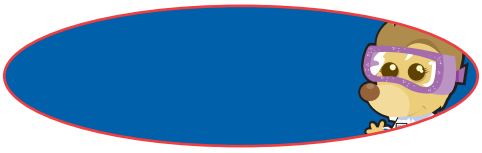
Water Walkers

Many different kinds of insects can walk on the surface of a pond without breaking the water's "skin". They can do this because they have many legs, and they can spread their weight out over a large surface area. If they were to stand on one foot, then all of their weight would be in one small spot, the water's "skin" would break, and they would sink to the bottom of the pond. You may also have seen a feather or a leaf fall gently onto the surface of a pond without sinking. Like the water bugs, feathers and leaves are very light, and their weight is spread out over a large area of the surface. Based on these examples, and others that you may have seen, try making your own water walker!

Materials

Disposable aluminum pie or cake pan
Water
Small paper clips
Pop-top rings, plastic tabs
Aluminum foil or paper
Pencil
Blunt scissors



SAFETY! *SAFETY: Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not drink any of the water samples in this activity.*

Procedure

1. Fill the pan with several centimeters of water. Do not overfill the pan.
2. Hold a paper clip by one end and observe what happens when it is dropped into the water.

3. Now try to put a second paper clip on the surface of the water by very carefully lowering it so that it lays flat on the water's "skin" or surface. Keep trying until you are able to get the paper clip to float.
4. Try to float other paper clips or plastic tabs on the water's surface. It will take a little practice and a steady hand.
5. Once you have practiced putting things on the surface of the water, you are ready to make your own "Water Walkers". Use the pencil to lightly draw on the aluminum foil or paper to make a paper animal like the frog to the right. Be sure that you have a flat surface that will float on the water as part of your design. Big "feet" work best!
6. Use the scissors to cut out the design.
7. Set your creation carefully on the water and observe. Did it float? If not, try again, or make another "Water Walker" that you think will work better.

8. Thoroughly clean the work area and wash your hands. Pour the water down the drain, and throw away any other trash.

Try this...

When there are several objects floating on the water, try adding a squirt of liquid dishwashing detergent to the water and observe what happens.

Note: Once detergent has been added to the pan, the water's "skin" will be broken. You will need to pour out all of the water and rinse any soapy residue out of the pan before you continue with your experiments.

Where's the Chemistry?

Water molecules tend to stick together. This cohesion is strong enough at the surface of the water to form a "skin". In this activity, you had to be very careful to place the paper clip and other objects gently on the water's surface, so that you did not break the water's "skin". You also had to place them onto the water so that they laid down flat, so that their weight would be spread out over a large area. By spreading the objects' weight over a large area on the surface of the water, you were able to make them float without breaking the water's "skin".

The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".