What is Matter?
Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode–do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the filmstrip to the left. (View/Hide Filmstrip.)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.

Materials Needed Per Group:

<u>Explore: Lab A–Comparing Mass</u>

Triple beam balance
Empty soda can
Student scissors
Water-based marker
Gallon-sized baggie
Full can of soda
Full bottle of water
Full-sized scissors
Sharpie™

<u>Explore: Lab B–Testing Magnetism</u>

Wand magnet
Clipboards, 1 per student (optional)

<u>Explore: Lab C–Testing Relative Density</u>

Large Bowl
Table tennis ball
Lime
Highlighter
Glue stick
Paper towels
Water
Golf ball
Walnut
Craft stick
Binder clip

<u>Explore: Lab D–Observing Physical State</u>

Empty water bottle
Vinegar
Snack baggie
Small funnels, 2
Paper towels
1 balloon
Baking Soda
Beaker (250 mL)
Teaspoon
Hand lens (1 per student)

<u>Explore: Lab E–Measuring Volume</u>

Beaker (250 mL)
Water
Large marble
Large paper/foam cups, 2
Paper towels
Metric ruler
Graduated cylinder (100 mL)
Blue or red food coloring
Solid cube or wooden block

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Materials, continued

Explore: Lab F–Testing Solubility in Water

Graduated cylinders (50-100 mL), 2	Food coloring, 3 different colors
Cooking oil, 25 mL	Water, 25 mL
Small baggie	Salt
Straw	Paper towels

Explore: Lab G–Testing Conductors and Insulators of Thermal Energy

Beakers or glass jars, 4	Thermometer
Foil	Thick, corrugated cardboard
Felt square	Water
Timer	Masking tape

Evaluate: Anchor Charts

Chart paper or poster board Markers
Rulers, optional

Other Materials

Student Recording Sheets	Explore Lab Procedures Sheets
Student Summative Evaluation	Science notebooks
Pencils	Cardstock
Sheet protectors	Microwave or kettle (to heat water)

Advanced Preparations

- Duplicate the Explore Lab Procedures on card stock. Place in sheet protectors. The number of copies you duplicate depends on the chosen option (see Explore Facilitation Notes).
- Duplicate copies of the recording sheets for each student.
- Assemble all materials in a central location for ease of distribution.
- Explore Lab A: Place all of the objects except the triple beam balance in the large baggie.
- Explore Lab C: Place the objects in a large baggie. Fill the bowl about ¾ full of water.
- Explore Lab D: Place about 2 spoonfuls of baking soda in a snack baggie for each group. Measure about 150 mL of vinegar in a beaker for each group.
- Explore Lab E: Fill one paper/foam cup with water for each group. Fill another cup with water and add 3-4 drops of food coloring.
- Explore Lab F: Put a small amount of salt in a condiment cup or baggie for each group. Have oil available in a central location.
- Explore Lab G: Review safety procedures for using hot water in a science lab. Heat enough water to put about 100 mL of water in each of the 4 beakers or jars for each group.

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Engage

- Start with the title slide, pointing out the objective and discussing what it means.
- Call on students to give ideas about what matter is. If necessary, remind students that matter is anything that has mass and takes up space.
- Show the lesson contents slide and discuss the engage question and description.
- Read the section title slide. Have students list 3 things they already know about matter in their science notebooks. Allow time for sharing and discussing what they know.
- Start the video about matter. Continue playing until the end of page 7 in the book. Have students list the topic of the video and the definition of matter on their video note-taking document.
- Continue the video. Stop it after reading page 16 of the book. Have students list the three states of matter on their note-taking sheet.
- Continue the video, stopping after reading page 33. Have students list 4 things that are not matter. (Remind them that the video said sound, light, and heat are not matter–they are forms of energy. What other forms of energy do the students know?)
- Continue the video until the end. Have students list 5 important vocabulary terms they heard in the video.
- Write the terms *volume, mass* and *weight* on the board. Tell students that the video defined matter as anything that takes up space and has <u>weight</u>. Review the difference between mass and weight. Tell the students that a better scientific definition of matter is anything having volume and mass.
- Have students complete the engage evaluation independently. Discuss as desired.

