Vector WebQuest

What is a Vector?

[Vector Applet #1](http://illuminations.nctm.org/tools/vector1/index.html) Then scroll down to the "applet" with the car and the arrow, and mess with it.

1a) What happens to the car's direction when the vector (arrow) changes direction?

The car moves in the direction you change the vector through.  
1b) What happens to the car's speed when the arrow length changes?

When you change the vector length and it increases, the cars’ speed increases. When the vector size decreases the cars’ speed decreases.  
1c) What are the two pieces of information a vector quantity gives?

Magnitude and Direction  
1d) Does this blue arrow indicate the car's speed or velocity? Explain your answer!

Velocity, because it indicates the speed and direction

Adding Vectors

[Vector Applet #2](http://illuminations.nctm.org/tools/vector2/vector2.asp) Familiarize yourself with all of the controls, then answer the questions below. (Make sure "Show Vector Sum is NOT checked.)

2a) What does the red vector indicate? What does the blue vector indicate?

The red vector indicates wind velocity and the blue vector indicates plane velocity vector.  
2b) Adjust the red vector so it has a "medium" length. Make sure the plane is moving, then adjust the blue vector so the plane does not move. What must be true about the two vectors to make this happen?

They must be going the exact same direction and must be the same length  
2c) Adjust the red vector so that it is somewhat short, and pointed straight up. Then adjust the blue vector so that it is a little longer than the red one, and pointed straight down. Record what direction the plane is moving AND explain why.

The plane is going downwards, but moving slight to the side. It is moving slightly to the side because the hurricanes force is pushing slightly on it causing it to move.  
2d) Adjust the red vector so that it is somewhat short, and pointed straight up. Then adjust the blue vector the same length, but pointing to the right. Record what direction the plane is moving AND explain why.

The plane moves at a forty five degree angle because the two forces working on it are equally pushing it.

[Vector Applet #3](http://phet.colorado.edu/sims/vector-addition/vector-addition_en.html) Grab two vectors from the bucket and familiarize yourself with what you can do.

**Directions:** After adjusting the lengths and directions of your two vectors, click the "sum" box to create the resultant vector (green) of the two vectors you are adding together (red).

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| http://www.wvsd208.org/hs/Staff/nolld/phys/webquests/vector.jpg | 3a) Move the three vectors around to make a triangle. Draw a picture your diagram and label the red vectors that are being added together, and green vectors that is their sum. 3b) Now label the green arrow as the "resultant" vector. That's the sum of the two red vectors. 3c) Notice the "tips" and "tails" of each vector, how MUST the two red vectors be connected to correctly add them? They must be pointing two different directions from the same place. 3d) Are there TWO different ways to correctly add the two red vectors? Draw both. 3e) Is the resultant the same in both situations?  3f) Draw the two WRONG ways to add the two red vectors. 3g) Define in words the correct way to add vectors. (ie. connect the "tip" to the... etc.) |

