

# Example Planning Tool

## Survey the Curriculum



*Step back and look at the curriculum unit as a whole. Take stock of how the sequences of learning experiences and understandings build on each other to create a richer understanding of the disciplinary core idea (DCI).*

**Curriculum:** Investigating Water Transformations: Keeping Track of Matter

**What DCI does this curriculum target?** PS1: Matter and its interactions

**What is the overarching learning goal (“big idea”) for the curriculum?**

This curriculum unit provides students with a set of experiences that helps them develop the understanding that particles too small to see can have weight, take up space, and can help us understand the story behind transformations such as water melting and freezing, puddles evaporating, or drops condensing on a glass.

**How does the big idea unfold over the entire curriculum?**

Curriculum Sequences	What are the learning experiences and understanding goals for each sequence?
1. Water, a liquid	<p>Students build a mini-lake and review concepts of weight, volume and heaviness for size. Dissolving salt in water, they learn that they can use weight to keep track of matter and they are introduced to 3 key ideas:</p> <ol style="list-style-type: none"><li>1) the matter we encounter in everyday life at the visible level is composed of tiny particles that are visible only when they are clumped together, and become invisible when they spread apart;</li><li>2) these individual particles continue to have weight and take up space even when they are spread apart and are too small to see; and</li><li>3) these particles must exist in unimaginably large numbers in order to account for the measurable size and weight of objects in the macroscopic world.</li></ol>

2. Water to Vapor	Students investigate what happens to water when it evaporates. As students explore evaporation within a closed system, they also start to see the relationship between condensation and temperature.
3. Water to Ice	Students compare ice and water. They rely on a combination of data they have collected, scientific reasoning, and finally a computer model as they consider whether or not water and ice are the same material. The computer model provides the particle view of the solid-to-liquid transformation of water as well as the relationship between temperature and particle motion.
4. Air, A Gas	The class collects data to establish that air has weight, takes up space, and has properties that can be explored and described. Air has much in common with the more tangible forms of matter - solids and liquids - but this form of matter is not visible. Students use a computer model, to investigate the liquid-to-gas transformation of water at the particle level.
5. Two Scales	Students analyze and reflect on their experience with the mini-lakes. They draw connections between transformations at the visible level and at the particle level.

**What component(s) of a DCI do these sequences of learning experiences target? (Refer to the NGSS.)**

**PS1-A Structures and Properties of Matter**

- 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 showing 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 and the effects of air on larger particles or objects.
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- Measurements of a variety of properties can be used to identify materials.

**Are there sequences of learning experiences that you can omit because they don't contribute to understanding the DCI?**

All sequences contribute to understanding Structures and Properties of Matter