

Developing an Engineering Design Challenge (Grade 8)



Developing an Engineering Design Challenge

STEM professions require individuals to apply their content knowledge to unique circumstances and to solve problems using creativity and innovation. When engineers are presented with a problem, they research to determine if the problem has occurred before (language arts connection) and what innovations have been made in the past (historical connection). Then, the engineer will use engineering practices to develop a solution that applies science and math knowledge. Engineering design challenges can be created for a specific standard or aligned with multiple standards and subject areas. [Cross-disciplinary instruction](#) introduces concepts and skills that could be linked from two or more disciplines to highlight connections and deepen understanding. Integrated learning can help students see the connection across content areas and braid that understanding together to create a solution to a problem using the engineering design process.

Purpose of this Tool:

This tool supports educators in developing cross-curricular engineering design challenges anchored in the science standards. While engineering practices are embedded in the Texas Essential Knowledge and Skills (TEKS) for science, engineering design challenges can draw from multiple subject areas. By integrating content across disciplines, students apply their knowledge in meaningful ways to solve a real-world problem.

This tool includes the following components:

1. A graphic organizer to identify targeted standards
2. A content crosswalk to help educators identify potential connections for an engineering design challenge
3. STEM career highlights for each student expectation

Engineering Design Practices:

When developing an engineering design challenge, it is important to anchor the challenge in TEKS. The students will use the engineering practices TEKS paired with the science content TEKS when solving the engineering design challenge. The first strand in the science TEKS outlines the scientific and engineering practices for the grade level/courses. Engineering practices refer to the methods, techniques, and standards that engineers use to ensure their work is efficient, reliable, safe, and meets the intended requirements. To create a cohesive learning experience, educators should integrate scientific and engineering practices with content. Embedding these practices across the content areas as part of engineering design challenges provides

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students with the context in which to ask questions, develop models, and analyze data that supports critical thinking and problem-solving skills in real-world scenarios.

Engineering Design Process:

The [engineering design process](#) is a systematic way of thinking, used to teach and apply concepts and skills in an integrated manner. Students engage with concepts from multiple disciplines while using design thinking to develop a solution to an open-ended, authentic problem. Learning from failure is a natural part of the iterative process. There are numerous engineering design process models; however, they share foundational practices that include identifying questions or defining problems, imagining solutions, brainstorming ideas, planning, creating, testing, and improving a design.

Engineering-Related TEKS:

In grade 8 science, the following engineering practices can be used in engineering design challenges. The student is expected to:

Science.8.1.A ask questions and define problems based on observations or information from text, phenomena, models, or investigations

Science.8.1.B use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems

Science.8.1.G develop and use models to represent phenomena, systems, processes, or solutions to engineering problems

Science.8.2.D evaluate experimental and engineering designs

Science.8.4.A relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content

Science.8.4.B make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used

Science.8.4.C research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers

Science.8.5.A identify and apply patterns to understand and connect scientific phenomena or to design solutions

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Communication is also part of the engineering design process. [Claim-Evidence-Reasoning \(CER\)](#) is a discussion structure commonly used by scientists and engineers to engage in collaborative discussions with peers. While both scientists and engineers use the CER structure, they use it for different purposes. Scientists tend to focus on asking questions and analyzing patterns, while engineers tend to focus on solving problems. The following student expectations demonstrate the knowledge and skills students apply to communicate their thinking. The student is expected to:

Science.8.3.A develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories

Science.8.3.B communicate explanations and solutions individually and collaboratively in a variety of settings and formats

Science.8.3.C engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence

Component 1: Integration Planning Graphic Organizer

The [Integration Planning Graphic Organizer](#) can be used in conjunction with the Integrated Content Crosswalk for STEM Education to organize the standards and subject areas incorporated into an engineering design challenge. The graphic organizer serves as a workspace to capture ideas of possible connections, but not all spaces need to be filled. Many factors will influence the selection of standards during an engineering design challenge. Instructional materials, district scope and sequences, student age, and other factors that inform instructional decisions are some examples.

On the next page is an example of a grade 5 science engineering design challenge developed using the components of this tool. In this example, the graphic organizer has been completed with information from the Integrated Content Crosswalk for STEM Education. There are many ways to approach developing an engineering design challenge. An easy way to start is to select your science content standard, then identify the problem that needs to be solved, and what engineering practices will be used when solving the problem. The highlighted standard below is the content standard used as an anchor for this challenge. The engineering practices that align with this challenge are Science.5.1.G and Science.5.4.A.

