

Structure and Properties of Matter



2nd grade Teacher's Guide

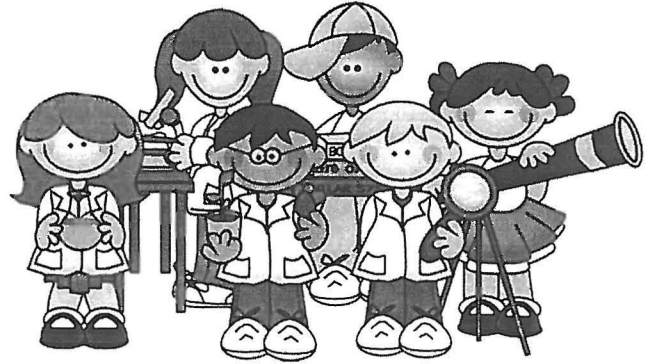
Lesson 1

- Length:** 1 session: about 30-40 minutes
- Materials:** What is the World Made Of? By: Kathleen Weidner Zoehfeld
Sticky Notes
White Board
- Overview:** Launch unit with a subject introduction, student generated hypothesis, and an exploration walk.
- Engage:** Sing *States of Matter* located in the teacher guide.
- Explore:** Introduce matter as a concept. Draw the idea chart from page 1 of the student journal on the board. Pass out sticky notes to each child and allow time for them to write ideas.
- Explain:** Have students attach sticky notes to the board and have a classroom discussion based on their thinks, knows, wonders, and connections. Encourage the class to record other students' responses in their journal.
- Elaborate:** Read *What is the World Made Of?*
On page 1 of the student journal define in kid language solid, liquid, and gas.
- Evaluate:** Go on a scavenger (indoors or outdoors) hunt for solids, liquids, and gases (student journal page 2). Come back for a quick whole group discussion. What did you find?

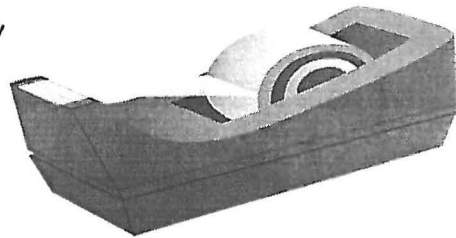
States of Matter

(To the tune of Famer in the Dell)

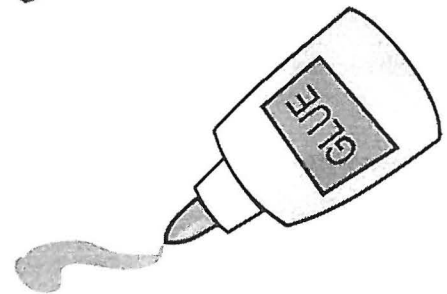
Solid, Liquid, Gas
Solid, Liquid, Gas,
Three states of matter,
Solid, Liquid, Gas,



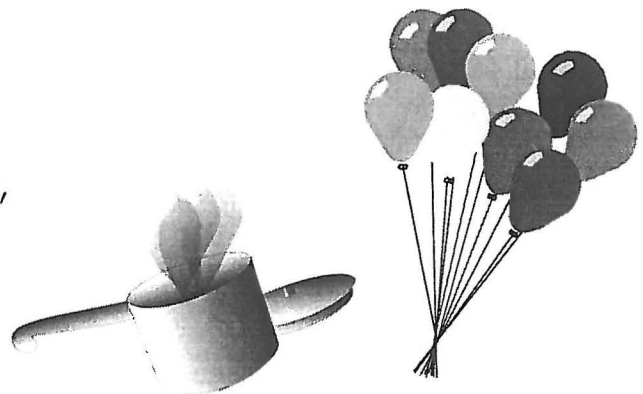
A solid keeps its shape,
Some are hard, some can break,
Like a table or a role of tape,
A solid keeps its shape.



A liquids shape depends
On the container that's it's in.
Like a cup, bottle, or metal tin,
A liquids shape depends



A gas you cannot see,
It's in the air that we breathe,
Helium, oxygen, or steam,
A gas you cannot see.



Matter

I know...

Reminds me of...

I wonder...

I think...

Solid: _____

Liquid: _____

Gas: _____

Matter Scavenger Hunt

Look for each of the following states of matter:

Solid	Liquid	Gas

Which state of matter did you observe most often? _____

Which state of matter did you observe least often? _____

Lesson 2

Length: 1 session: about 30-40 minutes

Materials: **At each group:**
Pipe cleaner
Sticky bug
Marble
Porcupine ball
Feather
Sand paper
Twizzler
Cotton ball
Rock
Popsicle stick
Hand Lenses (each student)

Overview: Students and teacher will be creating anchor charts and observing properties of various objects. We will be creating language which allows students to describe materials by their observable properties.

Engage: Let students know that we will be discovering the properties of various objects. Allow discussion for ideas about how to observe and what they can observe. This will lead into a natural transition for the next activity.
Students will create anchor charts with texture, shape, and color words (student page 3). Discuss as whole group and hang chart in room. Explain flexibility and have students give examples of items that are flexible. Students will enter yes/no in the chart for flexibility.

Explore: Have students open journals to page 4. Read the poem:

Fingers Tell

*What can your fingers
See for you?
Whether a surface
Feels old or new?
Is it bumpy, lumpy,
Slippery, slick?
Prickly, scratchy?
Hard as brick?
Spongy, rough?
Softer than dough?
Touch it!
See if your fingers know.*

Explain:

Discuss and model how to use hand lenses. Distribute materials to tables and allow students to explore **properties of materials**. Observe and listen to students as they interact to encourage scientific language. Students record observations in the table on page 4.

Evaluate:

Ask open ended questions to foster higher order thinking. Questions include:

What evidence do you have...

How could you prove...

What properties do these materials share?

Describing Properties

Property: _____

Color	Texture	Shape

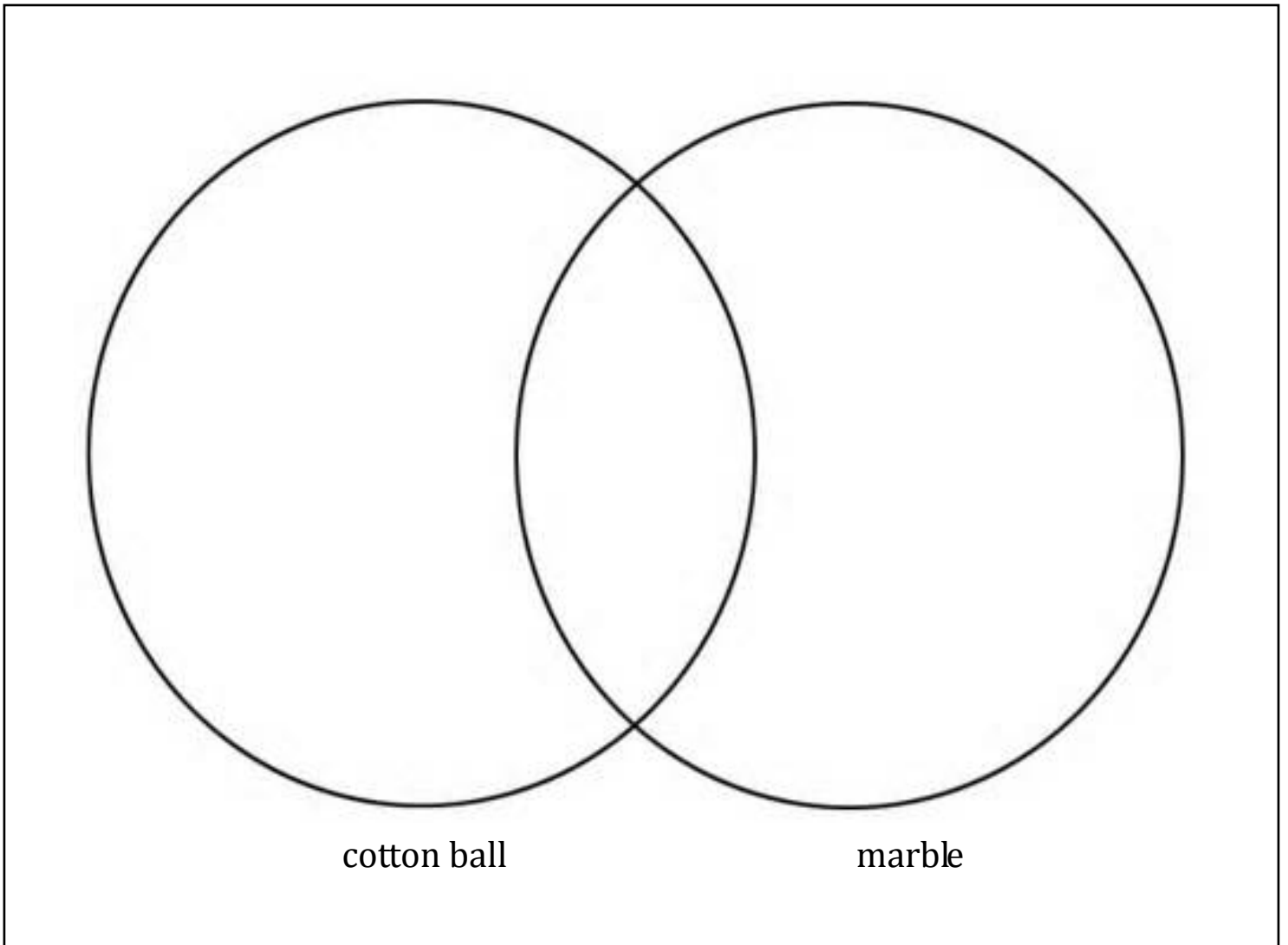
Describing Properties

	Color	Flexible Can you bend it?	Shape	Texture How does it feel?
Pipe Cleaner				
Sticky Bug				
Marble				
Porcupine ball				
Feather				
Sandpaper				
Twizzler				
Cotton Ball				
Rock (bumpy)				

