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**Unit 2 - Investigation 2**

**Activity 2.1** - *How does potential energy change when an object is pushed or pulled?*

**Introduction**

In the previous investigation, you learned that there are two types of energy–kinetic and potential. In this activity, you will begin to characterize the potential energy of systems and what happens to cause the potential energy to change.

**Part 1: SPRINGS AND TOY CAR/MARBLE**

**Materials**

* springs
* toy car or marble

Explore **stretching** a spring (pulling it apart) and **compressing** the spring (pushing it together).

**Caution**: When pulling the spring, make sure to be gentle. If you pull the spring too much, you can easily deform it. If this happens, the spring will not return to its original shape, and it will be unusable for these activities.

1. What do you feel when stretching and compressing the spring?

2. What evidence do you have that the energy of the spring is higher when you stretch or compress it?

3. Use the spring to push the toy car or marble. Draw two energy graphs: one showing the energy of the car/marble and spring just before releasing the car, and one showing the energy of the car/marble and spring after the car/marble is moving.

4. What evidence do you have that there was potential energy in the system before the car moved?

5. Which part of the system had potential energy before the car moved?

6. To increase the potential energy of the system, what do you have to do to the spring?

7. Springs have a specific length, or “natural” or “rest” position. How does the potential energy of the spring change when you stretch it beyond its natural position? Support your claim with evidence and reasoning.

**Part 2: COMPUTER SIMULATION:** go to the Weebly page and find the link to the simulation

8. To increase the potential energy of the system, what did you have to do?

\*In the simulation, move the spring to increase the potential energy of the system. Then, start the simulation, and make observations while the simulation is running before the spring returns to its natural, or rest, position. Observe the simulation after the spring has stopped.\*

Top of Form

9. Referring to your before, during, and after observations, explain what happens to the energy from the beginning to the end of the simulation.

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10. Based on the observations you made for the previous questions, make a stacked bar graph of the energy before, during, and after the simulation ran.

11. Does conservation of energy apply to the system shown in the simulation? Justify your answer using the simulation.

**COMPUTER SIMULATION LINK:**

<http://lab.concord.org/interactives.html#interactives/interactions/spring.json>