Highlighted Standards from the Example

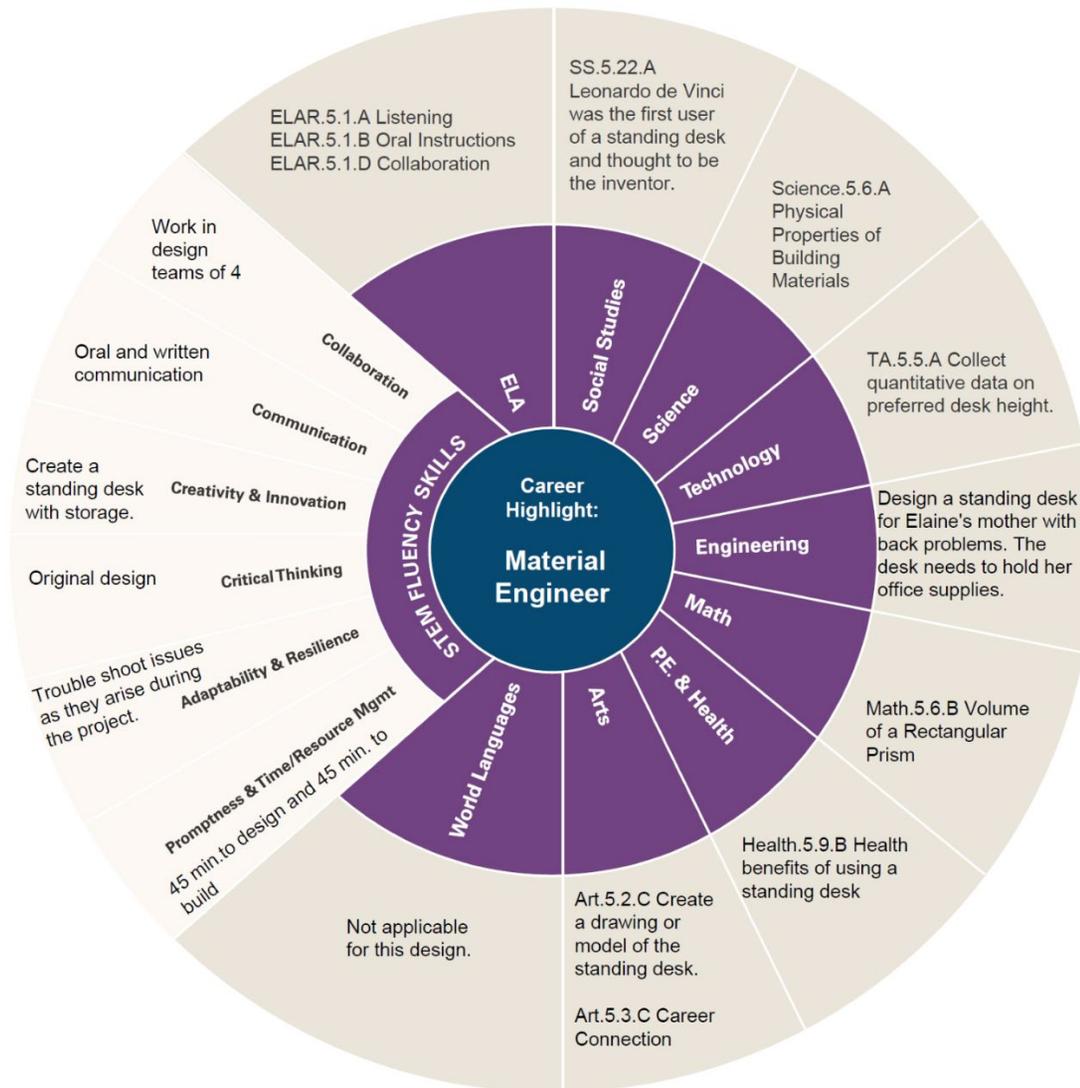
The student is expected to:

Science.5.6.A compare and contrast matter based on measurable, testable, or observable physical properties, including mass, magnetism, relative density (sinking and floating using water as a reference point), physical state (solid, liquid, gas), volume, solubility in water, and the ability to conduct or insulate thermal energy and electric energy

Science.5.1.G develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem

Science.5.4.A how scientific discoveries and innovative solutions to problems impact science and society

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Engineering Design Challenge: Design a standing desk for Elaine's mother who has back problems. The desk needs to hold her office supplies.

