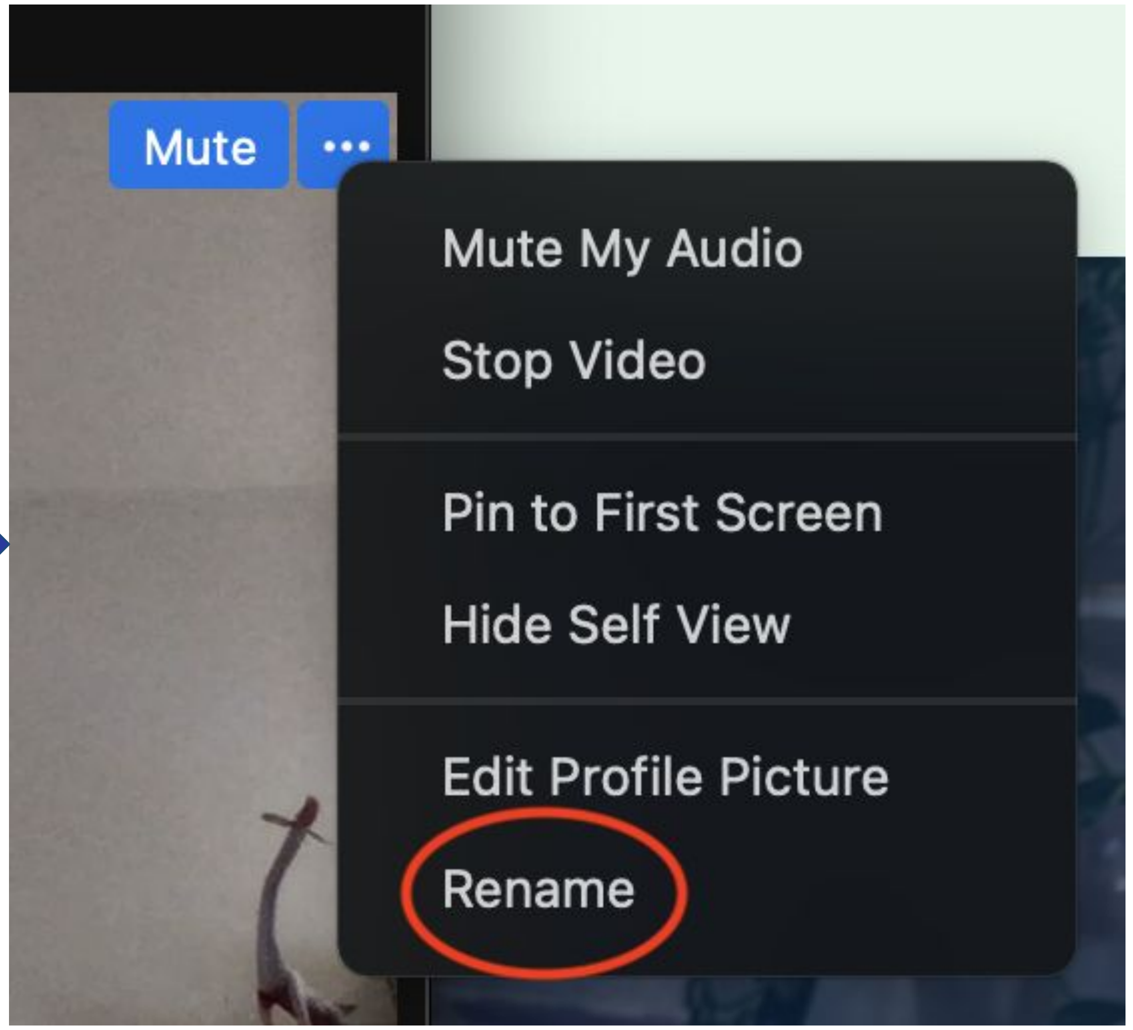
Rename yourself with your preferred grade band:

- Add an “**E**” before your name for Elementary Breakout
- Add a “**M**” before your name for Middle School Breakout
- Add a “**H**” before your name for High School Breakout

How to change your name:
Hover over your face and when the three dots appear, click on them. Choose Rename from the drop down menu.



ILLINOIS STATE BOARD OF EDUCATION

REGIONAL OFFICE OF EDUCATION #47
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SCIENCE EDUCATORS SESSION 4:

Models in Motion: Helping Students Make Their Science Thinking Visible

Illinois Science Capacity Builders Series

CONTEXT , INTRODUCTIONS, and ROLES:

October - June 2026 Professional Learning

Synchronous virtual sessions, Asynchronous virtual sessions (spring 2026), Face to Face Session (June 2026). All professional learning supported by funds through the Illinois State Board of Education.

IL SCIENCE STEERING COMMITTEE

Meagan Budke, ISBE

Anji Garza, PD & Ed Service Director, ROE 47 (Tech, Chat)

Heather Galbreath, 6th Grade Science Teacher Galesburg, IL

Brian Gibbs, Educator, Bradley School District 61

Sarah Meador, Director of ROE Services, ROE 8

Dawn Novak, Professional Learning Designer, Northwestern University

Nate Nugent, High School Science Teacher, Streator, IL

Kristin Rademaker, Professional Learning Specialist, NSTA

Misty Richmond, Middle School Science Teacher, CPS

Richard Stokes, University of Illinois - Springfield

Nicole Vick, Curriculum Developer, Northwestern University

You! Breakout Participant, Speaker

Purpose & Desired Outcome

Purpose

To deepen your understanding of the Illinois Science Standards, build your capacity to teach science, and support greater student success.

Desired Outcome

By the end of this meeting we will have:

- Experience the science and engineering practice of Developing and Using Models from a K–12 student perspective.
- Create, revise, and refine models to represent their own understanding of phenomena.
- Explore how modeling supports sensemaking and conceptual progression across grade levels.
- Identify instructional moves that make student thinking visible and actionable.
- Leave with ready-to-use modeling routines, templates, and strategies for immediate classroom implementation.

Participant Guidelines

- Cameras on if possible
- Participate though chat, hands up feature, and breakout sessions
- Resist the temptation to multitask
- Take care of your own needs

