Vectors Vs. Scalars

- Scalars have only a MAGNITUDE (number)
- Vectors have a MAGNITUDE and DIRECTION (+ or -)

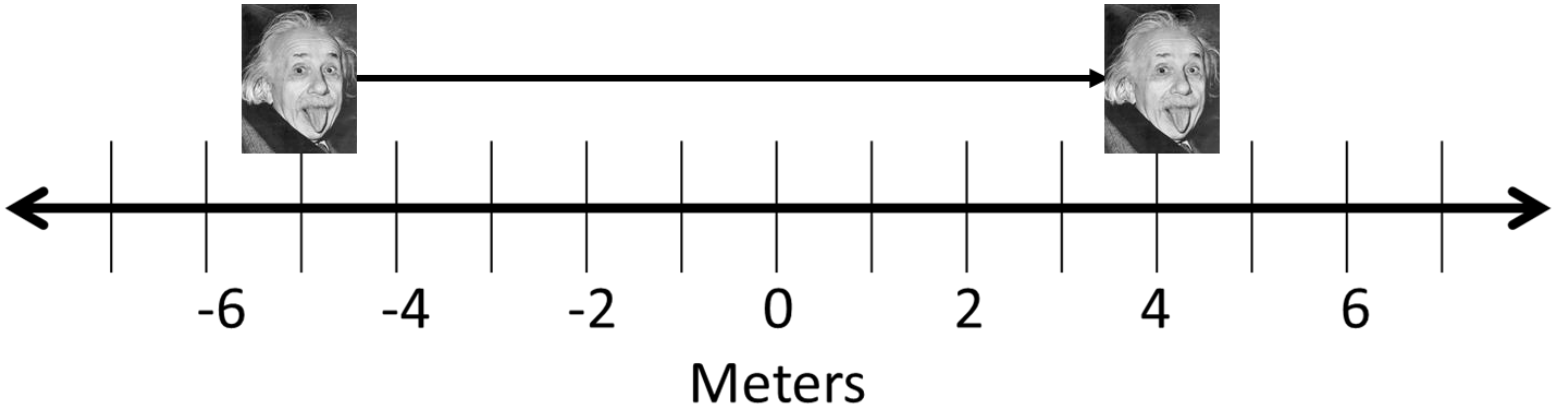
Scalar	Vector
Speed	Velocity
Distance	Displacement
Weight	Acceleration
Height	Force
Mass	Momentum
Age	

