Sugar Shake Weathering Lab

Objective:

To model the effects of mechanical weathering by using sugar cubes to simulate rock breakdown due to physical forces.

Materials:

- 4 sugar cubes per group
- Small plastic container with a secure lid (or a resealable plastic bag)
- Timer or stopwatch
- Paper towel
- Data recording sheet

Procedure:

1. Before beginning, use the marker to draw a line on all edges of the sugar cubes. This will help to better observe any changes in the sugar cube.
2. **Observation:** Examine and describe the sugar cubes before the experiment. Record their shape, size, and texture.
3. **Shaking (Mechanical Weathering Simulation):**
    - Place 4 sugar cubes inside the plastic container.
    - Close the container securely.
    - Shake the container for **30 seconds** and record observations on chart.
    - Shake for another **30 seconds** (total: 1 minute).
    - Record how the sugar cubes change over time.
4. **Collecting Data:** Carefully open the container and observe the sugar cubes and any sugar dust or fragments. Record observations in data table.
5. **Repeat:** If time allows, continue shaking in 30-second intervals up to 2 minutes, recording observations after
6. each interval.

Data Table:

Time Shaken	Shape Changes	Size Changes	Presence of Sugar Dust/Fragments
0 sec (Start)			
30 sec			
1 min			
1.5 min			
2 min			

Analysis Questions & Answer Key

1. **What changes did you observe in the sugar cubes as you shook the container?**
   Answer: The sugar cubes became smaller, developed rounded edges, and created sugar dust and small fragments.

2. **What force does the shaking represent in nature?**
   Answer: The shaking represents mechanical weathering caused by natural forces like wind, water movement, ice, or rock collisions in rivers or landslides.

3. **What do the fragments and sugar dust represent in nature?**
   Answer: The fragments and dust represent the sediment that is a result of weathering.

4. **Identify the independent variable in this experiment.**
   Answer: The amount of shaking (time or number of shakes).

5. **Identify the dependent variable in this experiment.**
   Answer: The amount of sugar lost (change in size and shape of the sugar cubes).

6. **Identify at least two constants in this experiment.**
   Answer: The type of container, the number of sugar cubes, the shaking method, and the time the sugar is shaken.

7. **How does this experiment model mechanical weathering in real life?**
   Answer: This experiment simulates how rocks break down due to physical forces like wind, water, or glaciers grinding against them, similar to how the sugar cubes break into smaller pieces without changing their composition.

8. **If you were to change the type of material inside the container (e.g., using small rocks instead of sugar cubes), how might the results differ?**
   Answer: The rocks would likely break down much slower than sugar cubes because they are harder and more resistant to mechanical weathering.

Key Concepts:

- **Mechanical weathering** occurs when rocks break down due to physical forces like wind, water, or ice without changing their chemical composition.

- The sugar cubes represent rocks, and shaking simulates forces such as river currents, waves, or wind abrasion.

- The sugar fragments and dust represent sediments that occur as a result of weathering.