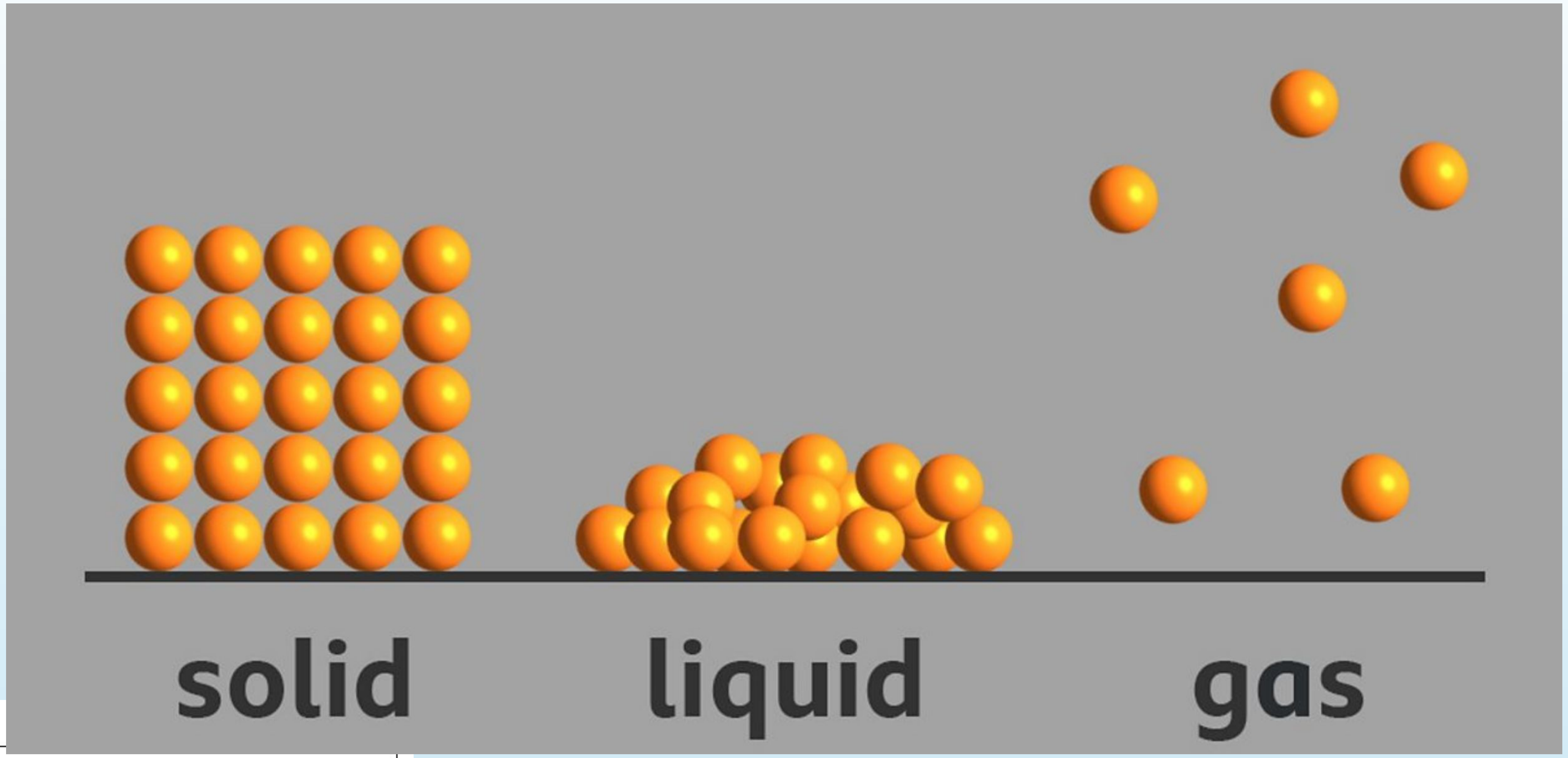
Please rename yourself and include your grade level. e.g. 2nd Grade, Anji Garza.

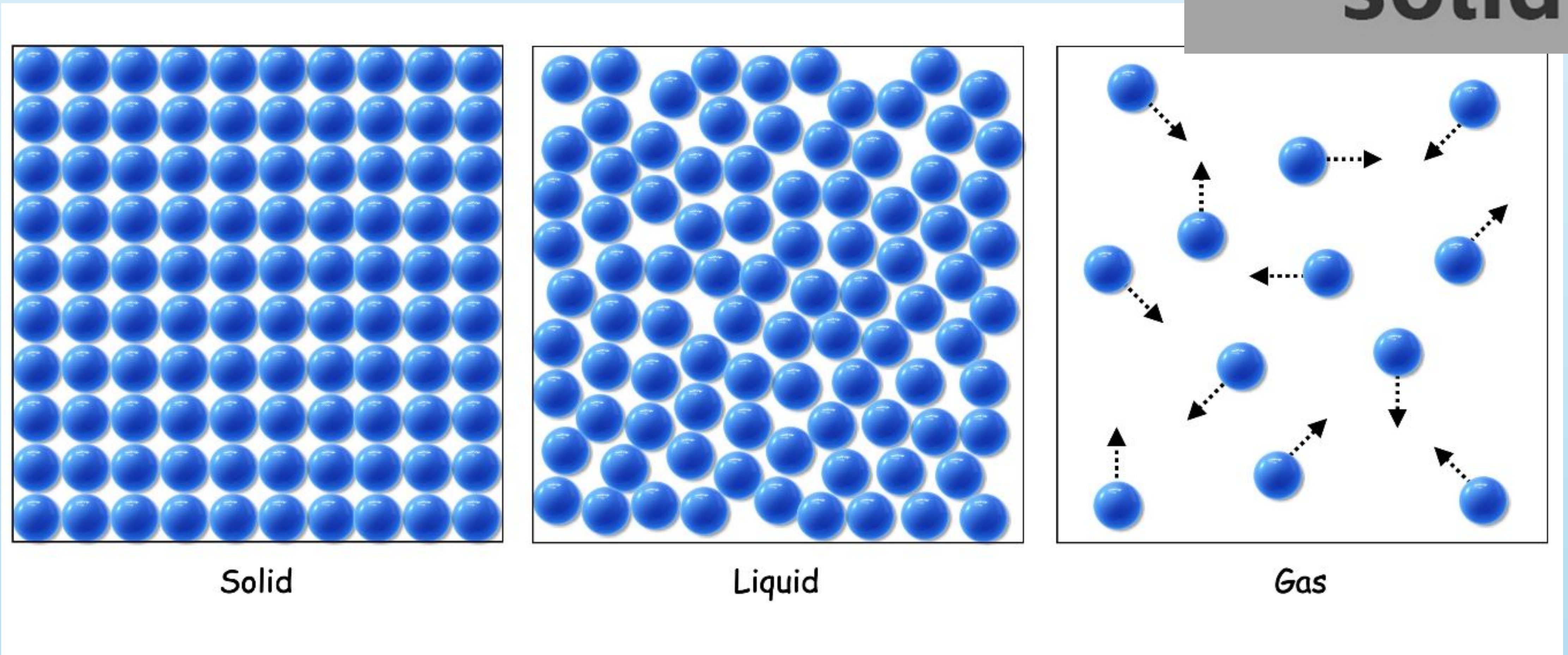
Is This a Model?

- Yes! 👍
- No! 👎
- It Depends 🤔

What We Mean by Modeling: Is this a Model?