Core Subject Area Connection Summary:

Science.5.6.A Compare and contrast physical properties of building materials

Math.5.6.B Calculate the volume of the standing desk (Rectangular Prism)

SS.5.22.A Read about Leonardo de Vinci was the first user of a standing desk and thought to be the inventor

ELAR TEKS Support the STEM Fluency Skills:

ELAR.5.1.A and 5.1.B Listen to others and provide oral Instructions (Communication)

ELAR.5.1.D Work in groups (Collaboration)

Enrichment Area Connection Summary:

TA.5.5.A Collect quantitative data on preferred desk height

Health.5.9.B Identify health benefits of using a standing desk

Art.5.2.C Create a drawing or model of the standing desk

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Component 2: Integrated Content Crosswalk for STEM Education

The Integrated Content Crosswalk for STEM Education section is a resource designed to help teachers identify connections between student expectations across the required curricula. It is important to note that this tool offers suggestions. Educators may use the suggestions in the crosswalk as a starting place for selecting student expectations across disciplines for an engineering design challenge. Student expectations in an integrated content crosswalk will vary and should align with the design challenge. The [Integration Planning Graphic Organizer](#) example provided for grade 5 includes the student expectations from the crosswalk, as well as additional standards from health and art. The boxes on the chart excerpt below indicate the student expectations that were used in the previous example on the graphic organizer.

In a STEM career, professionals must communicate throughout a design process. Students will practice language skills during engineering design challenges by using written and oral communication, research, questioning, and synthesizing information. Students may also use technology to create, develop, and communicate their ideas. The standards aligned to each project will change depending on what students are doing in the design challenge.

| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <p>Science.5.6.A compare and contrast matter based on measurable, testable, or observable physical properties, including mass, magnetism, relative density (sinking and floating using water as a reference point), physical state (solid, liquid, gas), volume, solubility in water, and the ability to conduct or insulate thermal energy and electric energy</p> <p>Career Highlights: Materials Engineers, Machinists, Service Unit Operators</p> | <p>Math.5.1.E create and use representations to organize, record, and communicate mathematical ideas</p> <p>Math.5.6.A recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlaps if possible</p> <p>Math.5.6.B determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base</p> | <p>SS.5.22.A identify the accomplishments of notable individuals in the fields of science and technology such as Benjamin Franklin and Thomas Edison</p> | <p>ELAR.5.1.B follow, restate, and give oral instructions that include multiple action steps</p> <p>ELAR.5.1.D work collaboratively with others to develop a plan of shared responsibilities</p> <p>ELAR.5.13.A generate questions on a topic for formal and informal inquiry</p> | <p>TA.5.5.A identify and collect quantitative and qualitative data with digital tools</p> |

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Component 3: Career Highlights

The career highlights section is listed below each science student expectation in the Integrated Content Crosswalk for STEM Education. The career highlights are designed to provide career connections to the science content being taught. On the *Integrated Content Crosswalk*, each science standard has three career connections that support the incorporation of scientific and engineering practices for investigating STEM careers. The careers highlighted use the science content regularly by STEM professionals in their careers. The career highlights show science content that is regularly used by STEM professionals in the identified careers. The [Texas Workforce Commission](#) and [O*NET](#) provide the labor data information. Connecting engineering design challenges to careers promotes career awareness and provides relevance for learning content.

Getting Started:

To begin developing your own cross-curricular engineering design challenge, start by selecting a science content standard that aligns with your instructional goals. Use the Integration Planning Graphic Organizer in conjunction with the Integrated Content Crosswalk for STEM Education to identify meaningful connections across subject areas and incorporate relevant student expectations. Consider which engineering practices will be used to solve the real-world problem presented in the engineering design challenge. Leverage the career highlights to introduce students to STEM professions and make learning more relevant. As you plan, remember to adapt this tool to fit your students' needs, available resources, and instructional context.