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Explore: Properties of Matter

- Read and discuss the introductory slides about physical properties in general.
- Depending on students' abilities levels, the amount of time allotted for this lesson, and the availability of resources, choose one of the two options below to complete the Explore portion of the lesson.
  - OPTION 1:
    - Divide the class into groups of 4-5 students each.
    - Set up the materials so that each group has the necessary resources to perform the lab at the same time.
    - Read and discuss the slide about mass. Have students watch the video to review how to use a triple beam balance.
    - Have all of the groups work through Explore Lab A independently. Circulate around the room, asking questions and redirecting thinking as needed.
    - Continue in the same manner for the other labs. (NOTE–this option may take 5-6 class periods to complete.)
  - OPTION 2:
    - Divide the class into groups of 4-5 students each.
    - Set up 1 set of each explore lab in stations around the classroom.
    - Read through and discuss the slides about all eight of the physical properties that students must learn for this expectation.
    - Assign a different lab station to each group.
    - The groups work independently, moving to a new station when they finish one station. (You can have them move in order, or just go to an empty station.)
    - Continue in this manner until the groups have completed all of the stations. (This option may take 2-3 class periods to complete.
- See the directions for implementing the introductory electricity conductors and insulators slides on the next page of these notes. NOTE: There is not a hands-on student lab for conductors and insulators of electricity. This will be part of the separate electricity lesson.
- NOTE: You will discuss their lab results during the explain part of this lesson.

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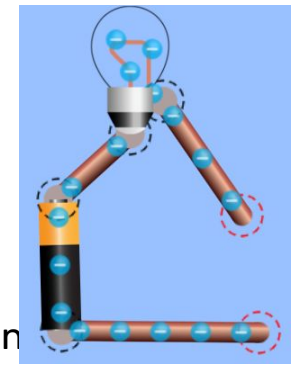
PHET Circuit Construction Kit Instructions

- Open this link and display for the whole class: https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc_en.html
- Click on the word "INTRO".
- Drag a bulb, a battery, and 3 wires onto the work area.
- Use these three components to make a simple open circuit. (Click on the edges to move and rotate the pieces as needed.)
- Click the down arrow in the gray box on the left side of the page.



- Ask students if they think the first object, a wire, is a conductor or an insulator of electrical energy. Have them record their predictions in the data table on their recording sheet.
- Drag the wire into the opening in the circuit. Be sure to connect the ends of the wire to the ends of the other wires. The light bulb should be lit. Have students record that the wire is a conductor in the results column of their data table.
- Click on the wire that you added to the circuit and then on the yellow trash can centered at the bottom of the work area.
- Continue in the same manner for the remainder of the objects shown.
- Discuss as desired.

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Explain

- Read the introductory slide. Make sure students understand that the properties of matter can be observed, tested, and measured. They should also know that matter can be compared and contrasted using these physical properties.
- Discuss and explain the properties of matter and the results of their lab investigations.
  - Lab A–Mass: Review the results of their lab investigation. Call on volunteers to answer the questions on the recording sheet. Read and discuss the explain slide. To answer the question at the bottom of the slide, have students compare the masses of the fruits on each balance. For example, the apple has more mass than the banana. The banana and the orange have the same mass. The correct answer to the question is the apple. On the second explain (mass) slide, use the online activity to practice using the triple beam balance. Call on volunteers to tell the answers to the questions on the slide. Have students define the term *mass* in their science notebooks using their own words.
  - Lab B–Magnetism: Review the results of their lab investigation. Make sure students understand that most objects that are attracted to a magnet contain iron, cobalt, or nickel. Read and discuss the explain slide for magnetism. Call on volunteers to identify which objects are magnetic and which are not. Have students define the term *magnetism* in their science notebooks using their own words.
  - Lab C-Relative Density: Review the results of their lab investigation. Make sure students understand that objects with MORE relative density that water will SINK. Objects with LESS relative density than water will FLOAT. Call on volunteers to identify which of the objects pictured on the explain relative density slide will sink and which will float. Have students define the term *relative density* in their science notebooks using their own words.
  - Lab D-Physical State: Review the results of their lab investigation. Read and discuss the definitions of solid, liquid, and gas explain slide for physical state. Make sure students understand that the gas (air) is INSIDE the balloon dog. The balloons themselves are solids. Call on volunteers to call out different examples of solids, liquids and gases as you fill in the table. Have students define the terms *physical state, solid, liquid,* and *gas* in their science notebooks using their own words.
  - Lab E–Volume: Review the results of their lab investigation. Use the online websites to practice measuring volume. Have students define the term *volume* in their science notebooks using their own words.

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Explain, continued

- Continue with the rest of the physical property labs.
  - Lab F–Solubility in Water: Review the results of their lab investigation. Work a class to complete the C - E - R on the explain slide. Remember, the CLAIM is just the answer to the question, i.e., "The salt is soluble in water." The evidence is what data or information in the problem that supports their claim, i.e., "The salt seemed to disappear." The reasoning is the science behind the science rule or principle that describes why the evidence supports the claim, i.e., "When an ingredient is soluble in water, it dissolves or seems to disappear." Have students define the term *solubility in water* in their science notebooks using their own words.
  - Lab G-Thermal Energy Conductors or Insulators: Review the results of their lab investigation. Have students read through the cards describing some properties of different kinds of matter. Drag a picture to the center of the screen. Call on a volunteer to tell if the object is a conductor or an insulator of thermal energy. Drag and drop the pictures in the correct columns. Have students define the terms *thermal energy, conductor,* and *insulator* in their science notebooks using their own words.
  - Lab H-Electrical Conductors or Insulators: Review the results of their lab investigation. Carefully observe the pictures and discuss the answers to the questions as desired. Have students define the term *electrical energy* in their science notebooks using their own words.

