Getting a feel for the phenomenon: Activity 1 -- Solid: Vibrate in Place

Exploring Solid, Liquid, Gas, and State Change

Goals & Rationale

- Help students experience how atoms/molecules behave in solids, liquids, and gases -- rather than only see diagrams
- Use students' bodies and movement to eternalize and explore abstract scientific ideas. This can make invisible phenomena (e.g., molecular motion, spacing, energy) accessible
- Support multiple ways of knowing (embodied, social, verbal, conceptual) -- serving diverse learners and offering culturally sustaining, engaging science learning
- Use Move About It cards to guide embodied inquiry, and encourage flexibility, creativity, and student-driven exploration.

Tips and Considerations for Implementation

- Provide plenty of physical space and clear norms for movement to ensure safety
- Combine embodied activities with reflection -- discussion, drawing, linking to diagrams/simulations -- to help students connect body experiences to scientific concepts
- Us multiple modalities (movement, talk, drawing, simulation) to support diverse learners and deepen understanding
- Consider rhythm or music (for fluid transitions or warm-ups), but ensure that movement goals remain clear
- Invite students to invent their own gestures, motions, or interpretations -- this honors student creativity, identity, and agency
- Us the cards to help students expand they ways they explore movement ideas in the space

Activity 1 -- Solid: Vibrate in Place

Prompt: "You are a solid -- particles are tightly bound, fixed in place, but can vibrate"

Use this as a warm-up to introduce the concept of solids. Solids have a definite shape and definite volume. They are rigid and incompressible. Their particles are tightly packed, often in regular (crystalline) or irregular (amorphous) patterns, held together by strong forces.

Setup: Have students stand up in a space where they have room to move openly.

Movement Instructions:

- Students stand close together (shoulder-to-shoulder or within one's arms reach). While their feet remain planted, have students gently "shake," "shimmy," or "vibrate" in place *(Facilitator can use Move About It Cards to encourage students to explore different qualities of movement, energy levels, shapes, and speeds)*
- Encourage minimal displacement, almost like a "shiver" rather than walking or sliding. *(Facilitator can have students explore differences between standing closer or farther apart)*

Facilitator Notes / Variations:

- Use this a s a warm-up to introduce the concept of solids. Ask: "What does it feel like to be tightly bound but still moving?"
- Variation: Enact temperature change at the molecular scale by asking students to move their bodies faster when the temperature heats up and to move more slowly as the temperature goes down. What happens when the solid gets too hot? What happens when it gets too cold?
- Variation: Older students can explore specific material compounds and chemical structures (e.g. crystalline/lattice, amorphous) by using their bodies to create and break chemical bonds
- After the activity, have the students describe: How close were we? How did it feel to be very close? To be farther apart? What can you as a solid? What can you not do?

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