Your name: Cooperating Teacher:	Melissa Fannon, Nicole Loomis, Morgan Pendleton Amy O'Brien	School: Lincoln Elementary Grade:4th Subject: Math/ Science/ Technology/ IB	Date/Time: TBD
Unit Plan Driving question/Theme/Title:	What are the three states of matter and how do they interact with each other and the environment?		Lesson title/Topic: Calculating Density Lesson number: 1 Lesson Type (Please circle): • **Demonstration** • **Investigation** • **Learning technology tool** • **Performance-based assessment**

STANDARDS/BENCHMARKS/GLCE addressed in this lesson:

3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (L). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems, i.e., problems involving notions of "times as much.")

5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement (5-PS1-1)

S.IP.04.15
Make accurate measurements with appropriate units (millimeters centimeters, meters, milliliters, liters, Celsius, grams, seconds, minutes) for the measurement tool.

S.IP.04.16
Construct simple charts and graphs from data and observations.

P.PM.04.17
Measure volumes of liquids in milliliters and liters.

STUDENT LEARNING OBJECTIVES/OUTCOMES *Through these learning activities, the learner will demonstrate the ability to:*

Students will understand mass and volume are measurements and density is the mass divided by the volume.

INSTRUCTIONAL ACTIVITIES:

Time:	**Introduction**
10 min	• **Engagement:** "Today boys and girls we are going to talk about solids, liquids, and gases. On the board I have this chart; we are going to list some solids, liquids, and gasses that we know! Take a moment and think to yourself about some solids, liquids, and gases. Now discuss this with your table buddy. Okay, who can raise their hand and tell me what you came up with? Great! Now, we are going to talk about the molecules of each! Does anyone know what a molecule is? Good! In a solid the molecules are very close together and they move super quickly. For the next 5 seconds we are all going to pretend our hands are molecules in a solid by gently drumming the table. 5,4,3,2,1 STOP! Great. Now the molecules in a liquid move a little more slowly and are more spread out. So at a little bit slower of a beat we will drum like a liquid for 5 seconds. 5,4,3,2,1 STOP! Lastly we will talk about gas, does anyone have a prediction about the molecules in a gas? Great, so beating at a slow speed for 5 seconds lets beat like a gas. 5,4,3,2,1 STOP!"
	Anticipatory set
25 min	• **Exploration:** I am going to split the class into groups of 7 and you will be placed around the room. As you can already see, there are supplies at some tables. Please do not touch the supplies until you are instructed to do so. When your group gets to your work station there will be a sheet of directions and a card for each member of the group. You will have to follow the directions in order for

	your results to be accurate. The first direction on the sheet is to find out whose birthday is closest to today's date. That person than becomes student number 1. The next direction then tells how every group member will receive their numbers. Every group member will have specific steps for the experiment so make sure you follow the directions! Teacher Steps: 1. Distribute supplies. 2. Have student number 1 grab a single block and measure each side of the cube with the centimeter side of a ruler (length, width, and height). Have each student fill in the chart. 3. Have student number 2 grab the ten block and measure each side of the cube with the centimeter side of a ruler (length, width, height) and fill in the next column of the chart. 4. Have student number 3 grab the hundred block and measure each side of the cube with the centimeter side of a ruler (length, width, height) and fill in the last column of the chart. 5. Have students compute the volume of the blocks. (L*W*H) 6. Have student 4 measure the mass of a single block on the scale in grams. Have every student record the data in the chart. (Zero out scale, place block on to scale and record number result). 7. Have student number 5 measure the mass of a ten block on the scale in grams. Have every student record the data in the chart 8. Have student number 6 measure the mass of a hundred block on the scale in grams. Have every student record the data in the chart. 9. Now we are going to check our calculations of the volume. Have student 7 fill the graduated cylinder with 30 mL of water. 10. Have students record the original amount of water in the graduated cylinder. (Read from the bottom of the meniscus, which is the bottom of the curve) 11. Have student 1 drop a single base cube into the graduated cylinder. 12. Have student 2 observe the amount of water in the cylinder.

