Activity 6: What is Form and Function?

Structured Inquiry – Students apply concepts from previous activities to explain relationship between form and function.
Concepts: Engineering process.

Activity 7: Engineer Your Rocket

Guided Inquiry – Design Alka-Seltzer rocket and launch it.
Concepts: Engineering process.

Activity 8: Redesign and Launch

Guided Inquiry – Students redesign and launch their rockets and collect data about the performance of the rocket
Concepts: Engineering process.

Activity 9: What Goes Up Must Come Down

Structured Inquiry – Students extend their understanding of the force of gravity.
Concepts: Effects of the force of gravity.

Activity 10: What Might Effect Gravity

Structured Inquiry – Students compare rate of fall and their understanding of the force of gravity.
Concepts: Air resistance.

Activity 11: Rhythms of Gravity

Guided Inquiry – Students observe and compare rate of fall of several objects.
Concepts: Air resistance.

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Activity 2: Alka-Seltzer in Water

Activity Description

In this activity, you will investigate the reaction of Alka-Seltzer with water – the action of an effervescent antacid tablet (Alka-Seltzer) with water was responsible for the reaction (launch) of the rocket you observed earlier.

Materials Needed

- 1 effervescent antacid tablet (Alka-Seltzer works well, other brands are available)
- 1 clear container
- water
- pH indicator (or litmus paper)

Explore

Pour tap water into the clear container. Using the pH indicator, determine whether the water is an acid, base or neutral.

Drop the effervescent tablet into the water and observe what happens.

After any reaction stops, determine whether the solution is acid, base or neutral.

Explain

2a. Go to page 113 of the SDR and answer question 2a.

Action and Reaction

A chemical reaction took place when the effervescent antacid tablet (a chemical) was added to water (another chemical). One of the new substances made when the effervescent antacid (Alka-Seltzer) tablet and water react is carbon dioxide gas. The bubbles you see are the carbon dioxide. It is the pressure of the carbon dioxide inside the film canister that causes the rocket to flip its lid and launch (kinetic energy). This build up of gas and pressure (action) causes a reaction (the launching of the rocket).

This action/reaction is known as Newton's Third Law of Motion.

To investigate some other physical and chemical changes in matter, visit the websites below.

www.chem4kids.com/files/matter_chemphys.html

www.brainpop.com/science/matter/propertychanges/preview.weml

Explain

2b. Using the information about action and reaction, go to page 113 of the SDR and answer question 2b.

It's About Energy

This module, *3-2-1 Lift Off*, is all about energy. It took energy to launch the rocket. Where did it come from? Well, energy can be stored in chemicals and is called potential energy (PE). The Alka-Seltzer and water both contain potential energy. When that energy is converted (chemical reaction) into motion of the rocket it is called kinetic energy (KE). Potential energy is waiting to be converted into kinetic energy.

Petrol in a fuel tank, food in your stomach, a compressed spring and a weight hanging from a tree are all examples of potential energy. When you lift an object higher, it gains potential energy. The higher you lift it, and the heavier it is, the more energy it gains. For example, if you lift a bowling ball three centimetres in the air and drop it on the roof of your car, it won't do much damage (please, don't try this). But if you lift the ball up thirty metres and drop it on your car, it will put a huge dent in the roof. The same ball dropped from a greater

Activity 3: Temperature and Dissolving Time

3a. Prediction:

If the temperature of the water is _____ then the dissolving time of the tablet will _____ because _____.

3b.

Dissolving Time of Table in Different Water Temperatures			
Cup	Description of Water Temperature	Temperature of Water (C°)	Dissolving Time (seconds)
A	Cold		
B	Room Temperature		
C	Hot		

3c. What was the independent variable (variable you changed on purpose) in this investigation? What was the dependent variable (the effect that was measured or counted)?

