Hooke’s Law: Potential Energy

Did you know? Potential energy of an object increases as you increase its elevation, but that is not the only determining factor to the amount of potential energy an object has.

# Investigation Question

When does a spring have the most potential energy?

Prediction

# Procedure Part I

1. Select ​Intro​ activity.

2. Click the ​Applied Force​ checkbox.

3. Click the ​Spring Force​ checkbox.

4. Click the ​Equilibrium Position​ checkbox.

5. Use the claw to pull the spring scale with 50 N of force.

6. Use the claw to push the spring scale with -50 N of force.

7. Return the spring to the equilibrium position.

8. When does the spring have the most stored energy (potential energy)?

Data : Observations

 **Part II**

1. Select ​Energy​ activity at the bottom.

2. Reset the simulation.​

3. Click the ​Bar Graph​ checkbox.

4. Click the ​Applied Force​ checkbox.

5. Click the ​Equilibrium Position​ checkbox.

6. Click the ​Values​ checkbox.

7. Set the ​Spring Constant​ to 200 N/m.

8. Slide the claw back and forth a few times and return it to its equilibrium position.

9. Make observations.

 Data: Observations

10.Use the claw to pull the spring scale to a displacement of 1.

11.Use the claw to push the spring scale to a displacement of -1.

12.Return the spring to the equilibrium position.

13. Record your data of the potential energy of each position in Joules (J).

|  |  |  |
| --- | --- | --- |
| Displacement | Potential Energy | Applied Force |
| 1 meter |  |  |
| -1 meter |  |  |
| 0 meter |  |  |

 **Part III**

1. Click the ​Energy Plot​ checkbox. 2. Chart the data for various spring constant and displacements.

|  |  |  |
| --- | --- | --- |
| Spring Constant | Displacement | Potential Energy (J) |
| 100 | -1.0 meter |  |
| 100 | -0.500 meter |  |
| 100 | 0.500 meter |  |
| 100 | 1.0 meter |  |
| 200 | -1.0 meter |  |
| 200 | -0.500 meter |  |
| 200 | 0.500 meter |  |
| 200 | 1.0 meter |  |
| 300 | -1.0 meter |  |
| 300 | -0.500 meter |  |
| 300 | 0.500 meter |  |
| 300 | 1.0 meter |  |
| 400 | -1.0 meter |  |
| 400 | -0.500 meter |  |
| 400 | 0.500 meter |  |
| 400 | 1.0 meter |  |

 **Conclusion**

1. The spring constant refers to what attribute of the spring?

2. When does a spring have the most potential energy?