2nd Grade Matter Unit
Unit Blueprint

Lesson	Essential & Unit Questions (for conceptual benchmarks)	Benchmarks (**Bolded** sections indicate portion of benchmark addressed)	Formative and Summative Assessments (Unless noted as a Summative Assessment, the assessments are formative and should be used to guide teaching and learning.)	Using Assessments to Monitor Student Learning
Throughout Unit		1B(K-2)#1: People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens. 1C(K-2)#2: In doing science, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean. 12E(K-2)#1: Ask "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question.	The benchmarks are not specifically linked to individual lessons. They align with virtually all lessons and should be integrated throughout the unit.	Throughout the unit, do students: • Understand that sometimes more can be learned by doing something to an object than just observing it? • Do students suggest doing things to objects to see what happens? • Do students recognize that working in a team is beneficial? • Do students recognize that sharing findings is beneficial? • Are students willing to draw their own conclusions after listening to other students' ideas? • Do students use evidence to support how they know something? • Do students encourage their classmates to support their ideas with evidence?

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<u>Lesson 1: Thinking about How Things Change</u> **Pacing Suggestions:** **Day 1 –** *Procedure* Step 1 on page 21 in TG **Day 2 –** *Procedure* Steps 2 & 3 on page 21 in TG **Day 3 –** *Procedure* Steps 4-8 on pages 22 & 23 and *Final Activities* Steps 1-4 on pages 23 & 24 in TG **Teacher Resources:** 	How can solids and liquids change?	4C(K-2)#2: Change is something that happens to many things.	• Pre-unit assessment--*What We Know about Solids, Liquids, and Change* Chart (See *Procedure* Step 1 on page 21 in Teacher's Guide.) • Change Cards & *Looking at Changes* Chart (See *Procedure* Steps 2 & 3 on page 21 in Teacher's Guide.) • *Changes All Around Us* poem—read and discuss poem (See *Final Activities* Step 4 on page 24 in Teacher's Guide.)	***What We Know about Solids, Liquids, and Change* Chart** See *Assessment* on page 25 in Teacher's Guide **Change Cards** • Are the students able to identify the solids and liquids in the pictures? • Are the students able to reasonably predict how the solids and liquids in the pictures will change? **Changes Poem (Discussion)** • Are students able to identify and describe a change from the poem?
	Why is it important to keep accurate records or notes about things that are observed? What are some ways to describe objects?	Related to 1B(K-2)#3: Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others. 4D(K-2)#1: Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, etc.).	*Record Sheet 1-A*, Questions 1 and 2 and class discussion of data (See *Procedure* Steps 4-8 on pages 22 & 23 in Teacher's Guide.) Click to view a sample of student work	The lesson does not deliberately address benchmark 1B(K-2)#3. The teacher needs to help students make the connection between the importance of recording accurate observations & the ability to compare observations with others. This should be emphasized throughout the unit. ***Record Sheet 1-A*** • Are the students able to accurately describe some physical properties of the water and tablet? • Are the students able to describe physical properties of the water/tablet that changed after the tablet was dropped in the water?

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Lesson 1 (Continued)		12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described.	*Record Sheet 1-A*, Question 3, class discussion/comparison of drawings, and self-reflection of drawing	The Teacher's Guide does not specifically direct teachers to have students reflect on their drawings. However, this step is necessary for students to become aware of the details included in their drawings. Reflection could be as simple as students sharing with a partner what they did well and what they can improve or be more detailed having students use a "T Table" describing what they did well and what they can improve.
	How can water be changed back and forth between a solid and a liquid?	4B(K-2)#2: **Water can be a liquid or a solid and can be made to go back and forth from one form to the other.** If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.	Student predictions about how the water will change when frozen in the ice cube trays (See *Final Activities* Step 2 on pages 23 & 24 in Teacher's Guide.)	Criteria to consider while students generate predictions: • Do students know that water becomes a solid when it is placed in a cold environment such as a freezer?

