Engineering Design Challenge Planning Guide (Grade 2)

Engineering Design Challenge Planning Guide

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 use language skills when researching to determine if the problem has occurred before 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 between what they are learning in every class and braid that understanding together to create a solution to a problem using the engineering design process.

Purpose of this Guide:

This guide supports educators in developing cross-curricular engineering design challenges anchored in the science standards. Engineering practices are part of the student expectations in the Texas Essential Knowledge and Skills (TEKS) for science. However, an engineering design challenge can incorporate content from multiple subject areas to enable students to apply content to solve a real-world problem.

This guide provides the following components:

- A graphic organizer to organize targeted standards
- A content crosswalk to help educators identify potential connections for an engineering design challenge
- STEM career highlights for each student expectation
- Stakeholder engagement ideas

Engineering Design Practices:

When developing an engineering design challenge, it is important to anchor the challenge in TEKS. The students will use the engineering practice 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 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.

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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 2 science, the following engineering practices and can be paired with engineering design challenges. The student is expected to:

Science.2.1.A ask questions and define problems based on observations or information from text, phenomena, models, or investigations
Science.2.1.B use scientific practices to plan and conduct simple descriptive investigations and use engineering practices to design solutions to problems
Science.2.1.G develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem
Science.2.2.D evaluate a design or object using criteria to determine if it works as intended
Science.2.4.A explain how science or an innovation can help others
Science.2.4.B identify scientists and engineers such as Alexander Graham Bell, Marie Daly, Mario Molina, and Jane Goodall and explore what different scientists and engineers do
Science.2.5.A identify and use patterns to describe phenomena or design solutions

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.2.3.A develop explanations and propose solutions supported by data and models
Science.2.3.B communicate explanations and solutions individually and collaboratively in a variety of settings and formats
Science.2.3.C listen actively to others' explanations to identify important evidence and engage respectfully in scientific discussion

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Integration Planning Graphic Organizer Component:

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. For example, instructional materials, district scope and sequences, student age, and other factors that inform instructional decisions.

On the next page is an example of a grade 5 science engineering design challenge developed using the components of this planning guide. 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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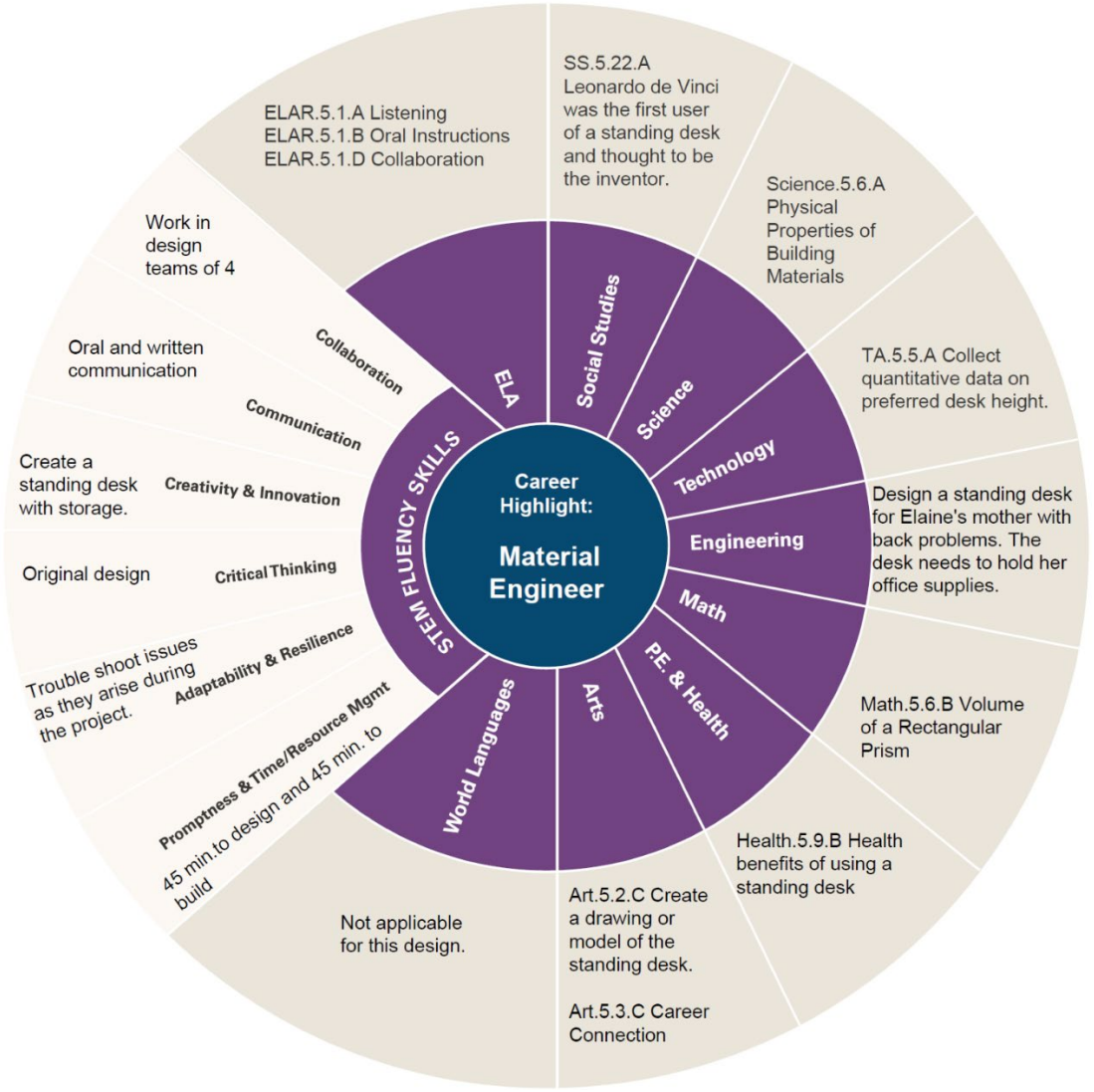

