Force and Motion 3.1

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On-Level

2017

S8P3a

- S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.
- a. Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration.
- (Clarification statement: Students should be able to analyze motion graphs, but students should not be expected to calculate velocity or acceleration.)

Learning Target

- Students will be able to determine the speed/velocity of an object.

Speed

- The rate at which someone or something moves or travels

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Average Speed

- The speed of most moving objects is not constant.

AVERAGE SPEED

$$\text{AVERAGE SPEED} = \frac{\text{total distance traveled}}{\text{total time}}$$

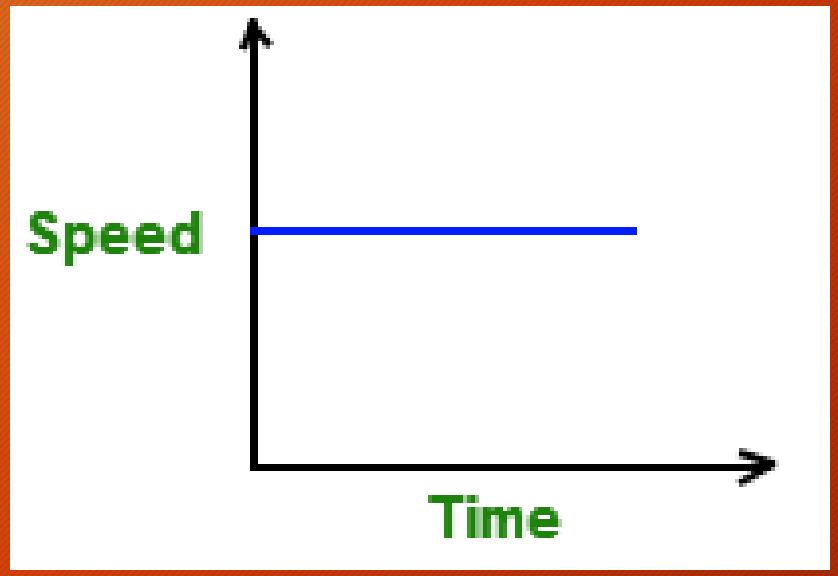
Instantaneous Speed

- The Rate at which an object is moving at a given instant in time.

- https://www.khanacademy.org/science/physics/one-dimensional-motion/displacement-velocity-time/v/instantaneous-speed-and-velocity

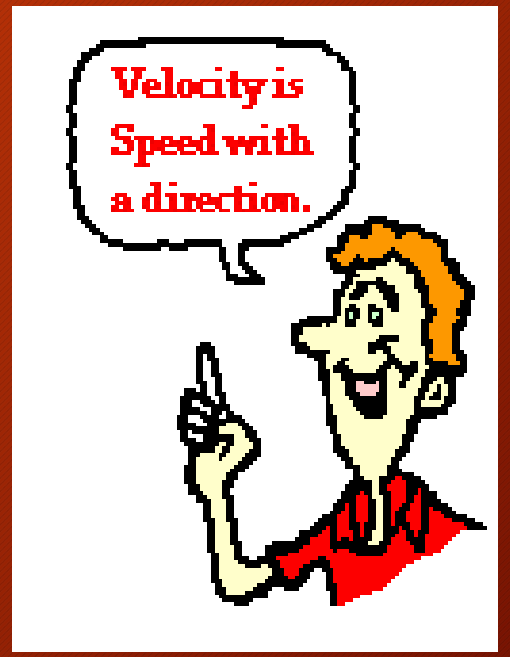
Constant Speed

- Speed that does not change; it stays constant.
- https://www.youtube.com/watch?v=_DtDCBHEM1k



Velocity

- Speed in a given direction.
- Ex. If you know the velocity of a storm if you know it is moving 25mph eastward.



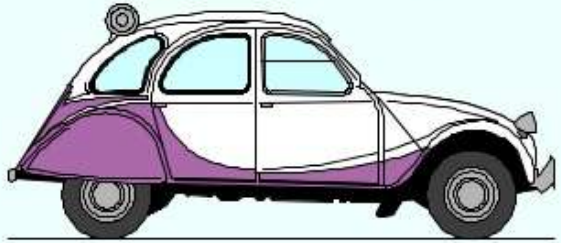
Velocity Continued

- The equation or formula for velocity is similar to **speed**. To figure out velocity, you divide the **distance** by the time it takes to travel that same **distance**, then you add your direction to it.

$$\text{Average Velocity} = \frac{\text{Total distance traveled}}{\text{Total time taken}}$$