Elaborate

- Display each slide. Call on volunteers to read the question/prompts. Have students respond on the digital responde document or in their science notebooks.
- Discuss student answers. Elaborate on their responses as desired.

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Evaluate

- Divide the class into 8 groups. Each group will be responsible for creating an anchor chart on one physical property studied in this lesson:
  - Mass
  - Magnetism
  - Relative Density
  - Physical State
  - Volume
  - Solubility in Water
  - Conductors/Insulators of Thermal Energy
  - Conductors/Insulators of Electrical Energy
- Go over the slide showing the directions and tips for making these anchor charts. Give students time to create and present their charts.
- Display the charts around the classroom or in nearby hallway.
- Let students complete the quiz independently.
- Discuss evaluation as desired.

What is Matter?

Name: KEY

Evaluation

1. Some students added 4 grams of each substance shown below to a beaker of water. Which of the substances would be soluble in the water? Circle all the answers that apply

2. A student dropped a glue stick and a marble into a glass of water. The glue stick floated but the marble sank to the bottom. Which of the following is a valid conclusion based on these results?

F The glue stick floats because it is less dense than the marble.

G The marble sinks because its density is less than the water's density.

H The glue stick floats because it has less relative density than the water.

J Both the glue stick and the marble have a greater relative density than water.

3. Some students wrapped four 250 mL beakers with a different material. Then they poured 100 mL of hot water into each beaker and covered them with pieces of cardboard. After 10 minutes, they measured the temperature of the water in each beaker. What property of matter were they likely investigating?

A Ability to insulate against the flow of thermal energy

B Ability to insulate against the flow of electrical energy

C Ability to insulate against the flow of mechanical energy

D Ability to insulate against the flow of light energy

What is Matter?

Name: _____

Evaluation

4. A science teacher places the following items on a tray.

- Nail
- Cotton ball
- Penny
- Craft stick
- Cork bottle stopper

Which of the following correctly identifies the physical properties of the objects?

F

Object	Conductor	Insulator	Magnetic
Nail	✓		✓
Cotton ball		✓	
Penny		✓	✓
Craft Stick		✓	
Cork Stopper		✓	

G

Object	Conductor	Insulator	Magnetic
Nail	✓		✓
Cotton ball		✓	
Penny	✓		
Craft Stick		✓	
Cork Stopper		✓	

H

Object	Conductor	Insulator	Magnetic
Nail	✓		
Cotton ball		✓	✓
Penny	✓		✓
Craft Stick		✓	
Cork Stopper		✓	✓

J

Object	Conductor	Insulator	Magnetic
Nail	✓		
Cotton ball		✓	
Penny	✓		
Craft Stick		✓	
Cork Stopper			✓

5. Which of the following would be classified as a good insulator of thermal energy?

A Aluminum, because thermal energy flows through it easily

B Copper, because thermal energy flows through it easily

C Glass, because it lets both heat and electricity pass through it

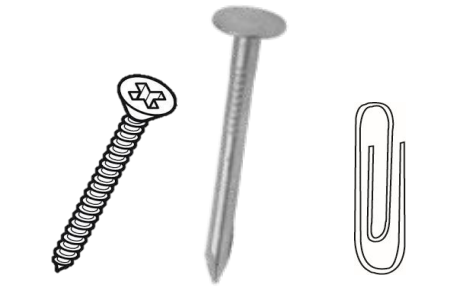
D Plastic, because thermal energy does not flow through it easily

What is Matter?

Name: _____

Evaluation

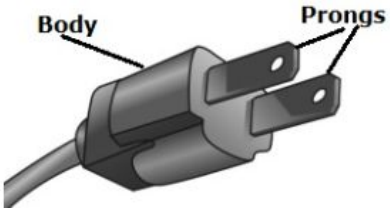
6. A student places three objects into a group based on their physical properties.



What physical property is the same for all four objects? Mark all answers that apply.

F Mass
G Relative Density
H Physical state
J Magnetism
K Volume
L Color

7. The illustration shows an electric cord plug with a plastic body and metal prongs. Which of the following best explains what the plug body is made of plastic?



