Name _____ Period ____

SPASH PHYSICS

UNIT 3 REVIEW (NEWTONS 3rd LAW AND VECTORS)

Part 1 VECTORS

1. A boat has a velocity vector due East at 40 KM/HR.
   a. What is the magnitude of the vector with units?
   b. What is the direction of the vector?

   What if a current also travels due East at 30 KM/HR.

   c. What is the resultant velocity of the boat taking the current vector into account?
      Magnitude? Direction?

   Now let us change the current velocity vector to due West at 30 KM/HR.

   d. What is the resultant velocity vector of the boat's velocity and the currents velocity?
      Magnitude? Direction?

Now let us change the current velocity vector to due South at 30 KM/HR.

   e. What is the resultant velocity vector of the boat's velocity and the currents velocity?
      Magnitude? Direction?

Now let us change the current velocity vector to due North at 30 KM/HR.

   f. What is the resultant velocity vector of the boat's velocity and the currents velocity?
      Magnitude? Direction?

   g. Can the resultant magnitude ever be 75 KM/HR for this problem if the boat always has a velocity with magnitude 40 KM/HR and the current always has a velocity with magnitude 30 KM/HR; noting both vectors can be any direction you wish?

2. Graphically, what is the rule for adding two or more vectors together?

Mathematically, what is the rule for adding two or more vectors together? (Two ways)

3. If you are pulling with 12 N vector force due north and a friend is pushing the same object with a vector force of 5 N due north, what is the resultant vectors force and direction?

4. If you are pulling with vector force of 12 N due north and a friend is pulling with a vector force of 5 N due south, what is the resultant vector force's magnitude and direction?

5. If you are pulling with vector force of 12 N due north and a friend is pulling with a vector force of 5 N due East, what is the resultant vector force's magnitude and direction?

6. If you are pulling with a 12 N force due north and a friend is pushing any direction possible with a 5 N force, what are all the possibilities for the final magnitude of the resultant force?

7. In the Vector Addition Lab, when you added any two of the three vector forces, how was the resultant vector related to the 3rd force's vector? Magnitude and direction

8. In the Where Am I Lab, what was the easiest way to find the resultant card given the 19 cards each with a vector or a scalar on the index card?

9. What was the point of drawing a right triangle with the Etch-a-Sketch?

10. How do you resolve a vector into its components?

11. If the angle of the vector is A degrees and the vector has a magnitude of F N, what is the formula for the vertical component's magnitude?
    What is the formula for the horizontal component's magnitude?

12. Draw a force diagram of all five vectors of an object of weight F_w on an incline plane of angle A with angle A mentioned in two places in the diagram. (Vectors F and F and F_N and F_W and f and two angle A's)

13. A. What is the equilibrant of 13 N due South?

B. What is the bearing of the direction 13° S of E?

C. What is the bearing of the direction 13° N or W?

D. What is the heading of the direction 13° W or N?

E. What is the trigonometric way (with the +x axis zero degrees and going counterclockwise around the quadrants) of an angle for each of the above:

A. B. C. E.

What is the advantage of doing it this way?

Part 2 Newtons 3RD Law

1. What is Newton's 1st Law?

2. What is Newton's 2nd Law?

3. What is Newton's 3rd Law including magnitude's and direction's?

Newton's 3rd Law continued from other side

4. Orally name at least three places you see Newton's 3rd law taking place while observing them, to someone nearest to you?

5. Who wins at a tug of war?

6. What is the reaction force of a car taking a curve?

7. What is the reaction force of pulling back and letting go of all five spheres on a Newton's Cradle?

8. On an incline plane, what is the reaction force to the normal force?

9. On an incline plane, what is the reaction force to the friction force if the object is sliding down the incline plane at a constant speed?

10. On an incline plane, what is the reaction force to the weight force sitting on the incline plane?

11. Draw the force diagram for the Boom Lab showing the Boom force of the spring pushing out, the hanging weight force down, and the resolution of the tension in the cable both pushing in and pulling up. How does the etch a sketch activity help you understand this tension force?

12. Draw the force diagram for the Parking on a Hill Lab showing the Weight of the Truck vector, the parallel vector force, the perpendicular vector force, and the angle of the incline B at two places. Which component was equal to the weight of the washers? How did we calculate the weight of the truck?

13. Name the four fundamental forces?