

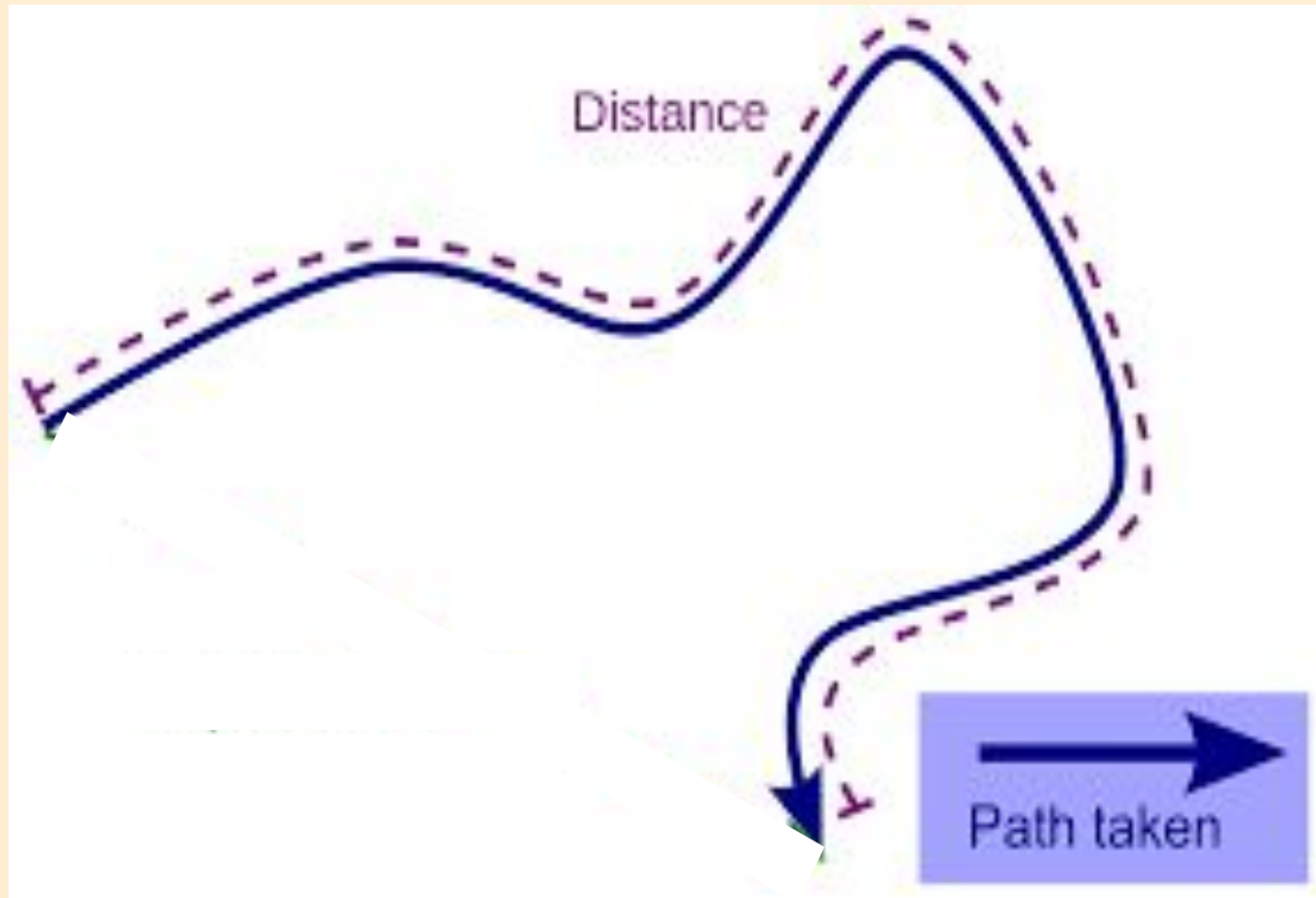
The background features a light beige color with several abstract shapes. A large, irregular teal shape is the central focus, containing the text. To its left is a smaller orange shape. To its right are two dark blue circles of different sizes. At the bottom right, there is another teal shape. The overall style is modern and minimalist.

Distance & Displacement

The background features a light cream color with several abstract shapes. A large teal shape is in the center, containing the text. To its left is a dark blue shape with an orange oval inside. To its right is a dark blue shape and an orange curved line. In the top left, there is a small blue shape. In the top right, there is an orange curved line. In the bottom right, there is an orange curved line.

