LETTER TO PARENTS

Cut here and paste onto school letterhead before making copies.

SCIENCE NEWS

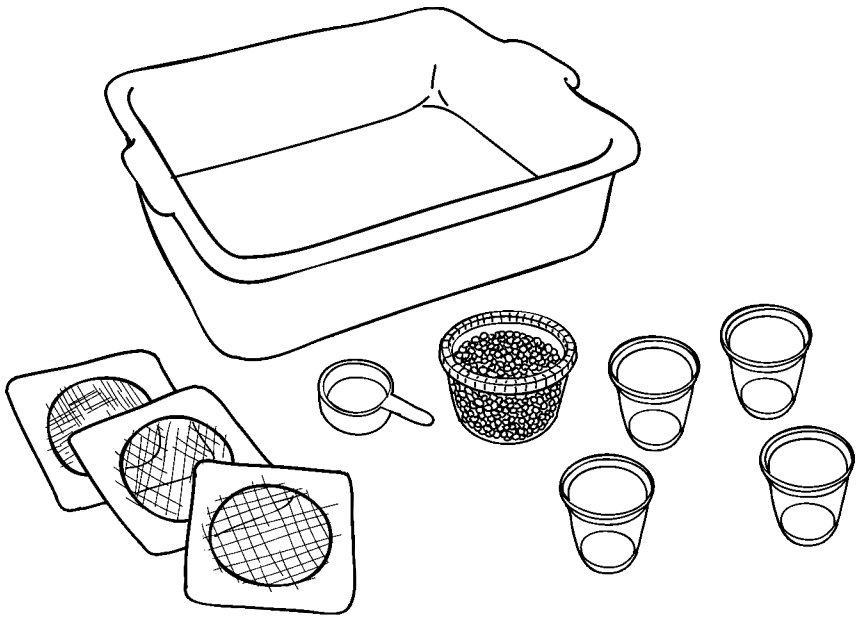
Dear Parents,

Our class is beginning a scientific study of solids and liquids. We will observe the properties of many solids and liquids, comparing how different solids and liquids are alike and how they are different, organize the results of our inquiries, and communicate both orally and in writing the things we discover. These processes (observing, communicating, comparing, and organizing) are the basic thinking processes students need at this age to develop a scientific understanding of the world around them.

Your child may ask you for help finding solids and liquids at home. You'll want to discuss and compare the different characteristics of those you find. (For example, how are salt and sugar the same? How are they different?) You may find yourself observing what happens when solids and liquids are put together. Making lemonade or salad dressing can provide interesting observations when solids and liquids are mixed. Watching an ice cube melt is a way to observe a solid change to a liquid.

We're looking forward to lots of fun and lots of learning as we explore a world full of solids and liquids!

Sincerely,



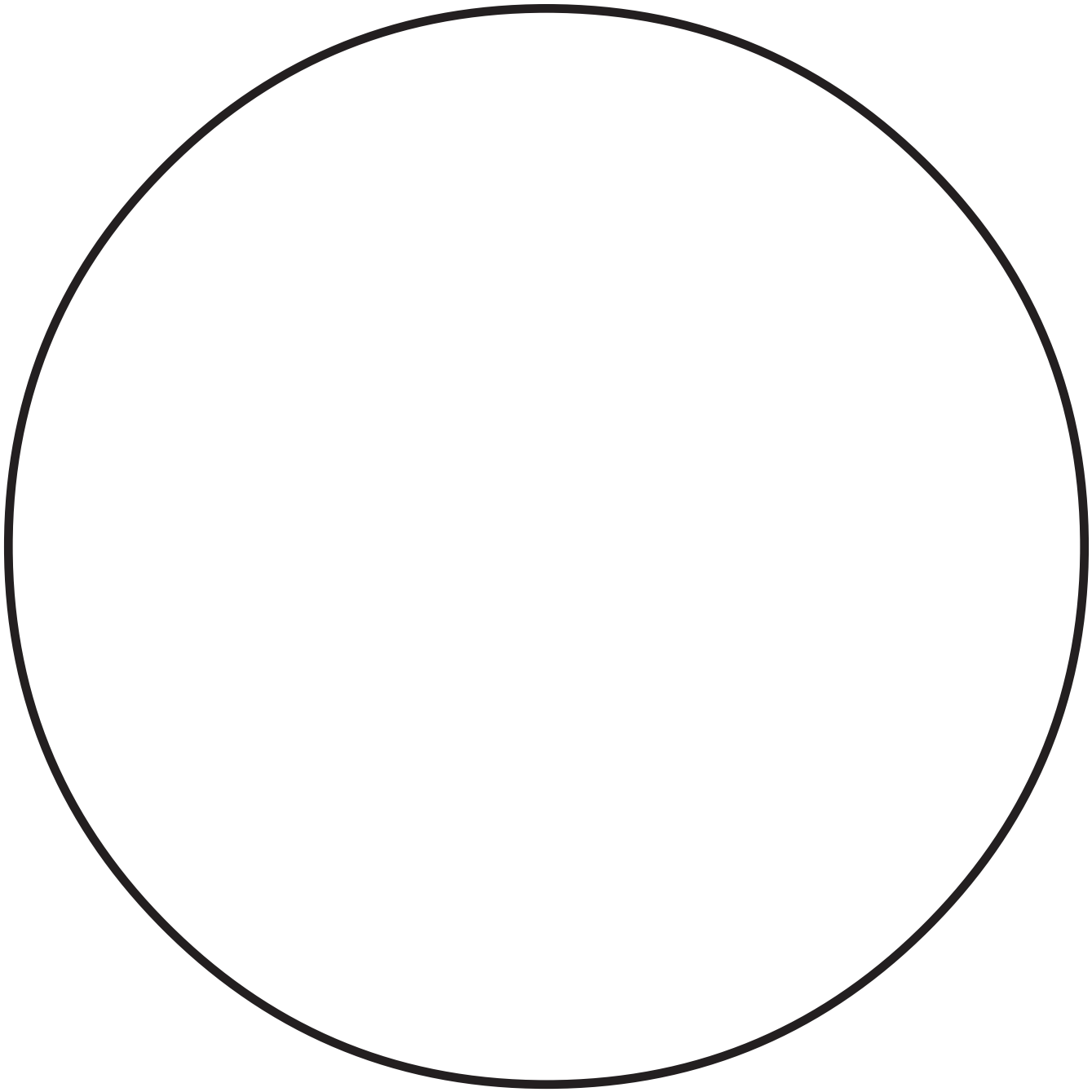
Name _____ Date _____

PROPERTIES OF SOLID OBJECTS

OBJECT / PROPERTY	plastic tube	cloth square	plastic triangle	metal screw	craft stick	wood cylinder	wire
flexible							
rigid							
smooth							
rough							
soft							
hard							
has color							
pointed							
flat							

Name _____ Date _____

SORTING CIRCLE



Some solids are _____ .

MINI-SENTENCE STRIPS

This solid is _____

This liquid is _____

This solid is _____

This liquid is _____

This solid is _____

This liquid is _____

CENTER INSTRUCTION CARD

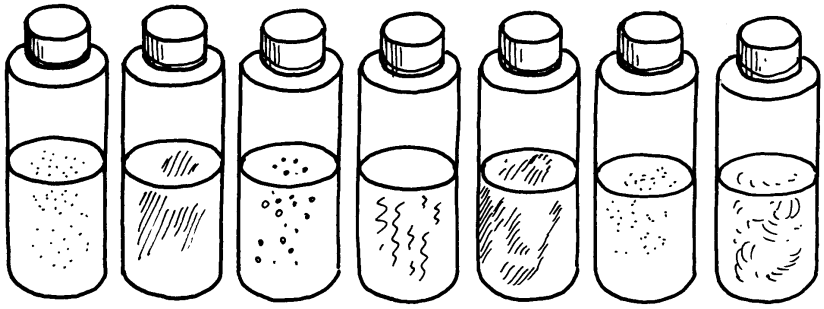
LIQUIDS IN BOTTLES

MATERIALS FOR EACH STATION

1 Basin

1 Set of liquids
- Plain water
- Colored water
- Corn syrup
- Cooking oil
- Liquid detergent
- Liquid hand soap
- Fabric softener or starch

1 Large book or lapboard



SET UP THE CENTER

Space the five basins with their bottles evenly around the table.

GUIDE THE INVESTIGATION

1. **Describe the Investigation.** Show students a set of bottles. Tell them that their job is to work with a partner to find out as much as they can about the liquids in the bottles. Caution students that they are *not* allowed to open the bottles for any reason.

2. **Keep the Center Activity Moving Forward.** Provide very little guidance as the students work with the bottles. Let them start a free exploration of the liquids.

3. **Focus the Observations.** After students have worked with the bottles for several minutes, ask some guiding questions.
   - *Are all of the liquids the same? How are they different?*
   - *Do all of the liquids move the same?*
   - *What happens to the liquids when you slowly tip the bottles on their sides? When you turn them upside down?*
   - *What happens to the liquids when you spin the bottles?*
   - *What happens to the liquids when you roll the bottles? Which bottles roll best?*
   - *What happens to the liquids when you let the bottles roll down a ramp? Do they roll the same way?*
   - *What happens to the liquids when you shake the bottles?*
   - *Can you make a tornado in the bottles? Which ones?*
   - *If students focus on the identities of the liquids, ask them to describe what it is that makes them think that it is that particular liquid.*

4. **Rotate Groups.** After 20 minutes ask students to return the bottles to the basins, and rotate the next group into the center.

LABELS FOR CARD DECKS

MEMORY
Card Deck
(two sets of six cards)

GO FISH
Card Deck
(four sets of six cards)

MEMORY
Card Deck
(two sets of six cards)

GO FISH
Card Deck
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MEMORY
Card Deck
(two sets of six cards)

GO FISH
Card Deck
(four sets of six cards)

