**Life Vest Challenge**

Lesson explores the engineering behind life vests or personal flotation devices and the challenges met by these devices. Students work in teams to design and build a flotation device out of everyday materials that can keep an unopened can of soup or vegetables afloat in a bucket of water or sink for a minute. They design their life vest, build and test it, evaluate their designs and those of classmates, and share observations with their class.

| Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | IPC |
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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 & outdoor investigations. | 1.A Demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom & 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 Demonstrates 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. |
| 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 Plan and implement investigate procedures including asking questions, formulating testable hypotheses, and selecting 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 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.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.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.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.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.D Organize, analyze, evaluate, make inferences, and predict trends from data. |
| 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. |
| 3.C Represent the natural world using models such as volcanoes or Sun, Earth, and Moon system, and identify their limitations including size, properties, and materials. | 3.C Represent the natural world using models such as rivers, stream tables or fossils and identify their limitations, including accuracy and size. | 3.C Draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works. | 3.B Use models to represent aspects of the natural world such as a model of Earth’s layers. | 3.B Use models to represent aspects of the natural world such as human body systems, and plant and animal cells. | 3.B Use models to represent aspects of the natural world such as an atom, a molecule, space or a geologic feature. |  |
| 3.CIdentify advantages and limitations of models such as size, scale, properties, and materials. | 3.CIdentify advantages and limitations of models such as size, scale, properties, and materials. | 3.CIdentify advantages and limitations of models such as size, scale, properties, and materials. |  |
| 3.B Draw inferences and evaluate accuracy of product claims found in advertisements and labels, such as for toys and food. | 3.B Draw inferences and evaluate accuracy of services and product claims found in advertisements and labels, such as for toys, food, and sunscreen. | 3.B Evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels. |  |  |  | 3.C Draw inferences based on data related to promotional materials for products and services. |
| 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. |
| 4.A Collect, record, and analyze information using tools, including microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, wind vanes, rain gauges, pan balances, graduated cylinders, beakers, spring scales, hot plates, meter sticks, compasses, magnets, collecting nets, notebooks, sound recorders, Sun, Earth, and Moon system models; timing devices, including clocks and stopwatches; and materials to support observation of habitats of organisms such as terrariums and aquariums. | 4.A Collect, record, and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, mirrors, spring scales, pan balances, triple beam balances, graduated cylinders, beakers, hotplates, meter sticks, compasses, magnets, collecting nets, and notebooks; timing devices, including clocks and stopwatches; and materials to support observation of habitats of organisms such as terrariums and aquariums. | 4.A Collect and analyze information using tools including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms, mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, timing devices including clocks and stopwatches, magnets, collecting nets, notebooks and materials to support observations of habitats or organisms such as terrariums and aquariums. | 4.AUse appropriate tools to collect, record, and analyze information including: journals/notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot plates, test tubes, triple beam balances, microscopes, thermometers, calculators, computers, timing devices, and other equipment as needed to teach the curriculum. | 4.AUse appropriate tools to collect, record, and analyze information including: life science models, hand lens, stereoscopes, microscopes, beakers, Petri dishes, microscope slides, graduated cylinders, test tubes, meter sticks, metric rulers, metric tape measures, timing devices, hot plates, balances, thermometers, calculators, water test kits, computers, temperature and pH probes, collecting nets, insect traps, globes, digital cameras and journals/notebooks and other equipment as needed to teach the curriculum. | 4.AUse appropriate tools to collect, record, and analyze information including: lab journals/notebooks, beakers, meter sticks, graduated cylinders, anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectroscopes, timing devices, and other equipment as needed to teach the curriculum. |  |
| *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.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity. |
| 5.B Describe and classify samples of matter as solids, liquids, and gases and demonstrate that solids have a definite shape and that liquids and gases take the shape of their container. |  |  |  |  |  |  |
| *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. |  |