

# Moving Masses

Newton's Toy Box Activity 3  
*acceleration, mass, Newton's 2nd law*

**Weight** is a measure of the amount of gravity force pulling on an object.

**Mass** is the amount of matter in an object.

An object with more mass also has more weight.

# Acceleration

Acceleration is a measure of the rate of change in speed and direction (velocity).

When an object is falling, its speed increases.

If the speed of two objects increases at the same rate, then the objects have the same acceleration.

# Speed and Velocity by They Might Be Giants



# Newton's 2nd Law of Motion

An object acted on by a force will accelerate in the direction of the force.

The acceleration of an object is directly proportional to the external force acting on it and inversely proportional to the object's mass.

*In other words, applying more force leads to greater acceleration; a larger mass will require more force to accelerate.*

# Newton's 2nd Law of Motion

$$F=ma$$

force = mass x acceleration

which means...acceleration=force/mass

# Rolling the Wooden and Steel Ball on the Table

*Newton's 2nd Law of Motion  $a=F/m$*

You used equal force on the wooden and steel ball.

The wooden ball had less mass, so it had a greater acceleration-it rolled faster.

# Pushing the Wooden and Steel Ball off the Table

*Newton's 2nd Law of Motion  $a=F/m$*

The wooden and steel ball hit the ground at the same time. They accelerated at the same rate.

Remember that the steel ball has more mass and also has more gravity force acting on it.