Name: _____ Pd: ____

Energy, Forces and Motion Study Guide Key

9 Weeks Test Date: Parent Signature (BONUS!): _____

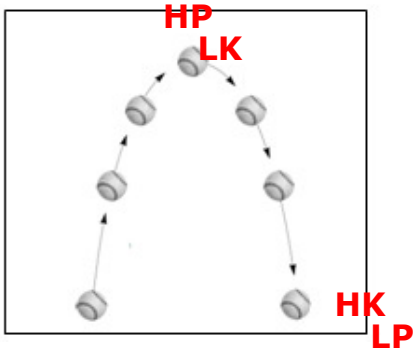
Forms of Energy (6.8A)
Define Key Vocabulary

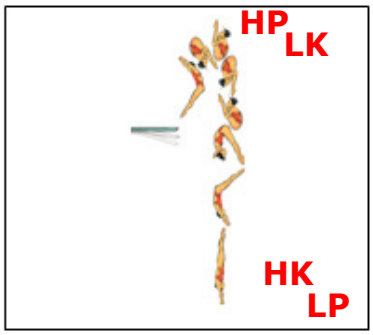
Energy	The ability to cause change
Law of Conservation of Energy	Energy can transform from one form to another, but cannot be created or destroyed.

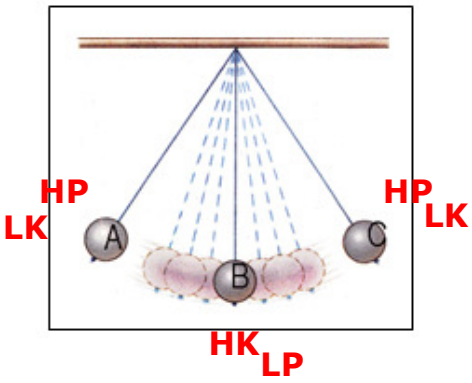
Complete the chart.

	DEFINITION	DEPENDS ON	FORMS	EXAMPLES
POTENTIAL ENERGY	Stored energy due to the interactions between objects	1. mass	1. Chemical	Battery, fuel, food, object above ground, nucleus of atom, stretched rubber band, compressed spring
			2.Gravitational	
		2. height	3. Nuclear	
			4. Elastic	
KINETIC ENERGY	Energy due to motion	1. mass	1. Mechanical	Running water, rotating turbine, electrons flowing, closed circuit, lamp, sun, microwave, fire, hot food, music, shouting
			2. Electrical	
		2. speed	3. Light/radiant	
			4. thermal	
			5. sound	

Label the highest point of potential (HP), lowest potential (LP), highest kinetic (HK), and the lowest kinetic (LK) in each of the pictures.





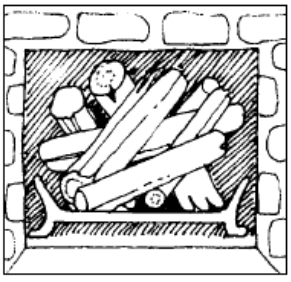


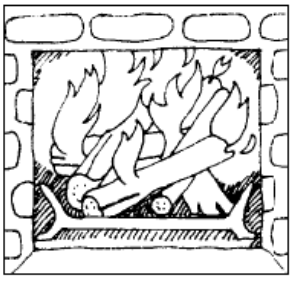
Forms of Energy (6.8A)
Define, classify and give examples for each form of energy.

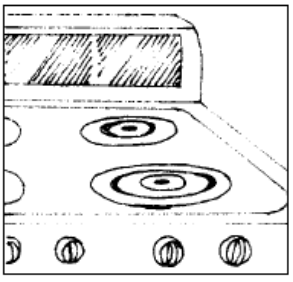
Form of Energy	Definition	Potential or Kinetic	Examples
Gravitational	Energy stored in position or height	Potential	Water behind damn, ball at top of bounce
Elastic	Energy stored in tension or compression	Potential	Stretched band, drawn bow, compressed spring
Chemical	Energy stored in chemical bonds of substance	Potential	Battery, food, fuel, coal, firewood
Nuclear	Energy stored in nucleus of atom	Potential	Fusion of atoms, fission of atoms
Mechanical	Energy due to motion of an object	Kinetic	Running, spinning, flowing,
Electric	Energy due to movement of electrons	Kinetic	Closed circuit, power lines, electrical cord
Light/Radiant	Energy due to movement of light or other waves	Kinetic	Lamp, sun, microwave, flashlight
Thermal	Movement of particles that causes heat	Kinetic	Fire, oven, stove, heated food, friction
Sound	Energy carried by sound waves	Kinetic	Music, talking, horns, TV, buzzing

