WARM UP

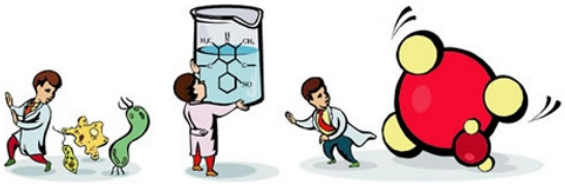
NEW SEATS! CHECK THE SEATING CHART ON THE FRONT DESK.

- Fill out the anticipation guide for the Physics Unit.
  - > Indicate whether or not you agree or disagree with the statement by circling the appropriate shuttle.
  - > Make sure your name in on the worksheet and keep in it a secure place. We will refer to it later in the quarter.

LET'S READ THROUGH THE BASICS OF FORCE AND MOTION.

Apr 7-8:30 PM

PHYSICS



If it's green or wriggles, it's biology.
If it stinks, it's chemistry.
If it doesn't work, it's physics!

Apr 7-8:02 PM

KEY TERMS

Direction: a position to which motion or another position is referred.

Motion: change in position

Position: a condition with reference to place or location

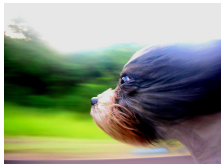
Speed: rate of change of an object's position

Apr 7-8:57 PM

- Motion is defined as *the state in which the distance from another object is changing.*
  - > Motion is typically determined by use of stationary reference points.
    - > Reference points are *a place or object used for comparison to determine if something is in motion.*
      - – *Stationary* or permanent fixed objects *make good reference points* because their position is fixed, it doesn't change.
      - – *Moving objects make poor reference points* because objects in motion make it difficult to determine the motion of another object.

Apr 7-8:08 PM

- Relative motion
  - > Motion depends on the reference point that you choose.
  - > All things are in constant motion.
    - – This is due to the fact that the *Earth is in constant motion around the sun.*
    - – Everything on Earth is moving at the same speed (30 km/s) however, *because it is all riding on Earth and traveling at the same speed even "stationary" objects appear to not be moving.*



Apr 7-8:12 PM

WARM UP

1.) What is motion?

-the state in which the distance from another object is changing; a change in position

2.) Explain why everything is constantly in motion.

-because the Earth is in constant motion as it rotates around the sun, so everything on Earth moves with it

3.) What type of object makes a better reference point?

-a stationary object

Apr 8-7:17 PM

Balancing act Demo

Watch as I squeeze the bottle.

What happened?

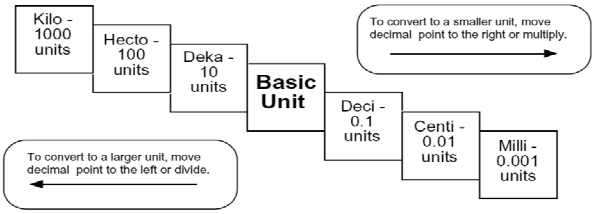
Were the fores balanced or unbalanced?

When I placed the cup on the bottle, the forces were balanced. When the bottle was squeezed, the air inside the bottle suddenly had more force. The forces became unbalanced, causing the cup to move.

Apr 9-8:12 AM

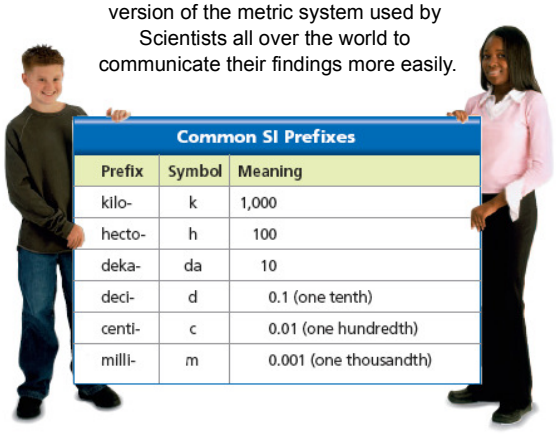
Before going any further in physics... we need to review and practice our math skills with conversions and units!

Remember this?