Lesson 3

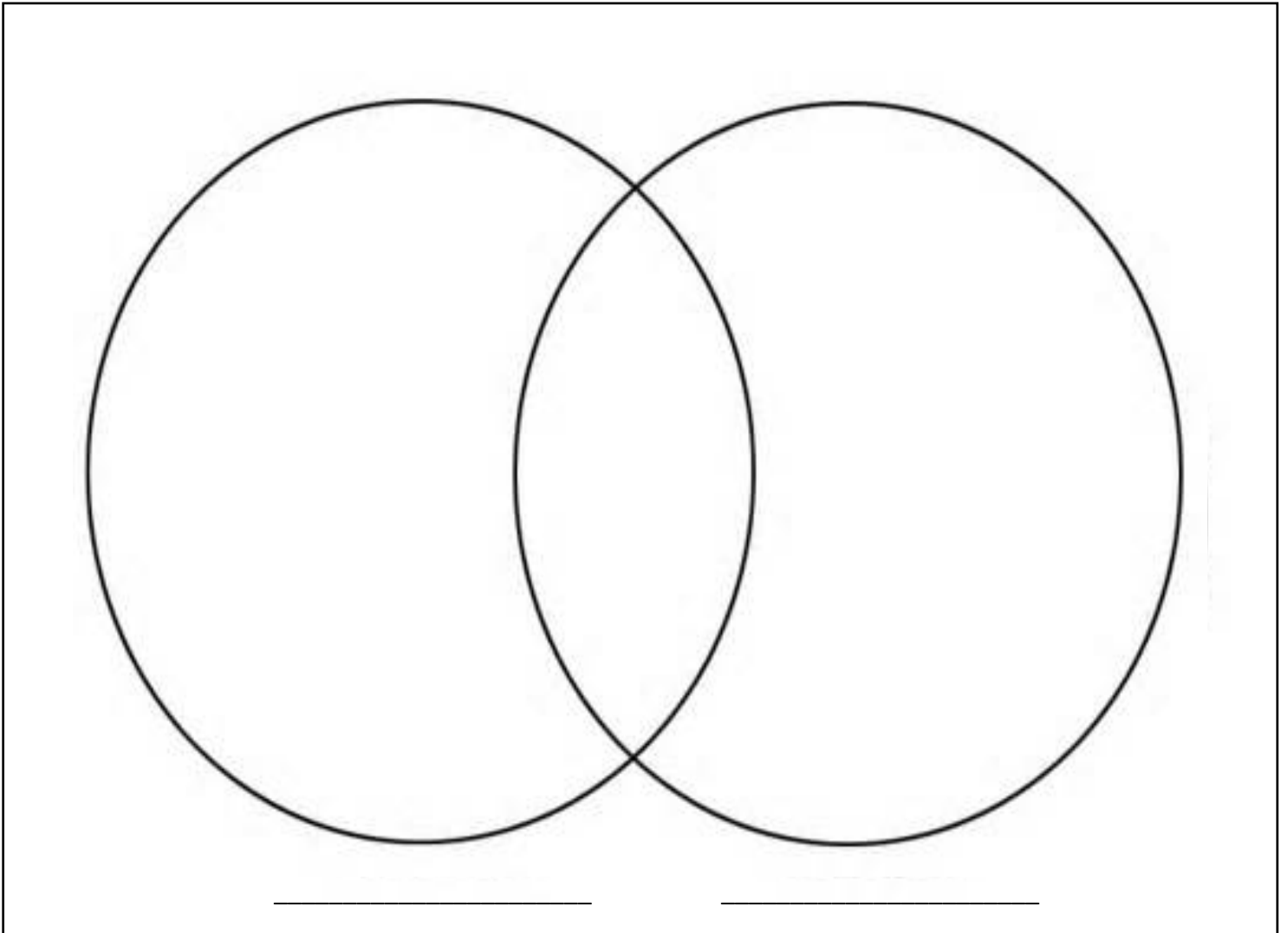
- Length:** 1 session: about 30-40 minutes
- Materials:** Cotton Ball
Marble
Prior lesson materials optional
- Overview:** Compare and contrast materials and their properties.
- Engage:** Raise questions from the prior lesson:
What did you notice?
Where there properties which two materials shared?
- Explore:** Quickly review a Venn Diagram with your students. Create the first Venn Diagram on the board or overhead. Guide students in filling out diagram together. Encourage scientific language. Student page 5.
- Explain:** Make an observation about the information. (The cotton ball and the marble have two properties in common.)
- Elaborate:** Have students complete the Venn Diagram on student journal page 6. Encourage them to pick two materials that have similar properties as well as different. This may be a good time to pull students who are in need of extra support.
Ask students to make an observation about the materials.
- Evaluate:** Come together for a quick whole group closing. Ask students to share out what materials they chose and observations they made.

Comparing and Contrasting Materials



Using the information in the Venn diagram, write an observation. Remember to use scientific language.

Comparing and Contrasting Materials



Using the information in the Venn diagram, write an observation. Remember to use scientific language.

Lesson 4

Length:	1 session: about 30-40 minutes
Materials:	Sponge Paper Towel Wax Paper Graduated Cylinder Medium Bowl with Water Funnel
Overview:	Students will find the material that is most absorbent. We will create a graph and form a conclusion. Students will explore materials that contain properties we use for an intended purpose: absorbency.
Engage:	Prior lessons have been based on properties of materials. Draw on those lessons to make the connection that a material being absorbent is another property of a material.
Explore:	Let students know that we will be conducting an experiment to find an object that is the most absorbent. Brainstorm different household items that they know to be absorbent. Introduce the materials we will be testing: sponge, paper towel, wax paper. Complete the scientific process on student page 7. Do not fill out the conclusion until after the experiment. Fill a bowl with water. Dip the first absorbent material in the bowl and squeeze its contents into a graduated cylinder. Graph results on student journal page 8. Repeat for the rest of the materials.
Explain:	Complete the conclusion on student page 7.
Elaborate:	Complete the definition for absorbent in kid language on student journal page 8.
Evaluate:	Quick whole group overview of the experiment. Which material would you choose to clean up a spill? What property does this material have that would persuade you to pick this material for a cleanup job?
Extension:	Take the growing alligator from the package. Ask students what properties it has. Discuss what they believe will happen if we leave the alligator in distilled water all night. Do the experiment and then discuss what properties the alligator must have for it to be able to grow to such a large size.

