

Name _____ Homeroom _____ Date _____

Use these notes to study from as we begin our unit on Motion

Motion: a change in position, measured by distance and time.

Frame of reference: the point from which movement is determined.

- To measure movement, some point must be considered as nonmoving.
- Earth is the most common frame of reference, however:

Speed: the distance traveled by a moving object per unit of time.

- To calculate speed, use the equation - $\text{Speed} = \text{distance} / \text{time}$
- Speed only gives distance and time.

Average speed: the speed of moving objects is not always constant:

- $\text{Average speed} = \text{total distance} / \text{total time}$

Velocity: speed in a given direction.

- Velocity gives distance, time, and the direction of travel.

Acceleration: The rate of change in velocity.

- To calculate acceleration, use the equation: $\text{Acceleration} = (\text{Final Velocity}) - (\text{Original Velocity}) / \text{Time}$

Deceleration:

- A term commonly used to mean a decrease in speed.

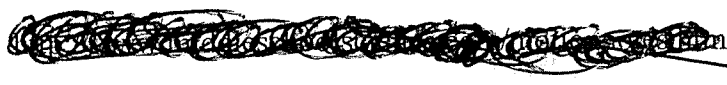
Force: any push or pull.

- Forces give energy to objects.
- Forces cause a change in motion.

Friction: a force that opposes motion.

Gravity: the force of attraction between all objects in the universe.

- Gravity is the weakest of the known natural forces, only becoming obvious when massive objects like stars and planets are involved.



Free fall - an object falling under the influence of gravity.

- Near the surface of the earth all objects are accelerated by gravity at a rate of 9.8 m/s^2

Weight: the effect of gravity on an objects mass

Momentum: the product of the mass of an object and its velocity.

- All moving objects have momentum.
- To calculate momentum, use the equation: $\text{Momentum} = \text{Mass} \times \text{Velocity}$

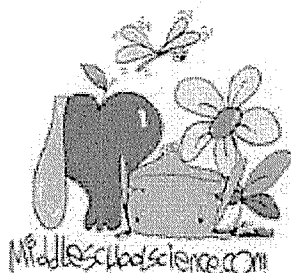
The Three Laws of Motion by Sir Isaac Newton explain all aspects of motion.

1. **Newton's First Law** describes motion produced by balanced forces.
 - An object at rest will remain at rest, and a moving object will remain at a constant velocity unless unbalanced forces act on it.
 - Newton was first to use the term **inertia** to describe the tendency of objects to remain in motion or stay at rest. Inertia comes from the Latin word *iners*, which means "lazy".
2. **Newton's Second Law** describes motion produced by unbalanced forces.
 - This law is best stated using the equation:
 $\text{Force} = \text{mass} \times \text{acceleration}$
 - Acceleration is always in the direction of the unbalanced force.
 - The units of force are "Newtons".
 - $1 \text{ N} = 1 \text{ kg} \times 1 \text{ m/s}^2$
3. **Newton's Third Law** explains why forces act in pairs.
 - For every action, there is an equal and opposite reaction.
 - Forces always act in pairs.

