# Engineering Design Challenge Planning Guide (Grade 1)

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

Science.1.1.A ask questions and define problems based on observations or information from text, phenomena, models, or investigations
Science.1.1.B use scientific practices to plan and conduct simple descriptive investigations and use engineering practices to design solutions to problems
Science.1.1.G develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem
Science.1.2.D evaluate a design or object using criteria to determine if it works as intended
Science.1.4.A explain how science or an innovation can help others
Science.1.4.B identify scientists and engineers such as Katherine Johnson, Sally Ride, and Ernest Just and explore what different scientists and engineers do
Science.1.5.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.1.3.A develop explanations and propose solutions supported by data and models
Science.1.3.B communicate explanations and solutions individually and collaboratively in a variety of settings and formats
Science.1.3.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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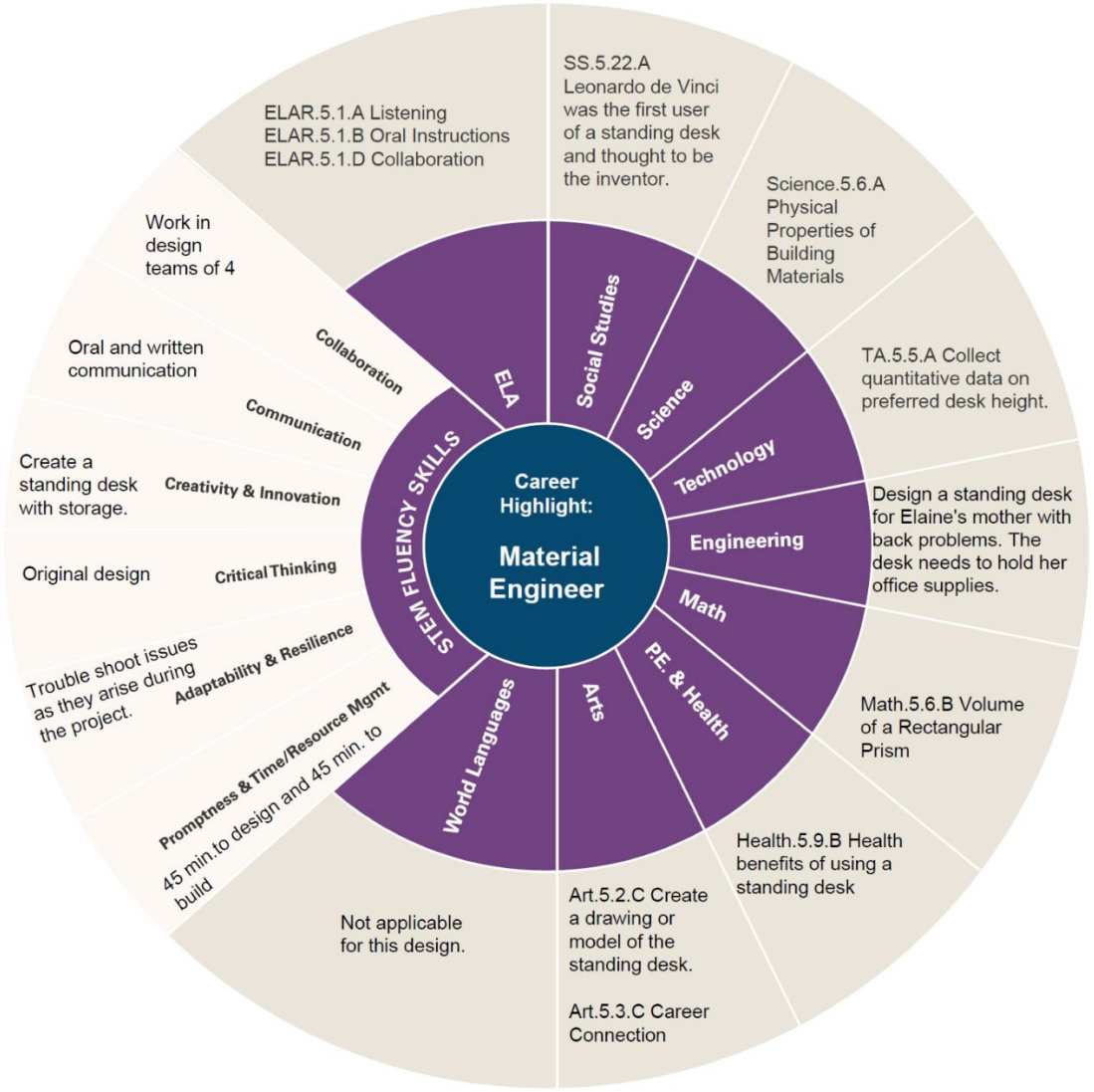


