FORCES

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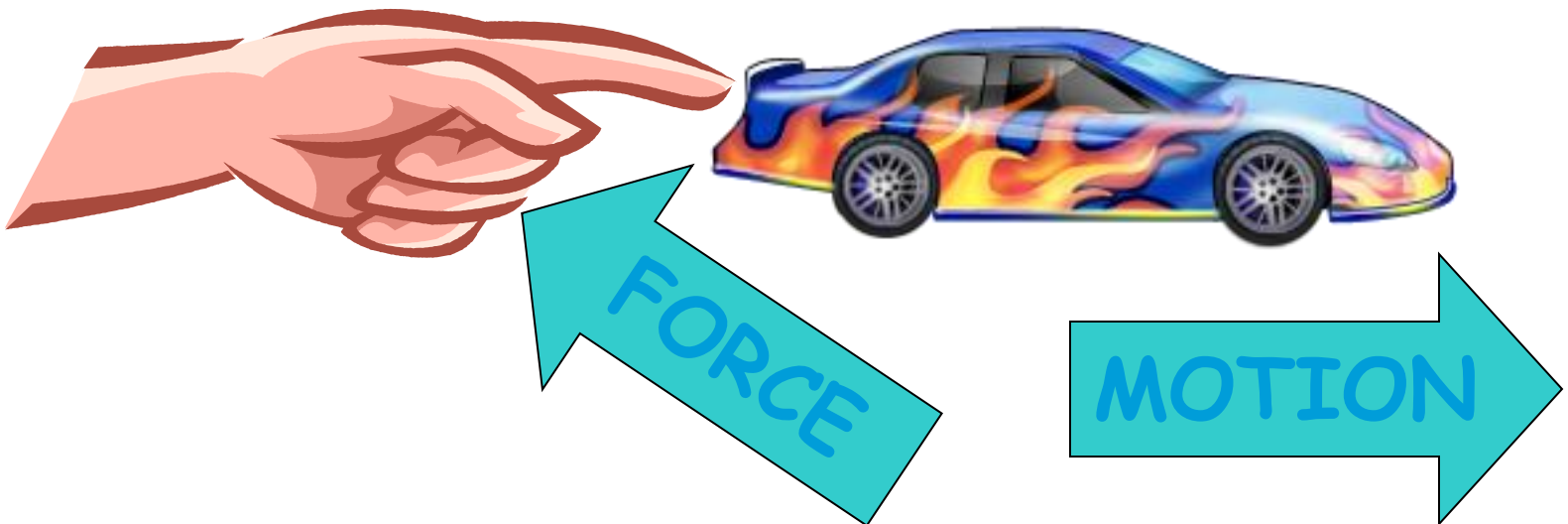
Motio

- **What causes an object to move?**
  - A FORCE!
  - ALL motion is due to forces acting on objects!
- **What is a force?**
  - A push or a pull



Motion

- What is motion?
  - A change in the position of an object over time.
- How do you know something has moved?
  - You use a reference point!
    - A stationary (not moving) object such as a tree, street sign, or a line on the road.

Can more than one force act on an object at the same time?

The total combination of the forces acting on an object is called NET FORCE.

YES!

Example: Gravity is pulling you down to Earth, the ground is supporting you, and your legs moving you forward as you run during PE.

