Engineering Design Challenge Planning Guide (Grade 3)

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 3 science, the following standards include engineering practices and could be paired with engineering design challenges. The student is expected to:

Science.3.1.A ask questions and define problems based on observations or information from text, phenomena, models, or investigations
Science.3.1.B use scientific practices to plan and conduct descriptive investigations and use engineering practices to design solutions to problems
Science.3.1.G develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem
Science.3.2.D evaluate a design or object using criteria
Science.3.4.A explain how scientific discoveries and innovative solutions to problems impact science and society
Science.3.4.B 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.3.5.A identify and use patterns to explain scientific phenomena or to 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.3.3.A develop explanations and propose solutions supported by data and models
Science.3.3.B communicate explanations and solutions individually and collaboratively in a variety of settings and formats
Science.3.3.C listen actively to others' explanations to identify relevant 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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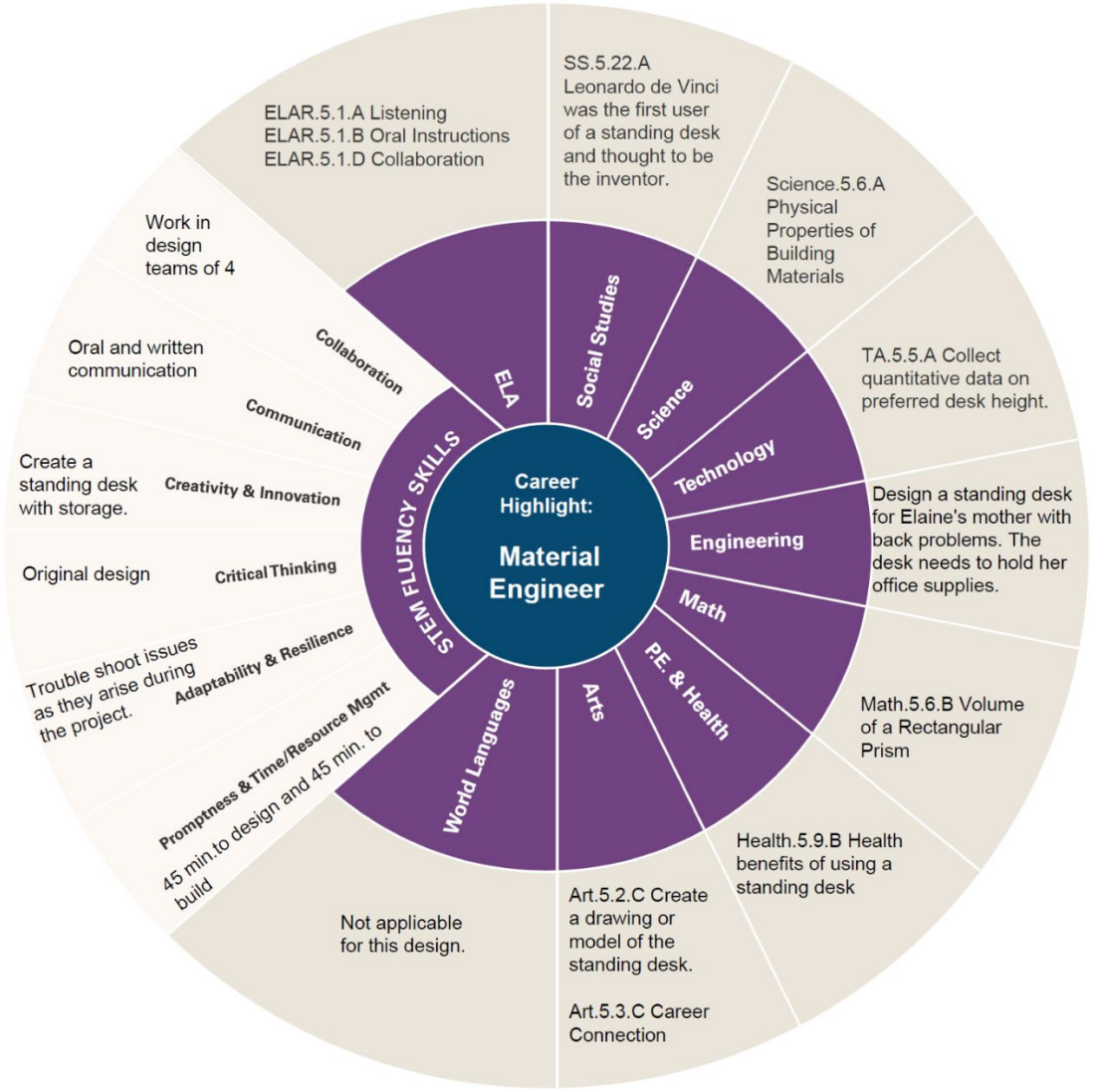

