What's the Matter?

MATERIALS

FOR STUDENT: (one per student unless otherwise noted)

- FloraCraft® Make It: Fun® Foam Blocks:
  - 6" x 12" x 1" thick, cut from large foam block (see "FOR TEACHER")
  - 2" x 2" x 1 15/16" thick, cut from large foam block (see "FOR TEACHER")
- Balloon, green or color of choice
- Plastic balloon holder
- Three toothpicks
- Pencil
- Washable black felt tip marker
- Scissors
- Glue stick
- Paper plate
- Small plastic cups, two
- Plastic zip-sealed bag, large (to hold when finished)

FOR TEACHER:

- FloraCraft® Make It: Fun® Foam Blocks:
  - 1" x 12" x 36" (can get six pieces per foam block)
  - 1 15/16" x 3 7/8" x 11 7/8" (can get twelve pieces per foam block)
- Cardstock, 8.5" x 11":
  - Light blue, one sheet per two students
  - Light green, approx. one sheet per fifteen students
- Sheet of white address labels
- Pencil
- Permanent black felt tip marker
- Ruler
- Serrated knife
- Paper cutter
- Scissors
- Transparent tape
- Glue stick
- Glue gun (for teacher only)
- Paper towels
- Cutting mat or stack of old newspapers
- Photocopier

SCIENCE
GRADE LEVEL
SECOND – THIRD

COMPLETION TIME
- 50 minute session

OBJECTIVES

Students learn:
- That matter has three forms: Solid, liquid and gas
- That evaporation and melting are changes that occur when objects are heated
- To identify in which stage matter is, at the time

STANDARDS

Structure and Properties of Matter:
- Energy and matter have multiple forms and can be changed from one form to another
- There are three forms: Solid, liquid and gas, depending on temperature
- Matter can be described and classified by its observable properties
- Different properties are suited to different purposes.

TEACHER PREPARATION

Note: Read through all the instructions first and check out the TIPS! Decide if you will have real water and ice, or paper water and foam ice, or both. Have a glue gun plugged in and ready to use (ideally set on low temperature) but out of student reach. This can give you immediate adhesion when you're in a hurry to help students. It is also recommended that you make a sample first, before preparing the materials for any others, since knowing how the parts fit, might affect how you prepare the rest of them.

[1] To cut the 1" thick foam block for the bases, use a ruler and pencil to measure and mark six rectangles, 6" x 12". On a cutting mat, use a serrated knife against the edge of the ruler to cut the foam block with several passes of the knife. Repeat for the number of students.

Similarly, to cut the 1 15/16" thick block for the ice cubes, mark and cut twelve 2" x 2" squares.

Repeat both as needed, for the number of students.

[2] Copy the water and melting ice patterns onto light blue cardstock. Use scissors to cut apart for students.

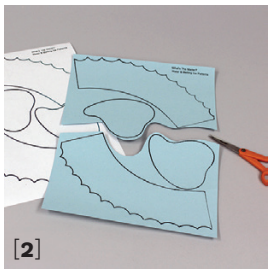
[3] Use a paper cutter to cut the light green cardstock into three of each, for each student: 1 1/4" x 2 1/4" and 1" x 1 1/4" rectangles. (The smaller pieces are used on back of the signs to hold them onto the toothpicks.)

[4] On a plate put: 2" foam cube, pencil, marker, scissors, glue stick, balloon, balloon holder, one or two plastic cups (two if planning to use real ice) with items inside: Three large and three small green cardstock pieces, white label, and three toothpicks. Set the plate onto the blue photocopied paper on top of the foam base. Repeat for each student.

LESSON INTRODUCTION

- Explain and discuss the stages of matter: Solid, liquid and gas. Ask students to come up with examples. Explain that they can make a small display that can illustrate the stages. If they are in a location that allows them to use an actual ice cube and water in the cups, you can do that. (The notches in the foam will minimize the chance of spilling the water and ice.) If water and ice isn't practical, they will also have the paper water and foam ice cube.