NAME _____

DATE _____

SCIENCE EXPERIMENT RECORDING SHEET

PROBLEM/QUESTION



OBSERVATIONS



HYPOTHESIS



MATERIALS



PROCEDURE



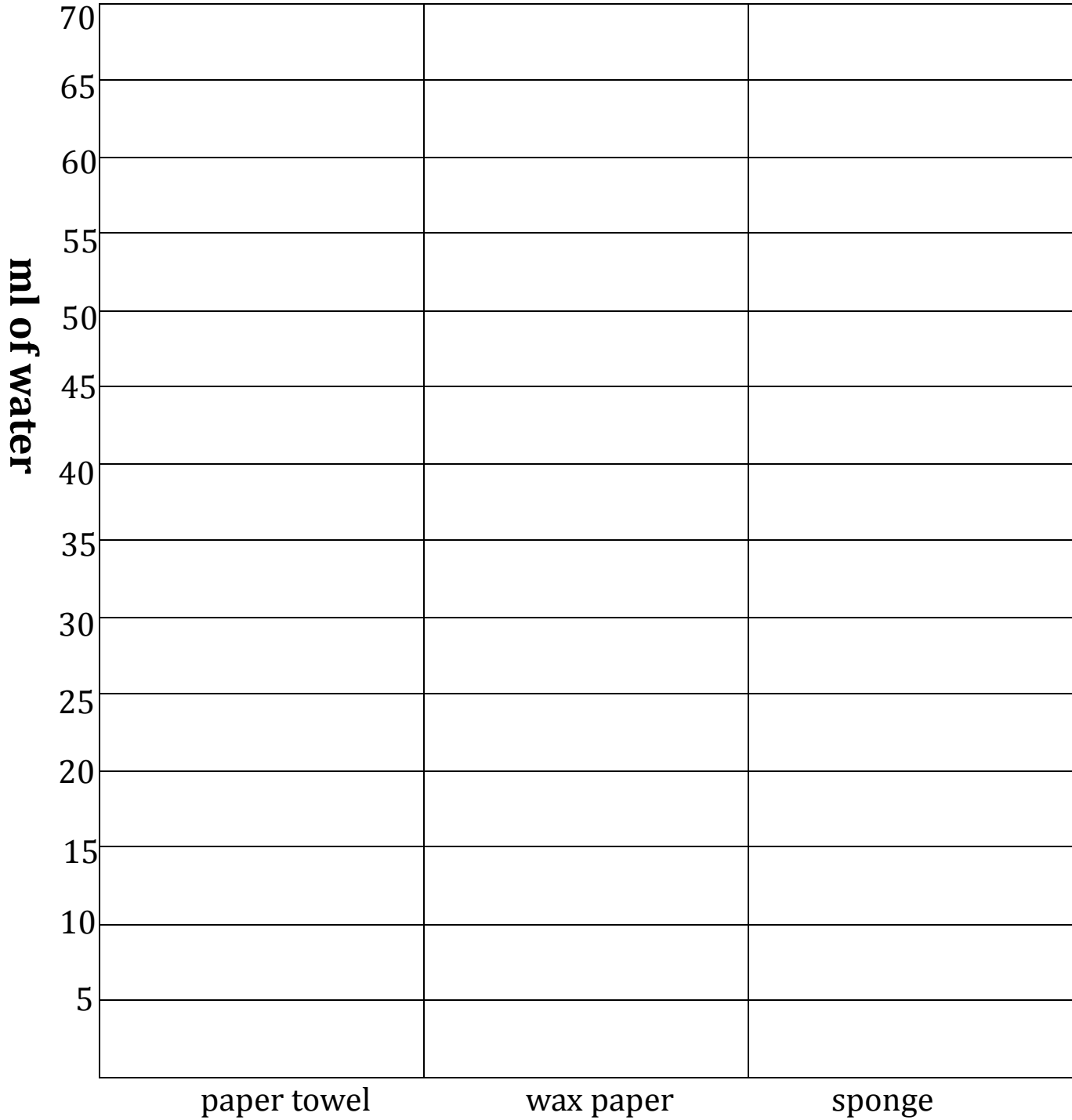
RESULTS



CONCLUSION



How absorbent am I?



Absorbant: _____

Lesson 5 (2 days optional)

- Length:** 1 session: about 30-40 minutes
- Materials:** Pipe Cleaners
3x5 Notecard
Popsicle Sticks
Washers
Note: Arrange desks so that they are 4 inches apart in order to create a bridge across the two tables
- Overview:** Students will be testing materials based on strength. Continue to connect students back to the concept of observable properties.
- Engage:** Discuss what properties a pipe cleaner, 3x5 notecard, and popsicle sticks have. Introduce another observable property: strength.
- Explore:** Let students know we will be testing different materials for strength. Form a hypothesis and fill out the scientific process (special attention to the procedure so that students can conduct the experiment successfully) on student page 9. Do not fill out the conclusion portion until the experiment is completed.
- Elaborate:** Put students in mixed ability, small groups. Give each group 6 pipe cleaners taped together, one 3x5 notecard, 6 popsicle sticks taped together, and 40 washers.
Students should relate back to the procedure portion of the scientific process.
The popsicle sticks will hold all 40 washers. They will have to stop there. Encourage students to predict how many washers it could hold. Fill out the chart on student page 10.
- Evaluate:** Students will complete the conclusion section on the scientific process on student page 9.
Go back to student page 10 and fill out the definition for strength. Allow them to brainstorm. We are looking for **not flexible, hard, and solid**.

NAME _____

DATE _____

SCIENCE EXPERIMENT RECORDING SHEET

PROBLEM/QUESTION



OBSERVATIONS



HYPOTHESIS



MATERIALS



PROCEDURE



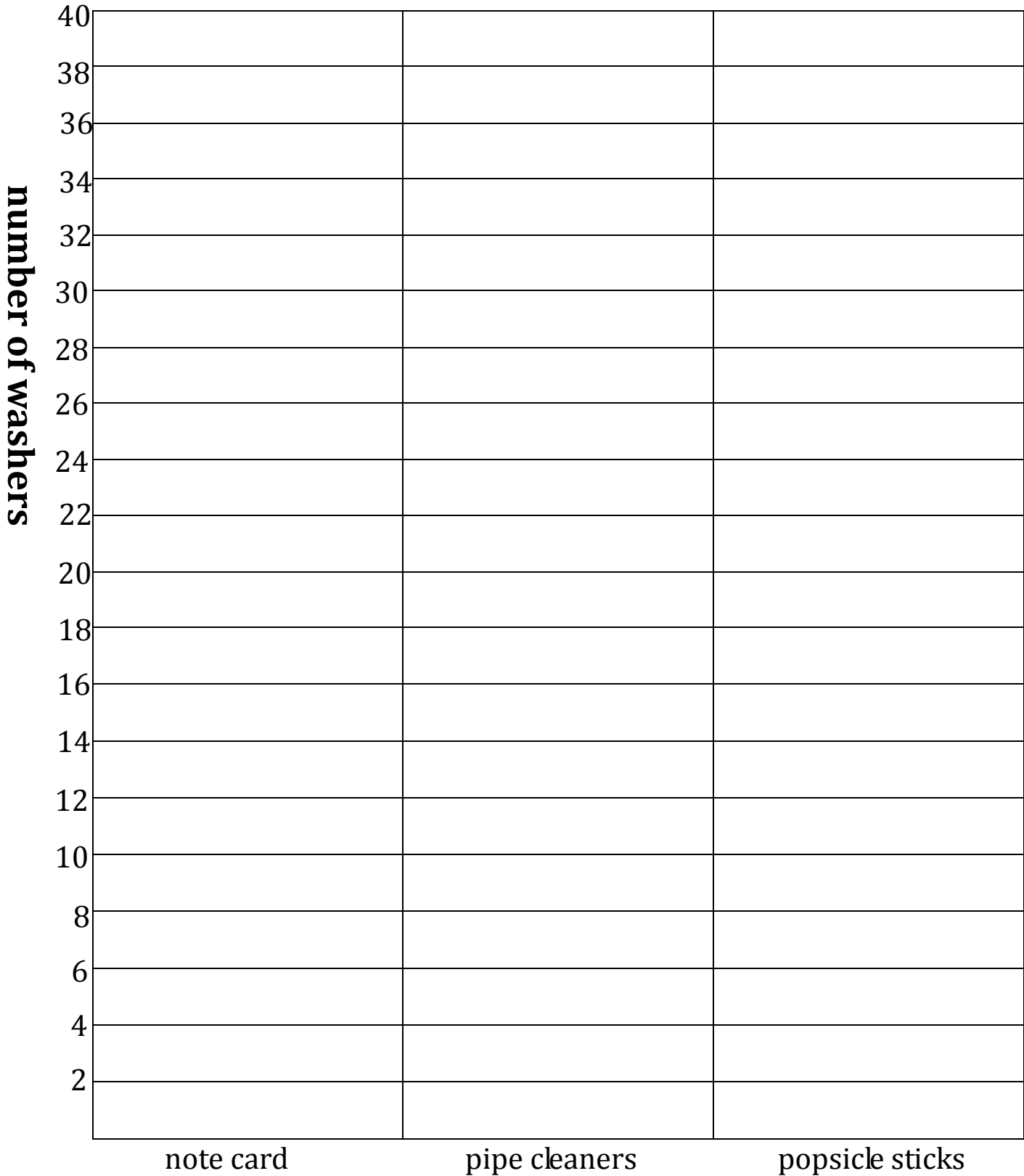
RESULTS



CONCLUSION



How strong am I?