	13. Have student 3 remove the blocks from the graduated cylinder by pouring the water into the cups provided and remove cubes. 14. Have student 4 pour 30 mL of water from the cup into the graduated cylinder, observe the amount of water in the graduated cylinder and have students record it in the ten block column. 15. Have student 5 drop a ten block in the graduated cylinder. 16. Have student 6 observe the amount of water in the graduated cylinder. Have students record the data.
7 min	**Instructional activities (including 'checking for understanding' activities, modeling, guided practice, independent practice)** • **Explanation:** What do you notice about the hundred block? Right, it won't fit into our graduated cylinder. If we have observed the volume of a single block and a ten block, how could we find the volume of the hundred block? Right, we can estimate! But how are we going to estimate the volume of a hundred block? I would like everyone, on your own, to try and estimate the volume of the block by using the results of the single and ten blocks. (Once students have recorded their guess, explain to students how they could have went about estimating the volume of the block). Now we are going to calculate the volume from our measurements in the graduated cylinder. If you look at your charts, there is a row for the volume with the formula to use.
5 min	**Interdisciplinary approaches:** • **Elaboration:** During this introduction to volume, mass and density, we only looked at Base 10 blocks. Is there a way to find the volume of any object? Right, it may be more difficult than a cube, but we could find the volume. Can someone explain to me in their own words how we found the density of an object? Does this mean every object probably has density that could be calculated? Good!

	Accommodations for differentiated instruction for: Resource students: Students are put into groups of seven so the resource students will be spread out between groups so they will have assistance if needed. ESL students: Each student will have a card with their directions clearly stated on them. If there are any ESL students in my classroom, I would include pictures on all of the cards in order to help these students. They will also have their group members to help them read the directions. Gifted students: There is a part in the lesson where students will have to make estimates and explain how they got these measurements. At this point, the gifted students will have the opportunity to explain to the class how they came up with their estimates and try to convince the class that they are correct. **Assessment** • **Evaluation:** As students perform this lesson, they will be filling out charts with all of their observations and estimates. At the end of the lesson, I will collect the charts and assess students based off of their written results.
3 min	**Conclusion/closure** Talk about how if you were to find the density of ten single cubes it would be the same as a ten block. This is the same for ten, ten blocks and a hundred block. **Assignment/follow up** • **Extension:** A review of volume, mass, and density will be given at the beginning of lesson 4. After reviewing the charts, if another lesson needs to be performed, that will be worked out.

LIST of MATERIALS and CLASSROOM SET UP needs:

Base 10 Blocks (single, ten, hundred)
Water
Graduated Cylinders
Battery Operated Scales
Rulers
Observation Chart
Cups

SAFETY/CAUTIONS:

Use rulers the correctly
Walk around the room, don't run
When adding and removing the cubes, make sure to do it in the correct manner, being careful not to spill the water.

LIST of RESOURCES:

Battle Creek Area Mathematics and Science Center Planning

The specific mathematics and science goals that are addressed in this lesson are students will be learning about mass, volume, and density along with working on their multiplication and division skills and their charting and observing skills. The students will be assessed by their charts at the end of each lesson. This will include if they calculated the correct density. The equipment that will be used includes battery operated scales, graduated cylinders, and base 10 blocks. With this lesson there are not many safety cautions that need to be addressed. Students just need to know how to properly use the equipment and that they are expected to use it responsibly. The students will be using their prompt cards to complete the experiment within their group while the teacher is walking around and observing. After the experiment, the teacher will prompt higher order thinking questions regarding to density.

Your name: Cooperating Teacher:	Melissa Fannon, Nicole Loomis, Morgan Pendleton Amy O'Brien	School: Lincoln Elementary Grade: 4th Subject: Math/Science/IB	Date/Time: TBD	
Unit Plan Driving question/Theme/Title:	What are the three states of matter and how do they interact with each other and the environment?		Lesson title/Topic: Solids Liquids, and Gases Lesson number: 2 Lesson Type (Please circle): • **Demonstration** • **Investigation** • **Learning technology tool** • **Performance-based assessment**	

STANDARDS/BENCHMARKS/GLCE addressed in this lesson:
P.PM.04.23 Compare and contrast the states (solids, liquids, gases) of matter.

CCSS.ELA-LITERACY.RI.4.5 Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

ART.VA.I.4.4 Prepare, present, and collaboratively evaluate personal artwork.

STUDENT LEARNING OBJECTIVES/OUTCOMES *Through these learning activities, the learner will demonstrate the ability to:*
Students will be able to demonstrate on the molecules in solids, liquids, and gases.

