TEACHER KEY · LESSON WORKSHEET · GRADE 6 · Enrichment · not in IN 2023 Gr 6

Kinetic & Potential Energy and Heat Transfer

Fill in each part when its number appears on the slide.

PART 1 · TARGET

I can explain how energy changes between kinetic and potential forms and identify conduction, convection, and radiation.

PART 2 · WARM-UP

1. Give one example of something that has energy because it is moving.
   Key: Examples: a rolling ball, wind, a running dog.
2. Which has more stored energy: a book on the floor or the same book on a high shelf? Why?
   Key: The book on the high shelf, because it is higher, so it could fall farther.
3. Why does a metal spoon in hot cocoa get hot at the handle?
   Key: Heat moves through the metal from the hot end to the cooler end (conduction).

PART 3 · PREDICTION

A pencil is held still above the floor. Does it have energy?

Circle one: [ ] Yes [ ] No, it is not moving [ ] Not sure

PART 4 · VOCABULARY

Word	Meaning
Kinetic energy	Energy of motion. More mass or more speed means more kinetic energy.
Potential energy	Stored energy. Gravitational potential energy increases with height and mass.
Conduction	Heat transfer through direct contact.
Convection	Heat transfer by the movement of fluids (liquids and gases) in currents.

PART 5 · POTENTIAL AND KINETIC ENERGY

POTENTIAL energy is stored. KINETIC energy is the energy of motion.

Check: A roller coaster car is stopped at the top of a hill. It has mostly:

Circle one: (A) Potential energy (B) Kinetic energy (C) No energy (D) Sound energy

Key: (A) Potential energy. It is high but not moving.

PART 6 · ENERGY TRANSFORMS

As an object falls, potential energy changes into KINETIC energy. The TOTAL energy stays the same.

Check: Where is the coaster's kinetic energy greatest?

Circle one: (A) Halfway up a hill (B) At the bottom of the biggest hill (C) At the top of the first hill (D) When it is stopped

Key: (B) At the bottom of the biggest hill. At the bottom, most PE has become KE.

PART 7 · HEAT MOVES WARM TO COOL

Heat always moves from WARMER to COOLER objects.

Check: Hot cocoa (70 °C) sits in a 20 °C room. Heat moves:

Circle one: (A) Both ways equally (B) Nowhere (C) From the cocoa to the room (D) From the room to the cocoa

Key: (C) From the cocoa to the room. Heat flows from warmer to cooler.

PART 8 · CONDUCTION, CONVECTION, RADIATION

CONDUCTION is heat by touching. CONVECTION is heat by moving currents. RADIATION is heat by waves.

Check: A campfire warms your face from across the fire. This is:

Circle one: (A) Friction (B) Radiation (C) Conduction (D) Convection

Key: (B) Radiation. The heat travels as waves; you are not touching it.

PART 9 · WORKED EXAMPLE

1. Imagine a roller coaster car on a big hill.
2. Step 1: At the top, the car is high and slow: most potential energy (PE).
3. Step 2: Halfway down, it has some PE and some kinetic energy (KE).
4. Step 3: At the bottom, it is low and fast: most KE.
5. Step 4: Energy changed form. It did not disappear (some becomes heat from friction).

PART 10 · WE DO

A skateboarder starts at the top of a ramp and rolls to the bottom. Describe the energy changes.

Answer: PE changes into KE

PART 11 · YOU DO

A pot of soup is heated from the bottom. The warm soup rises and the cooler soup sinks. This is:

Circle one: (A) Radiation (B) Insulation (C) Convection (D) Conduction

Key: (C) Convection. Currents in a fluid (liquid or gas) are convection.

PART 12 · WORK TIME: POWER UP INDIANA FIELD TRIP

Write each code piece as you earn it: Stop 1: P Stop 2: O Stop 3: W Stop 4: E Stop 5: R

Final code: POWER

PART 13 · WRAP-UP

Was your prediction in Part 3 right? One thing I learned today:

Key: Heat moves through the metal from the hot end to the cooler end (conduction).