Engineering Design Challenge: Design a standing desk for Elaine's mother with back problems. The desk needs to hold her office supplies.

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.3.6.A measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float in water **Career Highlights:** Materials Engineers, Machinists, Service Unit Operators	**Math.3.7.D** determine when it is appropriate to use measurements of liquid volume (capacity) or weight **Math.3.7.E** determine liquid volume (capacity) or weight using appropriate units and tools		**ELAR.3.1.D** work collaboratively with others by following agreed-upon rules, norms, and protocols	**TA.3.5.A** identify and collect numerical data such as the price of goods or temperature
Science.3.6.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 **Career Highlights:** Materials Engineers, Chemists, Atmospheric and Space Scientists	**Math.3.7.D** determine when it is appropriate to use measurements of liquid volume (capacity) or weight			

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.6.C predict, observe, and record changes in the state of matter caused by heating or cooling in a variety of substances such as ice becoming liquid water, condensation forming on the outside of a glass, or liquid water being heated to the point of becoming water vapor (gas) **Career Highlights:** Nanosystems Engineers, Hydrologists, Chemists	**Math.3.1.E** create and use representations to organize, record, and communicate mathematical ideas **Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.7.D** determine when it is appropriate to use measurements of liquid volume (capacity) or weight **Math.3.7.E** determine liquid volume (capacity) or weight using appropriate units and tools		**ELAR.3.13.A** generate questions on a topic for formal and informal inquiry **ELAR.3.13.B** develop and follow a research plan with adult assistance	**TA.3.5.A** identify and collect numerical data such as the price of goods or temperature
Science.3.6.D demonstrate that materials can be combined based on their physical properties to create or modify objects such as building a tower or adding clay to sand to make a stronger brick and justify the selection of materials based on their physical properties **Career Highlights:** Materials Engineers, Civil Engineering, Transportation Engineers	**Math.3.6.B** use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories	**SS.3.3.B** identify and compare how people in different communities adapt to or modify the physical environment in which they live such as deserts, mountains, wetlands, and plains	**ELAR.3.1.D** work collaboratively with others by following agreed-upon rules, norms, and protocols	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.7.A demonstrate and describe forces acting on an object in contact or at a distance, including magnetism, gravity, and pushes and pulls **Career Highlights:** Engineers, Physicists, Aerospace Engineers	**Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.5.E** represent real-world relationships using number pairs in a table and verbal descriptions		**ELAR.3.1.B** follow, restate, and give oral instructions that involve a series of related sequences of action **ELAR.3.1.D** work collaboratively with others by following agreed-upon rules, norms, and protocols **ELAR.3.13.A** generate questions on a topic for formal and informal inquiry	
Science.3.7.B plan and conduct a descriptive investigation to demonstrate and explain how position and motion can be changed by pushing and pulling objects such as swings, balls, and wagons **Career Highlights:** Engineers, Physicists, Airline Pilots, Copilots, and Flight Engineers	**Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication **Math.3.5.E** represent real-world relationships using number pairs in a table and verbal descriptions	**SS.3.16.B** use problem-solving and decision-making processes to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution	**ELAR.3.13.A** generate questions on a topic for formal and informal inquiry **ELAR.3.13.B** develop and follow a research plan with adult assistance	**TA.3.1.A** decompose story problems into smaller, manageable subproblems and identify a solution to the problems **TA.3.1.C** develop a plan collaboratively and document a plan that outlines specific steps taken to complete a project **TA.3.5.A** identify and collect numerical data such as the price of goods or temperature

