

## Ideas & Inventions Unit Design - Grade 3

The **Ideas and Inventions Module** consists of four sequential investigations promoting the inquiry process that promote student creativity and inventiveness. Each investigation provides valuable science content while introducing a conventional technique for revealing the unseen.

### RI Statements of Enduring Knowledge - (Established Goals):

ESS2 – The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

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

PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

PS3 – The motion of an object is affected by forces.

Related Rhode Island GSE's (Understandings)	RI Assessment Targets (Assessment Evidence) High Emphasis Targets**
<p><b>ESS2 (3-4)-7</b>  <b>Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by ...</b>                      7a observing that the sun, moon, and stars appear to move slowly across the sky.</p> <p>7b observing that the moon looks slightly different from day to day, but looks the same again in about 4 weeks.</p> <p><b>ESS3 (3-4)-9</b>  <b>Students demonstrate understanding of processes and change over time within the system of the universe (Scale, Distances, Star Formation, Theories, Instrumentation) by...</b></p> <p>9a recognizing that throughout history people have identified patterns of stars that we call constellations.</p> <p><b>PS1 (3-4)-1</b>  <b>Students demonstrate an understanding of characteristic properties of matter by...</b></p>	<p>Local Level Only (No further ESS Targets K-4)</p> <p>Science Stories, pp. 33-34, 37</p> <p>Science Stories, pp. 34-36</p> <p>Science Stories, p. 37</p>

<b>Related Rhode Island GSE's (Understandings)</b>	<b>RI Assessment Targets (Assessment Evidence) High Emphasis Targets**</b>
<p>1a identifying, comparing, and sorting objects by similar or different physical properties (e.g., size, shape, color, texture, smell, weight, temperature)</p> <p>1b citing evidence (e.g., prior knowledge, data) to support conclusions about why objects are grouped together.</p> <p><b>Students demonstrate an understanding of physical changes by...</b></p> <p>1c observing and describing physical changes (e.g., freezing, thawing, torn piece of paper).</p> <p><b>PS2 (3-4)-5 Students demonstrate an understanding of energy by...</b></p> <p>5a investigating observable effects of light using a variety of light sources (e.g., light travels in a straight line until it interacts with an object, blocked light rays produce shadows).</p> <p>5b predicting, describing and investigating how light rays are reflected, refracted, or absorbed.</p> <p><b>PS3 (3-4)-7 Students demonstrate an understanding of motion by...</b></p> <p>7b describing change in position relative to other objects or background</p>	<p><b>PS1 (K-4) – INQ-1**</b> 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). <b>Investigation 2, Parts 1-2, pp. 8-19</b></p> <p><b>Investigation 2, Parts 1-2, pp. 8-19</b></p> <p><b>Investigation 1, Parts 1-2, pp. 8-17 Investigation 3, Parts 1-2, pp. 8-17</b></p> <p><b>PS2 (K-4) – SAE-5</b> Use observations of light in relation to other objects/substances to describe the properties of light (can be reflected, refracted, or absorbed). <b>Investigation 4, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-21 Science Stories, pp. 28-32</b></p> <p><b>PS3 (K-4) – INQ + SAE-7**</b> Use data to predict how a change in force (greater/less might affect the position, direction of motion, or speed of an object (e.g., ramps and balls) <b>Investigation 3, Parts 1-2, pp. 8-17</b></p>

Investigation- Time (45min. periods)	Investigation	Focus Questions (Essential Questions)	<p align="center"><b>Big Ideas</b></p> <p align="center">(Understandings)</p> <p>Words in <b>bold</b> are important for science vocabulary development, and should be used for <b>word walls</b>.</p>
1-(2)	Leaf Rubbings	<p>Can you use rubbing techniques to learn about objects?</p> <p>What can leaf rubbing tell you about a leaf?</p>	<ul style="list-style-type: none"> <li>• <b>Texture</b> refers to the surface of a material.</li> <li>• <b>Pattern</b> is a design or arrangement of objects</li> <li>• Veins transport materials in a leaf</li> <li>• Leaf-venation <b>patterns</b> can be organized into three types: parallel, palmate, and pinnate</li> </ul>
2-(3)	Carbon Printing	<p>How can we look for patterns on finely textured objects like fingers?</p> <p>How are fingerprints alike and different?</p> <p>Can you solve a mystery using fingerprints?</p>	<ul style="list-style-type: none"> <li>• Carbon printing is a technique used to make fine textures visible</li> <li>• Fingerprints can be stored into three groups based on patterns: whorl, arch, and loop</li> <li>• No two people have the same fingerprints</li> </ul>
3-(3)	Color Writing	<p>How could we find out what pigments are used in different color markers?</p> <p>Can you solve a mystery using paper chromatography?</p>	<ul style="list-style-type: none"> <li>• Chromatography uses water to carry pigments from one place to another</li> <li>• Paper chromatography reveals pigments in watercolor inks</li> <li>• The process of water moving through paper is called wicking</li> </ul>

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4-(4)	Reflecting	<p>What can you see with mirrors that you cannot see without one?</p> <p>How can a mirror be used to find a line of symmetry?</p> <p>Can you make a rear view mirror for your desk?</p> <p>How can you see through a book using a mirror?</p> <p>How does a periscope work?</p>	<ul style="list-style-type: none"> <li>• <b>Light</b> travels in a straight line</li> <li>• Symmetry is an arrangement in which the parts on the opposite sides of a center line are the same</li> <li>• Mirror images are a result of light <b>reflected</b> from a surface</li> <li>• An image produced by something that <b>reflects</b>, such as a mirror, is always reversed right to left</li> <li>• Mirrors can be used to determine symmetry in objects</li>   <li>• always reversed right to left</li> <li>• Mirrors can be used to determine symmetry</li> </ul>