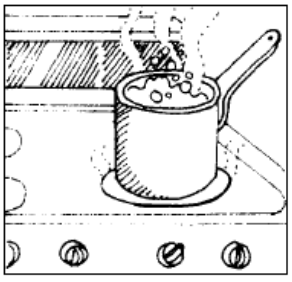
Energy Transformations (6.9C)

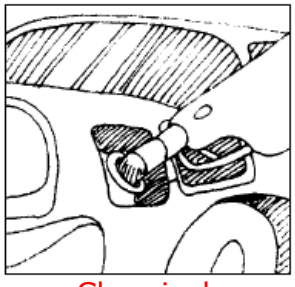
Identify the energy transformations taking place between each pair of pictures.

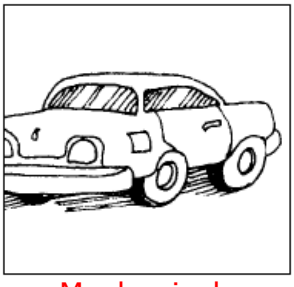

Chemical

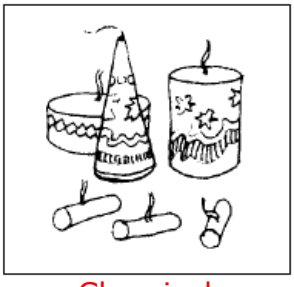

Thermal, radiant


Electrical


Thermal


Chemical


Mechanical

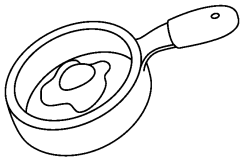
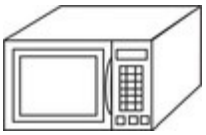

Chemical


Radiant, sound

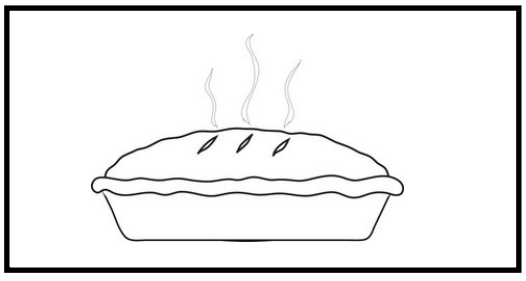
Thermal Energy Transfer (6.9A,B)

Define Key Vocabulary

Kinetic Molecular Theory	Theory that explains how particles move: all matter is made of particles, particles are in constant, random motion, and particles constantly collide with each other.
Temperature	The measure of the average kinetic energy of the particles in a material
Heat	the movement of thermal energy from a region of higher temperature to a region of lower temperature
Equilibrium	State of balance; heat moves from hotter to colder until they are the same temperature.

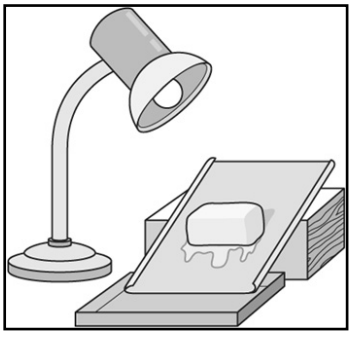
Method	Definition	Example	Picture
Conduction	Transfer of thermal energy by direct contact	Pot touching stove, iron touching clothes, hot iron on hair, hot food touching tongue	
Convection	Transfer of thermal energy by rising and sinking of particles in a gas or liquid	Boiling water, magma in earth's mantle, air in room, sea breezes, hot air balloon, lava lamp	
Radiation	Transfer of thermal energy through space by way of waves	Heat from sun, heat from fire, heat from coils in a toaster, heat from grill	

In the box below, draw an example to represent thermal energy's pattern of movement. Explain the pattern of movement on the lines.