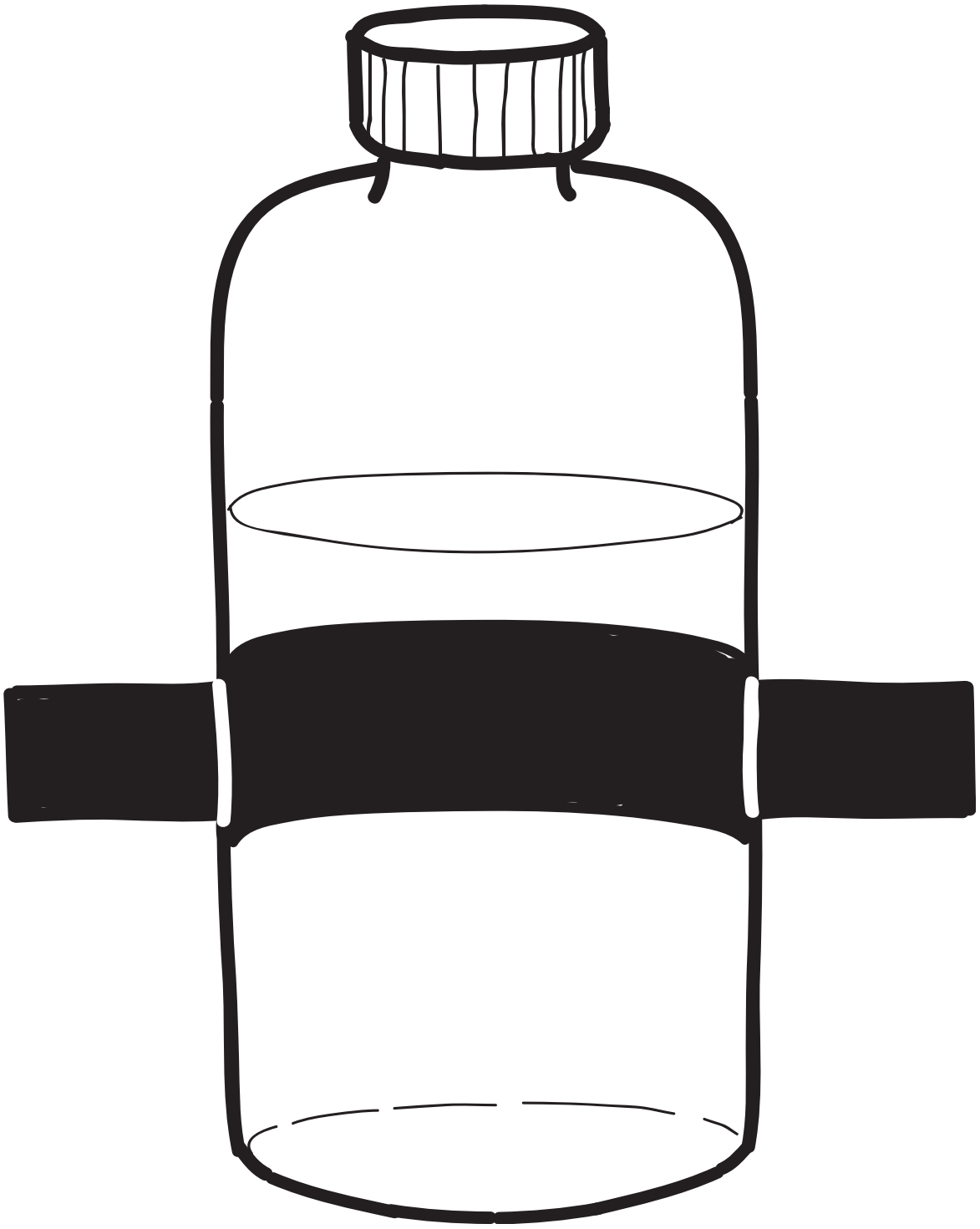
MEMORY TALLY SHEET

bubbly	viscous	foamy
translucent	has color	transparent

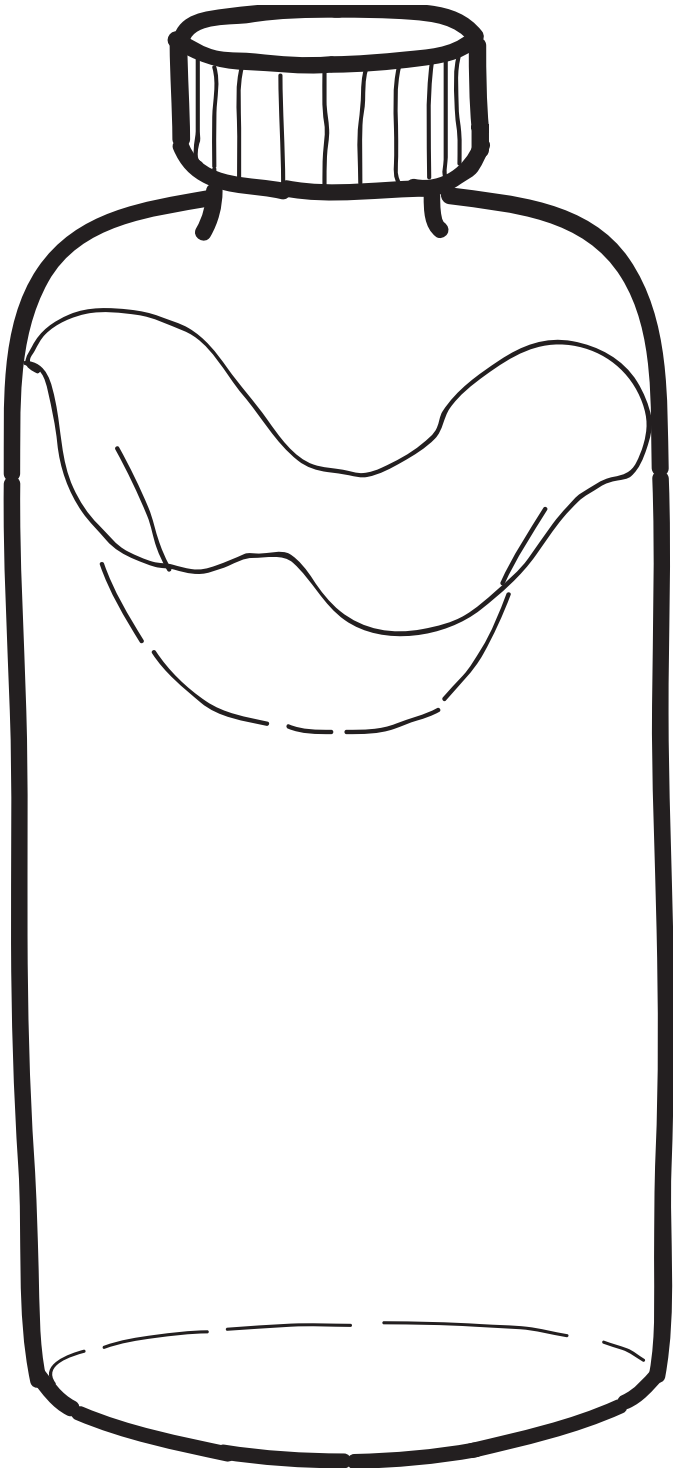
Name _____ Date _____

PROPERTIES OF LIQUIDS

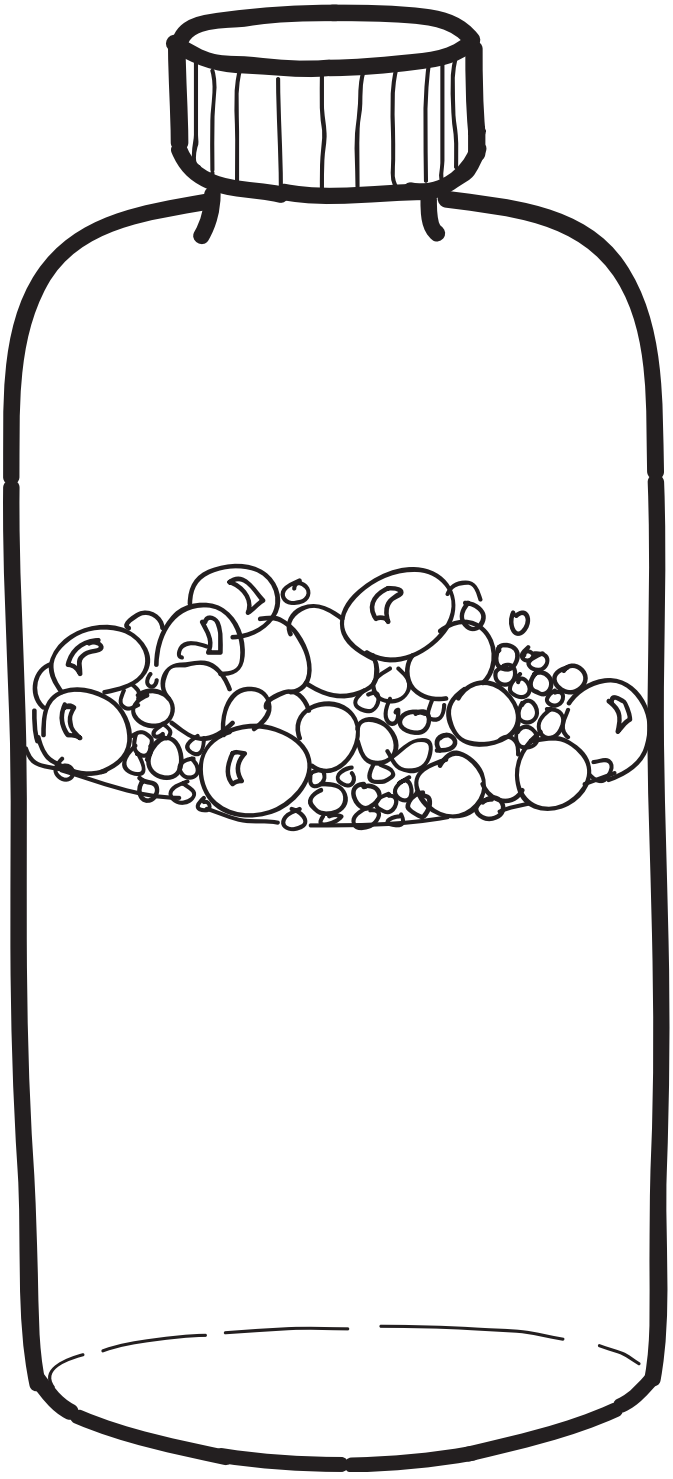
LIQUID / PROPERTY	fabric softener	detergent	colored water	cooking oil	hand soap	plain water	corn syrup
has color							
transparent							
viscous							
bubbly							
translucent							
foamy							



