

# What You Should See Students “Doing” “Thinking” “Knowing” and “Using” in Science?

## A Framework/Big Ideas for K-12 Science Instruction’s 3 Dimensions and AzSS Using Science

<p><b>Dimension 1: The Science and Engineering Practices</b></p> <p><b>DO</b></p> <ol style="list-style-type: none"> <li>1. Asking questions and defining problems (p. 54)*</li> <li>2. Developing and using models (p. 56)*</li> <li>3. Planning and carrying out investigations (p. 59)*</li> <li>4. Analyzing and interpreting data (p. 61)*</li> <li>5. Using mathematics and computational thinking (p. 64)*</li> <li>6. Constructing explanations and designing solutions (p. 67)*</li> <li>7. Engaging in argument from evidence (p. 71)*</li> <li>8. Obtaining, evaluating, and communicating information (p. 74)*</li> </ol>	<p><b>Dimension 2: The Crosscutting Concepts</b></p> <p><b>THINK</b></p> <ol style="list-style-type: none"> <li>1. Patterns (p. 85)*</li> <li>2. Cause and effect (p. 87)*</li> <li>3. Scale, proportion, and quantity (p. 89)*</li> <li>4. Systems and system models (p. 91)*</li> <li>5. Energy and matter (p. 94)*</li> <li>6. Structure and function (p. 96)*</li> <li>7. Stability and change (p. 98)*</li> </ol>
<p><b>Dimension 3: The Core Ideas / AzSS P, E and L (Big Ideas)</b></p> <p><b>KNOW</b></p> <p><b>P: Physical Science (p. 105)*</b></p> <p>P1: All matter in the Universe is made of very small particles. (p. 20)**</p> <p>P2: Objects can affect other objects at a distance. (p. 21)**</p> <p>P3: Changing the movement of an object requires a net force to be acting on it. (p. 22)**</p> <p>P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event. (p. 23)**</p> <p><b>E: Earth and Space Science (p. 171)*</b></p> <p>E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth’s surface and its climate. (p. 24)**</p> <p>E2: The Earth and our solar system are a very small part of one of many galaxies within the Universe. (p. 25)**</p> <p><b>L: Life Science (p. 142)*</b></p> <p>L1: Organisms are organized on a cellular basis and have a finite life span. (p. 26)**</p> <p>L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms. (p. 27)**</p> <p>L3: Genetic information is passed down from one generation of organisms to another. (p. 28)**</p> <p>L4: The unity and diversity of organisms, living and extinct, is the result of evolution. (p. 29)**</p>	<p><b>AzSS: Using Science (Big Ideas)</b></p> <p><b>USING</b></p> <p><b>U1:</b> Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. (p. 30 &amp; 31)**</p> <p><b>U2:</b> The knowledge produced by science is used in engineering and technologies to solve problems and/or create products. (p. 32)**</p> <p><b>U3:</b> Applications of science often have ethical, social, economic, and/or political implications. (p. 23)**</p>

\*A Framework for K-12 Science Education

\*\*Working with Big Ideas of Science Education

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