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Unit Title: Changes	**Content Area:** Physical Science	**Grade Level:** 2

Unit Summary: Changes develops students' knowledge of states of matter, students learn to describe the properties of solids, liquids, and gases and categorize them by their identifiable properties. The freezing, melting, evaporation, and condensation of water are investigated as an introduction to phase change. Rusting, dissolving, crystallization, gases created by effervescent tablets, and ink separated through chromatography are other phase changes students create and observe in the lab. This unit strengthens students' ability to observe and describe the properties of solids, liquids, and gases. It also gives students many opportunities to predict results, plan and perform simple tests, and analyze, interpret, and discuss their results. Students have several opportunities to practice their new skills in lessons in which they devise ways of separating a mystery mixture, and plan and carry out investigations that involve other changes. The performance expectations in second grade help students formulate answers to questions such as: "How are materials similar and different from one another, and how do the properties of the materials relate to their use? "An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Students will observe patterns in nature guide organization and classification and be prompt to propose questions about relationships and causes underlying them.

Unit Essential Questions:	**Unit Enduring Understandings:**
• How do the properties of materials determine their use? • How does conservation of mass apply to the interaction of materials in a closed system?	• The structures of materials determine their properties.

Possible Student Misconceptions:

- Dissolving and melting is the same thing.
- When water boils, the bubbles we see are mostly air; steam is hot air

NJCCCS:

- 5.2.2.A.1. Sort and describe objects based on the materials of which they are made and their physical properties.
- 5.2.2.A.2. Identify common objects as solids, liquids, or gases.
- 5.2.2.B.1. Generate accurate data and organize arguments to show that not all substances respond the same way when heated or cooled, using common materials, such as shortening or candle wax.
- 5.2.2.D.1. Predict and confirm the brightness of a light, the volume of sound, or the amount of heat when given the number of batteries, or the size of batteries.
- 5.2.2.E.1. Investigate and model the various ways that inanimate objects can move.
- 5.2.2.E.2. Predict an object's relative speed, path, or how far it will travel using various forces and surfaces.
- 5.2.2.E.3. Distinguish a force that acts by direct contact with an object (e.g., by pushing or pulling) from a force that can act without direct contact (e.g., the attraction between a magnet and a steel paper clip).

NGSS Performance Expectations: *Students who demonstrate understanding can…*

- 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
- 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
- 2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]
- 2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.

Primary CCSS ELA/Literacy Connections:	**Primary CCSS Mathematics Connections:**
RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-PS1-4) RI.2.8 Describe how reasons support specific points the author makes in a text. (2-PS1-2),(2-PS1-4)	MP. 2 Reasons abstractly and quantitatively; MP. 4 Model with mathematics

Lesson 1: Pre Unit Assessment - Thinking About How Things Change	**Learning Objective(s):** By using their senses, students will be able to discuss how familiar objects change.	**Lesson Duration:** 80 - 100 Minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	By creating a class chart "What We Know About Solids & Liquids and How They Change" by asking questions like "What do you know about solids?", "What do you know about liquids?", "What do you know about change?"	• STC TE Planner 2-3 pgs. • TE pgs. 2 -14; 134-144 • Chart paper • Markers	Ask questions based on observation to find more information about the natural and/or designed world(s)		
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Teacher will provide an illustration card to each pair of students in order to stimulate discussion. The teacher will then ask questions "What solids do you see?", "What liquids do you see?", "Where do you see change?" Record student responses on class chart "Looking At Changes"	• STC TE pgs. 2 -14 • Chart paper • Markers • Change Cards from Blackline Master Appendix pgs. 17 - 20			Patterns in the natural and human designed world can be observed. (2-PS1-1)
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Students will be provided with a hand lens and a solid tablet. Students will then use their tools of a Scientist (5 Senses except tastes). Teacher will ask "What color is it? What shape is it? "Students are to record their observations on their recording sheet/journal. Next they would be given 1/2 cup of water and asked same questions. Finally, student will make a prediction on what they think will happen if the put the tablet into the water. Record student responses. Students place tablet into the	• STC TE pgs. 2 -3 • 1 paper tray, 18 × 24 cm (7 × 9½ in) • 2 hand lenses • 1 large clear plastic cup, 270 ml (9 oz.), half filled with water • 1 lid for 270-ml (9 oz.) cup (optional) • 1 small clear plastic cup, 30 ml (1 oz.), containing one effervescent tablet (such as Alka-Seltzer®) • Recording sheet 1 A	Planning and Carrying Out Investigations • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1) Students asked to use all of their senses except taste.	PS1.A: Structure and Properties of Matter • Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)	Cause and Effect • Events have causes that generate observable patterns. (2-PS1-4) • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