_____

_____

_____

_____

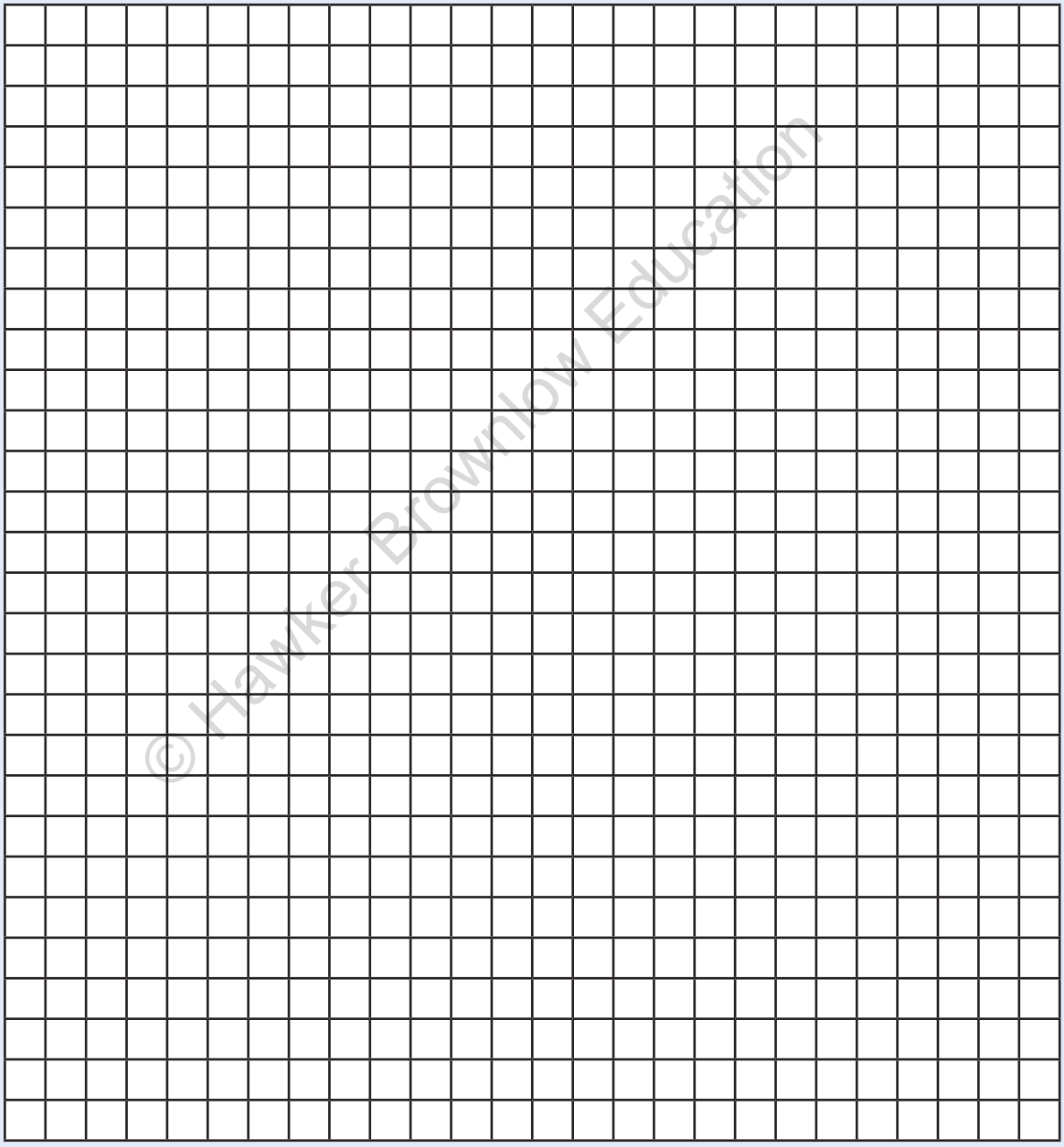
_____

_____

_____

3f. A bar graph is used to show counting data – in this case total time. Bar graphs show comparisons of data. Create a bar graph that shows how the total time it took for the tablet to dissolve changed as the temperature of the water changed. Be sure to:

- **include a title that tells what is being displayed on the graph.**
- **number the y axes in even intervals (by 1s, 2s, 5s, 10s, 20s, etc).**
- **label the x and y axes.**
- **plot the data from the data table carefully.**



Activity 8: Engineering Your Rocket – Redesign and Launch

8a. Based upon your first tests, it is now time to redesign and build your final rocket. Show how your redesign will look in the space below.

8b. What changes did you make?