Apr 7-9:33 PM

The SI system of measurement is a version of the metric system used by Scientists all over the world to communicate their findings more easily.



Common SI Prefixes

Prefix	Symbol	Meaning
kilo-	k	1,000
hecto-	h	100
deka-	da	10
deci-	d	0.1 (one tenth)
centi-	c	0.01 (one hundredth)
milli-	m	0.001 (one thousandth)

Apr 8-7:34 PM

- What are the basic units of measurement in the SI system?
  - meter, liter, gram
- What number is the SI system based upon?
  - 10
- Why do we use this system in science?
  - Scientists use this common system to easily convert numbers and share data all of the world. The sharing of information would be much more difficult if we all used different systems.

Apr 8-7:32 PM

Now, let's practice!

- At your table, you should have 1 covered worksheet, 1 dry erase marker, and 1 calculator.
- Work together to get as many calculations completed as you can.
- Be ready to get called on as we go over the answers in class!

Apr 8-7:27 PM

Warm Up

1.) Convert 5.23hm to cm: 52300.0cm

2.) Convert 730mg to g: .730g

3.) Convert 4kl to ml: 4000000.0ml

4.) Using the formula d=m/v, calculate density with a mass of 150g and a volume of 125cm^3: d=1.2g/cm^3

Apr 8-7:42 PM

More Practice

Work together with your seat partner to complete questions 10-14 on the "Customary to SI" conversion side of the worksheet.

Now that we have finished conversions, let's move on to more physics!

Apr 9-8:24 PM

Speed

- Ratio of the distance traveled to the time it takes.
- The unit for distance is always the unit for distance in the problem over the unit for time given in the problem.
- Speed typically measured in m/s in S.I. system & mi/hr. in the Customary System.
- Ex.) A cyclist traveled 50 km in 2 hours.

$Speed = Dist/Time$

$Speed = 50km/2hr$

Answer:

$Speed = 25\ km/hr$

Apr 7-8:13 PM

- The speed formula can be manipulated to solve for both time & distance.

$Time = Dist./Speed$ $\quad$ $Dist. = Speed \times Time$

- Speed typically is not always constant.
  - Average speed: is the overall rate at which an object travels.
    - To determine average speed you take the total distance divided by the total time including any stops or breaks.

$Avg.Speed = Tot.Dist./Tot.Time$

- Instantaneous Speed Video! -->
  - Rate an object is moving at a particular instant or moment in time.

Apr 7-8:17 PM

Warm Up

1.) What is the speed of a car that traveled 120 km in 2 hours? 60 km/hr

2.) How long does it take for a car to travel 75 miles while traveling at 45 mi/hr? 1.6 hr

3.) What is the difference between average speed and instantaneous speed?

An objects average speed is the overall rate with which that object traveled (including any breaks); instantaneous speed is an object's speed at a particular time or location.

Apr 8-8:43 PM

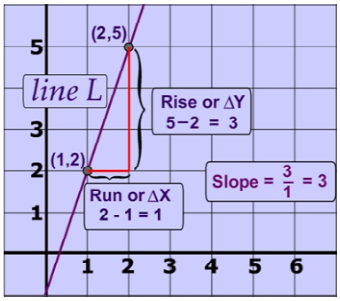
- **Velocity**
  - Is the speed of an object in a given direction.
  - If the speed changes, either increases or decreases, then the velocity changes.
  - If the direction changes then the velocity changes.

Video! -->

- **Slope**
  - The steepness of a line on a graph.
  - Tells how fast one variable is changing in relation to the other.
  - In a distance versus time graph the steeper the slope the greater the speed.
  - A constant slope means a constant speed.

Apr 7-8:18 PM

Δ: means change in



$$Slope = \frac{Rise}{Run}$$

$$Slope = \frac{\Delta y_{values}}{\Delta x_{values}}$$

$$Slope = \frac{y_2 - y_1}{x_2 - x_1}$$

Apr 7-8:21 PM

Let's Practice Calculating Speed

You will work through the worksheet in sections. Be prepared to be called upon.

Basic:

-Work independently without a calculator.

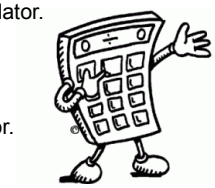
-Check answers with a calculator.

