Making Algae Beads

In this activity, students create spheres of green algae for use in experiments that explore the metabolic processes of plants, including rates of photosynthesis. The activity supports 3-dimensional learning and builds toward the following:

- NGSS Science and Engineering Practice: Developing and using models; Planning and carrying out investigations
- NGSS Core Idea: Life Science 1: From molecules to organisms: Structures and processes

Materials Required
Thick Green Algae Culture (Chlorella, Ankistrodesmus, or other freshwater species)*
2% (by mass) Sodium Alginate Solution
3% (by mass) Calcium Chloride Solution in a 250-mL Beaker
2 15-mL Culture Tubes
Plastic Spoon or Tea Strainer
Distilled Water in Wash Bottle
Pipette

Activity Procedure
1. Place 5 mL of green algae culture into a culture tube.
2. Add 2.5 mL of 2% sodium alginate solution to the tube, place the cap on the tube, and mix for 1 to 2 minutes.
3. Collect some of the mixture into your pipette.
4. Suspend the pipette over a beaker containing 3% calcium chloride solution. For best results, the calcium chloride solution should be cold.
5. Gently depress the bulb on your pipette to release the algae mixture dropwise into the beaker. Do this slowly and uniformly. As the algae mixture drops in the calcium chloride, the algae will be immobilized inside of a bead. Your mixture should allow you to make approximately 100 algae beads.
6. Collect your beads using the plastic spoon provided and rinse them using the water in the wash bottle.
7. Transfer the beads to your clean culture tube and fill the tube with distilled water.

Results/Summary
The algae beads can be stored in the distilled water and refrigerated for approximately 2 weeks. Algae beads will produce oxygen as a byproduct of photosynthetic activity. This accumulation of oxygen will cause the beads to float to the surface when exposed to light. Additionally, hydrogen carbonate indicator can be used to monitor changes in pH as dissolved carbon dioxide is extracted from the water as a result of photosynthesis.

Additional Information
View more information, content links, and products related to this activity at www.carolina.com/takeaways.

*Algae culture should be allowed to grow for 3 to 4 weeks under constant lighting to achieve desired population density. It should appear dark green in color prior to use.