	water and record their observations.				
Explain: How will you help students connect their exploration to the concept/topic under investigation?	Have students discuss and share their observations from their recording sheets. Teacher addresses what the tablet looked like before it looked like before it went into the water; what it looked like once it went into the water; how the tablet and water changed when they were mixed.	• STC TE pgs. 2 - 14 • Recording Sheet 1 A			
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	After reading the poem "Change All Around You" students would be encouraged to describe what they think "changed" from what the heard in the poem. (Think pair share with a partner)	• STC TE pg. 14 • "Change All Around You" Poem • Paper, pencil, crayons			
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Ongoing; reviewing of recording sheets, monitoring of discussions	• Recording sheet 1 A • Journal • Recording sheets • Charts			

Extend: How will students deepen their conceptual understanding through use in new context?	Have students create a collage of photos that illustrate change. The photos might include pictures of colored leaves in autumn, plants sprouting in a field, candles burning, snow melting, and the sun setting. Students can display their collages in an area of the classroom labeled "Changes All around U"	• Vocabulary words • Objects and/or photos from home			
Lesson 2: Freezing and Melting	**Learning Objective(s):** Students will observe, record the properties of an ice by designing and implementing a method for melting an ice cube as well as creating an investigation for evaporation.				**Lesson Duration:** 40 - 50 Minutes
Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	**Learning Activities** **What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?**	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Teacher will ask students to recall from Lesson 1 "Who remembers what was done with the liquid at the end of our last lesson? (poured into ice trays and placed into the freezer) In what way do you think the water changed in the freezer? How do you know that?	• STC TE Planning pgs. 4-5; 21 - 30; 134-144	Ask questions based on observations to find more information about the natural and/or designed world(s)	PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)	
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Teacher will then show the ice tray to the students and quickly pass it around in order for them to observe it. Ask students to describe changes in the water since Lesson 1. Discuss their predictions from Lesson 1. Were they correct?	• STC TE Planning pgs. 4-5; 21 - 30; 134-144 • Ice tray filled with ice	Ask and /or identify questions that can be answered by an investigation.		

Explore: What hands-on/minds-on common experience(s) will you provide for students?	Teacher will illicit from students "I wonder how could I make this ice a liquid once again?" "What tools would I need?" Show the students the sandwich bag and petri dishes and ask "What could I do with these items?" Teacher then says "Let's play a game" Refer to Blackline Master "The Melting Game" and pass out materials. For each pair of students, remove one ice cube from the tray, put it in a plastic bag, and seal the bag tightly (see Figure 2-1 on pg. 25). Distribute a bag with ice to each pair of students.	• STC TE 21 - 30; 134 -144 • 1 ice cube (from Lesson 1) • 1 resealable plastic bag, 10 × 15 cm (4 × 6 in) • 1 petri dish top or bottom • 1 index card, 7.6 × 12.7 cm (3 × 5 in) • Blackline Master "The Melting Race" • Journals	Define a simple problem that can be solved through the development of a new or improved object or tool.	PS1.B: Chemical Reactions Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)	Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
Explain: How will you help students connect their exploration to the concept/topic under investigation?	Ask students to describe how their ice cube changed. Encourage them to discuss the color, shape, size, and texture of the solid and liquid. Record students' responses in the appropriate columns on the newsprint labeled "Properties"	• STC TE 21 - 30; 134 -144; • 1 ice cube (from Lesson 1) • 1 resealable plastic bag, 10 × 15 cm (4 × 6 in) • 1 petri dish top or bottom 1 index card, 7.6 × 12.7 cm (3 × 5 in) • Blackline Master "The Melting Race" • Journals		PS1.A: Structure and Properties of Matter: Different kinds of matter exist and many of them can be either solid of liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1).	
Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Have each pair of students describe the method they used to melt their ice cube. Did anything surprise them as they attempted to melt it? Ask students to share and compare the length of time recorded on their paper clocks. Why did some of the ice cubes melt faster than others? Record responses.	• STC TE 21 - 30; 134 -144; • 1 index card, 7.6 × 12.7 cm (3 × 5 in) • Blackline Master "The Melting Race" • Journals	Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.		Stability and Change: Things may change slowly or rapidly.

Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Ongoing: Properties Chart: Solicit from the students physical characteristic of a Solid and record their responses on chart paper. Repeat process with Liquid. Anecdotes, Journals, etc.	• Anecdotes, journals, charts, etc.	Record information (observations, thoughts, and ideas.		
Extend: How will students deepen their conceptual understanding through use in new context?	Ask students to predict what will happen to a covered and an uncovered water as it sits for two or three days. Students can record their predictions in their science journals, share their predictions with their partner, or discuss their predictions. Next, have the students work in partners and pour water into two petri dishes one covered and one uncovered. Leave untampered with for 2 to 3 days and return and discuss findings.	• Index cards • Petri dish for each pair of students • Water	Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question		Cause and Effect: Mechansim and Prediction: Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Lesson Pace & Sequence

Lesson 3: Where Did the Water Go?	**Learning Objective(s):** The student will be able to conceptualize that as part of the water cycle, water evaporates and vapor condenses as the temperature warms and cools by discussing their observations and recordings as well as creating an experiment.	**Lesson Duration:** 80 - 100 Minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***

Elicit: How will you access students' prior knowledge?	Ask the students if they recall what took place two to three days ago in Science (placing water small amounts of water in a petri dish and then covering it. The dish was to be left untampered with in a sunny area preferably in order for the water to evaporate and leave behind evaporated water rings in the dish) and share their predictions from their journals.	• STC TE Section 4 pgs. 33 – 35 • Journals	Asking Questions and Defining Problems Ask questions based on observations to find more information about the natural and/or design world(s).		
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	After discussing their prediction have the students retrieve their petri dishes and record the results. Have the students Think/Pair/Share with their partner.	• Journals • Petri dishes			Cause and Effect Events have causes that generate observable patterns. (2-PS1-4)
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Ask students to brainstorm where they think the water in the uncovered petri dishes went. Ask them to discuss how the covered petri dishes may be different. Does anyone know why?		Asking Questions and Defining Problems Ask and/or identify questions that can be answered by an investigation.		
Explain: How will you help students connect their exploration to the concept/topic under investigation?	As water heats up, some of it escapes into the air as water vapor. This change of water from liquid to gas, which requires the addition of heat energy, is called evaporation. Close your eyes and think about when you think evaporation has occurred when you have been at home or on your way to school? Wait for responses. Have students write/draw the experiences in journal or discuss as a class.			PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)	Patterns Patterns in the natural and human designed world can be observed. (2-PS1-1)

Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	5. Guide students as they complete the following steps: Place the two small cups (one with cool water, one empty) side by side. The cups should be separated by about the width of your hand. When you are ready to begin the investigation, remove the lid from the cup with water in it. The teacher or a helper will quickly fill your empty cup with very warm water. Put one finger in each cup of water. What do you observe? Use the index cards to label the cups of water “Cool” or “Warm.” Immediately place a large cup upside down over each small cup of water. Observe what happens. Discuss your observations with your partner. Compare the two large cups. After students record their observations, encourage them to pick up the large cups and feel the inner surfaces. What observations can they make about these cups? Has the inside of each cup changed? If so, how?		Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)	PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)	

Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Ask students to think about their observations in this lesson and in Lesson 2. Direct their attention to the "Properties" chart. Use questions such as the following to discuss the properties of water: How did the water change when it was in the freezer? How did the ice cube change when it was removed from the freezer? How did you get the ice cube to melt quickly? How did the water change when it was in the uncovered dish? Where did the water go? How do you know from this investigation that the water went into the air? Think about the cup of very warm water. What happened when the water in the air touched the large cup? Record any new ideas that students may have about water as a solid, liquid, or gas in the appropriate columns of the "Properties" chart.				
Extend: How will students deepen their conceptual understanding through use in new context?	Students can experiment with water vapor using the moisture from their own bodies. Have them hold a mirror close to their mouth and breathe on it. Can they see the moisture? As the mirror clouds over, they can observe water vapor condensing on it. Have students look for other evidence of evaporation and condensation at home (for example, steam rising from the road after a brief summer shower, water droplets forming on the outside of a cold soft drink can, or seeing their breath on a wintry day.			"PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)"	

