



"Eggs"periments with Vinegar

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In this activity, students observe chemical reactions as eggshells dissolve in vinegar, and calcium acetate crystals grow. These crystals will look botryoidal (bumpy – like a bunch of grapes or popcorn).



Materials

- 250 mL pickling or extra-strength vinegar (7% acetic acid) – more or less may be used depending on the quantity of solid material to be dissolved. If using white vinegar (5% acetic acid), increase the volume to dissolve the required amount of material.
- 3 or 4 eggshells – small bits of gravel, limestone pebbles, chalk, marble chips, or calcite can be substituted
- Clear 500 mL plastic tub

Procedure

1. Pour the pickling vinegar into the plastic tub.
2. Crush the eggshells and add to the liquid—smaller pieces speed the process.
3. Observe the immediate reaction for five minutes. Note: Pickling vinegar will create immediate gas bubbles (carbon dioxide) that float small eggshell pieces to the surface. White vinegar will not have such a pronounced effect, but over a few days there will be visibly less eggshell.
4. Leave the container undisturbed in a warm spot and observe changes every few days. Evaporation and deposition will occur. Botryoidal crystal shapes will form on the sides of the tub.
5. Keep a journal, draw diagrams, or take digital photographs documenting the change.
6. Observe until no liquid remains in the container (about three weeks).
7. Optional: Measure the weight of the initial liquid and solid and compare to that of the final product.

Objectives

- To observe and understand the concept of chemical change—i.e., liquid dissolves solid rock, calcium carbonate reacts with acetic acid to release carbon dioxide.
- To develop scientific skills such as observing, predicting, concluding, journaling.
- To learn the scientific method of experiments.
- To learn new scientific terms: acid, dissolve, carbon dioxide, acid rain, scientific method, variable, surface erosion, evaporate, liquid, solid, gas, deposit, crystals, botryoidal, calcium, calcite.



Content Applications

Water that is acidic (rain, fog, snow) can dissolve exposed rock. This is called surface erosion. In our urban environment, it affects limestone buildings, marble statues, and other man-made structures. In the natural environment, exposed rocks become pitted, and groundwater carries dissolved minerals to other areas, affecting the rock cycle and other natural processes.

Extension Activities

Change the look of the crystals

- Place a rock in the container for crystals to grow on, or add coloured chalk bits to the liquid.

Change the acidic liquid

- Test a variety of acidic liquids such as different juices, pop, and coffee. Note: These liquids have other active ingredients that might colour the crystals, and additional organic "sludge" will attract fruit flies.

Change the material to be dissolved

- Try rocks, minerals, and other items containing calcium: marble (broken tiles), limestone (crushed gravel), calcite, apatite, chalk, bones, old teeth, seashells.