**Be a Scanning Probe Microscope**
Lesson focuses on how engineers have developed and use special tools that can observe the landscape of materials when they are working at the nano scale. Students learn about Scanning Probe Microscopes (SPM) and then work in teams using a pencil to explore and identify the shape of objects they cannot see, just as the SPM does at the nano level. They draw what their mind "sees" on paper, compare their results with other student teams, and share observations with their class.

| Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 |
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| ***Strand: Scientific Investigation and Reasoning*** |
| 1.A Demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations including observing a schoolyard habitat. | 1.A Demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations. | 1.A Demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations. | 1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards. | 1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards. | 1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards. |
| 1.B Make informed choices in the use and conservation of natural resources by recycling or reusing materials such as paper, aluminum cans, and plastics. | 1.B Make informed choices in the use and conservation of natural resources and reusing and recycling of materials such as paper, aluminum, glass, cans and plastic. | 1.B Make informed choices in the conservation, disposal, and recycling of materials. | 1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials. | 1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials. | 1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials. |
| 2.A Plan and implement descriptive investigations including asking and answering questions, making inferences, and selecting and using equipment or technology needed to solve a specific problem in the natural world. | 2.A Plan and implement descriptive investigations, including asking well-defined questions, making inferences, and selecting and using appropriate equipment or technology to answer his/her questions. |  | 2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions, and using appropriate equipment and technology. | 2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions and using appropriate equipment and technology. | 2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions, and selecting and using appropriate equipment and technology. |
| 2.B Collect data by observing and measuring using the metric system and recognize differences between observed and measured data. | 2.B Collect and record data by observing and measuring, using the metric system, and using descriptive words and numerals, such as labeled drawings, writing, and concept maps. | 2.B Ask well-defined questions, formulate testable hypotheses, and select and use appropriate equipment and technology. |  |  |  |
|  |  | 2.C Collect information by detailed observations and accurate measuring. | 2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers. | 2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers. | 2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers. |
| 2.D Analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations. | 2.D Analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured. | 2.D Analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence. | 2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends. | 2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends. | 2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends. |
| 2.F Communicate valid conclusions supported by data in writing, by drawing pictures, and through verbal discussion. | 2.F Communicate valid, oral and written results supported by data. | 2.F Communicate valid conclusions in both written and verbal forms. |  |  |  |
| 3.D Connect grade level appropriate science concepts with the history of science, science careers and contributions of scientists. | 3.D Connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists. | 3.D Connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists. | 3.D Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content. | 3.D Relate the impact of research on scientific thought and society, including history of science and contributions of scientists as related to the content. | 3.D Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content. |
| *Strand: Matter and Energy* |
| 5.A Measure, test, and record physical properties of matter including temperature, mass, magnetism, and the ability to sink or float. | 5.A Measure, compare, and contrast physical properties of matter including size, mass, volume, states (solid, liquid, gas), temperature, magnetism, and the ability to sink or float. | 5.A Classify matter based on physical properties including: mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), and solubility in water, and the ability to conduct or insulate thermal energy or electric energy. | 6.ACompare metals, nonmetals, and metalloids using physical properties such as luster, conductivity or malleability. |  |  |