Engineering Design Challenge: Design a standing desk for Elaine's mother with back problems. The desk needs to hold her office supplies.

Core Subject Area Connection Summary:

Science.5.6.A Physical Properties of Building Materials

Math.5.6.B Volume of a Rectangular Prism

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

ELAR.5.1.A Listening, ELAR.5.1.B Oral Instructions, ELAR.5.1.D Collaboration

Enrichment Area Connection Summary:

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

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

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

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Integrated Content Crosswalk for STEM Education Component:

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 included 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
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 **Career Highlights:** Materials Engineers, Machinists, Service Unit Operators	**Math.5.1.E** create and use representations to organize, record, and communicate mathematical ideas **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 **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	**SS.5.22.A** identify the accomplishments of notable individuals in the fields of science and technology such as Benjamin Franklin and Thomas Edison	**ELAR.5.1.B** follow, restate, and give oral instructions that include multiple action steps **ELAR.5.1.D** work collaboratively with others to develop a plan of shared responsibilities **ELAR.5.13.A** generate questions on a topic for formal and informal inquiry	**TA.5.5.A** identify and collect quantitative and qualitative data with digital tools

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Career Highlights Component:

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 link provides a description of the career, education requirements, and wage range of the profession. 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
Science.2.6.A classify matter by observable physical properties, including texture, flexibility, and relative temperature, and identify whether a material is a solid or liquid **Career Highlights:** Materials Engineers, Machinists, Service Unit Operators	**Math.2.8.B** classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language **Math.2.8.C** classify and sort polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices	**SS.2.4.A** identify major landforms and bodies of water, including each of the seven continents and each of the oceans, on maps and globes		**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays
Science.2.6.B conduct a descriptive investigation to explain how physical properties can be changed through processes such as cutting, folding, sanding, melting, or freezing **Career Highlights:** Materials Engineers, Machinists, Welders, Cutters, Solderers, and Brazers	**Math.2.1.A** apply mathematics to problems arising in everyday life, society, and the workplace **Math.2.1.B** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution		**ELAR.2.13.B** develop and follow a research plan with adult assistance **ELAR.2.1.D** work collaboratively with others by following agreed-upon rules for discussion, including listening to others, speaking when recognized, making appropriate contributions, and building on the ideas of others	**TA.2.1.A** identify and communicate a problem or task and break down (decompose) multiple solutions into sequential steps **TA.2.1.C** analyze a plan with adult assistance that outlines the steps needed to complete a task **TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.6.C demonstrate that small units such as building blocks can be combined or reassembled to form new objects for different purposes and explain the materials chosen based on their physical properties **Career Highlights:** Materials Engineers, Civil Engineering, Transportation Engineers	**Math.2.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication **Math.2.3.B** explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part **Math.2.8.D** compose two-dimensional shapes and three-dimensional solids with given properties or attributes	**SS.2.5.A** identify ways in which people have modified the physical environment such as clearing land, building roads, using land for agriculture, and drilling for oil	**ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	
Science.2.7.A explain how objects push on each other and may change shape when they touch or collide **Career Highlights:** Engineers, Physicists, Forensic Science Technicians			**ELAR.2.13.E** demonstrate understanding of information gathered	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.7.B plan and conduct a descriptive investigation to demonstrate how the strength of a push and pull changes an object's motion **Career Highlights:** Engineers, Physicists, Mobile Heavy Equipment Mechanics	**Math.2.1.B** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution **Math.2.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.2.9.A** find the length of objects using concrete models for standard units of length **Math.2.9.D** determine the length of an object to the nearest marked unit using rulers, yardsticks, meter sticks, or measuring tapes		**ELAR.2.1.D** work collaboratively with others by following agreed-upon rules for discussion, including listening to others, speaking when recognized, making appropriate contributions, and building on the ideas of others **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance **ELAR.2.13.B** develop and follow a research plan with adult assistance	**TA.2.1.A** identify and communicate a problem or task and break down (decompose) multiple solutions into sequential steps **TA.2.1.C** analyze a plan with adult assistance that outlines the steps needed to complete a task **TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays **TA.2.10.A** select and use a variety of applications, devices, and online learning environments to create and share content
Science.2.8.A demonstrate and explain that sound is made by vibrating matter and that vibrations can be caused by a variety of means, including sound **Career Highlights:** Sound Engineering Technicians, Architects, Sonar Technician			**ELAR.2.1.C** share information and ideas that focus on the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.8.B explain how different levels of sound are used in everyday life such as a whisper in a classroom or a fire alarm **Career Highlights:** Sound Engineering Technicians, Architects, Sonar Technician		**SS.2.13.B** explain how science and technology have affected the ways in which people meet basic needs	**ELAR.2.1.C** share information and ideas that focus on the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	
Science.2.8.C design and build a device using tools and materials that uses sound to solve the problem of communicating over a distance **Career Highlights:** Sound Engineering Technicians, Architects, Sonar Technician	**Math.2.1.A** apply mathematics to problems arising in everyday life, society, and the workplace **Math.2.1.B** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution **Math.2.9.A** find the length of objects using concrete models for standard units of length **Math.2.9.D** determine the length of an object to the nearest marked unit using rulers, yardsticks, meter sticks, or measuring tapes	**SS.2.13.A** describe how science and technology have affected communication, transportation, and recreation	**ELAR.2.1.D** work collaboratively with others by following agreed-upon rules for discussion, including listening to others, speaking when recognized, making appropriate contributions, and building on the ideas of others **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance **ELAR.2.13.B** develop and follow a research plan with adult assistance	**TA.2.1.A** identify and communicate a problem or task and break down (decompose) multiple solutions into sequential steps **TA.2.1.C** analyze a plan with adult assistance that outlines the steps needed to complete a task **TA.2.3.B** apply a design process with components such as testing and reflecting to create new and useful solutions to identify and solve for authentic problems

