

Unit 4G Spring Potential Energy *Practice Problems* 

Date:

Name:

Work each of the following problems. SHOW ALL WORK.

1. A 20 N force is necessary to stretch a spring 0.5 m. What is the spring constant of this spring?

2. A spring has a spring constant of 25 N/m. What force is necessary to stretch the spring 0.2 m?

3. A 40 N force is applied to a spring with a spring constant of 100 N/m. How far can this spring be compressed by this force?

4. A spring with an unknown spring constant is hung vertically, and a 200 g mass is attached to the bottom. If the spring stretches 0.25 m from its resting position to the position at which the hanging mass is in equilibrium, what is the spring constant of this spring? Draw a free-body diagram for the hanging mass.



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5. A spring with a spring constant of 20 N/m is compressed 0.5 m. How much energy is stored in this spring?

6. A spring with a spring constant of 100 N/m is stretched 0.2 m. How much energy is stored in this spring?

- 7. A spring is placed horizontally on a frictionless table. The spring constant of the spring is 50 N/m, and it is compressed 0.1 m by a 2 kg block.
  - a. How much energy is stored in the spring?

b. When the spring expands back to its resting position, it pushes the block away. What is the kinetic energy of the block as a result of this force?

c. What is the velocity of the block as it is pushed away by the spring?



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## Work each of the following problems. SHOW ALL WORK.

8. A 1.5 kg block moves at 4 m/s moves along a frictionless horizontal surface. The block slides into a spring with a spring constant of 240 N/m. How far is the spring compressed after the block comes to rest?