Thermal energy will move from the hotter pie to the cooler air that surrounds it. The method of transfer is conduction because the particles that make up the pie are touching the particles of air surrounding it.

Use the picture below to explain how thermal energy moves to melt the ice cube.



Thermal energy will move from the hotter lamp to the cooler ice. The method of heat transfer is radiation. Heat radiates from the lamp, heat waves, that move through empty space to hit the ice cube.

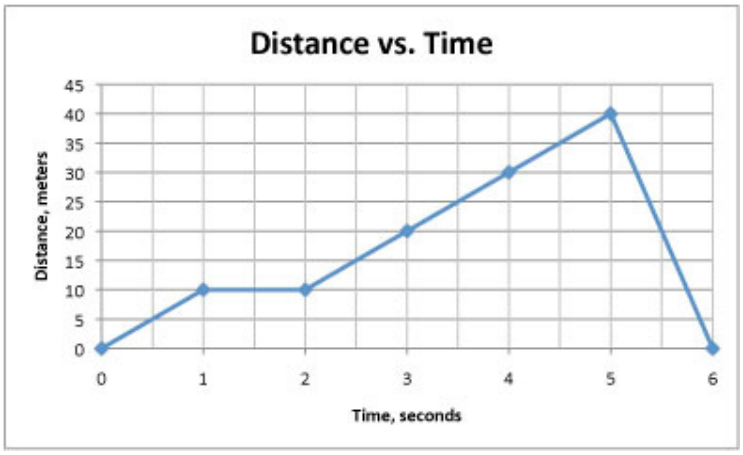
Calculate Average Speed (6.8C)

Define key vocabulary:

Reference Point	The starting point you use to describe the motion or position of an object.
Position	An objects distance and direction from a reference point.
Displacement	The difference between the starting position and final position that an object has moved.
Motion	The process of changing position.
Speed	The distance an object moves divided by the time it takes to move that distance
Velocity	The speed and direction of an object in motion.
Acceleration	A measure of the change in velocity during a period of time.
Average Speed	Total distance traveled divided by the total time.

Calculate Average Speed (6.8C)

Use the graph to calculate the average speed.



1. Average speed from 0 to 1 second?

10 m divided by 1 s = 10 m/s

2. Average speed from 1 to 2 seconds?

0 m divided by 1 s = 0 m/s

3. Average speed from 2 to 5 seconds?

30 m divided by 3 s = 10 m/s

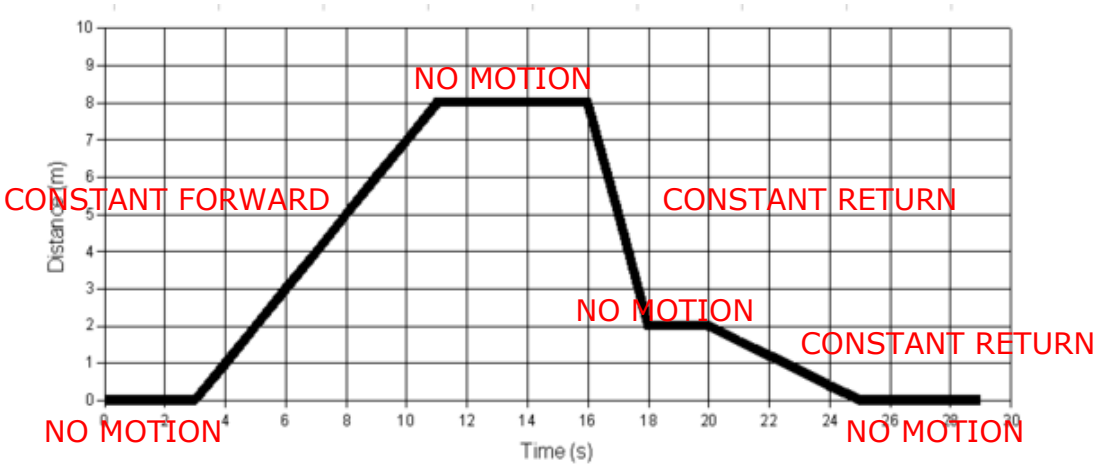
4. Average speed from 5 to 6 seconds?

