

Up, Up, and Away!

Pulley Lab

Problem: How do pulleys help you do work?

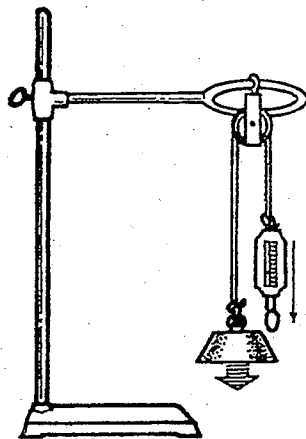
Materials per group:

- ring stand and ring
- spring balance calibrated in newtons
- weight
- string
- single pulley

Procedure:

1. Tie one end of a small piece of string around the weight. Tie the other end to the spring balance. Weigh the weight. Record the weight in newtons. Untie the string and weight.
2. Attach the ring about one half to three fourths of the way up the ring stand.
3. To construct a single fixed pulley, hand the pulley directly onto the ring as shown.
4. Tie the weight to one end of a string.
5. Pass the other end of the string over the pulley and tie it to the spring balance.
6. Pull down slowly and steadily on the spring balance and record the force needed to raise the weight.
7. To make a single movable pulley, tie one end of a string to the ring.
8. Pass the other end of the string under the pulley and tie it to the spring balance as shown.
9. Attach the weight directly onto the pulley.
10. Raise the weight by pulling the spring balance upward. Record the force shown on the spring balance.

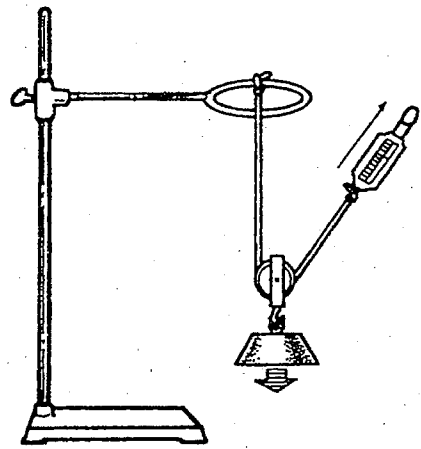
Fixed Pulley



F_R _____

F_E _____

Movable Pulley



F_R _____

F_E _____

Observations:

1. How much force was needed to lift the weight using the fixed pulley? _____
2. How much force was needed to lift the weight using the movable pulley? _____

Analysis and Conclusions:

1. How does a fixed pulley help you do work? _____

2. How does a movable pulley help you do work? _____

3. What could you do to lift an object with greater ease than either the fixed pulley or the movable pulley alone? _____

4. Using what you learned about pulleys, figure out how many movable pulleys you would need to lift a 3600 N boat using a force of 450 N. _____

5. How can you increase the efficiency of a pulley? _____