Lesson Pace & Sequence

Lesson 4: Mixing and Separating Solids	**Learning Objective(s):** Student will be able to observe and identify 2 different solids by recording their observations and understand that the solids can be mixed and that some solids can be separated after being	**Lesson Duration:** 80 - 100 Minutes

	mixed.				
Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Teacher will ask the students "Who can tell me what are the physical characteristics of a solid?", How do I an object is a solid and not a liquid?" Solicit responses or have students write physical characteristics on post is and place on chart paper for review and discussion.	• STC TG Section 4 pgs. 44 – 48 • Post-its • Chart paper			
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Teacher will now ask the students to get their journals and ask them to write what they know about "mixing". Anything they know about mixing. Mixing at home, at school, in the playground, anything they know about mixing. You will have 5 minutes to write or draw what you know about mixing. Now share with your neighbor/friend. Record the students' responses on chart paper and be prepared to referr to it later. Next provide the students the kosher salt crystals, black paper and a hand lens. Have the students take turns observing and recording their observations. While observing teacher will ask if NOT discussed by students "What color do you see?", "What shape do you see?", and "What size would you say to describe it?" Is it smooth or rough? etc.		Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.(2-PS1-1)		

	Repeat process with the gravel.				
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Teacher will ask the students to remember the salt and gravel we looked at with our hand lens? What do you think would happen if we put the salt and the gravel together? Can you predict what would happen if we mixed the salt and gravel together? Can you write or draw what it would look like in journal? You have 5 minutes. After materials have been passed out the students will work in partners and mix the two solids. Student will be encouraged to discuss and share findings with partner and record observations.				
Explain: How will you help students connect their exploration to the concept/topic under investigation?	The students are encouraged to define and write their own definition of a mixture. Next the class will share their definitions. The teacher will ask "How could I get just the salt from the mixture?" Elicit as many responses as possible. If no responses, ask the students how does Mom separate the pasta from the water? (something similar) Next show them the sieve and follow Steps 5-7 Figure 4-3. Next, the teacher with the class will define the term mixture as "a blend of two or more substances (solid), each of which keeps its properties and can be separated from the other by physical means without changing its chemical makeup."				

Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Teacher asks "Can you think of any other solids that we mix together?" Elicit as many responses as possible. Talk about daily activities and foods. If not suggested, talk about salads. Introduce STC KID DISCOVER reader Veggies to Salad. Ask What do you see? How do carrots, tomatoes, celery become a mixture?				
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Invite students to share their observations with the class. Ask questions such as the following: "What happened when you mixed the salt and gravel? Describe the mixture." How did using the sieve change the mixture? Next, have students remove the mesh from their cups. Ask them to place a small sample of the newly separated gravel on their black paper. Have students compare the gravel samples taken before and after mixing. Then invite students to discuss the following questions In what ways is the gravel the same as before you mixed it with the salt? Did the gravel change as a result of the mixing? Finally, encourage students to make the same comparison using samples of the salt taken before and after mixing?				

Extend: How will students deepen their conceptual understanding through use in new context?	Place several solids, such as salt, sand, lima beans, marbles, and sugar, at a "mixing center." Students can also contribute solids to the center. Have students select two items from the center and mix them in a cup. Encourage them to record their observations with both drawings and words in their science journals. Also, place different grades of mesh in the mixing center so that students can experiment with separating various mixtures. Students can record their observations in their science journals using both words and drawings. Observe and listen to students as they play. Record the anecdotes.				

Lesson Pace & Sequence

Lesson 5: Mixing Solids and Liquids	**Learning Objective(s):** Students observe, record, describe, and compare how each solid behaves when mixed with water.	**Lesson Duration:** 40 - 50 Minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Teacher would introduce lesson by saying to students "Who remembers the 2 solids we were working with when we were creating a mixture?" Wait for a response. Refer to chart if necessary. Next, tell students that are going to continue on the journey of discovery by adding 2 new forms of matter.	• STC TE Section 4 pgs. 54 -58			

Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Is tissue a solid? Pass tissue sheets to small groups of four to touch and feel. Ask students to record their observations. Discuss their findings. Address any misconceptions. Record responses. What makes water a liquid? Discuss within the group the properties of liquid and check your journals to make sure you have the properties listed in your journal.				
Explore: What hands-on/minds-on common experience(s) will you provide for students?	Teacher will say to students "We mixed 2 solids together and we were able to separate them. What else could we mix together?" Students would provide mixing solid with a liquid. Ask the students to predict what will happen if water is added to each solid individually? Follow procedure 5-2.	• STC Recording Sheet 5 - A Mixing Solids and Liquids			