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.9.A describe the Sun as a star that provides light and heat and explain that the Moon reflects the Sun's light **Career Highlights:** Astronomers, Atmospheric and Space Scientists, Solar Energy Systems Engineers			**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.7.C** use text evidence to support an appropriate response **ELAR.2.7.E** interact with sources in meaningful ways such as illustrating or writing **ELAR.2.13.E** demonstrate understanding of information gathered	**TA.2.1.B** identify complex patterns and make predictions based on the pattern
Science.2.9.B observe objects in the sky using tools such as a telescope and compare how objects in the sky are more visible and can appear different with a tool than with an unaided eye **Career Highlights:** Astronomers, Atmospheric and Space Scientists, Photonics Technicians	**Math.2.1.A** apply mathematics to problems arising in everyday life, society, and the workplace **Math.2.1.F** analyze mathematical relationships to connect and communicate mathematical ideas		**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.10.A investigate and describe how wind and water move soil and rock particles across the Earth's surface such as wind blowing sand into dunes on a beach or a river carrying rocks as it flows **Career Highlights:** Geographers, Geoscientists, Hydrologists	**Math.2.1.A** apply mathematics to problems arising in everyday life, society, and the workplace **Math.2.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.2.9.D** determine the length of an object to the nearest marked unit using rulers, yardsticks, meter sticks, or measuring tapes		**ELAR.2.1.A** listen actively, ask relevant questions to clarify information, and answer questions using multi-word responses **ELAR.2.1.D** work collaboratively with others by following agreed-upon rules for discussion, including listening to others, speaking when recognized, making appropriate contributions, and building on the ideas of others **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	**TA.2.3.A** demonstrate personal skills and behaviors, including effective communication, following directions, and mental agility, needed to implement a design process successfully **TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays
Science.2.10.B measure, record, and graph weather information, including temperature and precipitation **Career Highlights:** Atmospheric and Space Scientists, Geoscientists, Hydrologists	**Math.2.1.E** create and use representations to organize, record, and communicate mathematical ideas **Math.2.10.A** explain that the length of a bar in a bar graph or the number of pictures in a pictograph represents the number of data points for a given category **Math.2.10.B** organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more			**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holiday

