



What is a Coral Skeleton Made of

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conservationtales.com/coral



Grade Levels: 3-8

Timeline: 15 min prep + 2 days waiting time

Materials:

- Piece of a coral skeleton
- Glass jar or beaker with lid
- Distilled white vinegar

Driving Question: *Besides calcium carbonate, what makes up the skeleton of a coral?*

Objectives:

- I can experiment with natural ways to dissolve calcium.
- I can describe the changes in the physical characteristics of an object.
- I can explain the results of my experiment.

Background Information

Have you ever held a piece of dead coral? If you have, know that it feels very hard, like a rock! That's because it made of a chemical called calcium carbonate – the same chemical as limestone! But that piece of coral is not JUST made of calcium carbonate! It has other substances that make a coral skeleton a lot like your bones. In this experiment, you can create a simple chemical reaction to remove the calcium carbonate and observe the material that is left behind!

****Important! DO NOT collect live coral or pieces of dead coral you find at the beach! In most places, coral and coral skeleton pieces are protected by law! Please use an old piece of coral you may have. This activity with permanently change the coral, and it will likely not keep for very long.**

Background:

Calcium carbonate (CaCO_3) is a common substance! Limestone is made of calcium carbonate, so we can find it in gravel, many stones used for construction and landscaping, and even in cement! (Cement is made by grinding limestone into a fine powder!). But did you know that limestone is actually the fossilized skeletons and shells of ocean animals? Coral is one of those animals!

Corals make their hard skeletons by taking calcium and carbon dioxide from the water around them and combining them to make calcium carbonate. Each small coral animal (called a "polyp") secretes a ring of skeleton. Because corals live in large colonies of polyps, these skeletons build up to make the coral structures you have probably seen.

And we can dissolve calcium carbonate by soaking it in vinegar – a chemical also called "acetic acid!"

NGSS Alignment

This activity addresses the following standards from the Next Generation Science Standards:

Disciplinary Core Ideas:

- PS1B: Chemical Reactions
- LS1A Structure and Function
- ESS2A: Earth Material and Systems

Science & Engineering Practices:

- Planning and carrying out investigations;
- Analyzing and interpreting data;
- Constructing explanations

Cross-Cutting Concepts:

- Structure & Function



Experiment

Let's use some vinegar to remove the calcium carbonate from a piece of coral, and then examine it to see what's left!

- 1) Observe a small piece of coral skeleton. Notice the way it feels, and how hard and rigid it is.
- 2) Place the piece of coral in a jar, flask or beaker. Try to use a container with a lid, because vinegar has strong odor.
- 3) Pour enough vinegar in the container to cover the coral by about an inch. Then put the lid or a piece of plastic wrap over the top of the jar. Set it aside in a safe place for about 2-3 days.
- 4) After 2-3 days, use a spoon to scoop the coral out of the vinegar. You can rinse it in fresh water if you want.
- 5) Make more observations:
How does it feel now? Compare it to the way the coral felt before you soaked it.
- 6) If there is no noticeable change, repeat the experiment again, using fresh vinegar.



Coral in vinegar at Mote's coral research lab. (Currie ©2023)

Making Inferences:

- A. The coral skeleton should be flexible after you soak it in vinegar! This is because the calcium carbonate is held together in a network of protein fibers. The protein is called "collagen." Look up collagen to see where you can find it in YOUR body! What features do you think collagen gives to coral that can help it survive?
- B. The coral you used is probably called a "stony" coral. But there are also "soft" corals! Soft corals are flexible and "wave" in the moving ocean waters. If you go to an aquarium or a pet store with live corals, you are likely to see them! What do you think is the difference between the skeleton of a "stony" coral and a "soft" coral?

Extend the Experiment: The information on page 1 mentions that the materials in the coral skeleton are a lot like your bones! You can do this experiment with a bone!! Use a bone from a piece of chicken kept after you eat it. Place the bone in vinegar, and observe how it changes!

Your bones (and those of other animals) are made of calcium and phosphorus held in flexible proteins like collagen, just like a piece of coral!

You can also soak a raw egg in vinegar! The shell of an egg is also made of calcium carbonate! What do you think the egg will be like after you soak it?? Try it and see!