Write three properties that strong materials share:

1. _____ 2. _____ 3. _____

Lesson 6

- Length:** 1 session: about 30-40 minutes
- Materials:** Twizzler (one for each student)
Yarn (one for each student)
Marker (one for each student)
- Overview:** Students will be testing materials based on flexibility. Continue to connect students back to the concept of observable properties.
- Engage:** Discuss what properties a Twizzler, yarn, and a marker have. Introduce another observable property: flexibility.
- Explore:** Let students know we will be testing different materials for flexibility. Verbally discuss which object will be the most flexible.
- Explain:** In prior lessons students identified whether a material is flexible or not. In this lesson students should expand their thinking to conclude that some items can be **somewhat flexible**.
- Elaborate:** Give each student a piece of yarn, a Twizzler, and a marker. Turn to page 11 in the student journal. Ask them to draw the object how they see it now and explain some observable properties. Try and tie each material in a bow or a knot. Draw the result in the observations box with a short explanation. (Twizzler was kind of easy to tie but would not make a tight knot.)
- Evaluate:** Ask students to talk about if their materials were either flexible or not flexible. After discussion ask them to order the materials from least flexible to most flexible. Offer questions:
Can some objects be somewhat flexible?
- Extension:** Time permitting: Video Clip

Flexibility

Materials (Picture and words)	Observations (Picture and words)

Order your materials from most flexible to least flexible:

Lesson 7 (2 days)

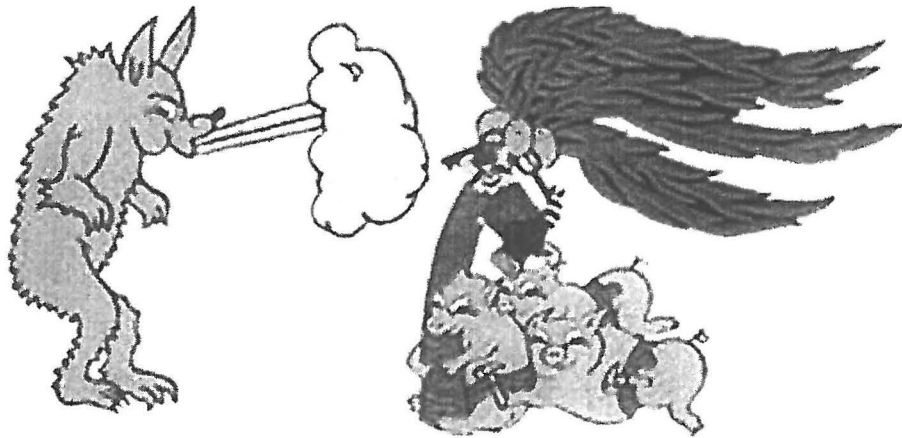
- Length:** 2 sessions: about 30-40 minutes
- Materials:** 6 Real Life Problem Cards
Construction Paper
Crayons/Markers/Colored Pencils (to color construction paper)
- Overview:** Students will be creating a shelter, a playground, or an animal for the purpose of defense. Make connections to prior lessons concerning observable materials and now linking it to an intended purpose.
- Engage:** Put students in small groups of 3-6. Pass out one real life card to each group.
- Explore:** Allow them time to discuss ideas.
- Explain:** Open student journal to page 12. Review checklist with them and allow time for questions. Allow students to be creative while bringing them back to scientific terminology.
- Elaborate:** Pass out construction paper and instruct them to label their drawings. Circulate the classroom and encourage scientific thinking. What about that material is useful?
- Evaluate:** Allow students time to present.

YOU ARE UNDER ATTACK!

Make a home or shelter for your family that will keep you safe.

What materials will you use to create your shelter?

What properties will these materials have that make you want to use them?

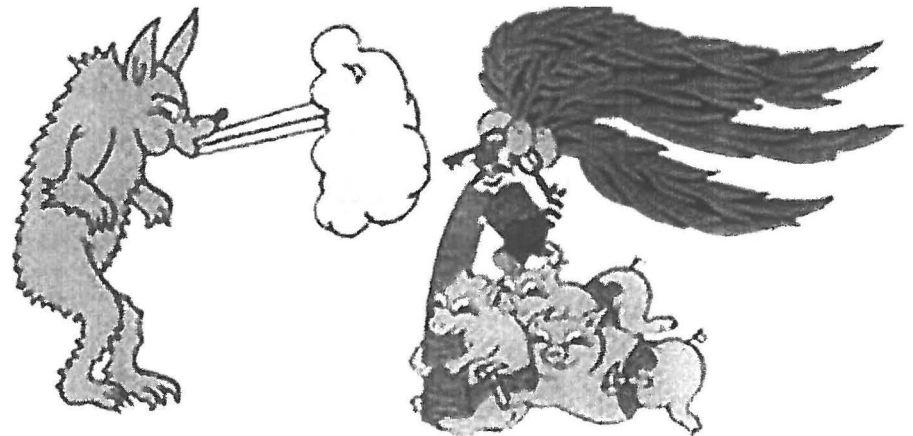


YOU ARE UNDER ATTACK!

Make a home or shelter for your family that will keep you safe.

What materials will you use to create your shelter?

What properties will these materials have that make you want to use them?

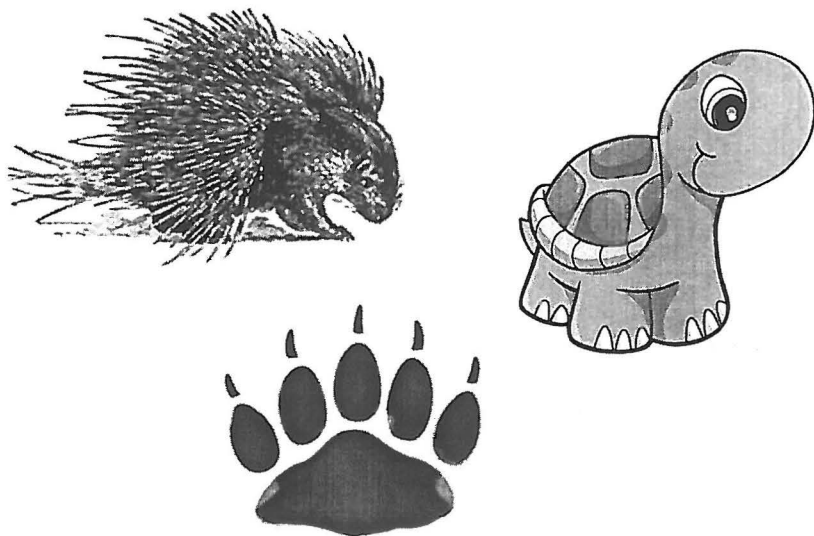


YOU ARE UNDER ATTACK!

You are an animal under attack! Create your own suit of armor using animal body parts.

What about this animal shield makes it good for defense?

What does it feel like? What is it made of?
You may have more than form of defense!

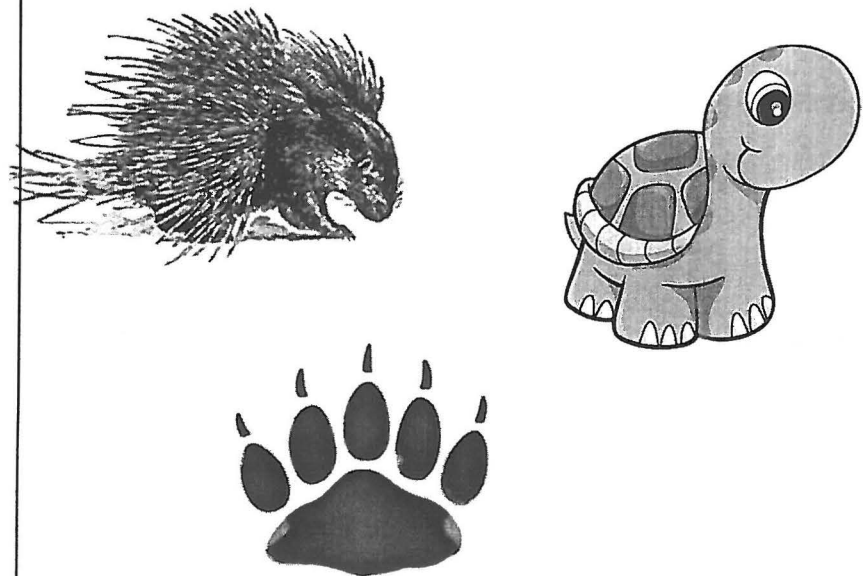


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What about this animal shield makes it good for defense?

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You may have more than form of defense!

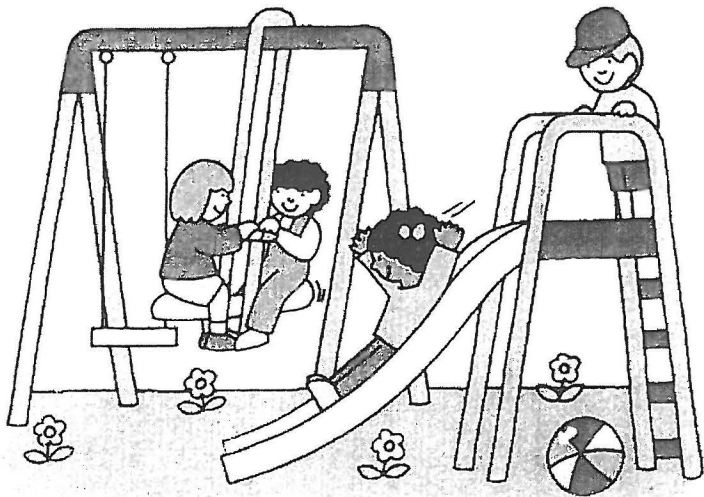


KIDS RULE THE SCHOOL!

