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FSI 8th Grade Science – Unit 2 Post test Review

Thermal Energy • Kinetic & Potential Energy • Energy Transformations

1. A student leaves a cool, shaded porch and stands barefoot on a concrete driveway on a hot, sunny day. She notices her face feels warm and her feet feel hot. Which statement best explains how thermal energy is transferred?

- A. Her face is warmed by radiation; her feet are warmed by conduction.
- B. Her face is warmed by conduction; her feet are warmed by convection.
- C. Her face is warmed by convection; her feet are warmed by radiation.
- D. Both her face and feet are warmed by conduction.

2. A student places a hot metal spoon in contact with a cold metal block. Which direction will energy move, and what type of transfer occurs?

- A. From the hot spoon to the cold block through conduction.
- B. From the cold block to the hot spoon through conduction.
- C. From the hot spoon to the cold block through convection.
- D. From the cold block to the hot spoon through radiation.



3. A mug of hot chocolate is placed on a kitchen counter. Over time, the drink cools and the countertop warms slightly. Which statement correctly describes the flow of energy?

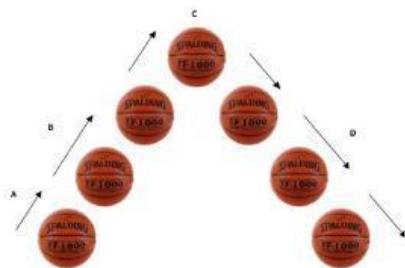
- A. Thermal energy flows from the countertop to the hot chocolate.
- B. Thermal energy flows from the hot chocolate to the countertop.
- C. Thermal energy flows evenly between both.
- D. No transfer occurs because they are different materials.

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4. A student pulls a rubber band back and releases it to hit a small paper cup. Which procedure and energy transformation describe this situation best?

- A. Measure the stretched length before release; potential energy changes to kinetic energy.
- B. Measure the speed of the rubber band after release; kinetic energy changes to potential energy.
- C. Measure the cup's mass; mechanical energy changes to chemical energy.
- D. Measure air temperature; thermal energy changes to kinetic energy.



5. A basketball is tossed upward from the ground, rises, and then falls back down. At which point does it have the most potential and least kinetic energy?

- A. When it leaves the player's hand.
- B. At the highest point of its path.
- C. Just before it hits the ground.
- D. Halfway between the ground and peak.

6. During which part of the ball's motion does its kinetic energy increase and potential energy decrease?

- A. As it rises upward.
- B. As it reaches the highest point.
- C. As it falls back downward.
- D. While it rests on the ground.



7. A marble rolls down a curved ramp. Where on the ramp is its kinetic energy greatest?

- A. At the top of the ramp.
- B. Halfway down the ramp.
- C. At the lowest point of the ramp.
- D. After it stops rolling.

8. At what point on the same ramp are the marble's potential and kinetic energies about equal?

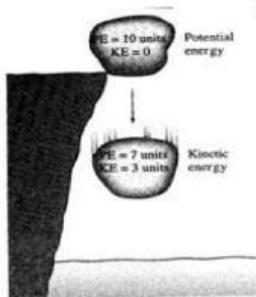
- A. Just after it begins to roll.
- B. Halfway between the top and bottom.
- C. Right before reaching the bottom.
- D. After leaving the ramp.

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9. Two identical soccer balls are kicked—one gently, one hard. Which has the greater kinetic energy?

- A. The gently kicked ball
- B. The harder kicked ball
- C. Both have equal kinetic energy
- D. Neither has kinetic energy



10. A rock is dropped from a cliff. As it falls, what happens to its energy?

- A. Kinetic energy decreases as potential increases.
- B. Kinetic energy increases as potential decreases.
- C. Both kinetic and potential increase.
- D. Both kinetic and potential decrease.



11. A runner collects data while sprinting with backpacks of different masses. Speed stays the same. Which relationships are supported?

- A. Kinetic energy increases as mass increases.
- B. Kinetic energy decreases as mass increases.
- C. Kinetic energy remains unchanged when mass changes.
- D. Kinetic energy depends only on speed, not on mass.

12. A student heats soup in a microwave. Part A: Which best describes the energy transformations in the microwave?

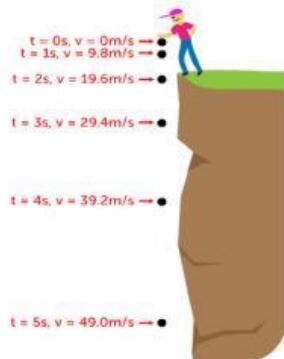
- A. Electrical \rightarrow Electromagnetic \rightarrow Thermal
- B. Thermal \rightarrow Sound \rightarrow Electrical
- C. Mechanical \rightarrow Electromagnetic \rightarrow Sound
- D. Electromagnetic \rightarrow Electrical \rightarrow Thermal

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Part B: Which observation supports your answer?