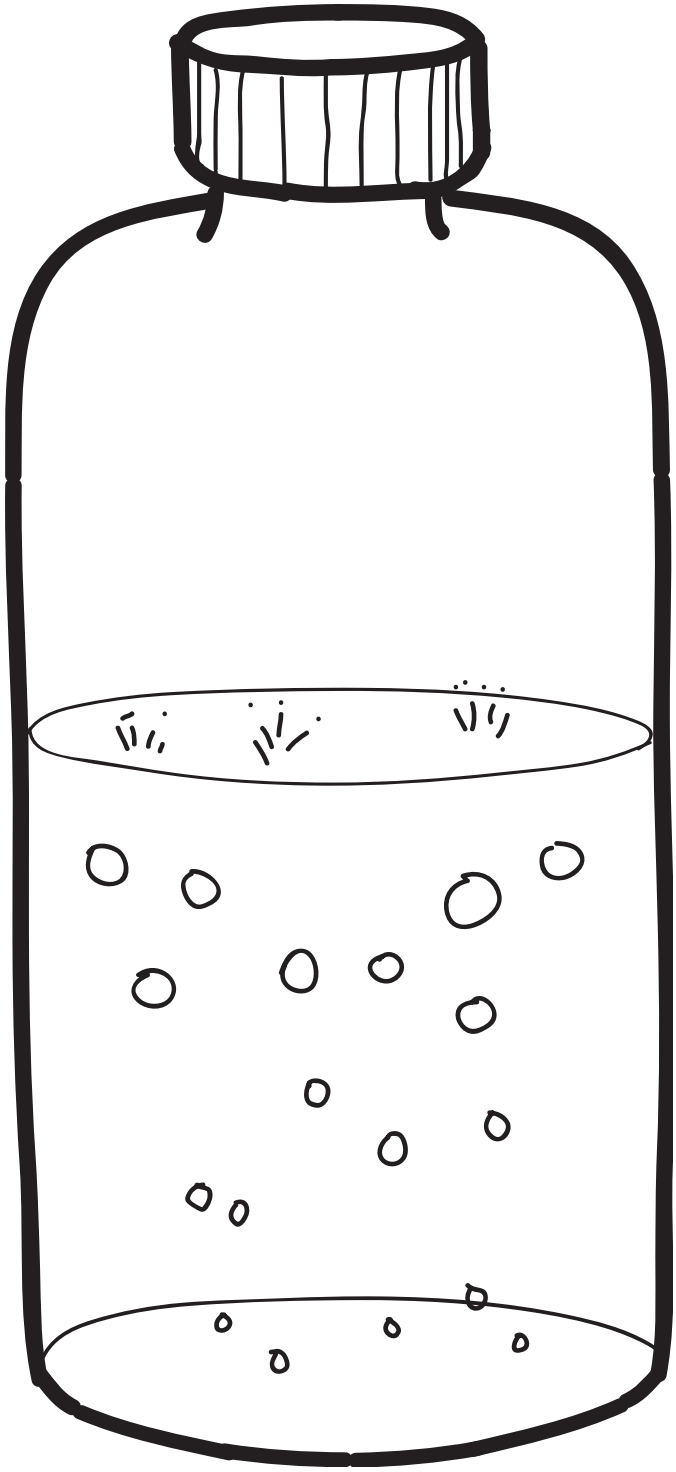
transparent



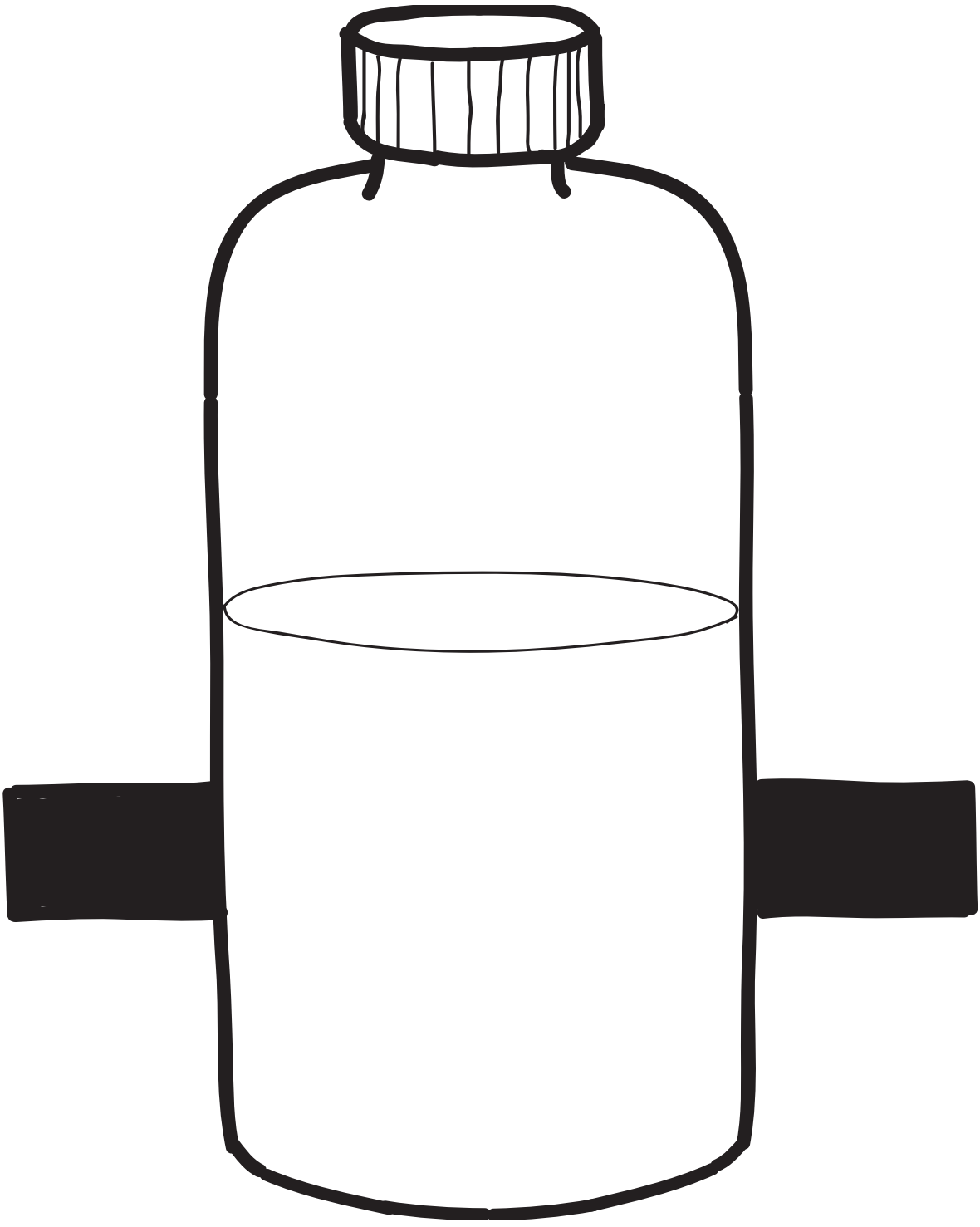
viscous



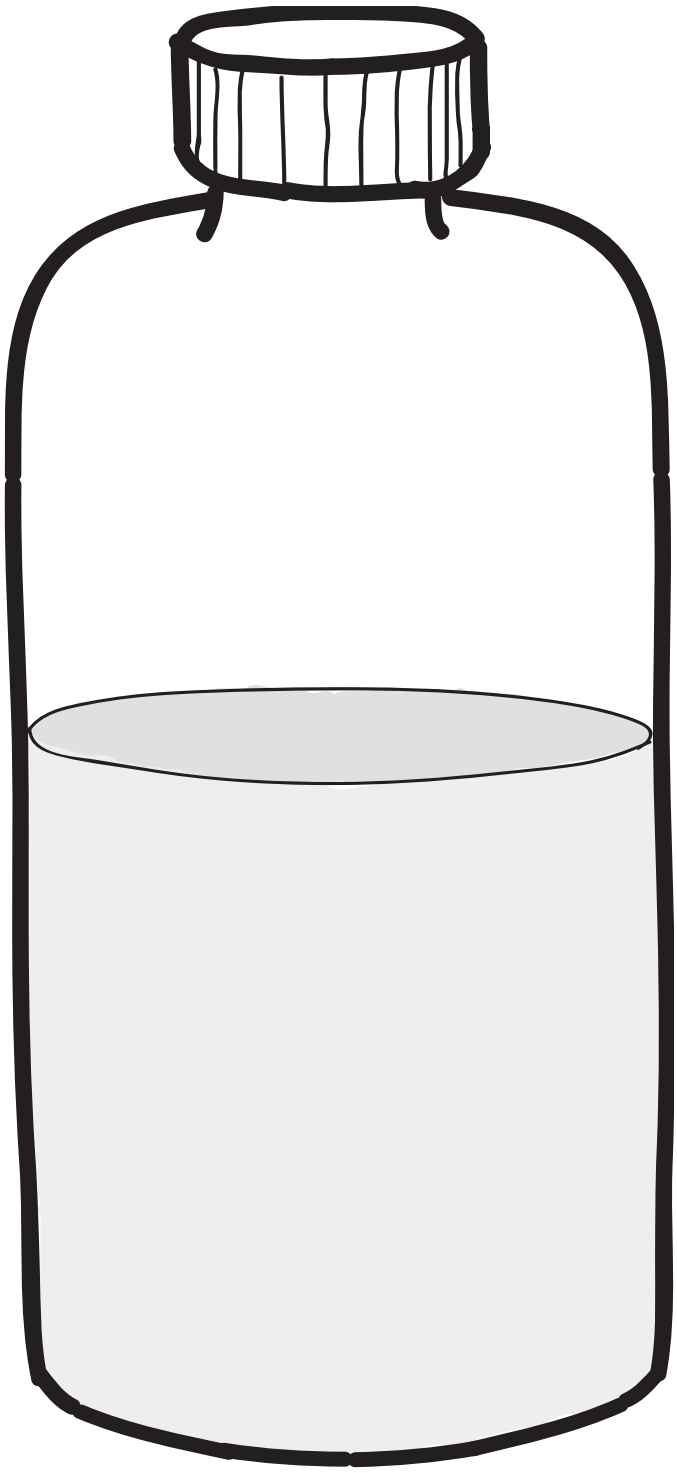
foamy



bubbly

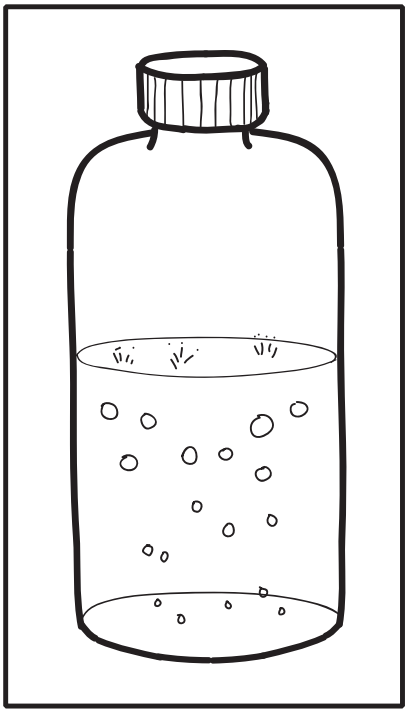


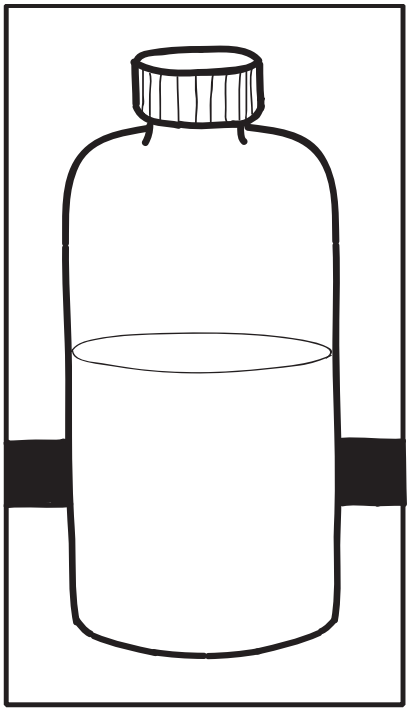
translucent

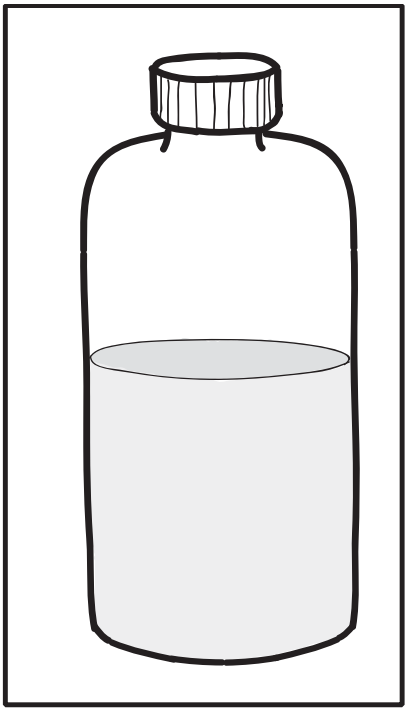


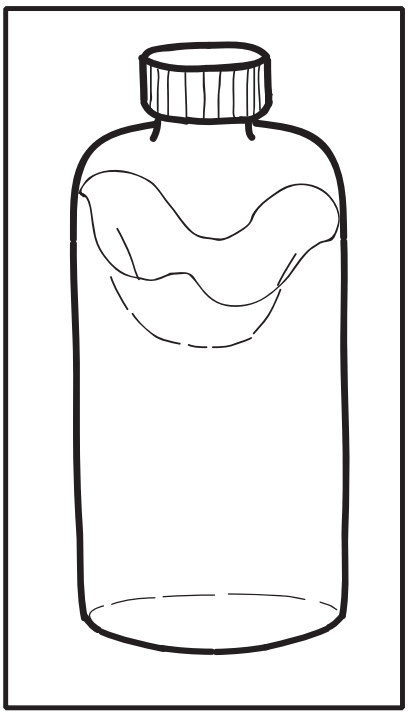
has color

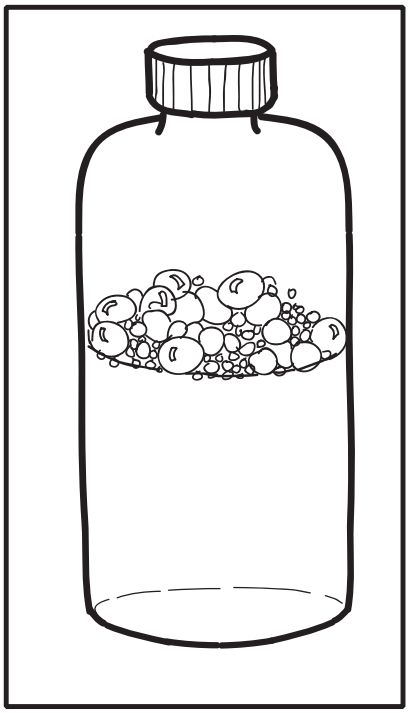
MASTER FOR CARD DECKS

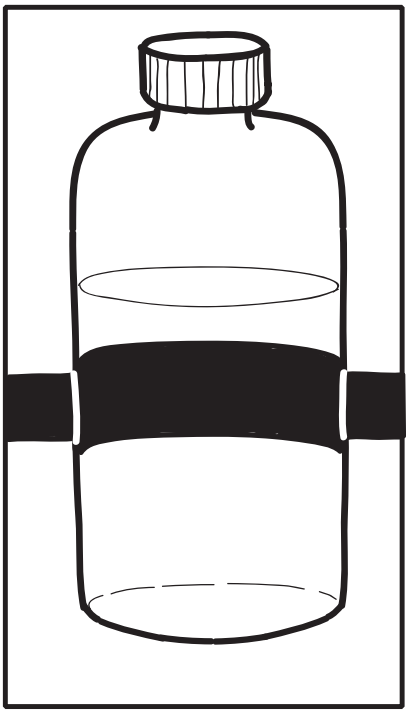












CENTER INSTRUCTION CARD

LIQUIDS IN CONTAINERS

MATERIALS FOR EACH STATION

- 1 Bus tray
- 1 Container, 1-liter
- Water
- 1 Vial, 7-dr. (small)
- 1 Plastic bottle
- 1 Container, 1/4-liter
- 1 Vial, 12-dr. (large)
- 1 Plastic cup
- 2 Student sheets called *Liquids in Containers*
- Colored pencils or crayons
- Paper towels

SET UP THE CENTER

Fill five 1-liter containers with water and add a drop of food coloring to each container. Space the five bus trays with their containers evenly around the table. Place two student sheets at each station, and have paper towels and colored pencils or crayons at hand.

GUIDE THE INVESTIGATION

1. **Introduce the Investigation.** Show students a set of containers and the *Liquids in Containers* sheet. Describe the procedure, modeling the actions as you proceed.
   a. *Work with a partner to line up the containers as they are on the sheet.*
   b. *Pour one full small vial of water into each container.*
   c. *Draw a line on each picture showing the level of the water.*
   d. *Color the water on your sheet if you would like to.*

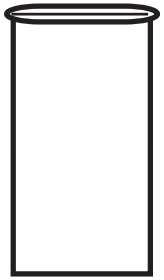
2. **Suggest Close Observations.** As students work, ask,
   - *What is the **shape** of the water in the bottle? In the cup? In the flat container? In the large vial?*
   - *Does each container have the same amount of water in it?*
   - *Which container **looks like** it has the most water in it?*
   - *Where do you think the water level will be if we add another vial of water to each container?*