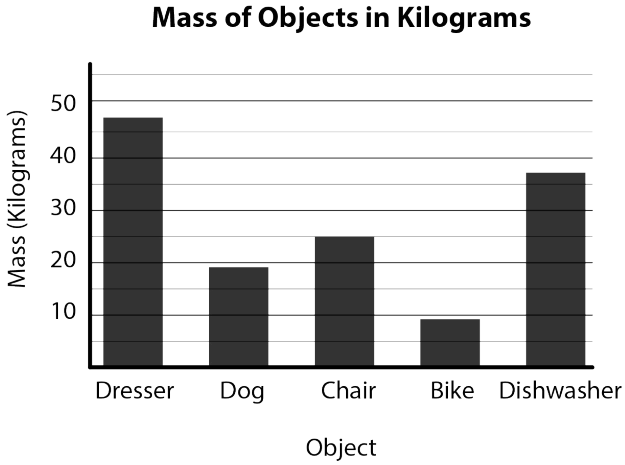
A Plastic is a good conductor of electrical energy
B Plastic is a good insulator of electrical energy.
C Metal is a good conductor of electrical energy.
D Most metals are attracted to magnets.

What is Matter?

Name: _____

Evaluation

8. The graph shows the masses of several common objects. Which of the objects has a greater mass than the weight shown with the graph?



F The dresser only

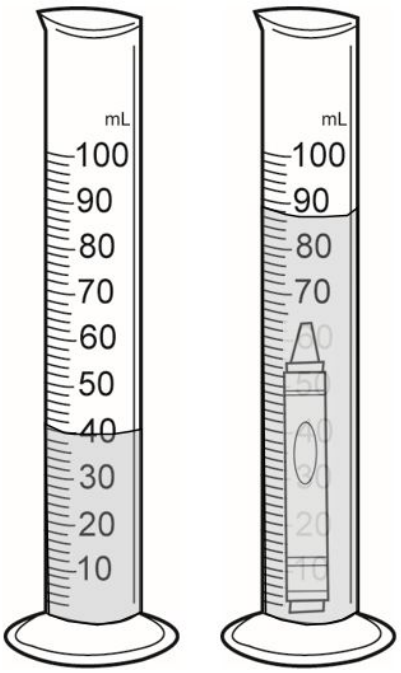
G The dog, the chair, and the bike

H The dresser, the dishwasher, and the chair

J The dresser and the dishwasher only

Use the illustration to answer questions 9 and 10.

9. A student found the volume of some water in a graduated cylinder. Then he put a crayon in the same cylinder. What is the volume of the water?



A 40 mL

B 60 mL

C 78 mL

D 88 mL

10. What is the volume of the crayon?

F 40 mL

G 42 mL

H 48 mL

J 88 mL

What is Matter?

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Engage: What is Matter?--Video Note-Taking

What is the topic of this video?

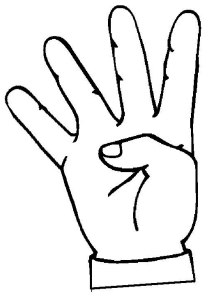
1. _____
   _____
   _____

Matter is anything that has–

1. _____
2. _____

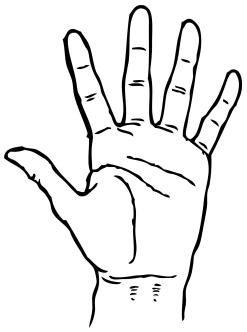
Matter can be found in three states:

1. _____
2. _____
3. _____



Some things are not matter:

1. _____
2. _____
3. _____
4. _____



Key Terms from the video:

1. _____
2. _____
3. _____
4. _____
5. _____

What is Matter?

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Engage: What is Matter?

Directions: Use words from the Word Bank to complete each sentence. Some words may be used more than one time.

Word Bank			
gas	liquid	mass	matter
solid	volume	weight	

1. Anything that has mass (the amount of matter in a substance) and volume (takes up space) is called _____.

2. _____ is the measure of the pull of gravity on an object or substance.

3. The three states of matter are _____.

4. _____ is an example of matter in a solid state.

5. _____ is an example of matter in a liquid state.

6. _____ is an example of matter in a gaseous state.

7. The amount of space an object takes up is its _____.

8. _____ is the amount of matter in an object or substance.

9. What is the difference between *mass* and *weight*?

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Engage: What is Matter?, page 2

Directions: Complete the table below by writing the following terms in the correct columns according to their physical state: *water, ice, water vapor, lemonade, rock, sugar, salt, oxygen, milk, helium, air,* and *cola*.

Solid	Liquid	Gas

10. Light, heat, and sound are not examples of matter. What are they? How can you tell light, sound, and heat are not examples of matter? _____

_____

_____

_____.

11. Look around your classroom. List 5 examples of matter that you see around you. _____

_____

_____.

What is Matter?

Physical Properties Lab A–Comparing Mass
Procedures

Directions: Follow the procedures below to investigate how mass can be measured and used to compare different objects. Record your observations and answer the questions on your recording sheet as you work.

