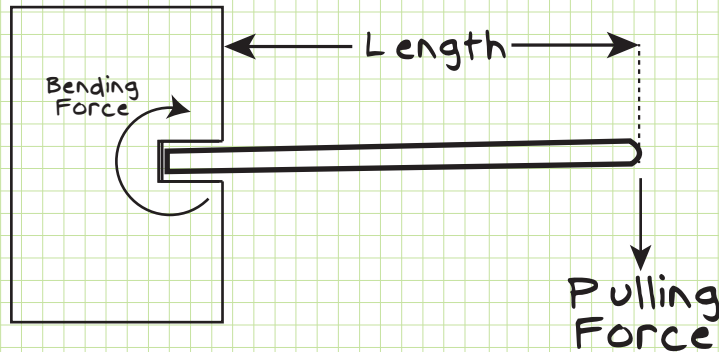


Educator Information

Why does it feel easier to bend a long wire and harder to bend a short wire?

The answer lies in Engineering Mathematics. This solution can be explained with the easiest math problem in engineering. From measuring forces it was shown that the bending force is simply a multiple of the pushing force and the length of your wire.



$$\text{Bending Force} = \text{Length} \times \text{Pulling Force}$$

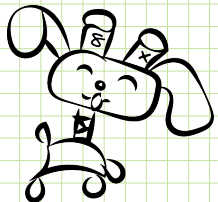
For example, if you have a wire that is 4 inches long and you push on it with 2 pounds force, you create 8 pounds bending force.

$$\text{Bending Force} = \underset{\text{(Length)}}{4} \times \underset{\text{(Pulling Force)}}{2} = 8 \text{ pounds Bending Force}$$

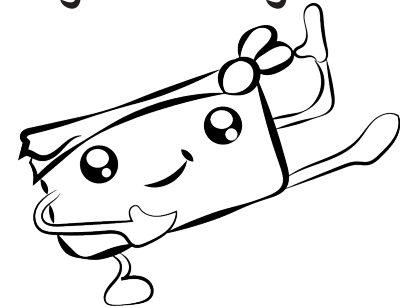
Now if you double the length to 8 inches long and you push on it with the same force, 2 pounds force, you double the bending force! That is why it is easier to bend the longer piece of metal.

$$\text{Bending Force} = \underset{\text{(Length)}}{8} \times \underset{\text{(Pulling Force)}}{2} = 16 \text{ pounds Bending Force}$$

You are using leverage to do the work, rather than extra energy or force. Try it, you will feel the difference!



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Why is this lab so cool?

Engineering intuition can only be gained by experience. You don't even have to do math to gain engineering intuition. By thinking about how they are bending the metal, this lab will get students thinking about the world around them in a different way. Where is it best to hold a hammer? you get more swinging force if you hold it further down on the handle. Understanding this simple math problem is the basis for designing how strong the foundation of a tall building needs to be, how strong the base of an airplane wing needs to be, or how to design an overhanging balcony. It's as easy as 4×2 ! Watch as your students get excited about bending stuff with blocky!