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Integrated Content Crosswalk for STEM Education and Career Highlights:

| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
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| <p>Science.8.6.A explain by modeling how matter is classified as elements, compounds, homogeneous mixtures, or heterogeneous mixtures</p> <p>Career Highlights: Materials Scientist, Chemical Engineer, Chemist</p> | <p>Math.8.2.A extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers</p> | | <p>ELAR.8.5.F make inferences and use evidence to support understanding ELAR.8.5.G evaluate details read to determine key ideas ELAR.8.6.C use text evidence to support an appropriate response</p> | |
| <p>Science.8.6.B use the periodic table to identify the atoms involved in chemical reactions</p> <p>Career Highlights: Chemist, Chemical Engineer, Forensic Science Technician</p> | | <p>SS.8.29.A differentiate between, locate, and use valid primary and secondary sources such as media and news services, biographies, interviews, and artifacts to acquire information about the United States</p> | <p>ELAR.8.5.F make inferences and use evidence to support understanding ELAR.8.5.G evaluate details read to determine key ideas ELAR.8.6.C use text evidence to support an appropriate response</p> | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
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| <p>Science.8.6.C describe the properties of cohesion, adhesion, and surface tension in water and relate to observable phenomena such as the formation of droplets, transport in plants, and insects walking on water</p> <p>Career Highlights: Biochemist, Environmental Scientist, Hydrologist</p> | | | <p>ELAR.8.5.D create mental images to deepen understanding</p> <p>ELAR.8.5.E make connections to personal experiences, ideas in other texts, and society</p> <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> | |
| <p>Science.8.6.D compare and contrast the properties of acids and bases, including pH relative to water</p> <p>Career Highlights: Chemical Engineer, Environmental Scientist, Chemist</p> | <p>Math.8.2.D order a set of real numbers arising from mathematical and real-world contexts</p> | | <p>ELAR.8.5.C make and correct or confirm predictions using text features, characteristics of genre, and structures</p> <p>ELAR.8.6.I monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down</p> | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
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| <p>Science.8.6.E investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis</p> <p>Career Highlights: Chemical Engineer, Chemist, Environmental Engineer</p> | <p>Math.8.10.B differentiate between transformations that preserve congruence and those that do not</p> | | <p>ELAR.8.5.E make connections to personal experiences, ideas in other texts, and society ELAR.8.5.F make inferences and use evidence to information to create new understanding ELAR.8.5.H synthesize information to create new understanding</p> | <p>TA.8.3.B discuss and implement a design process that includes planning, selecting digital tools to develop, test, and evaluate design limitations, and refining a prototype or model TA.8.6.A use digital tools in order to transform data, analyze trends, and predict possibilities and develop steps for the creation of an innovative process or product</p> |
| <p>Science.8.7.A calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion</p> <p>Career Highlights: Aerospace Engineer, Mechanical Engineer, Civil Engineer</p> | <p>Math.8.4.C use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems</p> | | <p>ELAR.8.5.E make connections to personal experiences, ideas in other texts, and society ELAR.8.5.F make inferences and use evidence to support understanding ELAR.8.5.H synthesize information to create new understanding</p> | |

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| <p>Science.8.7.B investigate and describe how Newton's three laws of motion act simultaneously within systems such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches</p> <p>Career Highlights: Aerospace Engineer, Mechanical Engineer, Civil Engineer</p> | | | <p>ELAR.8.1.B follow and give complex oral instructions to perform specific tasks, answer questions, or solve problem</p> <p>ELAR.8.1.D participate collaboratively in discussions, plan agendas with clear goals and deadlines, set time limits for speakers, take notes, and vote on key issues</p> <p>ELAR.8.5.C make and correct or confirm predictions using text features, characteristics of genre, and structures</p> | <p>TA.8.3.B discuss and implement a design process that includes planning, selecting digital tools to develop, test, and evaluate design limitations, and refining a prototype or model</p> <p>TA.8.6.A use digital tools in order to transform data, analyze trends, and predict possibilities and develop steps for the creation of an innovative process or product</p> |
| <p>Science.8.8.A compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum</p> <p>Career Highlights: Geoscientist, Aerospace Engineer, Mechanical Engineer</p> | | | <p>ELAR.8.1.B follow and give complex oral instructions to perform specific tasks, answer questions, or solve problem</p> <p>ELAR.8.5.C make and correct or confirm predictions using text features, characteristics of genre, and structures</p> <p>ELAR.8.5.D create mental images to deepen understanding</p> | |

