sources of Energy Worksheet
- 15. Answer Key
- 16. Energy Search

### 17. Pictures

### Troubleshooting Tips

None

### Safety Issues

None

### Additional Resources

None

### Key Words

Energy, Heat, Magnetism, Mechanical Energy, Sound Energy, Electrical Energy, Heat Energy, Magnetic Energy, Light Energy, Electricity, Wind, Water, Wood, Food, and Natural Gas

Name \_\_\_\_\_

Date\_\_\_\_\_

### Energy

- 1. Sources of energy include:
  - a. Food
  - b. Sun
  - c. Wind
  - d. All of the above (Food, Sun, and Wind)
- 2. All sounds have \_\_\_\_\_ in common:
  - a. Traveling energy
  - b. Vibrations
  - c. Waves
  - d. All of the above (Traveling energy, Vibrations, and Waves)

### 3. Sound travels through which of the following:

- a. Liquid
- b. Gas
- c. Solid
- d. All of the above (Liquid, Gas, and Solid)

### 4. Forms of energy include:

- a. Heat
- b. Light
- c. Mechanical
- d. All of the above (Heat, Nuclear, and Mechanical)
- 5. What is energy?

6. Give an example of how you use energy \_\_\_\_\_

Name \_\_\_\_\_

Date\_\_\_\_\_

### **Energy Answers**

1. Sources of energy include:

- a. Food
- b. Sun
- c. Wind
- d. All of the above (Food, Sun, and Wind) \*
- 2. All sounds have \_\_\_\_\_ in common:
  - a. Traveling energy
  - b. Vibrations
  - c. Waves
  - \* d. All of the above (Traveling energy, Vibrations, and Waves)
- 3. Sound travels through which of the following:
  - a. Liquid
  - b. Gas
  - c. Solid
  - \* d. All of the above (Liquid, Gas, and Solid)
- 4. Forms of energy include:
  - a. Heat
  - b. Light
  - c. Mechanical
  - \* d. All of the above (Heat, Light, and Mechanical)

5. What is energy? **Answers will vary** 

6. Give an example of how you use energy \_\_\_\_\_\_ Answers will vary \_\_\_\_\_

## What is Energy?

"Energy makes everything go! Energy makes light bulbs glow, cars go, fans blow and you grow! Energy make microwaves cook and TV's look and powers you to read a book! Energy makes plants grow and horsed out of hay!..."

- How does energy make microwaves cook?
- How does energy make horses out of hay?

## Mechanical

## Sound

**Electrical** 

Heat

Magnetic

Light

## Forms of Energy Definitions

**Mechanical** - Energy of motion (i.e. wind, cars moving, riding a bike)

**Sound** - An invisible wave through the air produced by strings vibrating (music, voices)

**Electrical** - Energy created by the flow of electric charge (electricity)

**Heat -** Movement of atoms (particles)

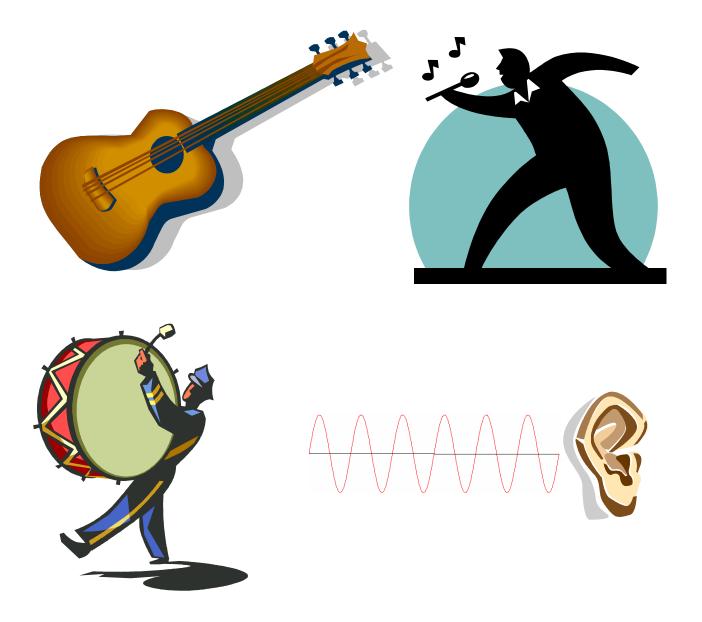
Magnetic Energy - Having the properties of a magnet. Capable of being magnetized or attracted by a magnet

Light - Comes from the sun

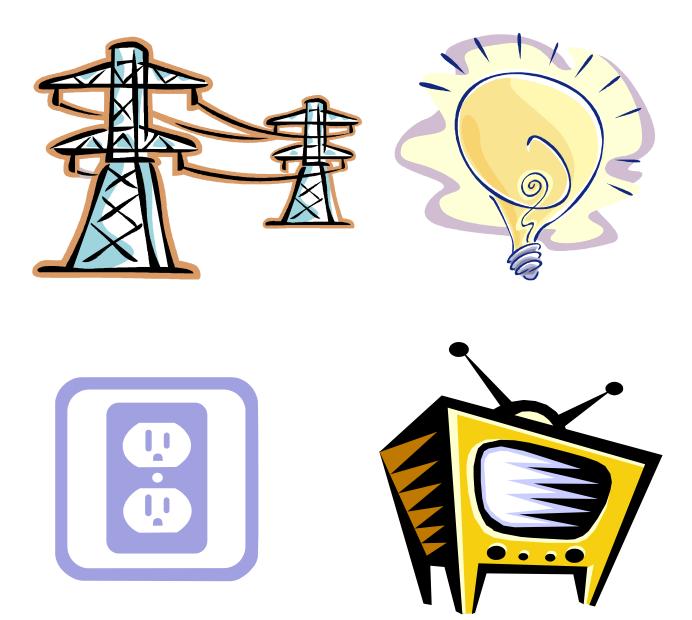
**Mechanical -** Energy of motion (i.e. wind, cars moving, riding a bike)



