

Water Unit Design - Grade 3

Water is the most important substance on Earth. Water dominates the surface of our planet, changes the face of the land, and defines life. These powerful, pervasive ideas are introduced here. The **Water Module** consists of four investigations in which students explore properties of water, changes in water, interactions between water and other earth materials, and how humans use water.

RI Statements of Enduring Knowledge - (Established Goals):

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

PS1 - All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance)

PS 2 Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.

PS 3 The motion of an object is affected by forces.

Related Rhode Island GSE's (Understandings)	RI Assessment Targets Assessment Evidence high emphasis assessment target**
<p>ESS1 (K-2) –2 Students demonstrate an understanding of processes and change over time within earth systems by ... 2a conducting tests on how different soils retain water (e.g., how fast does the water drain through?).</p> <p>ESS1 (3-4)–2 Students demonstrate an understanding of processes and change over time within earth systems by ... 2a <u>conducting investigations and using observational data to describe how water moves rocks and soils.</u></p> <p>ESS1 (3-4) –5 Students demonstrate an understanding of processes and change over time within earth systems by ... 5b describing water as it changes into vapor in the air and reappears as a liquid when it's cooled. 5c explaining how this cycle of water relates to weather and the formation of clouds.</p>	<p>ESS1 (K-4) INQ –2 ** <i>Use results from an experiment to draw conclusions about how water interacts with earth materials (e.g., percolation, erosion, frost heaves)</i> Investigations 1-3 Science Stories, pp. 1-2, 4-9, 12-17</p> <p>ESS1 (K-4) POC –5 <i>Based on data collected from daily weather observations, describe weather changes or weather patterns.</i> Investigation 3, Parts 1-4, pp. 8-26 Science Stories, p. 13-16 FOSS Web, Activity: Evaporation</p>

<p style="text-align: center;">Related Rhode Island GSE's (Understandings)</p>	<p style="text-align: center;">RI Assessment Targets Assessment Evidence high emphasis assessment target**</p>
<p>Students demonstrate an understanding of physical changes by ...</p> <p>1c observing and describing physical changes (e.g. freezing, thawing, torn piece of paper).</p>	<p>PS1 (K-4) INQ –1 ** <i>Collect and organize data about physical properties in order to classify objects or draw conclusions about objects and their characteristic properties (e.g., temperature, color, size, shape, weight, texture, flexibility)</i> Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 FOSS Web, Activity: Evaporation</p>
<p>PS1 (3-4) –2 Students demonstrate an understanding of states of matter by ...</p> <p>2a describing properties of solids, liquids, <u>and gases</u>.</p> <p>2b identifying and comparing solids, liquids, <u>and gases</u>.</p> <p>2c making logical predictions about the changes in the state of matter when adding or taking away heat (e.g., ice melting, <u>water boiling</u> or freezing, <u>condensation/evaporation</u>).</p>	<p>PS1 (K-4) POC –2 <i>Make a prediction about what might happen to the state of common materials when heated or cooled or categorize materials as solid, liquid, or gas.</i> Investigation 1, Part 1, pp. 8-13 Investigation 2, Part 3, pp. 19-24 Science Stories, pp. 1-3, 8-9, 13</p> <p>Investigation 1, Part 1, pp. 8-13 Investigation 2, Part 3, pp. 19-24 Science Stories, pp. 1-3, 8-9, 13</p> <p>Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 FOSS Web, Activity: Evaporation</p>

<p>Related Rhode Island GSE's (Understandings)</p>	<p>RI Assessment Targets Assessment Evidence high emphasis assessment target**</p>
<p>PS2 (3-4)–6 Students demonstrate an understanding of energy by...</p> <p>6a Describing <u>how heat moves from warm objects to cold objects until both objects are the same temperature.</u></p> <p>6b Showing that heat moves from one object to another causing temperature change (e.g., when land heats up it warms the air).</p>	<p>PS2 (K-4) SAE+INQ –6 <i>Experiment, observe, or predict how heat might move from one object to another.</i> Investigation 2, Parts 2-3, pp. 14-24 Science Stories, pp. 14-16 Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 2, pp. 14-18</p>

