Lesson Plan: Matter and Its Properties

Grade Level: 4
Subject: Physical Science
Duration: 45–60 min
NGSS 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (Context: Heat energy causing phase changes in matter).

Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** the three states of matter (solid, liquid, gas) and their distinct properties.
- **Describe** how energy (heat) causes physical changes in matter, such as melting and

Materials Needed: (all links are included in this PDF)

- Matter Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-4-matter.pdf)
- Planning Pinwheel Activity (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-matter-planning-pinwheel-3.pdf)
- Matter Worksheet 1 (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-matter-0.pdf)
- Vocabulary Matching Worksheet (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-matter-1.pdf)

Lesson Procedure

Step 1: Introduction (5 minutes)

- Engage students by asking: 'What happens to an ice cube if you leave it on the sidewalk in summer?' Discuss how heat energy changes the ice.
- Distribute the Matter Study Guide and review the definitions of atoms and the three states of matter. (https://newpathworksheets.com/api/guide/study-guide-science-grade-4-matter.pdf)

Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to explain the difference between Physical Changes (melting, chopping) and Chemical Changes (burning, rusting).
- Demonstrate the properties of matter listed in the guide: Mass, Volume, and Buoyancy.

- Administer Matter Worksheet 1 to assess student understanding of states of matter, atoms, and phase changes. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-matter-0.pdf)

Differentiation Strategies

For advanced learners:

- Ask students to investigate the water cycle and explain how it represents a series of physical changes driven by energy.

For learners needing support:

- Provide real-world examples (water, ice, steam) to visualize the three states of matter during the Study Guide review.

Extension Activities

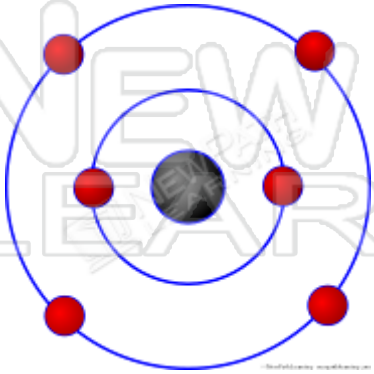
- Create a 'Molecule Model' using clay or marshmallows to show how atoms pack tightly in solids but move freely in gases.
- Conduct a simple evaporation experiment to observe a liquid changing into a gas.

- Vocabulary Quiz (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-matter-2.pdf)

MATTER

Matter is ALL Around Us!

Matter is anything that **takes up space and has mass**. Matter is made up of atoms. **Atoms** are the basic building blocks of matter and make up all objects.



Solid: A state of matter in which **molecules are packed tightly together** so they can't move around. Solids always hold the same basic shape. An example of a solid is a rock.

Liquid: A state of matter in which the molecules are close together, but are able to move around slowly. Liquids take the shape of whatever they are poured into. An example of a liquid is water.

Gas: A state of matter in which the molecules are far apart and can move around freely. Gas has no shape. Oxygen is an example of a gas.

Lesson Checkpoint:
What are the three states of matter?

Matter can Change States!

Not to New York, California, or Texas...matter change states from **solid, liquid, or gas.**

An example of physical change: shaping clay into different shapes, you change the shape of the clay but not what the clay is made of.

A **chemical change** changes what particles of matter are made of, which produces a new kind of matter.

An example of chemical change: combining baking soda + vinegar = carbon dioxide. The carbon dioxide is the new matter created.

Lesson Checkpoint:
What is the difference between a physical change and a chemical change?

Flexibility: A property of matter that refers to the ability an object has to be stretched without breaking.

Buoyancy: The ability an object has to float in a liquid.

Lesson Checkpoint:
What are three properties of matter?

Measuring Matter: Units of measurement

Meters, centimeters, grams, and liters are all examples of units of measurement.

For example, meters and centimeters are units of measurement that can be used to measure the **length** and **width** of an object.

Tools used for measuring:

Many properties of matter can be measured using different tools.

For example, **volume** is an amount of space measured in units. A **graduated cylinder** can be used to measure volume.

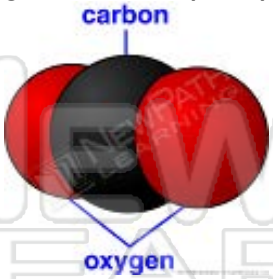
Lesson Checkpoint:
What can be used to measure volume?

What happens what matter is mixed, dissolved, or combined?

A **mixture** is a combination or two or more substances. The substances in a mixture are **physically combined**, which means they can be separated. Substances that are mixed together have the same properties as they did before they were mixed together. When you add chocolate chips to your cookie dough before you bake the cookies, you make a mixture of dough and chips. You could separate them again if you had to, since one did not dissolve in the other. That is a mixture.

