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What is matter?

Concepts:

- Matter is anything that has mass and takes up space.
- There are different types of matter: organic and inorganic.
- Organic matter consists of objects that are living or have been alive at one time.
- Inorganic matter has never been alive.
- Everything in the universe is either matter or energy.
- Energy is needed to move matter, to change matter or do any type of work. Examples of energy are heat and light.

Vocabulary Words: matter mass energy *organic *inorganic

Construct and Read: *Lots of Science Library Book #1*

Activities:

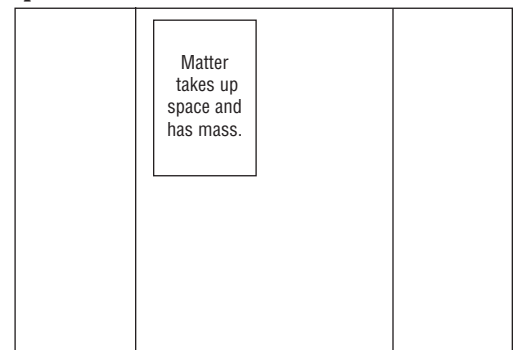
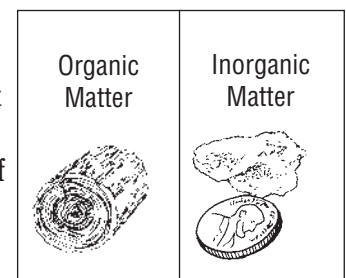
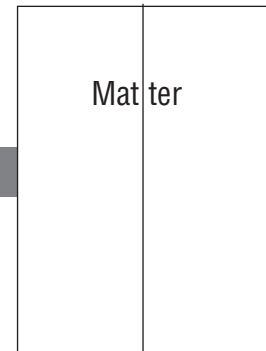
Organic and Inorganic Matter – Graphic Organizer

Focus Skills: classifying objects and comparing and contrasting.

Paper Handouts: a copy of Graphic 1A - H 8.5" x 11" sheet of paper
12" x 18" sheet of paper.

Graphic Organizers: Make a Desktop Project from the 12" x 18" sheet of construction paper. Label it *Matter*. Ask your students to draw pictures of organic and inorganic matter on the front. Set aside for future use.

Make a Large Question and Answer Book from the 8.5" x 11" sheet of paper. On the left tab write *Organic Matter*. On the right tab write *Inorganic Matter*. Ask your students to cut apart Graphics 1A- H. Discuss each picture with your student, asking if it is organic matter or inorganic matter. After students have divided the pictures into two piles, ask them to glue one picture on the top of each tab and open the tab and glue each picture under its appropriate tab. Close the Large Question and Answer Book, and label the front *Matter takes up space and has mass*. Glue this book inside the *Matter Desktop Project*, on the top left of the middle section. Store for future use.



Investigative Loop - Air Has Weight - Lab 1-1

Focus Skill: observing and drawing conclusions

Paper Handouts: 8.5" x 11" sheet of paper a copy of Lab Graphic 1-1

Lab Materials: a yardstick two paperclips three pieces of string two balloons

Graphic Organizer: Make a Large Question and Answer Book. This is the student's lab book. Glue Lab Graphic 1-1 on the left tab.

Question: Does air have weight?

Research: Read the *Lots of Science Library Book #1* and review the question.

Procedure: Make a balance with a yardstick by tying a string in the middle and tying a paperclip at both ends of the yardstick. Attach one deflated balloon on each paperclip. Hold the string in the middle to make sure the balance is even. Now remove a balloon attached to one end of the stick, blow it up, tie it off, and attach it to the paperclip again.

Observations: How did the yardstick look when both of the balloons were deflated? How did the yardstick look when one balloon was blown up?

Record the Data: Under the tab, write or draw your observations for this lab, explain how the yardstick looked with two deflated balloons, with one deflated, and with one blown up balloon.

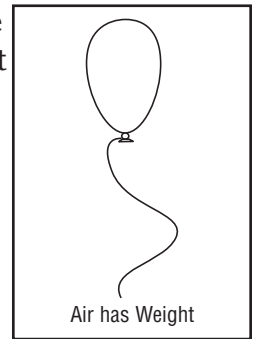
Conclusion: What does this lab indicate about air? **Possible answer: when the balloon was blown up, it was filled with air. It should have weighed more and therefore caused the yardstick to go down on the side of the blown up balloon.**

Communicate the Conclusions: Under the tab, write a description of the lab explaining why the yardstick changed after the inflated balloon was attached to one end.

Spark Questions: Discuss any questions sparked by this lab.

