🔬 Lesson Plan: Properties of Matter and Energy

Grade Level: 5
Subject: Physical Science
Duration: 45–60
NGSS 5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen.

🎯 Learning Objectives

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

- **Identify** the basic properties of matter including mass, volume, weight, and density.
- **Describe** the different forms of energy and how energy can be transferred.
- **Explain** the relationship between matter and energy and how they can be transformed.

- **Kinetic Energy:** Energy that is happening now; energy in motion. The faster an object moves or the more mass it has, the more kinetic energy it has.
- **Potential Energy:** Energy that is waiting to happen; stored energy. An object at the top of a slide or a pulled-back rubber band has potential energy.

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

- Printed copies of the Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-properties-of-matter-and-energy.pdf)
- Vocabulary matching worksheet (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-properties-of-matter-and-energy-1.pdf)
- Properties of Matter and Energy worksheet (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-properties-of-matter-and-energy-0.pdf)
- Pan balance
- Graduated cylinder
- Spring scale
- Small objects of different masses and volumes (such as a rock, sponge, metal spoon, wooden block)
- Rubber band

- Demonstrate measuring mass with a pan balance, volume with a graduated cylinder, and weight with a spring scale using classroom objects.
- Explain the difference between mass and weight: mass is the amount of matter and stays constant, while weight is the pull of gravity and can change.
- Introduce energy as the ability to do work, and discuss kinetic energy (energy in motion) and potential energy (stored energy) with concrete examples. (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-properties-of-matter-and-energy.pdf)

Step 3: Guided Practice (15 minutes)

- Distribute the vocabulary matching worksheet and work through the first two terms as a class to model the process. (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-properties-of-matter-and-energy-1.pdf)
- Have students work in pairs to complete the vocabulary worksheet, matching terms like matter, energy, conduction, and convection to their definitions. (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-properties-of-matter-and-energy-1.pdf)
- Demonstrate how kinetic energy can change into heat energy by having students rub their hands together quickly and feel the warmth produced.
- Show how a rubber band pulled back has potential energy that becomes kinetic energy when released.

Step 4: Independent Practice (15 minutes)

- Provide students with the Properties of Matter and Energy worksheet to complete individually. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-properties-of-matter-and-energy-0.pdf)

- Conduct oral questioning: 'What tool would you use to measure the mass of a rock?' 'Give an example of potential energy you can see in this room.'

Differentiation Strategies

For advanced learners:

- Challenge students to research and present on additional forms of energy such as nuclear or radiant energy, and how they are used in real-world applications.
- Have students design an experiment to compare the density of different liquids (water, oil, syrup) by observing which liquids float or sink when layered.

For learners needing support:

- Provide a pre-labeled diagram showing the tools used to measure mass, volume, and weight with pictures and simple descriptions.
- Offer one-on-one or small-group assistance during the vocabulary matching activity, reading definitions aloud and discussing examples together.

Extension Activities

- Have students create a poster illustrating the three methods of heat transfer (conduction,

matter-and-energy-0.pdf)

- Worksheet: Properties of Matter and Energy (Set 2) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-properties-of-matter-and-energy-1.pdf)
- Worksheet: Properties of Matter and Energy (Set 3) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-properties-of-matter-and-energy-2.pdf)

- Vocabulary: Properties of Matter and Energy (Set 1) (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-properties-of-matter-and-energy-1.pdf)
- Vocabulary: Properties of Matter and Energy (Set 2) (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-properties-of-matter-and-energy-2.pdf)

PREVIEW

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PROPERTIES OF MATTER AND ENERGY

What is matter?

Matter is anything that takes up space and has mass.

Properties of Matter

Mass
Definition: the amount of matter in an object
Tool for measuring: pan balance

Volume
Definition: the amount of space an object takes up
Tool for measuring: graduated cylinder

Weight
Definition: the measure of the pull of gravity on an object

pot that insulates against heat energy so that you can hold a hot pot using the wooden handle and not get burned.

Other properties of matter include **magnetism** which is the property of being magnetic (attracting iron or steel) and **buoyancy**, which is the ability of an object to float.

Energy

Energy is the ability to do work.

Kinetic energy is energy that is happening now; it is energy in motion. The faster an object is moving, the more kinetic energy it has. The more mass an object has, the more kinetic energy it will have.

Kinetic energy can change forms. For example, kinetic energy can change into heat energy when you rub your hands together.

Potential energy is energy that is waiting to happen; it is stored energy. Examples of potential energy include a rubber band being pulled back or someone sitting on the top of the slide – both have the potential to move, but have not moved just yet).

Lesson Checkpoint: What is kinetic and potential energy?

to its position. Mechanical energy can be either kinetic energy (energy of motion, like a rolling ball) or potential energy (stored energy because of an object's position, like an arrow pulled back in a bow).

Radiant Energy

Radiant energy is energy that travels in the form of electromagnetic waves. Radiant energy includes visible light, x-rays, gamma rays, and radio waves.

Lesson Checkpoint: Describe one form of energy.

How does heat get transferred?

- **By conduction** which is the transfer of heat between two objects that TOUCH. For example: When a metal spoon is put inside a cup of hot chocolate, heat travels from the hot chocolate to the spoon because the two are touching and because metal is an excellent conductor of heat.

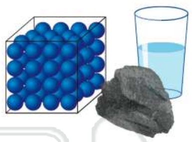
- **By convection** which is the transfer of heat through liquid or gas. An example of this is a heated pool.

- **By radiation** which is the transfer of heat through electromagnetic waves, such as radiation inside a greenhouse.

Lesson Checkpoint: What is one way heat can get transferred?