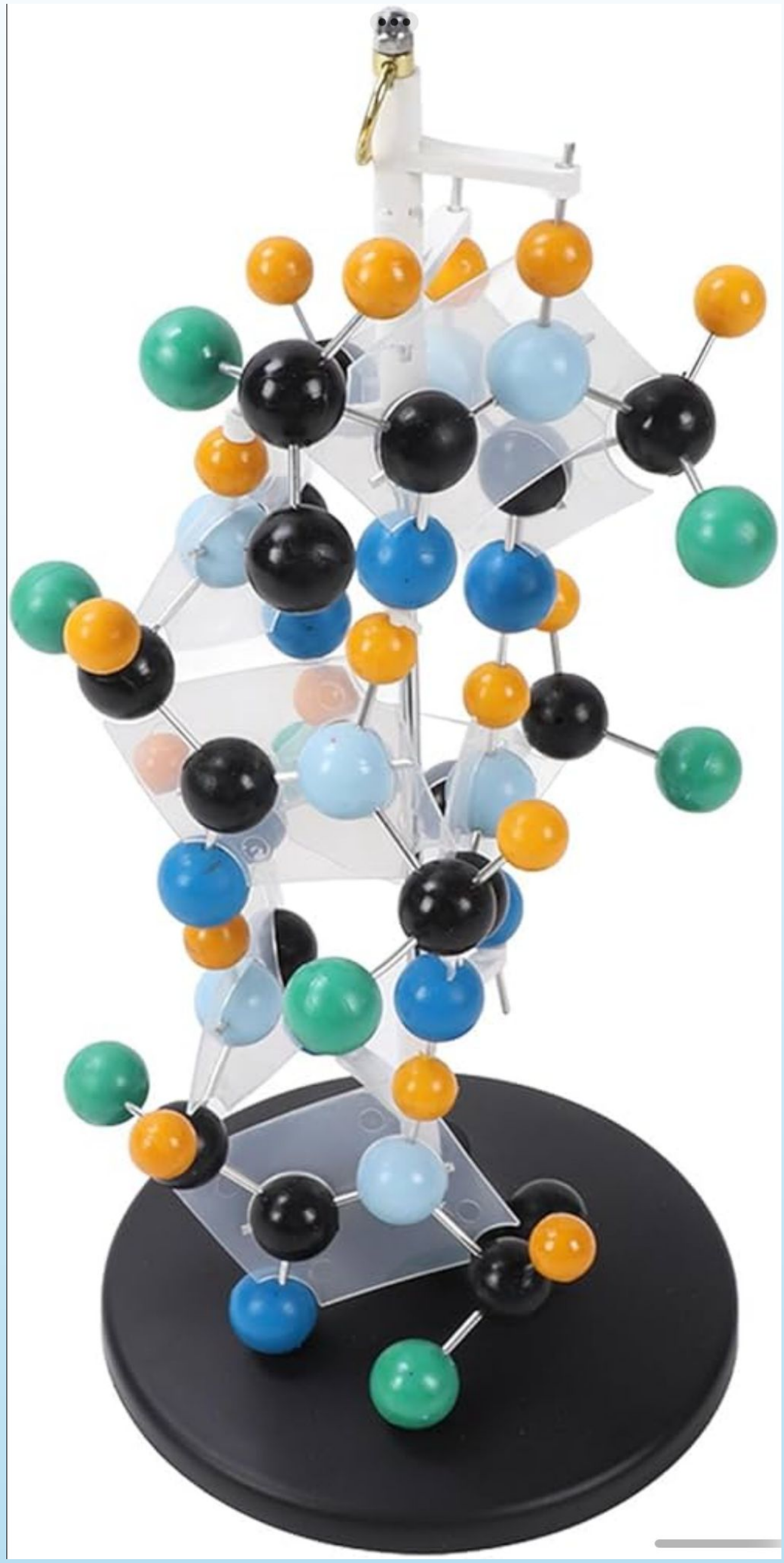
Is this a model? 👍 / 👎 / 🤔





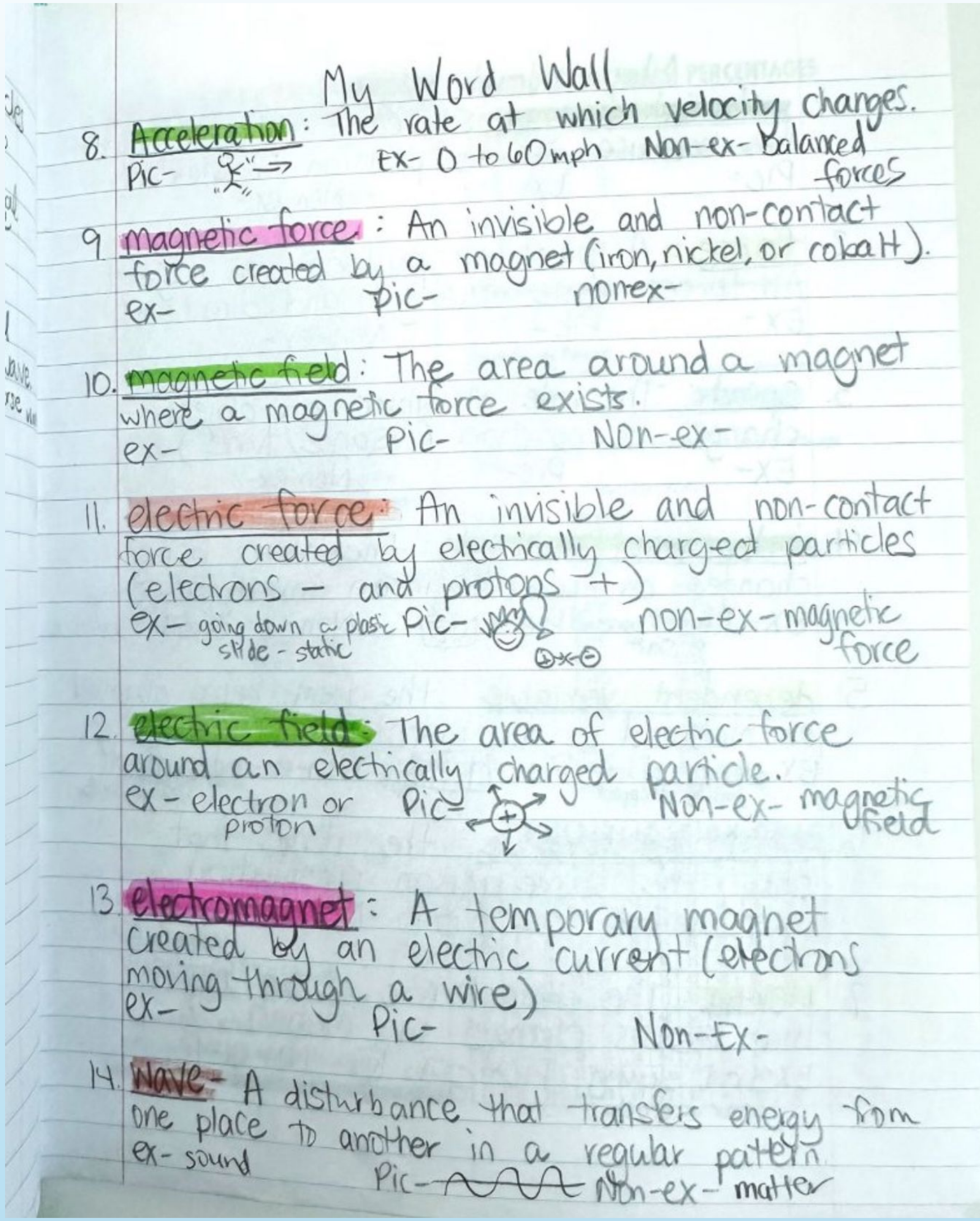
What We Mean by Modeling: Is this a Model?

