Relative Motion

What is something that is moving around you and how do you know it is moving?

vocabulary

Motion - the process of changing **position**.

Position is a place where someone or something is located or has been put.

A **reference point** is a place or object used to compare “position” and conclude if something is in “motion” (moving or moved).

Relative motion - depends on your reference point

What about “direction”?

What direction can forces push or pull?

When an object's distance from another object is changing it must be

A. Accelerating
B. In motion
C. At rest
D. Moving fast

The plane is moving but the man is not. If you were in the plane, you could use the man as:

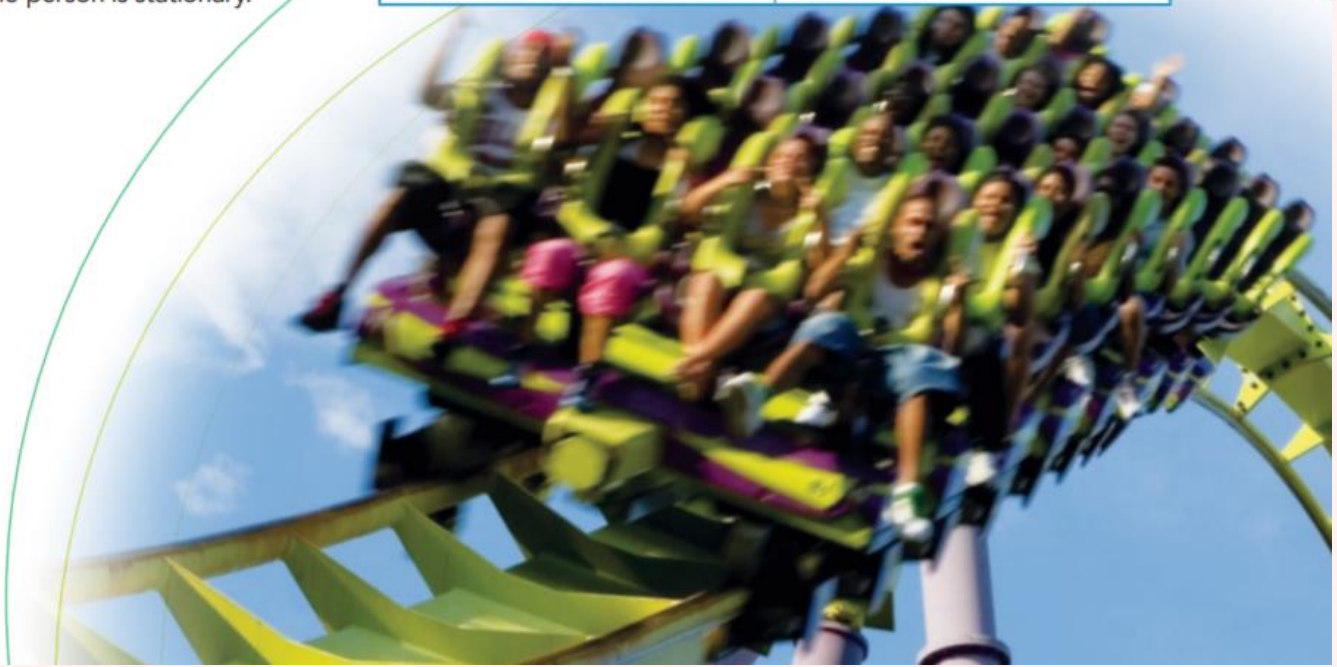
A. A reference point
B. In motion
C. A position
D. A force


09 Relative Motion
to the observer the ball has the same
horizontal velocity as the train
3:24 / 6:26

Relative Motion

Figure 2 Circle the person on the right side of the front car. In the table, list three reference points that could be used to show that the person is in motion. List three reference points that could be used to show that the person is stationary.