You and your friends must create the ultimate playground! Unfortunately we only have enough money for three structures.

What materials will you use to build your playground?

What properties will these materials have that make you want to use them?



KIDS RULE THE SCHOOL!

You and your friends must create the ultimate playground! Unfortunately we only have enough money for three structures.

What materials will you use to build your playground?

What properties will these materials have that make you want to use them?



Poster Checklist

Step 1: List the materials you'll use to create your structure(s) or animal:

Step 2: Draw your structure(s)/animal on your poster _____

Step 3: Label the materials on your poster _____

Step 4: Describe the properties the materials have:

Step 5: Be prepared to present your poster to the class and share why you chose the materials you did.

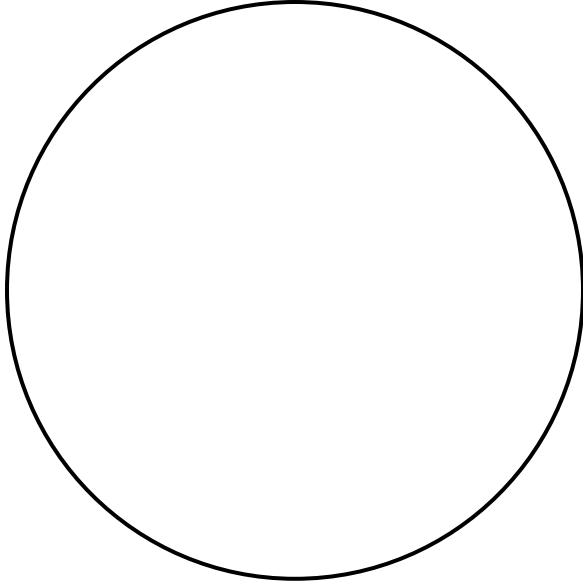
Lesson 8

- Length:** 1 session: about 30-40 minutes
- Materials:** Unit Test
10 materials from lesson 2:
Pipe cleaner
Sticky bug
Marble
Porcupine ball
Feather
Sand paper
Twizzler
Cotton ball
Rock
Popsicle stick
Computer
- Overview:** Students will watch a video clip by Bill Nye. After the clip is over students will go on a Test Exploration while the teacher administers a performance based test.
- Engage:** Play Bill Nye's: *States of Matter* on YouTube
<http://www.youtube.com/watch?v=3SUPA2CBjGs>
Watch up to 8 mins and 16 secs .
Optional: Continue watching the entire movie while you test students.
- Evaluate:** Set up testing materials while students watch Bill Nye. You may pull students to test during the video clip or wait until the video is finished.
- After the video students will go on a literature walk with partners to read the books included in the kit.
- On student page 13 students will list three things they learned or found interesting from what they read.
- Pull students one on one or in small groups to complete the performance based test. Record scores on the last page of the unit test. The testing template is included in the kit. It can be reused.

**2nd grade - Structure and Properties of Matter
Performance Based Assessment**

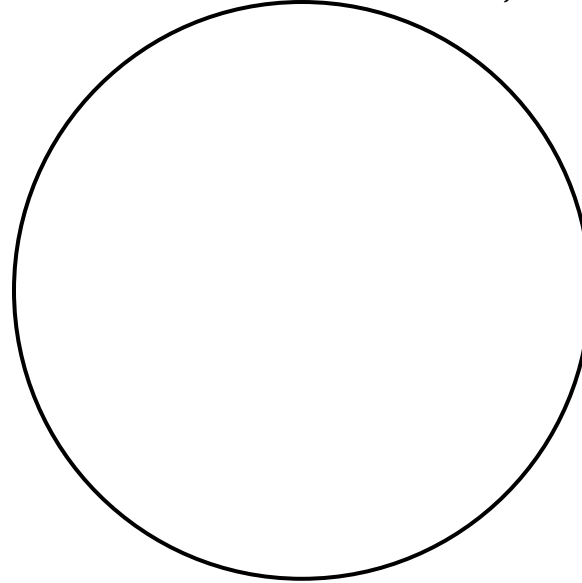
Place an object in the circle that is:

Round
Hard
White



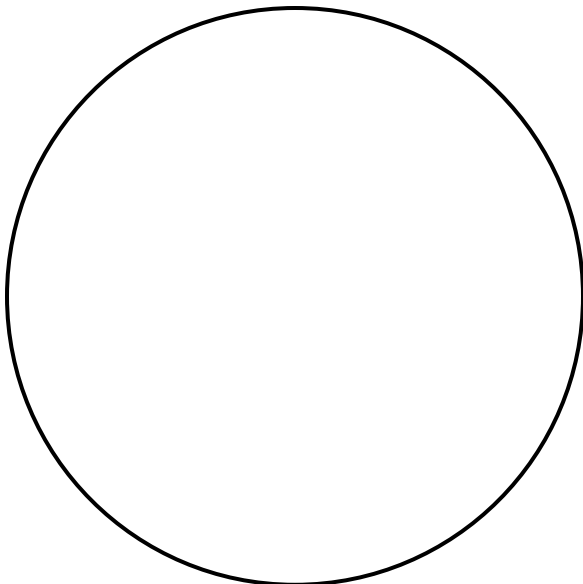
Place an object in the circle that is:

Long
Thin
Somewhat flexible



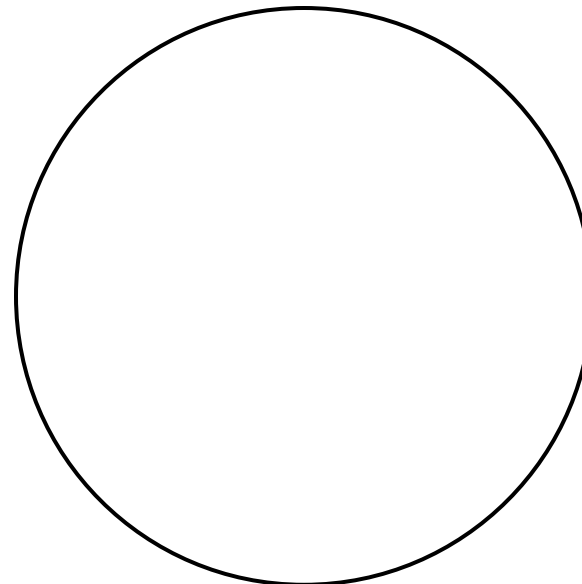
Place an object in the circle that is:

Red
Thin
Flexible



Place an object in the circle that is:

Rectangle
Rough
Flexible



Text Exploration

After reading through the books in your classroom, write down three interesting facts that you discovered. Be sure to use complete sentences with scientific language.

Did you know...

1. _____

2. _____

3. _____

List properties for each animal in the boxes below. You can use the words from your journal and anchor chart in our classroom.



Lesson 9

- Length:** 1 session: about 30-40 minutes
- Materials:** 1 bag with 2 red, 2 yellow, 2 blue, 2 green connecting cubes (one per student)
- Overview:** Students will construct and deconstruct connecting block towers. They will compare and contrast properties of teacher model and properties of student model (color, quantity, shape of cubes, and shape of the structure).
- Engage:** Pass out bags full of cubes to each student. Have students open to page 14 in their student journal. Student pages 14-16
- Explore/Explain:** Create a structure that is 6 long: RRBBGG
Have students create this structure with the teacher and draw it in their journal. Have them discuss the properties. Have them deconstruct the structure and **using the same cubes**, make a different tower.
Compare and contrast the 2 structures. The similarities should include the color and number of cubes will stay the same. The shape of the cubes will also stay the same. However the shape of the structure and color placement of cubes may change.
- Create a structure that is 4, 2, 2. B B
Repeat above. (p. 15) Y Y
 R R G G
- Create a structure that is 4 by 2. RRBB
Repeat above. (p.16) YYGG
- Evaluate:** Allow whole group time to discuss what changes were made in each structure and what stayed the same in each structure. (Each structure had the same number of cubes and the colors).