INSTRUCTIONAL ACTIVITIES:

Time:	**Introduction**

10 min	• **Engagement:** "I am going to pass out the paper that we will be using for today's lesson. But, before we begin the lesson, let's refresh our memories on how to find the area of something by calculating the area of one of the pieces of paper. So, I need everyone to pull out their rulers out of their desks and find the area in inches. When you are done, put your pencil down so I know. Now that everyone is done, you can raise their hand and tell me what you got for the area? Does everyone agree with that? Good! Today boys and girls we are going to talk about solids, liquids, and gases. On the board I have this chart; we are going to list some solids, liquids, and gasses that we know! Take a moment and think to yourself about some solids, liquids, and gases. Now discuss this with your table buddy. Okay, who can raise their hand and tell me what you came up with? Great! Now, we are going to talk about the molecules of each! Does anyone know what a molecule is? Good! In a solid the molecules are very close together and they move super quickly. For the next 5 seconds we are all going to pretend our hands are molecules in a solid by gently drumming the table. 5,4,3,2,1 STOP! Great. Now the molecules in a liquid move a little more slowly and are more spread out. So at a little bit slower of a beat we will drum like a liquid for 5 seconds. 5,4,3,2,1 STOP! Lastly we will talk about gas, does anyone have a prediction about the molecules in a gas? Great, so beating at a slow speed for 5 seconds lets beat like a gas. 5,4,3,2,1 STOP!"
	Anticipatory set
15 min	• **Exploration:** "I handed out 3 pieces of paper to each of you. Now please write your name on one side of them all and then flip them over so your name is on the back. On the top of one write solids, on the top of the next write liquids, and on top of the last piece of paper write gases. My classroom helpers are going to come around and pass out gloves and plates of paint to everyone. Please do not touch the supplies until instructed to do so. When you receive your gloves, please put them on your hands, but we are still not touching the paint. Who remembers how the molecules in a solid move? Right! Now, when I say go, we are going to put our hands in the yellow paint and move them on our paper like a solid. Remember, we said solid molecules move quickly and closely. Go! 5, 4, 3, 2, 1. Stop! Hands in the air! My helper is going to come around and grab your solid paper while my other is swapping your paint colors. Now we are going to do the same thing for a liquid. Who remembers how molecules in liquids move? Correct! Now,

	when I say go, you are going to put your hands in the new paint and then keeping your hands on the paper, move them like a liquid. Go! 5, 4, 3, 2, 1. Stop! Hands in the air! My helper is going to come around again and grab your liquid papers while my other helper is swapping your paint colors. Lastly, we are going to pretend like our hands are gas molecules. Who can remind us how gas molecules move? Right! Now when I say go, you can put your hand in the paint and start acting like a gas. But remember, we have to keep our hands on the paper. Go! 5, 4, 3, 2, 1. Stop! Hands in the air! While my helper is coming around to pick up your gas papers, I need you to carefully take off your gloves and put them on the paint plate and my helper is going to come pick up those plates. At this time, if it is needed you may go wash your hands or use the baby wipes I have provided to clean your hands." **Instructional activities (including 'checking for understanding' activities, modeling, guided practice, independent practice)** • **Explanation:** "Who can raise their hand and tell me what we learned from this lesson? Good! Let's look at this chair. How would you think the molecules are moving? What about the molecules inside of "pick a student's" water bottle? More specifically, the molecules of the water. Right! What is an example of a gas that we could think about? The gas I'm thinking about is constantly moving around us. Right, the air! I know we can't see air, but it is still there. How do we think the molecules of air are moving? Correct, they are probably moving slowly and are very spread apart."
5 min	
	Interdisciplinary approaches: • **Elaboration:** Students will be making a flip book for the states of matter. The book will have three different flaps, one for each state of matter. On the top of each flap, the students will draw an example of the state of matter along with writing its name. Underneath the flap, students will
20 min	

	write what they have learned about the molecules of solids, liquids, and gases. Accommodations for differentiated instruction for: Resource students: Directions will be given out at each step during the lesson. Students will always have a clear idea of what is happening and will be able to follow the lesson. There will also be adult resources available to help when needed (teacher helpers). ESL students: The directions will be given out in a very clear manner and will be repeated multiple times for clarification. Students will also have the opportunity to see what their neighbors are doing to help them along if they are confused. There will also be written definitions given to reference. Gifted students: Gifted students will have the option to calculate the area of all three pieces of paper put together after they finish the area of one sheet. **Assessment** **Evaluation:** I will collect the students flip books and grade them on completion and accuracy to make sure that they understand the objective. **Conclusion/closure:** Now that we know how the molecules move in solids, liquids, and gases, when you go home I want you to think about how the molecules are moving in the objects in your bedroom. When you come back to school in the morning, we are going to talk about the objects in the morning! **Assignment/follow up** • **Extension:** The concepts will be reviewed at the beginning of the next lesson.
5 min	

LIST of MATERIALS and CLASSROOM SET UP needs:

Pieces of white paper

Three different colors of paint

Plates

Gloves

Rulers

Newspaper

SAFETY/CAUTIONS:

Use the paint properly while keeping the paint on the paper.

When drumming on the table, make sure students drum responsibly and do not hurt themselves.

