How can you describe the location of an object?

- **Position** describes the location of an object.

- Comparisons using known objects or locations often are used to describe position.

- A **reference point** is a location to which you compare other locations.
How can you describe the location of an object?

- Describe the positions of the different parts of the zoo.
What is motion?

- **Motion** is a change in position over time.

- Even when motion is not observed directly, starting points and end points can indicate motion has occurred.
How is distance measured?

• Distance can be measured as a straight line between two positions.

• Distance can also be measured as the total length of a certain path between two positions.

• The standard unit of length for distance is the meter (m).
How is distance measured?

- Which distance is greater: a straight line from A to B or the total length of the path below?
What is speed?

• **Speed** is a measure of how far something moves in a given amount of time.

• Speed measures how quickly or slowly an object changes its position.

• Fast objects move farther than slower objects in the same amount of time.
What is average speed?

- *Average speed* is a way to calculate the speed of an object that may not always be moving at a constant speed.

- Average speed describes the speed over a stretch of time rather than at any exact moment in time.
How is average speed calculated?

- Speed can be calculated by dividing the distance an object travels by the time it takes to cover that distance.

  - speed = distance/time

  - \( s = \frac{d}{t} \)
How is average speed calculated?

• If two objects travel the same distance, the object that takes less time has the greater speed.

• An object with a greater speed travels farther in the same time than an object with a lower speed travels.

• The standard unit for speed is meters per second (m/s).
Fast Graphs

How is constant speed graphed?

• Distance-time graphs are used to plot the distance an object travels over time.

• The distance of an object away from a reference point is plotted on the $y$-axis. Time is plotted on the $x$-axis.

• Objects moving at a constant speed make a straight line on the graph.
How is constant speed graphed?

• The slope, or steepness, of the line is equal to the average speed of the object.

• Average speed can be calculated by dividing the change in distance by the change in time for that time interval.

• slope = change in y/change in x
How are changing speeds graphed?

• On a distance-line graph, a change in the slope of a line indicates a change in speed.

• If the line gets steeper, the object’s speed has increased.

• If the line gets less steep, the object has slowed down.

• A flat line indicates zero speed.
Follow Directions

What is velocity?

• A vector is a quantity that has both size and direction.

• Velocity is speed in a specific direction.

• Objects can have the same speed but different velocities because of their direction of travel.
What is velocity?

- Average velocity depends on the distance from the starting point to the final point.
- Average velocity can be 0 km/h if you travel at a certain speed to one point and then travel back to the starting point.