

SCIENCE OF BUBBLES



Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

OBJECTIVES

LEARN THE STRUCTURE OF A BUBBLE AND OTHER SCIENCE CONCEPTS THROUGH EXPERIMENTING WITH BUBBLES.

MATERIALS

CONTAINER OF BUBBLE SOLUTION
2 PIECES OF WIRE
PIPECLEANER
TWINE
FLAT WASHER
1 PIECE OF CARDSTOCK
COPY PAPER
STRAW

FACTS

- THE OUTSIDE AND INSIDE SURFACES OF A BUBBLE CONSIST OF SOAP MOLECULES.
- A THIN LAYER OF WATER LIES BETWEEN THE TWO LAYERS OF SOAP MOLECULES, SORT OF LIKE A WATER SANDWICH WITH SOAP MOLECULES FOR BREAD. THEY WORK TOGETHER TO HOLD AIR INSIDE.
- WHEN THE WATER LAYER BETWEEN THE SOAP LAYERS EVAPORATES (DRIES OUT), THE BUBBLE WILL POP.
- BUBBLES WILL FLY HIGHER WHEN IT IS COLDER. THIS IS BECAUSE YOUR BREATH IS WARMER THAN THE AIR OUTSIDE AND HOT AIR RISES.
- BUBBLES ARE ALWAYS ROUND ONCE THEY LEAVE YOUR WAND. THIS IS DUE TO SURFACE TENSION IN THE BUBBLE SKIN SHRINKING TO THE SMALLEST POSSIBLE SHAPE FOR THE VOLUME OF AIR IT CONTAINS.

GUIDING QUESTIONS

1. HOW ARE BUBBLES SHAPED?
2. HOW DO BUBBLES REACT TO ENVIRONMENTAL CHANGES?
3. WHY DO BUBBLES POP?

CONCEPTS

- BUBBLES ARE AIR WRAPPED IN SOAP FILM.
- BUBBLES ARE ALWAYS ROUND.
- BUBBLES POP WHEN THEY GET "POKED" OR THE WATER BETWEEN THE SOAP FILM SURFACES EVAPORATES.



INTEREST APPROACH-ENGAGEMENT

AS YOU BLOW BUBBLES, ASK:

- WHAT MAKES A BUBBLE?
- WHY DO THEY POP?
- LOOK CLOSELY, ARE BUBBLES TRANSPARENT OR DO THEY HAVE COLORS?



ACTIVITY 1: MAKE YOUR OWN BUBBLE WAND

- BEND A PIECE OF WIRE OR PIPE CLEANER INTO A SHAPE MAKING SURE TO CLOSE THE SHAPE.
- REPEAT WITH THE OTHER PIECE OF WIRE MAKING A DIFFERENT SHAPE.
- BLOW SOME BUBBLES. DOES THE SHAPE OF THE WAND MAKE A DIFFERENCE IN THE SHAPE OF THE BUBBLES?
- RECORD RESULTS IN YOUR JOURNAL.
- A STRING LOOP CAN BE USED TO MAKE GIANT BUBBLES. ATTACH STRING TO A STICK. THREAD A WASHER ON THE STRING. TIE THE STRING TO ANOTHER STICK LEAVING APPROX. A THIRD OF THE STRING. TIE THAT END ONTO THE FIRST STICK, CREATING A LOOP. DRAG STRING THROUGH THE BUBBLE SOLUTION KEEPING THE LOOP OPEN. THEN WAVE THE LOOP IN THE AIR. LARGE BUBBLES SHOULD FORM.

ACTIVITY 2: MAKE YOUR OWN JOURNAL

- TAKE A PIECE OF CARDSTOCK AND FOLD IT "HAMBURGER" STYLE OR WIDTH-WISE.
- FOLD SEVERAL PIECES OF COPY PAPER THE SAME WAY.
- PUT THE CARDSTOCK ON THE OUTSIDE OF THE COPY PAPER TO ACT AS A COVER.
- RECORD THE RESULTS OF YOUR EXPERIMENTS IN YOUR JOURNAL.
- USE BOTH SKETCHES AND WORDS TO TELL WHAT YOU OBSERVED.

BUBBLE EXPERIMENTS:

- SET THE LID OF THE BUBBLE CONTAINER ON A TABLE AND FILL IT WITH BUBBLE SOLUTION. DIP A STRAW INTO THE CONTAINER SO IT IS MOISTENED BY THE SOLUTION, AND BLOW A BUBBLE ON THE LID.
- THEN DRAW OUT THE STRAW. MAGIC!
- NEXT, DIP THE POINTED ENDS OF A PAIR OF SCISSORS IN THE SOLUTION. POKE THEM THROUGH THE WALL OF YOUR BUBBLE.
- TRY POKING OTHER STUFF THAT HAS BEEN MOISTENED IN THE SOLUTION, EVEN YOUR FINGERS.
- TRY POKING YOUR STRAW BACK INSIDE THE BUBBLE AND BLOWING ANOTHER BUBBLE.

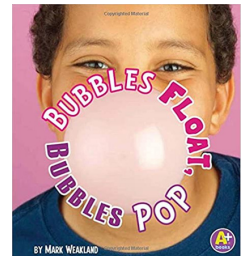
ACTIVITY 3: READ BUBBLES FLOAT, BUBBLES POP BY MARK WEAKLAND

[HTTPS://WWW.YOUTUBE.COM/WATCH?V=0EEULJBENXM](https://www.youtube.com/watch?v=0EEULJBENXM)

RECOMMENDED FOR PRE-K TO 1ST GRADE STUDENTS.

DISCUSSION QUESTIONS:

- WHERE HAVE YOU SEEN BUBBLES?
- WHAT ANIMALS DO YOU THINK MIGHT USE BUBBLES?
 - HUMPBACK WHALES BLOW BUBBLES FROM THEIR BLOWHOLES TO FORM WIDE NETS, WHICH THEY THEN USE TO CORRAL PREY SUCH AS KRILL AND HERRING.
 - DIVING BELL SPIDERS ARE THE ONLY SPIDERS THAT LIVE UNDERWATER, USING ITS WEB AS A GILL, THE DIVING BELL SPIDER CAN LIVE UNDERWATER WITH ONLY OCCASIONAL VISITS TO THE SURFACE. THE SPIDER (ARGYRONETA AQUATICA) BREATHES AIR FROM A BUBBLE THAT IT GRABS FROM THE SURFACE OF WATER USING FINE HAIRS ON ITS ABDOMEN.
 - STAR-NOSED MOLES BREATHE OUT BUBBLES AND THEN BREATHES THEM BACK IN TO SMELL PREY UNDERWATER.
- WHAT WOULD YOU USE A BUBBLE FOR?



LESSON PLAN CREATED BY WENDY FERGUSON, PROGRAM COORDINATOR

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Bubble Solution Recipe

The formula for awesome bubbles:

- 1 cup liquid dish soap like Joy or Dawn (not “ultra”)
- 6 cups distilled water inside a clean container that has a lid
- 1 tablespoon glycerin OR 1/4 cup light corn syrup

Pour the dish soap into the water and mix it without letting bubbles form.

That’s for later! Put the glycerin or corn syrup into the mix and stir.