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.10.C investigate different types of severe weather events such as a hurricane, tornado, or flood and explain that some events are more likely than others in a given region **Career Highlights:** Atmospheric and Space Scientists, Geoscientists, Hydrologists	**Math.2.1.D** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate **Math.2.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.2.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication		**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.6.H** synthesize information to create new understanding **ELAR.2.13.C** identify and gather relevant sources and information to answer the questions **ELAR.2.13.E** demonstrate understanding of information gathered	**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays **TA.2.5.B** conduct a basic search independently using provided keywords and digital sources
Science.2.11.A distinguish between natural and manmade resources **Career Highlights:** Geoscientists, Mining & Geological Engineers, Anthropologists & Archeologists		**SS.2.4.A** identify major landforms and bodies of water, including each of the seven continents and each of the oceans, on maps and globes **SS.2.7.C** trace the development of a product from a natural resource to a finished product	**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.7.C** use text evidence to support an appropriate response **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance **ELAR.2.13.E** demonstrate understanding of information gathered	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.11.B describe how human impact can be limited by making choices to conserve and properly dispose of materials such as reducing use of, reusing, or recycling paper, plastic, and metal **Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists	**Math.2.1.A** apply mathematics to problems arising in everyday life, society, and the workplace **Math.2.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	**SS.2.5.B** identify consequences of human modification of the physical environment **SS.2.5.C** identify ways people can conserve and replenish Earth's resources	**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.7.C** use text evidence to support an appropriate response **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance **ELAR.2.13.E** demonstrate understanding of information gathered	
Science.2.12.A describe how the physical characteristics of environments, including the amount of rainfall, support plants and animals within an ecosystem **Career Highlights:** Range Managers, Biologists, Zoologists & Wildlife Biologists, Environmental Science and Protection Technicians	**Math.2.1.D** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate **Math.2.1.E** create and use representations to organize, record, and communicate mathematical ideas **Math.2.10.D** draw conclusions and make predictions from information in a graph		**ELAR.2.6.F** make inferences and use evidence to support understanding **ELAR.2.7.C** use text evidence to support an appropriate response **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance **ELAR.2.13.E** demonstrate understanding of information gathered	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.12.B create and describe food chains identifying producers and consumers to demonstrate how animals depend on other living things **Career Highlights:** Soil & Plant Scientists, Biologists, Farmworkers & Laborers, Crop, Nursery, & Greenhouse		**SS.2.7.B** identify ways in which people are both producers and consumers	**ELAR.2.6.F** make inferences and use evidence to support understanding	
Science.2.12.C explain and demonstrate how some plants depend on other living things, wind, or water for pollination and to move their seeds around **Career Highlights:** Soil & Plant Scientists, Biologists, Farmworkers & Laborers, Crop, Nursery, & Greenhouse	**Math.2.10.D** draw conclusions and make predictions from information in a graph		**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.6.F** make inferences and use evidence to support understanding **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	
