

Name: _____ Date: _____ Period: _____

Energy Test Review Guide

Please complete on a SEPARATE SHEET of paper

Make sure you know and understand the meaning of the following words as we have learned it:

Fahrenheit Scale	Convection	Thermal energy
Conduction	Radiation	Electrical energy
Conductor	Insulator	Light/radiant energy
Temperature	Kelvin scale	Chemical energy
Kinetic Energy	Absolute zero	Potential energy
Energy	Sound energy	Heat
Celsius Scale	Mechanical energy	Joule

Provide an answer for each of the following questions:

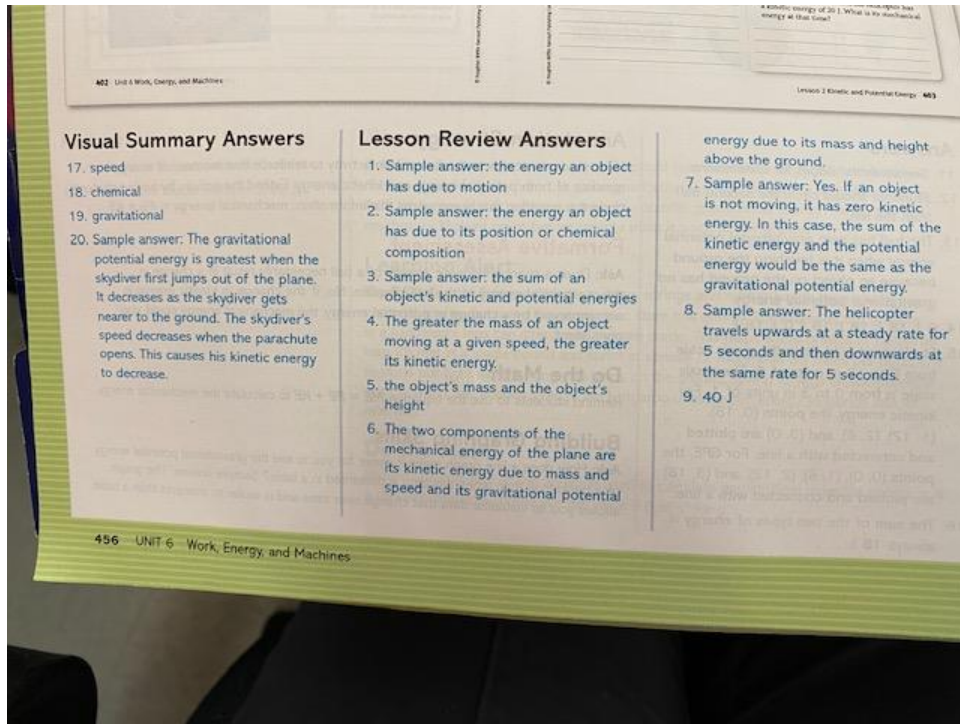
- ☆ What is energy? How is it measured? **The ability to do work. Energy is measured in units called Joules.**
- ☆ What is the difference between potential and kinetic energy? Give an example of each.
 - **Kinetic energy is the energy of movement. Leaf falling from a tree.**
 - **Potential energy is the energy of position. Leaf hanging from a tree waiting to fall.**
- ☆ Describe the conversion between potential and kinetic energy in the bounce of a ball. **Before the ball is dropped it has the most kinetic energy. As the ball falls, the potential energy is transferred into kinetic energy. Kinetic and potential energy are inversely proportional and add up to make mechanical energy.**
- ☆ What are the two types of potential energy and an example of each? **Elastic: rubber band stretched, Gravitational: measured by weight and height, Nuclear: fission (atomic bomb) or fusion (Sun), Chemical: food or fossil fuels**
- ☆ What is mechanical energy? **The total sum of potential and kinetic energy.**
- ☆ Explain the energy conversions that take place as the sun warms the earth and causes plants to grow. **The heat and light from the sun comes in the form of electromagnetic waves. The radiation transfers from the sun to the plant in where light energy transfers to chemical energy in photosynthesis.**
- ☆ Explain the energy conversions that occur within a toaster that is in use. **Electrical energy transfers to thermal energy.**
- ☆ What is the law of conservation of energy? **Energy cannot be created nor destroyed it transforms from one form to another.**
- ☆ During an energy transfer there is always a transfer to what type of energy? **Thermal energy**
- ☆ What is the difference between temperature and thermal energy? **Temperature is a measure of the average kinetic energy of the particles of an object. Thermal energy is the total energy of the particles in an object.**

