Physics 1-02 Relative Motion, Distance, and Displacement *Name: _____*

Kinematics

Studies _____ without thinking about its _____

Position (d)

The _____ where something is relative to a _____ system called a _____

The most common coordinate system the _____ coordinate system

Relative Motion

Relative motion is how to describe the motion of an object based on different _____.

Displacement (Δd)

The change in position

_____

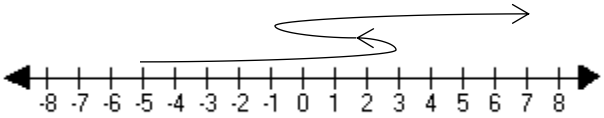
_____

Has _____ and _____

Path does _____ matter

Only _____ and _____ position matters

What is the displacement of the path in the diagram?



Distance

The _____ of the path traveled

_____

Has only _____

You drive 20 km east, then turn around and drive 15 km west. What is your displacement?

What was your distance traveled?

Physics 1-02 Relative Motion, Distance, and Displacement ***Name: _____***

Practice Work

1. What was difficult about measuring the 3x5 card? Why?
2. How are distance and displacement the same? How are they different?
3. How are scalars and vectors the same? How are they different?
4. Classify each measurement as a scalar or vector.
   a. _____ 20 books on a shelf
   b. _____ A car travels 25 km east
   c. _____ A plane flies 500 km
   d. _____ The car drives 100 km/h west
   e. _____ The plane flies 200 mph north
   f. _____ In an experiment, a toy car moves –15 cm
   g. _____ In an experiment, a mouse moves +20 cm
   h. _____ The temperature is –5 °C
5. Betty is riding in a subway train. While sitting at rest in a station, another train passes going from the right to left with reference to Betty's window. What direction does Betty appear to move with reference to a passenger in the other train? (RW)
6. Two subway trains are sitting in a station side by side. Clarence is looking out the window as the other train begins to move forward. Using the other train as the reference frame, which way does Clarence seem to move? (RW)
7. What is the meaning of a negative displacement? (RW)
8. A doe and a fawn are walking in the woods. The fawn runs zigzags and circles around its mother. If they both start walking at the same spot and stop to rest at the same spot, which walked the greater (a) distance? (b) displacement? (RW)
9. The road I live on goes east and west. One day, my family and I decide to go west to the beach. I travel 2 miles west when my wife realizes we passed a flock of wild turkeys. I turn around and drive back 1/2 miles before we find the turkeys. What is my displacement at the flock of turkeys (make west negative)? (RW) **–1.5 miles**
10. What is the distance I traveled to where I stopped by the turkeys? (RW) **2.5 miles**
11. Find the following for path A in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.1) **7 m, 7 m, 7 m**
12. Find the following for path B in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.2) **5 m, 5 m, –5 m**
13. Find the following for path C in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.3) **13 m, 9 m, 9 m**
14. Find the following for path D in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.4) **8 m, 4 m, –4 m**