

Teacher Copy: Suggested Answers

Several of the pages
that would contain student
data collection were removed from this copy.

My States of Matter

Learning Log

Read, Write & Draw



My Name _____

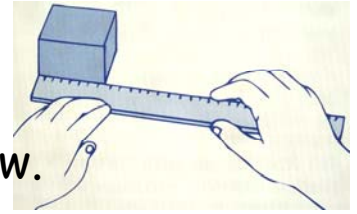
NAME: _____

What is a solid?

What is a Solid?

1. Observe and measure each block.

Record your measurements in the chart below.



| On the Table | | |
|------------------|-------------------|-------------------|
| | Wooden Block | Foam Block |
| Shape | rectangular prism | rectangular prism |
| Length of Side 1 | 3 cm | 3 cm |
| Length of Side 2 | 3 cm | 3 cm |
| Length of Side 3 | 2 cm | 2 cm |

2. Now make a prediction. When you place the blocks in the box will the shape and size of the blocks change or remain the same?

Circle One:

| | | |
|---|--------|---------------|
| I predict the shape of the blocks will... | Change | Stay the Same |
| I predict the size of the blocks will... | Change | Stay the Same |

3. Now measure each block as it sits in your box, and record your measurements.

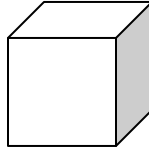
| In the Box | | |
|------------------|-------------------|-------------------|
| | Wooden Block | Foam Block |
| Shape | rectangular prism | rectangular prism |
| Length of Side 1 | 3 cm | 3 cm |
| Length of Side 2 | 3 cm | 3 cm |
| Length of Side 3 | 2 cm | 2 cm |

NAME: _____

What is a solid?

4. What happened when **the blocks were moved** from the table to the box. Circle the sentence that tells what happened to the shape?

The shape changed.



The shape stayed the same.

5. Think about **when the blocks were moved** from the table to the box. Circle the sentence that tells what happened to the size of the space that the block takes up?

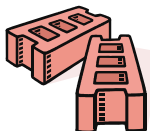
It took up more space.

It took up less space.

It took up the same space.

6. One way to decide if a substance is a solid, a liquid, or a gas is to see how it reacts when put into a container. Let's write a rule for matter that is solid. Fill in the missing words.

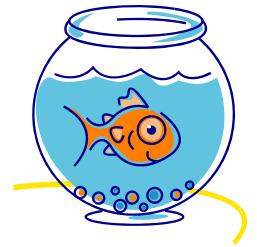
Solid Rule: When put in a container a solid will take up the same space and not change its shape.



NAME: _____

What is a solid?

7. Is a fish a solid? Use the rule to help you to decide. Think about what happens when a fish is placed from a take home bag into a bowl.



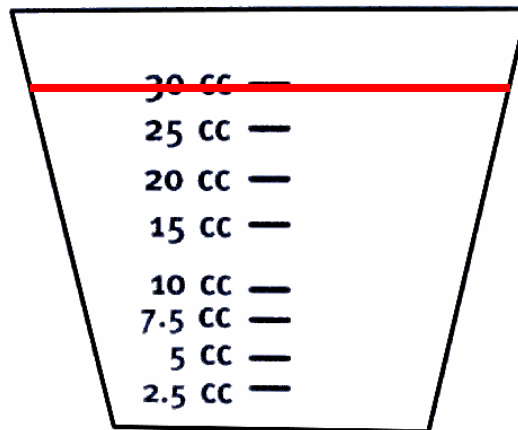
When a fish is put from a bag into a bowl it stays the same. The fish's shape does not change. The size of the fish does not change (unless it grows).

NAME: _____

What is a liquid?

What is a Liquid?

1. Pour the water from your paper cup up to the 30cc mark. Draw a line to show the water level on the picture below.



Write the number of cc of water on the line below:

___30___ cc

A cubic centimeter (cc) is one way to measure of the size of the space that matter takes up. You can think of this as the amount of room something needs. You may have heard the word "ounce" or "quart". These measure the same property as does a "cc". A cc is much smaller than an ounce. An ounce is a smaller amount than a quart.

What is the measurement of the amount of space that the water takes up in the small cup? 30 cc

Does the water take up all the space in the small cup? No

NAME: _____

What is a liquid?

