**Physics 11 – Unit 2: Motion in a Straight Line**

* Scalar and Vector Quantities
  + Scalar:

A scalar is a quantity that has only a magnitude or size.

* + Vector:

A vector is a quantity that has both magnitude (size) and direction.

* Position, Distance, and Displacement
  + Position:

Position is the separation between an object and a reference point.

* + Distance (Scalar):

Distance needs no reference frame. We measure the distance between two objects by measuring their separation.

* + Displacement (Vector):

The change in position of an object is often called its displacement. Displacement describes both the magnitude of the change in position and the direction of that change.



* + Speed and Velocity
  + Speed (Scalar):

The speed of an object moving with uniform motion is the distance it travels each second, and is calculated by dividing the distance travelled by the time taken.



* + Velocity (Vector):

The velocity between two times is the change in position divided by the difference in the two times.

* Uniform Velocity (Constant Velocity):



* Position-Time Graphs:

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* Average Velocity:

Average velocity involves the total displacement and the total time required for the displacement.



* Average velocity is given by the slope of the line joining two points on a position-time graph. Average velocity can be either positive or negative.
* Speed is the size or magnitude of the velocity. Speed is always positive.
* Instantaneous Velocity:

Instantaneous velocity is given by the slope of the tangent to a position-time graph.



* Relativity of Velocity

e.g. A ship is moving forward at 10.0 m/s. A passenger is waking on the deck. What are his velocities, as measured by an observer at rest on the shore, if ht passenger walks a) with a velocity of + 2.0 m/s toward the front of the ship? b) with a velocity of – 2.0 m/s toward the rear?

**Physics 11 – Unit 2: Motion in a Straight Line: Practice**

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