   Students can put a second vial of water into each container and draw a second line on each picture.

3. **Prepare the Center for the Next Group.** When time is nearly up, ask students to pour all the water back into the 1-liter container. Use the paper towels to clean up any spills. Make sure each bus tray has a complete set of containers.

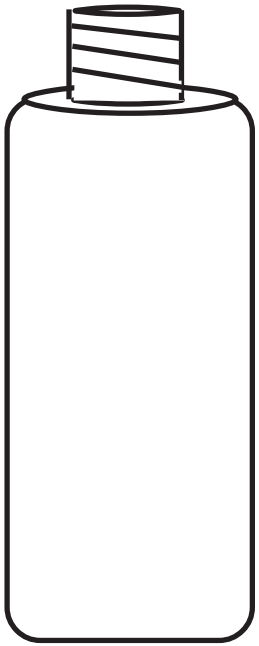
Name _____ Date _____

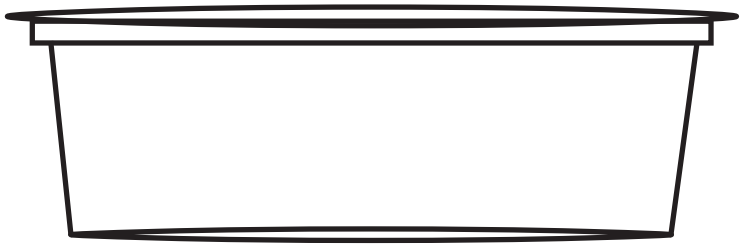
LIQUIDS IN CONTAINERS

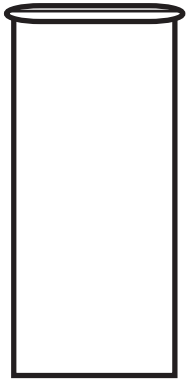


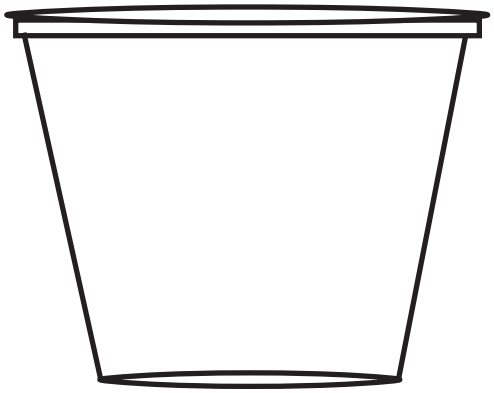
Small vial

1. Put one small vial of water in each container.
2. Draw the level of the water in each container.



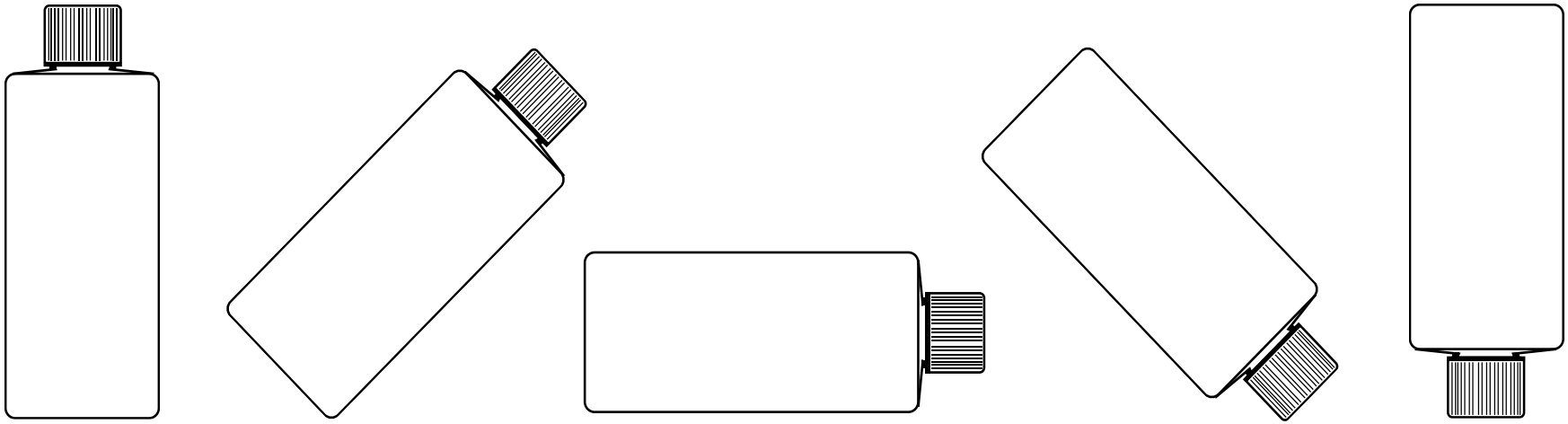






Name _____ Date _____

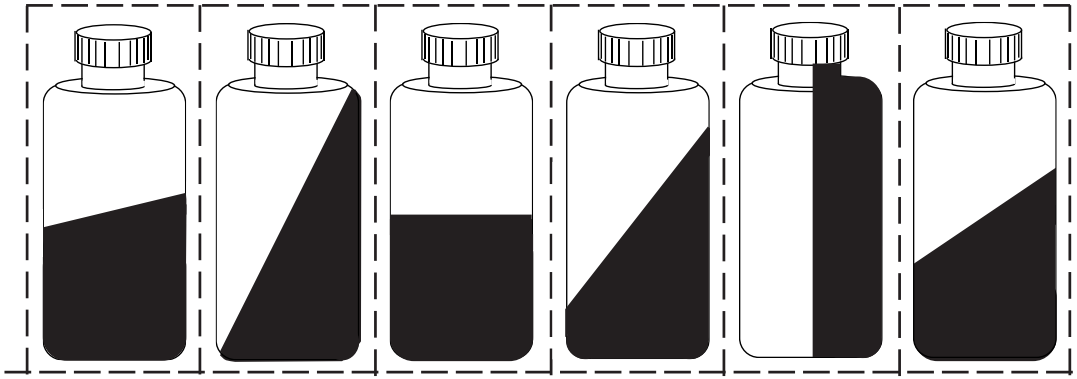
LIQUID LEVEL IN A BOTTLE



Draw what the liquid looks like in each picture as the bottle turns upside down.

Name _____ Date _____

FALLING-BOTTLE PUZZLE



1. Cut out the six bottles on the dashed lines.
2. Put them in order, showing how the bottle falls over onto its side.

Name _____ Date _____

FLOATING AND SINKING

What happens to each solid when it is put into water?

1. Clear plastic tube _____
2. Insulated wire _____
3. Plastic triangle _____
4. Rubber band _____
5. Craft stick _____
6. Wood cylinder _____
7. Vial with cap on _____
8. Vial with cap off _____
9. Vial cap _____
10. Aluminum foil _____

I learned that _____

_____

_____

_____.

CENTER INSTRUCTION CARD

SOLIDS IN CONTAINERS

MATERIALS FOR EACH STATION

- 1 Container (1/2-liter) lima beans, pinto beans, mung beans, rice, or cornmeal
- 1 Bus tray
- 2 Plastic cups
- 2 Bottles with caps
- 2 Vials with caps, 12-dr.
- 2 Vials with caps, 7-dr.
- 1 Beaker, 50-ml
- 1 Funnel
- 1 Scoop, 25-ml
- 1 Wood cylinder
- 1 Screw

SET UP THE CENTER

The cylinders and screws should be in a container in a central spot. Space the five bus trays with their containers and solid material evenly around the table.