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<u>Lesson 2: Freezing and Melting</u> **Pacing Suggestions:** **Day 1-** *Procedure* Steps 1-3 on page 37 in TG **Day 2-** *Procedure* Steps 6-9, *Final Activities* Steps 1-4 on pages 37-40 in TG **Teacher Resources:** 	How are ice and water (liquid) alike and different? How can water be changed back and forth between a solid and a liquid? How does the amount of water change if it is frozen and then melted?	11C(K-2)#1: Things change in some ways and stay the same in some ways. 4B(K-2)#2: Water can be a liquid or a solid and can be made to go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.	Observe ice cube trays and discuss changes (See *Procedure* Steps 1 & 2 on page 37 in Teacher's Guide.) Experimental design of "The Melting Race" (use teacher-generated sheet available under "Teacher Resources—Items to Print") and class discussion of experiment (See *Procedure* Steps 3, 6-9 on pages 37 & 38 in Teacher's Guide and *Final Activities* Step 2 on page 38 in Teacher's Guide) Click to view a sample of student work	Criteria to consider while students observe ice cube trays and discuss the change observed: • Did the students' predictions match their observations? • Can students generalize from the experiment water changes into ice when subjected to cold temperatures? • Do student know that the ice and water are still the same substance? • Do students recognize some differences between the ice and water (ex: the ice cube is hard and retains its own shape)? Criteria to consider while observing students create their strategy/procedure for melting the ice cube: • Do students know that the ice cube will melt if it is left out? • Do students create a plan that is related to heat (rubbing, placing by a heat source…), thus indicating they understand *how* to make the ice cube melt faster than just sitting out?
		12B(K-2)#1: **Use whole numbers** and simple, everyday fractions **in** ordering, counting, identifying, **measuring, and describing things and experiences.**	"The Melting Race" data (timed)	Criteria to consider when reviewing students' lab data: • Are students able to calculate the amount of time it took to melt the ice cube?

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Lesson 2 (Continued)	What are some ways to describe objects?	4D(K-2)#1: **Objects can be described in terms of** the materials they are made of (clay, cloth, paper, etc.) and **their physical properties (color, size, shape, weight, texture, flexibility, etc.).**	*Properties* chart and class discussion (See *Final Activities* Step 1 on page 38 in Teacher's Guide.)	Criteria to consider during class generation of the *Properties* chart: • Are students using physical properties to describe how the ice cube changed?
	What happens to water left out in an open container? What happens to water left in a container with a lid?	4B(K-2)#3: Water left in an open container disappears, but water in a closed container does not disappear.	Student predictions and observations of the water in their Petri dishes (See *Final Activities* Step 3 on pages 38 & 39, especially bullet #6 on page 39, in Teacher's Guide.)	Criteria to consider when students make predictions: • Do students think there will be a difference between the covered and uncovered Petri dishes? • Do students know that water will "disappear" if left in an open container? • If students use the word "evaporate," what do the students mean? (Evaporate means to turn into a gas—most students use the word incorrectly to mean that the water goes away or disappears.)

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Lesson 2.1: Measured Water Activity ****Additional activity, see Tips under *Teacher Resources* for details**** **Pacing Suggestions:** **Day 1-** Do Part 1 of activity **Day 2-** Do Part 2 of activity **Teacher Resources:** 	How does the amount of water change if it is frozen and then melted?	4B(K-2)#2: Water can be a liquid or a solid and can be made to go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing. 12B(K-2)#1: **Use whole numbers** and simple, everyday fractions **in** ordering, counting, identifying, **measuring, and describing things and experiences.** 12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described.	Student predictions and class discussion about the teacher demonstration of measured water freezing and melting (using a graduated cylinder). Students complete *My Observation Sheet* (available on page 198 in Teacher's Guide). Click to view a sample of student work	Criteria to consider during class discussion of teacher demonstration of measured water freezing and melting and when reviewing students' *My Observation* sheets: • Do students know that the water will turn into ice? • Do students know that the amount of water is conserved (it won't change after melting)? • Do students accurately measure the amount of water in the graduated cylinder? • Do students use the data as evidence to support the concept that the amount of water does not change from its original amount? • Do the students' drawings accurately portray the graduated cylinder and the water levels?

