

Geo Bubbles

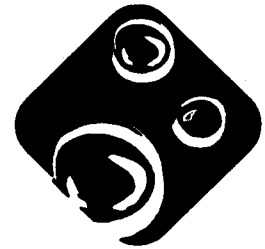
The students will create their own basic geometric bubble frame and explore the phenomena that occur because of surface tension.

Curriculum Connections

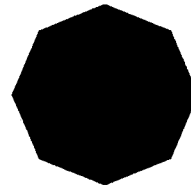
Geo Bubbles presents students with opportunities to discover a variety of two- and three-dimensional geometric shapes (mathematics—e.g., tetrahedron, pyramid, pentagon, etc.) and a special property of bubbles—surface tension (physical science).

Vocabulary

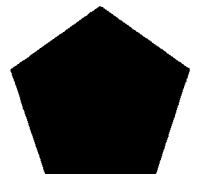
- cube:** a three-dimensional, six-sided shape with all sides square
- octagon:** a shape with eight sides
- pentagon:** a shape with five angles and five sides
- pyramid:** a three-dimensional shape with a square base and four triangular sides meeting at the top
- tetrahedron:** a three-dimensional shape with four triangular sides
- surface tension:** an elastic-like force caused by molecular attraction that causes a liquid to use a minimum of space



octagon



pentagon



Materials Needed

- straws, several per student or group
- paper clips or pipe cleaners (with pipe cleaners, you may need glue), several per student or group
- pipe cleaners for the 2-dimensional wands, several per student or group
- a ball of string
- scissors
- bubble solution (see recipe)
- 2 or 3 bins for bubble solution
- patterns (included)

Teacher Preparation

- ① Gather materials.
- ② You may want to cut the straws ahead of time, especially for younger children, to ensure that they are of equal size.
- ③ If you feel your students are too young for this activity, make the shapes ahead of time and demonstrate.
- ④ Hand out patterns, straws, strings, paper clips or pipe cleaners ahead of time. You may want to divide the class into groups of 3 or 4 for this activity.
- ⑤ Set up 2 or 3 bubble stations in your classroom.

Activity Directions

FOR GRADE LEVELS K-5

Two-dimensional shapes

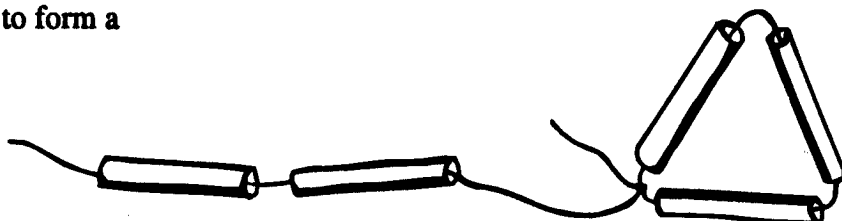
- ① Use the patterns provided to make the pipe cleaner bubble wands.
- ② Before dipping the geo wands into the bubble solution, have the students predict what will happen.
- ③ Before the children blow bubbles, ask them what shape the bubbles will be. Many of them may be surprised that bubbles are always spherical no matter what shape the wand is. Refer back to the description of surface tension to explain this phenomenon.

Tetrahedron

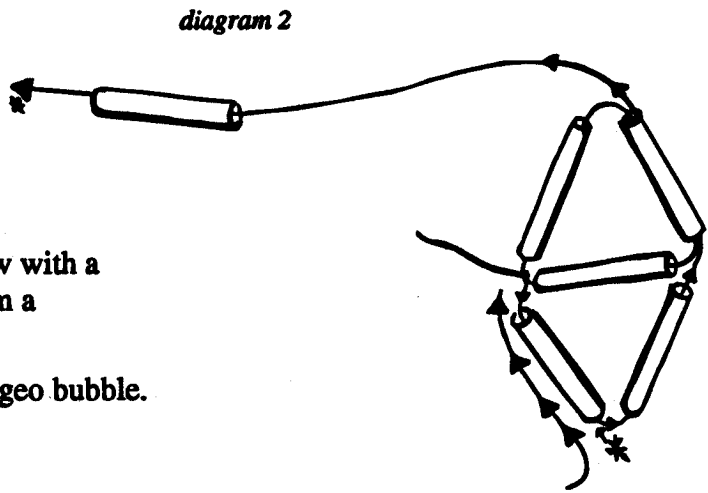
The tetrahedron is the easiest 3-dimensional shape to make. Even very young children can do this activity.

