

Bubble Cell Membrane Activity

Description: Did you know that bubbles and cell membranes have a lot in common? Now you can see for yourself! In this activity, you will make a bubble soap film and learn the science behind why certain objects can and cannot pass through it.

Materials:

- Water (2 ½ cups)
- Dish Soap (¼ cup)
- Glycerin (1 tsp)
- Tray or container (wider than straws)
- Flexible Drinking Straws
- Sewing thread or large straw/tube
- Scissors

Before you start: It is recommended for at least two people to perform the activity, where one person holds the straw frame and the other tests behavior of bubble cell membrane.

Instructions:

Assembly

1. Measure out 2 ½ cups of water, ¼ cup of dish soap, and 1 tsp of glycerin.
2. Combine all into a tray and mix together with a spoon.
3. Take four straws and bend them into L shape.
4. Use scissors to cut roughly 1 cm slits at one end of each drinking straw.
5. Insert cut end of straw into uncut end of another straw. Continue until all four straw ends are connected into a quadrilateral shape.

Activity

1. Immerse straw frame fully into bubble soap solution.
2. Gently lift the frame up until soap film is generated between the straw frame.
3. Test out how different objects cause the soap film to react. If it pops, repeat step 2.
Try poking the soap film with a:
 - a. Dry object (finger, toothpick, straw, etc.) and observe what happens.
 - b. Wet object (dipped in soap solution) and observe what happens.
 - c. OPTIONAL: Try wetting or coating object with other liquids (vegetable oil, juice, etc.)
4. Test out how channel proteins cause the soap film to react. If it pops, repeat step 2.
 - a. STRAW METHOD:
 - i. Coat a large straw with soap solution.

- ii. Insert straw into soap film and pop bubble generated in the center of straw with a dry object.
 - iii. Insert dry object (smaller than diameter of straw) through the channel created by straw.
- b. STRING METHOD:
- i. Cut out thin thread and tie into a circle.
 - ii. Coat thread with soap solution.
 - iii. Place thread onto soap film and pop film generated in the center of thread with a dry object.
 - iv. Insert dry object (smaller than diameter of thread circle) through the channel created by thread.

Tips

- *Where to find glycerin?*

You can find it at local pharmacy stores, like Rite Aid or CVS. Additionally, you can find it on Amazon for around \$7, linked [here](#).



- If you let your soap solution age overnight or for a few hours, it will allow for longer lasting bubbles.

Activity Presenter - Mindy Nguyen: Hello everyone! My name is Mindy Nguyen and I am the creator of the bubble cell membrane video. I am a second year at OSU studying Biochemistry. In the future, I hope to either pursue a career in cancer research or go to medical school.

Additional Resource:

The inspiration for this activity & more in-depth explanation of cell membranes - <https://www.exploratorium.edu/snacks/cellular-soap-opera>