Is this a model? 👍 / 👎 / 🤔



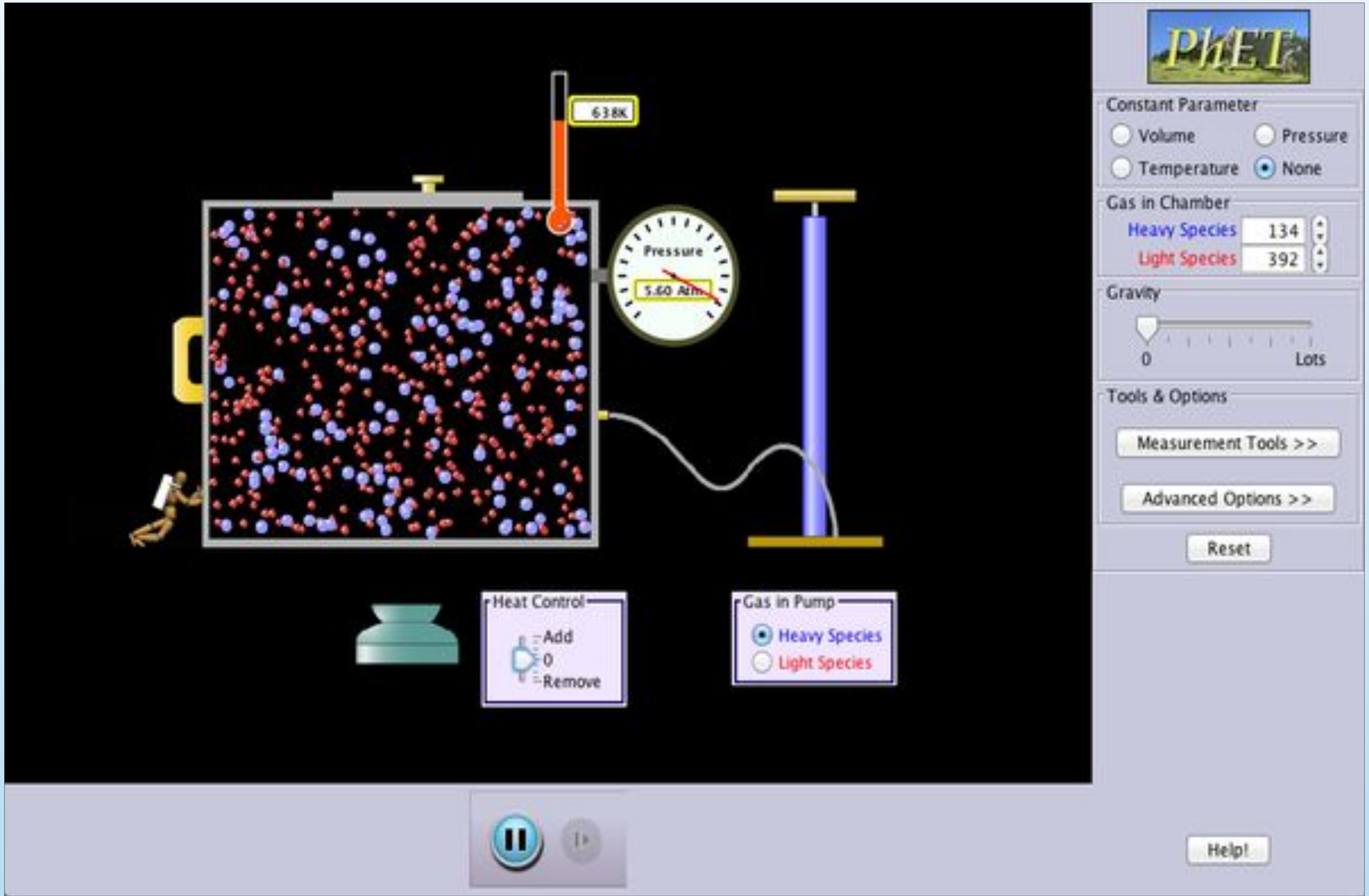
What We Mean by Modeling: Is this a Model?

