

Bubble Booth

Activity Description

This activity shows students hydrogen bonding and how the properties of water can be changed with the addition of soap. (*Previous members found that hydrogen bonds were too complicated, and advise that you focus on teaching the students that water is made up of molecules and they like to stick together...get them to say cohesion or surface tension.*)

Take-Home Message

Water molecules can be attracted to each other and to other materials. This process is called cohesion. When this happens at the water's surface, it is called surface tension.

Massachusetts Frameworks

Physical Science

Properties of Matter #2

Supplies/Set-up

- Plastic child's swimming pool
- Cement block
- Plastic tarp
- Sheet
- 2 buckets soap solution (see attached formula to make up solutions)
- Bubble wand
- Cheesecloth/strainer
- Pitcher

Set-Up

Make up the solution ahead of time; the bubbles improve as the solution ages provided it is kept clean. The formula for the solution is as follows and should be measured carefully. Mix in a large clean bucket 4 gallons water (warm if possible); 2 cups, 6 oz (22 T) glycerin; 11 cups Ultra Dawn Original Scent. You should have 2 buckets of solution on hand, so purchase double the ingredients at a time. Use warm water if possible and let it sit overnight before using. (*The Wetfest coordinator should take care of this*) **TIPS:** **Keep bricks clean**—don't let kids in with dirty shoes (dust affects the performance of the bubbles). The solution will be strained and saved between festivals.

1. Place mat on top of waterproof tarp (to keep it from getting slippery)
2. Place wading pool on top of sheet
3. Add enough bubble solution to cover the bottom of the pool 1-2 inches.
 - **You don't want the mixture to be sudsy or frothy.** The mixture should only be 1-2" deep, just enough to cover the bubble wand.
4. Place **CLEAN** cement block in the center of pool. Place wand in pool. Test bubble after letting sit 5-10 minutes. **Do not add water to dilute the mixture**—if you need more solution add more from the spare bucket.



Activity Procedure/Script

- **Greet students, ask what they've learned so far**
- **Ask if they've been to Water Olympics**
 - If yes, have them stand on brick one at a time and quiz them on the following points
 - If no, have them stand on brick one at a time and explain the following points
- **What is a water molecule?** Explain that a water molecule is made up of 2 hydrogen atoms and 1 oxygen atom and is the smallest particle of water. This is where water also gets the name "H₂O". These molecules look like Mickey Mouse. **This section is your take-away message for 4th graders.** If they only walk away learning one thing, this should be it.
- **Do they (water molecules) like to stick together or split apart?** Stick.
- **What is that called?** COHESION. (Make them all say it.)
- **What does cohesion cause at the surface of water?** Surface tension. (Make them all say it.) You can ask them if they've ever seen a bug walk on the surface of the water and explain that this is because of surface tension. **Surface tension is your goal take-away for 5th graders.**
- **How does a bubble form?** Soap and water molecules stick together and allow water molecules to spread farther apart without breaking the surface tension.
- **Why does a bubble pop?** The molecules get too far apart and the tension will break.
- **If this gets confusing, you can explain that it's like magnets:** If you pull apart two magnets, you feel the tension of them wanting to pull together. The bubble popping is like the magnets getting too far apart and losing the force.



- Explain that now they are going to get into a bubble. Remind the kids that it can get very slippery and they will need to be careful. This should be happening after each of the above points (with a different kid each time). **Help them up and down, do 1-2 bubbles per student.** You will get tired...this ends up being about 200 squats a day! (But it's also super fun.)
 - **Ask the first student a trivia question about water (see above).**
 - Once they get the answer, help the student step onto the brick in the pool. Have them hold their arms at their sides and stand quietly.
 - Pull the bubble up around them
 - The kids will go nuts at this point, so be prepared!
 - Lower the wand and help the student step off of the brick. Repeat with each student, asking a trivia question each time.



*******IMPORTANT POINTS FOR SAFETY*******

- **Help each student into and out of the pool.**
- **Raise and lower the wand while the student is standing on the brick. Since the floor gets slippery easily, always return the wand to the pool, never taking it out until you are done and ready to clean up.**
- **Don't let the students play with the soap water. If you want to let them try to raise a bubble, demonstrate the technique and supervise. Don't let them froth the water or move the wand to another location.**
- **If the floor seems wet, find a mop.** (This could be a good thing to find at the beginning of the day and have nearby)
- **Always be on the lookout for leaks from the pool—the plastic pools don't last forever.**

Clean – Up

During the festival

- You may need to add some extra solution from the spare bucket if the level is going down, but that is rare.

After the festival

- **Carefully empty bubble solution back into bucket using a pitcher and straining it through the cheesecloth. Seal the bucket tightly and save for next festival. DON'T LIFT UP A FULL POOL..... IT WILL SPILL.....THE POOL WILL CRACK**
- Rinse pool and tarp and let them have space in storage to dry.
- In the winter you will have to store the solution in a heated building so it doesn't freeze.