What is distance?

The complete path travelled by an object.



Distance

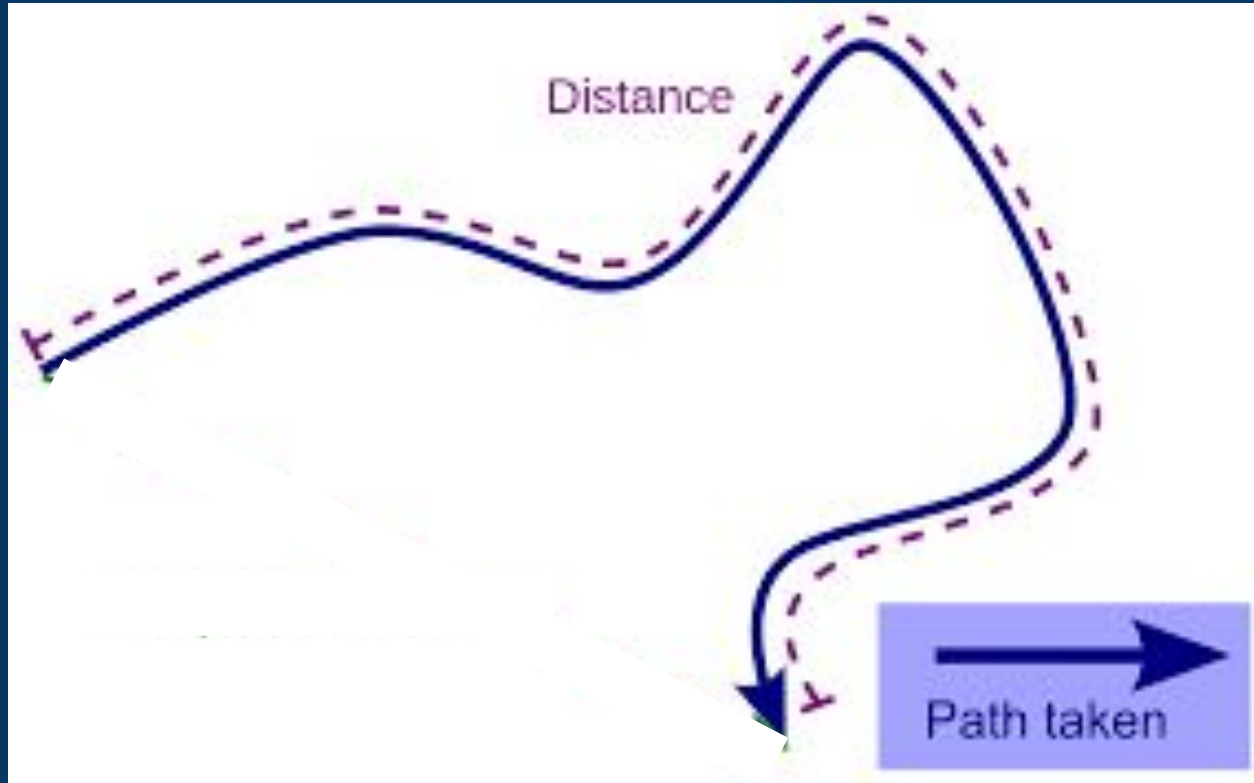
→
Path taken



...then what is displacement?

