Developing Experiments about spring constants

The spring constant, k, of an ideal spring is defined as the force per unit length and differs from one spring to another. It can be measured in both a static (motionless) and dynamic (in motion) systems. Different techniques are used to determine the spring constant in these situations. In static determinations, Newton’s 2nd Law can be applied to equilibrium positions and in dynamic systems laws of periodic motion apply.



A spring that can be assumed to be ideal hangs from a stand, as shown above.

1. You wish to determine experimentally the spring constant k of the spring in a static (motionless) situation.

a. What additional, commonly available equipment would you need?

b. What measurements would you make?

c. How would k be determined from these measurements?

2. You wish to determine experimentally the spring constant k of the spring in a dynamic (moving) situation.

a. What additional, commonly available equipment would you need?

b. What measurements would you make?

c. How would k be determined from these measurements?

3. You are curious about the effects of combining springs together in series (attached end to end), and parallel (next to each other).

a. Make a prediction about how attaching two springs together in series would affect the spring constant of the entire length of the new spring.

b. Develop an experiment that could test your theory.

c. Make a prediction about how attaching two springs together in parallel would affect the spring constant of the new spring pair.

d. Develop an experiment that could test your theory.