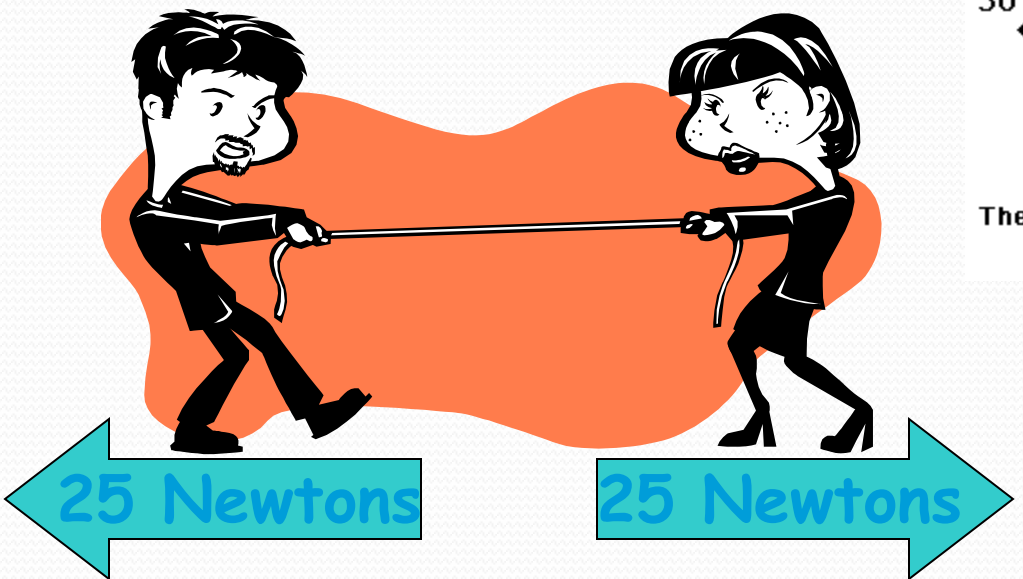
#3

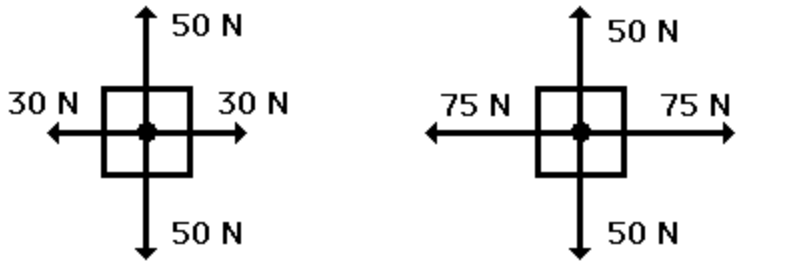
#1

#2

Balanced Forces

- A balanced force is one in which the net force equals ZERO.
- Do you think there will be any motion?
  - NO!
- Examples:

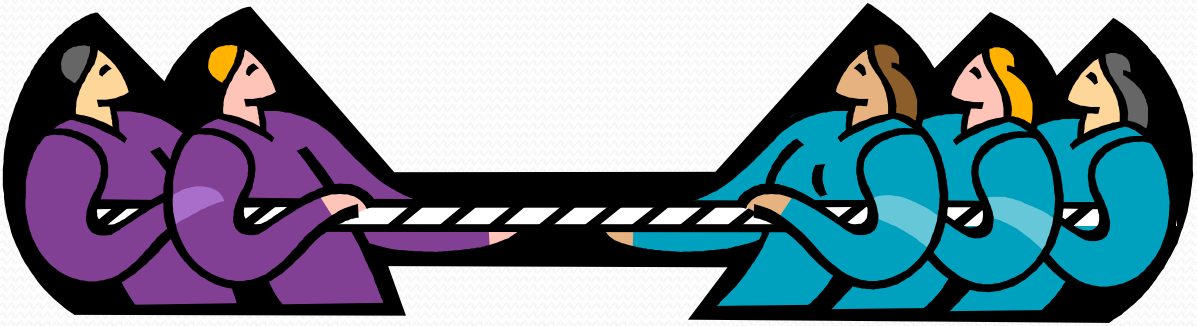


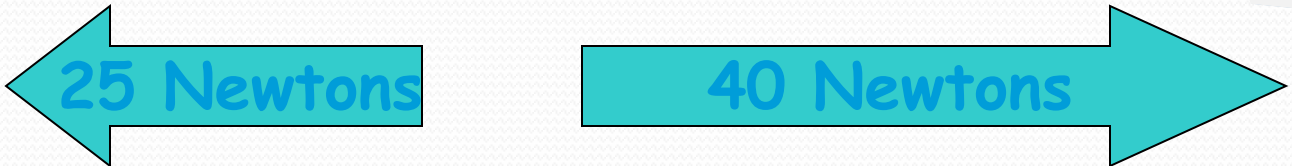


These two objects are at equilibrium since the forces are balanced. However, the forces are not equal.

Unbalanced Forces

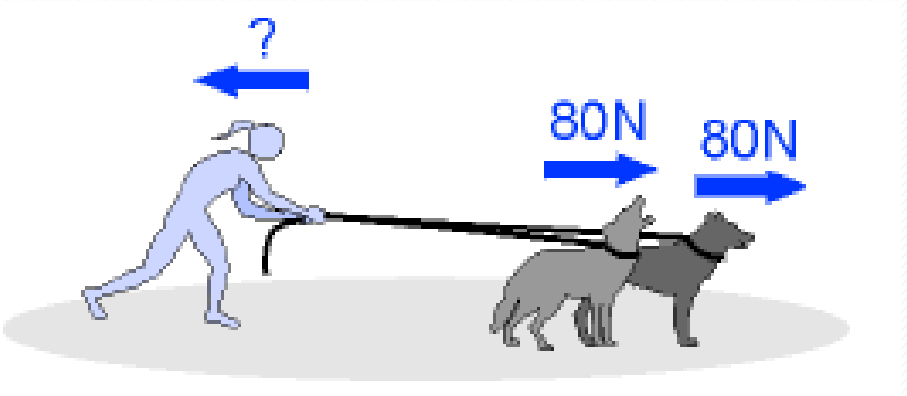
- An unbalanced force is one in which the net force is greater than zero.
- Do you think there will be any motion?
  - YES!
- Examples:





Only an unbalanced force can change the motion of an object.

- Example: Your doggy can cause you to move if he pulls with enough force.
  - His force is greater than the force you're using to stay in place



What would happen if an unbalanced force acted on an object that's already in motion?

- It will change the **speed** or **direction** of the object.
- Example: Your sister is driving her car. You run up behind her and give her a push.
  - Your force adds to the existing force causing her to speed up.

Carpespasm
http://bit.ly/tIETd6

Unbalanced forces can act in the same direction.

- Example: You're pushing a cabinet across the room with a force of 15 N. You're friend is pulling with a force of 10 N.
- **What is the NET FORCE?**
- **What direction is the cabinet moving?**

Unbalanced forces can act in opposite directions.

- Example: Six people
  Three people pulls with
  the other pulls with a
- What is the NET FORCE?
- What direction is the rope movi

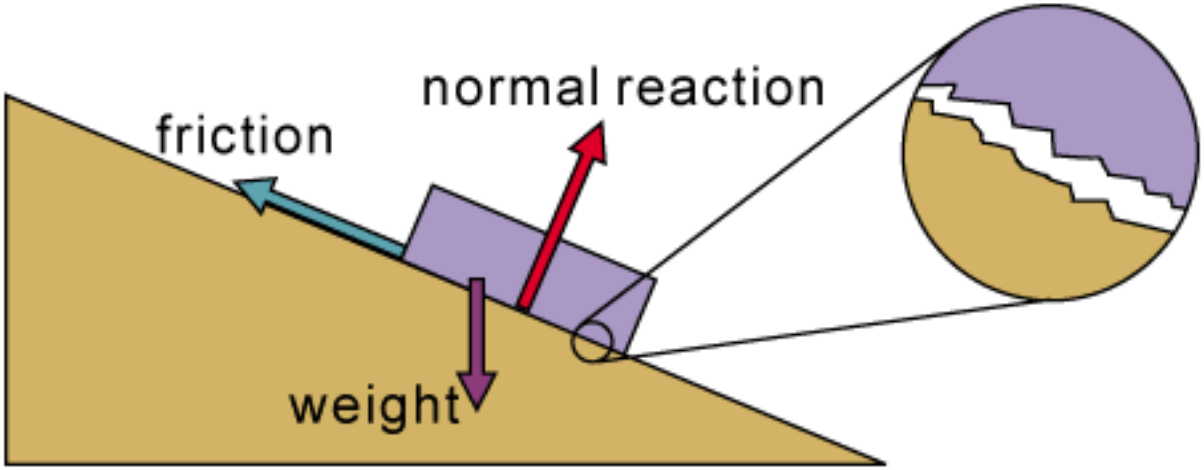
When you have opposing forces, the direction the object moves is in the same direction as the larger force.