- ★ Explain a situation in which two objects could have the same temperature but different thermal energies. **One situation is that one object is considerably larger than the other one. They have the same average temperature, but in whole, the object with larger mass contains more thermal energy.**
- ☆ Define and give an example of each of the following: conduction, convection, radiation.
 - **Conduction – the transfer of energy from one substance to another through direct contact – metal spoon getting hot in a hot pan.**
 - **Convection – the transfer of thermal energy by the circulation or movement of a liquid or gas – boiling water.**
 - **Radiation – the transfer of energy as electromagnetic waves – sunlight and coils of a heater radiating warmth.**
- ☆ How do the particles react as thermal energy is added to an object? Removed? **When thermal energy is added to an object the particles will move faster. When thermal energy is removed the particles will move slower.**
- ☆ At what temperature in both Celsius and Fahrenheit does water freeze and boil? **100 degrees C, 212 degrees F**
- ☆ What is thermal expansion? How is it used in everyday life? **An increase in the size of a substance in response to an increase in the temperature of a substance. Thermometer, expansion joints in highways, and bimetallic strips in thermostats.**
- ☆ If you add ice to a room temperature glass of water, why does it melt? **Heat from the room transfers to the ice cream. Ice cream gets warmer to reach equilibrium.**

From Online Textbook Complete:

- ☆ p. 394-403 #1-9 on pg 403
- ☆ p. 116-151 #1-10 on pg 127, #1-8 on pg 137, #1-10 on pg 151

Pg 403 key



Visual Summary Answers

- 17. speed
- 18. chemical
- 19. gravitational
- 20. Sample answer: The gravitational potential energy is greatest when the skydiver first jumps out of the plane. It decreases as the skydiver gets nearer to the ground. The skydiver's speed decreases when the parachute opens. This causes his kinetic energy to decrease.

Lesson Review Answers

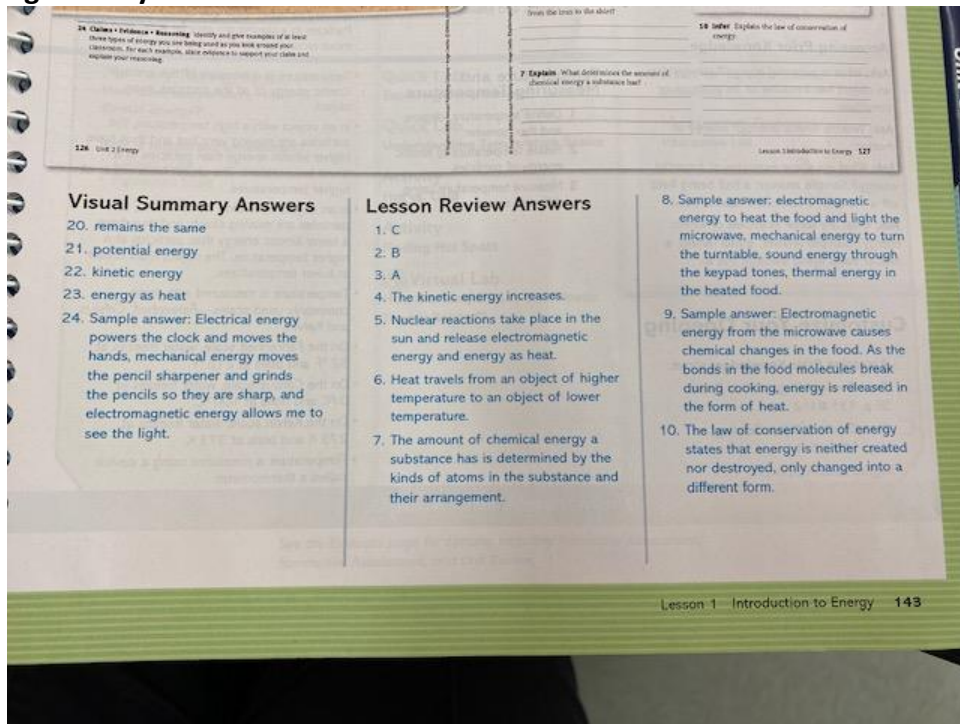
- 1. Sample answer: the energy an object has due to motion
- 2. Sample answer: the energy an object has due to its position or chemical composition
- 3. Sample answer: the sum of an object's kinetic and potential energies
- 4. The greater the mass of an object moving at a given speed, the greater its kinetic energy.
- 5. the object's mass and the object's height
- 6. The two components of the mechanical energy of the plane are its kinetic energy due to mass and speed and its gravitational potential

energy due to its mass and height above the ground.