New Loop: Choose one question to investigate further.

Design Your Own Experiment: Select a topic based upon experiences in the Investigative Loop. See page vii for more details.



Investigative Loop - Air Takes Up Space - Lab 1-2

Focus Skill: explaining a concept

Lab Materials: a deep bowl to hold water two see-through glasses water

Paper Handouts: a copy of Lab Graphic 1-2 Lab Book

Graphic Organizer: Glue Lab Graphic 1-2 on the right tab.

Question: Does air take up space?

Research: Read the *Lots of Science Library Book #1* and review the question.

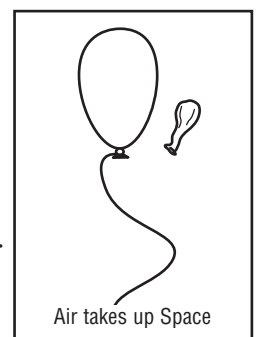
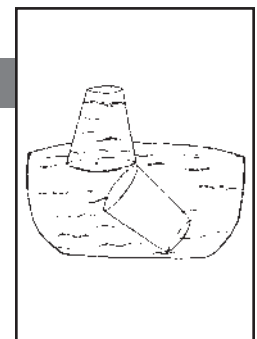
Procedure: Fill the bowl half full of water. Immerse one of the glasses in the water, filling it with water. Turn the glass top side down in the water. Take the other glass, put it in the water top side down so that no water gets into it, place the second glass underneath the first and release the air into the first glass. The air should replace the water by pushing the water out and leaving the first glass filled with air.

Observations: What happened when the air was poured into the glass of water?

Record the Data: Under the tab, write your observations for this lab. Draw a picture of the lab if desired.

Conclusions: What does this lab tell you about air? **Air takes up space.** How does it demonstrate that air is matter? **Matter takes up space.**

Communicate the Conclusions: Under the tab, write an explanation of why air has the ability to remove the water from the first glass. Explain your lab to one other person.



Spark Questions: Discuss any questions sparked by this lab.

New Loop: Choose one question to investigate further.

Design Your Own Experiment: Select a topic based upon experiences in the Investigative Loop. See page vii for more details.

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.

Teacher's Note:    Students may create a Large Question and Answer side-by-side book for the *Who's Who of Atoms, Molecules, and Matter* found in this section of the lessons.



1. List five pieces of matter in your room. Draw a picture of each item on the list in a Half Book.



2. *Who's Who* Early alchemists experimented with matter trying to change it into gold. Research the alchemists of the 1500's and report your findings in a Large Question and Answer Book. See the above **Teacher's Note**.