20 Newtons

25 Newtons

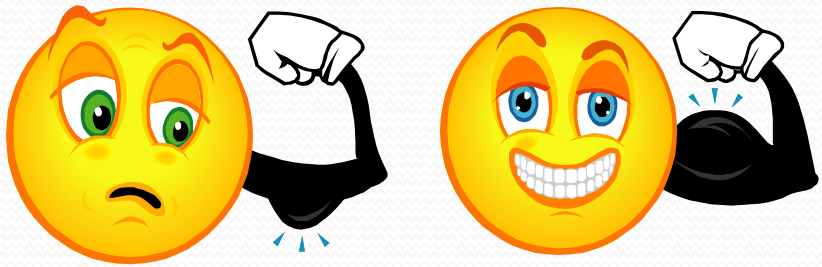
Friction and Gravity

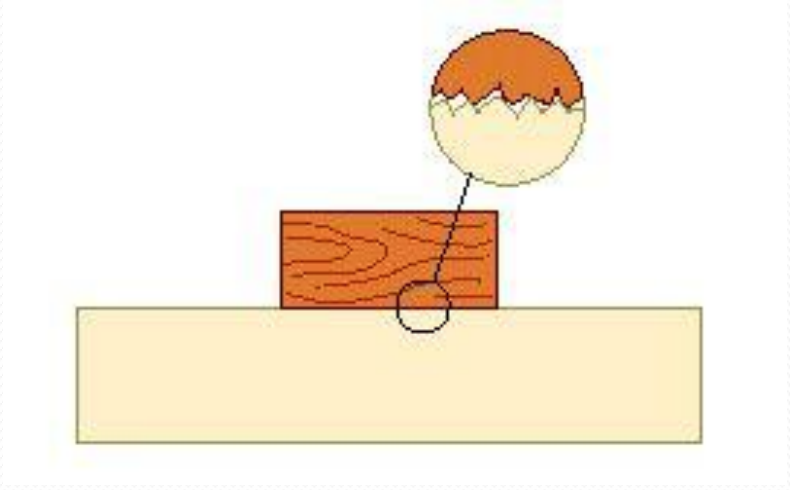
- What is friction?
  - A force that opposes the motion of an object
  - It's a "contact" force!
    - Occurs when an object in motion rubs against a surface.
    - The contact reduces the speed of the object and releases heat.

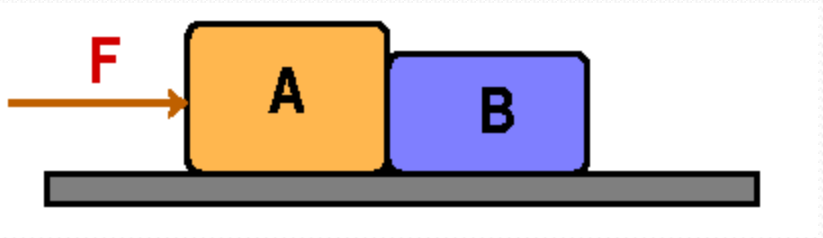


What affects the amount of friction?

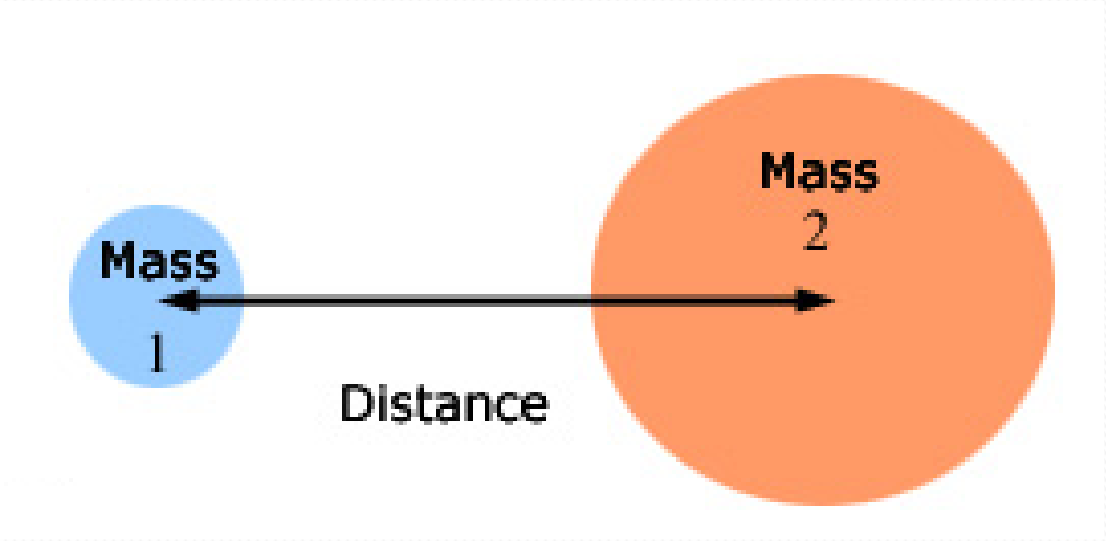
- **The force of the push/pull**
  - The harder you push, the longer it's going to take friction to stop the object.
- **The bumpiness of the surface**
  - The rougher the surface, the more friction.
- **The weight of the object**
  - The heavier the object, the more friction.







- **What is gravity?**
  - The force of attraction between all objects.
- **The amount of gravity depends on two things:**
  - The objects' masses
  - The distance between the two objects



- Since the earth is so large, everything on it is attracted to it even if they're not touching!
- Example: Apple fall
  - Apple fall because the gravity of the earth.