You are going to pour the water from the small plastic cup into the large plastic cup.



Predict the size of the space the water will take up in the larger cup.

Circle your prediction.

The size of the space the water takes up will be greater.

The size of the space the water takes up will be lesser.

The size of the space the water takes up will not change.

Predict what the shape of the water will be in the larger cup

Circle your prediction.

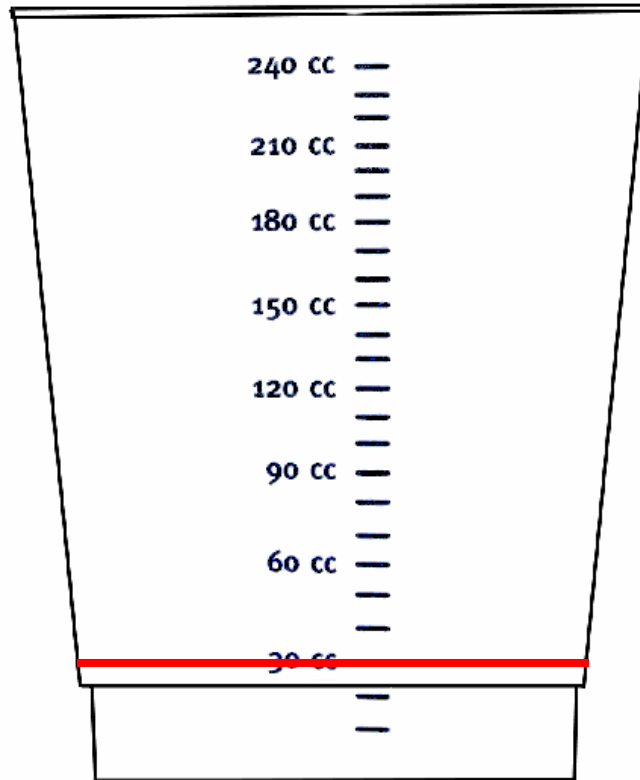
The shape of the water will change.

The shape of the water will stay the same.

NAME: _____

What is a liquid?

2. Pour water from the small plastic cup into the large plastic cup.
Draw a line to show the water level on the picture below.



Write the number of cc of water on the line below:

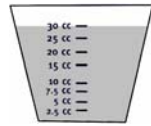
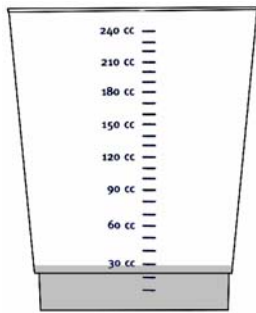
___30___ CC

A word that describes the size of the space that an object takes up or how much room it needs is **volume**. Volume can be measured in cc or cubic centimeters.

3. What is the volume of water in the large cup? ___30 cc___

NAME: _____

What is a liquid?



Volume in large cup = 30 cc

Volume in small cup = 30 cc

4. What happened to **the volume of the water** when it was poured into two different containers?

The volume of the water stayed the same. The volume did not change.

5. What happened to **the shape of the water** when it was poured into two different containers?

The shape of the water was different. The shape of the water changed.

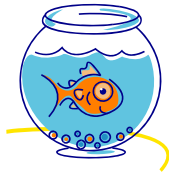
NAME: _____

What is a liquid?

6. One way to decide if a substance is a liquid is to see how it reacts when put into a container. Let's write a rule for matter that is liquid. (Fill in the missing words.)

Liquid Rule: When put in a container a liquid will take up the same space but may have a different shape.

7.



You have a fish bowl and you want to move the fish and the water into a larger fish tank. Tell what happens **when the water is poured into the different container**. (What stays the same? What may be different?)

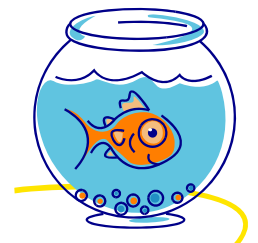
The fish stays the same size and shape. The water changes shape but the amount of water stays the same.

NAME: _____

What is a liquid?

8. Think about the fish. Think about what happens **when a fish is placed from a bowl into a tank**. Is the fish a liquid? How do you know?

Liquids change shape when they are placed in a different shaped container. The fish would not change its shape so it is not a liquid. (The fish is not in a liquid state because it does not change shape when put in a different shaped bowl.