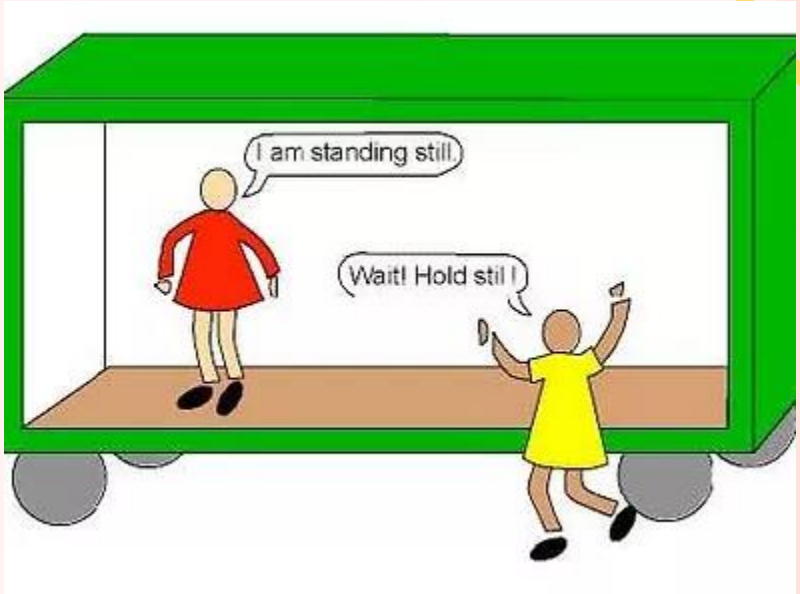
In motion relative to...	Stationary relative to...

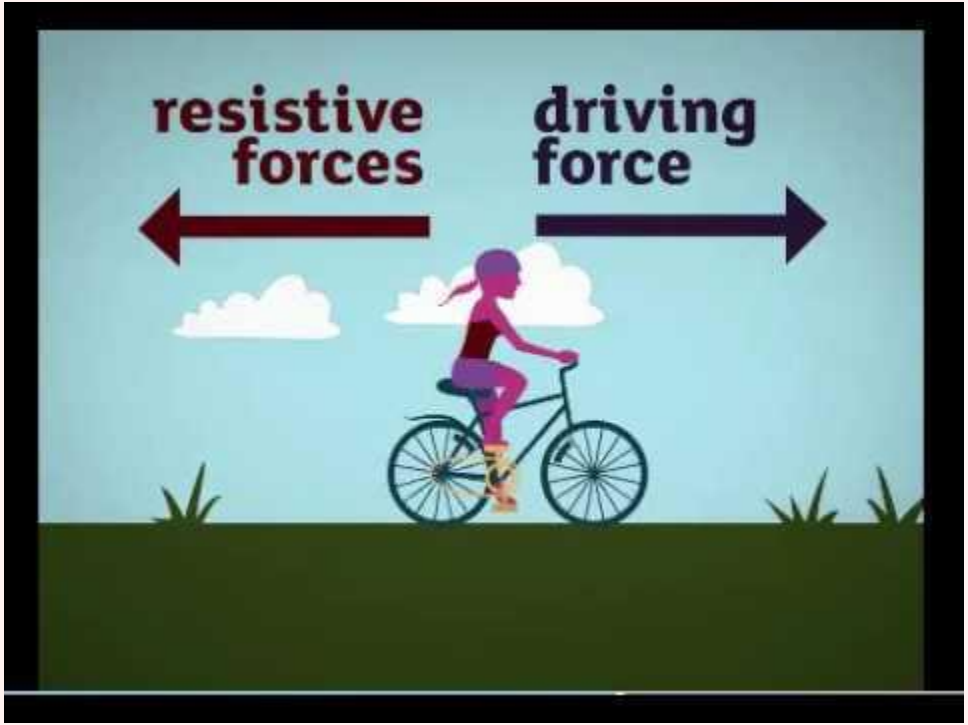


Choose two objects from the illustration. Based on the scene, how might these objects be in motion and a reference point at the same time?