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.8.A identify everyday examples of energy, including light, sound, thermal, and mechanical **Career Highlights:** Photonics Engineers, Physicists, Nanosystems Engineers		**SS.3.1.B** identify individuals, including Pierre-Charles L'Enfant, Benjamin Banneker, and Benjamin Franklin, who have helped to shape communities	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain **ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society	
Science.3.8.B plan and conduct investigations that demonstrate how the speed of an object is related to its mechanical energy **Career Highlights:** Transportation Planners, Command and Control Center Specialist, Engineers	**Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.5.E** represent real-world relationships using number pairs in a table and verbal descriptions **Math.3.8.A** summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals	**SS.3.16.B** use problem-solving and decision-making processes to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution	**ELAR.3.13.A** generate questions on a topic for formal and informal inquiry **ELAR.3.13.B** develop and follow a research plan with adult assistance	**TA.3.1.C** develop a plan collaboratively and document a plan that outlines specific steps taken to complete a project **TA.3.5.A** identify and collect numerical data such as the price of goods or temperature **TA.3.6.A** analyze data in graphs to identify and discuss trends and inferences

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.9.A construct models and explain the orbits of the Sun, Earth, and Moon in relation to each other **Career Highlights:** Astronomers, Aerospace Engineers, Atmospheric and Space Scientists			**ELAR.3.6.D** create mental images to deepen understanding **ELAR.3.6.F** make inferences and use evidence to support understanding **ELAR.3.7.E** interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating **ELAR.3.13.A** generate questions on a topic for formal and informal inquiry	
Science.3.9.B identify the order of the planets in Earth's solar system in relation to the Sun **Career Highlights:** Astronomers, Aerospace Engineers, Atmospheric and Space Scientists			**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain information **ELAR.3.6.D** create mental images to deepen understanding **ELAR.3.6.F** make inferences and use evidence to support understanding **ELAR.3.6.G** evaluate details read to determine key ideas	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.10.A compare and describe day-to-day weather in different locations at the same time, including air temperature, wind direction, and precipitation **Career Highlights:** Atmospheric and Space Scientists, Geoscientists, Hydrologists	**Math.3.1.F** create and use representations to organize, record, and communicate mathematical ideas **Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.8.A** summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals		**ELAR.3.13.A** generate questions on a topic for formal and informal inquiry **ELAR.3.13.C** identify and gather relevant information from a variety of source	
Science.3.10.B investigate and explain how soils such as sand and clay are formed by weathering of rock and by decomposition of plant and animal remains **Career Highlights:** Park Naturalists, Geographers, Geoscientists		**SS.3.3.A** describe similarities and differences in the physical environment, including climate, landforms, natural resources, and natural hazards	**ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.6.F** make inferences and use evidence to support understanding **ELAR.3.13.A** generate questions on a topic for formal and informal inquiry	**TA.3.1.B** identify simple and complex patterns in story problems **TA.3.5.B** use various search strategies with adult assistance **TA.3.6.A** analyze data in graphs to identify and discuss trends and inferences

