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

Our final lesson on matter will begin with a review of the states of matter, focusing on the properties of each. We will then conduct an oobleck experiment. Their participation in this activity and their completion of the worksheet will serve as the summative (performance based) assessment of the unit.

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

- Content: SWBAT apply their knowledge of the states of matter to a unique object.
- Language: SWBAT justify their hypotheses and conclusions in writing.

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

In this lesson, we will address the main content standard of the Massachusetts Frameworks for physical science (listed below). We will achieve the first by reviewing our gains throughout the unit regarding the properties of each state of matter. To measure their acquisition, we will challenge their preconceptions of these properties with oobleck, which seems to belong to more than one category. 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, solids, liquids, and gas correctly. Additionally, our scientists will continue to use a method in order to discern facts from experiments. This scientific method models the thinking and practice of all scientists. Lastly, they will work collaboratively to find answers to questions. 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. We will also continue to refer to our read-aloud text (listed below). 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 in our experiment; 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, students will be assessed by their contributions to a review of the unit material, which will reveal their retention of the definitions of matter, solid, and liquid. This will prepare them for their team work, which will require them to apply this information in a new context. This final, performance based assessment is both conducting the oobleck experiment and also completing the accompanying worksheet. This formal summative assessment measures their participation in the experiment and performance on the worksheet in which they have to use the scientific method to organize their ideas and discoveries.

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. During the experiment, high flyers will be provided with a more comprehensive version of the scientific method. 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 have a modified worksheet with less writing prompt and tasks; this worksheet also provides more space for illustrations. As always, I will emphasize model the correct use of 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. **Visual** learners are sure to benefit from our anchor charts. Finally, **kinesthetic** will be allowed to work in open spaces as is deemed appropriate. All students will enjoy the hands-on activity, which will ensure that minds are on too!
**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>0:00-0:15</td>
<td>I will lead the class in a review and make a graphic organizer that details the difference between gasses and liquids (definite/indefinite volume).</td>
<td>Students will participate in the review using our anchor chart as a tool to offer their prior and acquired knowledge.</td>
<td>Anchor Chart</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Markers</td>
</tr>
<tr>
<td>0:15-0:40</td>
<td>I will guide students through the oobleck experiment and point them to the portions of the worksheet to complete.</td>
<td>Students will play with the oobleck and complete the experiment.</td>
<td>Oobleck</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cleaning supplies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worksheets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Same as above</td>
</tr>
<tr>
<td>0:40-0:45</td>
<td>I will open the floor to any remaining questions and provide closure with a brief discussion.</td>
<td>Students will participate in the conclusive discussion.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

In our last lesson, students really struggled to tell the difference between a gas and a liquid. My challenge for this lesson will be really separating out these two states of matter. In order to achieve this, I will emphasize that the two do have something in common: that both liquids and gases can be “poured” and have an indefinite shape. I will be really explicit that liquids have a “definite volume” whereas gases most often do not.

**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**

My favorite part of this lesson has been going over the students’ responses to the Unusual Matter game! I wish I had built in a longer share out period, because the students did an excellent job of hunting for unusual matter! Perhaps in the future I will make the unusual matter and oobleck lesson go a bit longer and make a long list of things that go in each category. Overall I think that making a shared list and discussing what makes up a given category might’ve been a better choice than going through the whole scientific method again with the oobleck. That being said, I wanted summative, individual accountability for the material in the unit, and filling out our hypothesis, observations, and conclusions was a good way to achieve that.
What my students’ work reveals to me is that they have very good intuition about what makes a certain substance exist in a certain state. I think that if I had made them articulate each state’s properties then they might’ve had a bit more difficulty expressing themselves. However, they were quite creative about what they put on their unusual matter lists. I wonder if they would have enjoyed adding to other students’ categories. We could’ve done this as a whole class carousel activity, where the kids move around the room. That would’ve required more time, but oobleck could’ve been moved to a sixth lesson.

The students’ also excelled in the oobleck part of the lesson. Most students had a justification or piece of evidence for their hypothesis, and many were very clever in saying that the oobleck was both a solid and a liquid. Their observations demonstrated a strong grasp of sensory descriptions, as they used words that express touch and sight. Their conclusions were the ultimate summative part of the lesson. In this part, they described why their hypothesis was right or wrong. Here the students were challenged to demonstrate their knowledge of the properties of the three most famous states of matter in action. This applied situation allowed for the students to really grasp onto the bizarre situation that sometimes a substance is two things at once. The fact that many students recognized oobleck in writing as both a liquid and a solid depicts their flexibility as scientific thinkers and the growth in their understanding of matter specifically. So good to see their happy, smiling faces eagerly taking down the oobleck recipe at the end of class!