**Engineering Design Challenge:** Design a standing desk for Elaine's mother with back problems. The desk needs to hold her office supplies.

**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<br><br>**Career Highlights:** Materials Engineers, Machinists, Service Unit Operators | **Math.5.1.E** create and use representations to organize, record, and communicate mathematical ideas<br>**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<br>**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<br>**ELAR.5.1.D** work collaboratively with others to develop a plan of shared responsibilities<br>**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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Texas Education Agency

## 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.1.6.A** classify objects by observable physical properties, including, shape, color, and texture, and attributes such as larger and smaller and heavier and lighter<br><br>**Career Highlights:** Materials Engineers, Machinists, Service Unit Operators | **Math.1.6.A** classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language<br>**Math.1.6.D** identify two-dimensional shapes, including circles, triangles, rectangles, and squares, as special rectangles, rhombuses, and hexagons and describe their attributes using formal geometric language<br>**Math.1.6.E** identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes), and triangular prisms, and describe their attributes using formal geometric language<br>**Math.1.7.A** give an example of a measurable attribute of a given object including length, capacity, and weight | | | **TA.1.1.B** identify the simple patterns found in the solutions to everyday problems or tasks<br>**TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.6.B** explain and predict changes in materials caused by heating and cooling<br><br>**Career Highlights:** Materials Engineers, Welders, Cutters, Solderers, and Brazers, Cooling and Freezing Equipment Operators and Tenders | **Math.1.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication | | **ELAR.1.1.C** share information and ideas about the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language<br>**ELAR.1.6.C** make and correct or confirm predictions using text features, characteristics of genre, and structures with adult assistance | |
| **Science.1.6.C** demonstrate and explain that a whole object is a system made of organized parts such as a toy that can be taken apart and put back together<br><br>**Career Highlights:** Materials Engineers, Civil Engineering, Machinists | **Math.1.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication | | **ELAR.1.1.C** share information and ideas about the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.7.A** explain how pushes and pulls can start, stop, or change the speed or direction of an object's motion<br><br>**Career Highlights:** Engineers, Physicists, Forensic Science Technicians | **Math.1.1.G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication | | **ELAR.1.1.C** share information and ideas about the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language<br>**ELAR.1.6.H** synthesize information to create new understanding with adult assistance | |
| **Science.1.7.B** plan and conduct a descriptive investigation that predicts how pushes and pulls can start, stop, or change the speed or direction of an object's motion<br><br>**Career Highlights:** Engineers, Physicists, Mobile Heavy Equipment Mechanics | **Math.1.1.A** apply mathematics to problems arising in everyday life, society, and the workplace<br>**Math.1.1.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.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.B** develop and follow a research plan with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.1.C** create a simple algorithm (step-by-step instructions) for an everyday task<br>**TA.1.3.A** practice personal skills and behaviors, including following directions and mental agility, needed to implement a design process successfully<br>**TA.1.3.B** use a design process with components such as asking questions, brainstorming, or storyboarding to identify and solve authentic problems with adult assistance<br>**TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.8.A** investigate and describe applications of heat in everyday life such as cooking food or using a clothes dryer<br><br>**Career Highlights:** Heating, Air Conditioning, and Refrigeration Mechanics, Mechanical Engineer, Cooling and Freezing Equipment Operators and Tenders | **Math.1.1.A** apply mathematics to problems arising in everyday life, society, and the workplace | | **ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.3.A** practice personal skills and behaviors, including following directions and mental agility, needed to implement a design process successfully<br>**TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |
| **Science.1.8.B** describe how some changes caused by heat may be reversed such as melting butter and other changes cannot be reversed such as cooking an egg or baking a cake<br><br>**Career Highlights:** Heating, Air Conditioning, and Refrigeration Mechanics, Mechanical Engineer, Cooling and Freezing Equipment Operators and Tenders | **Math.1.1.A** apply mathematics to problems arising in everyday life, society, and the workplace | | **ELAR.1.1.C** share information and ideas about the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.9.A** describe and predict the patterns of seasons of the year such as order of occurrence and changes in nature<br><br>**Career Highlights:** Atmospheric and Space Scientists, Geoscientists, Hydrologists | **Math.1.1.F** analyze mathematical relationships to connect and communicate mathematical ideas | **SS.1.17.A** use a simple timeline to distinguish among past, present, and future<br>**SS.1.17.B** use a calendar to describe and measure time in days, weeks, months, and years | **ELAR.1.6.E** make connections to personal experiences, ideas in other texts, and society with adult assistance | **TA.1.1.B** identify the simple patterns found in the solutions to everyday problems or tasks |
| **Science.1.10.A** investigate and document the properties of particle size, shape, texture, and color and the components of different types of soils such as topsoil, clay, and sand<br><br>**Career Highlights:** Geographers, Geoscientists, Soil & Plant Scientists | **Math.1.6.A** classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language<br>**Math.1.6.B** distinguish between attributes that define a two-dimensional or three-dimensional figure and attributes that do not define the shape | **SS.1.5.A** identify and describe the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather | **ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.B** develop and follow a research plan with adult assistance | **TA.1.3.A** practice personal skills and behaviors, including following directions and mental agility, needed to implement a design process successfully<br>**TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.10.B** investigate and describe how water can move rock and soil particles from one place to another<br><br>**Career Highlights:** Geographers, Geoscientists, Hydrologists | | **SS.1.5.A** identify and describe the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather | **ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.B** develop and follow a research plan with adult assistance<br>**ELAR.1.13.E** use an appropriate mode of delivery, whether written, oral, or multimodal, to present results | **TA.1.3.A** practice personal skills and behaviors, including following directions and mental agility, needed to implement a design process successfully<br>**TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |
| **Science.1.10.C** compare the properties of puddles, ponds, streams, rivers, lakes, and oceans, including color, clarity, size, shape, and whether it is freshwater or saltwater<br><br>**Career Highlights:** Geographers, Geoscientists, Hydrologists | **Math.1.1.F** analyze mathematical relationships to connect and communicate mathematical ideas<br>**Math.1.7.B** compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference | **SS.1.4.A** identify the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather<br>**SS.1.5.A** identify and describe the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather | **ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.B** develop and follow a research plan with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.10.D** describe and record observable characteristics of weather, including hot or cold, clear or cloudy, calm or windy, and rainy or icy, and explain the impact of weather on daily choices<br><br>**Career Highlights:** Atmospheric and Space Scientists, Geoscientists, Hydrologists | **Math.1.1.E** create and use representations to organize, record, and communicate mathematical ideas<br>**Math.1.8.A** collect, sort, and organize data in up to three categories using models/representations such as tally marks or T-charts | **SS.1.4.A** identify the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather<br>**SS.1.5.A** identify and describe the physical characteristics of place such as landforms, bodies of water, Earth's resources, and weather | **ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |
| **Science.1.11.A** identify and describe how plants, animals, and humans use rocks, soil, and water<br><br>**Career Highlights:** Geoscientists, Anthropologists & Archeologists, Soil & Plant Scientists | | **SS.1.5.B** identify and describe how geographic location influences the human characteristics of place such as shelter, clothing, food, and activities | **ELAR.1.1.C** share information and ideas about the topic under discussion, speaking clearly at an appropriate pace and using the conventions of language<br>**ELAR.1.13.A** generate questions for formal and informal inquiry with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.11.B** explain why water conservation is important<br><br>**Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists | | **SS.1.10.A** explain the purpose for rules and laws in the home, school, and community | **ELAR.1.6.E** make connections to personal experiences, ideas in other texts, and society with adult assistance<br>**ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.7.C** use text evidence to support an appropriate response<br>**ELAR.1.13.E** use an appropriate mode of delivery, whether written, oral, or multimodal, to present results | **TA.1.5.B** conduct a basic search using provided keywords and digital sources with adult assistance |