LIST of RESOURCES:

Battle Creek Area Mathematics and Science Center Planning

The mathematics and science goals in this lesson to have the students recognize the difference in the molecules in a solid, liquid, and gas and how they gradually take up more space as they move farther apart. The assessment strategy I used was evaluating the flip books the students created to show their understanding of the lesson. The equipment used in this lesson is messy; we have paint, paper, gloves, and newspaper. The cautions we advised were to use the equipment properly and be respectful of the classroom furniture. The student activity is to created hand prints that show the movements of molecules of solids, liquids, and gases. My goal as the teacher is to provide specific instructions for my students so the lesson goes smoothly.

Your name: Cooperating Teacher:	Melissa Fannon, Nicole Loomis, Morgan Pendleton Mrs. Amy O'Brien	School: Lincoln Elementary Grade: 4th Subject: Math and Science	Date/Time:	TBD
Unit Plan Driving question/Theme/Title:	What are the three states of matter and how do they interact with each other and the environment?		Lesson title/Topic: Air: What is it? Lesson number: 3 Lesson Type (Please circle): • **Demonstration** • **Investigation** • **Learning technology tool** • **Performance-based assessment**	

STANDARDS/BENCHMARKS/GLCE addressed in this lesson:
S.IP.04.11 Make purposeful observation of the natural world using the appropriate senses.
S.IP.04.12 Generate questions based on observations.
S.IP.04.13 Plan and conduct simple and fair investigations.
S.IA.04.12 Share ideas about science through purposeful conversation in collaborative groups.
S.IA.04.13 Communicate and present findings of observations and investigations.
S.RS.04.15 Use evidence when communicating scientific ideas.
S.IP.04.14 Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer, graduated cylinder/beaker).
S.IP.04.15 Make accurate measurements with appropriate units (millimeters centimeters, meters, milliliters, liters, Celsius, grams, seconds, minutes) for the measurement tool.
S.IP.04.16 Construct simple charts and graphs from data and observations.

STUDENT LEARNING OBJECTIVES/OUTCOMES *Through these learning activities, the learner will demonstrate the ability to:*

Observe that air takes up space.

INSTRUCTIONAL ACTIVITIES:

Time:	Introduction
3 min	• **Engagement:** Okay friends! So today we are continuing our exploration in the states of matter, and before we get our topic, I have a question for you all. • Who knows what is all around us? *Air* • What do you think air is made up of? *Answers may vary* • Do you think air is matter? Does it have mass? **Anticipatory set**

32 min	**Exploration:**
	• I have here a tub filled with water, a cup, some tape, and a tissue… Is there any way I can put the tissue underwater without getting it wet? Discuss with your group what you think, and then write down your hypothesis.
	• Now you are going to try it on your own! When I say go, I want one group member to come up to the front table and get your supplies for the experiment.
	• Give each group of students a clear large Tupperware filled ¾ with water, 1 clear plastic cup, 4 tissues, and tape. Write on the board "Is there a way to put a tissue under water without getting it wet?" Give the students 10-15 minutes to brainstorm and test different ways to achieve a dry tissue. While they are brainstorming and testing, walk around and ask them questions to try and spark an answer.
	  • Who can explain what they have tested already?
	  • Were you able to keep the tissue dry?
	  • What did you notice when…?
	  • Why do you think that happened?
	• Who was able to keep their tissue dry? (If nobody did, continue on to the nest step) What worked for you – How did you do it? (Let students answer)
	• For those of you, who did not get a dry tissue, don't fret! I have a way for everyone to do it! *Pass out the prepared handout.* ((attached))
	• Give the students 5 minutes to complete.
	• Okay friends! Did your tissue stay dry this time? Awesome! What I want you to do now is reflect in your science journals

10 min	about what happened. Why do you think it stayed dry this time? **Instructional activities (including 'checking for understanding' activities, modeling, guided practice, independent practice)** • **Explanation:** • Okay class, who can tell me what their group thought the reason the tissue stayed dry? *Let one child from a group explain* Who agrees with them? Does anyone have the same answer but a different way of explaining it? • *Pick up a clear cup and show the class* Is there any matter in this cup? *Yes. It's full of air, even if it looks empty. If there was nothing in the cup, the water would come into the cup and make the tissue wet.* The air inside the cup is matter. Since it fills the cup before it is pushed into the water, the air pushes the water out, keeping the tissue dry. • So what did we learn about air so far? *It takes up space even though we can't see it.* • What are some examples of air taking up space in the "real world"? Can anybody think of one? Has anyone ever seen Pirates of the Caribbean or Pocahontas? What happens when their row boat tips over? They can go under the boat and breathe the air. Another example might be air bubbles in ice. *Show the YouTube clip https://www.youtube.com/watch?v=AElKOeadjJw at 1:28 seconds and https://www.youtube.com/watch?v=eBxDDsWoTPg * • What do you think will happen if we tip the cup in the water? *Have them predict what will happen. Next have them record the level of the water on a chart before tipping. Then experiment and show that bubbles escape the cup and the water level rises. Then measure the water level after letting some bubbles out and record it on the chart. The gas that was in the cup escapes in the form of bubbles out of the cup and into the water, and then out of the water and into the air. Since there is less air filling the cup, water takes its place.* **Interdisciplinary approaches:** • **Elaboration:**

