Name Date Class

Note-taking Worksheet

Motion, Forces, and Simple Machines

Section 1 Motion

A. _____ involves distance and time.

1. _____ **speed**—calculated as total distance traveled divided by travel time
2. _____ **speed**—an object's speed at a particular moment
3. When instantaneous speed does not change, an object is moving at _____ speed; average speed and instantaneous speed are the _____ in this situation.
4. Distance can be calculated if an object is moving at constant speed over a particular time period; total distance traveled equals _____ times time.

B. Speed and direction of motion is _____.

C. _____ is the change in velocity divided by the time needed for the change to occur.

1. Acceleration can be calculated using a formula: acceleration equals change in _____ divided by time.
2. Acceleration can be shown on a speed-time graph.

Section 2 Newton's Laws of Motion

A. _____—a push or a pull

1. When a force acts on an object, it _____ the object's acceleration.
2. Two or more forces that cancel each other out are _____ forces.
3. Two or more forces that do not cancel each other out are _____ forces.
4. The combination of all forces acting on an object is the _____ force.

B. Newton's _____—explain how forces cause motion

1. Newton's first law—a moving object moves in a straight line with _____ speed unless a force acts on it.
   - **a.** _____—a force that resists movement between two surfaces in contact
   - **b.** An object's tendency to resist a change in motion is _____; the more mass an object has, the greater its inertia.

Meeting Individual Needs

Note-taking Worksheet (continued)

2. Newton's second law—if an object is acted upon by a _____ force, the change in velocity will be in the direction of the _____ force; acceleration can be calculated as *acceleration equals net force divided by mass.*
3. Newton's third law—forces always occur in equal but _____ pairs; the equal and opposite forces act on different objects, so they are not balanced forces.

Section 3 Work and Simple Machines

A. _____

1. Occurs when a force causes an object to move in the same direction that the force is applied
2. Calculated as *work equals* _____ *times distance*

B. A _____ **machine** uses only one movement; a _____ **machine** is a combination of simple machines.

1. **Mechanical** _____ is the number of times force is multiplied; calculated as *mechanical advantage equals resistance force divided by effort force.*
2. An _____ machine would experience no friction, so work in would equal work out.
3. _____ machines do experience friction, so work out is always less than work in.

C. _____—an object with a groove, like a wheel, with a rope or chain running through the groove; changes the direction of the effort force

D. A **lever** is a rod or plank that pivots about a fixed point called the _____.

1. The fulcrum is between the effort force and the resistance force in a _____ lever.
2. In a _____ lever, the resistance force is between the effort force and the fulcrum.
3. The effort force is between the resistance force and the fulcrum in a _____ lever
4. The _____ and _____ provide a mechanical advantage greater than one.

E. An _____ or ramp allows an object to be lifted over a greater distance using less force.

1. A _____ is a moving inclined plane with one or two sloping surfaces.
2. _____—inclined plane wrapped around a post