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Lesson 3: Where Did the Water Go? (Only observe Petri dishes—do not conduct Warm/Cold experiment) **Pacing Suggestions:** Complete *Procedure* Steps 1 & first part of Step 2 in one day **Teacher Resources:**  	What happens to water left out in an open container? What happens to water left in a container with a lid?	4B(K-2)#3: Water left in an open container disappears, but water in a closed container does not disappear.	Student observations and class discussion about Petri dishes—students complete *My Observation Sheet* (See *Procedure* Step 1 on page 47 in Teacher's Guide.) Additional Directions: Draw a line down the middle of *My Observation Sheet*, available on page 198 in Teacher's Guide. Use one half to draw and describe the uncovered Petri dish filled with water. Use the other half to draw and describe the covered Petri dish filled with water. Click to view a sample of student work *I Learned* Sheet (teacher-generated sheet available under "Teacher Resources—Items to Print") & experiment discussion	**Petri Dish Experiment and *My Observation Sheet*** • Do the students' written observations include there is less water or no water left in the Petri dish without a lid? • Do the students' written observations include the amount of water remained the same in the Petri dish with the lid? • Are the students accurately drawing pictures of the two Petri dishes? Are the students' drawings on the *My Observation Sheet* improving in accuracy and detail? • Are the drawings titled? ***I Learned* Sheet** • Do students know that water left in an open container disappears and water left in a closed container does not disappear?
	Why is it important to keep accurate records or notes about things that are observed?	1B(K-2)#3: Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.		
		12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described.		

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<u>Mid-Summative Assessment</u> **Pacing Suggestions:** 1 Day to complete assessment **Teacher Resources:**  	How does the amount of water change if it is frozen and then melted? What happens to water left out in an open container? What happens to water left in a container with a lid?	4B(K-2)#2: Water can be a liquid or a solid and can be made to go back and forth from one form to the other. **If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.** 4B(K-2)#3: Water left in an open container disappears, but water in a closed container does not disappear.	**Summative Assessment:** *What Have You Learned About Water and Changes?* (teacher-generated sheet available under "Teacher Resources—Items to Print")	Students should be able to answer all the questions independently and correctly.

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<u>Lesson 4: Mixing and Separating Solids</u> **Pacing Suggestions:** Complete *Procedures* Steps 1-9 on pages 58-60 in one day. Walk students step-by-step through experiment. **Teacher Resources:** 	How can solids and liquids change?	Lesson 4 serves as precursor to Lesson 5 and 11C(K-2)#1: Things change in some ways and stay the same in some ways.	Pre and post-lab discussion *What We Know about Mixing* class chart (See *Procedure* Step 1 on page 58 in Teacher's Guide and *Final Activities* Steps 2-4 on page 61 in Teacher's Guide.)	Criteria to consider during class discussion: • Do students articulate some understanding of how things can change when mixed? (ex: texture, consistency) • Do students know that some things don't change when mixed?
	What are some ways to describe objects?	4D(K-2)#1: Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, etc.).	Students' observations (recorded on *My Observation Sheet)* and *c*lass discussion of activity (See *Procedure* Steps 2-9 on pages 58-60 and *Final Activities* Steps 1-4 on page 61 in Teacher's Guide.) Click to view a sample	Criteria to consider when reviewing student work and during class discussion of lab: • Are students able to accurately describe the salt and gravel using their senses (sight, touch, and smell)? • Do students understand that the gravel and salt did not change when mixed? • Do students understand that the gravel and salt did not change when separated?
	Why is it important to keep accurate records or notes about things that are observed?	1B(K-2)#3: Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.		
		12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described.		