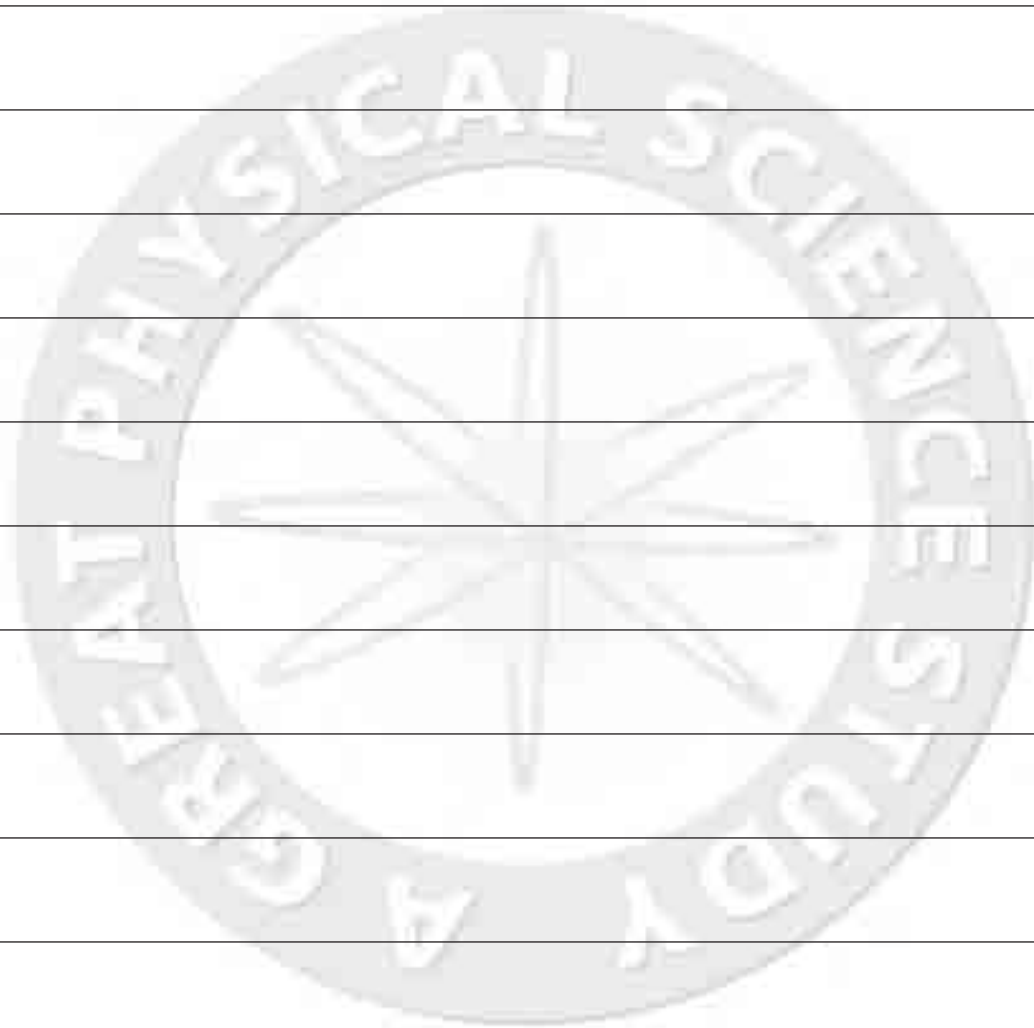


3. Play "Matter 20 Questions" with your students. Draw or write the name of different organic and inorganic matter on index cards. A student picks one card, and the other students ask questions regarding the word/picture the student saw. Examples of matter are desk, dog, planet, etc. Examples of questions: "Do you need to eat? Can you move?"



4. Make a Venn diagram to compare and contrast organic matter and inorganic matter.

Notes





What is the composition of matter?

Concepts:

- The Ancient Greeks were the first to describe the concept of atoms.
- Molecules are the smallest part of a substance or material.
- Molecules are made up of atoms.
- Atoms are the building blocks of all matter.

Vocabulary Words: molecules atoms microscope *substance *composition

Construct and Read: *Lots of Science Library Book #2*

Activities:

Size of Atoms

Focus Skill: observing and describing

Activity Materials: salt

Activity: Pour a little bit of salt into your student's hand. Isolate one grain of salt and reread the section in the *Lots of Science Library Book #2* that helps explain the size of atoms. Discuss this distance with your student using places in your community to determine about 6 1/2 miles.

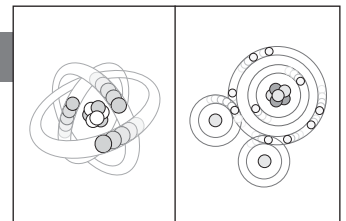
Atoms and Molecules - Graphic Organizer

Focus Skill: defining component

Paper Handouts: a copy of Graphic 2A-B 8.5" x 11" sheet of paper
Matter Desktop Project

Graphic Organizer: Make a Large Question and Answer Book. Glue Graphic 2A on one tab and Graphic 2B on the other. Close the book. On the front, write *Matter is composed of atoms and molecules*. Under the tabs:

- Draw the pictures from the front tab.
- Complete . Write clue words about atoms and molecules: atoms - *building blocks of all matter, make up molecules, paper is 1,000,000 atoms thick.* molecules - *smallest part of a substance that is still that substance, only seen with powerful microscope.*
- Explain what you have learned about atoms and molecules under the appropriate tab. Open the *Matter Desktop Project*. Glue this book on the top right of the middle section.



	Matter takes up space and has mass.	Matter is composed of atoms and molecules.	
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Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.



1. Antoine Lavoisier, a French chemist, is thought to be the founder of chemistry. Research this scientist and create a Four Door Book explaining the “who, what, when, and where” about his scientific career.



2. *Who's Who* Add Leucippus, Democritus, and Robert Boro to the *Who's Who* Book.



3. Microscopes changed scientific investigations. Research and create a time line of the microscope.



4. Collect common small objects and examine them under a microscope (e.g. a drop of liquid, a hair, an insect, a piece of fruit). Draw several circles on a sheet of paper. Draw what you see in the microscope in the circle. Label the circle with the name of the object and the power of the lens used for observation.



5. Pretend that you are so small you can only be seen with a microscope. Write a narrative about a day in your life.



6. Google: atoms



7. Google: molecules





What are atoms?

Concepts:

- Atoms are the building blocks of matter.
- Atoms have three parts: protons, neutrons and electrons.
- Protons have a positive charge, are heavy, and move slowly.
- Neutrons have no charge.
- The nucleus is the center of an atom and consists of neutrons and protons packed together.
- Electrons have a negative charge. These particles attract each other and keep the atom together.

