**Engineer a Cane**  
Lesson focuses on how engineers improve assistive devices such as a cane to meet the needs of the elderly. Students work in teams to re-engineer a cane for a "client." They are assigned a client profile, develop a design to suit the needs of the user, and those in older grades build a working prototype of their design.

| Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | IPC | Physics |
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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.A Demonstrate safe practices during laboratory and field investigations. | 1.A Demonstrate safe practices during laboratory and field investigations. |
| 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. | 1.B Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. | 1.B Demonstrate an understanding of the use and conservation of resources and the proper disposal 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.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.B Plan and implement investigate procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology. | 2.E Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness. |
| 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.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.C Collect data and make measurements with precision. | 2.H Make measurements with accuracy and precision and record data using scientific notation and International System (SI) units. |
| 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.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. |  |  |
| 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.D Organize, analyze, evaluate, make inferences, and predict trends from data. | 2.J Organize and evaluate data and make inferences from data including the use of tables, charts, and graphs. |
| 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.E Communicate valid conclusions. | 2.K Communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. |
| 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. | 3.D Evaluate the impact of research on scientific thought, society, and the environment. | 3.D Explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society. |
| *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, relative density (sinking and floating), and solubility in water, and the ability to conduct or insulate thermal energy or electric energy. |  |  |  | 6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity. |  |
| *Strand: Force, Motion and Energy* | | | | | | | |
| 6.C Observe forces such as magnetism and gravity acting on objects. | 6.D Design an experiment to test the effect of force on an object such as a push or a pull, gravity, friction, or magnetism. | 6.D Design an experiment that tests the effect of force on an object. | 8.B Identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces. | 7.C Demonstrate and illustrate forces that affect motion in everyday life, such as emergence of seedlings, turgor pressure, and geotropism. | 6.A Demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion. | 4.A Describe and calculate an object’s motion in terms of position, displacement, speed and acceleration. | 4.D Calculate the effect of forces on objects including the law of inertia, the relationship between force & acceleration, and the nature of force pairs between objects. |
| 6.C Observe forces such as magnetism and gravity acting on objects. |  |  | 8.D Measure and graph changes in motion. |  | 6.C Investigate and describe applications of Newton’s law of inertia, law of force and acceleration and law of action-reaction, such as in vehicle restraints, sports activities, amusement park rides, Earth’s tectonic activities, and rocket launches. | 4.C Investigate how an object’s motion changes only when a net force is applied, including activities and equipment such as toy cars, vehicle restraints, sports activities and classroom objects. | 6.D Demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension. |
|  |  |  |  |  |  | 4.E Apply the concept of conservation of momentum using action and reaction forces such as is illustrated by students on skateboards. |  |