| **Science.1.11.C** describe ways to conserve water such as turning off the faucet when brushing teeth and protect natural sources of water such as keeping trash out of bodies of water<br><br>**Career Highlights:** Engineers, Agricultural Engineers, Conservation Scientists | **Math.1.1.A** apply mathematics to problems arising in everyday life, society, and the workplace | **SS.1.10.A** explain the purpose for rules and laws in the home, school, and community | **ELAR.1.6.E** make connections to personal experiences, ideas in other texts, and society with adult assistance<br>**ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.13.E** use an appropriate mode of delivery, whether written, oral, or multimodal, to present results | **TA.1.1.A** identify and discuss a problem or task and break down (decompose) the solution into sequential steps |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.12.A** classify living and nonliving things based upon whether they have basic needs and produce young<br><br>**Career Highlights:** Biologists, Zoologists and Wildlife, Environmental Science and Protection Technicians | | **SS.1.6.A** describe ways that families meet basic human needs | **ELAR.1.6.E** make connections to personal experiences, ideas in other texts, and society with adult assistance<br>**ELAR.1.6.G** evaluate details to determine what is most important with adult assistance | |
| **Science.1.12.B** describe and record examples of interactions and dependence between living and nonliving components in terrariums or aquariums<br><br>**Career Highlights:** Range Managers, Biologists, Zoologists & Wildlife Biologists, Environmental Science and Protection Technicians | | | **ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.6.H** synthesize information to create new understanding with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance | **TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.12.C** identify and illustrate how living organisms depend on each other through food chains<br><br>**Career Highlights:** Soil & Plant Scientists, Biologists, Farmworkers & Laborers, Crop, Nursery, & Greenhouse | **Math.1.1.E** create and use representations to organize, record, and communicate mathematical ideas<br>**Math.1.1.F** analyze mathematical relationships to connect and communicate mathematical ideas | **SS.1.7.C** identify the role of markets in the exchange of goods and services | **ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.6.G** evaluate details to determine what is most important with adult assistance<br>**ELAR.1.6.H** synthesize information to create new understanding with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.9.A** select and use a variety of applications, devices, and online learning environments to create an original product |
| **Science.1.13.A** identify the external structures of different animals and compare how those structures help different animals live, move, and meet basic needs for survival<br><br>**Career Highlights:** Biologists, Zoologists and Wildlife, Geneticists | | | **ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.5.B** conduct a basic search using provided keywords and digital sources with adult assistance |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.13.B** record observations of and describe basic life cycles of animals, including a bird, a mammal, and a fish<br><br>**Career Highlights:** Zoologists and Wildlife Biologists, Biologists, Bioengineers and Biomedical Engineers | **Math.1.1.A** apply mathematics to problems arising in everyday life, society, and the workplace<br>**Math.1.1.E** create and use representations to organize, record, and communicate mathematical ideas | | **ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.6.H** synthesize information to create new understanding with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects<br>**TA.1.5.B** conduct a basic search using provided keywords and digital sources with adult assistance |

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| Science Student Expectation | Math Connection | Social Studies Connection | Reading Language Arts Connection | Technology Applications Connection |
|---|---|---|---|---|
| **Science.1.13.C** compare ways that young animals resemble their parents<br><br>**Career Highlights:** Zoologists and Wildlife Biologists, Biologists, Bioengineers and Biomedical Engineers | | | **ELAR.1.6.F** make inferences and use evidence to support understanding with adult assistance<br>**ELAR.1.6.H** synthesize information to create new understanding with adult assistance<br>**ELAR.1.13.C** identify and gather relevant sources and information to answer the questions with adult assistance<br>**ELAR.1.13.D** demonstrate understanding of information gathered with adult assistance | **TA.1.5.A** explore and collect many types of data such as preferences or daily routines of people, events, or objects<br>**TA.1.5.B** conduct a basic search using provided keywords and digital sources with adult assistance |

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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.