I. Content: Describe what it is you will teach. What is the content?

Our second lesson of our matter unit will focus on defining matter matter and the state of matter known as solid. We will explore in more detail the essential property of a solid: matter that holds its shape. We will ground our introduction of solids and states of matter by reviewing our scientific gains from last week (snow+heat=water) and accompanying logical deductions (water-heat=snow).

II. Learning Goal(s): Describe what specifically students will know and be able to do after the experience of this class.

- Content: SWBAT identify what is matter, the state of matter known as a solid, and examples of this state.
- Language: SWBAT sort a written list of items into categories: solid and not-solid; students will create their own groupings for the items on the not-solid list.

III. Rationale: Explain how the content and learning goal(s) relate to your Curriculum Unit Plan learning goals.

In order to begin to address the second content standard of the Massachusetts Frameworks for physical science (listed in my CUP), we must first do the work of this lesson, which is to introduce and define matter. In addition to these content standards, the lesson will also tackle practice standards, or habit of mind, so essential to the scientific discipline. The first is that our classroom scientists will be charged with employing technical language and vocabulary in order to communicate precisely; in this lesson, they will be required to define matter and solids correctly. Additionally, our scientists will begin to see science as a tool for seeking solutions to authentic, practical, every day situations; students will review their conclusions from the MELTDOWN! experiment that answered questions from our lived experience. This lesson incorporates literacy development by tasking students to engage with new vocabulary and to begin to employ it in their oral and written language. This is referenced in my language objective for this lesson, which appears in the learning goals section of this LAP. Lastly, we will further build our community of learners by maintaining a safe environment to ask questions, make mistakes, and challenge one another. Students will also work collaboratively on a solid sorting activity; as such, they will be forced to rely on one another as funds of knowledge. This type of interaction also allows a period of “legal” talk, in which interpersonal and social conflicts must be set aside for the purpose of achieving the most points.
IV. Assessment: Describe how you and your students will know they have reached your learning goals.

There will be a variety of formal and informal assessments that will indicate to me whether my students will have reached my learning goals. First, we will begin with a review of last class, which will reveal their retention of how heat influences the state of matter. Students will be assessed by their participation in our read-aloud; they will have to cull important definitions and information from the text that I read to them. Finally, students will be formally assessed by their performance on the worksheet in which they have to sort matter into solid or not solid; they will be challenged to also generate groups for the matter that they place in the “not-solid” category.

V. Personalization and equity: Describe how you will provide for individual student strengths and needs. How will you and your lesson consider the needs of each student and scaffold learning? How specifically will ELL students and students with learning disabilities gain access and be supported?

The strengths of individual students will be brought out and encouraged in several ways: High flyers will benefit greatly from sharing their retained knowledge during our review, as well as participating actively in the accompanying discussion. This will give them an opportunity to grow their understanding by showing it. Furthermore, they will benefit from the read-aloud, which offers a great deal of facts for the close listener. During the challenge to sort the “not-solid” matter, they will be pushed to think creatively and quickly in homogeneous groupings. Students who have an IEP or 504 will benefit from clear, single-step directions. To further support their success, I have thoughtfully selected preferential seating spots for them, as well as provided repeated directions as necessary. Both students on an IEP or 504 as well as ELLs will benefit from the read-aloud, which provides many visuals of the concepts at hand. They will benefit from the teacher doing the reading work, so that they can do the content tasks. As always, I will emphasize the need to use the correct vocabulary and encourage students to reference our anchor charts for assistance. Furthermore, ELLs who have the opportunity to work with more fluent English speakers will have the chance to encounter this new domain specific academic vocabulary employed by their peers. Auditory learners will be supported by the repetition of our new vocabulary. They will also profit from the oral nature of the discussion of the group work, a sorting activity. Visual learners are sure to benefit from the read-aloud, which is rich in illustrations, as well as our anchor charts. Finally, kinesthetic will be allowed to work in open spaces as is deemed appropriate.
VI. Activity description and agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Teacher Activity</th>
<th>Student Activity</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00-0:10</td>
<td>I will lead a discussion that reinforces our gains regarding heat and the water cycle.</td>
<td>Students will share what they have retained regarding the addition of heat to snow. They will deduce what needs to happen to reverse the process.</td>
<td>Chart Paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Markers</td>
</tr>
<tr>
<td>0:10-0:20</td>
<td>I will read aloud “What is the world made of? All about solids, liquids, and gasses!”</td>
<td>Students will listen to read aloud and pay attention for two definitions (matter and solid).</td>
<td>Same as above</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Book</td>
</tr>
<tr>
<td>0:20-0:35</td>
<td>I will introduce our sorting activity.</td>
<td>Students will complete the sorting activity.</td>
<td>Envelopes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worksheets</td>
</tr>
<tr>
<td>0:35-0:40</td>
<td>I will lead a brief discussion of the students’ sorting and categories.</td>
<td>Students will share their lists and reasoning.</td>
<td>Same as above</td>
</tr>
</tbody>
</table>

The main challenge I foresee is that students will fail to think creatively about their original groupings for the “non-solid” activity. Students will certainly be inclined to copy my model; I hope that with a little encouragement they can be guided toward more interesting groups along the lines of liquids and gasses. Students may also struggle to maintain an idea of what property makes a solid a solid; I will work to reinforce their understanding by repeating the definition and referring them to the anchor chart.

VII. List the Massachusetts Learning Standards this lesson addresses.

Massachusetts Frameworks for physical science (pg 64): 2. Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.

VIII. Reflection

The beginning of my lesson in which we reviewed the previous experiment was a great success. I was glad that I got the chance to follow up on Holly’s advice and provide students with a written scaffold for their understanding. Students easily generated the concept of heat when asked for the thing that changed the snow into water; additionally, they also were able to apply this knowledge and deduce that they could take away heat (or add cold) to reverse the process. I was so glad to see their understanding was so strong and so flexible. This logical reasoning is truly the work of scientists!

My students also enjoyed the read-aloud; I had only planned on reading the first twelve pages, and that was a good decision because the students were very engaged with the concepts at hand. We worked together to create definitions for matter and solid, which proved less
challenging than I had anticipated thanks to the book! The anchor chart proved an excellent assist in this regard as well. When students struggled during the sorting activity, I simply sent them to the anchor chart to think about what made a solid a solid.

The sorting activity was easy for some and hard for others. I wish I had differentiated better by having a more copious list. However, the smaller group of items allowed us to talk about and debate each one. When a student misplaced an item during our discussion, I allowed the class to make an argument one way or another. I wonder if it would be good to come back to the items on the “not-solid” list in the coming liquid and gas lessons. This may reinforce their understanding of what makes a solid different from the other states.

I had not foreseen that the last part of our sorting activity, to group the “not-solids,” would be such a telling task. This is really the bulk of where my assessment of their understanding from this lesson comes from, as we went over the “solid” v. “not-solid” lists as a group together. Given that I only gave minimal direction for the task of grouping the “not-solids,” this work is more demonstrative of their understanding. For example, several groups created unrelated categories:

• hot v. cold
• things that you eat and breath v. things you don’t eat and breathe.

Even though these aren’t necessarily on the mark, these groupings are fascinating. Other students generated more traditional groupings:

• Oxygen/air v. not oxygen/air
• things that we can breathe v. things that are a liquid
• things that are liquidy v. things that are not liquidy.

I can’t wait to use these final groupings as a jumping off point for our introduction to liquids! I look forward to validating their excellent scientific thinking and superb reasoning.