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About Rockets

Start Your Journey

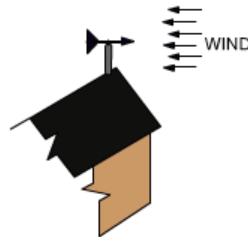
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START YOUR JOURNEY

Welcome to Rocket Research 102

Stability - Weathervane



Weathervanes point in the direction of the wind. How do they accomplish this? Which is the best answer?

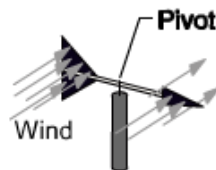
- a) They are shaped like arrows, or
- b) They have a large surface area on one end of the weathervane.

If you answered either (a) or (b), you are correct. The key point, however, is contained in answer b. The large surface area is located BEHIND the pivoting point of the weathervane.

What is the pivot point of a rocket?

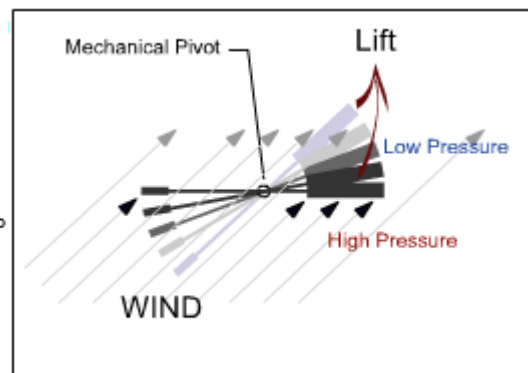
When the wind hits the weathervane, the greatest force is on the largest surface area. So the big fins in the picture to the right will be pushed AWAY from the wind. The arrow then pivots so that the small end points into the wind.

The physics of a weathervane is presented in this diagram.



The wind force will be greatest against the largest surface area. The weathervane will swing about its pivot until the force on the surfaces is minimized--when the arrow points directly into the wind.

If you want to understand the physics of a weathervane in terms of aerodynamics, consider the following: **wind hitting the large surface area creates a high pressure region.** The opposite side of the large surface sees a lower pressure. Therefore, the large surface gets drawn into the low pressure region (in this diagram that would be upward). That's called "lift." The small arrow at the front also experiences "lift." But because it's much smaller than the back surface, the largest



TOP VIEW