Performance Expectations - Topic: What are students going to learn?

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.

5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.
Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.

5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.
Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.

MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.
Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.
Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.

Phenomenon: What is the WHY behind the learning?

My Stomach Hurts!
Tell a story about when you had a stomach ache. What happened? How did you feel? What did you do to feel better? If we wanted to try and fix it with a seltzer tablet, should we use water or soda?

Do - Practices
Know - Disciplinary Core Ideas
Think - Cross Cutting Concepts

<table>
<thead>
<tr>
<th>Do - Practices</th>
<th>Know - Disciplinary Core Ideas</th>
<th>Think - Cross Cutting Concepts</th>
</tr>
</thead>
</table>
| *choose 1-2 Questioning Modeling Investigating Analyzing Computing Explaining Arguing Communicating | What DCIs are associated with this topic?  
- Life Science  
- Earth and Space Science  
- Physical Science  
- Engineering, Technology, and Science  
### PS1.A: Structure and Properties of Matter

- **A great variety of objects can be built up from a small set of pieces.** (2-PS1-3)

- **Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.** (5-PS1-1)

### PS1.B: Chemical Reactions

- **Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.** (MS-PS1-2)

- **Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy.** (HS-PS1-4)

### Energy and Matter

- **Objects may break into smaller pieces and be put together into larger pieces, or change shapes.** (2-PS1-3)

- **Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.** (HS-PS1-4)

### Scale, Proportion, and Quantity

- **Natural objects exist from the very small to the immensely large.** (5-PS1-1)

### Patterns

- **Macroscopic patterns are related to the nature of microscopic and atomic-level structure.** (MS-PS1-2)

---

**Differentiation for Students (SPED, ELD standards, Cultural Responsiveness)**
**CA Science Framework** My Stomach Hurts!

3D5E Learning Sequence Tool

**ELD Standards**
Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics (SL.6.1, 6; L.6.3, 6)
Evaluating how well writers and speakers use language to support ideas and arguments with details or evidence depending on modality, text type, purpose, audience, topic, and content area (RL.6.4-5; RI.6.4, 6, 8; RH.6.4-6, 8; RST.6.4-6, 8; SL.6.3; L.6.3, 5-6)

*Case Study Students*
Connection to relevant phenomena such as stomach aches and what different cultures do to treat stomach ailments.
# My Stomach Hurts!

## 3D5E Learning Sequence Tool

<table>
<thead>
<tr>
<th>5E</th>
<th>Group Talk Format</th>
<th><strong>Learning Activity</strong></th>
<th><strong>Student Work to Assess</strong></th>
<th><strong>Accommodations &amp; Modifications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engage</strong></td>
<td>Partner Talk</td>
<td><strong>Describe what the students will be doing and how they will be thinking about the concept.</strong></td>
<td>This captures student sense-making. Analyzing this provides a lens into student thinking. (written and oral work)</td>
<td>Place specific accommodations for each learning activity that will meet the needs of each of your diverse learners.</td>
</tr>
<tr>
<td><strong>Explore</strong></td>
<td>Partner Talk</td>
<td>Tell us a story of when you have had a stomach ache: Have students share and connect to an experience where they had a stomach ache. Share with a partner. Ask: What are some common remedies that student families use when they have a stomach ache?</td>
<td>Storyboard: Share snippets of a story and post it on the class wall. Think-Pair-Share: Listen for the different stories that students share</td>
<td>Prepare students with anxiety that this lesson is coming up soon. Giving them extra time beforehand to think of their personal story.</td>
</tr>
<tr>
<td><strong>Explain</strong></td>
<td>Small Group</td>
<td>Predict: Which cup do you think will dissolve the seltzer tablet first? Sprite or Water?</td>
<td>Activity Sheet: “My Stomach Hurts!” Dissolving in Water vs. Sprite Predictions Group Talk Individual Models</td>
<td>Provide graphic organizers and word banks for ALL students. Student that have visual impairments. Ask how can you tell the difference between the cups of liquid? What adjectives would you use to describe each liquid? Students with fine motor impairments, offer the tongs. Would this learning tool...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>At your tables, you have two cups, one with water and one with Sprite and two seltzer tablets. ● Timer: Decide which person will be the timer (preferably someone with time!) ● Sprite Seltzer Tablet: When the timer says go...drop the tablet in! ● Water Seltzer Tablet: When the timer says go...drop the tablet in! Observations: Use your senses (except for taste!) Record your observations below:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain</td>
<td>Partner Talk</td>
<td>Small Group</td>
<td>aide in you participating?</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>-------------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>What do you see?</strong>&lt;br&gt;<strong>What do you hear?</strong>&lt;br&gt;<strong>What do you smell?</strong>&lt;br&gt;<strong>What do you feel?</strong></td>
<td><strong>Model:</strong> Develop and use your model to describe how each tablet dissolved in each solution. Use your model to explain which solution dissolves the tablet faster.</td>
<td><strong>Model Revisions:</strong> Assess how students incorporated the reading and videos into their model revisions.</td>
<td>Suggest student with ADHD or Autism be time keepers, this is their strength.</td>
<td></td>
</tr>
<tr>
<td><strong>Incorporate your favorite reading strategy!</strong>&lt;br&gt;-CLOSE Reading&lt;br&gt;-Quiz, Quiz, Trade&lt;br&gt;Informational Videos/Text: ES/MS&lt;br&gt;<strong>Chemical Changes Video</strong>&lt;br&gt;<strong>Changing States of Water Video</strong>&lt;br&gt;<strong>Materials and Their Properties Slide Show</strong>&lt;br&gt;&lt;br&gt;<strong>MS/HS</strong>&lt;br&gt;<strong>ACS Water Chemistry Informational Text</strong>&lt;br&gt;<strong>Comparison of Water with Other Liquids</strong>&lt;br&gt;<strong>American Chemical Society Investigation</strong>&lt;br&gt;<strong>Effects of Temperature on Rate of Reaction</strong> (Alka Seltzer)&lt;br&gt;<strong>Can gases dissolve in water?</strong>&lt;br&gt;<strong>Water is a polar molecule</strong></td>
<td></td>
<td>Students with motor or writing fluency difficulties, offer voice to text technology to record their observations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consensus Model:</strong>&lt;br&gt;● Share your model with your small group&lt;br&gt;● Make sure each student has their turn</td>
<td>Offer a variety of reading levels.</td>
<td>Offer assistive technology, audio texts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Work ahead of time with co-teacher to modify or preteach vocabulary.</strong></td>
<td>During partner and small group reflection remind students of “whole body listening and respect”. A classroom expectation that you taught and set as a standard in September.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use object to pass around, to identify speaker.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Elaborate

