



## THE CASE OF THE STRONGEST CORD

People use cordage (rope, string, line) for many purposes such as in fishing, boat rigging, carrying loads, climbing, hauling and lashing. Picking the right cordage for the right job requires knowledge of tensile strength (or breaking strength), stretch, flexibility, abrasion resistance and durability. If you will be using the rope with your hands, then the way the rope feels in your hand is important too!

Rope manufacturers use special machines called tensile test machines that pull rope in opposite directions. The machine records the breaking point of the rope—we can think of the breaking point in kilograms or pounds of force on the rope. We don't have a tensile test machine, but there is another way we can test breaking point of cordage using scales and weights. Can you design a testing device in class?



Climbers test rope strength using a drop test. Climbers want to be sure their safety lines will hold their weight in case they fall! For a rope to pass the drop test, it must not break after five test falls. A weight is attached to the rope and the rope is dropped a specific number of meters. Can you design a drop test for our cordage materials in class?

To test for abrasion resistance, the cordage needs to rub against a rough surface. You could pass a length of cordage over sandpaper fixed to the edge of a desk, load the cordage with a weight, and then rub the cordage back and forth across the edge. Record the number times you rub the cordage back and forth before it breaks.

Another important quality to think about is knot strength. How well does your cordage hold a knot? Test this by knotting two pieces of cordage together and loading the cordage with weight. Be sure to use the same knot for each trial of an experiment. Does wetting the cordage affect knot strength? How?

To discover how much cordage stretches, measure the length of your cordage. Then tie a weight to the cordage, allow the cordage to hang for a set amount of time, and then



measure the length of cordage again. What is the difference in length before and after hanging weight to the cordage?

- ✓ What would you like to find out about cordage? Decide on one or two variables you would like to test and design an experiment using Learning Log sheet 3 to guide you.