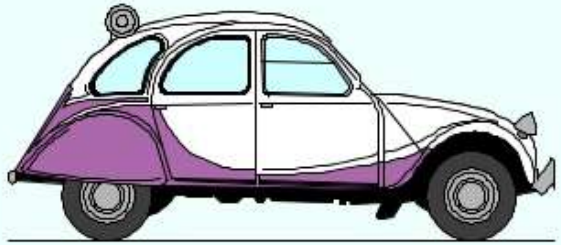
Speed vs. Velocity

Speed is simply how fast you are travelling…



This car is travelling at a speed of 20m/s

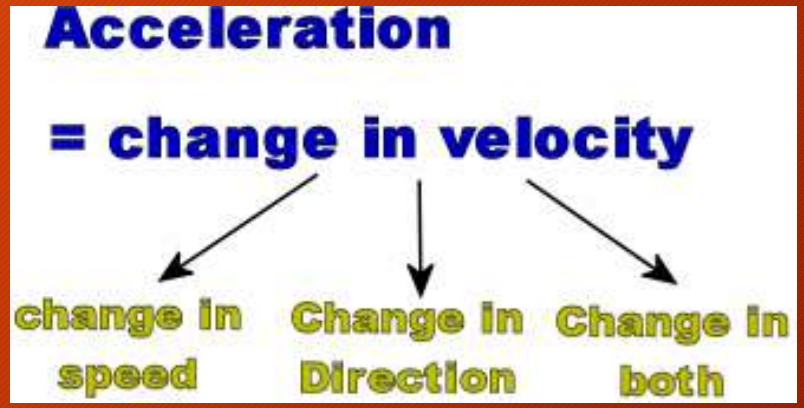
Velocity is "speed in a given direction"…



This car is travelling at a velocity of 20m/s east

Acceleration

- The rate at which velocity changes.
- In science it refers to increasing speed, decreasing speed, or changing direction.



Force

- Using energy to do work.
- Examples: Pushing or
- pulling.

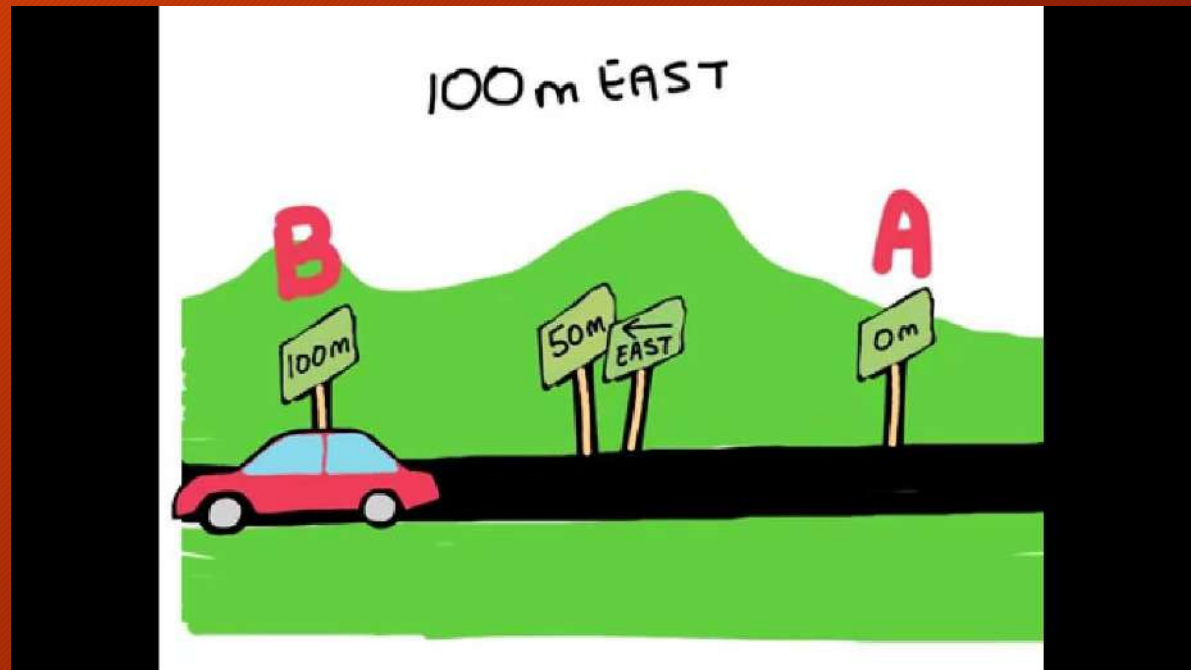
Motion

- An object is in motion if its distance from another object is changing.

- https://www.youtube.com/watch?v=LEs9J2IQIZY

Distance

- A Measurement that refers to "how much ground an object has covered" during its motion.



Mass

- The amount of matter in an object.

- Complete Coach Book Lesson 18
- https://quizlet.com/_32r7lp