NAME: _____

What is a liquid?

9. Make a list of 6 things that you know are liquids.

Answers will vary

_____ **water** _____

_____ **milk** _____

_____ **soda** _____



_____ **juice** _____

_____ **pancake syrup** _____

_____ **oil** _____

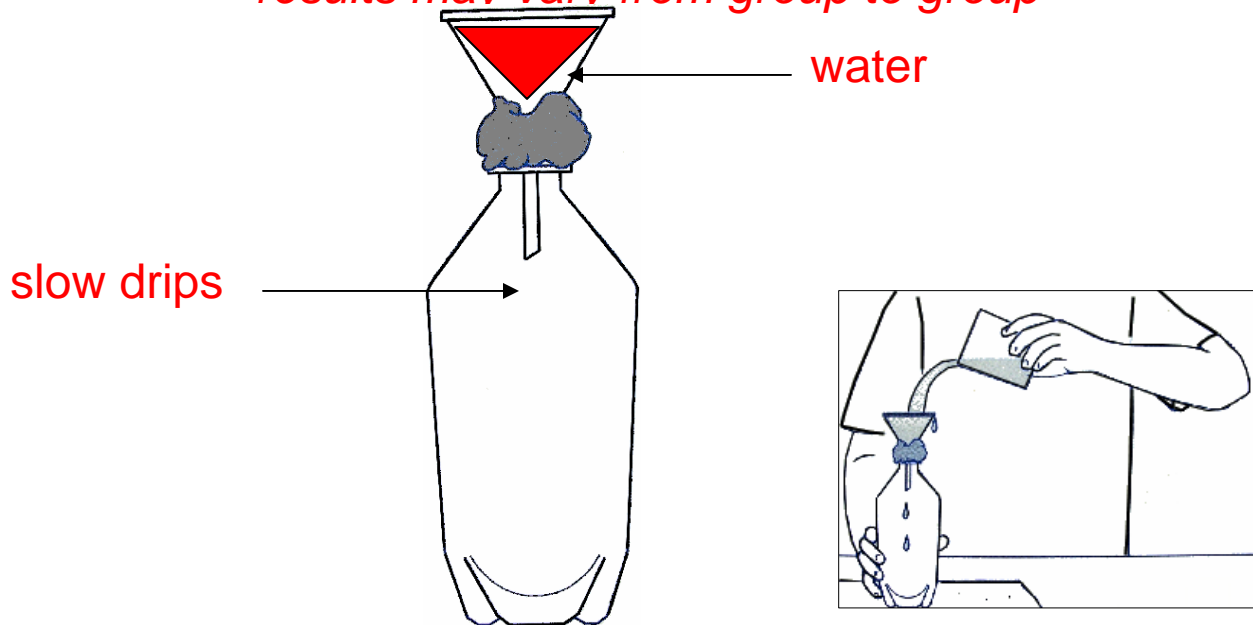
Draw a picture of yourself doing something with a liquid.

Write a sentence telling about your picture.

What is a Gas?

1. Put a funnel in the bottle. Seal the neck of the bottle to the funnel with clay, as shown.

results may vary from group to group



Pour the colored water from the plastic cup (**all at once**) into the funnel. (Read below right after you pour the water.)

2. Draw on the picture above to show above what happened to the water. Use arrows and labels to help describe your drawing.
3. Circle the sentence that best tells why that happened.

The funnel was too small for the water to easily pass through.

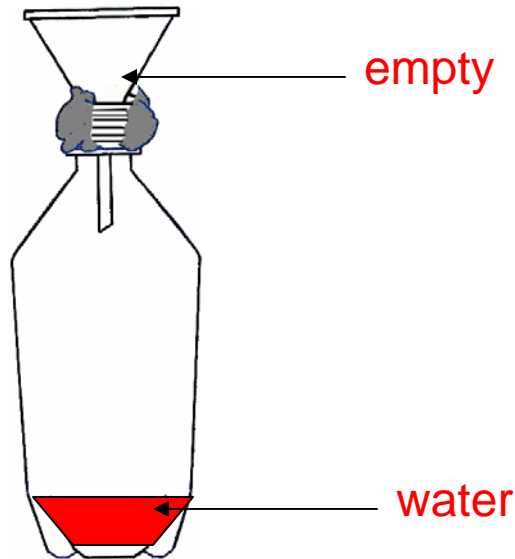
The air could not get out so the water could not easily go in.