40 m divided by 1 s = 40 m/s

Calculate speed using the given distance and time measurements.

1. Miranda drives 360 miles in 6 hours. 360 mi divided by 6 hrs = 60 mi/hr	2. A baseball traveled 35 yards in 5 seconds. 35 yds divided by 5 s = 7 yds/s	3. Football kicked 64 yards and traveled in the air for 8 seconds. 64 yds divided by 8 s = 8 yds/s
4. A giraffe runs 40 miles in 1 hour. 40 mi divided by 1 hr = 40 mi/hr	5. Flight from Houston to Norfolk, VA took 2 hours and is about 1200 miles away. 1200 mi divided by 2 hrs = 600 mi/hr	6. Leslie rode 100 miles in 50 minutes. 100 mi divided by 50 mins = 2 mi/min

Graphing Motion (6.8D)



1. Label the motion of each line on the graph (no motion, constant forward, constant back, increasing forward, increasing back).

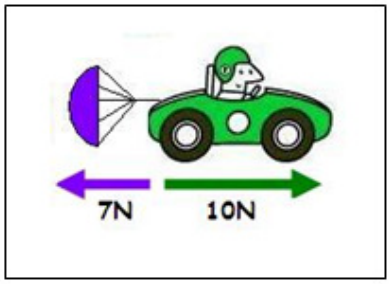
2. Between what two times is the object not in motion?
   0 – 3 seconds, 11 – 16 seconds, and 15 – 19 seconds
3. Between what two times is the object moving the fastest?
   Between 16 and 18 seconds
4. Between what two times is the object moving the slowest?
   Between 20 and 25 seconds
5. How does the steepness of a line represent an object's speed?
   The steeper the line, the faster the speed

Unbalanced Forces (6.8B)
Define key vocabulary:

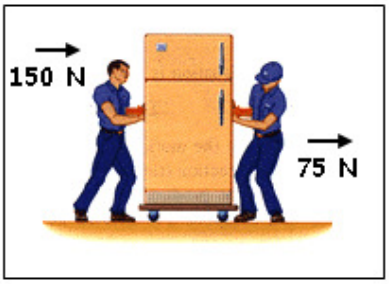
Force	A push or pull that acts on an object
Gravity	An attractive force that exist between all objects that have mass – more mass = more gravity, less distance = more gravity
Balanced Forces	The net forces acting on an object are equal to zero newtons and there is no change in speed and/or direction
Unbalanced Forces	The net forces acting on an object are NOT equal to zero and results in a change in speed and/or direction of an object.
Net Force	The total, or left over, forces calculated for an object.
Newton (N)	The unit of measure of force.
Newton's 1st Law of Motion	An object at rest will stay at rest, and object in motion will stay in motion unless acted on by an outside force
Inertia	The tendency of an object to resist change in motion.
Newton's 2nd Law of Motion	Force is equal to mass times acceleration.
Acceleration	A measure in the change in velocity during a period of time.

Unbalanced Forces (6.8B)

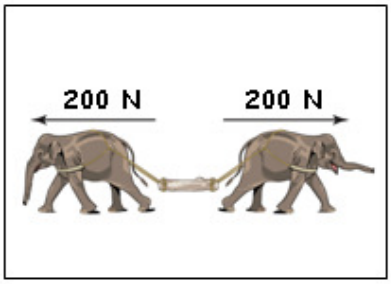
Calculate the net force; then describe the change in position and direction



10N – 7N = 3 N →



150N + 75N = 225 N →



200 N – 200 N = 0 N

Simple Machines – Inclined Planes & Pulleys (6.8E)

Define Key Vocabulary

Work	The amount of energy used as a force moves an object over a distance.
Simple Machine	
Force	A push or pull that acts on an object
Inclined Plane	A simple machine that makes work easier by changing the distance over which the work is distributed.
Pulley	A simple machine that is a grooved wheel with a rope or cable wrapped around it. • **Fixed Pulley –** A pulley that only changes the direction of the force, but does not change the amount of force needed • **Moveable Pulley –** a pulley attached to the object being lifted that reduces the amount of force needed to lift the object