1. Remove all of the objects from the large baggie.
2. Pick up each object and observe it carefully.
3. Discuss the physical properties of the objects with your group members.
4. Predict which object has the greatest mass. Write the name of the object in the first row of the data table on your recording sheet.
5. Then, predict the rest of the objects in order from most mass to least mass. Write them in order in the data table.
6. Use the triple beam balance to find the mass of each object. Record the mass (in grams) in the correct place in the data table.
7. In the last column, record the actual order of the objects from most mass to least mass. Write a number 1 for the object with the most mass, 2 for the object with the next greatest mass, and so on.
8. Answer the rest of the questions on the recording sheet.

What is Matter?

Name: _____

Physical Properties Lab A
Comparing Mass Recording Sheet

Object	Predicted Order of Mass	Mass (g)	Actual Order (1-7)

1. How can the mass of an object be measured? _____

   _____

2. Which object had the greatest mass? _____
3. Which object had the least mass? _____
4. What is the difference between the mass of the object with the greatest mass and the mass of the object with the least mass? (Show your work in the space below.)

5. How can mass be used to compare different kinds of matter?

   _____

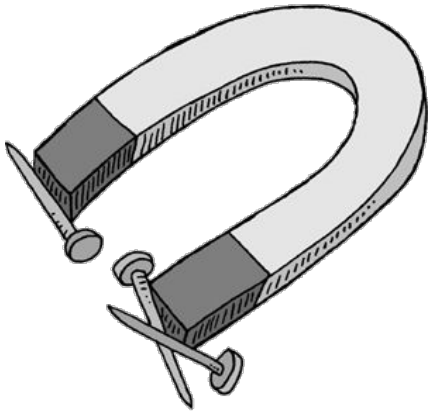
   _____

What is Matter?

Physical Properties Lab B–Testing Magnetism
Procedures

Directions: You are going on a scavenger hunt in your classroom for magnetic objects! Follow the procedures below to investigate magnets and their uses.

1. Think about magnets and the objects that might be attracted to them.
2. On your recording sheet, make a list of 6-8 objects you might find in your classroom that will be attracted to a magnet.
3. Do not disturb other groups that are working as you complete carry out your classroom magnetic scavenger hunt.
4. With a bar or wand magnet, test objects in your classroom to see if they are magnetic. Try to find at least 6 objects that are magnetic (attracted to a magnet) and 6 objects that are non-magnetic (not attracted in a magnet.
5. Complete the data table on your recording sheet as you find objects that are magnetic and non-magnetic. Be sure to say if it is magnetic, where it is found, and what its purpose is.
6. Answer the question on the recording sheet. Use evidence from your explorations to justify your answer.



What is Matter?

Name: _____

Physical Properties Lab B–Testing Magnetism
Recording Sheet

Object	Magnetic? (Yes or No)	Where found?	Purpose Or Use?

What materials are most likely magnetic? Use evidence from your data table to explain your answer. _____

_____

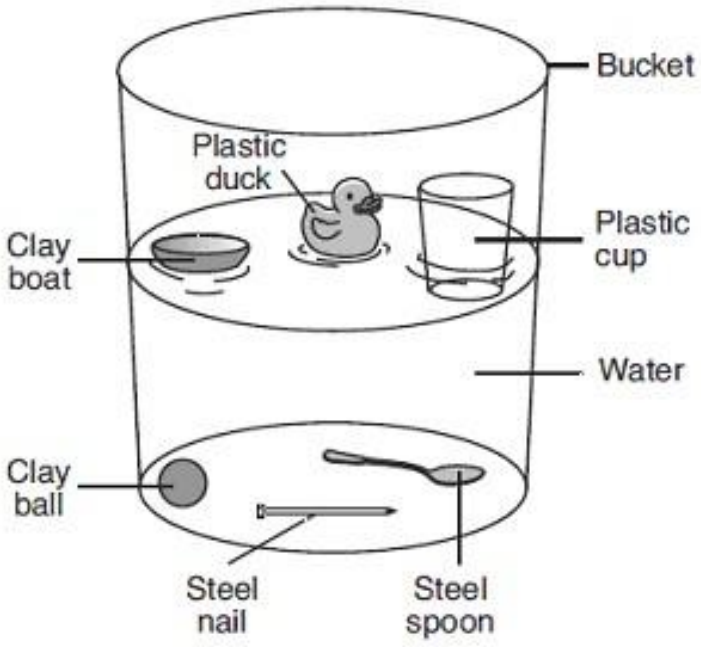
_____

What is Matter?

Physical Properties Lab C–Testing Relative Density
Procedures

Directions: Follow the procedures below to investigate the relative density of various objects.