	• What do you think would happen if we fill it all the way up with water and then blow air into it with a straw? Make a prediction in your science journals. *Take answers* Have each student measure the water level before using the straw, and then have them practice. *Bubbles form in the water making the water level go down, and air fill the cup.* Have the students measure the water level after. Accommodations for differentiated instruction for: Resource students: Put them in a group with the gifted students. ESL students: Pair them with another or a gifted student. Write down all key terms with definition so they can reference them. Gifted students: Pair them with a student at a lower level. **Assessment:** Observe that the students can complete the reading the instructions provided. **Evaluation:** • Have each student perform an exit slip, before they can move on to the next activity I will have them answer the question "describe two kinds of evidence you learned that helped you decide air takes up space." **Conclusion/closure** I will pull three students exit slips and read them for the class, this way everyone wraps up on the same page and if there are any lingering questions I can answer them here. **Assignment/follow up** • **Extension:** • We will do a refresher in the next lesson.

LIST of MATERIALS and CLASSROOM SET UP needs:

- 4 Tupperware
- 4 clear, plastic cups
- Box of tissues
- Tape
- Water
- Towels to clean up spills
- Computer
- Internet access
- Projector for Computer
- Straws
- Rulers
- Worksheets

SAFETY/CAUTIONS:

- Be careful with the tub of water and keep extra towels around just in case.
- Internet Safety

LIST of RESOURCES:

- Battle Creek Area Mathematics and Science Center Planning
- https://www.youtube.com/watch?v=eBxDDsWoTPg
- https://www.youtube.com/watch?v=AElKOeadjJw at 1:28

The students will observe that air takes up space. The students will be assessed by the answer to the exit slip question. The equipment used is the computer with internet, cups, water, Tupperware, tissues, straws, and water. Some cautions are about keeping towels around in case of spills, and safety on the internet. The students will observe air through exploration with cups and tissues.

Name: _____

Water Level Chart

Water Level Before Tipping the Cup	Water Level After Tipping the Cup
Water Level Before Using the Straw	**Water Level After Using the Straw**

Air: What Is It?

1. Crumple a tissue, push it down, and tape it to the inside of the cup.

2. Turn the cup upside down. Check to see if the tissue stays in the bottom of the cup.

3. Push the cup straight down into the water, all the way. What happened?

4. Raise the cup straight up out of the water. What happened?

Your name: Cooperating Teacher:	Melissa Fannon, Nicole Loomis, Morgan Pendleton Amy O'Brien	School: Lincoln Elementary Grade:4th Subject: Math/ Science/ Technology/ IB	Date/Time: TBD
Unit Plan Driving question/Theme/Title:	What are the three states of matter and how do they interact with each other and the environment?		Lesson title/Topic: Melting and Massing Lesson number: 4 Lesson Type (Please circle): • **Demonstration** • **Investigation** • **Learning technology tool** • **Performance-based assessment**

STANDARDS/BENCHMARKS/GLCE addressed in this lesson:
P.PM.04.23 Compare and contrast the states (solids, liquids, gases) of matter.

CCSS.MATH.CONTENT.4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale

3-5.RI.2. use digital tools to find, organize, analyze, synthesize, and evaluate information

STUDENT LEARNING OBJECTIVES/OUTCOMES *Through these learning activities, the learner will demonstrate the ability to:*

Describe how the mass of a solid object remains the same after a phase change.

INSTRUCTIONAL ACTIVITIES:

Time:	Introduction
5 min	• **Engagement:** "Alright students, who remembers what we learned about solids, liquids, and gases in our lesson the other day? I am going to create a chart on the board with the different characteristics that you list off to me, let's start with solids; what did we learn? Liquids? Gases? Great job, it sounds like you're really starting to understand this so today we will move on a little more."
25 min	**Anticipatory set** • **Exploration:** "Today we are going to be working with our scales again to measure the mass, think back to the first lesson in this unit when we found the mass of the base 10 cubes. Today we are going to find the mass of an ice cube, and the mass of the ice cube after it melts. Let's pause and make a prediction; how many people think the ice cube as a solid will weigh more than the liquid? How many think the liquid will weigh more than the solid? And how many believe they will weigh the same? Alright who can tell me which of these 3 predictions has the most students who picked that answer? And which has the least? Great! Let's get started with the activity! I have given each group a cup, put the cup on the scale and record the weight in your journals, next put the solid ice cube in the cup and put it on the scale. Record this weight in your journals. While you wait for the ice cube to melt we will watch the Bill Nye clip on matter: https://www.youtube.com/watch?v=3inwMLYHFPo&list=RD3inwMLYHFPo#t=5 Hey look our ice cubes have melted…time to put them on the scale and record the weight in your journals. Now we have 3 different weights recorded; what do you think we are going to do with these now? Well we have the weight of the cup, and to find the correct weight of the ice cube solid and frozen we need to subtract the weight of the cup from each, so use those math skills and subtract away!" **Instructional activities (including 'checking for understanding' activities, modeling, guided practice, independent practice)**

15 min	• **Explanation:** "What do we notice about the weight of the solid ice cube and the melted ice cube? They are the same right? (or very similar in case of an error). Why do we think they are the same? Was our class prediction right? I want each group to take turns, 1 at a time by coming up to my computer to fill out a post it note on lino it, once every group has posted their note on the computer we will compare the answers to make sure that we are all on the same page! Work with your groups and write your answer in your journals, then when I call your group you can come up together to record your answers online!" • Link to Lino It http://linoit.com/users/MelissaFannon/canvases/Melissa%20 • When reviewing the post it notes I will address the correct answers and see if any group needs additional assistance then I will carry on with my lesson. "So we have learned that the mass of the object doesn't change, the object can change states of matter but the mass remains constant. Based upon this, what do we think the mass will be when the water evaporates into the air? The same, very good!"
5 min	**Interdisciplinary approaches:** • **Elaboration:** "Now in this experiment we just let the ice cube sit in the cup to melt, what are some ways that we could get the ice cube to melt faster? Heat, good!! What are some ways that you use heat other than melting ice cubes? Does anyone know why we use heat? It is because heat makes the molecules move faster which is why temperatures increase. Do you think we could do this same experiment backwards? Changing the matter from a liquid to a solid? Take a moment and talk this over with your table!" Accommodations for differentiated instruction for: Resource students: I will pair these students with gifted students so that there is someone there so answer additional questions if I am working with another group. If the students still seem to be confused at the end of the lesson I will hold a mini review session so they understand the objectives.

5 min	ESL students: I will post definitions and key words on the board so they can reference them and I will also add them to the student's individual word log so they have them in the future. Gifted students: During discussions I will ask more thought provoking questions to keep them interested and engaged, I may also pair them with a resource student so they can help that student with any confusion. By pairing them with the resource student the gifted student is acting like a teacher, which makes them understand the knowledge at a higher level because they will know it enough to teach it. **Assessment** • **Evaluation:** Have the students write out a follow up experiment that is changing a liquid to a solid, using water how would they do this? **Conclusion/closure** Talk about how when you change the liquid to the solid you have to freeze the water and when you weigh the mass of each they should come out to be equal for the same reason as when we changed the solid to a liquid. **Assignment/follow up** • **Extension: we will follow up with a content refresher in the next lesson!**

LIST of MATERIALS and CLASSROOM SET UP needs:
Plastic cups
Ice cubes
Scales
Science journals
Pencil

SAFETY/CAUTIONS:
Be careful, do not spill the water! Keep napkins around just in case!

LIST of RESOURCES:

Battle Creek Area Mathematics and Science Center Planning

The specific math and science goals that we are looking for in this lesson are for students to be able to calculate the mass of an object in two different states of matter. The assessment strategy was that students should be able to predict what would happen if we changed the states of matter around based upon the knowledge they learned in the previous lesson. We have a variety of resources being used that include a scale to measure the mass, ice cubes, science journals, and technology. We caution our students to keep their work station clean and to be careful with the water. The activity the students will be completing is the observation of an ice cube changing from a solid to a liquid and the mass remaining the same. My role as the teacher is to monitor the behavior in the classroom and to keep specific instructions for my students to follow.

