VELOCITY AS A VECTOR

Velocity as a Vector

We have seen that vectors can be used to effectively represent forces acting on an object. Another useful application of vectors is that of velocity. Recall that velocity is speed in a direction.

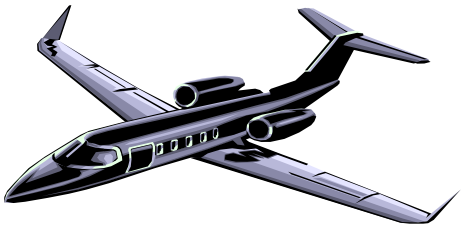
When a vector is used to represent a velocity, the magnitude of the vector represents the speed and the direction of the vector represents the direction of motion.

When a boat or aircraft is steered toward a specific direction, that direction is called the **heading**. This direction is measured by the **clockwise angle made with the north direction**.

- When a plane flies, its velocity relative to the ground is the resultant of:
    1) the plane's velocity through still air
    2) the velocity of the wind

- Similarly, a boat's actual velocity relative to the shore is the resultant of:
    1) the boat's velocity in still water
    2) the velocity of the current

Example
A plane leaves an airport and flies on a heading of 055° with an airspeed of 400 km/h. A wind is blowing N30°E at 35 km/h. Find the ground speed and direction of the aircraft.



Example

A canoeist who can paddle at a speed of 5 km/h in still water wishes to cross a river 400 m wide that has a current of 2 km/h. If he steers the canoe in a direction perpendicular to the current, determine the resultant velocity. Find the point on the opposite bank where the canoe touches.