

Motion: Frame of Reference

Physical Science

What is Motion?

- Motion is Relative-dependent on a reference point (frame of reference)
- Frame of Reference is a fixed object or background that you compare motion to
- Most common F.O.R. is Earth



Example

- You are on platform, and you see a train speed by what is your frame of reference?
- The ground, or a tree or a trashcan



Example

- http://www.classzone.com/books/ml_science_share/vis_sim/mfm05_pg7_relmotion/mfm05_pg7_relmotion.html

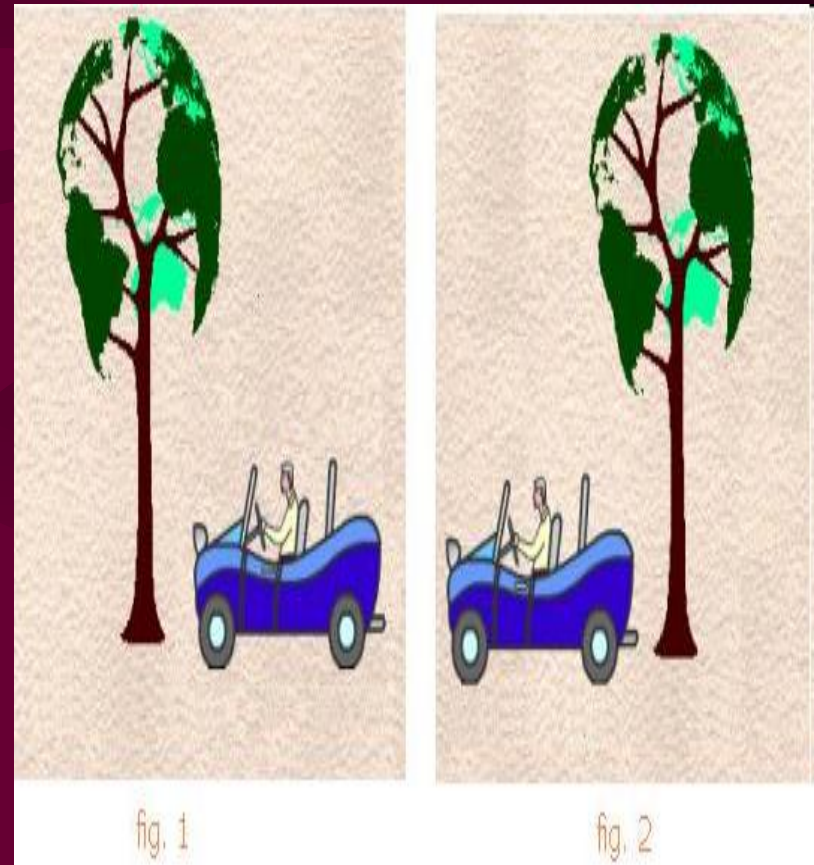
Example

- Sitting at your desk, how fast are you moving?
- Relative to the ground-zero
- Relative to the sun-
100,000km/hr
- So are you moving or not?
Both answers are correct
dependent on your frame
of reference



Another Example

- We know that the tree does not move, so we can assume that the car is moving. Our frame of reference is the tree.



example

- Movies- look like they are driving. Really the screen is moving



Relative Motion

- http://www.google.com/url?url=http://www.youtube.com/watch%3Fv%3DY75kEf8xLxI&rct=j&sa=X&ei=S0leTvumKc3diALXx_myBQ&ved=0CC8QuAIwAg&q=frame+of+reference+videos%27&usg=AFQjCNGsZrkicLxJn81VklzuYzLEeg7MCQ&cad=rja

Motion of objects can be defined as either

- Scalar: just numerical value
- EX: mass
- Vector: numerical and direction
- EX: wind speed

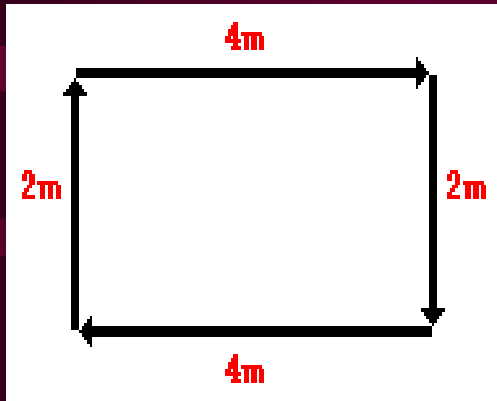
More examples

- 5m
- 5m, north
- 30 degrees celcius
- 4000 calories

Difference between distance and displacement?

- Distance: scalar representing “how much”
- Displacement: vector representing “how far”
- position

A physics teacher walks around the classroom. What is her displacement and distance



- Her displacement is zero
- Her distance is 12m

What is the displacement of the cross-country team if they begin at the school, run 10 miles and finish back at the school?

- Displacement is zero
- Distance is 10 miles

What is the distance and the displacement of the race car drivers in the Indy 500?

- The displacement is zero
- The distance is 500 miles

Motion

- Change in position relative to a frame of reference