Your name: Cooperating Teacher:	Melissa Fannon, Nicole Loomis, Morgan Pendleton Mrs. Amy O'Brien	School: Lincoln Elementary Grade: 4th Subject: Math and Science	Date/Time:	TBD
Unit Plan Driving question/Theme/Title:	What are the three states of matter and how do they interact with each other and the environment?		Lesson title/Topic: Combining Solids and Liquids Lesson number: 5 Lesson Type (Please circle): • **Demonstration** • **Investigation** • **Learning technology tool** • **Performance-based assessment**	

STANDARDS/BENCHMARKS/GLCE addressed in this lesson:

S.IP.04.11 Make purposeful observation of the natural world using the appropriate senses.
S.IP.04.12 Generate questions based on observations.
S.IP.04.13 Plan and conduct simple and fair investigations.
S.IP.04.14 Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer, graduated cylinder/beaker).
S.IP.04.15 Make accurate measurements with appropriate units (millimeters centimeters, meters, milliliters, liters, Celsius, grams, seconds, minutes) for the measurement tool.
S.IP.04.16 Construct simple charts and graphs from data and observations.
S.IA.04.12 Share ideas about science through purposeful conversation in collaborative groups.
S.IA.04.13 Communicate and present findings of observations and investigations.
S.RS.04.15 Use evidence when communicating scientific ideas.
P.PM.04.17 Measure volumes of liquids in milliliters and liters.
P.PM.04.23 Compare and contrast the states (solids, liquids, gases) of matter.
P.CM.04.11 Explain how matter can change from one state (liquid, solid, gas) to another by heating and cooling.

M.UN.04.01 Measure using common tools and select appropriate units of measure.

STUDENT LEARNING OBJECTIVES/OUTCOMES *Through these learning activities, the learner will demonstrate the ability to:*

Measure out solutions.

Mix Slime properly.

Observe that some products exhibit properties of different forms of matter.

Compare and contrast different substances.

Describe different substances by their properties.

INSTRUCTIONAL ACTIVITIES:

Time:	**Introduction**
3 min.	• **Engagement:** • Who can tell me what a solid is? • What about a liquid? • And how about a gas? • Can anyone think of a substance that doesn't really fall into just one category? Maybe it is technically a solid, but it is sort of wobbly or malleable (able to be reformed or moved)? *Jello, Silly Putty, mud, Play-doh, wet sand*
	Anticipatory set
5 min.	• **Exploration:** • Today we are exploring a mixture using different materials and observing the mixture for changes in their property. Who can come up to the board and write down a property that we can observe? *color, shape, state of matter, odor, texture, hardness.*
7 min.	• Here we have some Borax and some Elmer's glue. Using just our eyes, we are going to create a chart in our Science Journal to record what you observe about each one. What does it look like? What state of matter is it in? What texture does it have? Is it hard? Make sure to use the properties we have listed on the board. There is a possible template already on the board, you just need to copy it and fill in the appropriate squares.

10 min.	• What I am going to do now is mix the Borax in with warm water. As I am doing this, write down your observations in the chart. • Divide class into teams of two and give them a measuring cup, a deli container, and one craft stick. Have one member of each pair come up to the table and measure 50 mL of white glue into the deli container and then measure 50 mL of Borax solution. Then have the other group member use the craft stick to stir their mixture. • Let the students manipulate and "play" with the new substance. As they handle the slime, make sure the students record their observations in the chart. • Make sure that the students close the slime in their fist and feel it, and then let it drip through their fingers and record the difference. *When you squeeze it, it is more like a solid, but then when you open your fingers, the slime has more properties of a liquid.
5 min.	**Instructional activities (including 'checking for understanding' activities, modeling, guided practice, independent practice)** • **Explanation:** • It is changing from glue being a solid with more liquid tendencies, Borax powder being a small powder solid, which then is mixed with warm water so it dissolves into a liquid, then the mixture of both the glue and the Borax solution into a solid with liquid tendencies when you let it set.
3 min.	**Interdisciplinary approaches:** • **Elaboration** • When the students are done recording their observations, have them go to the pair closest to them and discuss their observations. • Did the new product that we created by mixing and combining two different materials surprise you? What did you think would happen? • In our science journal, write what you think would happen if you changed the volume of one of the materials in the procedure. Also, describe what you think would happen if

	the slime was heated or cooled. Include the motion of the particles in your description. Accommodations for differentiated instruction for: Resource students: Pair up with a gifted student. ESL students: Pair up with a gifted student. Gifted students: Pair up with a lower level student. **Assessment**
5 min.	• **Evaluation:** • Bring the class together as a whole group discussion. As they are discussing and answering their questions, observe their knowledge and answers as a formative assessment. • Is slime matter? **Yes** How do you know? **It takes up space, volume, and has a mass** • How is the slime mixture different from the materials that were combined to make the mixture? • Was there a change? What evidence do you have of change? • What are the properties of slime? What does it feel like? • Did everyone get the same results? Can you tell me why? **We all used the same materials, and the same amount of materials.** • What do you think would happen if one pair changed the amount of glue, Borax, and water? • How does slime relate to states of matter?
5 min.	**Conclusion/closure** • So some objects and materials can switch between the states of matter and some can feel/act/look like different types of matter. They can show properties of multiple states of matter. **Assignment/follow up**

10 min.	• **Extension** • Create a Venn diagram to compare and contrast the slime with one of the materials used to make the slime, and write how they are the same and how they are different in paragraph form.

