# Can You Eat Matter?

**Overview:** Matter takes up space. The concept of matter can be so much more fun than distinguishing solids, liquids, and gases. Have fun with your students while completing an experiment on how matter can change from one state to another with food. You can complete just one experiment or all three.

**Procedure:**
1) Give students the following writing prompt: *Can matter change from one state to another? Why or why not?* After students have written their responses, encourage them to share their ideas with the class.
2) Present students with the activity materials (ice cream, soda, juice, and chocolate chips). Briefly describe each activity, and tell the students we will be changing the properties of these foods.
3) Ask the students to predict/hypothesize the ending state of matter for each activity.
4) Experiment 1: Give each student a clear cup. Have students add a scoop full of ice cream into their cup. Ask students the state of matter for frozen ice cream (solid). Pour in soda and discuss its state of matter (liquid). Watch the gas bubbles pour out of your cup. Ask students for the state of matter of the bubbles (gas). Afterwards, enjoy your float while continuing to discuss the change in matter you just witnessed.
5) Experiment 2: Give each student a cup. Add juice to each cup. Discuss the state of matter of juice (liquid.) Then place a popsicle stick in each cup. Put the cups in a freezer for a few hours. Take out your popsicles and enjoy! While eating your popsicles continue to discuss the change in matter your students observed during this cooking activity.
6) Experiment 3: Have students observe the chocolate chips and identify the state of matter (solid). Heat up the chocolate chips and have students identify the new state of matter (liquid). Enjoy the melted chocolate on a spoon.
7) As a class, brainstorm other food or experiments that can demonstrate the change in matter. Encourage students to complete some of these new activities you discussed at home!

**ASOLs Covered in this Activity:**

**SCIENCE**

**5S-FME 5:** The student will investigate and understand that matter is anything that has mass, and takes up space, and occurs as solid, liquid, or gas. Key concepts include
a) distinguishing properties of each phase of matter;
b) the effect of temperature on the phases of matter;
c) atoms and elements
d) molecules, and compounds;
e) mixtures including solutions.

**8S-FME 5:** The student will investigate and understand the nature of matter. Key concepts include
a) the particle theory of matter;
b) elements, compounds, mixtures, acids, bases, and salts
c) solids, liquids, and gases;

d) physical properties;
e) chemical properties;
f) characteristics of matter based on physical and chemical properties

**Extension Idea:**

This activity gives students the opportunity to investigate solids, liquids, and gases. While completing this activity you can discuss the theory of matter, temperatures effect on matter, and the physical and chemical properties of matter. After this activity, describe the atoms and molecules in each state of matter. Draw or create an example of the atoms in all three phases while relating to the food experiments.

**5S-SI 1:** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) distinctions are made among observations, conclusions, inferences, and predictions;
b) objects or events are classified and arranged according to characteristics or properties;
e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources;
h) hypotheses are developed as cause and effect relationships;

**5S-SI 2** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

d) hypotheses are formed from testable questions;
i) inferences are made and conclusions are drawn;

**8S-SI 1** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations which

a) observations are made involving fine discrimination between similar objects and organisms;
e) a method is devised to test the validity of predictions and inferences;
f) one variable is manipulated over time, using many repeated trials;
h) data are analyzed and communicated through graphical representation;

**8S-SI 2i:** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which patterns are identified in data and are interpreted and evaluated.

**8S-SI 3:** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

j) valid conclusions are made after analyzing data;
l) experimental results are presented in appropriate written form.

**HSS-SI 2** The student will demonstrate an understanding of the nature of science and scientific reasoning and logic. Key concepts include

b) evidence is required to evaluate hypotheses and explanations;
c) observation and logic are essential for reaching a conclusion

**Extension Idea:**

These standards can be addressed through the course of this activity's scientific process.

**8S-FME 3b:** The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include the properties of water in all three phases.

**Extension Idea:**

Have students conduct a similar experiment using water. Students will be able to identify and investigate the properties of water in all three phases.

**8S-FME 4a:** The student will investigate and understand the properties of air and the structure and dynamics of Earth's atmosphere. Key concepts include air as a mixture of gaseous elements and compounds.

**8S-ESS 5f:** The student will investigate and understand the organization of the solar system and the interactions among the various bodies that comprise it. Key concepts include the unique properties of Earth as a planet.

**HS-ESS 1c:** The student will investigate and understand the characteristics of Earth and the solar system. Key concepts include characteristics of the sun, planets and their moons, comets, meteors, and asteroids.

**Extension Idea:**

Relate the previous learned knowledge of the three phases of matter to the planets, sun, moons, comets, meteors, and/or asteroids.

