

Name: _____ Period: _____ Due Date: _____

Energy, Work, and Heat Transfer

E-Learning Day #1 Work, Energy, and Heat

STANDARDS:

- 7.4.1 Understand that **energy is the capacity to do work.**
- 7.1.2 Describe and give examples of **how energy can be transferred from place to place** and transformed from one form to another through **radiation, convection and conduction.**

GENERAL DIRECTIONS:

- READ:** Read and analyze the text that goes with each specific e-Learning day. Scan over the text once and then go back and read more carefully. Mark important information however you need to.
- WATCH:** There are one or more videos that go with each text's topic. These will help you make even more sense of the text.
- QUIZ:** After reading and watching the videos complete the quiz. You can find the quiz button on my Weebly page.

☺ You may refer back to the text and videos as often as needed to complete the quiz. Each question is worth TWO points.


Day #1 Work, Energy, and Heat

Focus Questions:

- What is energy? What is work?
- How are work and energy related?
- What is Heat? How is thermal energy related to kinetic and potential energy?

How Are Work and Energy Related?

Have you ever watched sailboats on a lake? They move across the water without an engine to power them. A sailboat moves because the wind pushes it. Wind is moving air, and because it is moving, wind has energy. **Energy** is the ability to do work or cause change.

Work Work is done whenever a force exerted on an object makes the object move.  **Work is the transfer of energy.** For example, moving air exerts a force on a sailboat, and the sailboat moves. The air does work on the sailboat. When this happens, some of the energy of the wind is transferred to the boat.

The amount of energy the wind has can vary. On some days, the wind blows faster. The wind can then transfer more energy to a sailboat, and the sailboat moves faster. On other days, the wind has less energy and blows more weakly. As a result, a sailboat will move more slowly.

The moving sailboat has **kinetic energy**, the energy an object has because of its motion. The faster the sailboat moves, the more kinetic energy it has. Energy can also be stored. Stored energy is called **potential energy**. If the wind dies down, the sailboat's engine can be used to move the boat. Potential energy stored in the gasoline in the engine becomes the kinetic energy of the moving boat.

Thermal Energy **Thermal energy** is the total kinetic and potential energy of the particles in an object. These particles are always moving, so they have kinetic energy. The warmer an object is the faster its particles move and the more kinetic energy it has. The way the particles are arranged gives them potential energy. So all matter has both kinetic and potential energy.

What is heat?

You might think of the word *heat* as having to do with things that feel hot. But heat also has to do with things that feel cold. Heat causes objects to feel hot or cold or to get hot or cold under the right conditions. You probably use the word *heat* every day to mean different things. However, in science, **heat** is the energy transferred from an object at a higher temperature to an object at a lower temperature.

When two objects at different temperatures come into contact, energy is always transferred from the object that has the higher temperature to the object that has the lower temperature. Energy in the form of heat always flows from hot to cold. For example, if you put an ice cube into a glass of water, energy is transferred from the warmer water to the colder ice cube.

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**DON'T FORGET TO WATCH THE VIDEO TITLED: "Thermal Energy Heat and Temperature"**

**NOTE: You do not have to watch this video past the 2:15 mark.**

**There is a second video titled: "Temperature and Heat" will help you as well. You can stop watching this video at the 3:40 mark.**

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QUIZ – These questions will need to be answered online.

1. Which is the best example of an object that has kinetic energy?

- A) a pencil resting on the ground
- B) a pencil sitting in the sunlight
- C) a pencil resting on a table
- D) a pencil rolling off a table

2. When air is _____, the particles move around faster and take up more space.

- A) frozen
- B) condensed
- C) cooled
- D) heated

3. What is the **measure** of how hot or cold an object is?

- A) energy
- B) expansion
- C) temperature
- D) heat

4. Heat is the amount of _____ one object can transfer to another.

- A) electrical energy
- B) thermal energy

- C) expansion
- D) convection

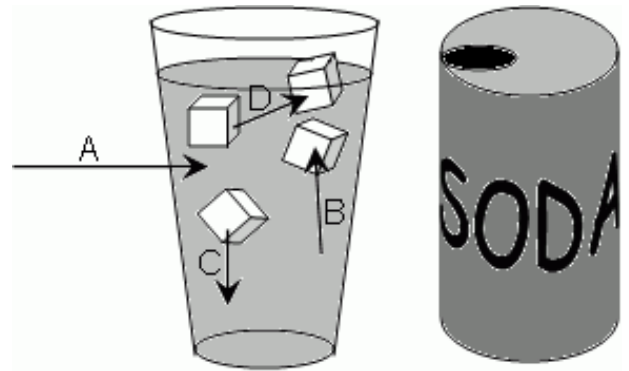
5. What form of energy does a baseball have when it is resting on top of a table?

- A) light energy
- B) kinetic energy

- C) electrical energy
- D) potential energy

6. Which arrow best represents the direction of heat flow when a can of soda at room temperature is poured from the can into a glass of ice? (See image for help.)

- A) from air in room directly to the soda within the glass
- B) from soda to the ice within the glass
- C) from ice to the soda within the glass
- D) from ice to ice within the glass



7. Heat always:

- A) rises.
- B) sinks.

8. Heat always moves:

A) from colder areas to warmer areas.

B) from warmer areas to colder areas.

9. When you hold an ice cube in your hand, your hand feels cold. This is because:

- A) heat flows from your hand into the ice cube (heat is removed)
- B) heat flows from the ice cube into your hand (cold is added)

- C) molecules flow from your hand into the ice cube.
- D) molecules flow from the ice cube into your hand.

DON'T FORGET TO SUBMIT YOUR ANSWERS ONLINE IN THE GOOGLE FORM.