- 7. Sample answer: Yes. If an object is not moving, it has zero kinetic energy. In this case, the sum of the kinetic energy and the potential energy would be the same as the gravitational potential energy.
- 8. Sample answer: The helicopter travels upwards at a steady rate for 5 seconds and then downwards at the same rate for 5 seconds.
- 9. 40 J



Pg 127 Key



Visual Summary Answers

- 20. remains the same
- 21. potential energy
- 22. kinetic energy
- 23. energy as heat
- 24. Sample answer: Electrical energy powers the clock and moves the hands, mechanical energy moves the pencil sharpener and grinds the pencils so they are sharp, and electromagnetic energy allows me to see the light.

Lesson Review Answers

- 1. C
- 2. B
- 3. A
- 4. The kinetic energy increases.
- 5. Nuclear reactions take place in the sun and release electromagnetic energy and energy as heat.
- 6. Heat travels from an object of higher temperature to an object of lower temperature.
- 7. The amount of chemical energy a substance has is determined by the kinds of atoms in the substance and their arrangement.

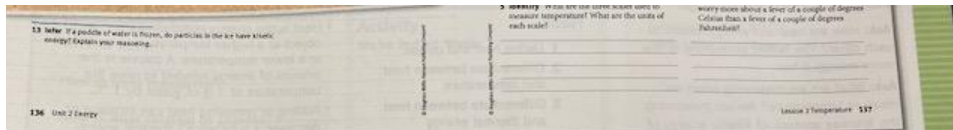
8. Sample answer: electromagnetic energy to heat the food and light the microwave, mechanical energy to turn the turntable, sound energy through the keypad tones, thermal energy in the heated food.

9. Sample answer: Electromagnetic energy from the microwave causes chemical changes in the food. As the bonds in the food molecules break during cooking, energy is released in the form of heat.

10. The law of conservation of energy states that energy is neither created nor destroyed, only changed into a different form.



Pg 137 Key



Visual Summary Answers

- faster
- thermometer
- Yes, all particles that make up substances always have kinetic energy because they are constantly in motion.

Lesson Review Answers

- Sample answer: The kinetic theory of matter says that the particles that make up matter are constantly in motion. The average kinetic energy of those moving particles is how temperature is measured.
- A thermometer is used to measure temperature and is often marked in degrees.
- Temperature measures the average kinetic energy of the particles that make up a substance.
- higher
- Celsius: degrees Celsius; Fahrenheit: degrees Fahrenheit; Kelvin: kelvins
- A; the particles are moving faster and thus have a higher kinetic energy

- The particles would, on average, slow down. The particles would, on average, speed up. This is because cold things have particles that move slowly and have less kinetic energy. Warm things have particles that move faster and have more kinetic energy.
- 98.6 °C is much hotter than 98.6 °F. A human would not be able to survive at that temperature. Doctors worry more about a fever of a few degrees Celsius because the difference between degrees in the Celsius scale is much higher than the difference between degrees in the Fahrenheit scale.



Pg 151 Key



Visual Summary Answers

- more
- hot to cold
- break
- direct contact
- radiation
- You are avoiding radiation from the sun. Standing in the shade of another object blocks the electromagnetic waves coming from the sun.

Lesson Review Answers

- Sample answer: energy transferred from hot objects to cold objects
- Sample answer: the kinetic energy of all particles in an object
- Sample answer: the transfer of heat through direct touching
- Sample answer: the transfer of heat by moving convection currents
- Sample answer: the transfer of heat by electromagnetic waves
- Temperature is the average kinetic energy of the particles in a substance, whereas heat is the energy that is transferred from objects at a higher temperature to objects at a lower temperature. Heat can change the temperature of an object.

- Heat is transferred between the two objects until they reach the same temperature.
- A. conduction
B. radiation
C. convection
- Temperature is the average kinetic energy of particles in an object; thermal energy is the total kinetic energy of particles in an object. Heat is the energy transferred between objects due to temperature differences.
- No; particles in a solid cannot move freely, so they cannot change places as different areas become more or less dense.



Fill in the blank questions:

1. Kinetic energy depends on **_Mass_**_____ and **_velocity_**_____.
2. Gravitational potential energy depends on **_weight_**_____ and **_height_**_____.
3. During all energy conversions, some of the original energy is converted to **_Thermal energy_**_____.
4. Heat is **the energy transferred between objects that are at different temperatures.**
5. Heat will always transfer from the object that has the **higher** temperature to the object that has the **lower** temperature.
6. What is a thermal insulator and give 3 examples of material that would be a good insulator.
A material that reduces or prevents the transfer of heat. Oven mitt, plastic spoon, flannel shirt, insulation in a house.
7. What is a thermal conductor and give 3 examples of material that would be a good conductor. **steel, copper and aluminum**
 1. What is a thermal conductor and give 3 examples of material that would be a good conductor. **A material through which energy can be transferred as heat. Cookie sheets, curling irons, iron skillet.**