**READING & WRITING**

**3E-RW 2a:** The student will use newly acquired vocabulary drawn from reading and other content areas.

**3E-CN 1g:** The student will sequence at least two steps in a procedure or ideas/incidents in an event.

**4E-RW 1c:** The student will use newly acquired vocabulary drawn from reading and other content areas.

**5E-RW 1f:** The student will demonstrate understanding of content-specific words.

**7E-RW 1e:** The student will demonstrate an understanding of word relationships by using synonyms and antonyms.

**7E-CN 1e:** The student will use content words and phrases from a nonfiction text.

**8E-RW 1e:** The student will acquire and use content words and phrases.

**8E-WP 1a:** The student will write to convey ideas and information including facts, details, and other information.

**d:** The student will use content specific vocabulary when writing about a topic.

**8E-WP 3b:** The student will write to convey ideas and information including facts, details, and other information as well as graphics and multimedia as needed.

**8E-WP 5a:** The student will write an argument to support a claim with one clear reason or piece of evidence.

**HSE-WP 1b:** The student will write to convey ideas and information using clear organization

and including facts, details, and other information as well as graphics and

multimedia as needed.

**c:** The student will write about an event or personal experience by introducing the event or experience, at least one character, and describing multiple events in sequence.

**HSE-RW 2c:** The student will acquire and use content words and phrases.

**Extension Idea:**

Upon completion of this experiment, students can write about their new food experiment. Particular attention may be given to content words and sequence of events. Encourage students to include illustrations, tables, graphs, and digital photographs. Texts might take the form of a PowerPoint presentation, book, journal entry, newsletter, or blog. These texts might make great additions to self-selected reading libraries.

**MATH**

**3M-NSCE 7 a:** The student will differentiate between whole, half, and fourth.
**4M-NSCE 2 a:** The student will represent equivalent fractions (e.g., 2/4=1/2).
**5M-NSCE 4 b:** The student will differentiate between halves, fourths, and eighths.
**6M-NSCE 3 a:** The student will compare the relationships between two unit fractions.
**7M-NSCE 1 a:** The student will add fractions with like denominators (halves, thirds, fourths, and tenths) with the sum less than or equal to one.
**8M-NSCE 2 a:** The student will subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than equal to one.

**Extension Idea:**

Use the soda (liquid) from your experiment as a visual during instruction on fractions. Using the same size clear container students can compare, add, and subtract fractions using soda.

**3M-MG 1a:** The student will identify coins (penny, nickel, dime, quarter) and their values.
**4M-NSCE 3a:** The student will round money to a nearest dollar.
**7M-NSCE 2c:** The student will demonstrate the value of various money amounts using decimals.

**Extension Idea:**

After the experiment, have students determine the price of all of the food bought to complete the experiment. Have students identify coins, count the amount of money needed to buy the food, write the price, and/or round the amount to the nearest dollar.

**8M-MG 2 a**: The student will identify volume of common measures (cups, pints, quarts, gallons, etc.).
**HSM-EO 1 a**: The student will match an algebraic expression involving one operation to represent a given word expression with an illustration.

**Extension Idea**:

Use the soda (liquid) as a visual for common measurements, measurement conversions, and algebraic expressions using volume.

**History**

**HS-H 7** The student will identify and compare changes in community life over time in terms of buildings, jobs, transportations, and populations.

**HS-H12f:** The student will demonstrate knowledge of the first permanent English settlement in America by describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival.

**HS-H20c:** The student will demonstrate knowledge of factors that shaped colonial America by describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, free African Americans, indentured servants, and enslaved African Americans.

**Extension Idea:**

Students can even use cooking matter to learn about history. Enjoy making home-made butter while learning about community life long ago. Pour cream into a clear container with a lid. Shake and watch the liquid turn into solid butter. Discuss with your students how life would be without a grocery store.

**Materials Needed:**

-cups (Clear cups works best for floats and small paper cups work best for popsicles.)
- soda
-juice
-ice cream
-popsicle sticks
- chocolate chips
-microwavable container
-microwave
-spoons

**Instructional Setting:**

This activity requires a microwave and freezer.

**Community Connections and/or Peer Interaction:**

Students can work together in small groups. Partnering with typically developing peers would be a wonderful way to build social skills as they work through the steps.

**Functional Activity/Routine:**

This activity encourages functional skills such as turn-taking, following instructions, cooking, and cleaning up afterward.

**Strategies to Collect Evidence:**

For collection of evidence, be sure that each student records a hypothesis, data, and conclusion individually.

**Specific Options for Differentiating this Activity:**

-Prepare food so that students with different needs can enjoy them. This may include blending or flavored Chap Stick.
-Try different food options or non-edible matter experiments.

-Allow students to use their preferred “pencil” when writing. This may include writing utensil, keyboard, alternative pencil, or dictating to a scribe.
-Prepare, as necessary, for each student to make choices and communicate with their preferred method. This may include using augmentative communication.