GUIDE THE INVESTIGATION

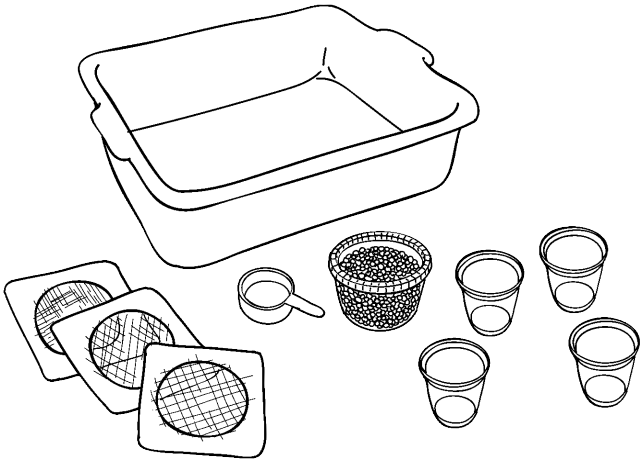
1. **Describe the Challenge.** Tell students that they will work with a partner to find out as much as they can about each of the five solid materials by transferring them from one container to another.
2. **Keep the Center Activity Moving Forward.** Provide very little guidance as students work with the materials and containers. If necessary, remind them to work in the bus trays. Don't allow students to mix materials.
3. **Focus the Observations.** Ask questions to focus students' observations on the properties of the solid materials.
   - *Put one level scoop of material in each container. Note the level of the material in each container. Does the highest level mean the most material?*
   - *Can you get the material to pile up?*
   - *Describe how small solid materials pour.*
   - *Can you put the material in a pile, a line, a circle, a square?*
   - *What happens when you put the wood cylinder and the screw in a cup of the solid material?*
4. **Move to a New Station.** After students become familiar with the first material, suggest that they move to a new station to investigate a different material. Spend 3–5 minutes at each station.
5. **Prepare the Center for the Next Group.** When time is nearly up, ask students to put all the materials back into their original containers. Make sure each bus tray has a complete set of containers.

CENTER INSTRUCTION CARD

SEPARATING SOUP MIX

MATERIALS FOR EACH STATION

- 1 Bus tray
- 1 Container of soup mix
- 4 Containers, 1/2-liter
- 1 Scoop, 25-ml
- 1 Screen, small mesh
- 1 Screen, medium mesh
- 1 Screen, large mesh



SET UP THE CENTER

Space the five bus trays with their containers and soup mix evenly around the table.

GUIDE THE INVESTIGATION

1. **Describe Separating Soup Mix.** Tell students to work with a partner to separate the soup mix into containers to find out how many kinds of material are in the mixture.
2. **Keep the Center Activity Moving Forward.** Provide very little guidance as students work with the soup mix and screens. If necessary, remind them to work in the bus trays. If they don't use the screens at the start, that's OK.
3. **Monitor the Separation.** If after an extended period of time the screens are not being used, suggest that the screens might be useful. Ask,
   - *How are screens used?*
   - *Are screens useful for separating soup mix?*
   - *Which screen is the best for separating soup mix?*
   - *Can you get each of the materials in its own container?*
4. **Discuss Separations.** After students have had some success separating the soup mix, ask some questions to focus thinking on the separation process.
   - *How many different materials were in the soup mix?*
   - *Were you able to separate the mix? How did you do it?*
   - *If you use the screens to sift the mixture, what is the best way to use them? Which screen did you use first?*
5. **Prepare the Center for the Next Group.** When time is nearly up, ask students to return the soup mix to its original container. Make sure each bus tray has a complete set of screens and 1/2-liter containers.

CENTER INSTRUCTION CARD

SOLIDS IN BOTTLES

MATERIALS FOR EACH STATION

1 Bus tray
1 Scoop, 25-ml
1 Funnel
4 Bottles with caps
1 Container of cornmeal
1 Container of rice
1 Container of mung beans
1 Container of lima beans
1 Large book or lapboard

SET UP THE CENTER

Space the five bus trays with their bottles and materials evenly around the table.

GUIDE THE INVESTIGATION

1. **Describe Filling the Bottles.** Tell students that they will fill bottles with a partner at one of the bus trays.
   a. Put the material from one of the containers into one of the bottles and put the cap on tightly.
   b. Repeat the process until a different material is in each of the four bottles.
   c. Roll, shake, and tip the bottles while observing what happens.

   Point out that there is a funnel to help direct the materials into the bottles.

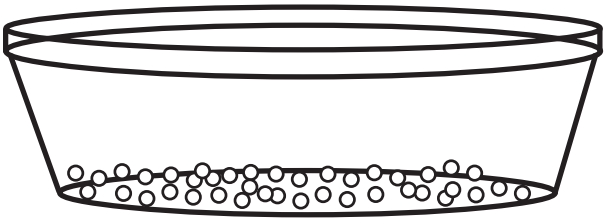
2. **Keep the Center Activity Moving Forward.** Watch to see that students put only one kind of material in each bottle. If necessary, remind students to work in the bus trays. Once the bottles are filled and the caps are screwed on tightly, provide very little guidance as students start their investigation. Caution them not to drop the bottles or hit them on anything, as they will crack. They should be handled carefully throughout the investigation.

3. **Suggest Close Observation of the Bottles.** After students have had plenty of time to try their own ideas, ask questions to focus their observations.
   - *What happens when you turn the bottles upside down slowly? Describe what you see.*
   - *What happens when you shake the bottles? Describe what you see and how they sound.*
   - *What happens when you spin the bottles on the floor?*
   - *What happens when you roll the bottles down a ramp and across the floor?*

4. **Prepare the Center for the Next Group.** When time is nearly up, ask the students to return the materials to their original containers. Make sure each bus tray has a complete set of bottles and materials.

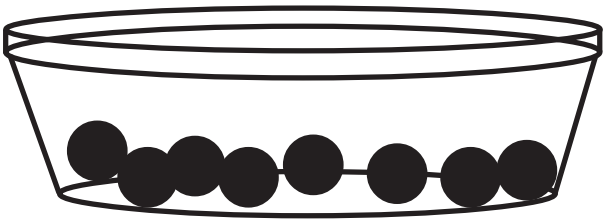
Name _____ Date _____

BEAD MIX A



Which screens can these beads go through?

_____



Which screens can these beads go through?

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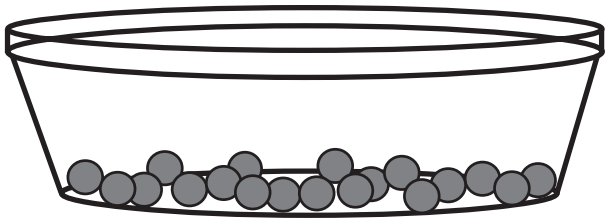

Which screens can these beads go through?

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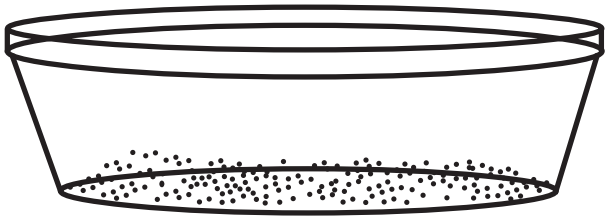
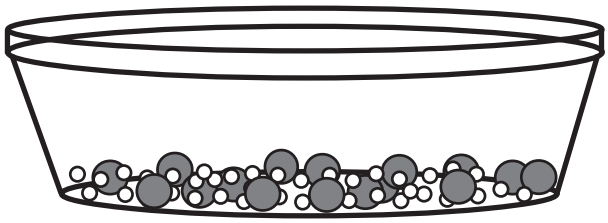


Which screens can these beads go through?

_____

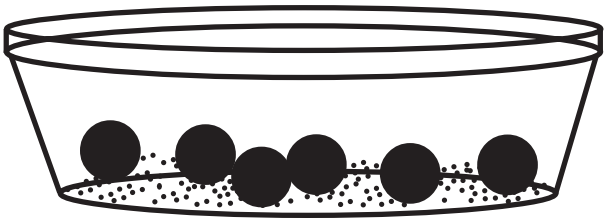
Name _____ Date _____

BEAD MIX B



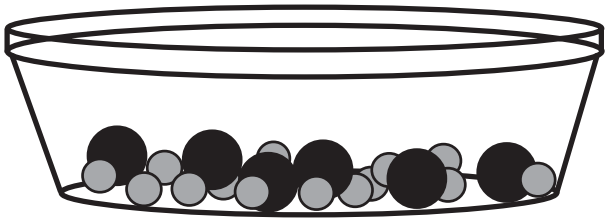
Which screen can separate this mixture?

_____



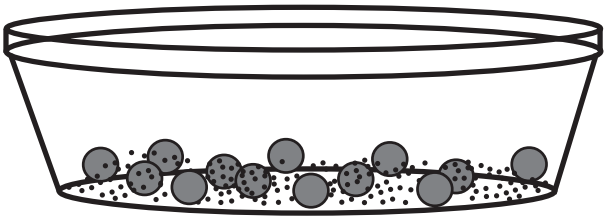
Which screen can separate this mixture?

_____



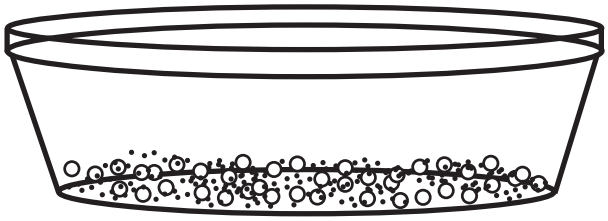
Which screen can separate this mixture?

_____



Which screen can separate this mixture?

_____

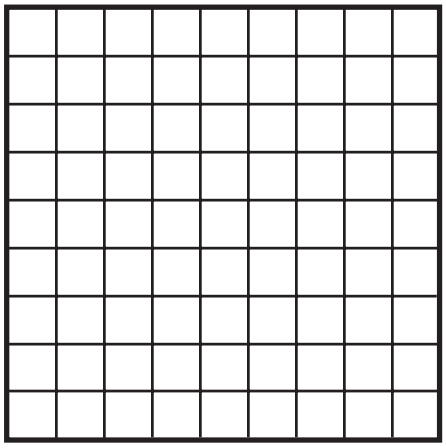


Which screen can separate this mixture?