Is this a model? 👍 / 👎 / 🤔

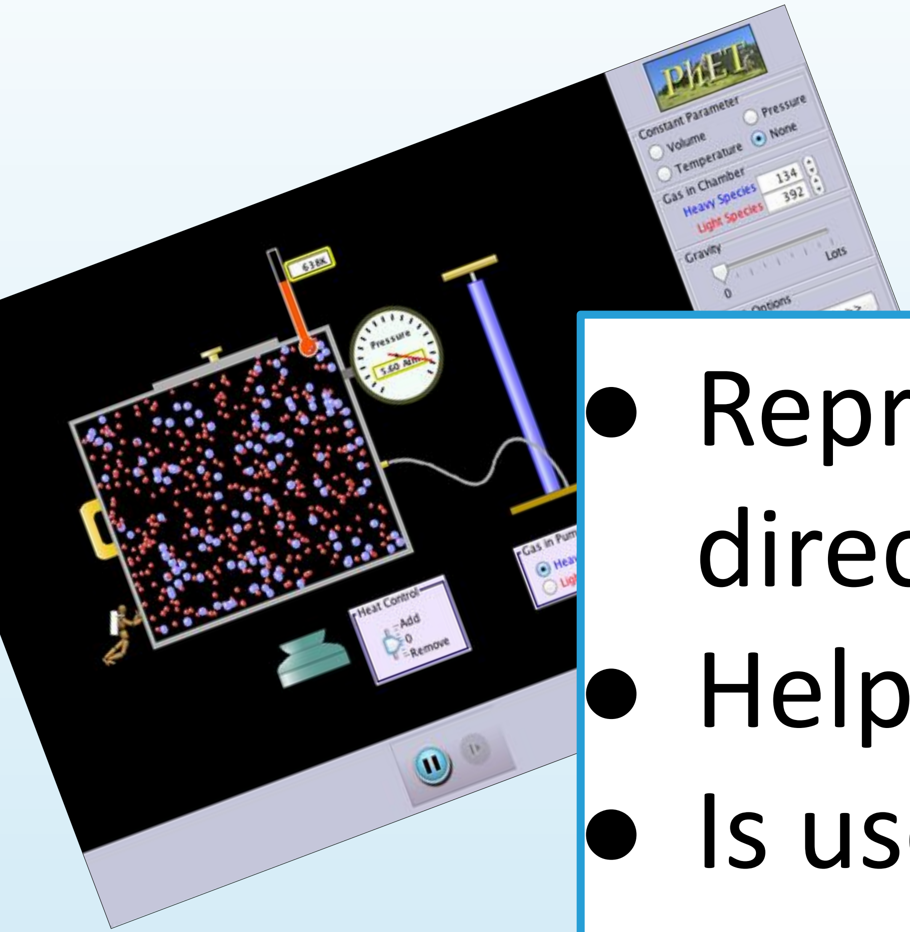


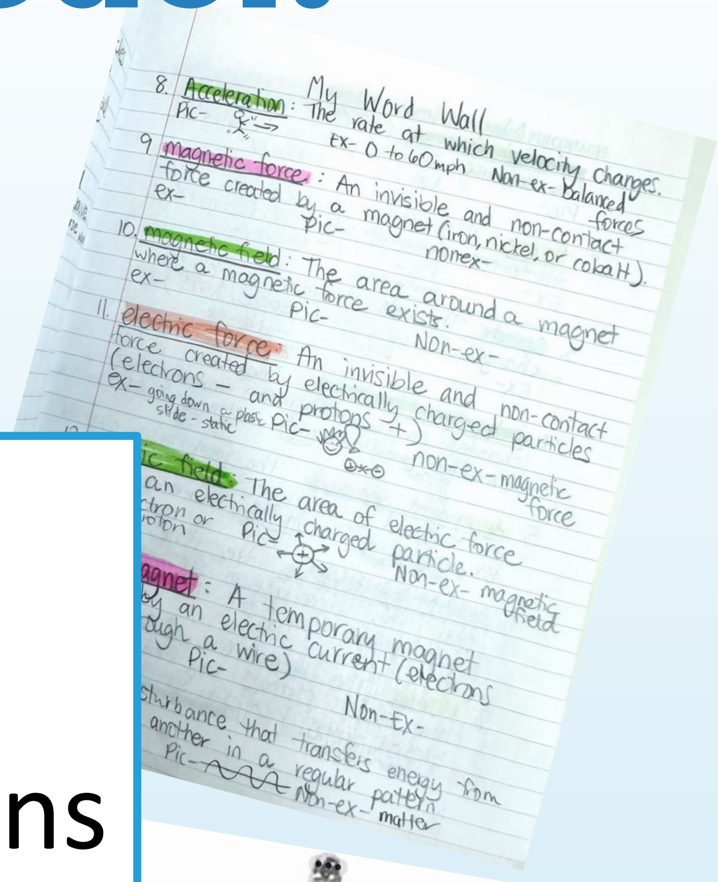
What We Mean by Modeling: Is this a Model?

Is this a model? 👍 / 👎 / 🤔

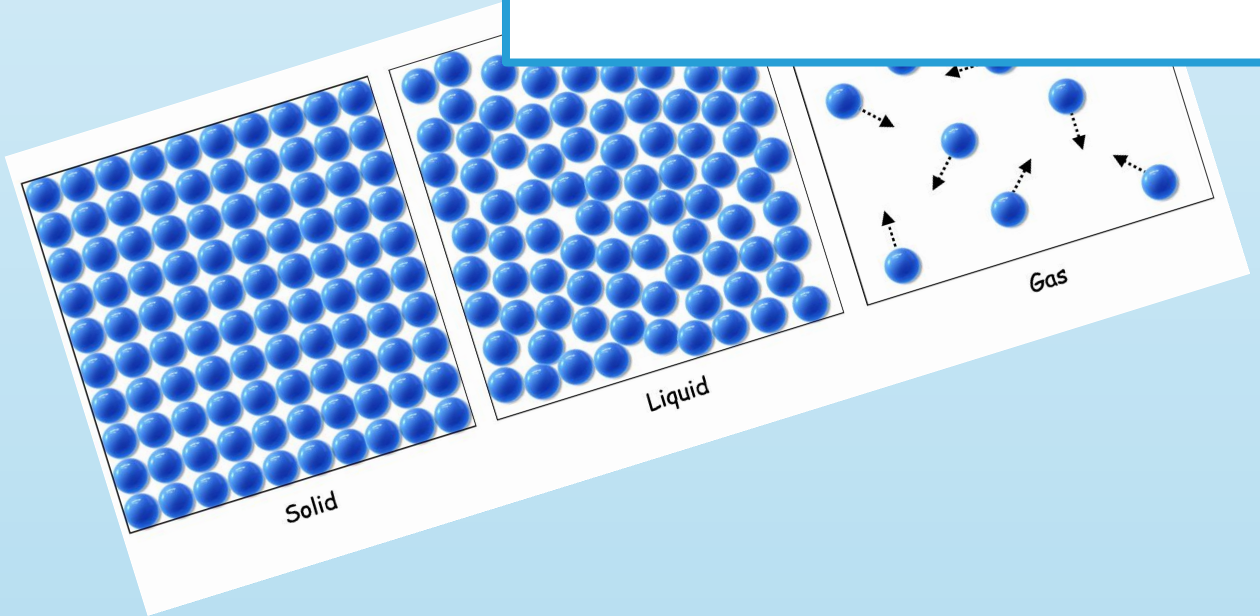


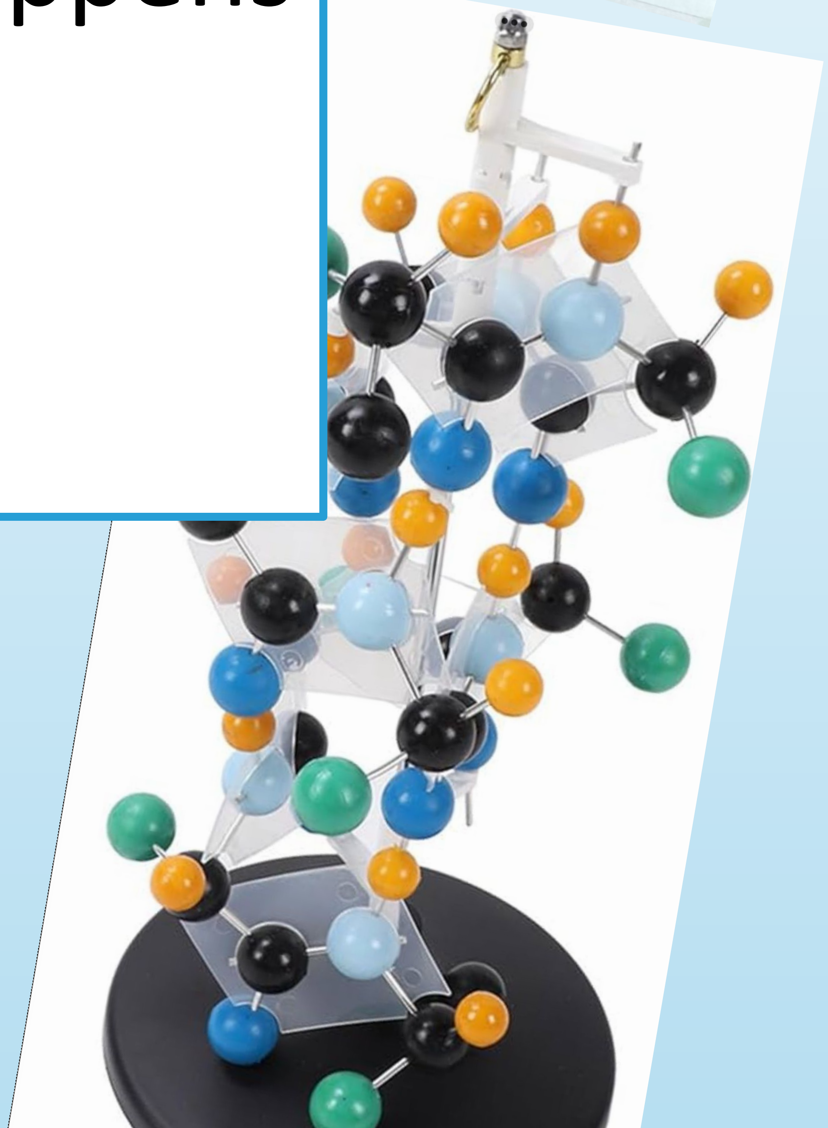
What Makes Something a Scientific Model?





