Do the Science

Northwest Educational Service District 189
Together We Can
Math & Science Collaborative Inquiry Project

Instructional materials (text; kit) Reading selections for each: solids, liquids, gases **Grade Level:** 6-8

Lesson: Particle Movement in Solids, Liquids, & Gases

Big Idea:
Solids, liquids, and *gases* differ in the *motion* of individual *particles*. In *solids, particles* are packed in a nearly rigid structure; in *liquids*, *particles* move around one another; and in *gases, particles* move almost independently. 6-8 PS2E

Lesson Learning Target:
I can explain how the motion of particles differs in three states of matter: solids, liquids, and gases.

Common Misconceptions:

Success Criteria: Students can explain in words and pictures that

- Particles in a solid are vibrating in place. A solid has a definite shape and volume.
- Particles in a liquid are fluid and flow around one another. The volume of a liquid is definite and does not change. The shape of a liquid conforms to its container; therefore a liquid does not have a definite shape.
- Particles in a gas are spread apart and move freely. A gas has neither a definite shape nor a definite volume. A gas expands or compresses to fit within its container.

Vocabulary:
definite, volume, shape, matter, solid, liquid, gas, particles

Elicitation Activity*:	**Talk structures/Discourse techniques:**
Review *matter* and *particles* Whiteboard: Groups brainstorm the characteristics/properties (Discuss meaning of "characteristic") of a solid, a liquid, and a gas, then without looking in textbooks, write a description of each state of matter. Have groups keep these descriptions to add to and/or adjust later in the lesson.	Teacher to class/review Small group/discussion and written description
Topic introduction/lesson Activities:	
Introduce learning target: I can explain how the motion of particles differs in three states of matter: solids, liquids, and gases.	Teacher to class/directions
Explore (Inquiry stage: Students work together to investigate and question) *Skits:* differences between solid, liquid & gas --4 groups --each group prepares 3 skits of 15 seconds or less --table groups are split like a jigsaw	Teacher to class/directions
--10 minutes to prepare all 3 skits (suggest pacing—give them prompts to move on to preparing the next skit every 3 minutes—use buzzer?)	Small group discussion/acting

Explain (Provide more information, i.e.: reading, video, discussion, interactive notes) Students are back with table group. *Reading purpose:* You are going to read in your text to add to your understanding of solids, liquids, and gases. Without a purpose, students will read aimlessly. • Review meaning of the words *definite* and *volume*. • Hand out the reading scaffold. Tell the students that as they read, they are to fill in the information boxes on the worksheet using words from the text. • Point out the section each group will read. Point out the illustrations that show the particles in each state of matter. Tell the students that these are important to study. They should also read the caption. • Divide the students into 7 groups. 2 groups read about solids, 2 groups read about liquids, and 3 groups read about gases. • Each student fills in the information on the reading scaffold for the section on matter he/she reads. Circulate to assure student confidence in reading and taking notes on the selected text. • The two solids/liquids/gases groups get together and refine their whiteboard descriptions of their state of matter. • Each group reports (one person shares whiteboard while another shares scaffold under doc cam) and the rest of the students fill in their scaffold worksheet. **Elaborate** (Students apply knowledge to new situations) • Display three balloons: one with ice, one with water, one with air. • Personal journal prediction: have students predict what will happen when each balloon is released and, using what they know about particle behavior in each state of matter explain their reasoning. • Demonstrate	Teacher to class/directions Individual/ reading, writing Small group/discussion, writing Report to class Writing Teacher/visual demonstration Individual/written, graphic

Embedded Formative Assessment/s:
Whiteboard descriptions, skit, reading notes, reports on reading, science journal entries

Adjustment Trigger *What level of student performance will necessitate an instructional adjustment?*	Students' journal entries explain in words and pictures that: • Particles in a solid are vibrating in place. A solid has a definite shape and volume. • Particles in a liquid are fluid and flow around one another. The volume of a liquid is definite and does not change. The shape of a liquid conforms to its container; therefore a liquid does not have a definite shape. • Particles in a gas are spread apart and move freely. A gas has neither a definite shape nor a definite volume. A gas expands or compresses to fit within its container.

Instructional Adjustment (if needed):
During the reading:
Early finishers read other sections of the text while they wait for the rest of the class.

Lesson Closure*:
"In your journals, use words and pictures to explain what is happening to the particles in each of the three balloons."

Journal write: Students explain the results of the balloon demo based on what is known about particles of solids, liquids, and gases and draw a picture of what's happening to the particles in each of the three balloons.

* Opportunity for formative assessment