Compare and Contrast Cube Structures

#1

Original Structure	New Structure
Draw and describe the properties of your structure:	Draw and describe the properties of your structure:

How are these two structures the same? _____

How are these two structures different? _____

#2

Original Structure	New Structure
Draw and describe the properties of your structure:	Draw and describe the properties of your structure:

How are these two structures the same? _____

How are these two structures different? _____

#3

Original Structure	New Structure
Draw and describe the properties of your structure:	Draw and describe the properties of your structure:

How are these two structures the same? _____

How are these two structures different? _____

Lesson 10

- Length:** 1 session: about 30-40 minutes
- Materials:** 1 bag with 2 red, 2 yellow, 2 blue, 2 green connecting cubes (one per student)
Student Structure Cards 1-6
- Overview:** Using their bag of blocks, students will be asked to create 6 different structures. Today's lesson focuses on properties needed for two alike structures to be built (correct number, color, and shape of cubes). Structures 1, 2, 5 can be built. Structures 3, 4, 6 cannot be built.
- Engage:** Pass out bags with blocks. Revisit properties of cubes. Ask students what color blocks they have and how many. Ask them to think of structures they built in the prior lesson.
- Explore:** Open to student page 17. (You will use student pages 17-18 for this lesson.) Pass out student structure card 1 (SSC1). Allow time to build structure and discuss the properties of the structure
Where you able to build it? Why? (Remember to encourage scientific language)
Pass out SSC2. Repeat process.
Pass out SSC3. Discuss why students are unable to build the structure.
Pass out SSC4. Discuss why students are unable to build the structure.
Pass out SSC5. Repeat process.
- Explain:** Pass out SSC6. Discuss why students are unable to build the structure. Draw attention to the curved edges on this structure. This is a new property to be introduced.
- Evaluate:** Circulate the room and encourage scientific reasoning and language within student answers.

Properties of Cube Structures

Structure #1

Could you build it? _____

Explain why you could or couldn't build structure #1

Structure #2

Could you build it? _____

Explain why you could or couldn't build structure #2

Structure #3

Could you build it? _____

Explain why you could or couldn't build structure #3

Structure #4

Could you build it? _____

Explain why you could or couldn't build structure #4

Structure #5

Could you build it? _____

Explain why you could or couldn't build structure #5

Structure #6

Could you build it? _____

Explain why you could or couldn't build structure #6

Lesson 11

- Length:** 1 session: about 30-40 minutes
- Materials:** 20oz pop bottle
Pop can
Playdough
Wax paper
Scissors
Piece of paper
6 connecting cubes (any color)
- Overview:** The next lessons introduce reversible and irreversible change in states of matter. In this lesson we will be introducing these terms and giving concrete example. Students will explore other example in their notebooks.
- Engage:** Hold up a piece of paper and rip it in half. Explain to students that the paper has gone through an irreversible change because we cannot put the paper back to its original form without adding another material.
- Hold up 6 connecting cubes and break the cube tower in half. Explain to students that this is a reversible change because we can put the structure back to its original state without the use of other materials.
- Hold up a pop can and a pop bottle. Ask the students to make a prediction. If we open both objects, which is a reversible change and which will be an irreversible change. Open both objects and discuss results. (Pop can is an irreversible change and pop bottle is a reversible change.)
- Hold up wax paper and play dough. Repeat process above. (Play dough is a reversible change and wax paper is an irreversible change.)
- Explore:** On student journal page 19 have students brainstorm materials/events with an irreversible and reversible change. Allow students to explore out of the box ideas. (Legos together and apart, zipper, fireworks, haircut)
- Explain:** Come together as a whole group and discuss a kid worded definition for reversible change and irreversible change. Open ended definitions.
- Read *Wax to Crayon* by: Inez Snyder
- Evaluate:** Remind students to use scientific language.

Changing Matter

Reversible change: _____

Irreversible change: _____

Reversible Change	Irreversible Change

Lesson 12 (2 days)
Closing on lesson 13

Length: 2 sessions: about 30-40 minutes

Materials: Crock Pot
Crayons
Ladle
Crayon Molds
Optional but recommended: Access to a freezer

Overview: The next lessons introduce reversible and irreversible change in states of matter. In this lesson we will be introducing the effects of heating and cooling on different materials. We will be melting and freezing crayons in a crock pot. Each student will get their own crayon!

Engage: Reflect on what was read in the lesson before and revisit reversible and irreversible change. Let your student know they will be melting crayons!

Explore: **DAY 1:**
Open to page 20 in the student journal. Complete the scientific process. It is important that the students have a large part in planning the experiment. Complete the results and conclusion section later.

Allow students to grab three light colored crayons (the end product is prettier with light colors) from the kit. Ask them to un-wrap the crayons and observe their properties on student page 21 in the beginning column. Have students refer to their anchor charts and student journals for scientific language. (Not flexible, hard, solid, long, thin, color, etc.) **Emphasize solid.**

Have students break crayons into thirds and place them in crock pot. Wait until Day 2 to turn the crock pot on.

DAY 2:
One hour before you teach the rest of the lesson, turn the crock pot on high.

Have students turn to student journal page 20. Show them the crayons in the crock pot. Fill out the middle column of the chart. Again, make note of the observable properties (shape, color, texture, temperature). **Emphasize liquid.**

Explain:

While students are writing in their journals pour liquid crayon into molds. This is a good time to revisit the scientific process and ask students if they still have the same hypothesis (will the change be reversible or irreversible).

Evaluate:

Ask the class related questions that will encourage future investigations such as:

Can you think of another material we can melt in the crock pot?
After we melt that, can we reverse the change by putting it in the freezer?

NAME _____

DATE _____

SCIENCE EXPERIMENT RECORDING SHEET

PROBLEM/QUESTION



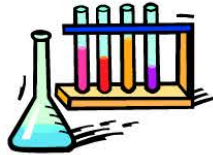
OBSERVATIONS



HYPOTHESIS



MATERIALS



PROCEDURE



RESULTS



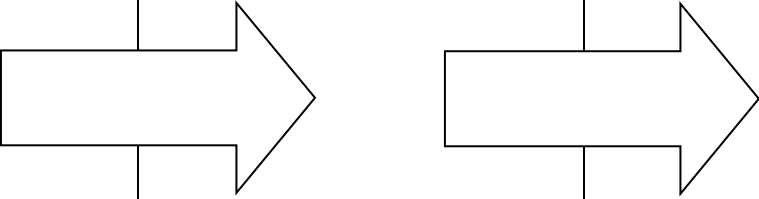
CONCLUSION



Changing Matter Experiment #1

Properties

Beginning	Middle	End



What tools are being used to change the crayons?

When the experiment began, the crayons were a _____.

When we applied heat, the crayons changed into a _____.

When we applied cool air, the crayons changed into a _____.

Was this a reversible or irreversible change? _____

Lesson 13

Length: 1 session: about 30-40 minutes

Materials: Finished Crayons in molds

Overview: In this lesson we will have further discussion of the effects of heating and cooling on different materials. We will be closing the crayon activity and beginning the heating and cooling of water experiment.

Engage: Revisit the prior lessons experiment. Show the class the solid crayons in the molds. Pop them out and allow students to touch them. Open to page 21 fill in the end column (shape, solid, color, texture, temperature, etc.)

Explore: Fill in student page 21 as you discuss the results with the class. The arrows should include the tools being used the change the crayons (heat and cool will be listed on the lines and in the arrows).

Answers:

Solid

Liquid

Solid

Reversible (Discussion)

Explain: Turn to student page 20 and complete the scientific process. Encourage scientific language. Emphasize that the properties are changing when heat or cool temperatures are applied.

Elaborate: Video Clip on Youtube:
Reversible and Irreversible Change
<http://www.youtube.com/watch?v=7SVAgDc46QM>

If time remains: Read a book from the kit (allow students to choose)

Lesson 14

Length: 1 session: about 30-40 minutes

Materials: Crock Pot
Water
Freezer
2 Frozen Ice in Trays

Overview: In this lesson we will have further discussion of the effects of heating and cooling on different materials. We will be beginning the heating and cooling of water experiment.

Have 2 frozen ice trays prepared for the lesson.

Engage: Connect back to prior lesson and review an irreversible change in matter and a reversible change in matter.

Explore: Let students know we will be conducting an experiment with ice and allow them to make predictions whether they believe it can be changed. What tool can change it? Can the process be reversed? If so, what tool can reverse it?

Elaborate: Open to page 22 in the student journal.
Show students the ice cube tray that contains frozen ice.
Fill out the beginning column of the changing matters chart with observable properties. (solid, cold, clear, cloudy, smooth, hard, not flexible)

Put ice (one tray only) in crock pot and put on high. Make predictions and ask:
What do we already know from prior experiments?
What predictions can we make based on those predictions?
How is the matter changing while we watch the crock pot?

When the ice is melted, fill out the middle column of changing matters chart.

Pour the ice back into the ice tray and explain to students we will place it back in the freezer. Pull the other pre-frozen ice tray from the freezer and explain to students that this is what happens to the water after being left in the freezer for a long period of time. (This should be a familiar concept)

Fill out the final column in the changing matters chart.

