



STEM Challenge: Building a Model of Giant Kelp Story Book Science at Home Activity

What you need

- Materials to model giant kelp, suggested materials include: string and balloons or other small, floating items like sponges
- Materials to model the ocean, suggested materials include: a cup, pebbles or rocks, and water to fill the cup

Preparation

The goal of this challenge is to build a model of giant kelp, a brown alga, with features including a holdfast, stipe, blades, and air bladders. It should be able to stay in place in an environment that models the ocean.

The instructions use the following suggested materials: string for the holdfast, stipe, and blades, and pieces of sponges containing holes to fill with air attached to the blades with glue. The sponges represent air bladders.



Step 1. Plan a building design for your model. Use the diagram on the next page to help in your planning. Then make a prediction about how different materials will act in your model.



Step 2. Gather the appropriate materials for your design. This guide offers suggestions for materials, but you can use whatever household items you have.



Step 3. Use the materials to build a model of giant kelp. The model should contain a holdfast, stipe, blades, and air bladders. Remember: the stipe is floppy! String is a great way to represent this.



Step 4. Place your model of giant kelp in a structure that resembles the ocean, or the giant kelp's environment. This example places the model in a cup with a rocky bottom, which is then filled with water! Don't forget: the holdfast should cling to a structure to keep the kelp in place.



Step 5. Observe your model. What is happening? What do you notice as the outcome of this challenge?

What to do

The model described in the previous section used a sponge containing holes. During the planning phase, it was predicted the holes would fill with air! They just filled with water and did not float very well. Sometimes, the sponges went more towards the bottom of the cup instead of up. It might have looked like they were floating, but another material might have worked better.

Did you build a model of giant kelp that functions like actual giant kelp, meaning it stayed in place and contained all the features of a giant kelp: a holdfast and a stipe held up by the air bladders attached to the blades? How might you rebuild your model?

What is happening?

Seaweeds are not plants. Seaweeds are macroalgae, or large plant-like organisms, that can be found in the ocean! They can be separated into three different categories: green algae, red algae, and brown algae.

One species of brown algae includes giant kelp, whose scientific name is *Macrocystis pyrifera*. The giant kelp has several unique features, many of which resemble parts of a plant. Giant kelp has a stem-like feature called a stipe. It also contains leaf-like structures called blades that attach to the stipe. Giant kelp does not have roots, but it does have a root-like structure called a holdfast. The holdfast anchors the root on the floor of the ocean.

Giant kelp grows upwards, towards the surface of ocean water along temperate ocean coasts with mild temperatures. This is where light is easily accessible for the alga to photosynthesize, or make energy from sunlight. The stem-like structure or stipe of giant kelp is not sturdy, in fact it's floppy, or easily moveable. Giant kelp contains gas-filled structures to keep the stipe in an upward position, towards light. These structures are called air bladders and can be found at the base of the giant kelp's blades. Air bladders function like balloons that float in the air, except the air bladders are mostly filled with nitrogen and oxygen gases and keep the giant kelp in an upward position.