**Small Group**

**Pose question:** What do you think will happen when we drop a seltzer tablet in vinegar?

**Predict:** Which cup do you think will dissolve the seltzer tablet first? Sprite, Water or Vinegar?

At your tables, you have three cups, one with water, one with Sprite, and one with vinegar and three seltzer tablets.

- **Timer:** Decide which person will be the timer (preferably someone with time!)
- **Sprite Seltzer Tablet:** When the timer says go...drop the tablet in!
- **Water Seltzer Tablet:** When the timer says go...drop the tablet in!
- **Vinegar Seltzer Tablet:** When the timer says go...drop the tablet in!

**Listen for discussion and predictions**

Provide extra wait time for ALL students to think before needing to share out to group.

**Use object to pass around, to identify speaker.**

### 3D5E Learning Sequence Tool

- After sharing your model to explain the dissolving, revise your model to see if there is anything you can add or modify.
- Come together to create a consensus model.
- Have each small group rotate and provide feedback for each consensus model. Add sticky notes for feedback on
  - **AGREE - I like _____**
  - **CLARIFICATION - I want to know more about _____**
- Have students go back to their original group model and discuss the feedback from their sticky notes.

**Listen for collaborative conversations**

**Look at feedback sticky notes**

**Listen for collaborative conversations**

**Assess group model components**
### CA Science Framework
#### My Stomach Hurts!
#### 3D5E Learning Sequence Tool

<table>
<thead>
<tr>
<th>Observations: Use your senses (except for taste!)</th>
<th>Record your observations below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you see?</td>
<td></td>
</tr>
<tr>
<td>What do you hear?</td>
<td></td>
</tr>
<tr>
<td>What do you smell?</td>
<td></td>
</tr>
<tr>
<td>What do you feel?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluate</th>
<th>Whole Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have students revise their initial model including the model with vinegar.</td>
<td>Have students use their models to conclude which home remedy should be used in treating a stomach ache. Use evidence from their observations and reasoning from informational text to draw arguments for each liquid.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final Consensus Model</th>
<th>Provide word banks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student-led class discussion</td>
<td>Provide options of presentations:</td>
</tr>
<tr>
<td></td>
<td>● Oral presentation</td>
</tr>
<tr>
<td></td>
<td>● Visual presentation (drawing or 3D model)</td>
</tr>
<tr>
<td></td>
<td>● Technology presentation (slideshow)</td>
</tr>
</tbody>
</table>

Provide word banks.

Provide options of presentations:

- Oral presentation
- Visual presentation (drawing or 3D model)
- Technology presentation (slideshow)

Allow time for students to prepare what they are going to share.