8. In which state of matter does water have the highest kinetic energy?

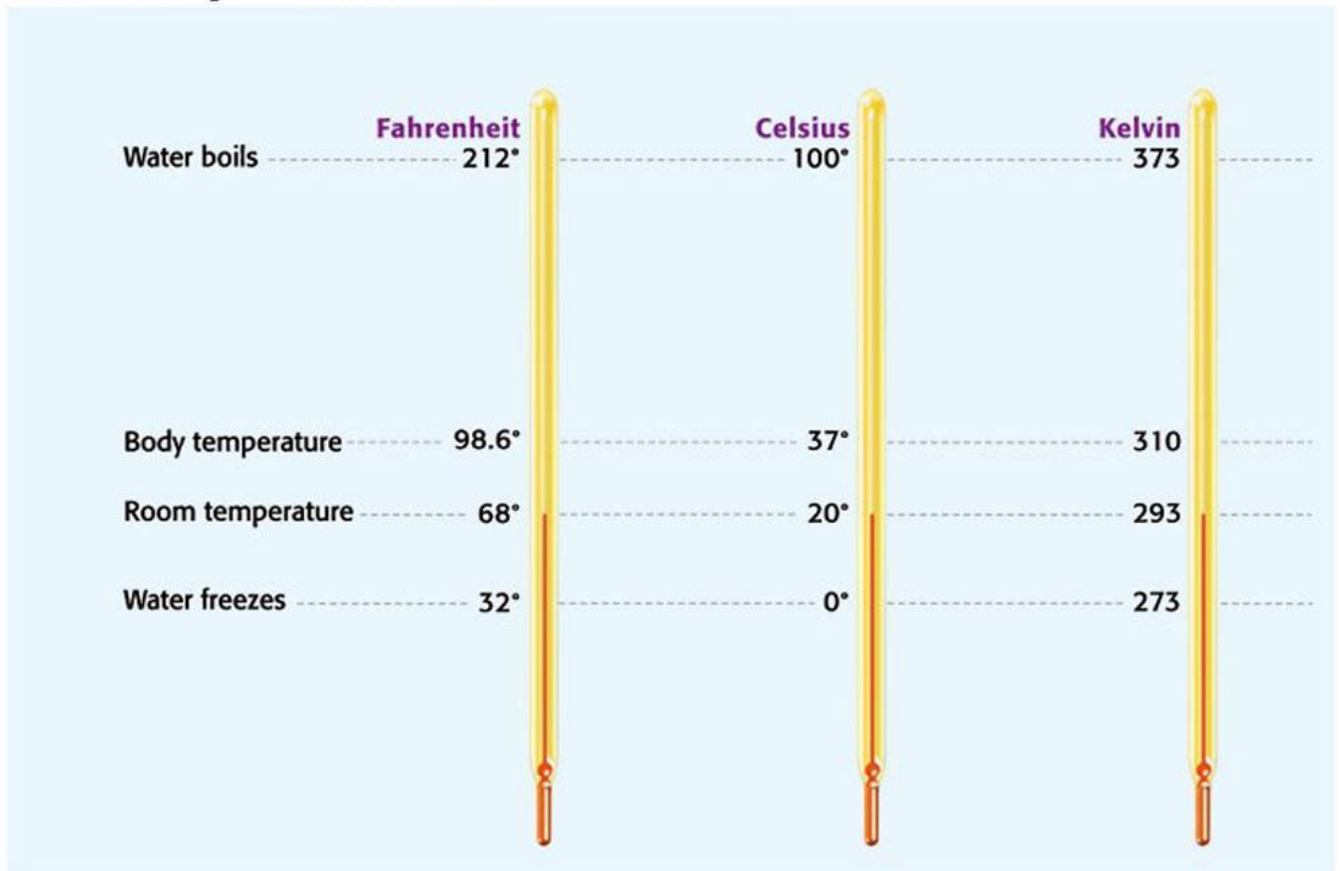
_____ **gas**

9. In which state of matter does water have the lowest kinetic energy?

_____ **Solid**

10. Which of the following has the most thermal energy and why? **A small pond in your backyard or a lake? Lake, it has the most “total energy”. Thermal energy depends partly on temperature, but also depends on how much of a substance there is. The more particles there are in a substance at a given temperature, the greater the thermal energy of the substance.**

Three Temperature Scales



Explain when we use each of the three temperature scales above.

Fahrenheit – Used by the USA when weather temperatures are given.

Celsius – Used by most of countries across the world and scientists – temperature range between the freezing point and boiling point is divided into 100 equal parts.

Kelvin – The official SI (international standard of units) temperature scale. Also used by scientists that study thermal energy and heat