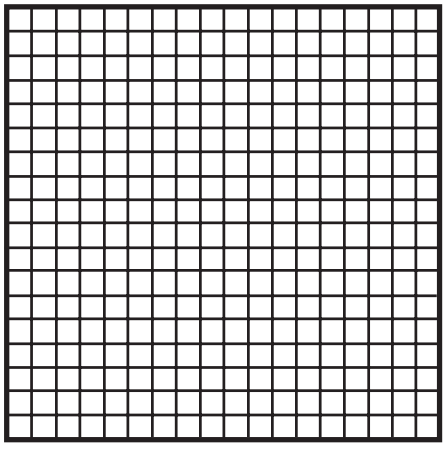
_____

SCREENS

1



2



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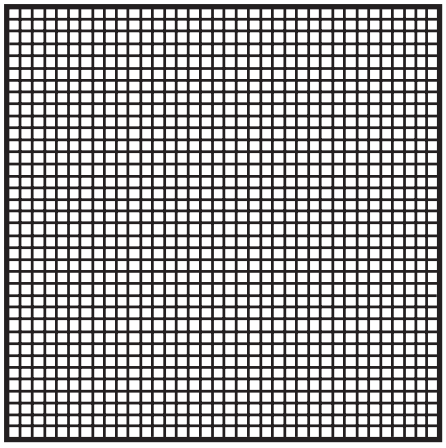
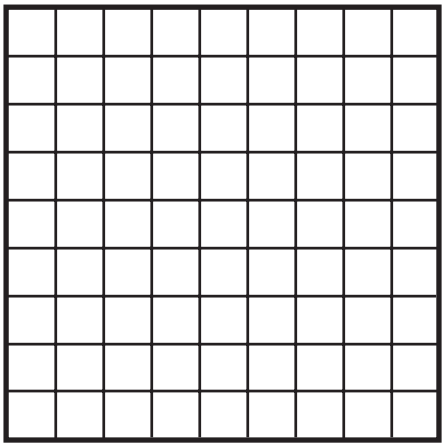
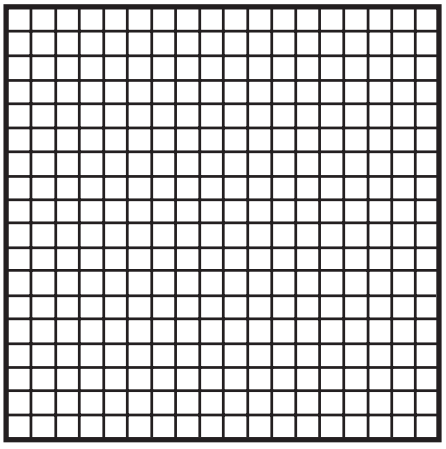


SCREENS

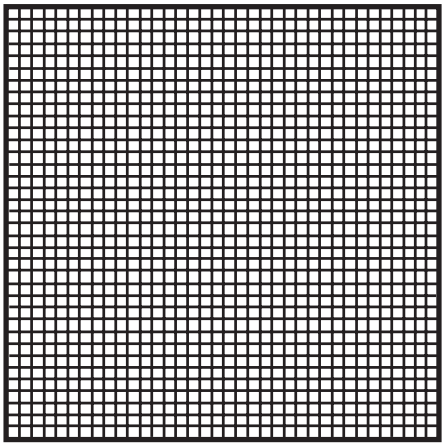
1



2



3

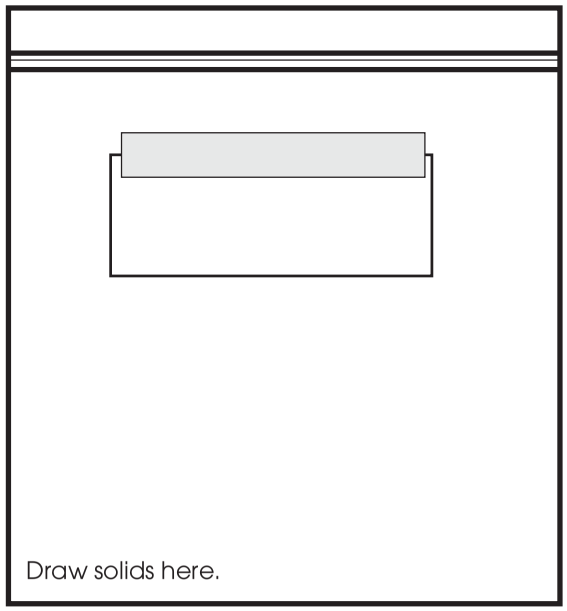


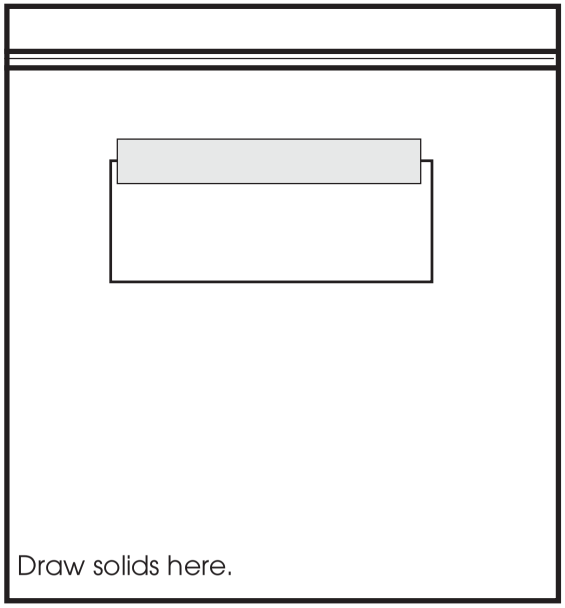
LABELS FOR SOLIDS IN WATER

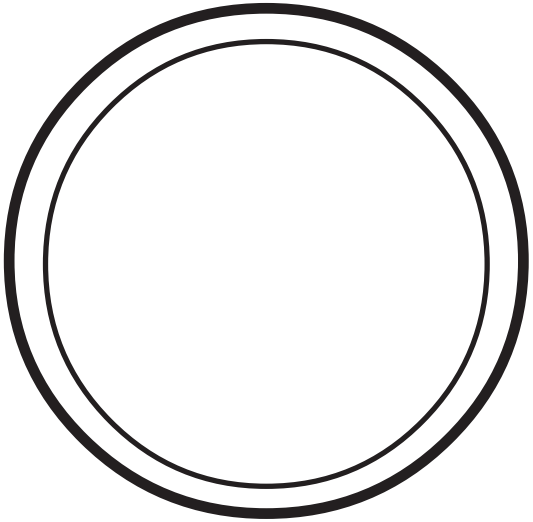
Cookie Name _____	**Craft Stick** Name _____
Beans Name _____	**Cardboard** Name _____
Rice Name _____	**Candy** Name _____
Cloth Name _____	**Rock Salt** Name _____
Raisins Name _____	**Aluminum Foil** Name _____
Chalk Name _____	Name _____

Name _____ Date _____

SOLID MATERIALS IN WATER







1. First the solid is dry. It looks

_____

_____

_____

2. After a night in water, it looks

_____

_____

_____

3. Then we evaporated the water. It looks

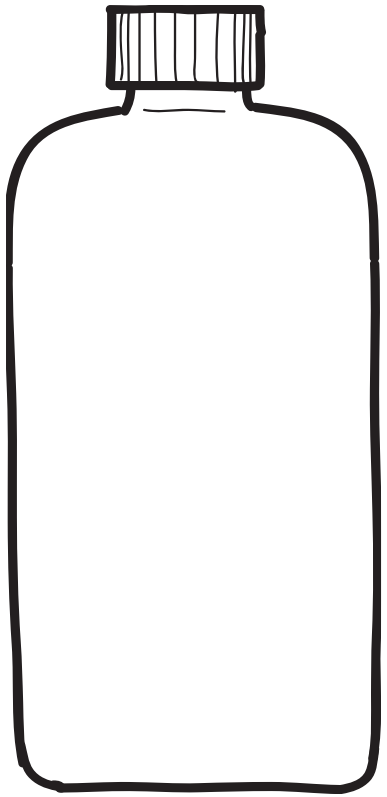
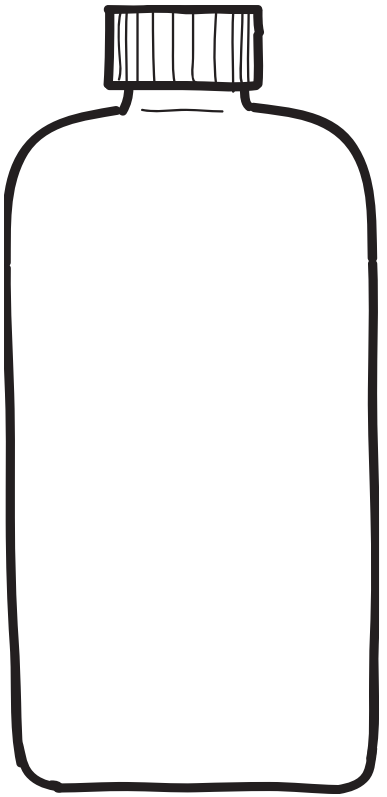
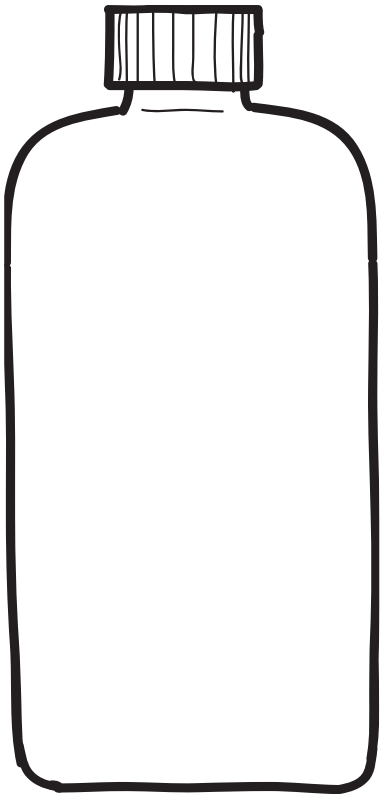
_____

_____

_____

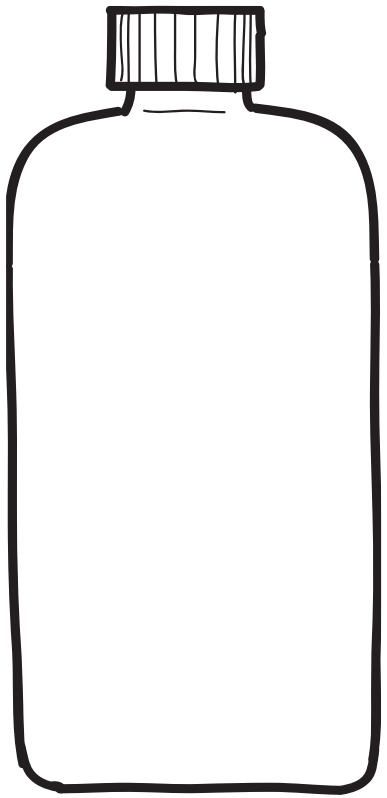
Name _____ Date _____

LIQUID WITH WATER

		
1. Add water. How does it look?	2. Shake it. How does it look?	3. Let it sit overnight. How does it look the next day?

Name _____ Date _____

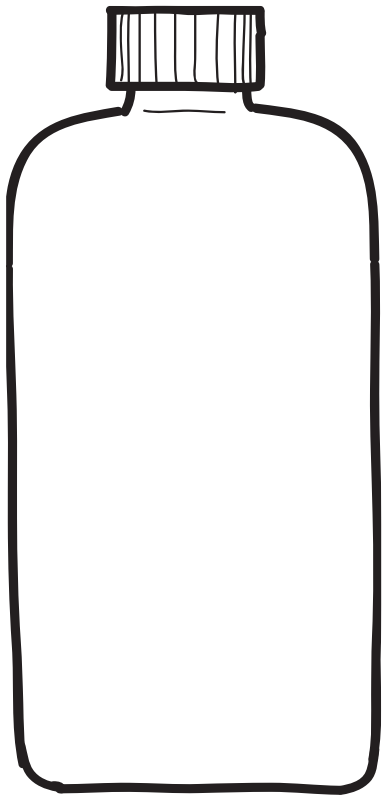
INVESTIGATING TOOTHPASTE



1. This is toothpaste soon after it is put in water.

_____

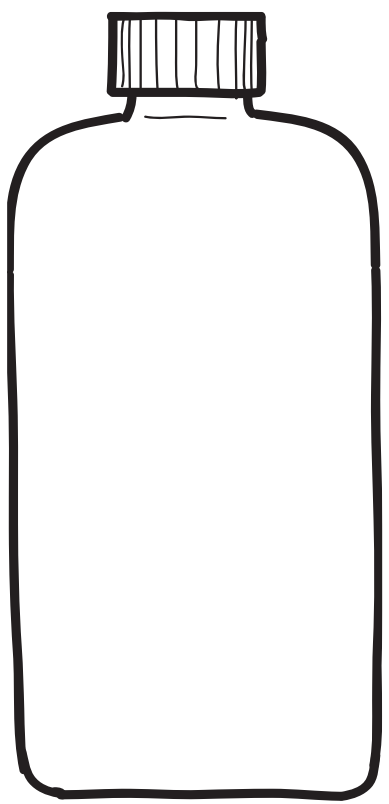
_____



2. This is toothpaste in water after mixing and waiting 5 minutes.

_____

_____



3. This is toothpaste after sitting overnight.

_____

_____

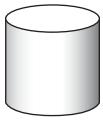
Name _____ Date _____

MATH EXTENSION A

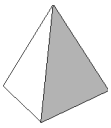
INVESTIGATION 1: SOLIDS

What solids have the shape of a **sphere** ?