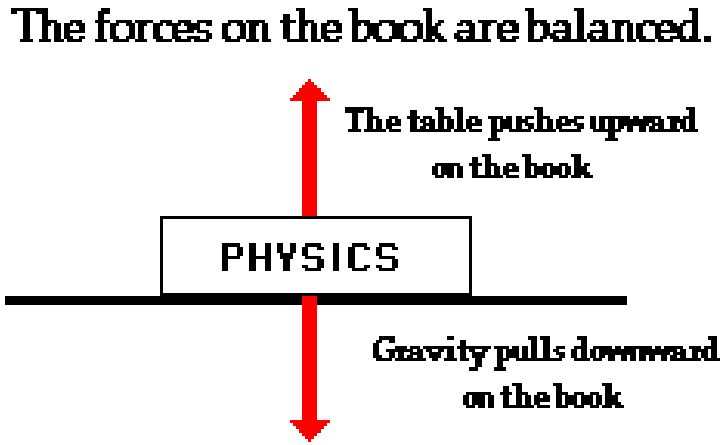
Review

What is relative motion and how does it relate to a person's reference point?

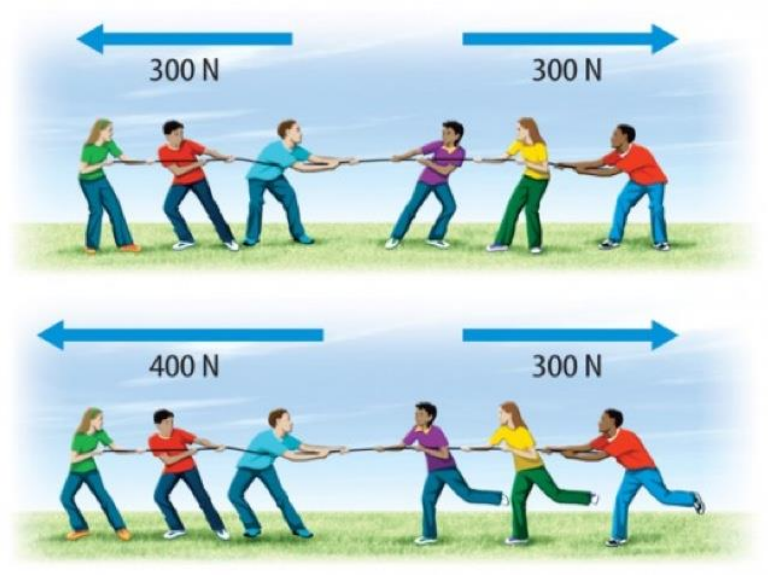



resistive forces
driving force

Balanced Forces



Where else do you find balanced forces?



Unbalanced Forces

Where else do you find unbalanced forces?

Page 10 in textbook

Math Toolbox

Effects of Net Force

In each diagram, two animals push on an apple. The forces of gravity and friction acting on the apple in each scenario does not change, so the forces that may cause a change will come from the animals.

Two chipmunks push on the apple in opposite directions with forces of equal strength. The forces on the apple are balanced. The motion and position of the apple do not change.

2N ← → 2N

Net Force:

A chipmunk and a squirrel push on the apple in opposite directions with forces of different strengths. The forces on the apple are unbalanced. In this case, the strength of the net force on the apple is found by subtracting the strength of the smaller force from the strength of the larger force. The net force is in the same direction as the larger force.

2N → ← 6N

Net Force:

A chipmunk and a squirrel push on the apple in the same direction. The forces on the apple are unbalanced. The net force on the apple is the sum of these forces. The apple will start moving to the right.

6N →

2N →

Net Force:

Explore Forces!

01

Force Arrows

Use the slider to change the force on a sled

02

Problems

Site with problems showing balanced and unbalanced forces

03

Explanation

Information on force arrows

04

Simulation

Phet simulation for forces

An an extra one here!

Create your own force arrows question!

Physics

“Physics is the natural science that studies matter, its fundamental constituents, its motion and behavior through space and time, and the related entities of energy and force.” Source

What is your favorite sport?

Science is in everything!

Sports are a great way to show balanced and unbalanced forces.

And relative motion!


30 DEGREES