The clay blocked the water from flowing into the bottle.

NAME: _____

What is a gas?

- Now loosen the clay seal from around the neck of the bottle and funnel.
- Draw on the picture below to show above what happened to the water then. Use arrows and labels to help describe your drawing.



- Circle the sentence below that tells why this happened.



Loosening the clay lets the water flow into the bottle.

Loosening the clay allows the air to leave so the water can enter.

Loosening the clay allowed the water to slip around the funnel.

- Circle the best words for the blanks.

Air is made up of gases. From this activity you can learn that gases can fill up _____ (a bottle / clay).

Gases can fill up any _____ (object / space).

NAME: _____

What is a gas?

What is a Gas?



Look at the blown up balloon in front of you. What do you **predict** would happen to **the balloon's shape** if you press on it?

1. Draw a picture of your balloon.

Student draws a picture of the blown up balloon.

2. Draw a picture of your balloon to show what you think it would look like if you press on it.

3. What do you **predict** will happen to **the shape of the air** inside of the balloon if you press on it? Circle the sentence that tells your prediction.

The shape of the air will stay the same.

The shape of the air will change.

NAME: _____

What is a gas?

Press gently on the balloon.



4. What actually happened to **the shape of the balloon** when you pressed on it? (Complete the sentence.)

When I pressed on the balloon, the shape of the balloon

_____ **was different (changed)**. _____

5. What actually happened to **the shape of the air inside the balloon** when you pressed on it? (Complete the sentence.)

When I pressed on the balloon, the shape of the air in the

balloon _____ **was different (changed)**. _____

6. What happens to the **shape of a gas** when the **shape of the container** is changed? (Complete the sentence.)

When the shape of a container is changed the shape of the

gases ___ **changes** _____

Gas Rule: When you put a gas in a container it will take up all the ___ **space** _____. It will have the ___ **shape** ___ of the container.

NAME: _____

What is a gas?

7. Draw a picture of something in your classroom that has gases (air) in it.

Student should draw an object that is not a solid. It should be one that can be filled and is not filled with liquid or solid material.

8. All matter takes up space.

Is there **matter** inside a balloon? Yes

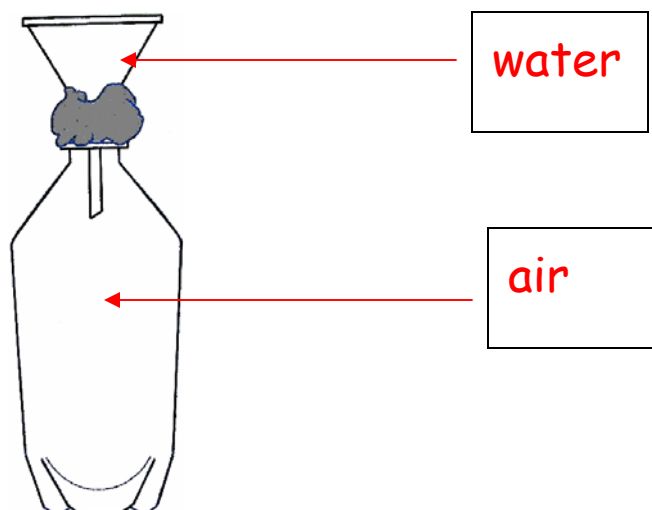


Write a reason why you think this.

There is space in a balloon that is filled with air. Matter takes up space and the air takes up space in the balloon. (I know that because when I push on a filled balloon I can feel the air inside.)

9. Two pieces of matter can not be in the same space at the same time. Air and water are both matter. When the water was at first poured into the funnel, where was the water?

Where was the air? Use arrows and labels to show on the picture.



NAME: _____

What happens to ice?



Ice

You have been given a 1 ounce cup of frozen water.

When you are told to, record the time on the clock and observe your ice.

Write the time and what you observed in the space provided.

Be sure to record the exact time when your ice melted completely.

Before you start, predict what will happen to the ice over time.

Do this by completing the sentence.

