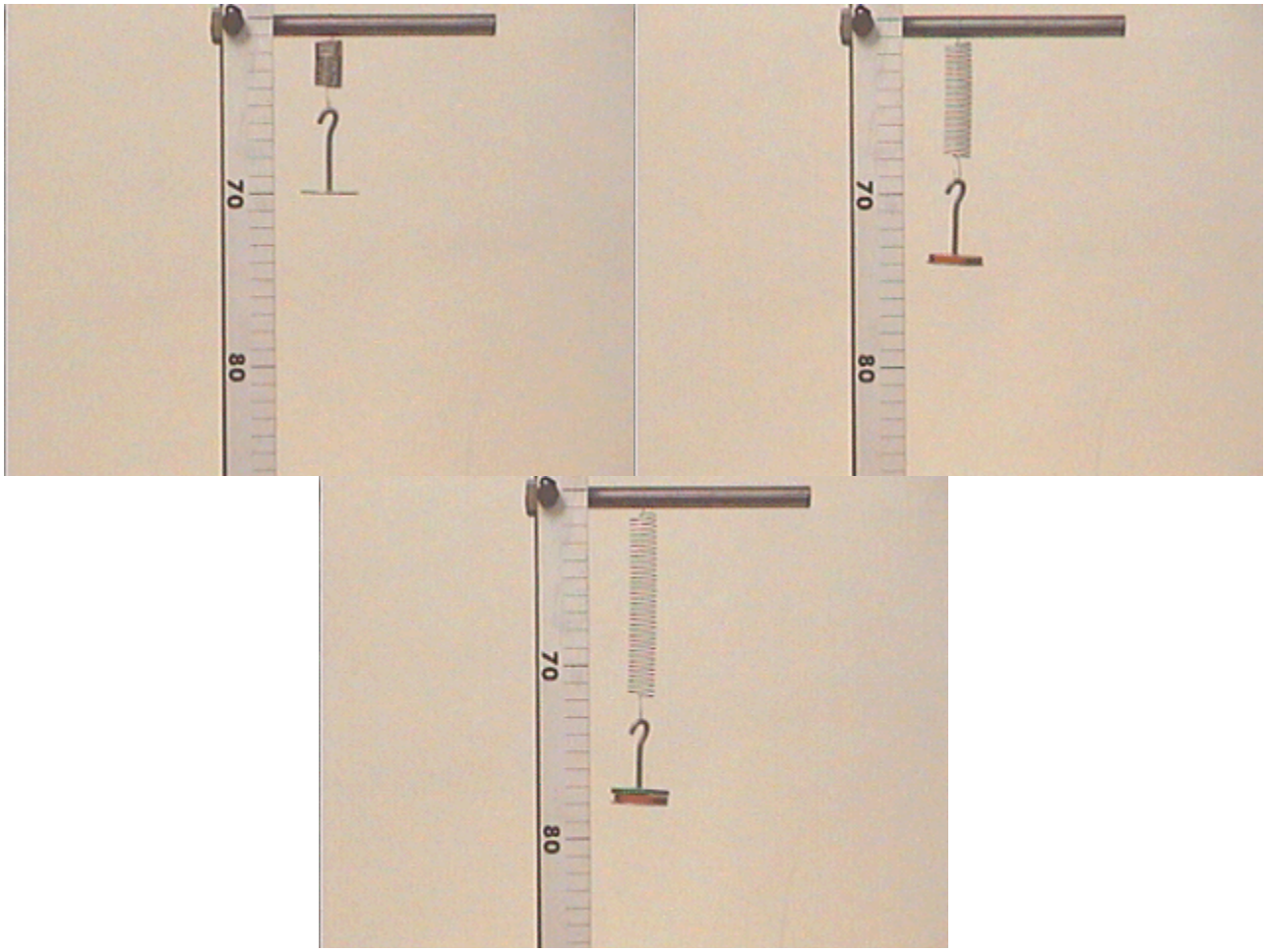
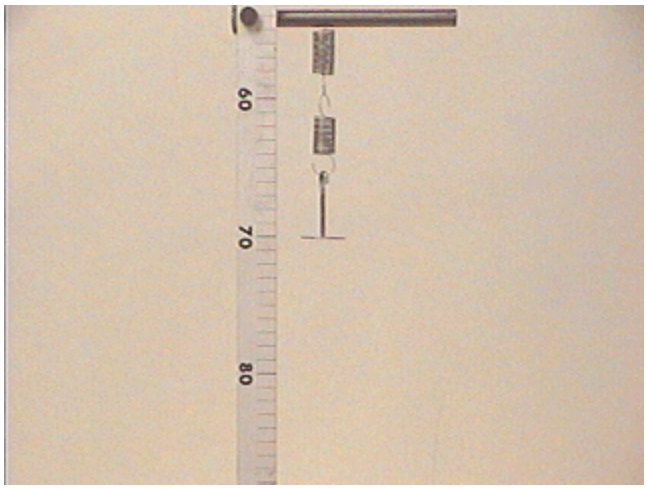
Question #176

