Name: _____ Date: _____

PHYSICS
Average Speed & Average Velocity

Average Speed = total distance divided by total time
- Distance in meters
- Time in seconds

$$v_{avg} = \frac{\text{Total distance}}{\text{Total time}}$$

Average Velocity = displacement divided by total time
- Displacement in meters
- Time in seconds

$$\vec{v}_{avg} = \frac{\text{Displacement}}{\text{Total time}}$$

- Distance = the total path of travel. "How far" you move.
- Displacement = the "change in position". It is the straight-line length between the start position and the current or final position.

- Determine the total distance. Report in meters.
- Determine the displacement. Report in meters.
- Determine the total time. Report in seconds (convert if in minutes).
- Determine average speed.
- Determine average velocity.

Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
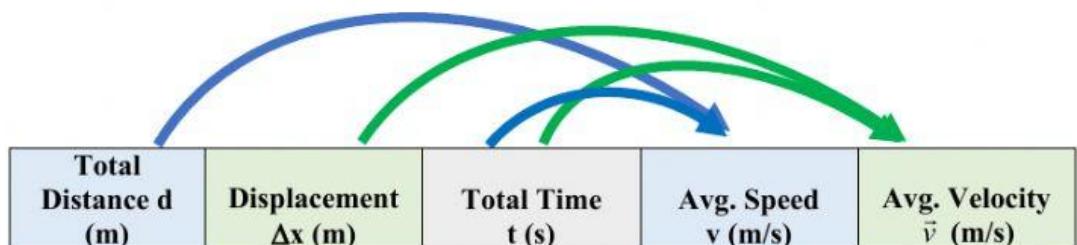
1. Collette walked 300 m west in 5.0 minutes from her house to the mall.

300 m, 5.0 min

	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → Mall					

2. Collette walked 400 m east in 7.0 minutes from her house to the street corner. She paused for 1.0 minute as traffic passed. She then walked another 700 m in 8.0 minutes to the park.


400 m, 7.0 min   1 min   700 m, 8.0 min
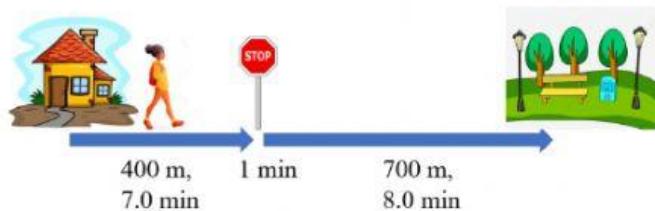
	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → Park					

3. Collette walked 600 m west in 10.0 minutes from her house to school. She turned, then walked 300 m east in 4.0 minutes to the store.


600 m, 10.0 min

300 m, 4.0 min
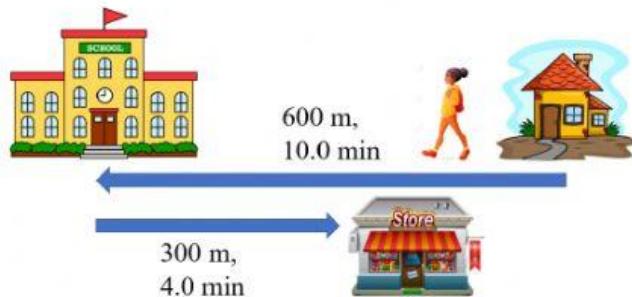
	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → School					
House → Store					

4. Collette walked 300 m west in 6.0 minutes from her house to the mall. She turned, then walked 300 m east in 3.0 minutes back to her house.

300 m, 6.0 min

300 m, 3.0 min
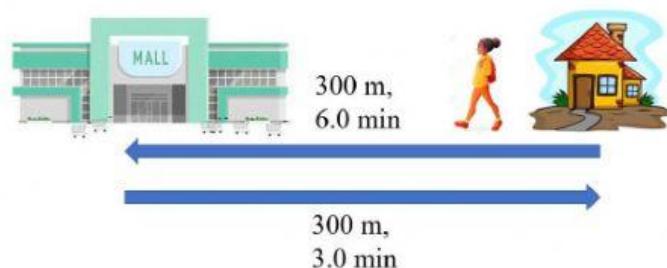
	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → Mall					
House → House					

5. Collette walked 600 m east in 6.0 minutes from her house to the market. She turned, then walked 400 m north in 4.0 minutes to the park.

400 m, 6.0 min

600 m, 6.0 min
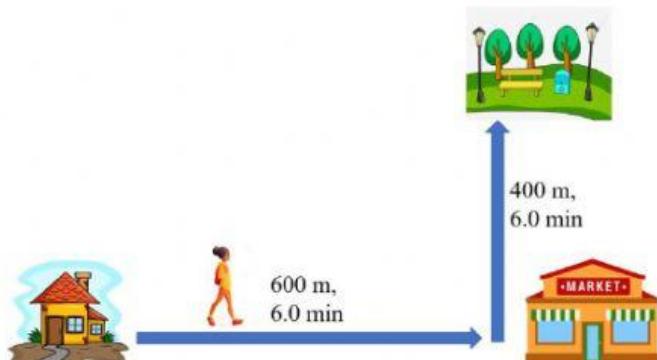
	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → Market					
House → Park					

6. Collette walked 400 m north in 8.0 minutes to the corner. She waited 2.0 minutes, then walked 400 m east in 3.0 minutes to the park.

STOP

2 min

400 m, 3.0 min

400 m, 8.0 min
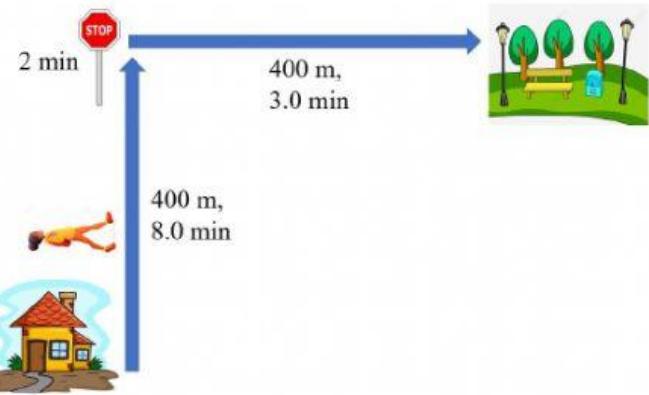
	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
House → Corner					
House → Park					

7. Collette walked around the perimeter of the city park. She started her walk at the SW corner, walked north to corner 1, walked west to corner 2, walked south to corner 3, and walked east to her starting place.

Corner 2   Corner 1

100 m, 120 s

60 m, 100 s

60 m, 50 s

100 m, 60 s
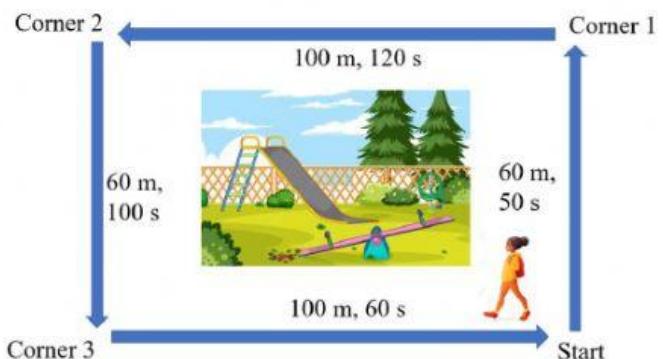
Corner 3   Start

	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
Start → Corner 1					
Start → Corner 2					
Start → Corner 3					
Start → Start					