

Instructional Recipe

What is the Mystery Matter?

3rd Grade
Science



Online research and information resources available through a partnership between the Texas State Library and Archives Commission, the Texas Education Agency and Education Service Center, Region 20
<http://web.esc20.net/k12databases>

Step 1 – Ask

Objectives: Students will analyze the properties of a mystery substance to determine its state of matter. Students will identify examples of solids, liquids, and gases in their environment.

Introduction: Tell students that they will create a mystery substance. Follow the recipes for either Gak or Goop, using the attached directions page. (Both of these substances are thixotropic, which means that they will exhibit some characteristics of both a solid and a liquid).



As students create their mixtures, allow them to describe the new substance. As a team, allow students to name their substance and describe how it could be used. Share and discuss their ideas.

Ask:

- ★ Which state of matter is the mystery substance?
- ★ What are the three common states of matter on earth?
- ★ What are the characteristics of each state of matter?
- ★ What are examples of solids, liquids, and gases that we observe in our environment?

Vocabulary:

- ★ Matter
- ★ Molecule
- ★ Solid
- ★ Liquid
- ★ Gas
- ★ Plasma (optional)

Science TEKS:

(3.2) **Scientific processes.** The student uses scientific inquiry methods during field and laboratory investigations. (A) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology; (B) collect information by observing and measuring; (C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence; (D) communicate valid conclusions (3.7) **Science concepts.** The student knows that matter has physical properties. (B) identify matter as liquids, solids, and gases.

Technology Application TEKS:

(4) **Information acquisition.** (A) apply appropriate electronic search strategies in the acquisition of information including keyword and Boolean search strategies (5) **Information acquisition.** (A) acquire information including text, audio, video, and graphics. (7) **Solving problems.** (A) use software programs with audio, video, and graphics to enhance learning experiences. (B) use appropriate software to express ideas and solve problems including the use of word processing, graphics, databases, spreadsheets, simulations, and multimedia. (9) **Solving problems.** (B) use software features, such as slide show previews, to evaluate final product. (10) **Communication.** (A) use font attributes, color, white space, and graphics to ensure that products are appropriate for the defined audience; (B) use font attributes, color, white space and graphics to ensure that products are appropriate for the communication media including multimedia screen displays, Internet documents, and printed materials; (11) **Communication.** (A) publish information in a variety of media including, but not limited to, printed copy, monitor display, Internet documents, and video; (B) use presentation software to communicate with specific audiences.

Step 2 – Investigate

Use the following resources to learn about solids, liquids, and gases. Students may also search EBSCO Kids Search for “matter” or “solid, liquid, gas.”

K-12 Database Resources:

- ★ [The States of Matter](#). By: Olivey, Harold. *Monkeyshines on Health & Science*, Jan98 Physics, p20-21, 2p, 1 diagram; Reading Level (Lexile): 750; (AN 12908068)
- ★ [Solids, liquids, and gases](#). By: Ward, Brian., *First Fun Science Encyclopedia*, 2003, p76, 1p, 1 diagram, 1bw, Reading Level (Lexile): 650; AN 9865541
- ★ [Lab Rats](#). By: Whyte, Shawna Stuart. *U.S. Kids*, Dec2000, Vol. 13 Issue 8, p14, 2p, 1bw; Reading Level (Lexile): 640; (AN 3947915)
- ★ "matter." *Britannica Elementary Encyclopedia*. 2008. Encyclopædia Britannica Online School Edition. 13 Oct. 2008
<<http://school.eb.com/elementary/article?articleId=353444>>.

Additional Websites:

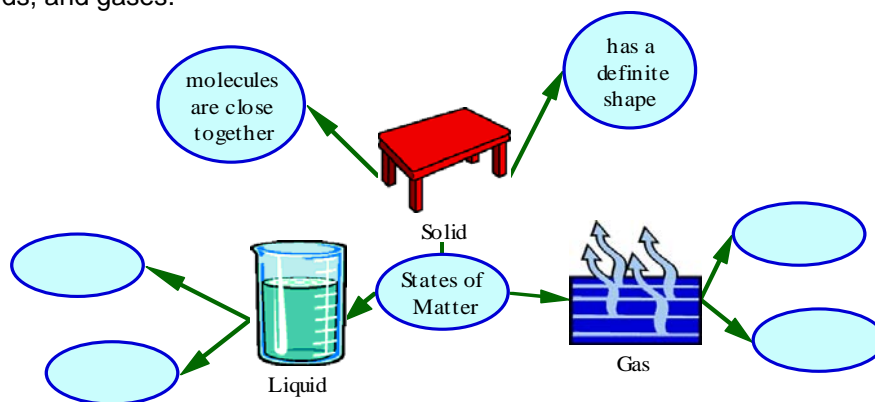
- ★ Revisewise Science - States of Matter Animation
http://www.bbc.co.uk/schools/revisewise/science/materials/08_act.shtml

Books:

- ★ Hewitt, Sally. *Solid, Liquid, or Gas (It's Science)*. Connecticut: Children's Press, 1998.
- ★ Zoehfeld, Kathleen Weidner. *What is the World Made Of? All About Solids, Liquids, and Gases*. New York: HarperTrophy, 1998.

Step 3 – Create

Students will create a graphic organizer to show what they learned about each state of matter. They can include the characteristics of each state as well as examples of solids, liquids, and gases.



 **Technology Link** –Use a graphic organizer program, such as Kidspiration.

Step 4 – Discuss

Students will create a slideshow about the three most common states of matter. They will describe the characteristic of each state of matter and include pictures of objects that are examples of each state. Finally, they will explain which state of matter they think the mystery substance is and the reasons for their opinion.

🔗 Technology Link – Use a digital camera to photograph objects that are solids, liquids, and gases. Insert the images into a multimedia program, such as AppleWorks, Kid Pix, or PowerPoint.

Extension Activity – Create a bar graph to show the number of items students found that were solids, liquids, and gases. Students can generate word problems about the graph.



Step 5 – Reflect

Allow students to present their projects to the rest of the class. Use the following suggested rubric to assess the students' work. Make sure that the students are familiar with the rubric *before* they begin creating their project. They should refer to the rubric repeatedly to monitor their progress in creating their project.

🔗 Technology Link: You can also create your own rubric with your students at <http://rubistar.4teachers.org/index.php>.

States of Matter Slideshow

CATEGORY	4	3	2	1
Description of Characteristics	Describe the characteristics of each state of matter in-depth with details and examples. Subject knowledge is excellent.	Includes essential knowledge about the characteristics of each state of matter. Subject knowledge appears to be good.	Includes essential information about the characteristics of each state of matter but there are 1-2 factual errors.	Content is minimal OR there are several factual errors.
Examples of each state	Student provides at least 4 examples of each state of matter. All examples are accurately labeled.	Student provides at 3 examples of each state of matter. All examples are accurately labeled.	Student provides 2-3 examples of each state of matter. There may be 1 or 2 examples labeled incorrectly.	Student only provides 1-2 examples of each state of matter. Some examples may be incorrectly labeled.
Identifying the Mystery Substance	Student provides at least 3 well-developed reasons for determining the state of matter of the mystery substance.	Student provides at least 2 well-developed reasons for determining the state of matter of the mystery substance.	Student provides at least 1 reason for determining the state of matter of the mystery substance.	Student choose a state of matter for the mystery substance, but does not explain his/her choice.
Attractiveness	Makes excellent use of font, color, graphics, effects, etc. to enhance the presentation.	Makes good use of font, color, graphics, effects, etc. to enhance to presentation.	Makes use of font, color, graphics, effects, etc. but occasionally these detract from the presentation content.	Makes use of font, color, graphics, effects etc., but these often distract from the presentation content.

Mystery Substances

Ingredients for Gak:

Solution A:

- 1 1/2 cups warm water
- 2 cups Elmer's white glue
- Food coloring (optional)
- Mix together until dissolved

Solution B:

- 4 teaspoons borax
- 1 1/3 cups warm water
- Mix together until dissolved

Instructions:

Pour solution A into Solution B. Knead the mixture together.

Ingredients for Goop:

- 1 cup water
- Food coloring, your choice of color (optional: coloring can stain!)
- 1 1/2 cups cornstarch

Instructions:

Combine water and coloring in plastic container. Gradually add starch, stirring with a spoon or kneading with your fingers as mixture thickens.