Explain: How will you help students connect their exploration to the concept/topic under investigation?	Have student stir the gravel and water mixture with the wooden stirrer for about a minute. Give students time to discuss their observations with their partners and to record them in their journal. ” Did the gravel and water mixture change at all after stirring? Ask students to discuss their observations. You might expect responses such as, “The gravel rained in the water,” “The gravel went to the bottom of the cup,” and “The gravel did not change at all.” Record students’ ideas in the right-hand column of the “Changes Observed” chart. Repeat with salt and tissue. Have students discuss with partners or small group and record in journal/ 5-A recording sheet. Students build on these experiences by mixing three solids (gravel, toilet tissue, and kosher salt) with water. Each of these solid-and-liquid mixtures varies in the degree to which the substances mix. Gravel settles to the bottom of the cup of water and does not appear to change. The toilet tissue changes in texture and appearance as its fibers break apart. Although the fibers do not dissolve, many are small enough that they remain suspended in the water.				

Elaborate: How will students apply their learning and develop a more sophisticated understanding of the concept/topic?	Students can create a class story about solid-and-liquid mixtures. Tape a piece of newsprint on the chalkboard. Have the class sit in a circle on the floor while you hold a small rubber ball in your hand. Let students know that they will help write a story about solids and liquids and the changes that occur when they are mixed. Start the story by writing on the newsprint "Once upon a time, there were three little solids." Roll the ball to a student. Ask that student to add a sentence to the story. Record the sentence on the newsprint. Continue this process until the story is finished.				
Evaluate: How will students demonstrate their mastery of the learning objective(s)?	Teacher will ask the students "What happened to each solid when you added it to water? How did the water change? What happened to the water and the solid when you stirred? How well did the solid and water mix? Did anything surprise you about the way each solid changed? If so, what?" Record anecdotes or on chart				
Extend: How will students deepen their conceptual understanding through use in new context?	Have students share the number and kinds of solids and liquids they consume in a day. Students can keep a log of the solids they eat and liquids they drink at home and report their findings to the class. They can then record these findings on a class graph.				

Lesson Pace & Sequence

Lesson 6: Separating Solid and Liquid Mixtures	**Learning Objective(s):** Students use a filter to examine how solids may be separated from liquids.	**Lesson Duration:** 40 - 50 Minutes

Learning Cycle ***What lesson elements will support students' progress towards mastery of the learning objectives(s)?*** ****Elements do not have to be in conducted in sequence.***	***Learning Activities*** ***What specific learning experiences will support ALL students' progress towards mastery of the learning objective(s)?***	***Resources/Materials*** ***What curricular resources/materials are available to facilitate the implementation of the learning activities?***	***Science and Engineering Practices*** ***What specific practices do students need to use in order to progress towards mastery of the learning objective(s)?***	***Disciplinary Core Ideas*** ***What core ideas do students need to understand in order to progress towards mastery of the learning objective(s)?***	***Crosscutting Concepts*** ***What crosscutting concepts will enrich students' application of practices and their understanding of core ideas?***
Elicit: How will you access students' prior knowledge?	Teacher brings out solid and liquid mixture and asks "Who can recall to what happened to our solid and liquid mixture?"				
Engage: How will you capture students' interest and get students' minds focused on the concept/topic?	Teacher provides the petri dish and requests the students to turn and talk and discuss their observations and provide reasons on why the change occurred. Students will discuss various possible reasons why outcomes that have occurred.				
Explore: What hands-on/minds-on common experience(s) will you provide for students?	While looking at their previous mixtures, the teacher will encourage the students to ask questions like "How have your mixtures changed overnight? (For example, the gravel may have settled, the tissue may be more broken down, and salt crystals may have formed on the edge of the cup with the salt-and-water mixture.) How are the mixtures the same? How are they different? Where is the gravel in the gravel-and-water mixture? Where is the tissue in the tissue-and-water mixture? What happened to the salt that was mixed with the water? Has it disappeared completely? Where did the salt go?				

Explain: How will you help students connect their exploration to the concept/topic under investigation?	Teacher will now introduce the term "dissolve". "What do you think it means to "dissolve" a solid? Which solids in the three mixtures dissolved? Which solids in these mixtures did not dissolve? How do you know if something has dissolved? What solids outside of the classroom have you seen dissolve in liquid?"				