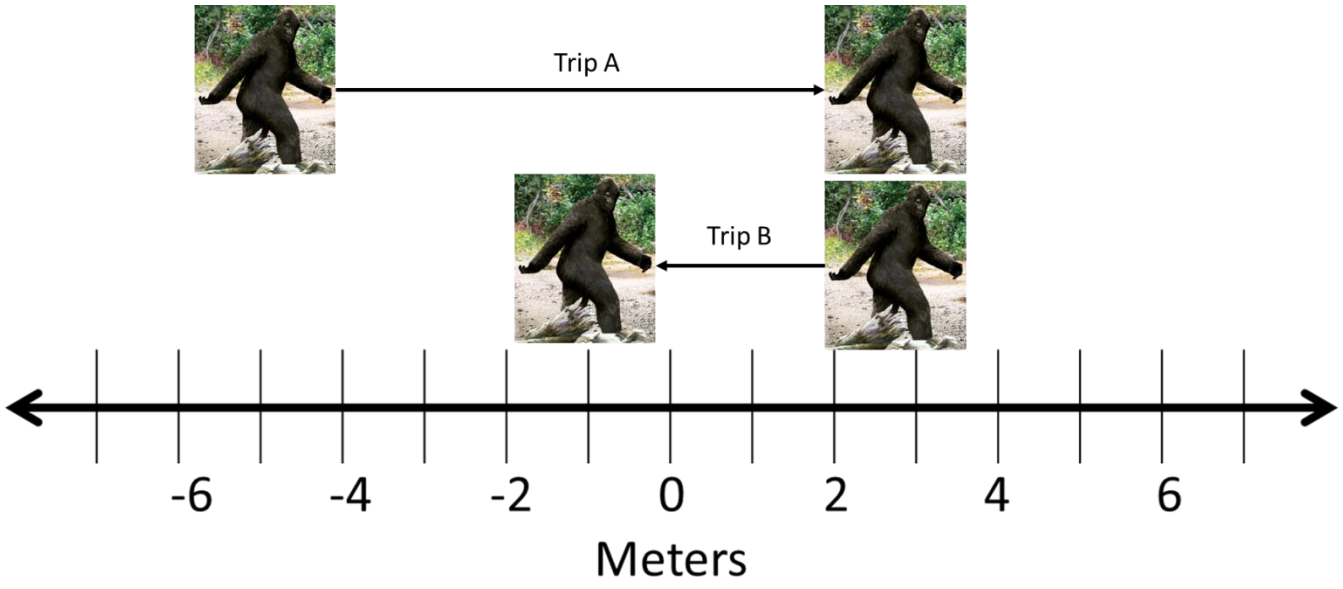
1D Motion

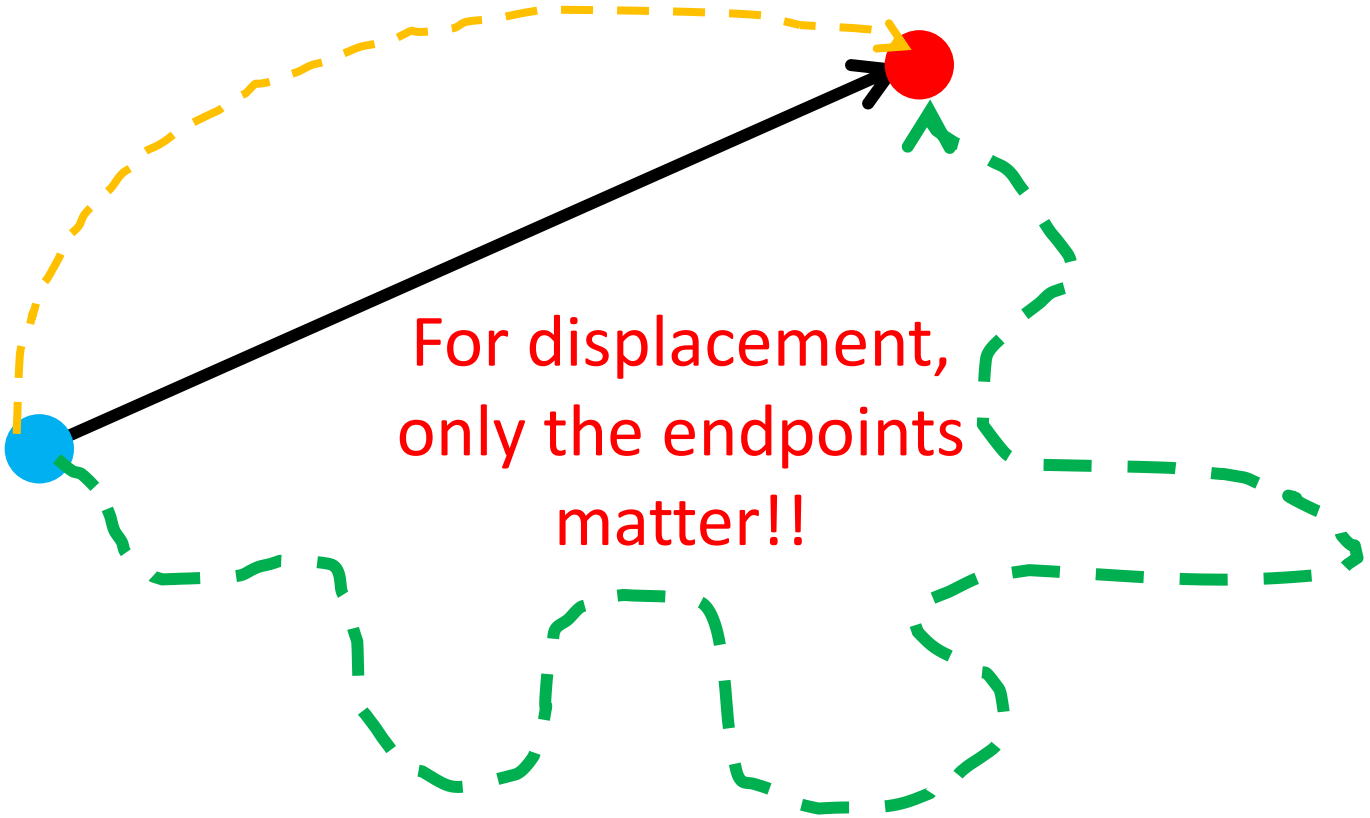
- Movement in a straight line
- **Position**-the point where an object is located
- **Displacement**-the change in an objects position in a specific direction defined as:

$$\Delta x = x_f - x_i$$

- **Distance**- the quantity which describes the total length traveled or how much ground was covered.
- **Time of travel**-the time required to go from x_i to x_f.


-6
-4
-2
0
2
4
6
Meters


Trip A
Trip B
-6
-4
-2
0
2
4
6
Meters



Which line represents the greatest distance traveled?

Which line represents the greatest displacement?

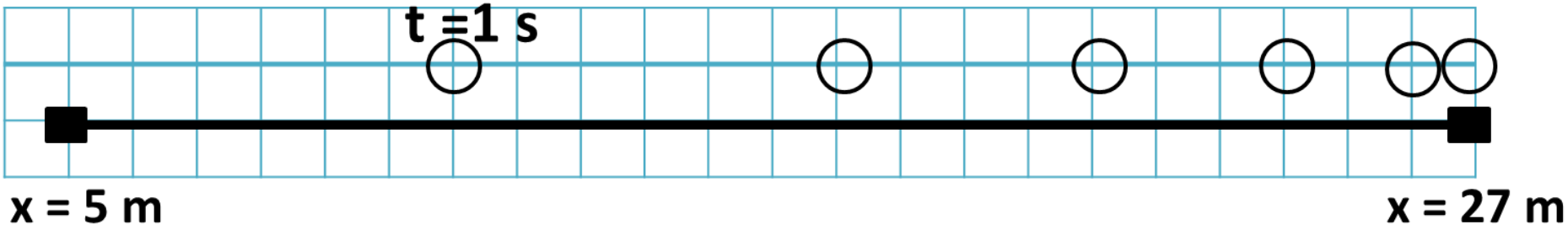
1D Motion

- Speed vs. Velocity
  - Both measure the rate of travel
  - Velocity has a directional component (+ = rightward and - =leftward)
  - Speed does not have a directional component
  - Velocity can be defined as:

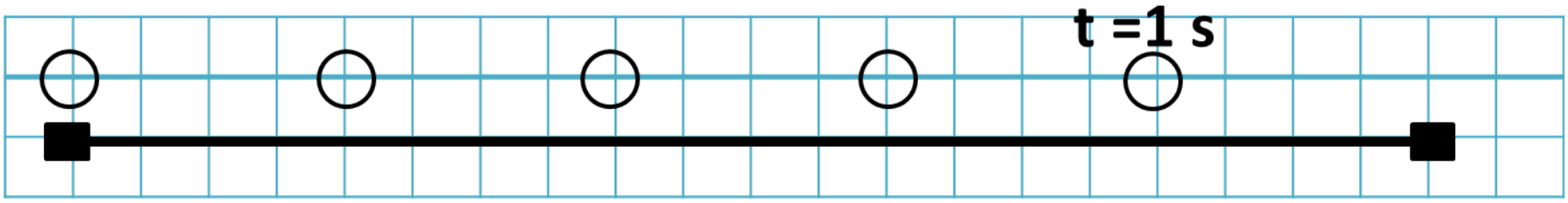
    $v = (\text{total displacement})/(\text{total time})$

    $v = (\Delta x)/(\Delta t)$ (for movement in the x-direction)
  - Speed can be defined as: $s = (\text{distance traveled})/(\Delta t)$
  - EX:
    - Car speed: 20 m/s
    - Car Velocity: 20 m/s NW

Track Diagrams



Where is the object at 3 seconds?
What is the object's displacement between 3 and 6 seconds?
How long did it take the object to get to a position of 17 m?
What is the object's average velocity?
Is the object's average velocity constant?



What is the object's displacement at 2 seconds?
What is the object's velocity between 1 and 2 seconds?
What is the object's displacement at 4 seconds?
Is the objects average velocity constant?