- Represents something hard to see or experience directly
- Helps us explain how or why a phenomenon happens
- Is used to think, test ideas, or make predictions
- Is incomplete on purpose
- Changes over time as evidence changes





From Experience › Language › Instruction

What We Just Did

- Made ideas visible
- Treated ideas a revisable
- Used tentative language to explore ideas
- We learned through disagreement

What We're Doing Now

- Connecting experiences to modeling practice
- Looking at how teachers support them
- Seeing how models grow
- Connecting to classroom routines

Experience Developing & Using Models as a Student

20
minutes

Unit Overview

Unit 2.2 Structure & Properties of Matter

How can we design a new toy?

Unit Overview

7.1 Chemical Reactions & Matter

How can we make something new that was not there before?

Unit Overview

C.3 Molecular Processes in Earth Systems

How can we find, make, and recycle the substances we need to live on and beyond Earth?

Progression Reflection Jigsaw

- Let's zoom out!

	Grades K-2	Grades 3-5	Grades 6-8	Grades 9-12
Physical Science				
PS1: Matter and Its Interactions				
PS1.A: Structure and Properties of Matter	• Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1) • Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3) • 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 shows 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; the effects of air on larger particles or objects. (5-PS1-1) • The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2) • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)	• Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) • Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2), (MS-PS1-3) • Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4) • In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) • Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1) • The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)	• Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1) • The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-1),(HS-PS1-2) • The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3),(secondary to HS-PS2-6) • Stable forms of matter are those in which the electric and magnetic field energy is minimized. A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4)

Progression Reflection Jigsaw

15 minutes

Think About These 3 Things (within your grade band):

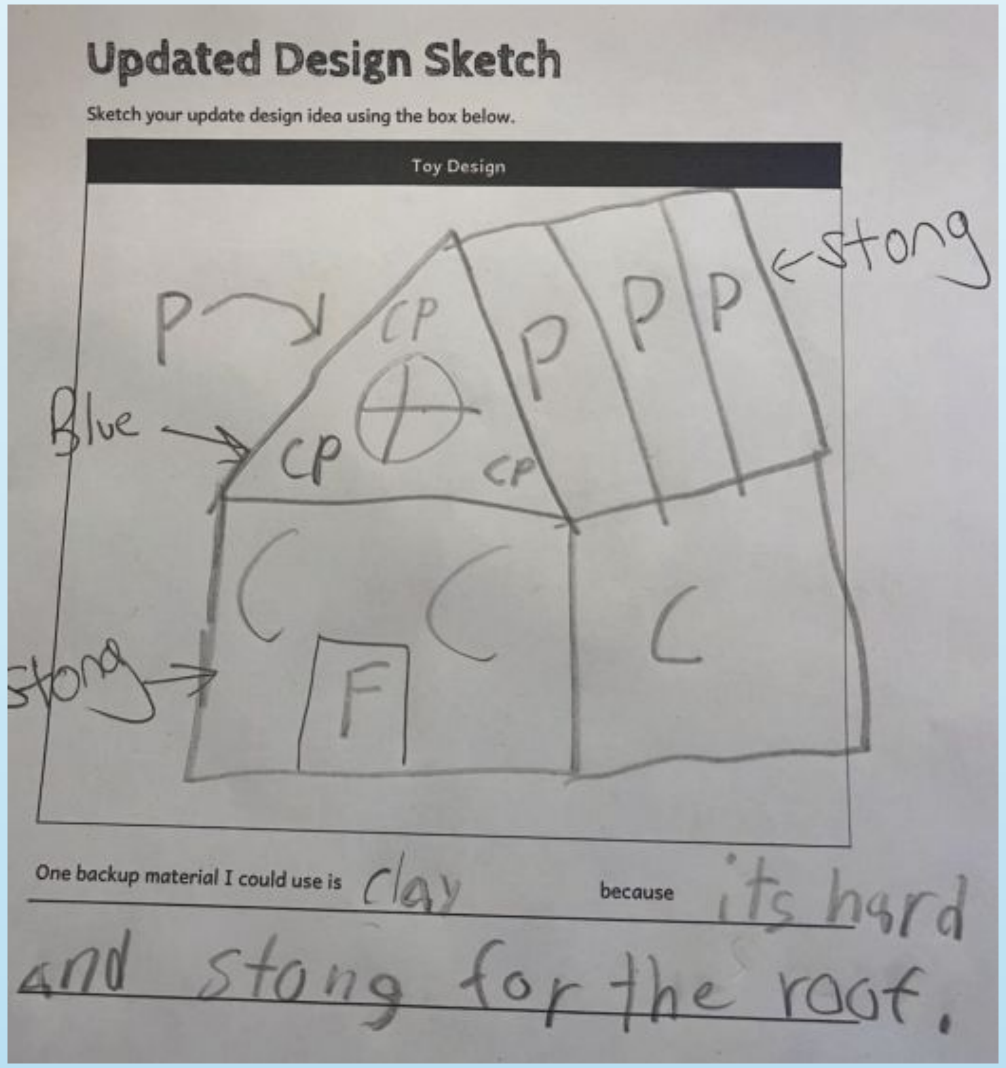
1. What do these models do?
2. What experiences make those models possible?
3. How does this build on earlier grades OR prepare them for later ones?