- ① Cut 3 straws in half to make 6 pieces, set aside.
- ② Cut a piece of string 24 inches long.
- ③ Thread the 3 straw pieces together. Leaving a 3 inch tail of string, tie a knot to form a triangle. (*diagram 1*)
- ④ Thread 2 straw pieces onto the long end of the string, then thread the string through the existing triangle. Unknotted string should be coming out of the straw. (*diagram 2*)

diagram 1

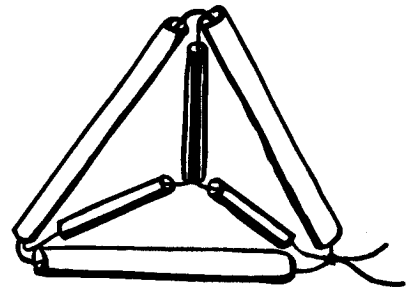


- 5 Thread the last straw piece, then thread the string through the top of the triangle you just made. (see asterisks in diagram 2) The end of the string should come out of the straw with a knot. Tie the two strings together to form a tetrahedron. (diagram 3)



- 6 Dip in the bubble solution to make your geo bubble.

diagram 3



Activity Directions

FOR GRADE LEVELS 3-5

Cube

- 1 Cut 6 straws in half to make 12 pieces, set aside.
- 2 Take 16 paper clips, unfold each one to form an "L" shape. If using pipe cleaners, cut 16 pieces, half the size of the straw, and bend them into an "L" shape.
- 3 Take 4 cut straws, connect them by inserting one end of paper clip into the ends of straws, forming a square. (diagrams 4 & 5) If the connection is not a tight fit, widen the bent end of the paper clip. If you are using pipe cleaners to connect the straws, you may need to glue them for a secure fit.
- 4 Make two separate squares.
- 5 To make the cube, connect the two squares with the remaining 4 straws using the same technique as you used to make the squares. (diagram 6)
- 6 Dip the cube into the bubble solution and be amazed. Before you take this step, try to guess what shapes you will see when the cube is dipped into the bubble solution.

diagram 4

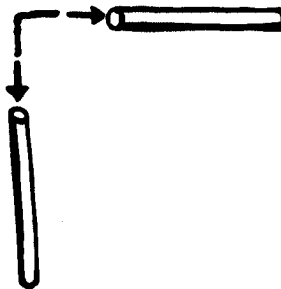


diagram 5

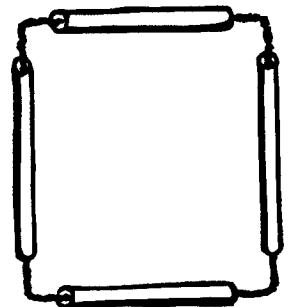
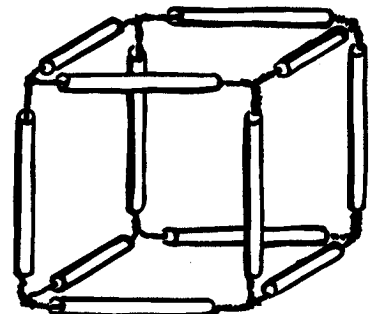