Over time the ice will _____.

| Draw your ice at the start | Draw your ice at the end |
|----------------------------|---|
| large piece of ice | small piece of ice (puddle of water) |

NAME: _____

Matter changes states.

| | | |
|-------------------------------|--------|-----|
| States of Matter Word Bank | | |
| Solid | Liquid | Gas |



Water **changes** states when it **freezes** and **melts**.

Before freezing, what is water's state of matter?

Before it freezes water is a liquid.

After the ice melts, what is its state of matter?

After it melts, it is a liquid.



NAME: _____

What speeds up melting?



Hurry Up



My team has a plan for melting our cup of ice faster. This is our plan:

Write a list of items you will need. *Each group's plan will vary.*

Draw a picture of how you are going to use these items.


NAME: _____

What slows melting?

Slow Down

My team has a plan for melting our cup of ice slower. This is our plan:

Write a **list** of items you will need. *Each group's plan will vary.*

| | | |
|-------|---|-------|
| _____ | | _____ |
| _____ | | _____ |
| _____ |  | _____ |
| _____ | | _____ |
| _____ | | _____ |

Draw a picture of how you are going to use these items.

NAME: _____

What slows melting?



Melting

Melting is the process by which a solid material changes into a liquid. What do you think made the **ice melt**—to **change from a solid to a liquid**? Complete the sentence.

The ice changed from a solid to a liquid because the temperature (heat energy) was greater (increased). It was too warm for the ice to stay as a solid.

Write one word for **what was added to the solid ice to cause it to become liquid**?

heat (energy)

Besides ice, what other solids have you seen become a liquid? Write down two.

juice, ice cream, sherbert, butter...

NAME: _____

What is a thermometer?

Using a Thermometer



1. *Place a thermometer stem into a cup of warm water.*
What happens to the red liquid in the thermometer?
(Circle one sentence.)

The red liquid moves up.

The red liquid moves down.

The red liquid does not move.



2. *Place a thermometer stem into a cup of ice water.*
What happens to the red liquid in the thermometer?
(circle one sentence.)

The red liquid moves up.

The red liquid moves down.

The red liquid does not move.



Snap a back onto each thermometer.

3. What is the temperature of the warm water? _____

4. What is the temperature of the ice water? _____

NAME: _____

What is a thermometer?

Pour warm water into the ice water.

5. What happens to **the red liquid in the thermometer?**

Circle the sentence that tells what happened.

The red liquid moves up.

The red liquid moves down.

The red liquid does not move.

6. What happens to **the temperature?**

Circle the sentence that tells what happened.

The temperature goes up.

The temperature goes down.

The temperature does not change.

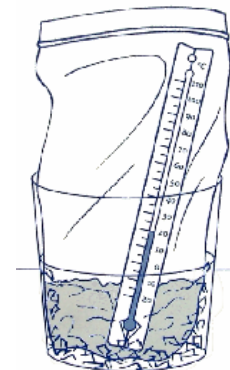
NAME: _____

What is a melting point?



Measuring Melting Points

Our Experiment:



1. Place one thermometer into the bag of ice.
2. Place one thermometer into the bag of solid butyl stearate.
3. Reseal the bags tightly.
4. Place each bag in a cup of warm water.
5. Read the thermometer every 3 or 4 minutes.
6. Record the temperature and the appearance of the substance on the correct charts.

NAME: _____

What is a melting point?

Results charts

Reading 5:



| Ice | Butyl Sterate |
|------------------------------------|------------------------------------|
| Temperature: _____ Observation: | Temperature: _____ Observation: |

Melting Point:

Tell about the melting point by filling in the letter blanks. You are given the first letter for each word.

The melting point is the temperature at which a solid changes to a liquid.

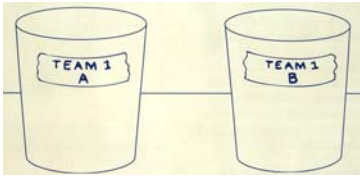
NAME: _____

What is evaporation?

Results will vary - generally water will be lost due to evaporation.

From Liquid to Gas

You and your partner will do an experiment to see how water changes from liquid to gas.



1. Label yours and your partner's 1-oz plastic cup with your names. Pour 10cc of water into each of the 1-oz cups.

2. Place one of your cups in sunlight or under a lamp.
Place the other cup out of direct light.
Leave the cups in the same place for 5 days.