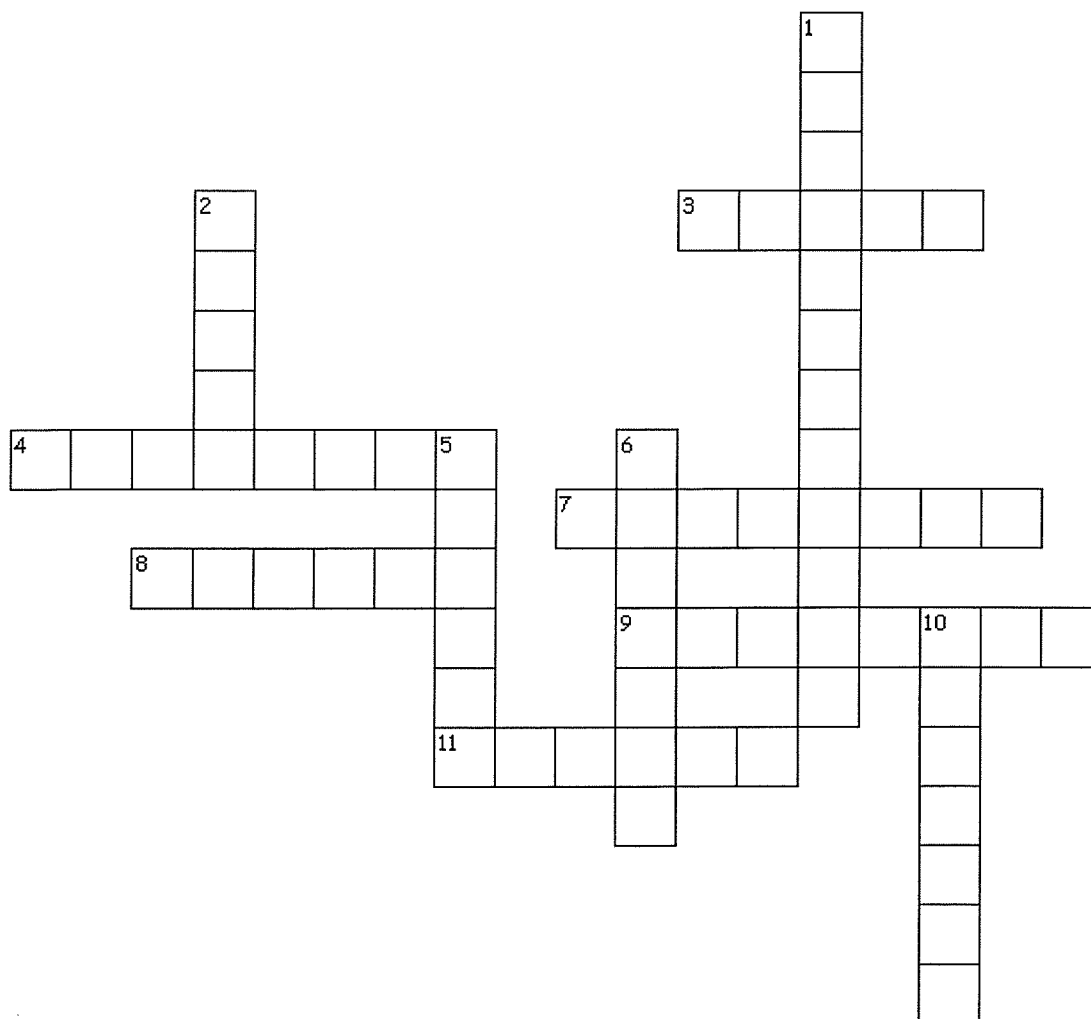
Note:

Notes have been taken from the following source: Physical Science Class

<http://pc65.frontier.osrhe.edu/hs/science/hps3.htm>



Motion Crossword Puzzle



Across

- 3. the rate at which an object moves
- 4. mass of an object times its velocity
- 7. a force that is opposite to the direction of motion
- 8. the measure of the force of gravity on an object
- 9. speed in a given direction
- 11. a unit that measures force

Down

- 1. the rate of change in velocity
- 2. a push or a pull
- 5. a change in position in a certain amount of time
- 6. acceleration is 9.8 meters/sec/sec
- 10. the tendency of an object to remain in motion or at rest

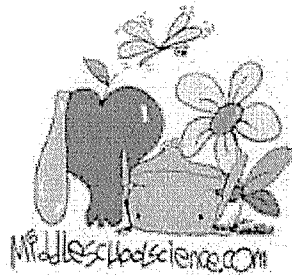
Motion Double Puzzle

What is Sir Issac Newton Famous For?

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Unscramble each of the clue words.

Take the letters that appear in boxes and unscramble them for the final message.



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