Explain: Input the tools being used on the lines and in the arrows. (heat and cool)

Answers:

Solid

Liquid

Solid

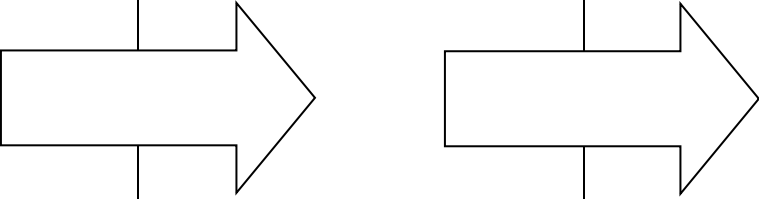
Reversible

Evaluate: Encourage scientific conversation throughout the page. Assess whether students need additional help with concepts.

Changing Matter Experiment #2

Properties

Beginning	Middle	End



What tools are being used to change the ice cubes?

When the experiment began, the ice cubes were a _____.

When we applied heat, the ice cubes changed into a _____.

When we applied cool air, the ice cubes changed into a _____.

Was this a reversible or irreversible change? _____

Lesson 15

Length: 1 session: about 30-40 minutes

Materials: 2 Hard Boiled Eggs
2 uncooked eggs
Crock Pot
Water
Butter Knife (optional)
Medium Bowl

Set-up: **Have 2 hard- boiled eggs prepared for the lesson.**
1 hard- boiled egg in freezer
1 hard-boiled egg ready to be switched when kids are not looking
1 raw egg with bowl to crack over
1 raw egg to be put in crock pot

Overview: In this lesson we will have further discussion of the effects of heating and cooling on different materials. We will be experimenting with eggs.

Engage: Connect back to prior lesson and review an irreversible change in matter and a reversible change in matter.
Crack an egg over a bowl and ask students to observe its properties.

Explore: Open to student journal page 23. Fill in the beginning column of the changing matter chart. Explain to students that we only broke the egg so that we can know what it looks like on the inside.

Put the other uncooked egg in the crock pot on high.
The egg will not cook in time for this experiment. When students are not looking replace the cooking raw egg with the already hard- boiled egg. Having a student read a book from the kit or watch a video clip is a good way to pass time while the egg 'cooks'.

YouTube Video Clip:
Reversible and Irreversible Changes by Luca
<http://www.youtube.com/watch?v=wn2lGLZQcGo>

Pull the hard-boiled egg from the crock pot and break it open. Have students complete the middle column of the changing matter chart. (Observing properties).

Explain:

Explain to students that you had already put a cooked egg in the freezer to get it ready for the lesson. Pull it out of the freezer and pass it around. Have students fill in the last column in the changing matters chart.

Did the egg go back to its original state after freezing? Shake it. Is it liquid-like on the inside?

The concept is to understand that once heat is applied, the egg cannot be changed back to its original state, even if when cooling is applied. It is an irreversible change.

Evaluate:

Complete the rest of the page.

Answers:

Heat

Cool

Liquid (inside)

Solid

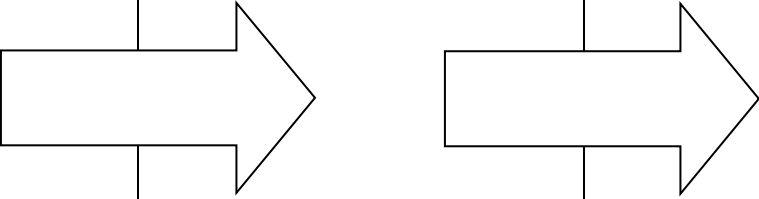
Solid

Irreversible

Changing Matter Experiment #3

Properties

Beginning	Middle	End



What tools are being used to change the eggs?

When the experiment began, the eggs were a _____.

When we applied heat, the eggs changed into a _____.

When we applied cool air, the eggs changed into a _____.

Was this a reversible or irreversible change? _____

Lesson 16

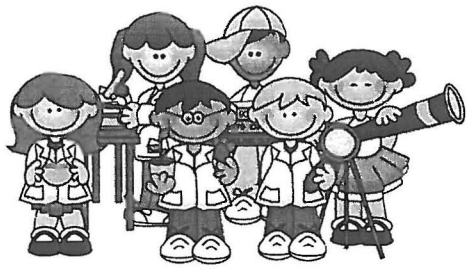
- Length:** 1 session: about 30-40 minutes
- Materials:** Copies of student letter format page (optional)
- Overview:** In this lesson students will write a letter to a family member, friend, or pen pal about an experiment they enjoyed.
- Engage:** Remind students of the prior experiments.
- Explore:** Open to student journal page 24. Read students directions. Encourage them to use scientific language. Their trusted student journal will be a great resource!
- Evaluate:** Review student letters and allow for a couple shares.

Sharing our knowledge with others!



Write a letter to a family member using the following checklist:

1. Look through your student journal. Choose one experiment to write about: _____
2. In your letter tell your family member what happened during the experiment. _____
3. Be sure to include the results and conclusion from your experiment. _____
4. Tell about your favorite part of the experiment and why it was your favorite part. _____
5. Make sure to use SCIENTIFIC LANGUAGE!! ☺ _____
6. Check your letter for capitals, ending punctuation, and correct spelling. _____

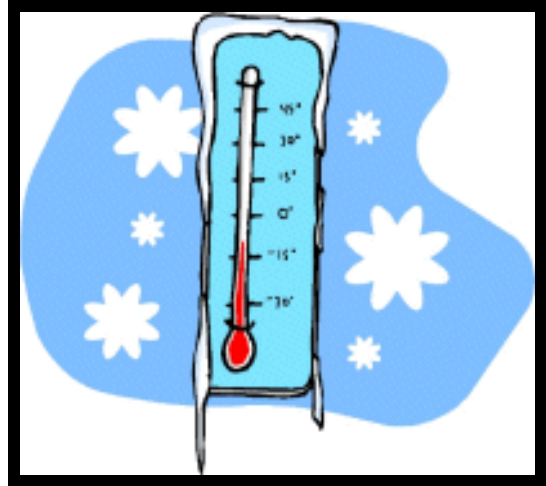


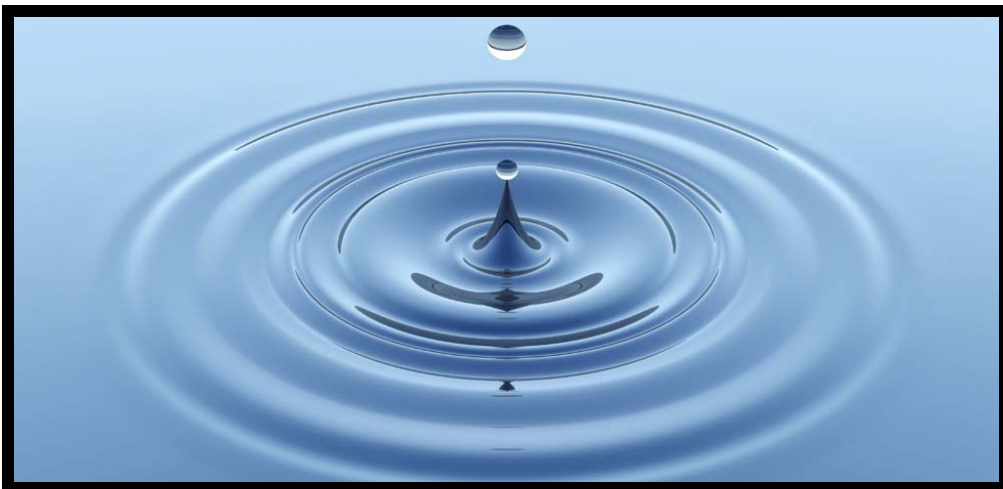
Dear _____,

From,

Lesson 17

- Length:** 1 session: about 30-40 minutes
- Materials:** Construction Paper
2 pages of clip art (one set per student)
Scissors
Markers/Pencil/Colored Pencils/Crayons (optional)
- Overview:** This is the culminating project of the unit. Students will create Changes in Matter Poster. A color example is included within this kit and detailed instructions are given in student journal page 25-26.
- Engage:** Show students the teacher example. Pull the flaps to show them that a solid plus heat equals a liquid (and so on).
- Explore:** Let students create their own! Pay special attention to folding and placement.
- Evaluate:** Circulate the room and encourage scientific language.