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Lesson 5: Mixing Solids and Liquids **Pacing Suggestions:** Complete *Procedures* Steps 1-11 on pages 70-71 in one day. Omit Step 5, Bullet 3. **Teacher Resources:**  	What are some ways to describe objects?	4D(K-2)#1: Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, etc.).	*Mixing Solids and Liquids Record Sheet 5-A* and *My Observation Sheet* Click to view samples of student work *Changes Observed* class chart (Properties column) (See *Procedure* Steps 2-6 on page 70 in Teacher's Guide.)	Criteria to consider when reviewing student work and creating class chart: • Are students accurately describing the solid and water mixture before and after stirring? • Do the descriptions include details like the sample record sheet on page 72 in the Teacher's Guide? • Are the students able to accurately describe the solids using their senses (sight, smell, and touch)?
		12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described. (Applies only if using *My Observation Sheet)*	*My Observation Sheet* (drawings of cups)	Criteria to consider when reviewing student work: • Do students' drawings accurately show the cups of gravel, toilet tissue, and salt mixed with water? • Are the students' drawings on the *My Observation Sheet* improving in accuracy and detail?
	How can solids and liquids change? How are mixtures alike and different from their original parts?	4D(K-2)#2: Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them. 11C(K-2)#1: Things change in some ways and stay the same in some ways.	*I Learned* Sheet (teacher-generated sheet available under "Teacher Resources—Items to Print") and class discussion of activity *Changes Observed* Chart (Changes with Water column) (See *Final Activities* Steps 1 & 2 on pages 71-72 in Teacher's Guide.)	Criteria to consider when reviewing student work, discussing lab with class, and completing the *Changes Observed* chart: • Do the students know that not all materials respond the same way when something is done to them? • Are students able to describe how the materials changed and how they stayed the same?

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Lesson 6: Separating Solid and Liquid Mixtures **Pacing Suggestions:** Complete *Procedures* Steps 1-10 on pages 78-80 in one day. **Teacher Resources:** 	How can mixtures be separated? Does the same method work well on all mixtures? How can solids and liquids change?	3A(K-2)#1: Tools are used to do things better or more easily and to do some things that could not otherwise be done at all. In technology, tools are used to observe, measure, and make things. 4D(K-2)#2: Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them.	*Ideas for Separating Our Mixtures of Solids and Liquids* Chart (See *Procedure* Step 3 on page 79 in Teacher's Guide.)	Criteria to consider during class discussion of *Ideas for Separating Our Mixtures of Solids and Liquids* Chart: • Do students suggest using tools to separate the mixtures? • Do students recognize that some methods are better than others when separating the mixtures (because not all the materials will respond the same way)?
	What are some ways to describe objects?	4D(K-2)#1: Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, etc.).	**Summative Assessment:** *My Observation Sheet* (written descriptions) Click to view a sample of student work	***My Observation Sheet*:** • Do students' written descriptions contain accurate details about what they observed? • Do the students know that not all materials respond the same way to what is done to them? (Should be reflected in written description.) • Do the students' drawings accurately show cups of gravel, toilet tissue, and salt separated from water (funnels should be included in the drawings)? • Are the cups labeled? • Are the students' drawings on the *My Observation Sheet* improving in accuracy and detail?
		12D(K-2)#2: Draw pictures that correctly portray at least some features of the thing being described.	**Summative Assessment:** *My Observation Sheet* (drawings of cups & funnels)	

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<u>Post Unit Assessment</u> **Pacing Suggestions:** **Day 1-** Complete class chart **Day 2-** Complete *What Have You Learned about Changes?* assessment **Day 3-** Complete *Self-Assessment* **Teacher Resources:**  	What kinds of changes can happen to solids and liquids?	4D(K-2)#2: Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them. 11C(K-2)#1: Things change in some ways and stay the same in some ways.	*What We Now Know about Solids, Liquids, and How They Change* class chart (See *Procedure* Steps 1 & 2 on page 170 in Teacher's Guide.) *What Have You Learned about Changes?* summative assessment (teacher-generated sheet available under "Teacher Resources—Items to Print") Student *Self-Assessment* (See *Additional Assessments* on pages 173-174 in Teacher's Guide and pages 176-177 for a copy of the self-assessment.)	• Do the students know that properties of a material can changes when something is done to it? • Do students know that not all materials will respond the same way when something is done to them? • Do students recognize that even when a change occurs, a material may retain some of its properties?