- A. The soup becomes hot.
- B. The bowl spins.
- C. The microwave door closes.
- D. The soup smells good.



13. A student drops a steel ball from different heights and measures its speed after falling. Which graph best represents the relationship between time and speed?

- A. Speed decreases steadily over time.
- B. Speed increases steadily over time.
- C. Speed stays constant over time.
- D. Speed increases, then decreases, then stops.

14. A student wants to compare how different materials conduct heat.

Part A: Which setup best tests conduction?

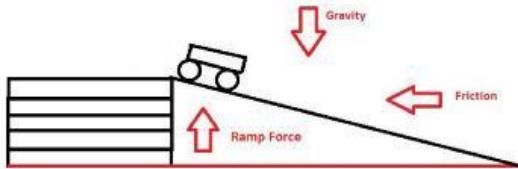
- A. Place equal amounts of hot water in metal, glass, and plastic cups; record temperature change.
- B. Paint bottles different colors and set them in sunlight.
- C. Place bottles at different distances from a lamp.
- D. Suspend bottles in air and record temperature.

Part B: What data would support conduction?

- A. The highest cup water warms fastest.
- B. All materials stay the same.
- C. The darkest cup warms fastest.
- D. Metal cup warms fastest.

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15. A student releases carts of different masses down the same ramp and measures their speed. Which graph best shows the relationship between kinetic energy and mass?

- A. As mass increases, kinetic energy decreases.
- B. As mass increases, kinetic energy increases.
- C. Kinetic energy is constant for all masses.
- D. The relationship is random.

16. A wind turbine spins and produces electricity. Which statement best supports the claim that mechanical energy transforms to electrical energy?

- A. The wires glow as current moves.
- B. The generator produces heat.
- C. Wind carries light energy.
- D. The blades must rotate for electricity to be generated.

17. A student observes a toaster plugged into an outlet turning bread brown. Which statement best supports that electrical energy is transformed into thermal energy?

- A. The toaster gets hot and browns the bread.
- B. The toaster makes sound as it toasts.
- C. The bread contains stored energy.
- D. The cord transfers light energy.

18. A pot of soup is heated on a stove. Which explanation identifies the most efficient mode of heat transfer?

- A. Conduction—molecules in metal transfer energy through collisions.
- B. Radiation—energy travels through space without matter.
- C. Convection—warm fluid rises and cooler fluid sinks, circulating heat.
- D. All modes are equally efficient in any material.

19. A student places metal rods touching each other, others separated by air, and others in water to test heat transfer. Which result supports the correct type of heat transfer?

- A. Contact rods heat each other fastest (conduction).
- B. Air-spaced rods warm fastest (radiation).
- C. Water-spaced rods heat fastest (convection).
- D. All rods heat equally.

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20. Drops of food coloring are added to hot and cold water. Which statements explain the observation? (Select all that apply)

- A. The color spreads faster in hot water.
- B. Molecules move slower in cold water.
- C. Density causes warm water to sink.
- D. Thermal motion increases in warm water.



21. A roller-coaster car climbs hills of equal height with passengers of different total masses.

Part A: Which graph best represents the relationship between mass and potential energy?

- A. Directly increasing line
- B. Flat horizontal line
- C. Curved upward slope
- D. Random scatter

Part B: If the car keeps the same mass, how could it increase its potential energy?

- A. Go faster
- B. Ride a shorter hill.
- C. Climb a taller hill.
- D. Reduce passengers.

22. Many buildings in Georgia use light-colored roofs. Which argument best supports this practice?

- A. Dark roofs release less infrared radiation.
- B. Dark roofs increase air circulation.
- C. Light roofs store heat longer.
- D. Light colors reflect sunlight and reduce heat absorption.

23. A scientist lifts weights of various masses to different heights. Which graph best represents how potential energy changes with both mass and height?

- A. As either mass or height increases, potential energy increases.
- B. As mass increases, potential energy decreases.
- C. Potential energy remains constant regardless of height.
- D. Height has no effect on potential energy.

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23. Maria uses several forms of energy getting ready for school. Which table correctly matches each?

A.

Light - Turns on her lamp
Mechanical - Cooks oatmeal
Electrical - Listens to music
Sound - Charges her phone
Heat - Pedals her bike

B.

Light - Turns on her lamp
Heat - Cooks oatmeal
Sound - Listens to music
Electrical - Charges her phone
Mechanical - Pedals her bike

C.

Heat - Turns on her lamp
Sound - Cooks oatmeal
Light - Listens to music
Electrical - Charges her phone
Mechanical - Pedals her bike

D.

Electrical - Turns on her lamp
Mechanical - Cooks oatmeal
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Sound - Pedals her bike



25. A candle is lit and burns steadily. Which statement best describes the energy transformations that occur?

- A. Chemical energy in wax becomes light and thermal energy.
- B. Electrical energy powers the flame.
- C. Light energy turns into chemical energy in the wax.
- D. Thermal energy from air melts the wax.