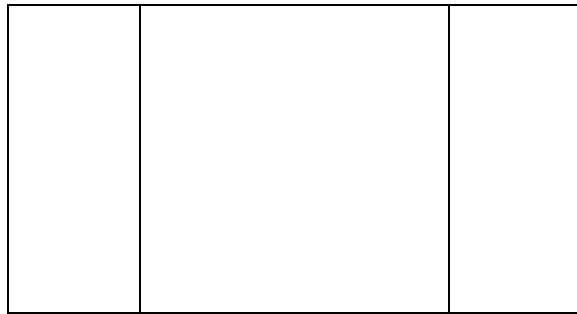


Lesson 18
Unit Test

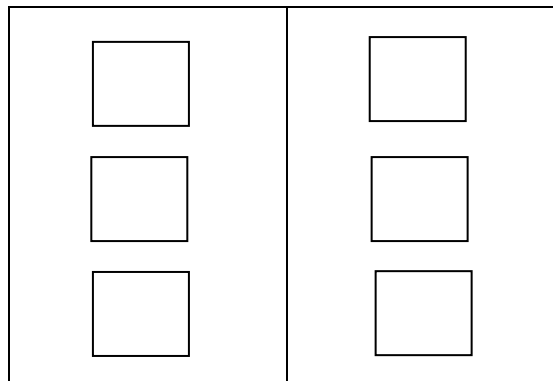
Key Included

Changes in Matter Poster Instructions

1. Take your paper with pictures on it and put it in the middle of your large poster paper. Fold the two sides of your poster so they meet in the middle. Open it back up to take your pictures out. Your poster paper should be in three parts.

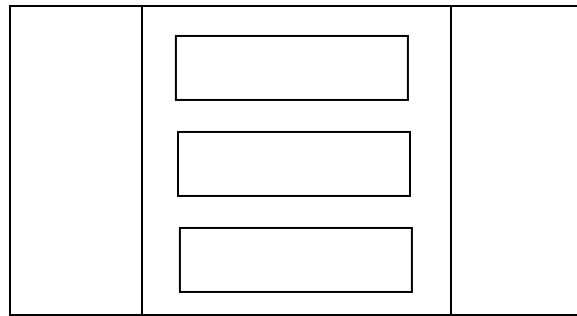


2. Cut out the 6 small picture cards. Fold your two outside flaps back over and glue the pictures into three rows.



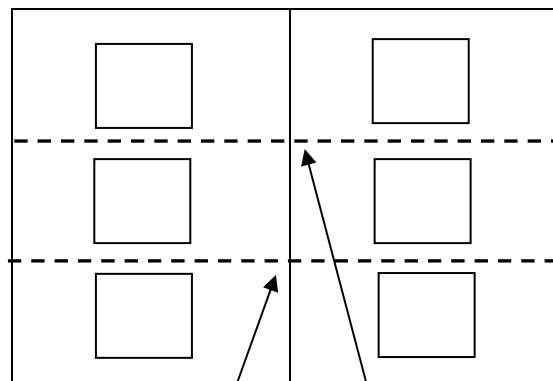
3. Add the words that go above each picture. Make sure to put the + and = signs.

4. Cut out your 3 long pictures. Open the poster up and glue the 3 pictures in the middle of the poster.



5. Write the correct word above each picture.

6. Open your poster back up and cut slits in between each of the pictures.



Cut from the inside toward the outside edge of the poster

We've learned that...

A solid + heat = _____

A liquid + heat = _____

A liquid + freezing temperatures = _____

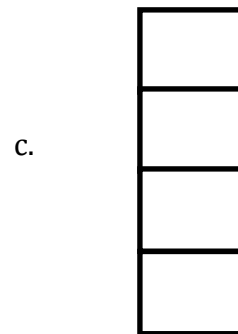
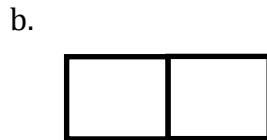
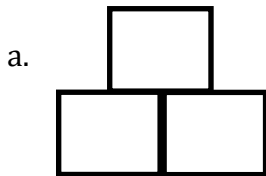
**2nd grade – Structure and Properties of Matter
End of Unit Test**

Name: _____

You have these blocks to build a structure.

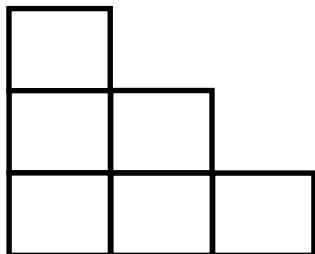


1. Circle the structure(s) you can build.



2. Is there a structure you cannot build? If so, why not? Give evidence to support your answer.

3. Can you build this structure? Give evidence to support your answer.



4. The three states of matter are solid, liquid, and gas. Fill in the blanks.

When water is frozen it is a _____.

When we boil water it turns into a _____.

When an ice cube sits in the sun it turns into a _____.

5. Which of the following changes cannot be reversed?

- a) An ice cube melting in a glass
- b) Butter melting in a dish
- c) An egg boiling in hot water

6. Johnny had three ice cubes in his cup. They melted in the hot sun. How can Johnny reverse this change?

- a) Add more heat to the cup
- b) Put his cup of melted water in the freezer
- c) Add more ice cubes to the cup

7. Which properties do these two objects share?



- a) Hard and bumpy
- b) Round and rectangular
- c) Hard and smooth

8. We did an experiment to find the material that would hold the most pennies. Use the table below tell which material was the strongest.

	Paper	Popsicle Sticks
Number of Pennies	23	72

9. Circle the 3 properties that describe that material.

Bumpy Slippery Sticky Not Flexible
Round Hard Red Solid

Performance Based Assessment

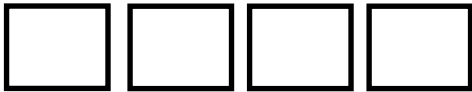
1. ____/1
2. ____/1
3. ____/1
4. ____/1

Score: _____ /18

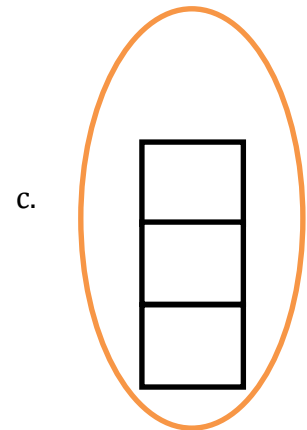
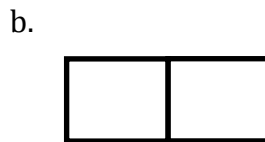
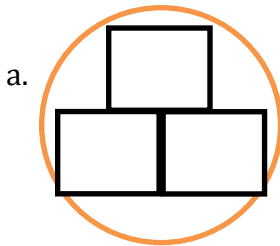
2nd grade – Structure and Properties of Matter
KEY

Name: _____

You have these blocks to build a structure.



1. Circle the structure(s) you can build. 2pts.



2. Is there a structure you cannot build? If so, why not? Give evidence to support your answer.

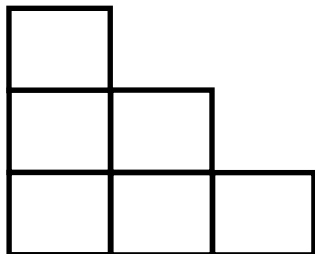
0 pt. – answers structure a or c

1 pt. – answers structure b with no support or incorrect response.

2 pts. – answers structure b with explanation but does not reference the round or curved edges. May just explain that they have the “wrong” pieces or “I don’t have the right ones”

3 pts. – answers structure b and explains that it can’t be built because they were not given blocks with round or curved edges

3. Can you build this structure? Give evidence to support your answer.



0 pt. – answers yes

1 pt. – answers no with no explanation

2 pts. – answers no and explains that there were not enough blocks to build this structure.

4. The three states of matter are solid, liquid, and gas. Fill in the blanks. 3pts.

When water is frozen it is a _____ solid _____.

When we boil water it turns into a _____ gas _____.

When an ice cube sits in the sun it turns into a _____ liquid _____.

5. Which of the following changes cannot be reversed? 1pt.

- a) An ice cube melting in a glass
- b) Butter melting in a dish
- c) **An egg boiling in hot water**

6. Johnny had three ice cubes in his cup. They melted in the hot sun. How can Johnny reverse this change? 1pt.

- a) Add more heat to the cup
- b) **Put his cup of melted water in the freezer**
- c) Add more ice cubes to the cup

7. Which of the
1pt.



following properties do these objects share?

- a) Hard and bumpy
- b) Round and rectangular
- c) **Hard and smooth**

8. We did an experiment to find the material that would hold the most pennies. Using the table below tell me which material was the strongest. 1pt.

_____popsicle sticks_____

	Paper	Popsicle Sticks
Number of Pennies	23	72

9. Circle the 3 properties that describe that material. 3pts.

Bumpy Slippery Sticky **Not Flexible**

Round **Hard** Red **Solid**

Performance Based Assessment

1. ____/1

2. ____/1

3. ____/1

4. ____/1

Score: _____ /21

Common Core References:

2-PS1-1: Performance Based assessment, #4, #7

2-PS1-2: #8, #9

2-PS1-3: #1, #2, #3

2-PS1-4: #5, #6