A **solution** is when one or more substances are dissolved in another substance. A **solute** is the substance that is dissolved in the solvent. The **solvent** is the substance that dissolves another substance. **Solubility** refers to the ability of one substance to dissolve into another substance. When you make lemonade, you combine water,

made up of carbon and oxygen atoms (CO_2).



Lesson Checkpoint:
What is a mixture?

Planning Pinwheel

Sci D

Name _____ Class _____ Date _____

Purpose

Question

Needed Materials

Test Method

PREVIEW

Please Sign In or Sign Up to download the printable version of this worksheet

Data Collection

Planning Pinwheel

Sci D

Name _____ Class _____ Date _____

Primary Examples

Question

Does the bean seed need light to germinate?

Needed Materials

- 3 bean seeds
- paper towel
- plastic baggie

Test Method

1. seeds on paper towel
2. wet towel
3. seal baggie

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orange juice, milk, soap solution, dressing)

2. Dip test strip in each
3. Check for color change and compare to chart

make chart to record results

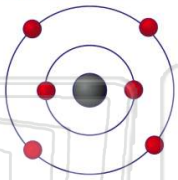
Data Collection

Matter

Sci D

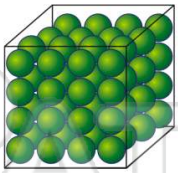
Name_____ Class_____ Date_____

1 **Atoms** are the basic building blocks of _____, which makes up all objects that take up space and have mass.



A density
B volume
C matter
D air

2 When **molecules** are packed so tightly together that they **cannot move** around, what **state of matter** is this?



A solid
B liquid
C gas
D air

3 **Matter** is any substance that has _____.

A mass and takes up space
B mass

4 Which is true of **solids**?

A They fill up whatever room they are in.
B They take the shape of what they are put in.

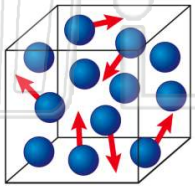
5

7

any shape.
C It would become a gas.
D It would keep its own shape.

C It always keeps its shape.
D It takes the shape of what it is poured into.

9 **Gas** is matter in which the molecules are _____ and can **move around** freely.



A tightly packed
B packed closely
C far apart
D close together

10 **Properties of matter** can be identified by which of the following?

A using your senses
B how it reacts to a magnet
C how easily it breaks
D all of the above

Matter

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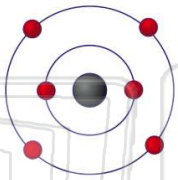
Name_____ Class_____ Date_____

1 **Atoms** are the basic building blocks of _____, which makes up all objects that take up space and have mass.

A density
B volume
C matter
D air



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2 When **molecules** are packed so tightly together that they **cannot move** around, what **state of matter** is this?

A solid
B liquid
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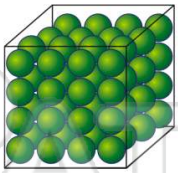
D air



A

3 **Matter** is any substance that has _____.

A mass and takes up space
B mass

A

4 Which is true of **solids**?

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B They take the shape of what they are put in.

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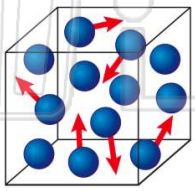


C

10 **Properties of matter** can be identified by which of the following?

A using your senses
B how it reacts to a magnet
C how easily it breaks
D all of the above

D

Matter

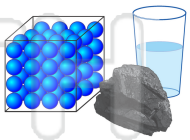
Sci D

Name_____ Class_____ Date_____

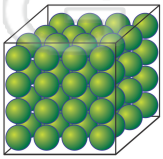
Match each of the following terms to its definition:

Chemical change	Flexibility	Compound	Liquid
Matter	Gas	Solid	Buoyancy

1. - anything that has mass and occupies space - a solid, liquid or gas



2. - a state of matter that has its own shape and never changes shape; an object with definite mass and volume



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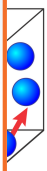

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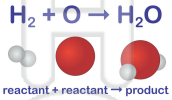
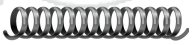
7. - a molecule made up of two or more different elements that are chemically combined



8. - a property of matter that refers to the ability an object has to be stretched without breaking



Matter

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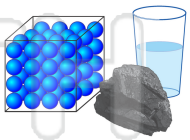
Name_____ Class_____ Date_____

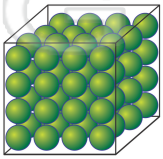
Match each of the following terms to its definition:

Chemical change	Flexibility	Compound	Liquid
Matter	Gas	Solid	Buoyancy

1. matter - anything that has mass and occupies space - a solid, liquid or gas



2. solid - a state of matter that has its own shape and never changes shape; an object with definite mass and volume



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4. gas
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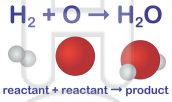
7. compound - a molecule made up of two or more different elements that are chemically combined



8. flexibility - a property of matter that refers to the ability an object has to be stretched without breaking