



Square Bubbles

Is a bubble always round?

@home

BEST FOR GRADES

2-5

ESTIMATED TIME

30 Minutes

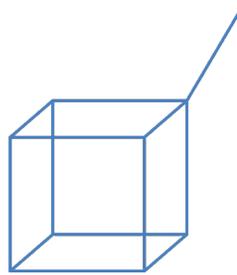
You Will Need

- ¼ cup liquid dish soap
- 4 cups water
- Bucket
- Pipe cleaners or bendable wire (or drinking straws and clay)
- Straw or pipette tip
- 2 Tablespoons glycerin (optional)

(Adding glycerin to the bubble mixture makes the bubbles stronger and last longer.)

Directions

1. Ask student to create a testable question (a hypothesis).
Example: Is it possible to create a bubble that isn't round?
If so, which shapes are possible?
2. Mix the dish soap (and glycerin) with water in the bucket
3. Construct a cube using pipe cleaners (or wire or straws and clay).



4. Dip the cube in the detergent and pull it out
5. If a square bubble does not instantly appear, dip the end of your straw in the solution, insert into the center of the cube and gently blow a bubble within the cube.
6. Try making different bubble wands and experiment with them!

Discovery Questions

Beginning the Experiment

What is the shape of the bubble wand you dip into the bubble solution to blow bubbles?

Does the shape of the bubble wand determine the shape of the bubble? Why or why not?

Can bubbles be different shapes?
Why do you think this is?

During the Experiment

How do the sides of the cube-shaped frame help make a square bubble?

Does the frame create a bubble of the same shape when you dip it into the solution? What does it create?

What happens when you try to release your cube bubble into the air?

After the Experiment

What have you discovered?

Why did we need to create a cube shape for the wand and not just a 2D square?

What other types of bubble shapes do you think you can make?





Square Bubbles

Is a bubble always round?

How does it work?

A free flying bubble, made with a 2D wand shape, will always be round. This is because when you blow a bubble, the soap solution stretches as the air flows into it, and the air pushes equally on all sides of the bubble causing the water molecules to stick together in the tightest possible groupings which makes a sphere. Thank you, surface tension.

Hydrogen atoms in one water molecule are attracted to oxygen atoms in another water molecule. They like each other and cling together. Soap molecules help them become “stretchy” or “flexible” by butting in and decreasing the force of the attraction. Soap (and the glycerin) also reduces evaporation of water molecules so individual bubbles can last longer. Bubbles use surface tension to enclose the volume of air trapped inside and this creates a perfectly spherical bubble with equal pressure on all sides.

When you dip the 3D cube frame into the bubble liquid, you create many bubbles that surround one center bubble. Even though the center bubble naturally wants to become a sphere, the pressure from the other bubbles pushing against it causes it to form a cube shape!

Keywords

Adhesion

The molecular attraction that holds the surfaces of two dissimilar substances together.

Air Pressure

The force exerted by air, whether compressed or unconfined, on any surface in contact with it.

Atom

The tiny particles called atoms are the basic building blocks of all matter

Cohesion

A physical property of a substance, caused by the intermolecular attraction between like-molecules within a body or substance that acts to unite them.

Force

An influence on a body or system, producing or tending to produce a change in movement or in shape or other effects

Surface Tension

A force present within the surface layer of a liquid that causes the layer to behave as an elastic sheet. Surface tension is caused by the attraction between the molecules of the liquid.

Water Molecule

The smallest unit of the substance of water that contains all properties of water. A water molecule can be divided into tiny parts called atoms. This produces two hydrogen atoms and one oxygen atom.