

Welcome to Physics First I Cycle 2 Lesson 1

OBJECTIVE: Define and use Newton's First Law of Motion

VOCAB: *force, Newton's first law, inertia, newton, vector, net force*

CLASSWORK:

Section 2.1 "Understanding Vocab" (p. 54 #1-5)

Section 2.1 "Reviewing Concepts" (p. 54 #1, #3-5)

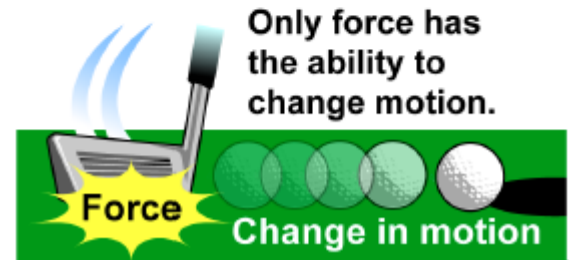
Section 2.1 "Solving Problems" (p. 55 #1, #2(a-b))

Newton's First Law

- **Newton's First Law of Motion**
 - “An object in motion stays in motion.”
 - What does mean?
 - Objects tend to continue the motion they already have unless they are acted on by **forces**.
 - In the absence of a **force**, an object at rest will stay at rest.
 - In the absence of a **force**, a moving object will keep moving at the same speed in the same direction.
- **Inertia**
 - Objects resist changes in their motion.
 - This is called **inertia**. Inertia is caused by mass.

What is a Force?

- **A force** is any action which has the ability to change motion.
- Without **force**, the motion of an object cannot be changed.
- The golfer is yelling at her ball to move. Is this a **force**?
- The golfer hits the ball with a club and it moves. Is this a **force**?
- The ball eventually stops due to friction. Is friction a **force**?



What is Inertia?

- **Inertia** is the resistance of an object to changes in motion.
- **Inertia** is caused by the **mass** of an object.
- Which is easier to stop, a rolling Hot Wheels car, or a rolling bowling ball? What does the bowling ball have more of?
- Which would you rather drop on your foot? A quarter, or a brick? What does the brick have more of than the quarter?
- More **mass** = more **inertia** = more **force** required to change motion.



Units of Force

- To honor Isaac Newton, the metric unit of force is called the **Newton**.
- A **Newton** is the amount of force which can change the speed of a 1 kg mass by 1 meters per second when acting on that mass for 1 second.
- People think of pounds as **mass** but they are really units of **force**: they are a unit of **weight**, and gravity is a **force**.
- 1 pound = 4.448 Newtons.**

Newton

One newton (N) is the force it takes to change the speed of a 1 kg mass by 1 m/sec in 1 second.

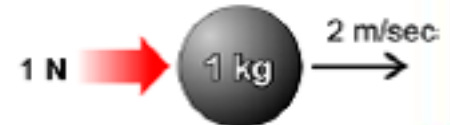
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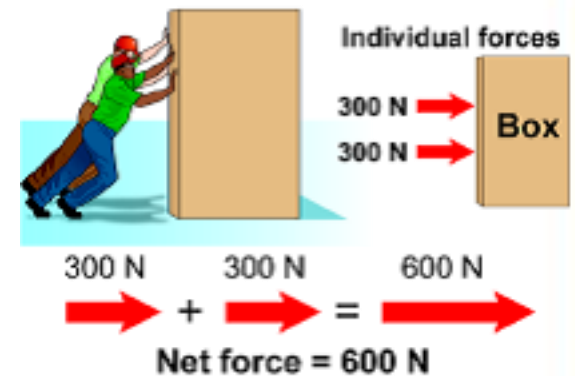
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Forces Add Together

- When multiple forces act on an object at once, their sum is the **Net Force**.
- Force is a **vector**. A vector is a quantity with a direction.
 - 40 miles is a distance but not a vector. 40 miles West is a vector. It is a quantity with a direction.
- Two forces in the same direction will add together.
- Two forces in opposite directions will subtract from each other.

Forces in the horizontal direction



Forces in the vertical direction

