Name: _____ Date: _____

The Science of Cannons

Introduction

When a cannon is fired, it relies on various scientific principles, including the Law of Conservation of Energy and chemical reactions. The **Law of Conservation of Energy** states that energy is neither created nor destroyed; it is only converted from one form to another. A **chemical reaction**, also called a chemical change, occurs when one or more substances change into completely different ones. In this activity, you will investigate chemical reactions and energy conversions during cannon firing as you create film canister cannons with Alka Seltzer and water.

Materials

- 35mm Film Canister
- Alka Seltzer Tablets
- Water

Lab Procedure

1. In your group, make a plan for how to fire your film canister cannons. Some things to consider are listed below.
    a. Water: the temperature of the water, how much goes in the canister
    b. Alka Seltzer: half tablet or whole tablet, crushed into powder
    c. General Steps: water added to Alka Seltzer or vice versa
2. Test your plan. Always wear goggles, gloves, and aprons, and ensure the canisters are pointed up.
3. After you have tested your plan, discuss how you can improve it and make a new plan. Some questions to consider are below.
    a. If your cannon did not fire, what can you do differently next test? Choose **one** thing to change.
    b. If your cannon did fire, how can you improve? (Faster, higher, etc.) Choose **one** thing to change.
4. Test your new plan. Always wear goggles, gloves, and aprons, and ensure the canisters are pointed up.
5. Repeat steps three and four as many times as needed.

Reflection

1. Record three observations as the Alka Seltzer dissolves in water.
2. After the Alka Seltzer was placed in water, is this a physical change or a chemical change/reaction? How do you know?
3. Outline how dissolving the Alka Seltzer in water can cause the cap of the film canister to pop off.
4. List the types of energy you observed before, during, and after the Alka Seltzer was placed in the water.
5. Compare and contrast the firing of a real cannon and the film canister cannon.