

#9300

MATTER: SOLIDS, LIQUIDS AND GASES

AIMS MULTIMEDIA

2001

Grade Levels: 5-12

15 minutes



DESCRIPTION

A teenage narrator presents general information about matter: its characteristics, qualities, properties, and states and changing states. Gives definitions and a review.

ACADEMIC STANDARDS

Subject Area: Physical Sciences

- Standard: Understands the structure and properties of matter
 - Benchmark: Knows that matter has different states (i.e., solid, liquid, gas) and that each state has distinct physical properties; some common materials such as water can be changed from one state to another by heating or cooling
 - Benchmark: Knows factors that influence reaction rates (e.g., types of substances involved, temperature, concentration of reactant molecules, amount of contact between reactant molecules)

INSTRUCTIONAL GOALS

1. To identify solids, liquids and gases in the environment.
2. To explain how matter changes state.
3. To describe the processes of vaporization, evaporation and condensation.
4. To calculate the volume and mass of various forms of matter.
5. To list the properties of various forms of matter.

VOCABULARY

1. condensation
2. evaporation
3. gas
4. liquid
5. mass
6. matter
7. molecule
8. solid
9. vapor
10. volume

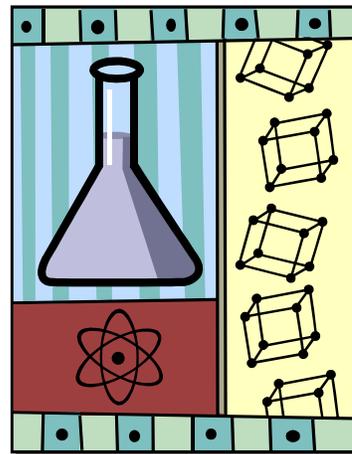
BEFORE SHOWING

Take a good look at the surroundings. Which are in a solid state? Which are in a gaseous or liquid state? What sort of changes could cause the things around them to change states? Name some specific examples.

AFTER SHOWING

Applications and Activities

1. Ask students to choose a scientist from the list below and write a one-page summary of their chosen person's contributions to science.
 - a. Dmitri Mendeleev
 - b. Ernest Rutherford
 - c. Niels Bohr
 - d. Antoine Lavoisier
 - e. Albert Einstein
 - f. Robert Boyle
2. We learned that liquids pour and take on the shape of the container they are placed in. However, sand can also be poured. In addition, when wet sand is placed into a bucket, it takes on the shape of the bucket. Does this mean that sand is a type of liquid? What other substances have similar properties?
3. Ask each student to look through a magazine and locate a photograph with several components. Next, ask them to categorize each substance found in their pictures as solid, liquid or gas. Which types of matter could easily change states? What environmental changes might cause these changes of state to take place?
4. To help the class understand the universal presence of matter, ask each student to choose a science-related article from a magazine or newspaper. What types of matter are mentioned in the articles? What "changes of state" are mentioned, such as vaporization, evaporation, melting, or solidifying? Have students present a summary of their articles to the class.
5. The *gram* is a metric unit. Metric units make it easy to convert measurements into other units. How can these conversions make it easier to record the mass of the objects such as an orange, a hardback textbook, a wooden chair, and a small car? How do they make calculations easier?
6. Ask students if they have ever wondered why the oceans don't freeze in winter. Do they have any theories or guesses? An experiment can explain this. Place a paper cup filled with water in the freezer. Also, place another paper cup filled with water and a tablespoon of salt mixed together. Ask them to check on both cups every 20 minutes for two hours. What happens? How does this knowledge help us clear the streets of ice when it gets cold?
7. Ask each student to locate three types of matter in the classroom. For each type of matter, have them list all the physical properties they can. Encourage them to consider each type of matter using each of the five senses. In addition, they can investigate the physical properties of each matter/type using library resources.
8. Ask each student to write a question related to the program. Collect the questions and use them to write a review quiz. After giving the quiz, ask students if they enjoyed designing the test. How would they feel about designing more tests in the future?



RELATED RESOURCES



Captioned Media Program

- Heat and the Changing States of Matter #3475
- How Does Heat Change Material? #2484
- Solid, Liquid, Gas #2331



World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and “kid safe” sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **THE PHANTOM’S PORTRAIT PARLOR**

<http://www.miamisci.org/af/sln/phantom/index.html>

Click on the mirror icon “Phases of Matter” geared toward Grades 6-12 then it’ll lead you to another page where you can choose a material (water, copper, or nitrogen) and change the temperature in order to view its molecular chamber and what its state is (gas, liquid, or solid).

- **GLENCOE ONLINE PHYSICAL SCIENCE QUIZ**

http://www.glencoe.com/sec/science/lep_science/physical_science/tutor/quizzes/test08.html

A 25-question quiz relating to the states of matter, provides a “Hint” link if you need additional information before answering the questions.

- **MATTER IS THE STUFF AROUND YOU**

http://www.chem4kids.com/files/matter_intro.html

A Chem4Kids site, begin a tour of physical and chemical properties, how matter can change, its states, and much more information.