Source: Reprinted from **Life on a Coral Reef: Marine Science Curriculum, Grades 7- 9.** The Seattle Aquarium . Used with permission.

15. MAKING CORAL SKELETONS

Objectives:

1. The student will understand that the raw materials of coral skeletons are contained within sea water.
2. The student will realize that the coral polyp has the ability to extract these raw materials from sea water, and to produce a solid substance.

Materials:

One cup white vinegar in glass container.
One stick white blackboard chalk, broken into several pieces.
One cup tap water in glass container.
Six teaspoons baking soda.
A two-cup capacity glass container.

Teacher Preparation:

1. In nature, lime (composed of calcium and oxygen) is dissolved in sea water. A coral polyp extracts this lime from the surrounding water, combines it with carbon and oxygen within its cells, and produces aragonite, a form of calcium carbonate ($CaC0_3$). Thus, the clear sea water provides substance for the construction of solid white material by the coral.
2. In this demonstration, we suggest how corals are able to produce calcium carbonate from clear sea water. Although we cannot duplicate, in the classroom, the exact process by which corals extract lime from sea water, we can show that the materials for making coral skeletons exist in the clear sea water.

Procedure:

1. Mix one cup white vinegar with one stick of white blackboard chalk, broken into small pieces. Let stand for two hours. Pour off and save the clear liquid. The remaining chalk can be discarded.
2. In another container, mix one cup tap water with six teaspoons baking soda. Stir occasionally for 15 minutes. Let settle. Pour off and save the clear liquid. Any remaining baking soda can be discarded.
3. Combine the two clear liquids in a glass container. A white precipitate will form and settle. This mixing process represents a coral polyp extracting calcium from the sea water, combining it with carbon dioxide, and producing aragonite, the hard white material of coral skeletons.
4. If the mixture does not become cloudy, add more baking soda solution until a precipitate forms.
5. Let the mixture stand until the white precipitate settles. This white material represents the white coral skeleton produced by the coral polyp.
6. If desired, the liquid can be poured off, and the white precipitate dried to show its solid nature. This dried material can be further tested. Calcium carbonate, the substance of coral skeletons, reacts with week acid (such as vinegar). After explaining this to the students, add a small amount of white vinegar to the precipitate, and observe the fizzing reaction. This reaction demonstrates that the material is indeed calcium carbonate.
7. Discuss the chemistry of these reactions.

Correlation to National Standards from McREL (http://www.mcrel.org) :

Life Sciences

5. Understands the structure and function of cells and organisms
6. Understands relationships among organisms and their physical environment

Physical Sciences

8. Understands the structure and properties of matter