1. Take the objects out of the large baggie and set them down on the desk or table.
2. Pick up each object and decide if you think it will sink in water or float in water. Write the name of each object on your recording sheet. Then, predict what you think each object will do when placed in the bowl of water: *sink* or *float*.
3. Place one of the objects in the bowl of of water. Record the results (sinks or floats) in the results column.
4. Tell why it sinks or floats in the last column. (Hint: record either *more relative density* or *less relative density*.)
5. Finally, answer the questions on the recording sheet. Use evidence from your investigation to justify your answers.



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Physical Properties Lab C–Testing Relative Density Recording Sheet

Object	Prediction	Result	More or Less Relative Density than Water?

1. Which objects have less relative density than water? How do you know? _____

   _____

   _____

2. Which objects have more relative density than water? How do you know? _____

   _____

   _____

   _____

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Physical Properties Lab D–Observing Physical State Procedures

Directions: Follow the procedures below to investigate the physical states that matter can take.

1. Carefully observe the vinegar in the beaker. Answer question #1 on your recording sheet.
2. Carefully observe the baking soda in the snack baggie. Answer question #2 on your recording sheet.
3. Place the narrow end of one of the funnels into the opening of the balloon. Carefully spoon all of the baking soda into the balloon.
4. Use the second funnel to carefully pour the vinegar into the empty water bottle. Answer question #2
5. Carefully attach the open end of the balloon to the top of the water bottle. Do NOT let any baking soda fall into the vinegar yet.
6. What do you think will happen if you allow the baking soda in the balloon and the vinegar in the water bottle to mix? Answer question #3.
7. With someone hold the water bottle down on the table or desk, lift the balloon so that the baking soda pours into the bottle of vinegar. Answer questions #4 & 5.

What is Matter?

Physical Properties Lab D–Observing Physical State
Recording Sheet

1. Describe what you see in the baggie. Is it a solid, a liquid, or a gas? How do you know? _____

   _____

   _____

2. As you pour the vinegar into the water bottle, what do you notice? What state of matter is the vinegar? How do you know?

   _____

   _____

   _____

3. What do you think will happen when the baking soda mixes with the vinegar? _____

   _____

   _____

4. Why do you think the balloon expanded? _____

   _____

5. What are the three states of matter that you observed in this investigation? _____

   _____

   _____

What is Matter?

Physical Properties Lab E–Measuring Volume
Procedures

Directions: Follow the procedures below to investigate measuring the volume of solids and liquids.

1. Carefully measure 100 mL of clear water in a beaker.
2. Measure 50 mL of colored water in a graduated cylinder.
3. What do you think the volume of the water will be if you add the colored water to the clear water in the beaker? Record your prediction on the recording sheet.
4. Pour the colored water into the clear water. Record the volume of the water in the beaker now on your recording sheet. Then, use what you know about the properties of liquids to explain why this happened.
5. Find the volume of the cube or rectangular solid. Remember, the formula for finding the volume of a regular solid like a cube is l x w x h (length x width x height). Hint, use the ruler to find the length, width and height of the solid before finding its volume. Remember to measure in cm and label the answer in cm^3.
6. To find the volume of irregular solid objects, you might have to use something called the displacement method. Measure 50 mL of clear water in the graduated cylinder.
7. Carefully drop the marble into the water in the cylinder. What is the volume of the marble combined with the water in the graduated cylinder? Record the measurement on your recording sheet.
8. In order to find the volume of the marble alone, you must subtract the original water level from the level after adding the marble. Record this difference on your recording sheet in cm^3.
9. Answer the rest of the questions on your recording sheet.

What is Matter?

Physical Properties Lab E–Measuring Volume
Recording Sheet

1. If I pour the colored water into the clear water, I think the volume of the water in the beaker will be _____.
2. The volume of the water was _____ because _____

   _____

   _____
3. Length _____ Width _____ Height _____

   Volume _____
4. What is the volume of the marble and the water combined?

   _____
5. What do you need to do to find the volume of the marble by itself?

   _____

   _____
6. What is the volume of the marble? _____
7. What is volume? _____
8. What science tools can be used to measure volume? _____

   _____
9. What units are used to label the volume of liquids? Of solids like cubes? _____

What is Matter?

Physical Properties Lab F–Testing Solubility in Water Procedures

Directions: Follow the procedures below to investigate the solubility of different substances in water.

1. Carefully measure 25 mL of tap water in one graduated cylinder.
2. Carefully measure 25 mL of cooking oil in the other graduated cylinder.
3. Slowly add 2 drops of red, blue, and yellow food coloring to the cooking oil. (If you do not have these particular colors, just use the colors of food coloring that you have!)
4. Observe the cooking oil in the graduated cylinder for about a minute. What do you notice? Record your observations on your recording sheet.
5. Use the straw to vigorously stir the oil and food coloring. Record your observations on your recording sheet.
6. Slowly pour the oil with the food coloring droplets into the graduated cylinder of water. Observe the system for 2-3 minutes. Record your observations on your recording sheet.
7. Take a pinch of salt between your first finger and your thumb. Watch carefully as you drop the pinch of salt into the graduated cylinder containing the water, cooking oil, and food coloring. What happens? Record your observations on your recording sheet.

