

B u b b l e D o m e s

Bubbles spark excitement and curiosity and are a wonderful way to investigate different math concepts. With *Bubble Domes* the students can explore various ways to measure.

Curriculum Connections

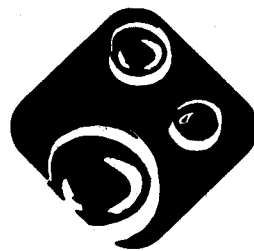
Bubble Domes combines the **physical science** of creating and manipulating bubbles with **mathematics** (measuring different parts of bubbles, e.g., circumference, diameter, radius, etc.).

When you blow bubbles, you use soap to stretch water's tough skin and make it super-elastic. Notice that when you fill your surface with bubble domes that their walls always meet at 120° or 190° angles.

Why do bubbles pop? As they get older, bubbles develop holes and their soapy film becomes thin. Some water evaporates while gravity pulls the water from the top of the bubble down to the bottom. Dryness is a bubble's enemy—even small dust particles can pop old, thin bubbles. Most soapy objects pass through the bubble film without breaking it because the soap solution on the object connects to the soap solution in the bubble film.

Vocabulary

- dome:** a portion of a sphere.
- diameter:** the length of a straight line through the center of a circle
- circumference:** the measurement around a circle
- radius:** the measurement from the center of a circle to the outer edge
- volume:** the amount of space taken up by a substance, measured in cubic units



Materials Needed

- straws, 1 per student
- bubble solution (see recipe)
- newspaper

measuring tools:

- several strings, each 1 yard long
- rulers
- unifix cubes
- use your imagination to think of others

This activity can be done inside or outside.

- inside:** use trays or shallow baking sheets to hold thin layer of bubble solution and newspapers to soak up spills
- outside:** use a long work table that can get soaked with bubble solution and a container for bubble solution

Teacher Preparation

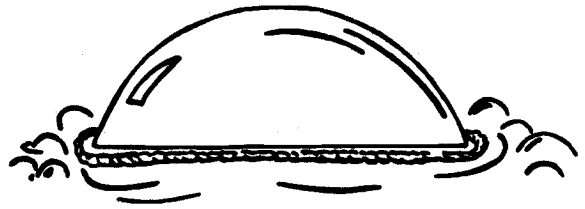
- ① Prepare the bubble mixture.
- ② If you are setting up inside, put a thin layer of bubble solution in the trays.
- ③ If you are preparing the activity outside, set up the table and wet it with bubble solution. Place the container of solution in the middle of the table.
- ④ Gather the measuring tools. You may also wish to have paper available to record the measurements.

Activity Directions

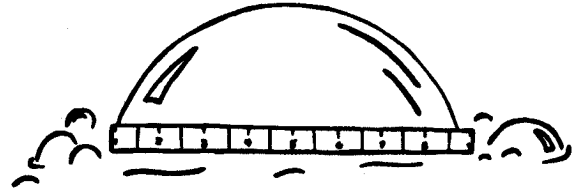
- Inside:** Have students place one end of the straw into the thin layer of bubble solution, blow gently into the straw to create their bubble dome.
- Outside:** Have each student place one end of a straw in the container of bubble solution, cap off the other end of the straw with his finger. Have each then place the uncapped end of the straw on the surface of the table, remove her finger and blow gently into the straw to create a bubble dome. After making several domes there is no need to dunk the straw in the solution because the table is wet enough.

Methods of measurement:

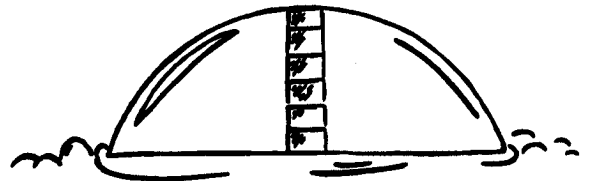
Circumference: Wet a piece of string in solution. Carefully place it around the dome at the table surface. Mark the string at the point where it meets the other end. Measure the marked off length of string with a ruler.



Diameter: This method works when you make the dome on the table: once the dome pops it leaves a circle on the table (a bubble print) that can be measured. Measure across the print to get the diameter.



Height, Radius, or Diameter: Wet a ruler or stick with bubble solution and insert it into the dome to make measurements. Stack the unifix cubes next to the bubble dome: across for the diameter or up for the radius. Wet your hand and place it inside the dome, how high up does the dome reach?



FOR GRADE LEVELS 4-5

Volume: Measure the radius by inserting the ruler vertically into the dome. Calculate the volume of the sphere using the formula $V = \frac{4(3.14)r^3}{3}$
 $r = \text{radius}$.

Then divide by two to determine the volume of a hemisphere (dome).

Extensions

- Ask students to make big domes and small domes and domes of all sizes. What happens when the domes touch each other? Can they make a dome inside a dome?
- How many domes does it take to cover the table surface?

- Ask the students to find a way to stack the unifix cubes inside a bubble dome.
- Try placing a wet fork or a rubber doll in the dome. Someone we know has even put rubber dinosaurs inside bubble domes!

Museum Exhibits

Bubbalogna