Science Learning Progression

FOSS *Water* **Grade: 4-5**

Prerequisite skill/knowledge:

2-3 PS2A Objects have properties
2-3 PS2CWater changes state when the temperature of the water changes.

Skill/knowledge:

To ***identify properties*** of ***states of matter*** --***solid***, ***liquid***, and ***gas***.
Inv. 1, part 1; Inv.3, part 3
4-5 PS2A

I can…brainstorm properties of

- Liquid water
- Water ***vapor*** **(Gas)**
- Frozen water

Formative Assessment:
KWL Chart

Skill/knowledge:

To ***explain*** that matter can be changed from one state to another.
Inv. 3, parts1 & 2
4-5 PS2A & C

I can…

- explain what would probably happen to water in a puddle on a sunny day.
- explain why it might happen quickly.

Formative Assessment:
FOSS Response Sheet #11, "Water Vapor"

Skill/knowledge:

To explain that the total amount of matter is ***conserved*** (stays the same) when it changes state.
*** Inv. 2, part 3**
4-5 PS2C

I can…

- ***predict*** how much an amount of water will ***weigh*** after it is frozen.
- give ***evidence*** to support my reasoning.

Formative Assessment:
Concept Cartoon (see attachment)

Skill/knowledge:

To explain that matter can be changed from one state to another by heating or cooling.
Inv.3, part 4
4-5 PS2A & C

I can…

- ***Describe*** what I observe on the outside of a cup of ice.
- Explain how the substance got on the outside of the cup.
- Predict what the cup will look like tomorrow.
- Explain my reasoning for my prediction.

Formative Assessment:
FOSS Performance Assessment: Ice #8

Big Idea
4-5 PS2A & C

Heating and cooling cause change in the state of materials.

Later big ideas that build on this big idea include:

6-8 PS2 Students learn the basic concepts behind the atomic nature of matter.

Substances have properties such as density, solubility, boiling point, and melting point.

Solids, liquids, and gases differ in the motion of individual particles.

The focus of FOSS Inv. 2, part 3 is the expansion of water when it freezes. This idea is not in the science standards at the elementary level. However, conservation of matter is in the standards, and this investigation lends itself, with a little tweaking, to a focus on standard 4-5 PS2C. Rather than focusing on the expansion of water and measuring its volume, focus on the total mass (*weight*) of the water and the mass (weight) of that water after it has been frozen. The mass should be almost the same. Mass is a *property* that is *conserved* when matter changes state. The lesson on volume might be done as an extension.

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