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.10.C model and describe rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides **Career Highlights:** Geographers, Geoscientists, Hydrologists	**Math.3.1.E** create and use representations to organize, record, and communicate mathematical ideas	**SS.3.3.A** describe similarities and differences in the physical environment, including climate, landforms, natural resources, and natural hazards	**ELAR.3.6.D** create mental images to deepen understanding **ELAR.3.6.F** make inferences and use evidence to support understanding	
Science.3.11.A explore and explain how humans use natural resources such as in construction, in agriculture, in transportation, and to make products **Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists	**Math.3.9.B** describe the relationship between the availability or scarcity of resources and how that impacts cost	**SS.3.3.A** describe similarities and differences in the physical environment, including climate, landforms, natural resources, and natural hazards **SS.3.3.B** identify and compare how people in different communities adapt to or modify the physical environment in which they live such as deserts, mountains, wetlands, and plains	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain information **ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.13.C** identify and gather relevant information from a variety of source	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.11.B explain why the conservation of natural resources is important **Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists	**Math.3.9.B** describe the relationship between the availability or scarcity of resources and how that impacts cost;	**SS.3.3.C** describe the effects of human processes such as building new homes, conservation, and pollution in shaping the landscape	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain **ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.13.H** use an appropriate mode of delivery, whether written, oral, or multimodal, to present results information	
Science.3.11.C identify ways to conserve natural resources through reducing, reusing, or recycling **Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists		**SS.3.3.C** describe the effects of human processes such as building new homes, conservation, and pollution in shaping the landscape	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain information **ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.13.C** identify and gather relevant information from a variety of source	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.12.A explain how temperature and precipitation affect animal growth and behavior through migration and hibernation and plant responses through dormancy **Career Highlights:** Range Managers, Biologists, Zoologists & Wildlife Biologists, Environmental Science and Protection Technicians	**Math.3.1.E** create and use representations to organize, record, and communicate mathematical ideas **Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas	**SS.3.3.B** identify and compare how people in different communities adapt to or modify the physical environment in which they live such as deserts, mountains, wetlands, and plains **SS.3.4.A** use cardinal and intermediate directions to locate places on maps and globes in relation to the local community **SS.3.4.C** identify, create, and interpret maps of places that contain map elements, including a title, compass rose, legend, scale, and grid system	**ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.13.C** identify and gather relevant information from a variety of source **ELAR.3.13.H** use an appropriate mode of delivery, whether written, oral, or multimodal, to present results information	
Science.3.12.B identify and describe the flow of energy in a food chain and predict how changes in a food chain such as removal of frogs from a pond or bees from a field affect the ecosystem **Career Highlights:** Soil & Plant Scientists, Biologists, Farmworkers & Laborers, Crop, Nursery, & Greenhouse	**Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.5.E** represent real-world relationships using number pairs in a table and verbal descriptions **Math.3.8.A** summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals		**ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.13.C** identify and gather relevant information from a variety of source **ELAR.3.13.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.3.12.C describe how natural changes to the environment such as floods and droughts cause some organisms to thrive and others to perish or move to new locations **Career Highlights:** Environmental Engineers, Environmental Science and Protection Technicians, Environmental Restoration Planners	**Math.3.1.F** analyze mathematical relationships to connect and communicate mathematical ideas **Math.3.5.E** represent real-world relationships using number pairs in a table and verbal descriptions **Math.3.8.A** summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals	**SS.3.3.A** describe similarities and differences in the physical environment, including climate, landforms, natural resources, and natural hazards **SS.3.3.B** identify and compare how people in different communities adapt to or modify the physical environment in which they live such as deserts, mountains, wetlands, and plains	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain information **ELAR.3.6.G** evaluate details read to determine key ideas **ELAR.3.13.C** identify and gather relevant information from a variety of source	
Science.3.12.D identify fossils as evidence of past living organisms and environments, including common Texas fossils **Career Highlights:** Geoscientists, Anthropologists & Archeologists, Biologists		**SS.3.14.C** interpret oral, visual, and print material by sequencing, categorizing, identifying the main idea, distinguishing between fact and opinion, identifying cause and effect, comparing, and contrasting **SS.3.14.D** interpret and create visuals, including graphs, charts, tables, timelines, illustrations, and maps	**ELAR.3.6.B** generate questions about text before, during, and after reading to deepen understanding and gain information **ELAR.3.6.G** evaluate details read to determine key ideas **ELAR.3.13.A** generate questions on a topic for formal and informal inquiry	

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Science Student Expectation	Math Connection	Social Studies Connection	Reading Language Arts Connection	Technology Applications Connection
Science.3.13.A explore and explain how external structures and functions of animals such as the neck of a giraffe or webbed feet on a duck enable them to survive in their environment **Career Highlights:** Biologists, Zoologists and Wildlife, Geneticists			**ELAR.3.6.E** make connections to personal experiences, ideas in other texts, and society **ELAR.3.6.H** synthesize information to create new understanding **ELAR.3.13.A** generate questions on a topic for formal and informal inquiry	
Science.3.13.B explore, illustrate, and compare life cycles in organisms such as beetles, crickets, radishes, or lima beans **Career Highlights:** Zoologists and Wildlife Biologists, Biologists, Bioengineers and Biomedical Engineers			**ELAR.3.6.G** evaluate details read to determine key ideas **ELAR.3.6.H** synthesize information to create new understanding **ELAR.3.13.C** identify and gather relevant information from a variety of source	

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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.