[1]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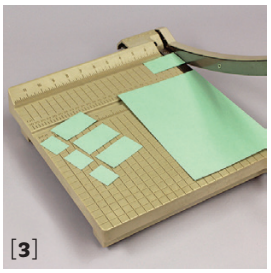
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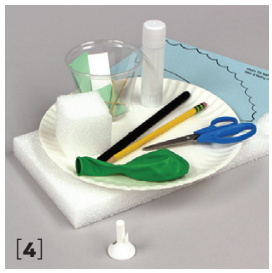
[4]

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INSTRUCTIONS

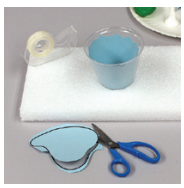
[1] Demonstrate with the foam base and foam ice cube, how to compress and slightly round all the edges and corners, by pressing the foam edge down onto the table with even pressure as you rock the foam block back and forth. Have the students smooth their foam pieces, particularly the ice cube.

[2] Demonstrate and have the students set a plastic cup in the center of the large foam base and lightly trace around it, in pencil. Remove the cup and use the rounded top of the glue stick to press the indention lower, going all along the pencil line and about 1/4" deep. Have the students keep checking to be sure that the cup just fits into the circular indention, being careful not to make it too large.

Note: If you plan to use real ice, have the students do the same thing on the left side of the base, positioning the cup so that it fits next to the center cup, already in the base – Check this before making the second circle and the indention.) If you won't ever be using real ice, leave the area flat.

[3] Have the students use their scissors to cut out the blue paper water. Distribute one piece of tape per student and have them set the water into their cup, taping it on the inside where the ends meet.

Also have them cut out their melting ice and set their ice cube on top of it to the left of the water cup.



[4] Have the students write their name in pencil on the label and attach it to the bottom of the base. To make signs, have them write in pencil first: "solid", "liquid" and "gas" on the larger green rectangles. Then they can go over the words with their markers.

Demonstrate how to wipe the end of one toothpick on the top of the glue stick to get a lump of glue. Center it on the back of one sign and set a small green rectangle on top to hold. (Apply more glue to the small rectangle if needed.) Have students repeat, for all three of their signs.

[5] Demonstrate how to blow up a balloon to the size you indicate and put it through the plastic balloon holder, wrapping it around as needed to hold. (By using the balloon holder, you do not have to knot it, and can deflate it for storage and still use it again.) Then, demonstrate how to push the bottom of the holder into the foam base, to the right of the center cup. Advise students to plan where to push it in, so that the balloon is over far enough that it doesn't bump the center cup out of it's indention.

Have students repeat. Then, have them insert their signs in front of the correct form of matter.

MODIFICATIONS

To simplify project:

- Pre-cut water and melting ice.
- Have the indented circle where the cup goes on the base, already indented.

To expand project:

- Have the students think of other matter that could be represented in each of the three forms, using foam, cardstock, and other basic materials.
- Ask the students to do research on how the matter shifts from one form to another and report back to the class.

For multiple ages:

- Younger and older students can work side-by-side, with the older students doing the indentions and printing and the younger students cutting and taping.
- Younger students can discuss with you the forms and how they change, while the older students can report on the additional research you have assigned relating to matter, energy and the basics of evaporation and condensation.

ADDITIONAL IDEAS

- Collect photos of other types of matter, in various states. Cut them down and mount them on toothpicks that can be inserted into the foam, behind and around the cups and a smaller, less-inflated balloon.
- Use this model as the basis for science fair and parents' night projects and displays.
- Create jumbo models for the whole class, using large, clear containers with blue paper cut from roll of paper for the water, and melted ice. Stack and glue layers of foam to cut one giant ice cube from the foam. Find a large balloon that can be inflated.
- Consider other science experiments that can be illustrated in 3-D by using foam, cardstock, and basic craft supplies.

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TIPS

- Keep the serrated knife blade perpendicular to the table so that the foam edges are straight. Score it lightly first and then press more firmly to cut deeper with several passes of the knife.
- Have the students double check that their word signs are right side up when they attach the toothpick to the back. If not, hurry and slide the toothpick all the way through, so the length of it is on the correct side.
- Have extras of everything.
- Encourage the students to share with their parents / family the stages of matter and the terms used.

REFERENCES

What Is The World Made Of by Kathleen Weidner Zoehfeld
My Science Book by Simon Mugford
Change It! Solids, Liquids, Gasses and You by Adrienne Mason
Amazing Materials by Sally Hewitt

PATTERN

WATER AND MELTING ICE
Print at 100%