Investigation-Time (45 min. periods)	Focus-Essential Questions	Big Ideas
1.1 Looking at Water-(2)	<ul style="list-style-type: none"> What happens when water gets spilled, splashed or dropped on something? Does water do the same thing on all surfaces? 	<ul style="list-style-type: none"> Water has observable properties, including transparency, shapelessness, and movement or flow Water beads up on some materials and is absorbed by other materials
1.2 Surface Tension-(2)	<ul style="list-style-type: none"> What shape does water make on a flat surface? Why does water form a dome on a flat surface? How can you change the surface tension of plain water? 	<ul style="list-style-type: none"> Surface tension is the skinlike surface of water that pulls it together into the smallest possible volume Drops of water form domes on pennies because of surface tension Surface tension can be disrupted by the addition of some other substances
1.3 Water on a Slope-(2)	<ul style="list-style-type: none"> What happens to beads of water when they are placed at the top of a slope? How does changing the amount of water in a bead change the speed at which water flows downhill? How does changing the slope change the speed at which water flows downhill? 	<ul style="list-style-type: none"> Water flows downhill Larger amounts of water flow more quickly Increasing the slope over which the water flows makes it flow more quickly
2.1 Build a Thermometer-(2)	<ul style="list-style-type: none"> What happens to water when it is heated? What happens to water when it is cooled? 	<ul style="list-style-type: none"> Water expands when heat is added Water contracts when heat is taken away
2.2 Sinking and Floating Water-(2)	<ul style="list-style-type: none"> Is hot water denser or less dense than room temperature water? Is cold water denser or less dense than room temperature water? 	<ul style="list-style-type: none"> Warm water is less dense than room-temperature water Cold water is more dense than room-temperature water. Cold water is denser than warm water A material that floats in water is less dense than the water; a material that sinks is more dense

Investigation-Time (45 min. periods)	Focus-Essential Questions	Big Ideas
2.3 Water as Ice-(3)	<ul style="list-style-type: none"> What happens to water when it freezes? What happens to ice when it is heated? How do the masses of equal volumes of ice and water compare? 	<ul style="list-style-type: none"> Water begins to expand when its temperature reaches 4 degrees C Water is densest at 4 degrees C Ice is less dense than liquid water A solid has definite volume and shape; a liquid has only definite volume
3.1 Evaporation-(2)	<ul style="list-style-type: none"> What happens when two paper towels are allowed to dry, one in a cup with a lid, and the other in an open cup? 	<ul style="list-style-type: none"> Evaporation is the process by which liquid water changes into water vapor, a gas
3.2 Evaporating Locations-(1)	<ul style="list-style-type: none"> What effect does air temperature have on evaporation? 	<ul style="list-style-type: none"> Temperature effects the rate of evaporation
3.3 Surface Area-(2)	<ul style="list-style-type: none"> What effect does surface area have on the rate of evaporation? 	<ul style="list-style-type: none"> The surface area of a volume of water affects the rate of evaporation
3.4 Condensation-(1)	<ul style="list-style-type: none"> What happens when the surface area of an object or material is cooler than the air surrounding it? 	<ul style="list-style-type: none"> Condensation occurs when water vapor touches a cool surface and changes into a liquid Evaporation and condensation contribute to the movement of water through the water cycle
3.5 Water Cycle Game-(2)	<ul style="list-style-type: none"> What happens to a water molecule during the water cycle? 	<ul style="list-style-type: none"> The <i>water cycle</i> is the endless sequence of condensation and evaporation of water on Earth.

Investigation-Time (45 min. periods)	Focus-Essential Questions	Big Ideas
4.1 Water in Earth Materials-(2)	<ul style="list-style-type: none"> What happens when you pour water through different earth materials? 	<ul style="list-style-type: none"> Some earth materials, like soils, absorb more water than other earth materials Water flows more easily through some earth materials than through others
4.2 Waterwheels-(2)	<ul style="list-style-type: none"> How does a waterwheel work? What is the best design for a waterwheel that will efficiently lift objects? 	<ul style="list-style-type: none"> Flowing water can be used to do work Waterwheels are a kind of a machine powered by flowing water
4.3 Water from Home-(2)	<ul style="list-style-type: none"> What are some of the properties of water that affect its quality? 	<ul style="list-style-type: none"> Water contains different materials that affect its quality Evaporation can be used to detect materials dissolved in water
4.4 Choosing Your Own Investigation-(3)	<ul style="list-style-type: none"> Students ask their own questions and plan investigations or research to answer them 	<ul style="list-style-type: none"> Apply concepts developed concerning water, its properties and its uses