**Fizzy Nano Challenge**
Lesson focuses on how materials behave differently as their surface area increases. Students learn about nanotechnology and how engineers can harness the differences in how materials behave when small to solutions for challenges in many industries. Students work in teams to explore examples of how surface area impacts functionality. They hypothesize how surface area will impact the performance of antacid tablets, conduct an experiment using whole and crushed tablets to see how they behave when introduced to water, observe what they see, extrapolate to other examples, compare their hypotheses and the results with those of other student teams, reflect on the experience, and share observations with the 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 Describe, plan and implement simple experimental investigations testing one variable. | 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.B Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology. | 2.B Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology. | 2.B Design and implement comparative and experimental investigations by making observations, asking well- defined questions, formulating testable hypotheses and selecting and using 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 Demonstrate that repeated investigations may increase the reliability of results. | 2.E Perform repeated investigations to increase the reliability of results. | 2.E Demonstrate that repeated investigations may increase the reliability of results. | 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. |  |  |  |
| 2.C Construct maps, graphic organizers, simple tables, charts, and bar graphs using tools and current technology to organize, examine, and evaluate measured data. | 2.C Construct simple tables, charts, bar graphs, and maps using tools and current technology to organize, examine, and evaluate data. | 2.G Construct appropriate simple graphs, tables, maps, and charts using technology including computers to organize, examine, and evaluate information. | 2.D Construct tables, using repeated trials and means to organize data and identify patterns. | 2.D Construct tables and graphs, using repeated trials and means to organize data and identify patterns. | 2.D Construct tables and graphs, using repeated trials and means, to organize data and identify patterns. |
| 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. |  |  |  |
| 5.C Predict, observe and record changes in the state of matter caused by heating or cooling. | 5.C Compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water. | 5.D Identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water. |  |  |  |
| 5.D Explore and recognize that a mixture is created when two materials are combined, such as gravel and sand and metal and plastic paper clips. |  |  |  |  |  |