Make some predictions on the chart below. Write the number of cc of water that you predict will be in your cup at the end of each day.

PREDICTIONS:

Will there be more water or less water as each day passes? Will it stay the same? Why do you think that?

NAME: _____

What is condensation?

5. Use a drawing to show the **difference** between a cup that was placed **in the light** and one that was **not in the light**. Compare the end results for these two cups. Use labels to describe your drawing.

Drawings should show the results of the experiment. The cup in the light should have evaporated faster so it should have less water left in it (or no water).

6. The matter in the cups changed. The water changed from one form to another. Use the word bank to fill in the blanks.



Word bank: gas heat liquid evaporation

A liquid changed to a gas.

Heat was added to cause the change.

The word that is used to describe this change is

evaporation.

NAME: _____

What is condensation?

From Gas to Liquid

1. Put red water and red ice cubes in a cup.
2. Put a lid on the cup.
What happens?



Student writing should indicate that moisture (liquid) formed on the outside of the glass. Students may try to explain where the liquid came from or why it formed.

3. Draw on the cups below show how it looked at the beginning of the activity and again at the end of the activity. Use your red crayon.

At the start there is red liquid in the cup – at the end there is red liquid in the cup and clear liquid on the outside of the cup.

My cup at the **beginning** of the experiment:



My cup at the **end** of the experiment:



NAME: _____

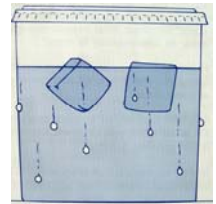
What is condensation?

4. What are the clear drops on the outside of the cup made of?

I think that the clear drops are drops of water.

5. Where did the drops come from?

Circle the sentence that answers the question.



The water came from inside the cup.

The water came from the air outside the cup.

The water came from the air inside the cup.

6. What do you call the process that caused the drops to form on the cold cup?

It is called condensation.

7. Circle the sentence that answers the question.

What caused the drops to form on the cup?

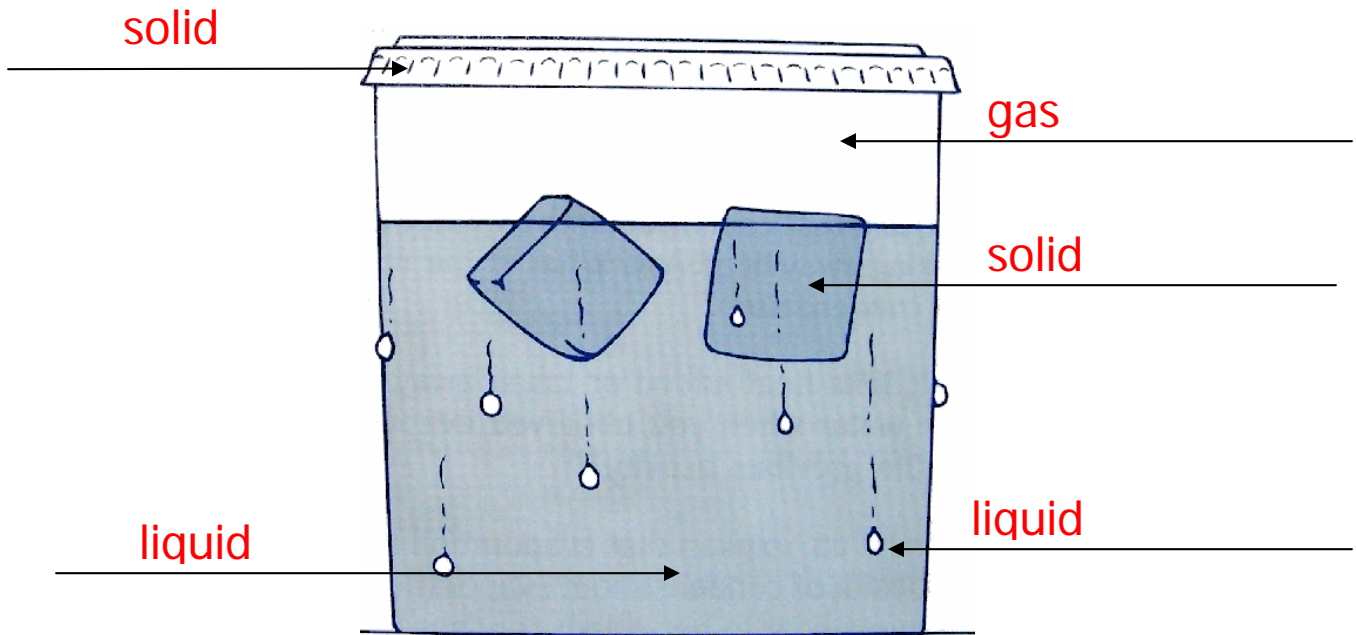
The air around the cup cooled down.