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| <p>Science.8.8.B explain the use of electromagnetic waves in applications such as radiation therapy, wireless technologies, fiber optics, microwaves, ultraviolet sterilization, astronomical observations, and X-rays</p> <p>Career Highlights: Telecommunications Engineering Specialist, Photonics Engineer, Electrical Engineer</p> | | | <p>ELAR.8.1.D participate collaboratively in discussions, plan agendas with clear goals and deadlines, set time limits for speakers, take notes, and vote on key issues</p> <p>ELAR.8.5.D create mental images to deepen understanding</p> <p>ELAR.8.5.E make connections to personal experiences, ideas in other texts, and society</p> | <p>TA.8.4.A evaluate how changes in technology throughout history have impacted various areas of study</p> <p>TA.8.4.B evaluate and predict how global trends impact the development of technology</p> <p>TA.8.4.C transfer current knowledge to the learning of newly encountered technologies</p> |
| <p>Science.8.9.A describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram</p> <p>Career Highlights: Astronomer, Physicist, Aerospace Engineer</p> | <p>Math.8.1.E create and use representations to organize, record, and communicate mathematical ideas</p> <p>Math.8.1.F analyze mathematical relationships to connect and communicate mathematical ideas</p> | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.G evaluate details read to determine key ideas</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> | |

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| <p>Science.8.9.B categorize galaxies as spiral, elliptical, and irregular and locate Earth’s solar system within the Milky Way galaxy</p> <p>Career Highlights: Astronomer, Physicist, Aerospace Engineer</p> | | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.G evaluate details read to determine key ideas</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> | |
| <p>Science.8.9.C research and analyze scientific data used as evidence to develop scientific theories that describe the origin of the universe</p> <p>Career Highlights: Astronomer, Aerospace Engineer, Physicist</p> | | | <p>ELAR.8.12.C refine the major research question, if necessary, guided by the answers to a secondary set of questions</p> <p>ELAR.8.12.D identify and gather relevant information from a variety of sources</p> <p>ELAR.8.12.F synthesize information from a variety of sources</p> | <p>TA.8.6.A use digital tools in order to transform data, analyze trends, and predict possibilities and develop steps for the creation of an innovative process or product</p> |

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| <p>Science.8.10.A describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate</p> <p>Career Highlights: Atmospheric and Space Scientist, Environmental Engineer, Hydrologist</p> | | <p>SS.8.10.C analyze the effects of physical and human geographic factors such as weather, landforms, waterways, transportation, and communication on major historical events in the United States</p> | <p>ELAR.8.5.F make inferences and use evidence to support understanding ELAR.8.5.G evaluate details read to determine key ideas ELAR.8.5.H synthesize information to create new understanding</p> | |
| <p>Science.8.10.B identify global patterns of atmospheric movement and how they influence local weather</p> <p>Career Highlights: Atmospheric and Space Scientist, Environmental Engineer, Hydrologist</p> | | <p>SS.8.10.C analyze the effects of physical and human geographic factors such as weather, landforms, waterways, transportation, and communication on major historical events in the United States</p> | <p>ELAR.8.5.F make inferences and use evidence to support understanding ELAR.8.5.G evaluate details read to determine key ideas ELAR.8.5.H synthesize information to create new understanding</p> | |

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| <p>Science.8.10.C describe the interactions between ocean currents and air masses that produce tropical cyclones, including typhoons and hurricanes</p> <p>Career Highlights: Atmospheric and Space Scientist, Environmental Engineer, Hydrologist</p> | | | <p>ELAR.8.12.A generate student-selected and teacher-guided questions for formal and informal inquiry</p> <p>ELAR.8.12.F synthesize information from a variety of sources</p> <p>ELAR.8.12.J use an appropriate mode of delivery, whether written, oral, or multimodal, to present results</p> | |
| <p>Science.8.11.A use scientific evidence to describe how natural events, including volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate</p> <p>Career Highlights: Environmental Scientist, Geoscientist, Biologist</p> | <p>Math.8.1.G display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication</p> | | <p>ELAR.8.12.A generate student-selected and teacher-guided questions for formal and informal inquiry</p> <p>ELAR.8.12.F synthesize information from a variety of sources</p> <p>ELAR.8.12.J use an appropriate mode of delivery, whether written, oral, or multimodal, to present results</p> | |