**Sound** - An invisible wave through the air produced by strings vibrating (music, voices)



**Electrical -** Energy created by the flow of electric charge (electricity)

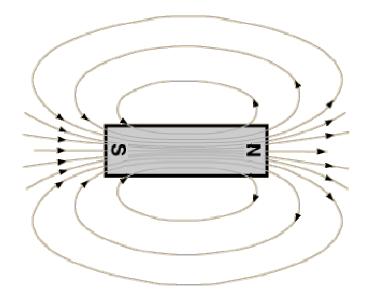


**Heat -** Movement of particles that make up matter



**Magnetic** - Having the properties of a magnet. Capable of being magnetized or attracted by a magnet.





**Light** - Comes from the sun



# Sources of Energy

### The different forms of energy come from energy sources.

**Sunlight:** A picture of the sun. This is pure energy and the sun is the original source of energy for almost all living things. Plants convert the solar energy into food energy, which allows them to make leaves, flowers, and fruit.

**Food:** Piece of fruit. Food is consumed by people for energy. The energy allows people to keep their heart beating and body growing.

Wood: Pencil or desk. Used in wood-burning stoves or a campfire to create heat.

Coal: Charcoal. Burned to heat homes and run electrical machines.

**Oil:** A bottle of motor oil. Petroleum products similar to motor oil are burned to fuel motor vehicles and heat homes.

Natural Gas: Lighter or candle. The flame represents the natural gas used to heat homes.

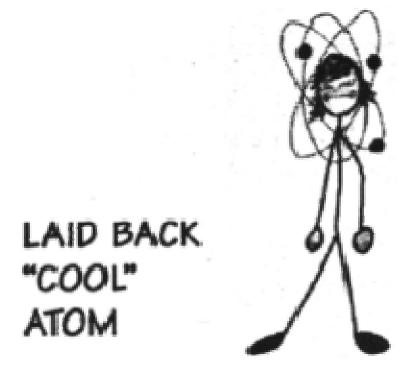
Water (Hydropower): Glass of water. Use waterfalls or waterwheels to generate energy.

Wind: Pinwheel or fan. Use windmills to generate electricity.

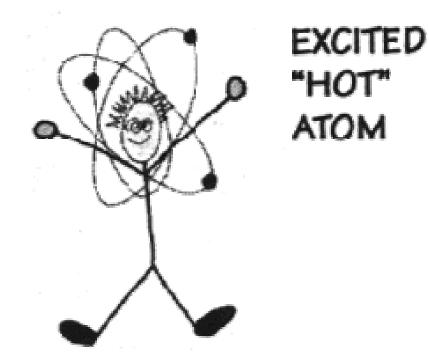
Electricity: Light bulbs in class. Makes things run.

**Biomass:** Trash can with garbage. Organic materials which has stored sunlight in the form of chemical energy.

## Heat Energy



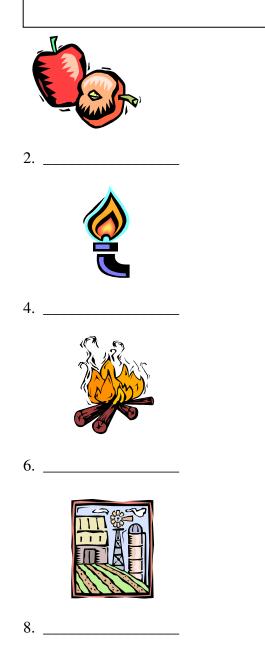
http://www.powermasters.com/heat\_energy.html



http://www.powermasters.com/heat\_energy.html

### Sources of Energy Worksheet

**Directions:** Look at the symbols below and then identify the source of energy on the line below each symbol: solar; food; wood; coal; oil; natural gas; water; wind; electricity; nuclear. Each source is used only once.









3. \_\_\_\_\_









9. \_\_\_\_\_

Name\_\_\_\_

Date\_\_\_\_\_

#### Sources of Energy Worksheet

**Directions:** Look at the symbols below and then identify the source of energy on the line below each symbol: solar; food; wood; coal; oil; natural gas;



2. \_\_\_\_Food\_\_\_\_\_



4. \_\_\_\_Wood or Oil\_\_\_\_\_



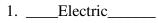
6. \_\_\_\_Wood\_\_\_\_



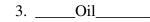
8. \_\_\_\_Wind\_\_\_\_\_

### **Answer Key**













7. \_\_\_\_\_Water\_\_\_\_\_



9. \_\_\_\_\_Solar\_\_\_\_\_

Date\_\_\_\_\_

**Form of Energy** 

### **Energy Search**

Instructions: For this assignment you will think about evidence of energy usage at school. Describe the evidence in the left column and write down what type of energy in the right column.

### **Evidence of Energy Being Used**

1. Door Closing	Mechanical Energy
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

### **Forms of Energy**

Mechanical

Sound

Electromagnetic

Heat

Nuclear