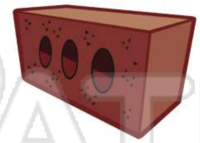
Name______________________ Class______________ Date__________

1 Which is the **best definition** of the word **matter**?



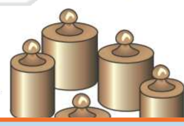
A anything that is hard and has weight
B anything that is large in size
C anything that takes up space and has mass
D anything that has volume

2 If you were trying to figure out the **amount of matter** in a certain object, you would be trying to figure out the __________ of that object.



A velocity
B volume
C density
D mass

3 Which of the following tools would you use to **measure the mass** of an object?



A a pan balance
B a thermometer
C a graduated cylinder

4 Hannah determined the **amount of space** the liquid in container A takes up. She determined the __________ of the liquid in container A.

A mass
B weight

PREVIEW

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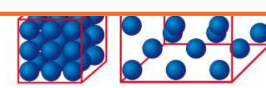
D a ruler

B mass
C density
D volume



9 A dry, solid **rock** conducts **electricity** **better** than a **long, metal wire**.

True or false?

A true
B false

10 Which is an example of **matter that insulates against energy**?

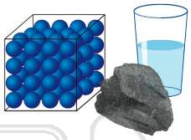
A a metal spoon
B wire
C a wooden handle
D a key

Properties of matter and Energy

Sci E

Name_____ Class_____ Date_____

1 Which is the **best** definition of the word **matter**?



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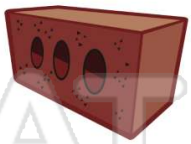

A velocity
B volume
C density
D mass

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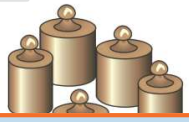

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Properties of matter and Energy

Sci E

Name_____ Class_____ Date_____

1 Which of the following objects can have **magnetic** properties?

A a wood chip
B a paperclip
C a plastic fork
D a paper cup

2 Peter was testing a plastic boat, a ball of clay, and a wooden ruler to see which items could **float** and which could not. What **property of matter** was Peter testing?

A magnetism
B buoyancy
C mass
D volume

3 Scientifically, **work** occurs when an object is **moved**. Which of the following is the **ability** to do work?

A velocity
B matter

4 Energy in **motion**, or energy that is happening now, is _____.

A potential energy
B kinetic energy
C gravitational energy

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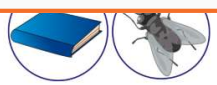
D a rubber band pulled back



D Heat energy

9 Which of the following is an example of **potential energy**?

A a rubber band being pulled back
B a person kicking a ball
C a person running on grass
D a person clapping hands

10 _____ is the **movement or flow of charged particles** that are called electrons.

A Heat energy
B Electrical energy
C Sound energy
D Mechanical energy

Properties of matter and Energy

Sci E

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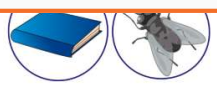

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Properties of matter and Energy

Sci E

Name_____ Class_____ Date_____

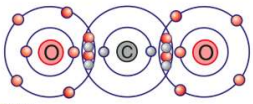
1 **Lightning** is a form of _____ energy.

A potential
B mechanical
C electrical
D chemical

2 **Thermal energy** is energy related to _____. An example of thermal energy is **geothermal energy**.

A space
B chemicals
C sound
D heat

3 _____ is energy **stored** in the **bonds** between atoms of molecules. It's the bonding energy that holds these particles together.



A Mechanical energy

4 **Mechanical energy** is the energy an object has due to its _____.

A weight
B motion or position
C size and shape

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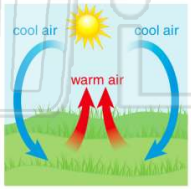
C radiant
D sound

B by radiation
C by thermal reduction
D by conduction

9 The **transfer of heat** from one area to another **through liquid or gas** occurs by _____.



A convection
B radiation
C thermal reduction
D conduction

10 **Radiation** is the transfer of heat through electromagnetic waves. Which is an example of **radiation**?

A putting on a sweater
B the Sun warming your face
C turning a light on
D lighting a match

Properties of matter and Energy

Sci E

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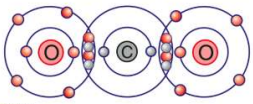

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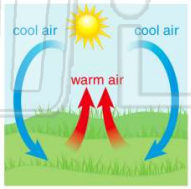

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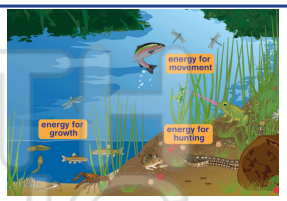
Properties of matter and Energy

Name_____ Class_____ Date_____

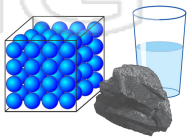
Match each of the following terms to its definition:

Weight	Electrical energy	Convection	Density
Matter	Energy	Conduction	Chemical energy

1. - the ability to do work; what animals need to grow and move



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



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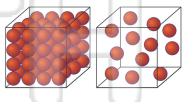
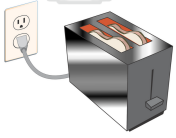
7. - a property of matter that tells how much matter fits into a certain space; the amount of mass per unit volume



8. - energy made available by the movement or flow of charged particles called electrons through a conductor



Properties of matter and Energy

Name_____ Class_____ Date_____

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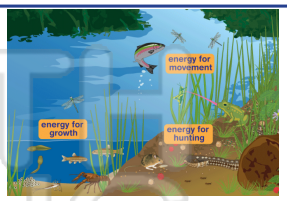

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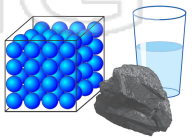

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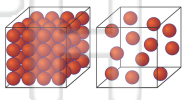
6. con

7. density - a property of matter that tells how much matter fits into a certain space; the amount of mass per unit volume



8. electrical energy - energy made available by the movement or flow of charged particles called electrons through a conductor