

STEM: Matter and Volume

UNIT PLAN

Virginia Standard 5.4

The student will investigate and understand that matter is anything that has mass, takes up space, and occurs as a solid, liquid, or gas. Key concepts include:

- a) atoms, elements, molecules, and compounds;
- b) mixtures including solutions; and
- c) the effect of heat on the states of matter.

Understanding the Standard

This standard incorporates various characteristics of matter such as mass, volume, and the effect of heat on the three states of matter. Instruction should center on the basic structure of matter and how it behaves. This standard builds on standard 3.3, which provides a basis for understanding the structure of matter. It is intended that students will actively develop scientific investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

Day 1:

Introductory Activity (60min)

- Read Dr. Seuss' book *Bartholomew and the Oobleck* to the class.
- Make Oobleck:

1 1/2 C. Corn Starch

1 C. Water

Food Color (optional)

- Using graduated cylinders and triple beam balances, students practice finding the mass and volume of their Oobleck.

Homework: Journal Activity in My Curriculum (Students write their own story about Oobleck.)

Teachers may want to assign some of the following Instruction Modules to introduce volume before this activity.

Aha! Math:

- [Volume of Rectangular Prisms with Cubes and with Measurements](#)
- [Estimating Volume](#)

Other volume resources available in Aha!Math includes:

- Finding Volume of Composite Shapes
- Finding Volume of solid shapes
- Observing Changes in Pyramids

- Observing Changes in Cylinders
- Observing Changes in Square Prisms
- Formula for the Volume of a Cone

Day 2:

Properties of Matter/Journal Notes (30 min)

- As a class go through the Properties of Matter Instruction Module and complete the note sheet.
- Stop often to answer questions and discuss the lesson.
Homework: “Floating and Sinking Lesson”

Day 3:

Properties of Metals (30 min)

- Go through the “Properties of Metals Lesson” as a whole class.
- Assign students the “Conduction Lesson” to complete individually.
Homework: “Treasure Hunt Game”

Day 4:

Phase Change Lab (60 min)

- In small groups, students get a cup of crushed ice and a thermometer.
- They make a hypothesis about what will happen to the ice.
- They take the temperature every minute and record an observation.
- Students will make a spreadsheet of the temperature every minute and then create a line graph of their results.
- Then they complete the activity sheet answering questions about phase changes.

Homework: “Water Bops Game”

Teachers may want to assign some of the following lessons to introduce spreadsheets and line graphs.

EasyTech Spreadsheet Basics:

- [Parts of a Spreadsheet](#)
- [Tables and Data](#)
- [Cell Formatting](#)
- [Columns and Rows](#)

EasyTech Graphing in Spreadsheets:

- [Line Graphs](#)

Other spreadsheet resources available in EasyTech include:

- Measuring Matter
- Mixtures and Solutions
- Graphing in Spreadsheets Unit Quiz

Day 5:

Properties of Matter Quiz (15 min)

- Students take the “Properties of Matter” quiz.

Day 6:

Elements and Compounds/Journal Notes (30 min)

- As a class go through the Elements and Compounds Instruction Module and complete the note sheet.
- Stop often to answer questions and discuss the lesson.

Homework: “Compound Cruiser Game”

Day 7:

Matter Models (60 min)

- Students will make models of atoms that will hang like mobiles from the ceiling. Students will use cotton balls for the nucleus, wire/pipe cleaner for the electron’s orbit, and small beads for the electrons. (Students may choose to create a hydrogen atom or an oxygen atom.)
- Students will make models of a water molecule. They will draw a picture of an oxygen atom on construction paper and cut it out. Then they will do the same for two hydrogen atoms and then glue them together to form a molecule of water.

Homework: “Compound Super Store Game”

Day 8:

Chemical Creations Activity (30 min)

- Complete the “Chemical Creations Activity” as a class.

Homework: “Periodic Table Lesson”

Day 9:

Mixtures (60 min)

- Complete the “Mixtures Lesson” as a class.
- In small groups students complete the Mixture Lab. (Students practice creating mixtures and solutions and then separating them.)

Homework: Review Matter Notes

Day 10:

Elements and Compounds Quiz (15 min)

- Students take the Elements and Compounds Quiz

Day 11:

Matter Review (60 min)

- Students use this time to replay and review the matter games and lessons.
- As a whole class, play a review game using questions from the note sheets.

Homework: Study for the Matter Test

Day 12:

Matter Test (30 min)

- Students take the “Matter Test” which is a Journal in the easy set.