Welcome to Physics! I am so excited for the coming school year! Be prepared for a lot of in-class investigation, because hands-on is the best way to learn Physics!

The textbook we will be using this year is College Physics, a strategic approach (AP Edition) 4th Edition. *Please note that this is not the same textbook that was used in last year's Physics class.* You do not need the textbook to do the summer work, but it would definitely help if you could follow along with the text as you go through the prepared videos. Books will be available for purchase when the school online bookstore opens on July 1st.

The work I have assigned for summer work covers Chapter 1 and the start of Chapter 2 in your textbook. **I will be collecting the Summer Assignment on the first day of classes. This assignment will be graded and we will be having a quiz on this material during the second week of classes.**

Summer Assignment:

- Unit 1 Formula Sheet – You will be creating your own formula sheet to be used on tests and quizzes throughout the year. For summer work, please begin preparation of your formula sheet by adding pertinent formulas and constants as you watch the videos. Depending on how large you write, your formula sheet may end up being more than one page, but please limit the formula sheet to only formulas and constants. No worked example problems allowed.
- Chapter 1 & 2 Assignments - Each assignment (attached on the following pages) is broken up into main topics that cover the same content as your text and contains a link to a video meant to provide course notes and worked examples followed by problems for you to complete this summer. You must show all work for the sample problems. If you only provide answers, you will receive a zero for the assignment.
    - Please note that the videos are broken up into sections that DO NOT correspond to the textbook you will be using this coming year. The content follows the same basic flow but some sections are renamed or rearranged in the textbook we will be using this year.

If you have any questions as you work through this assignment, please feel free to reach out to me. My email address is below. I am looking forward to a fantastic school year with lots of fun and investigation in the classroom.

Sincerely,

Mrs Kenerson
mkenerson@nda-worc.org

Physics Summer Assignment

Units and Unit Conversion

Watch the following video: http://youtu.be/_XLvpAMdes8?hd=1 (11:13)
Add any significant formulas to your formula sheet and complete the following problems.

1. Complete the following unit conversions:
    a. 15 hrs to s
    b. 15 g to kg
    c. 120 cm to m
    d. 25 mins to s
    e. 65 miles per hour (mph) to meters per second (m/s)

2. Solve the following problems. Round your answer to the correct number of sig figs (and use the correct unit on your answer).
    a. 825 cm x 32 cm x 0.248 cm
    b. $\frac{15.68\ g}{2.885\ mL}$

Vectors

Watch the following video: http://youtu.be/xySMK9_XAMg?hd=1 (15:00)
My apologies, but the last few seconds of video were cut off.
*What is missing is that the sin(35)*15 = 8.6 m/s for the vertical component.*
Add any significant formulas to your formula sheet and complete the following problems.

1. Label each of the following quantities as a vector or a scalar:
    a. 35 mph due East
    b. 75°
    c. 25 minutes
    d. 5 miles at a heading of 35° North of East

2. In a very odd car trip, we started out travelling 125 miles due east then made a sharp turn and continued 90 miles due north. How far away did we end up from our starting position?

3. Maddie threw a softball with a x-component of the velocity of 3.5 m/s and the y-component of the velocity of 2.5 m/s. What are the magnitude and angle (above the horizon) of the total velocity of the softball as it leaves Maddie's hand?

Trigonometry

Watch the following video: http://youtu.be/89MDzITq9VM?hd=1 (13:55)
Add any significant formulas to your formula sheet and complete the following problems.

1. John stands 150 meters from a water tower and sights the top at an angle of elevation of 36°. How tall is the tower?
2. In a sightseeing boat near the base of the Horseshoe Falls at Niagara Falls, a passenger estimates the angle of elevation to the top of the falls to be 30°. If the Horseshoe Falls are 173 feet high, what is the distance from the boat to the base of the falls?

Algebra Review

Solve each of the following equations for the requested variable:

1. 5(x-3) = 4-3x Solve for x.
2. $T = 2\pi\sqrt{\frac{l}{g}}$ Solve for l.
3. $v_f^2 = v_i^2 + 2ax$ Solve for x.
4. $W = \frac{1}{2} k x^2$ Solve for x.

Displacement

Watch the following video: http://youtu.be/mkRWvdX-lFQ?hd=1 (14:02)
Add any significant formulas to your formula sheet and complete the following problems.

1. Can the displacement ever be more than the distance travelled? Explain your reasoning.
2. What is the displacement of the cross-country team if they begin at the school, run 10 miles and finish back at the school? What is the distance travelled?
3. Michaela travelled 6 miles east, 6 miles north, and then 2 miles west. What distance did she travel, and what was the magnitude of her final displacement?

Speed & Velocity

Watch the following video: http://youtu.be/bqVIRdHO7Q8?hd=1 (14:52)
Add any significant formulas to your formula sheet and complete the following problems.

1. If I am travelling at a velocity of 55 mph due north, what is my speed?
2. You bike at a constant speed of 5.2 m/s for 15 s. How far do you travel?
3. Light from the Sun reaches Earth in about 8.3 minutes. The speed of light is 3.00×10^8 m/s. What is the distance from the Sun to the Earth?
4. During a track event, it takes a runner 23 seconds to run 500 meters. What is the runner's average velocity?
5. You and a friend are each driving 50.0 km. You travel at 90.0 km/hr and your friend travels at 95.0 km/hr. How much sooner will your friend finish the trip?
6. A canoeist paddles upstream at a velocity of 2.0 m/s for 4.0 seconds and then floats downstream at 4.0 m/s for 4.0 seconds. What is the average velocity of the canoe during the 8 second time interval?

Acceleration

Watch the following video: http://youtu.be/ya3L_Ijbs74?hd=1 (10:42)
Add any significant formulas to your formula sheet and complete the following problems.

1. Is it possible for an object to increase its speed (go faster) while its acceleration is negative? Explain your reasoning.
2. Can an object reverse its direction while its acceleration is constant? Explain your reasoning.
3. During the Daytona 500, a race car accelerates uniformly from 5 m/s to 17 m/s in 2.5 seconds. What was the acceleration of the car?
4. A golf ball rolls up a hill toward a hole. Assume the direction toward the hole is positive. If the golf ball starts with a speed of 2.0 m/s and slows at a constant rate of 0.50 m/s^2, what is the velocity after 2.0 s?