

PHYZ SPRINGBOARD: TORQUE



Consider the following findings about **torque**. The “torque-o-meter” consists of a vertical bar with three holes in it. Through one hole, a rope is attached. The base of the bar is its axis of rotation. But instead of rotating when a torque is applied, the torque-o-meter measures the torque.

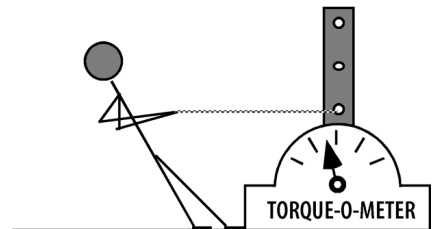
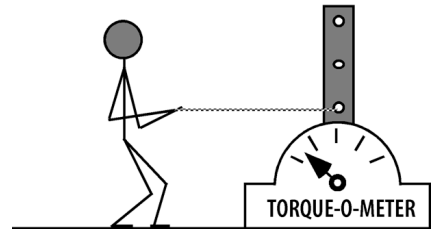
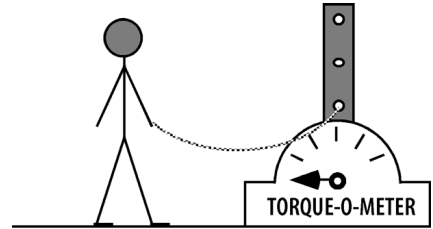
1. Force

a. When no force is applied to the bar, **no** torque is found.
(By the way, what is the name of the curve formed by the drooping rope?*)

b. When some force is applied, **some** torque appears.

c. When more force is applied, **more** torque appears.

d. What does this indicate about torque?



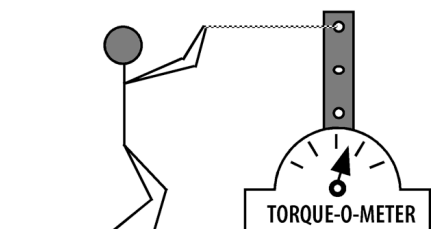
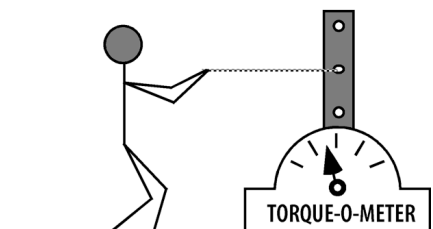
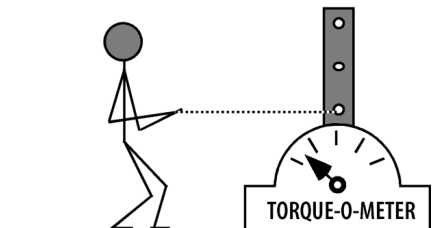
2. Distance between axis and force

a. When a force is applied close to the axis of rotation, **some** torque is found.

b. When the same force is applied farther from the axis of rotation, **more** torque appears.

c. When the same force is applied even farther from the axis of rotation, **even more** torque appears.

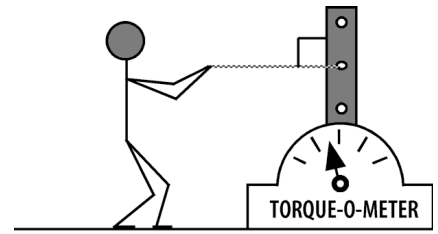
d. What does this indicate about torque?



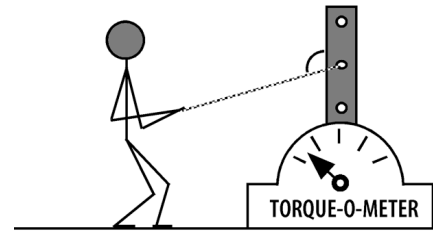
*No, it's a catenary.

3. Direction of force

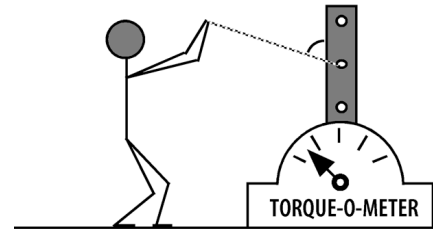
a. When a force is applied perpendicular to the bar, **some** torque is found.



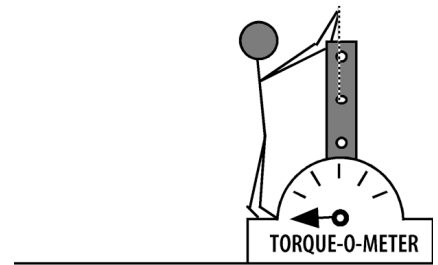
b. When the same force is applied at an obtuse angle, **less** torque appears.



c. When the same force is applied at an acute angle, **less** torque appears again.



d. When the same force is applied at a zero angle, **no** torque appears.



e. What does this indicate about torque?

4. Considering all the factors, how could the greatest torque be applied and measured on the torque-o-meter? Describe the conditions and draw the picture.

5. What factors determine torque and how is each related to torque?