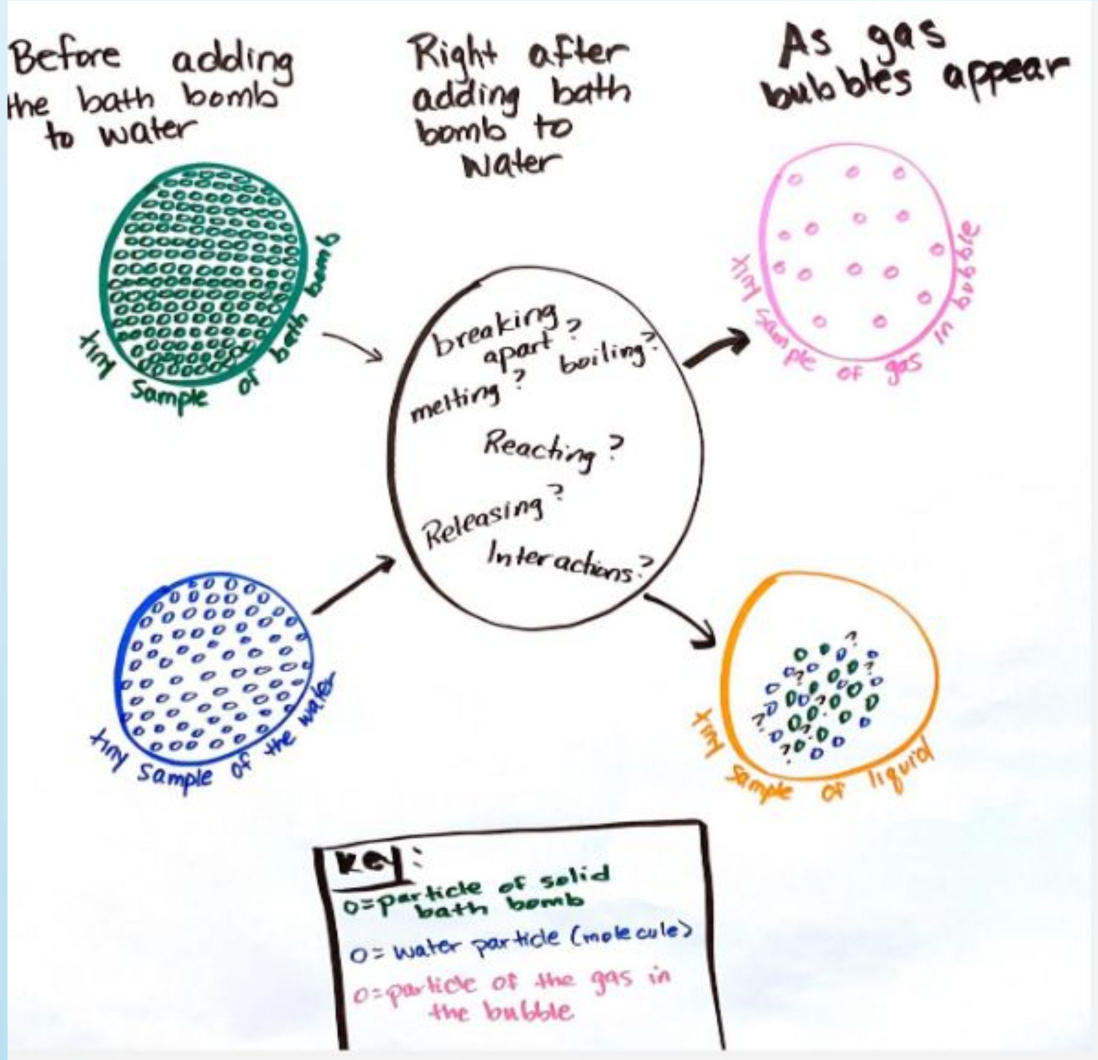
	Grades K-2	Grades 3-5	Grades 6-8	Grades 9-12
Physical Science				
PS1: Matter and Its Interactions				
PS1.A: Structure and Properties of Matter	• Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1) • Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3) • 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 shows 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; the effects of air on larger particles or objects. (5-PS1-1) • The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2) • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)	• Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) • Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2), (MS-PS1-3) • Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4) • In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) • Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1) • The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)	• Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1) • The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-1),(HS-PS1-2) • The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3),(secondary to HS-PS2-6) • Stable forms of matter are those in which the electric and magnetic field energy is minimized. A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4)

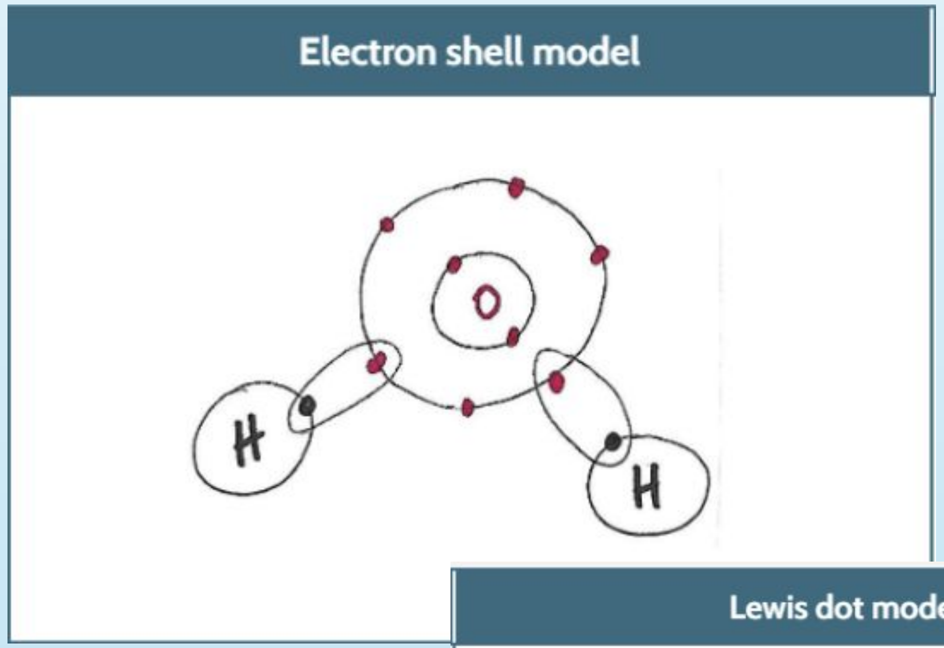
But, our standards are three dimensional - so how do these work together?

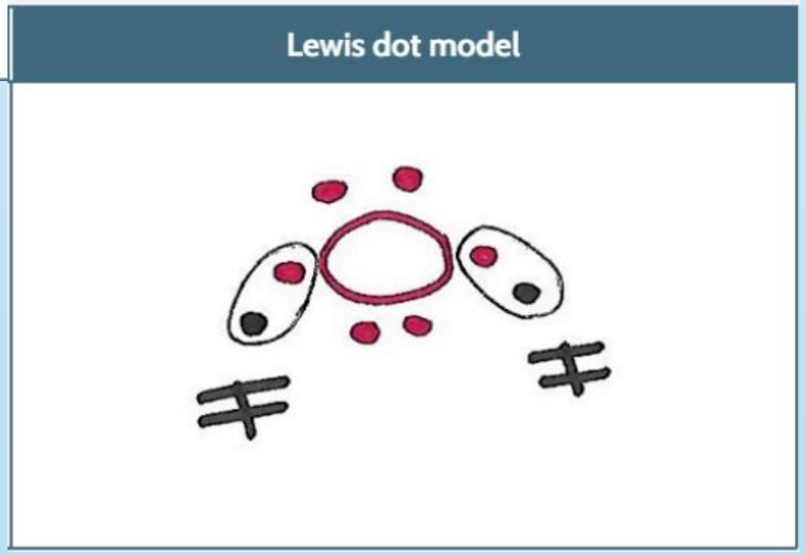
Unmute or in the chat:

What connections do you see between these two elements for these models we worked with today?