Science.2.13.A identify the roots, stems, leaves, flowers, fruits, and seeds of plants and compare how those structures help different plants meet their basic needs for survival **Career Highlights:** Biologists, Geneticists, Soil & Plant Scientists, Farmworkers & Laborers, Crop, Nursery, & Greenhouse			**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.6.F** make inferences and use evidence to support understanding **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.2.13.B record and compare how the structures and behaviors of animals help them find and take in food, water, and air **Career Highlights:** Biologists, Zoologists and Wildlife, Environmental Science and Protection Technicians			**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.6.F** make inferences and use evidence to support understanding **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays
Science.2.13.C record and compare how being part of a group helps animals obtain food, defend themselves, and cope with changes **Career Highlights:** Range Managers, Biologists, Zoologists & Wildlife Biologists, Environmental Science and Protection Technicians	**Math.2.10.D** draw conclusions and make predictions from information in a graph	**SS.2.8.A** identify functions of governments such as establishing order, providing security, and managing conflict	**ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.13.A** generate questions for formal and informal inquiry with adult assistance	**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays
Science.2.13.D investigate and describe some of the unique life cycles of animals where young animals do not resemble their parents, including butterflies and frogs **Career Highlights:** Zoologists and Wildlife Biologists, Biologists, Bioengineers and Biomedical Engineers			**ELAR.2.1.C** share information and ideas that focus on the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language **ELAR.2.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.2.6.F** make inferences and use evidence to support understanding	**TA.2.5.A** identify and collect non-numerical data, such as weather patterns, preferred reading genres, and holidays **TA.2.5.B** conduct a basic search independently using provided keywords and digital sources

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Stakeholder Engagement Component:

This section highlights the various ways different external stakeholders can utilize the integrated learning crosswalk. The Integrated Content for STEM Education crosswalk can be used in the following ways to:

Parents:

- highlight content alignment across their child's grade level.
- provide context to parents to communicate the relevance of schoolwork to their child.
- explore different careers with their child and learn about various STEM occupations.

K-12 Education:

- provide ideas for connecting learning for students across different subject areas.
- give campuses ideas for how to connect career awareness to content.
- align K-5 career awareness activities with feeder pathways leading to high school career technical education programs of study.
- providing cross-curricular instruction allows students to understand the collaborative nature of STEM careers.

Institutes of Higher Education:

- support pre-service teachers in developing cross-curricular projects without researching all the subject standards.
- provide guidance for professors who are designing cross-curricular projects for courses and professional development.
- offer departments a better understanding of the content students learn before entering higher education programs.

Non-Profit Organizations:

- support the design of cross-curricular programs, curricula, and professional development aligned with state standards for in and out-of-school time.
- use the crosswalk to align current programming with standards from different subject areas and provide a uniform way to measure student outcomes in programs.
- provide self-contained teachers with cross-curricular lessons during professional development.

Business and Industry:

- connect engineering design challenges to local businesses to get professional design feedback.
- find industry mentors for teachers and students on content and designs.
- connect schools with industry to offer "lunch and learns" with industry workers, guest speakers, and externships or professional development for teachers aligned with their lesson's career focus.