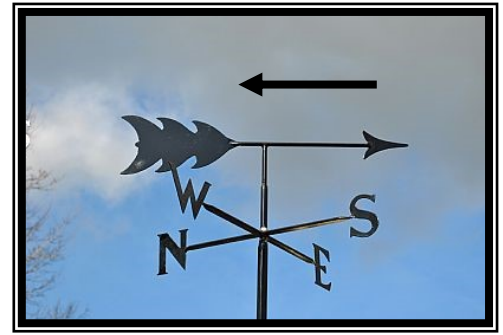


The Science Behind Wind/ Weather Vanes and Windsocks

What is a wind/weather vane?

A wind vane or weather vane is a tool for measuring wind direction. It has two parts: the tail and a pointer (usually an arrow, but it doesn't have to be). It spins in the wind and points in the direction from which the wind is coming from.



Why doesn't it point in the direction where the wind is blowing to?

If you ever made a wind vane and a windssock and put them next to each other on a windy day, you might be fascinated to discover that while the windssock points in the direction the wind is blowing to, the wind vane does the opposite. It points in the direction the wind is blowing from! So if the wind is blowing from the north. The wind vane would point toward the north, and the windssock would be point south.

You might remember the concept of a path of least resistance from your school physics class. The same principle applies here. The point of least resistance points into the wind. The tail of the wind vane is bigger than the front, making the front end the point of least resistance. For the wind vane to work correctly, the weight on each figure 'side to side' of the vane must be of equal weight. However, the area of the figures on the 'opposite ends' of the vane must be unequal, forcing the point of least resistance to face into the wind.

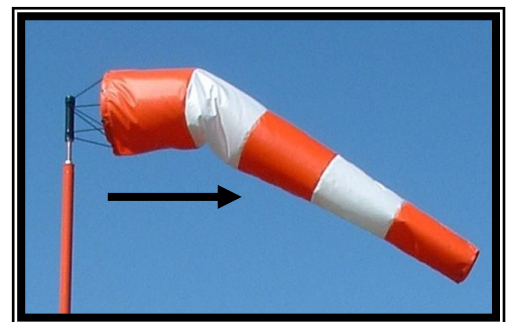
A wind vane has many names. You might have heard weathervane or weathercock. The word "vane" comes from the Old English word "flag" because original vanes were fabric banners attached to medieval towers to show the direction of the wind. It is one of the first weather tools ever used. As long as there were farmers and fleets, fishermen and armies, there was a need to know where the wind is coming from.

Research this...

- How could knowing the direction of the wind help farmers and sailors? And why would an airplane pilot use a wind sock?

What is a wind sock?

Windssocks are used to tell wind speed and the direction of the wind speed itself. Windssocks typically are used at airports to indicate the direction and strength of the wind to pilots and at chemical plants where there is risk of gaseous leakage. They are sometimes located alongside highways at windy locations.



Unlike wind/weather vanes, wind socks will move in the direction that the wind is traveling to. The aerodynamics of a windssock are complex but basically they involve compression. The compression is very small but it is enough to force the sock up and out. When wind enters the sock at the large end it is forced down the tapered tube. As the tube gets smaller, the pressure and speed of the wind is increased. This pushes out on the walls of the sock making it stick straight out. It also causes some turbulence inside the sock that makes it flutter. Having a large opening and smaller exit gives the wind sock all the features it needs to act like a funnel for wind, increasing its velocity and force to keep the sock "inflated" and at an angle above the surrounding winds.