The water in the cup became cooler.

NAME: _____

What is condensation?

3. On each arrow write if it points to a solid, liquid or a gas.



Review: Write the word heated or cooled to tell what causes each of the changes.

Solid ——— ———> Liquid heated

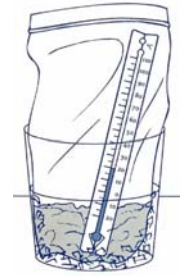
Liquid ——— ———> Gas heated

Gas ——— ———> Liquid cooled

NAME: _____

What is freezing?

From Liquid to Solid



SESSION 1:

1. Write your name on a strip of masking tape. Use it to label a 1-oz plastic cup. Fill the cup with 20cc of water.

PREDICT:

What will happen to the **water** if it is placed overnight in the **freezer**? Circle the sentence that tells what you think will happen.

The water will not change.

The water will change.

2. Place the cup of water on a tray and put it in the freezer overnight.
3. Observe the cup of water that was in the freezer overnight.

Did the water change? ___**Yes**_____

What is the water like now?

The water is a solid. (The water has changed to a solid. The water is hard.)

NAME: _____

What is freezing?

SESSION 2:

1. Observe a bag of liquid butyl stearate.
Do not open the bag.



PREDICT:

What will happen to the **butyl stearate** if it is placed **overnight in the freezer**? Circle the sentence that tells what you think will happen.

The butyl stearate will not change.

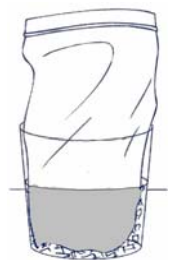
The butyl stearate will change.

2. Place the bag of butyl stearate in a cup of ice water.

4. Observe the butyl stearate after it had been in the tumbler of ice water for a while.

Did the butyl stearate change? ___**Yes**___

What is the butyl stearate like now?



The butyl stearate has hardened. (It has changed to a solid.)

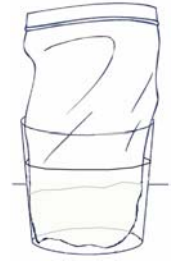
NAME: _____

What is freezing?

5. Put the butyl stearate into a tumbler of warm water.
Leave it for a while.

Did the butyl stearate change? ___Yes___

What is the butyl stearate like now?



The butyl stearate is a liquid.



Fill in the blanks with a correct word.

In order to change a liquid to a solid, the liquid must be cooled. We can also say that heat is taken (removed) from the liquid. When a liquid is cooled the temperature will go down (decrease, drop, lower).

NAME: _____

Measuring Freezing Point

In this experiment you will be trying to freeze three different substances. Record the appearance and temperature of each.

| Substance | Appearance | Temperature (°C) | Freezing Point (°C) |
|-----------------------|-------------------|---------------------|------------------------|
| Butyl Stearate | <hr/> <hr/> <hr/> | | |
| Substance A: Water | <hr/> <hr/> <hr/> | | |
| Substance B | <hr/> <hr/> <hr/> | | |

In the table above, write down the freezing point of each substance. Did the three substances have the same freezing points? (Circle one)

Yes

No

NAME: _____

Freezing Points of Substances

Use a red colored pencil to color in the three thermometers. Show the freezing points for the three substances. Below each thermometer write the freezing point temperature.



Butyl Stearate

_____ about 68°C _____



Substance A: Water

_____ about 32°C _____



Substance B

_____ about 26°C _____

NAME: _____

Reading a Thermometer

Read each thermometer.

Write the temperature in the box below the thermometer.



A

40°C



B

36°C



C

26°C



D

18°C

Look at the temperature measurements from thermometer A to D.

Is the temperature going up or down? down

Is it getting warmer or cooler? cooler