LIST of MATERIALS and CLASSROOM SET UP needs:

- 20 bottles of glue
- 15 Deli containers
- 20 Popsicle Sticks
- Measuring cups – 50mL
- Water, warm
- Borax solution = ½ cup warm water + 1 teaspoon Borax ***TEACHER MADE***

SAFETY/CAUTIONS:

- Don't let the students touch the Borax.
- NO EATING OR PUTTING NEAR THE MOUTH.
- Glue Allergies

LIST of RESOURCES:

- Battle Creek Area Mathematics and Science Center Planning

The students will mix and measure to create a substance, and then describe that substance. The students will be assessed through their ability to take what they learned and apply it into a Venn diagram. The equipment used is measuring cups, deli containers, glue, Popsicle sticks, and Borax. Things to watch out for are not letting the students touch Borax, and to watch out for glue allergies, as well as don't eat the slime. The students will make slime and describe their properties.

	Elmer's Glue	**Borax Powder**	**Borax Solution**	**Slime**
Color				
Texture				

Name: _____

1. Describe what you think would happen if the slime was heated or cooled. Include the motion of the particles in your description.

_____

_____

_____

_____

2. Write what you think would happen if you changed the volume of one of the materials in the procedure.

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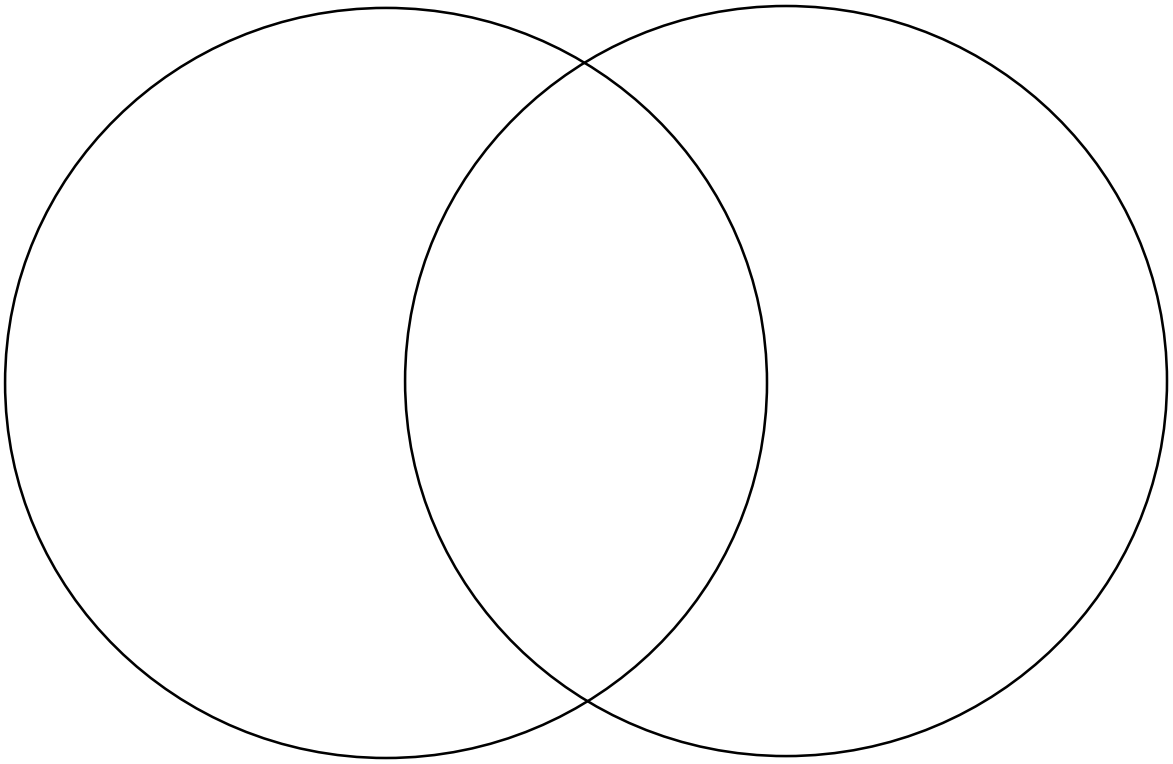
Name: _____

Slime Take Home

1. Use the Venn diagram to compare and contrast the slime with one of the materials used to make the slime.



2. Write how they are the same and different.

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