What is Matter?

Physical Properties Lab F–Testing Solubility in Water
Recording Sheet

1. What do you notice when you put the drops of food coloring into the graduated cylinder of oil? _____

   _____

2. What do you notice when you stir the cooking oil and the food coloring? _____

   _____

3. What do you notice when you pour the cooking oil and food coloring drops into the graduated cylinder of water? _____

   _____

   _____

4. What happens when you put the salt in the graduated cylinder containing the water, cooking oil, and food coloring? _____

   _____

   _____

5. What substance or substances were soluble in water? _____

   _____

6. What substance or substances were insoluble in water? _____

   _____

What is Matter?

Physical Properties Lab G–Testing Thermal Insulators and Conductors
Procedures

Directions: You know that some materials insulate, or slow, the movement of thermal energy. You also know that other materials conduct thermal energy (allow it to flow freely). Follow the procedures below to test the insulating properties of several different materials.

1. You are going to be testing four different materials to see which is the best insulator against the movement of thermal energy: air, cardboard, foil, and fabric. Which material do you think will hold the thermal energy the longest? Record your prediction on your recording sheet by writing *conductor* or *insulator* in the prediction column of the data table.
2. Completely wrap the outside of one beaker/jar with aluminum foil. Tape securely. Wrap a second beaker with cardboard and a third beaker with fabric. Leave the fourth beaker as it is.
3. Create a data table in your science notebook to record the temperatures of the water that will be added to each of your beakers. You will want to measure the temperature about every 20 seconds for 5 minutes.
4. As soon as your teacher pours the VERY HOT water into your beakers, start taking the temperature of the water in each one. Do this until the 5 minutes is up.
5. Record the beginning and ending temperature of the water in each beaker in the data table on your recording sheet.
6. Identify each material as a *conductor* or an *insulator* of thermal energy by writing the terms in the last column of the data table.
7. Which material was the best insulator? Which material was the best conductor? Answer the questions on the recording sheet.

What is Matter?

Physical Properties Lab G–Testing Thermal Insulators and Conductors
Procedures

Material	Prediction	Beginning Temperature	Ending Temperature	Conductor or Insulator
Air				
Cardboard				
Foil				
Fabric				

1. What material kept the water the hottest? _____

   _____

2. What material covered the beaker in which the water cooled the fastest? _____

3. A lot of the thermal energy escaped from the top of the beakers. What could you have done to improve this investigation? _____

   _____

   _____

4. Why do you think the handles of most pots and pans are made of plastic or rubber? _____

   _____

   _____

What is Matter?

Physical Properties Lab H–Testing Electrical Insulators and Conductors
Procedures

Object	Prediction	Test Result
Wire		
Fuse		
Dollar bill		
Paper Clip		
Coin		
Eraser		
Pencil		
Hand		
Dog		

1. What types of materials make good conductors of thermal energy? _____

   _____

2. What materials make good insulators of thermal energy? _____

   _____

   _____

What is Matter?

Name: _____

Evaluation

1. Some students added 4 grams of each substance shown below to a beaker of water. Which of the substances would be soluble in the water? Circle all the answers that apply.


Sugar


Baby Oil


Sand


Rice


Wax Chips

Powdered Drink Mix

2. A student dropped a glue stick and a marble into a glass of water. The glue stick floated but the marble sank to the bottom. Which of the following is a valid conclusion based on these results?

   F The glue stick floats because it is less dense than the marble.

   G The marble sinks because its density is less than the water's density.

   H The glue stick floats because it has less relative density than the water.

   J Both the glue stick and the marble have a greater relative density than water.

3. Some students wrapped four 250 mL beakers with a different material. Then they poured 100 mL of hot water into each beaker and covered them with pieces of cardboard. After 10 minutes, they measured the temperature of the water in each beaker. What property of matter were they likely investigating?

   A Ability to insulate against the flow of thermal energy

   B Ability to insulate against the flow of electrical energy

   C Ability to insulate against the flow of mechanical energy

   D Ability to insulate against the flow of light energy

What is Matter?

Name: _____

Evaluation

4. A science teacher places the following items on a tray.

- Nail
- Cotton ball
- Penny
- Craft stick
- Cork bottle stopper

Which of the following correctly identifies the physical properties of the objects?