diagram 6

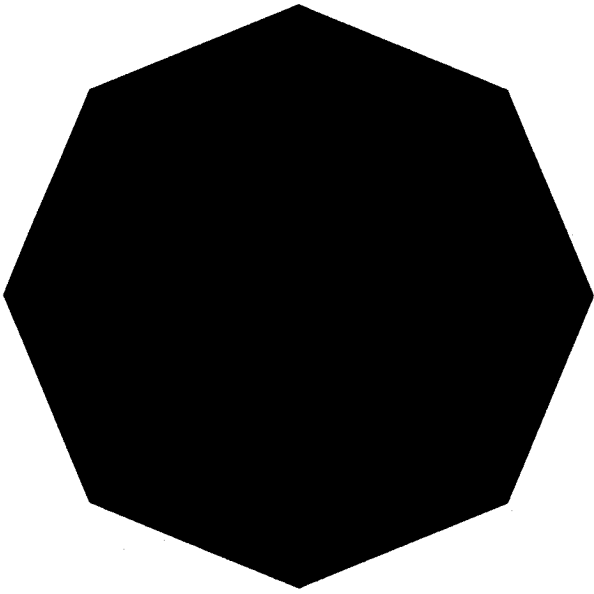


Extensions

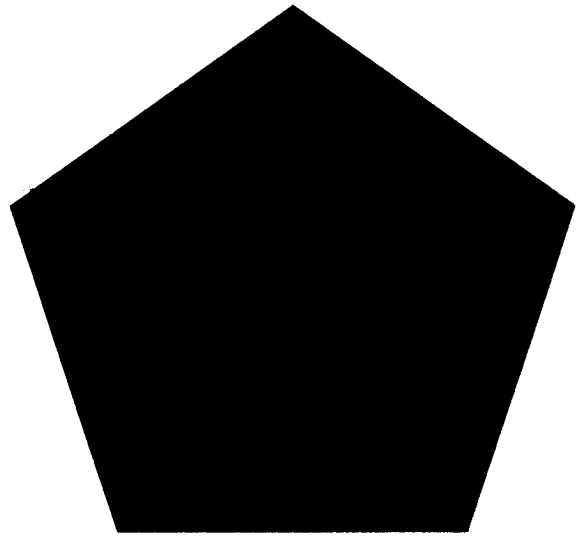
- Try making other geometric shapes, such as a pentagon or pyramid. Experiment. What shapes can you come up with, and what happens to them?
- Try popping one side at a time. How does it affect the soap film?
- Have students gently wave their geo bubble through the air or blow into it with a straw. What happens?

Museum Exhibits

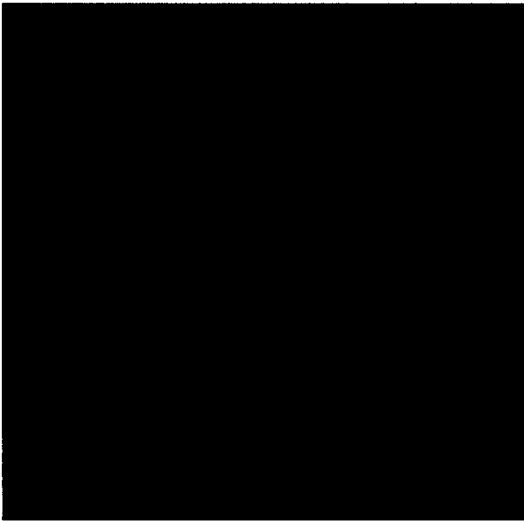
Bubbalogna



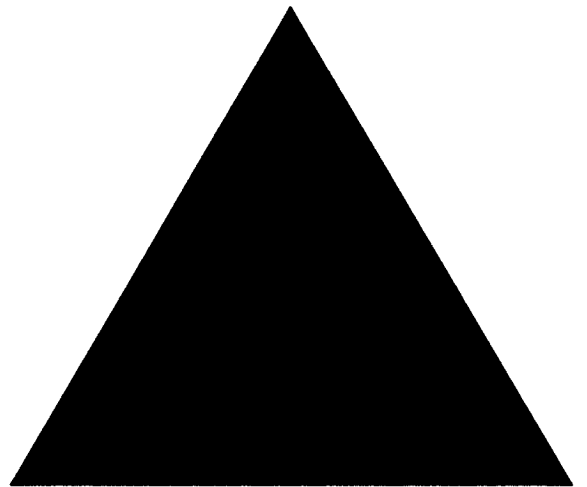
octagon



pentagon



square



triangle