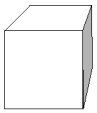
What solids have the shape of a **cylinder** ?



What solids have the shape of a **pyramid** ?



What solids have the shape of a **rectangular solid** ?

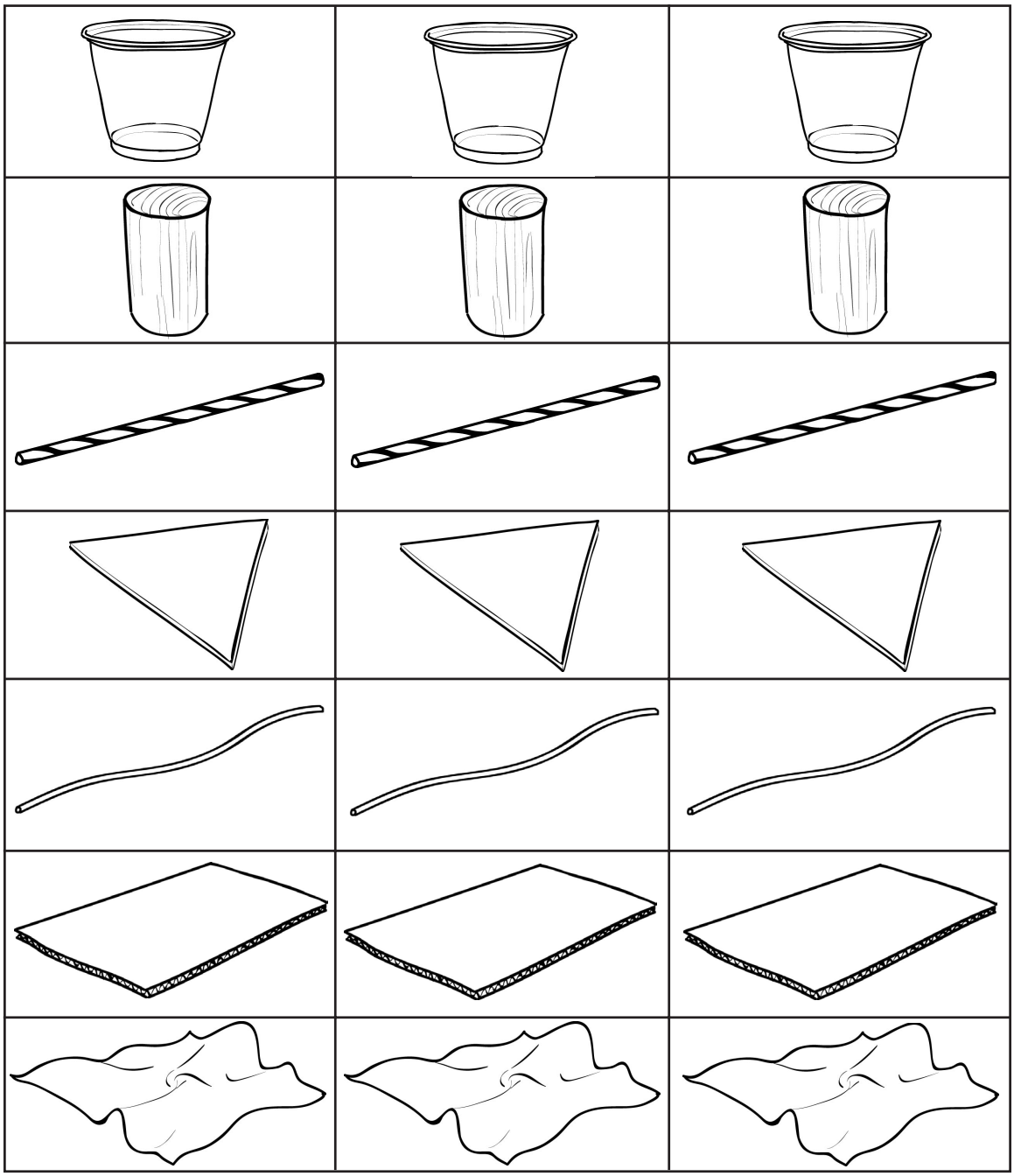


Name _____ Date _____

MATH EXTENSION B

INVESTIGATION 1: SOLIDS

Cut out the boxes with the pictures of objects. Build towers with the pictures to match the clues your teacher gives you.

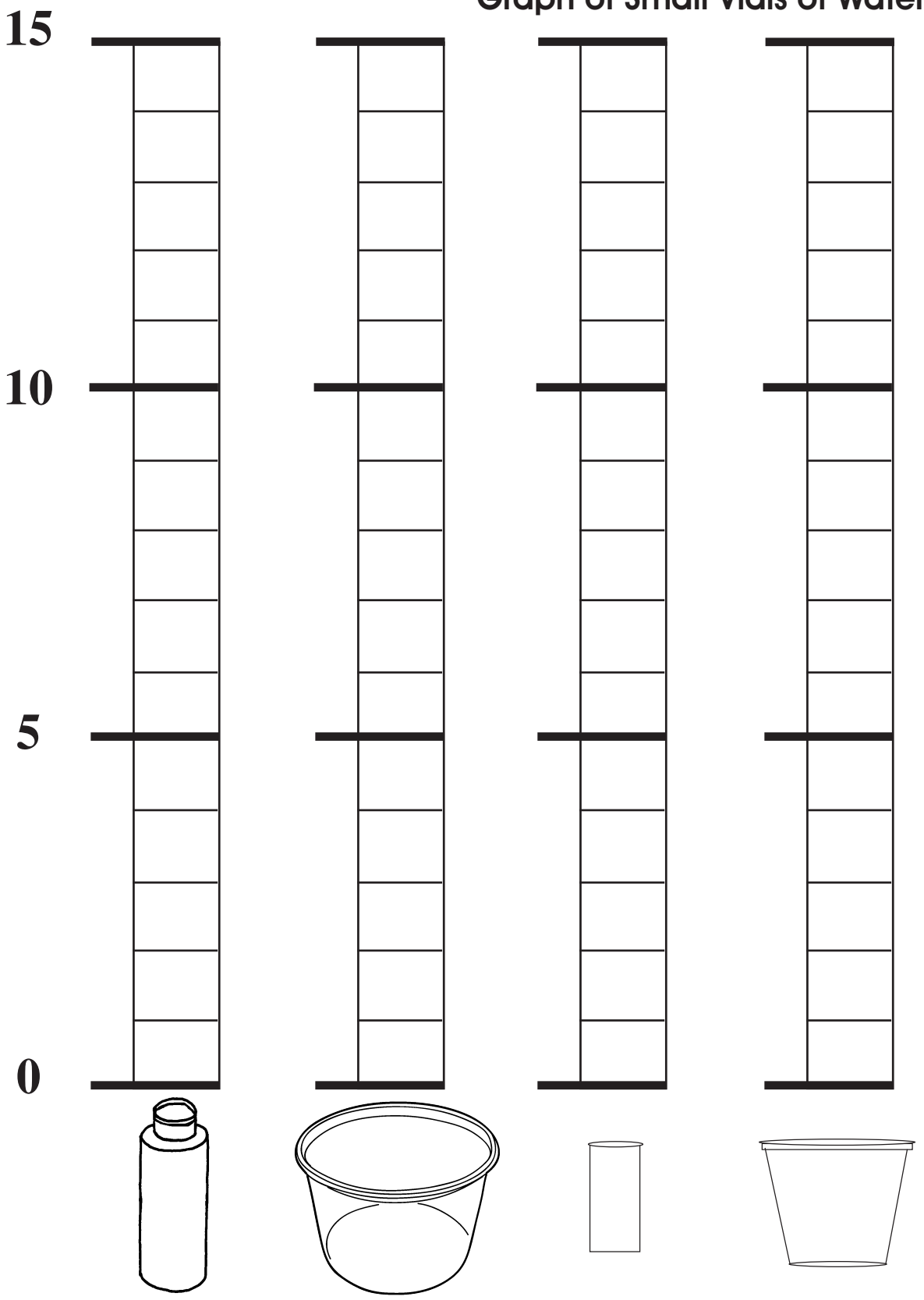


Name _____ Date _____

MATH EXTENSION A

INVESTIGATION 2: LIQUIDS

Graph of Small Vials of Water



Name _____ Date _____

MATH EXTENSION B

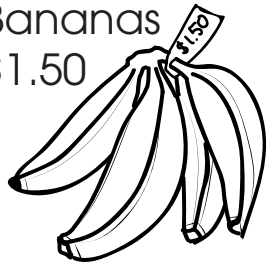
INVESTIGATION 2: LIQUIDS

Aubree went to the store with his mother to pick up a few things. They bought dishwashing soap, milk, bran flakes, some cheese, and some bananas. The prices for each are listed below.