Intermediate:

-Work independently with a calculator.

Challenge:

-Work with seat partner and with a calculator.



Apr 8-8:43 PM

Warm Up

1.) What is the difference between speed and velocity?

velocity is speed but includes the direction in which the object is traveling

2.) What is the formula for slope?

$$Slope = \frac{y_2 - y_1}{x_2 - x_1}$$

3.) What is the symbol for "a change in"?

a triangle

Apr 9-9:09 PM

Warm Up

Make sure your lab sheets are turned in!

Apr 9-9:18 PM

Warm Up

Make sure your homework is turned in!

1.) Find the slope using the following coordinates: (3,-3) (5,2).

2.) What is the speed of an object that travels 52km in 20 mins?

3.) How far does an object go if it is traveling at 32 mi/hr for 2 hours?

Apr 9-9:28 PM

Marble Madness Lab

- You will work in your cooperative groups to complete the lab activity.
- Group Roles:
  - > Group Leader
  - > Time Keeper
  - > Distance Measurer
  - > Ramp Holder/Marble Retriever

- **You will be responsible for completing your own lab sheet. All boxes must be filled in, all questions must be answered, and both graphs must be complete and attached. Lab sheets are due on Wednesday!**

Apr 9-9:10 PM

- **Acceleration**
  - > in everyday terms it's described as the process of "*speeding*" up.
  - > Scientifically it is the rate a which velocity changes.
  - > Velocity is speed in a given direction and can change in 3 ways.
    - > Increase speed
    - > Decrease speed
    - > Change directions

Video! -->

  - > Deceleration is "*negative*" acceleration.

Apr 7-8:22 PM

- **Calculating acceleration**

$$Acc. = \frac{Fin.Spd - Int.Spd}{Time}$$

  - Fin. Spd = the final speed of the object.
  - Int. Spd = the beginning or initial speed of the object.
  - Time = the overall time it takes.

> Ex.) An airplane reaches a take off speed of 70 m/s in 15 seconds, how fast is the plane accelerating?

$$Acc. = \frac{70\,m/s - 0\,m/s}{15s} \qquad Acc. = \frac{70\,m/s}{15s} =$$

Answer

The unit for acceleration incorporates the unit for speed with the unit for time squared.

- Ex.) m/s^2 Ex.) mi/hr^2 Ex.) km/day^2

Apr 7-8:23 PM

Variations on the acceleration formula given, speed & time.

$$\text{Acceleration} = \frac{\text{Final speed} - \text{Beginning speed}}{\text{Time}}$$

Finding acceleration --> $a = \frac{v_2 - v_1}{t}$

Finding final speed --> $v_2 = v_1 + (a \times t)$

Finding time --> $t = \frac{v_2 - v_1}{a}$

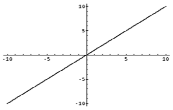
Finding beginning speed --> $v_1 = v_2 - (a * t)$

Apr 7-8:24 PM

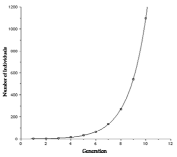
- **Graphing acceleration**

> Can be displayed on both a distance versus time graph & a speed versus time graph.

- Distance vs. Time
  - « The slope of the line will indicate the acceleration or deceleration *between* the points.



- Speed vs. Time
  - « The *exponential curve* will indicate the acceleration or deceleration between points.
  - « The exponential curve also indicates that with each second you are traveling farther than you did the previous second.



Apr 7-8:24 PM

Warm Up

1.) What is acceleration?
- the rate at which velocity changes; speeding up

2.) What is negative acceleration?
- slowing down; deceleration

3.) Calculate the acceleration of an object as it goes from 5 m/s to 20 m/s in 18 seconds.
- .83 m/s^2

Apr 17-7:41 PM

Quiz time!

- When you have completed your quiz, turn it over and place it on the corner of your desk.
- Work on the acceleration worksheet.
- The worksheet will be homework if not completed in class.

Apr 17-7:53 PM

Let's Practice!

Apr 7-8:38 PM

How Fast Are You?

Apr 9-9:29 PM

Apr 9-9:27 PM