

STEM Career Explorations

Companion Lesson to USA Science and Engineering Festival

Student Career Resources Page

Grade Band: 6-12		Topic: Career Exploration
<p>Brief Lesson Description: In this lesson, students will explore various career opportunities in STEM fields using a specific website that provides information on jobs, educational programs, internships, apprenticeships, and professional organizations. They will engage in research, analysis, and creative presentations to understand the skills, education, and daily life associated with different careers in STEM.</p>		
<p>Performance Expectation(s): <u>MS-ETS1-1:</u> Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impact on people and the natural environment that may limit possible solutions. <u>HS-ETS1-1:</u> Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p>		
<p>Specific Learning Outcomes: Students will be able to: -Identify a STEM career of interest. -Research and summarize job descriptions, required skills, and salary information. -Create an engaging representation of their chosen career through various formats.</p>		
<p>Narrative / Background Information</p> <p>This lesson exploring STEM careers expects that students have a basic understanding of what STEM fields entail, along with research and analytical skills to navigate online resources. Additionally, students should be comfortable expressing their findings creatively through various formats, such as written summaries or visual presentations.</p> <p>This lesson is important as it raises awareness of the diverse career options available in STEM, fostering self-exploration and helping students identify their strengths and interests. By connecting classroom learning to real-world applications, students can make informed decisions about their educational and career paths, ultimately preparing them for future opportunities in a rapidly evolving job market.</p>		
<p>Science & Engineering Practices:</p> <p><u>Asking Questions and Defining Problems</u> Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1)</p> <p>Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HS-ETS1-1)</p>	<p>Disciplinary Core Ideas:</p> <p><u>ETS1.A: Defining and Delimiting Engineering Problems</u></p> <p>The more precisely a design's task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (MS-ETS1-1)</p> <p>Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if the given design meets them. (HS-ETS1-1)</p> <p>Humanity faces major global challenges today, such as the need for supplies of clean water and food or energy sources that minimize pollution, which can be addressed through engineering. These global challenges may also manifest in local communities. (HS-ETS1-1)</p>	<p>Crosscutting Concepts:</p> <p><u>Connections to Engineering, Technology, and Application of Science</u></p> <p><u>Influence of Science, Engineering, and Technology on Society and the Natural World</u></p> <p>The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)</p> <p>All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment (MS-ETS1-1)</p> <p>New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1)</p>

Possible Preconceptions/Misconceptions:

Narrow Definition of STEM: Students may believe that STEM careers are limited to traditional fields like engineering and medicine, overlooking other areas such as environmental science, data analysis, or technology-related roles.

Overemphasis on Math and Science: Some students might think that STEM careers require advanced math and science skills to the exclusion of other abilities, leading them to feel discouraged if they don't excel in these areas.

Assumption of Job Availability: Students may assume that all STEM careers are in high demand without understanding the specific skills and qualifications required for different roles, leading to unrealistic expectations about job opportunities.

A belief that Passion Alone Suffices: Some students might think that simply having an interest in a STEM field is enough to succeed, not realizing the necessity for education, training, and continual skill development.

Fixed Mindset About Skills: Students may believe that their current skills are fixed and unchangeable, leading to a lack of motivation to develop new skills or explore areas of interest further.

Addressing these misconceptions is crucial to helping students gain a more accurate understanding of STEM careers and empowering them to explore their options confidently.

LESSON PLAN – 5-E Model**ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions:**

Begin the lesson with a discussion of the importance of STEM careers in today's world. You can use information and data from the infographic "[The Value of a STEM Education](#)" to help students see the value of these careers.

Next, have students work with a partner to generate a list of STEM careers that they know about. After a few minutes, have students compile a class list. Then show the video "[STEM Careers: Inspiring the Next Generation of Innovators](#)"

EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions:

Go to <https://usasciencefestival.org/resources/> to access the Student Career Resources. Have students select one (or more) industries of interest to browse.

Have students browse the careers within their chosen cluster for 10-15 minutes. Select one or more careers that they would like to learn more about. Have them create a list of these careers to come back to in the elaborate section of this lesson.