This week we have a two-part question regarding series and parallel springs. In the photograph at the left below is a setup to measure the stretch of a simple spring hanging from a fixed point when a known amount of weight is supported by the spring. With one unit of mass (20 grams) hanging from the spring the spring becomes extended by about 4 cm, as seen in the photograph at the center. With two units of weight (40 grams) hanging from the spring it is extended by about 8 cm, as seen in the photograph at the right. In each case the reference point at which we are making the measurement is the bottom of the weight hanger. This sequence of measurements demonstrates that this spring obeys *Hooke's law*: the amount of extension of the spring is proportional to the amount of force, or the weight hanging on the spring.



Part 1:

Suppose that two identical springs were connected in series as seen in the photograph below.



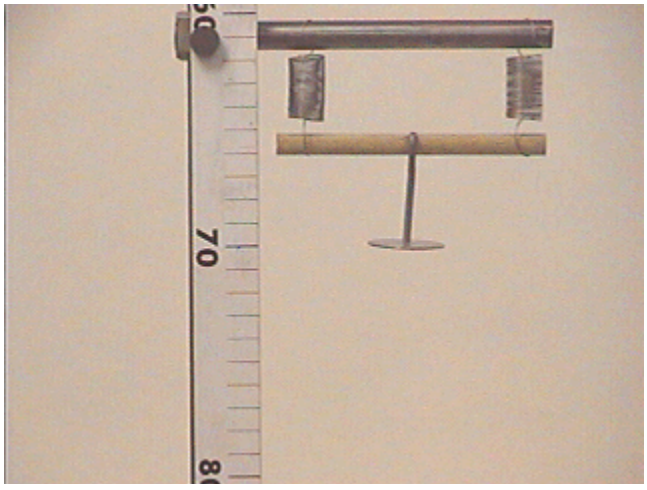
If the same two units of mass were hung on the bottom of the series springs in the photograph, where would the bottom of the weight hanger be? You are to determine a number for the extension of the spring, and from that number you are to determine *where* the bottom of the weight hanger will be located.

Hanging 40 grams of weight on the series spring arrangement will cause the bottom of the weight hanger to move to the location:

- (a) 74 cm.
- (b) 78 cm.
- (c) 82 cm.
- (d) 86 cm.

Part 2:

Suppose that two identical springs were connected in parallel as seen in the photograph below.



If the same two units of mass were hung on the bottom of the parallel springs in the photograph, where would the bottom of the weight hanger be? You are to determine a number for the extension of

the spring, and from that number you are to determine *where* the bottom of the weight hanger will be located.

Hanging 40 grams of weight on the parallel spring arrangement will cause the bottom of the weight hanger to move to the location:

- (a) 74 cm.
- (b) 78 cm.
- (c) 82 cm.
- (d) 86 cm.

Click here for Answer #176 after February 23, 2004.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.