What tools are there to support student development of models?

Make a choice board? (buffet of teacher moves to support modeling?)

Individual Sensemaking & Reflection

Protects thinking time and helps students name tentative ideas.

- Voice Memo: 2-Sentence Summary
- Exit & Entry Tickets
- Pre-Write → Notes → Post-Write

Collaborative Talk Structures

Varies who students talk with and how ideas circulate.

- Think–Pair–Square
- Small Group Roles
- Discussion Diamond
- Four Quadrants/Voting Chips
- Idea Coaching

Public & Revisable Thinking

Makes thinking visible, shared, and easy to revise

- Standing Whiteboards
- Model Gallery Tour / Feedback
- All-Day Post-Its

Movement & Positioning

Uses physical movement to surface thinking and commit to ideas.

- Take It or Leave It
- Agree-Disagree Line
- Four Corners
- Share-Trade
- Three Stay, One Stray

What is one strategy you read about that you want to try?

Do you have strategies you use to share with us?

What is one strategy you read about that you want to try?

Do you have strategies you use to share with us?

What is one strategy you read about that you want to try?

Do you have strategies you use to share with us?

What tools are there to support student development of models?

What is one strategy you would like to try with your students in the next week or so?

What questions do you have?

What additional strategies do you have to share with us?

Individual Sensemaking & Reflection *Protects thinking time and helps students name tentative ideas.*	Collaborative Talk Structures *Varies who students talk with and how ideas circulate.*
• Voice Memo: 2-Sentence Summary • Exit & Entry Tickets • Pre-Write → Notes → Post-Write	• Think–Pair–Square • Small Group Roles • Discussion Diamond • Four Quadrants/Voting Chips • Idea Coaching
Public & Revisable Thinking *Makes thinking visible, shared, and easy to revise*	**Movement & Positioning** *Uses physical movement to surface thinking and commit to ideas.*
• Standing Whiteboards • Model Gallery Tour / Feedback • All-Day Post-Its	• Take It or Leave It • Agree-Disagree Line • Four Corners • Share-Trade • Three Stay, One Stray

Next Steps

- Follow up email from Anji Garza, includes slides, agenda, and video recording
- Encourage your teachers to attend the educator sessions each month.
- Join us for the next session!

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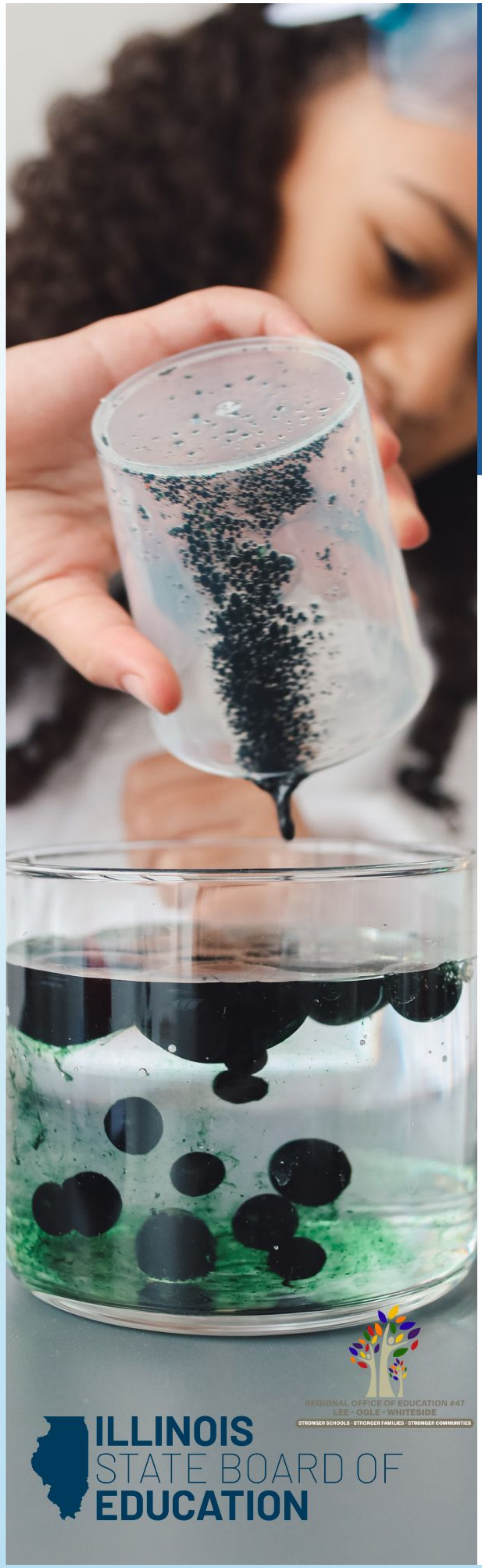
SPARKING CURIOUSITY

CULTIVATING STUDENT-DRIVEN QUESTIONS IN SCIENCE

In this interactive session, teachers will experience the science practice of Asking Questions from the perspective of their students. Participants will engage in phenomena-based tasks that spark curiosity, generate investigable questions, and refine those questions through collaborative routines. By functioning as learners, teachers will develop a clearer understanding of how questioning supports sensemaking and drives investigations at different grade levels. Educators will leave with questioning structures, talk moves, and classroom-ready tools to empower students to lead their own learning.

MONDAY
9 FEBRUARY 2026
4:00 – 5:30 P.M.
ZOOM

REGISTER NOW



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EVIDENCE IN ACTION: SUPPORTING STUDENTS IN MAKING SCIENCE CLAIMS THAT STAND

In this session, teachers will immerse themselves in the science practice of Constructing Arguments from Evidence by working through phenomena as students do. Participants will gather and analyze evidence, develop claims, and engage in structured argumentation routines to justify their thinking. By experiencing the practice firsthand, teachers will better understand how students build evidence-based explanations across grade levels and what supports strengthen their reasoning. Attendees will leave with CER tools, discourse routines, and practical strategies for elevating student argumentation in the classroom.

Monday, March 9, 2026

4:00 - 5:30 p.m.
Zoom

Register Now

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Making Meaning from Data:

Building Student Science Skills in Analysis and Interpretation

In this data-rich session, teachers will experience Analyzing and Interpreting Data from the perspective of K–12 students. Participants will work with multiple forms of data, identify patterns, construct visual representations, and make evidence-based interpretations to explain phenomena. By engaging in the practice as learners, teachers will better understand the developmental progression of data skills and what scaffolds help students make meaning from information. Educators will leave with data routines, graphic organizers, and ready-to-use tools that support student success in data sensemaking.

Monday, April 20, 2026
4:00 - 5:30 p.m.
Zoom

Register Now

This session is offered free of charge,
made possible by funding from the Illinois State Board of Education.

Meeting Evaluation

PLUS

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DELTA

-

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THANK YOU!