EXPLAIN:

Discuss the components of a career profile, including job description, required skills, education paths, and average salary. Explain that these components add together to fully describe a career path for students to be able to compare careers.

From their list in the explore section, have students select one career that they would like to learn more about. They should then gather the following information using the [student graphic organizer](#) or in a class notebook:

- Job description and typical responsibilities
- Education and training required
- Skills and qualities needed
- Average Salary
- Work environment and schedule
- Professional Organizations, Educational Programs, and Internship & Apprentice Opportunities

ELABORATE: Applications and Extensions:

Students will choose one of the following activities from the [X-STEM Career Connections Choice Board](#) to deepen their understanding of their selected career. Before students make their choice board product, introduce the X-STEM Career Connections Choice Board Template, explaining the various project options and their expectations.

After providing students with work time (30 minutes), students will present their chosen project to the class, allowing for peer feedback and discussion of the various careers explored.

EVALUATE:

Formative Monitoring (Questioning / Discussion):

The following components can be used to assess student understanding throughout the lesson:

Explore: List of STEM Careers

Explain: List of Careers to Learn More About

Explain: Research on Graphic Organizer

Elaborate: Products from Choice Board

Summative Assessment (Quiz / Project / Report):

Students will reflect upon their learning by completing an individual reflection. Provide a copy of the "[Reflection Assessment](#)" to each student and then grade using the provided rubric.

Elaborate Further / Reflect: Enrichment:

Students will organize a STEM Career Exploration Fair where they will choose an additional STEM career to research and present. Each student will create a booth or presentation that highlights key aspects of their chosen career, including job responsibilities, required skills, education pathways, salary expectations, and job outlook. To enhance their presentations, students will prepare engaging materials such as informative posters, brochures, and interactive elements like quizzes or hands-on activities. During the fair, students will take turns presenting their booths to classmates, encouraging questions and discussions. Following the event, students will reflect on what they learned from their peers and how this knowledge may influence their own career exploration, fostering collaboration and communication skills while deepening their understanding of various STEM opportunities.

SOCIAL EMOTIONAL LEARNING ACTIVITY

CASEL Competency Addressed: Self-Awareness and Social Awareness

Objective: In this 30-minute SEL lesson, students will reflect on their personal strengths and interests to identify potential STEM careers that align with their individual profiles. This self-analysis will help them understand how their unique qualities can contribute to their future career choices.

Introduction

As a class, discuss the question: *"What are some qualities or skills you believe are important in STEM Careers?"*

Next, discuss the importance of self-awareness in career choices. Explain how by understanding your own strengths and interests, you can find a job that is fulfilling for you in a STEM Field.

Activity: Strengths and Interests Survey

Provide each student with a copy of the "[Personal Strengths and Interests Survey](#)." After students complete individually, divide class into small groups. Each group should discuss the following questions:

1. *"Which of your strengths do you think is most valuable in a STEM field?"*
2. *"How do your interests align with different STEM careers?"*

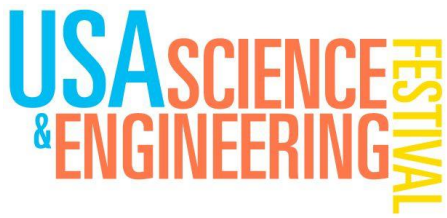
Bring the class back together and have students share their insights from the group discussion. Discuss how specific strengths and interests can be connected to various careers in STEM. For example:

1. A student who enjoys problem-solving might thrive in engineering.
2. A student interested in biology may find fulfillment in healthcare or environmental science.
3. A student who likes to work with their hands may enjoy working in welding.

Conclusion

Ask students to reflect individually on what their takeaways are from the lesson. Have them share with their small groups. Encourage students to consider what steps they might take next in their career exploration based on their survey and their learning in the lesson.

Materials Required for This Lesson/Activity	
Quantity	Description
1 per student	Computer or Tablet for Internet Research and Choice Board Products.
For the Class	Markers, Colored Pencils, Crayons, Blank Paper for Choice Board Products



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