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| <p>Science.8.11.B use scientific evidence to describe how human activities, including the release of greenhouse gases, deforestation, and urbanization, can influence climate</p> <p>Career Highlights: Zoologist and Wildlife Biologist, Environmental Scientist, Biologist</p> | <p>Math.8.1.G display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication</p> | <p>SS.8.27.A explain the effects of technological and scientific innovations such as the steamboat, the cotton gin, the telegraph, and interchangeable parts</p> <p>SS.8.27.B analyze how technological innovations changed the way goods were manufactured and distributed, nationally and internationally</p> <p>SS.8.28.A compare the effects of scientific discoveries and technological innovations that have influenced daily life in different periods in U.S. history</p> | <p>ELAR.8.12.A generate student-selected and teacher-guided questions for formal and informal inquiry</p> <p>ELAR.8.12.F synthesize information from a variety of sources</p> <p>ELAR.8.12.J use an appropriate mode of delivery, whether written, oral, or multimodal, to present results</p> | <p>TA.8.4.A evaluate how changes in technology throughout history have impacted various areas of study</p> <p>TA.8.4.B evaluate and predict how global trends impact the development of technology</p> <p>TA.8.4.C transfer current knowledge to the learning of newly encountered technologies</p> |
| <p>Science.8.11.C describe the carbon cycle</p> <p>Career Highlights: Geoscientist, Biologist, Remote Sensing Scientist and Technologist</p> | | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
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| <p>Science.8.12.A explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems</p> <p>Career Highlights: Biologist, Environmental Scientist, Hydrologist</p> | <p>Math.8.11.A construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data</p> <p>Math.8.11.C simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected</p> | <p>SS.8.11.A analyze how physical characteristics of the environment influenced population distribution, settlement patterns, and economic activities in the United States</p> | <p>ELAR.8.5.D create mental images to deepen understanding</p> <p>ELAR.8.5.E make connections to personal experiences, ideas in other texts, and society</p> <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> | |
| <p>Science.8.12.B describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity</p> <p>Career Highlights: Zoologist and Wildlife Biologist, Environmental Scientist, Biologist</p> | <p>Math.8.11.A construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data</p> <p>Math.8.11.C simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected</p> | <p>SS.8.10.B compare places and regions of the United States in terms of physical and human characteristics</p> <p>SS.8.11.A analyze how physical characteristics of the environment influenced population distribution, settlement patterns, and economic activities in the United States</p> | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> <p>ELAR.8.6.I reflect on and adjust responses as new evidence is presented</p> | |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <p>Science.8.12.C describe how biodiversity contributes to the stability and sustainability of an ecosystem and the health of the organisms within the ecosystem</p> <p>Career Highlights: Environmental Scientist, Geoscientist, Conservation Scientist</p> | <p>Math.8.4.B graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship</p> <p>Math.8.4.C use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems</p> <p>Math.8.5.A represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$</p> | <p>SS.8.10.B compare places and regions of the United States in terms of physical and human characteristics</p> | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> <p>ELAR.8.6.I reflect on and adjust responses as new evidence is presented</p> | |
| <p>Science 8.13.A identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells</p> <p>Career Highlights: Bioengineer and Biomedical Engineer, Molecular and Cellular Biologist, Physician and Pathologist</p> | | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> <p>ELAR.8.6.F respond using newly acquired vocabulary as appropriate</p> | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <p>Science 8.13.B describe the function of genes within chromosomes in determining inherited traits of offspring</p> <p>Career Highlights: Geneticist, Molecular and Cellular Biologist, Physician and Pathologist</p> | <p>Math.8.5.H identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems</p> | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> <p>ELAR.8.6.F respond using newly acquired vocabulary as appropriate</p> | |
| <p>Science.8.13.C describe how variations of traits within a population lead to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations</p> <p>Career Highlights: Geneticist, Molecular and Cellular Biologist, Agricultural Scientist</p> | | | <p>ELAR.8.5.F make inferences and use evidence to support understanding</p> <p>ELAR.8.5.H synthesize information to create new understanding</p> <p>ELAR.8.6.F respond using newly acquired vocabulary as appropriate</p> | |