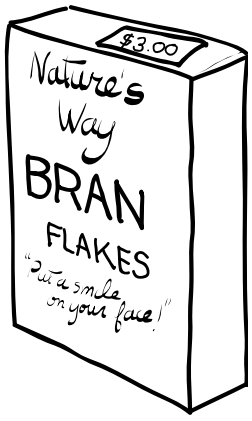
How much did they spend for liquids? _____

How much did they spend for solids? _____

Bananas
$1.50



Bran flakes
$3.00



Dishwashing soap
$1.50

Milk
$2.00

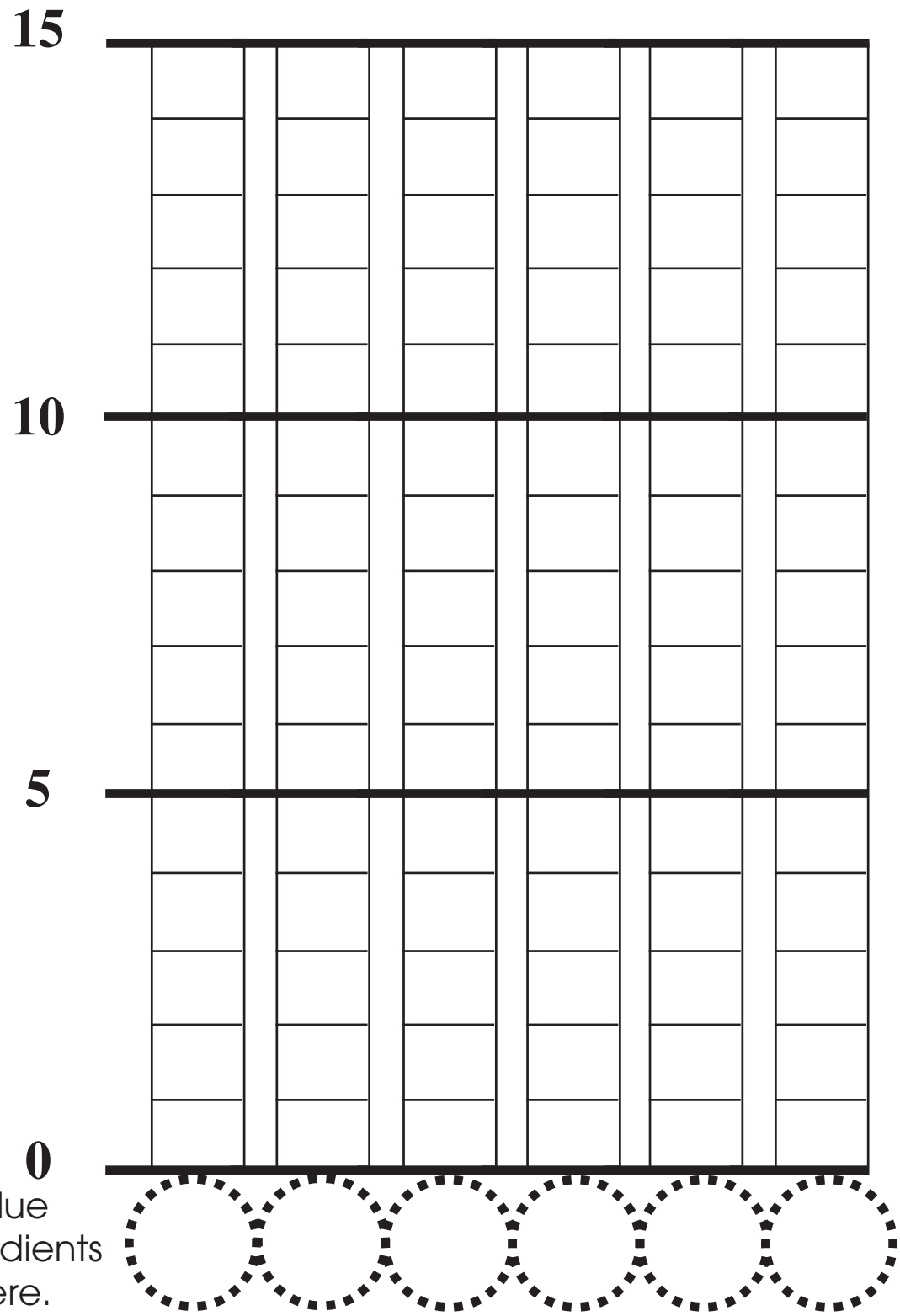
Cheese
$2.50

Name _____ Date _____

MATH EXTENSION A

INVESTIGATION 3: BITS AND PIECES

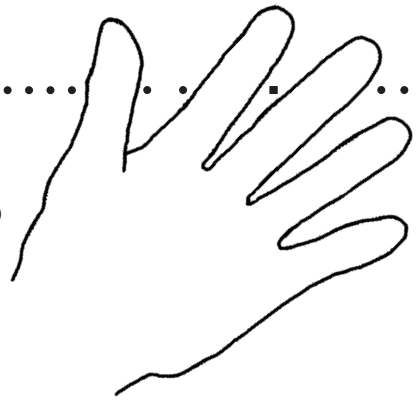
Trail-Mix Graph



Name _____ Date _____

MATH EXTENSION B

INVESTIGATION 3: BITS AND PIECES



How many pinto beans can you grab in one hand? Do it to find out, and record the number here. _____

Will you be able to grab more, fewer, or the same number of lima beans?
(Circle one.) More Fewer Same number

Why do you think so?

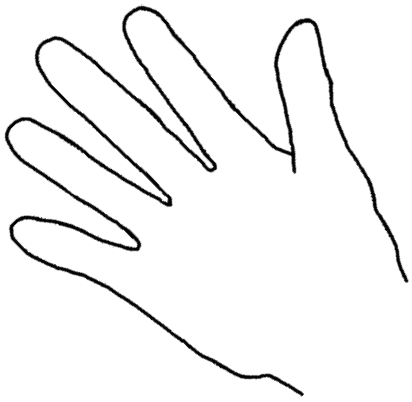
_____

_____

_____

_____

How many lima beans can you grab in one hand? Do it to find out, and record the number here. _____

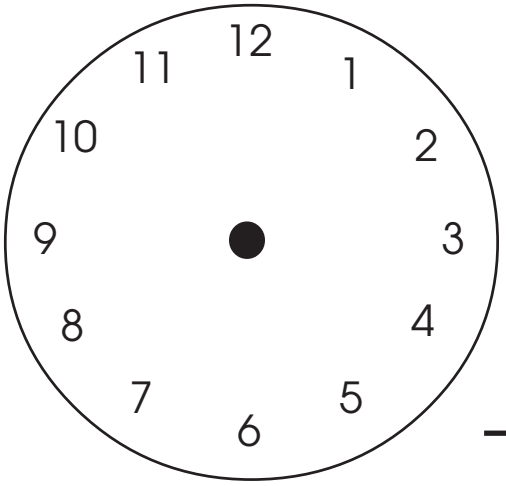


Name _____ Date _____

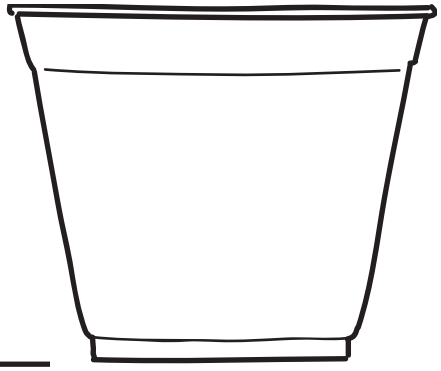
MATH EXTENSION A

INVESTIGATION 4: SOLIDS AND LIQUIDS WITH WATER

1. What time is it when you start?

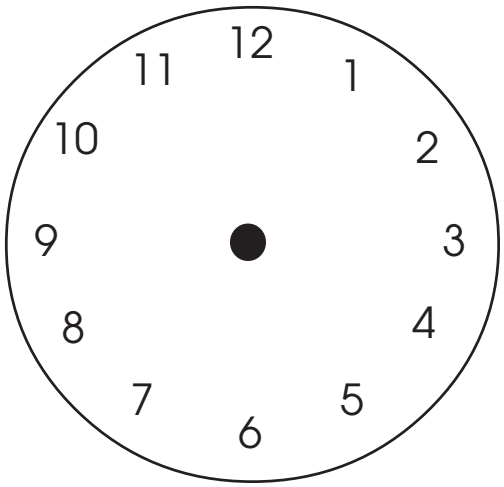


_____ : _____

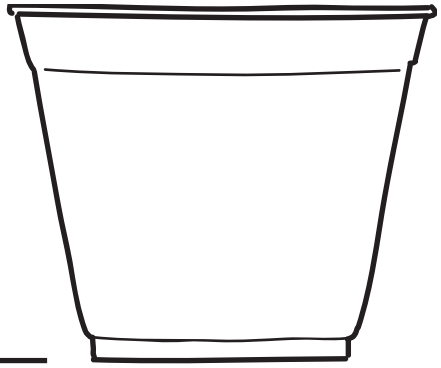


This is the ice before it melts.

2. What time is it when the ice is melted?



_____ : _____



This is the ice after it melted.

3. How long did the ice take to melt? _____

Name _____ Date _____

MATH EXTENSION B

INVESTIGATION 4: SOLIDS AND LIQUIDS WITH WATER

Shelby wanted to make a new kind of soda. She tested many ways of putting the solids and liquids together. Here is what she thought made the best-tasting soda.

Water	2 ounces
Sugar	4 spoons
Flavoring	3 spoons of vanilla, 2 spoons of strawberry
Coloring	5 drops of blue, 3 drops of red

Then she wanted to make a larger portion of soda, using 8 ounces of water. How much of each solid and liquid listed above should she use? She wants her 8-ounce soda to taste just like her 2-ounce test.

Name _____ Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 1: SOLIDS

Play I Spy a Solid with someone at home. These are some of the words we have been using in class to describe solids. Next to each word, draw or write the name of the solid you spied that matches the word. Add any other properties of solids that you spied.

"I spy a solid that is..."	
flexible	rigid
smooth	rough
soft	transparent
flat	pointed

Name _____ Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 2: LIQUIDS

Draw the bottle here.

This liquid is called

_____

_ _

_____

Circle the properties of the liquid.

transparent
translucent
bubbly
viscous
foamy
has color

_____

_____

_____

_____

Name _____ Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 3: BITS AND PIECES

Soak, Slide, or Pile Up?

Compare what happens when you drop a spoonful of different materials on a paper towel. You might try water, rice, milk, flour, cornmeal, or beans. Then try the same materials on a different surface, such as plastic wrap or foil.

What did you observe?

Material	On Paper Towel	On Other Surface	Solid or Liquid

Name _____ Date _____

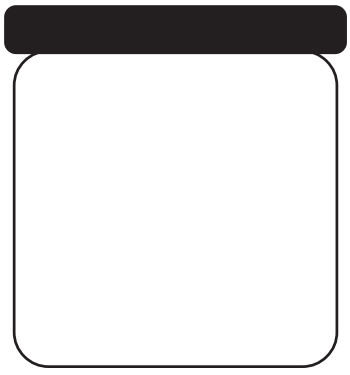
HOME/SCHOOL CONNECTION

INVESTIGATION 4: SOLIDS AND LIQUIDS WITH WATER

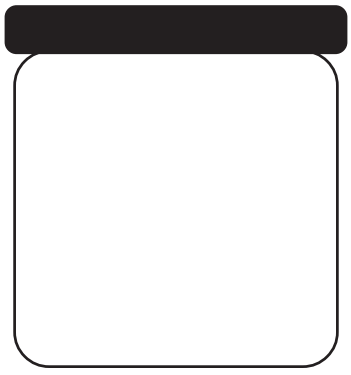
Scientific Salad Dressing

Cooks are chemists! Cooks investigate solids, liquids, and mixtures all the time. Make some tasty salad dressing to investigate what happens when solids and liquids are mixed.

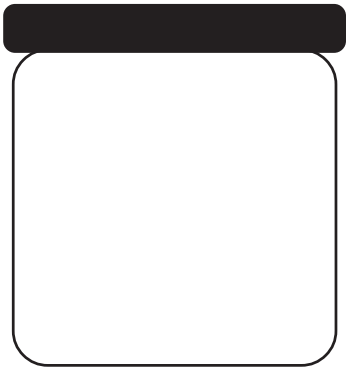
You will need a jar with a lid, salt, oil, pepper, vinegar, and a spice such as dried rosemary, tarragon, oregano, or basil.



1. Add 1/3 cup of vinegar to 1/2 cup of oil. Draw your observations.



2. Put on the lid and shake it up. Draw your observations.



3. Let it sit for 5 minutes. Draw your observations.

4. Add 1/2 teaspoon of salt and shake. What happens?

5. Add 1/2 teaspoon of pepper and shake. What happens?

6. Add _____ teaspoon of _____
Shake. What happens?

Now you can try your salad dressing on salad. How does it taste?