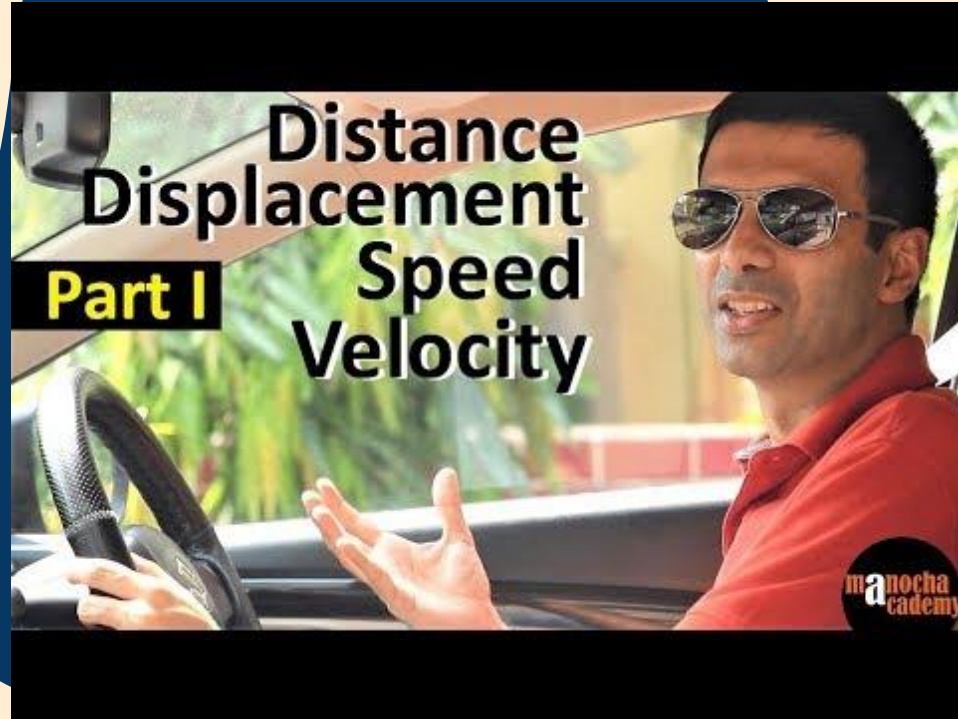
The shortest distance from the initial to final position

What is the shortest distance in this picture?





Handout!
Distance vs Displacement



Speed and Velocity

Speed

The rate at which something moves

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Velocity

The rate at which a position changes; the speed in a given direction

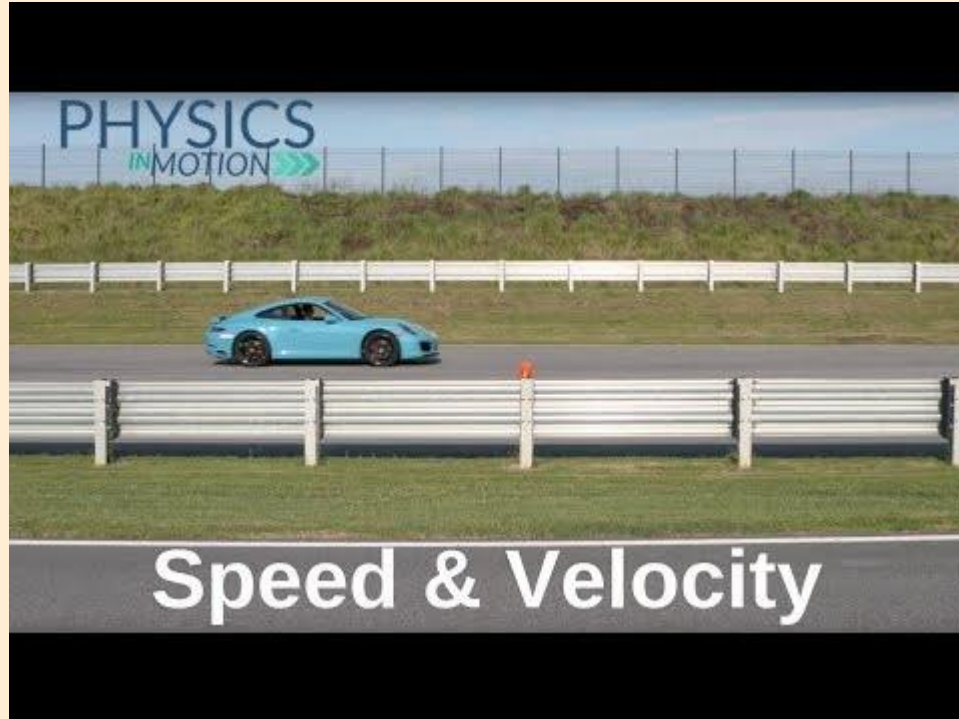
$$\mathbf{v} = \frac{\Delta \mathbf{x}}{\mathbf{t}}$$

v = velocity

x = position

t = time

Speed and Velocity



Practice Problems

1. What is the speed of a rocket that travels 9000 meters in 12.12 seconds?
2. What is the speed of a jet plane that travels 528 meters in 4 seconds?
3. How long will your trip take (in hours) if you travel 350 km at an average speed of 80 km/hr?
4. How far (in meters) will you travel in 3 minutes running at a rate of 6 m/s?
5. A trip to Cape Canaveral, Florida takes 10 hours. The distance is 816 km. Calculate the average speed.
6. How many seconds will it take for a satellite to travel 450 km at a rate of 120 m/s?
7. What is the speed of a walking person in m/s if the person travels 1000 m in 20 minutes?