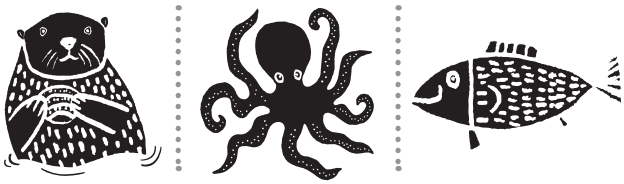
Shell Dissolving activity



SEATTLE AQUARIUM

Ideal group size:
Groups of three to four students

Suggested grades:
4th & up

Venue:
Classroom

Time:
Prep shells two days in advance

Activity time:
20 minutes

Materials needed:
- White vinegar
- Water
- Glass beakers or other non-reactive containers of the same size
- Shells
- Heavy books

Space:
Desk clusters or lab benches

Goal:

Demonstrate the effects of ocean acidification (OA) on the shells of marine invertebrates. As increased CO2 is absorbed by the ocean, the water becomes more acidic. This is causing the shells of animals such as mussels and clams to begin to degrade and break apart.

Setup:

Two days before the activity:

1. Mix 1 cup of vinegar and 1 cup of water in a glass container.
2. Put 2 cups of water into another glass container.
3. Place shells of the same size and type in each container—shells should be small and thin such as mussel, scallop or clam.

Day of activity:

1. Remove shells from the solutions, rinse and dry.
2. Divide the shells, both degraded and un-degraded, evenly among the student groups.
3. Provide heavy books for each group.

Instructions:

Two days before activity:

1. Review a few questions with the students before introducing the activity.
    - Why do soft-bodied animals need a shell?
    - What will happen to these animals if their shells are degraded?
    - How is CO2 getting into ocean water, and what are some implications of an ocean increasing in acidity?
2. Place the shells in both the vinegar/water solution and the plain water. Have students observe what happens to the shells in the acid. Have them discuss why the bubbles are being generated and what the bubbles are composed of.

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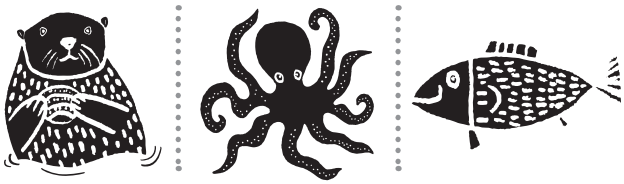

Day of the activity:

1. Give each group of students a few of both the degraded and non-degraded (control) shells. The shells should be from the same species of shellfish and of similar size.
2. Have students place heavy books on top of both degraded and non-degraded shells to compare the strength of each. Students should only test the same kind of shells against each other and the books should be the same for both the experimental and control shells.
3. Lead the students in a discussion of what implications ocean acidification may have on shellfish and how that factors into the food web.

Alternatives:

If you can't get shells, you can do a demonstration using chalk or TUMS® tablets (both are composed of calcium carbonate); just make sure you buy chalk without a lot of additives. Set up an experiment with a control beaker of water, a beaker of half water and half vinegar, a beaker of vinegar, a beaker of half water and half seltzer, and a beaker of seltzer. Drop the chalk or TUMS into these solutions and watch what happens over time. Bubbles should appear as the TUMS or chalk dissolve in the acidic solutions.