**Vernier Labquest Replacement Investigation**

**Grade**: 6 Kit: SEPUP Issues & Physical Science: Energy **Activity**: 56

**Title of investigation**: Shake the Shot

**Guiding Question**: How can kinetic energy be transformed into another energy type?

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**Summary of activity:** In this activity students further investigate energy transfer and transformation. They add kinetic energy to a system and explore the resulting energy transformation.

**Science Standards**:

6.1.6 Compare and contrast potential and kinetic energy and how they can be transformed from one form to another.

6.1.7 Explain that energy may be manifested as heat, light, electricity, mechanical motion, and sound and is often associated with chemical reactions.

**Equipment used:**

Per group: 1 shaker containing metal pellets (shot)

1 thermometer with shaker cap attached

1 cup with 100 mL of cool water

Vernier labquest and temperature probe

**Description of Procedures, notes (teacher manual)**

Room temperature is taken with the thermometer and/or probe, and recorded in science notebook.

The regular cap is taken off the shaker and replaced with one with the thermometer or probe attached.

Initial temperature of pellets is taken. Initial temperature must be within 2 degrees C of room temperature. If it is more, then inner vial should be removed and immersed in cool water until temperature is within 2 degrees C of room temperature.

Initial temperature information is recorded in data table.

Regular cap is snapped on tightly and the vial is shaken as fast as you can for 10 seconds. The thermometer cap is quickly exchanged and the thermometer or probe is attached. Wait until the alcohol in the thermometer stops moving or the probe stops going up and record the highest temperature. Record the temperature.

Find the temperature change by subtracting the initial temperature from the final temperature. Record the temperature change in the data table.

Repeat two more trials at 10 seconds, calculate the average temperature for the three trials, and record in the table.

Repeat three trials with shaking the vial for 20 seconds.

Repeat three trials with shaking the vial for 30 seconds.

Extensions: Check the accuracy of the thermometer by switching out the thermometer for the probe.

**Scientific Questions:**

For each time interval, why did you perform three trials and then average the temperature?

Describe any possible sources of error in your experiment, and explain how each may have affected your results.

Use evidence gathered in this investigation to describe the relationship between:

a. shaking time and temperature change.

b. shaking time and energy transfer.