

FORCES



6th grade Science

Do Now

- ✦ **What is an unbalanced force?**
- ✦ **What is a balanced force?**



DO NOW:

- ◆ **What causes an object to start moving, stop moving, or change direction?**

Forces

✦ A force is a push or a pull.

Spring Scales measure force

Force measured in Newtons (N)

Examples of Exerting a Force

◆ 1) Zipping up your pants.

◆ 2) Lifting a book.







2 Types of Forces

1) UNBALANCED

2) BALANCED

A silhouette of a person in a starting crouch on a track, symbolizing unbalanced forces.

Unbalanced Force

- ✦ An unbalanced force can cause an object to start moving, change direction, or stop moving.
- ✦ It can change an object's motion.



Examples of Unbalanced Forces

◆ 2 people pushing a box toward each other. (one person is bigger than the other person)

◆ See page 47

BALANCED FORCE

Balanced forces are equal forces acting on one object in opposite directions .

They DO NOT change an object's motion.

Example of a Balanced Force

- ◆ Two people pushing the box toward each other. (They are both the same size- so the box does not move.)

- ◆ See page 47

DO NOW:

- ◆ Review your study guide in preparation for today's quiz.

BONUS:

✦ What instrument is used to measure force? _____




NET FORCE

- ✦ **The overall force on an object when all the individual forces acting on an object are added together.**

DO NOW

Why is the surface of the snow on a mountain allowing you to ski down the mountain?



FRICTION

- ✦ **Friction**: Force that slows things down and keeps things in place.
- ✦ Caused by two objects rubbing together.

When is friction good? Not good?

Write whether you want more or less friction.

1. Walking on an icy sidewalk.
2. Driving a car around a corner during the rain.
3. Going down a slide.
4. Climbing up a ladder.
5. Skiing down a hill.

Friction

✦ The strength of friction depends on 2 factors:

a) The type of surface involved

b) With what force the surfaces push together

✦ Rough surfaces provide **MORE** friction than smooth surfaces.



GRAVITY

Gravity: The force that pulls objects towards Earth.



MASS vs. WEIGHT

- ◆ **Mass** is the measure of the amount of matter in an object.
- ◆ **Weight** is the measure of the force of gravity on an object.

Instructions for today's LAB

ACTIVITY

- ✦ Place the wooden block on top of the board on one of the strips of material.
- ✦ While you gently hold the block in place, have a partner pull the board out from under the block so the block slides along the strip, not across – don't rip the strips.
- ✦ Does the material make a difference in how hard your partner needs to pull?
- ✦ Switch jobs with your partners.
- ✦ Then put the weight on top of the block. Repeat.

Copy this chart

	BOARD	SANDPAPER	RUBBER	CORK
Wooden block				
Block with weight				

1. Tilt board.
2. Slide wooden block up board. Measure and record force in N.
3. Hook metal weight on top of block
4. Slide both up board. Measure and record force in N.
5. What 2 things affect friction?

DO NOW: Copy this law

◆ Newton's 1st Law of Motion

An object at rest stays at rest unless acted on by a force. A moving object will continue moving unless acted on by an unbalanced force.

Example: A book will remain on the table unless I push it off.

Using Newton's First law of Motion,
explain why it is important to
wear a seatbelt when in a car.



Do Now

a) Define Speed.

a) Define Acceleration.

b) Copy the formula for calculating Speed:

$$\text{Speed} = \text{Distance} / \text{Time}$$

Speed

◆ Speed is a calculated measurement of an objects motion.

◆ $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

◆ Ex.



120miles
2hours

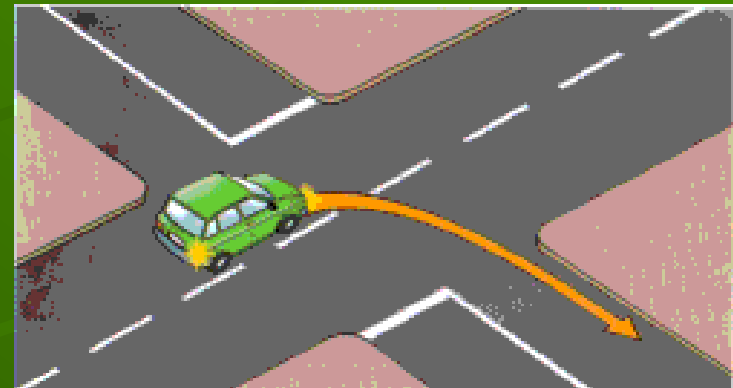
◆ Ex.



5,000feet
2 seconds

Acceleration

- ◆ Acceleration is increasing speed, decreasing speed or changing direction.



INERTIA

◆ Inertia: The tendency of an object to resist change

Ex. penny at rest

Ex. person flying out of car

Newton's 2nd Law of Motion

- ✦ Accelerating an object with a large mass requires a large force
- ✦ Accelerating an object with a small mass requires a small force

Summarizer

◆ How would a batter have to swing differently if he wanted to hit a bowling ball as far as a baseball?



Do Now

- ◆ Use Newton's 2nd Law of Motion to explain why the cinder block did not travel as far as the small weight.
- ◆ How did we get the cinder block to go as far as the small weight?

Newton's 3rd Law of Motion

- ◆ For every action there is an equal and opposite reaction
- ◆ Ex. Balloon let go
- ◆ Ex. Rocket or jet