Demystifying Models: Approachable and Practical Modeling in the Science Classroom
HELLO!

Thank you for attending our session!

A Quick Introduction from Your Presenters

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Session Objective:
The goal of this session is to provide attendees with practical visual modeling concepts that can be used in a variety of ways and can be adaptable to fit all classroom needs.

Common Vocabulary for Today’s Presentation:
Phenomenon: a natural/observable event
Visual Model: a scientific diagram outlining a phenomena and new learning over time
Let's start with getting to know you and what you need from this session!

Question 1: What grade level(s) do you teach?

Corner 1: K-4
Corner 2: 5-8
Corner 3: 9-12
Corner 4: Other (Specials, Support Staff, Admin., etc.)
Let’s start with getting to know you and what you need from this session!

Question 2:
What is your comfort level with visual modeling?

Corner 1: I have never have done a model before.
Corner 2: I have some experience using models with students.
Corner 3: I use models regularly in my classroom.
Corner 4: I could teach someone else how to use models.
Let’s start with getting to know you and what you need from this session!

**Question 3:**

What are your areas of struggle with visual models?

**Corner 1:** I need help getting started in using them.

**Corner 2:** Differentiation

**Corner 3:** Students “not knowing what to do” (Expectations)

**Corner 4:** Assessing models
Modeling is a way to see what your students are thinking. The models should reflect their learning over time by communicating the science concepts covered in class.
Modeling in Science!

A scientific visual model should:

★ Be specific to one phenomenon
★ Be used to explain and predict patterns within a phenomenon
★ Include labeled pictures/diagrams to help illustrate student thinking about the cause of the phenomenon
★ Shows learning change over time (though colors, symbols...)}
Ways to Use Models in Your Classroom Routines:

- Pre-assessments
- Post-assessments
- Station activities
- Whole-class discussions
- Talk circles
- Mini-lessons
- “Anchoring Phenomena” for Unit
- Spiral Review
- And many more!!!
Getting started with our models!

Today’s Questions

What is happening when the boiling water hits the cold air?

If you were in Corner 1, please use page 4 of the packet.
If you were in Corner 2, please use page 4 of the packet.
If you were in Core 3, please use page 3 of the packet.
If you were in Corner 4, please use page 2 of the packet.
Today’s Phenomenon

Today’s Question:
What is happening when the boiling water hits the cold air?

https://www.youtube.com/watch?v=B3VHGTQQs-4&feature=youtu.be
Exemplary Scientific Explanations at Various Grade-Levels

*The model should serve to explain the scientific concepts taught in class*

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Essential Components of the Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>*showing idea of Water Cycle&lt;br&gt;identifying condensation and evaporation</td>
</tr>
<tr>
<td>5</td>
<td><em>All of Grade 3, and identifying a phase change as a physical change caused by temperature&lt;br&gt;showing how the particles look in each state of matter</em></td>
</tr>
<tr>
<td>Middle School</td>
<td>*When water particles are heated, they begin to move faster until they gain enough energy to change state.&lt;br&gt;<em>When water particles are cooled, they slow down and their energy loss causes a phase change.</em></td>
</tr>
<tr>
<td>High School</td>
<td><em>All of Middle School, and describing intermolecular forces between water particles</em></td>
</tr>
</tbody>
</table>
"What is happening with the boiling water when it hits the cold air?"

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Features Correctly Represented</th>
<th>Features Missing / Incorrectly shown</th>
<th>Order and Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evidence and connection to the water cycle</td>
<td>Something new was created</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changing state of matter</td>
<td>The water froze in the pot, and then it was thrown into the air</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evidence the water was boiling and the water froze</td>
<td>No/incomplete explanation of how water shifted phases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding of differences in before, during, and after</td>
<td>Missing Labels or unclear explanation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evidence of how the water molecules act in each stage of matter</td>
<td>Wrong vocabulary use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connect systems, components</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Student Modeling Rubric

**Student/Group Name(s):**

<table>
<thead>
<tr>
<th>Category</th>
<th>4: Exceeds Expectations</th>
<th>3: Proficient</th>
<th>2: Approaching</th>
<th>1: Beginning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detail</strong>&lt;br&gt;How well does the model match the actual phenomenon?&lt;br&gt;Is the model complex or simple?</td>
<td>Few labels and/or arrows are present in the model to show the science ideas to explain the phenomenon. The labels and/or arrows are correct and easy to understand.</td>
<td>Many labels and/or arrows are present in the model to show the science ideas to explain the phenomenon. The labels and/or arrows are correct and easy to understand.</td>
<td>Very few labels and/or arrows are present to show the science ideas to explain the phenomenon.</td>
<td>No labels and/or arrows to show the science ideas behind the phenomenon.</td>
</tr>
<tr>
<td><strong>Predictive</strong>&lt;br&gt;How well can the model be used to make predictions based on evidence?</td>
<td>If the same phenomenon were to happen in the future, the model can be used to make a reasonable prediction based on evidence. Very little scientific vocabulary is used.</td>
<td>If the same phenomenon were to happen in the future, the model can be used to make a reasonable prediction based on evidence. Very little scientific vocabulary is used.</td>
<td>If the same phenomenon were to happen in the future, the model can be used to make a reasonable prediction based on evidence. Very little scientific vocabulary is used.</td>
<td>The model is not an accurate representation of the phenomenon.</td>
</tr>
<tr>
<td><strong>Accuracy</strong>&lt;br&gt;How well does the model match the actual phenomenon?&lt;br&gt;Is the model complex or simple?</td>
<td>The model is an accurate representation of the phenomenon. The model is a somewhat accurate representation of the phenomenon.</td>
<td>The model is an accurate representation of the phenomenon.</td>
<td>The model is a somewhat accurate representation of the phenomenon.</td>
<td>The model is not an accurate representation of the phenomenon.</td>
</tr>
<tr>
<td><strong>Conclusiveness</strong>&lt;br&gt;How well does the model support the conclusion?</td>
<td>The model clearly communicates the student/group’s thinking to others. It is neat, organized, and easy to follow.</td>
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<td>The model clearly communicates the student/group’s thinking to others. It is neat, organized, and easy to follow.</td>
<td>The model does not communicate the student/group’s thinking.</td>
</tr>
<tr>
<td><strong>Revisions</strong>&lt;br&gt;How well have you revised your model?</td>
<td>The model has been revised to include new understandings and/or new evidence. The revisions are clearly shown.</td>
<td>The model has been revised to include new understandings and/or new evidence. The revisions are clearly shown.</td>
<td>The model has not been revised to include new understandings and/or new evidence. The revisions are not clearly shown.</td>
<td>The model has not been revised.</td>
</tr>
</tbody>
</table>

[Link to Document: https://tinyurl.com/vd7awqn](https://tinyurl.com/vd7awqn)
Breakout Sessions!
Student Work Sample Gallery Walk

https://docs.google.com/presentation/d/1eCQTMXxMM4l0__vz_tuGssGkc0FCSXm_sZwjM0Hy3Q/edit#slide=id.p
THANKS!

We hope you enjoyed learning about models!

Any questions?