Vocabulary Words: protons neutrons electrons nucleus *subatomic

Construct and Read: *Lots of Science Library Book #3.*

Activities:

Atoms – Graphic Organizer

Focus Skill: categorizing characteristics

Paper Handouts: a copy of Graphics 3A-E two 8.5” x 11” sheets of paper
12” x 18” sheet of paper

Graphic Organizer: Make a Desktop Project from the construction paper. Cut Graphic 3A on the dotted line and glue it on the cover of the Desktop Project. Title it *Atoms*.

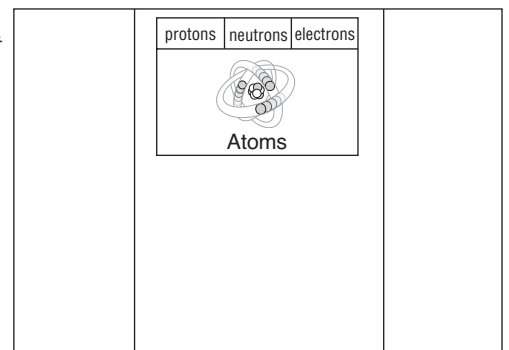
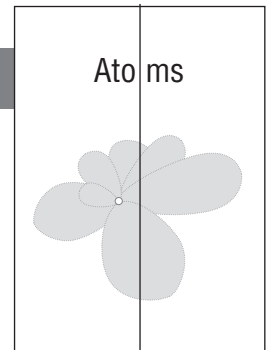
Cut out Graphics 3B-E, stack them in order, and staple on the left side. Label the left tab *protons*, the middle tab *neutrons*, and the right tab *electrons*.

On the *protons* page, color the protons red. On the *neutrons* page, color the neutrons blue. On the *electrons* page, color the electrons yellow.

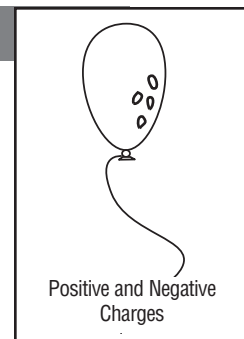
Complete . Write clue words about each part of an atom. protons: *in nucleus, positively charged, heavy, move slowly.* neutrons: *in nucleus, no charge.* electrons: *negatively charged, orbit nucleus in shells or levels.*

Describe each part of an atom on the appropriate page.

Glue the 3 Top Tab Book on the top, middle section in the Atoms Desktop Project. Store for future use.



Positive and Negative Charges - Investigative Loop - Lab 3-1



Focus Skill: demonstrating a concept

Lab Materials: balloon paper hole punch

Paper Handouts: 8.5" x 11" sheet of paper copy of Lab Graphic 3-1
Lab Book

Graphic Organizer: Make a Large Question and Answer Book. Glue it side-by-side to the Lab Book. Glue Graphic 3-1 to the left tab.

Question: Do like charges attract or repel?

Research: Read *Lots of Science Library Book #3*.

Procedure: Punch holes in the paper and spread the paper circles on a table. Rub an inflated balloon on your head several times. Hold the balloon close to the paper circles, but do not touch them. The paper circles are drawn to the balloon.

Observations: How did the paper circles react to the balloon? **The paper was attracted to the balloon.**

Record the Data: On the inside top section under the tab; write or draw your observations of the lab. **Teacher's Note: Your students may not know the charges that were created in this lab but may be aware that unlike charges caused the attraction. Explain the lab if needed: When you rub the balloon on your hair, it gives the balloon extra negative charges, by rubbing the electrons off of the hair. The positive charge in the paper is attracted to the negative charge on the balloon.**

Communicate the Conclusions: Demonstrate this lab to someone who did not participate in it with you. Ask him/her to predict what will happen to the paper circles before you put the balloon near them. Explain the conclusions of this lab.

Conclusion: What does this tell us about charges?

Spark Questions: Discuss any questions sparked by this lab.

New Loop: Choose one question to investigate further.

Design Your Own Experiment: Select a topic based upon experiences in the Investigative Loop. See page vii for more details.

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.



1. Research the Nobel Prize. Make a Four Door Book and report on the "what, when, who, and why" of the Nobel Prize. Make a timeline of Nobel Prize winners.



2. *Who's Who* Add John Dalton and J.J. Thomson to the *Who's Who* Book.



3. Research, sketch, and report on changes in the atomic model since it was first conceptualized by Democritus as an uncuttable atom.