F

Object	Conductor	Insulator	Magnetic
Nail	✓		✓
Cotton ball		✓	
Penny		✓	✓
Craft Stick		✓	
Cork Stopper		✓	

G

Object	Conductor	Insulator	Magnetic
Nail	✓		✓
Cotton ball		✓	
Penny	✓		
Craft Stick		✓	
Cork Stopper		✓	

H

Object	Conductor	Insulator	Magnetic
Nail	✓		
Cotton ball		✓	✓
Penny	✓		✓
Craft Stick		✓	
Cork Stopper		✓	✓

J

Object	Conductor	Insulator	Magnetic
Nail	✓		
Cotton ball		✓	
Penny	✓		
Craft Stick		✓	
Cork Stopper			✓

5. Which of the following would be classified as a good insulator of thermal energy?

A Aluminum, because thermal energy flows through it easily

B Copper, because thermal energy flows through it easily

C Glass, because it lets both heat and electricity pass through it

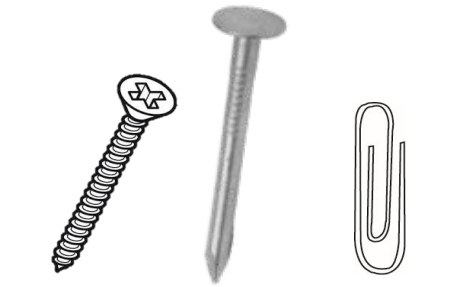
D Plastic, because thermal energy does not flow through it easily

What is Matter?

Name: _____

Evaluation

6. A student places three objects into a group based on their physical properties.



What physical property is the same for all four objects? Mark all answers that apply.

F Mass

G Relative Density

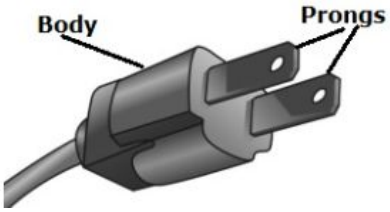
H Physical state

J Magnetism

K Volume

L Color

7. The illustration shows an electric cord plug with a plastic body and metal prongs. Which of the following best explains what the plug body is made of plastic?



A Plastic is a good conductor of electrical energy

B Plastic is a good insulator of electrical energy.

C Metal is a good conductor of electrical energy.

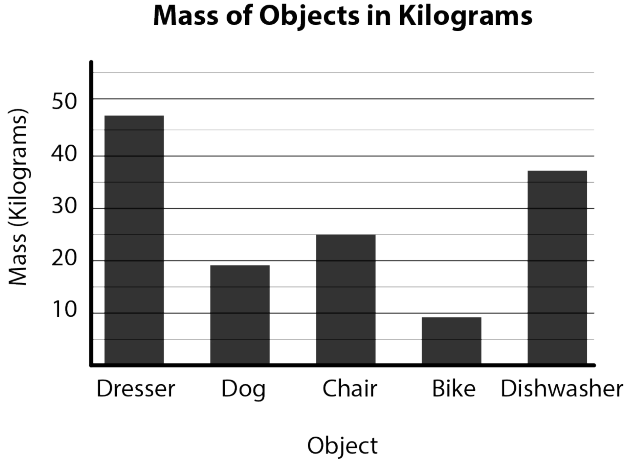
D Most metals are attracted to magnets.

What is Matter?

Name: _____

Evaluation

8. The graph shows the masses of several common objects. Which of the objects has a greater mass than the weight shown with the graph?



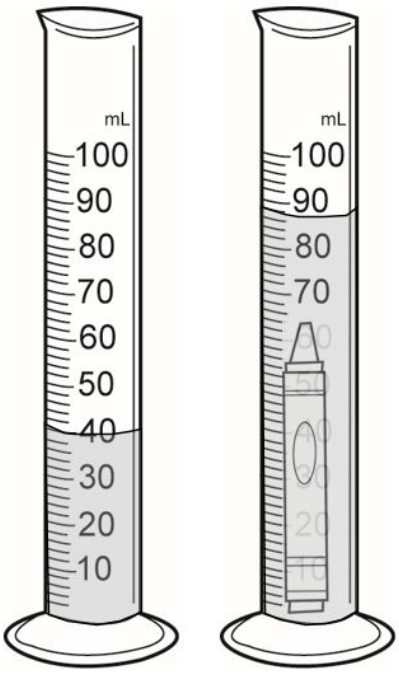
F The dresser only

G The dog, the chair, and the bike

H The dresser, the dishwasher, and the chair

J The dresser and the dishwasher only

Use the illustration to answer questions 9 and 10.



9. A student found the volume of some water in a graduated cylinder. Then he put a crayon in the same cylinder. What is the volume of the water?

A 40 mL

B 60 mL

C 78 mL

D 88 mL

10. What is the volume of the crayon?

F 40 mL

G 42 mL

H 48 mL

J 88 mL