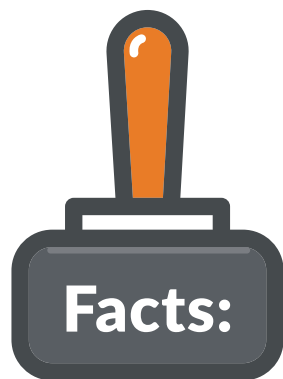


5-E Classroom STEM Activity:
Exploring STEM Careers:
Construction, Health Care, Manufacturing, Transportation

Ellen Egley
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STEM Myths Busted

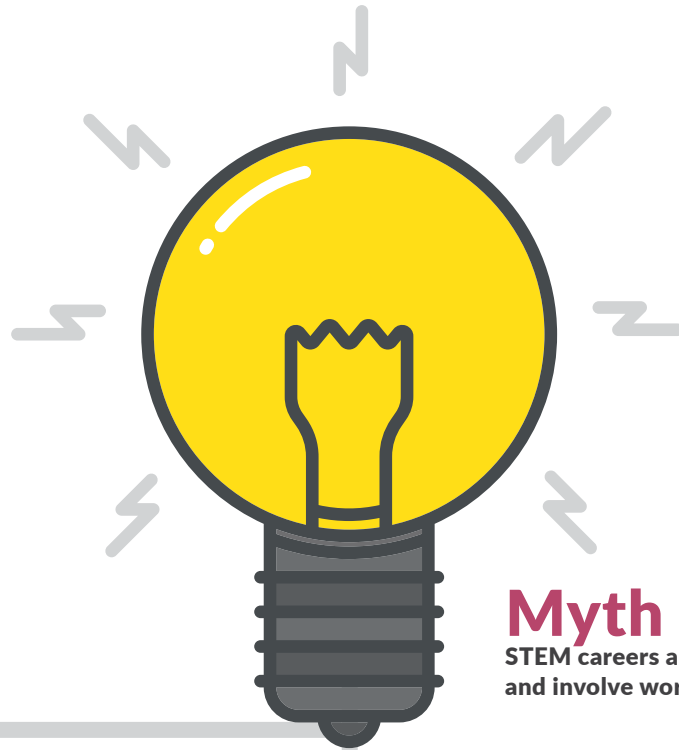
There are a lot of myths out there about STEM careers and the path students should take after high school. These myths are accepted as fact and feed into each other - causing students to miss out on opportunities to do what they love. Let's bust some common STEM myths.



A. Engineering recruitment experts told engineering.com that two out of the top five skills hiring managers are looking for revolve around collaboration: communication and interpersonal skills.

B. Apple co-founder and entrepreneur Steve Jobs famously said, "Great things in business are never done by one person; they're done by a team of people." If that holds true for a huge, innovative tech company like Apple, it's likely true for other STEM companies as well.

C. Diversity is so important in all its forms as true innovation can only happen when people with diverse perspectives, experiences, and ideas come together and build on each other's solutions. That collaborative process cannot happen when people are working in isolation.



Myth 1:
STEM careers are isolating and involve working alone.



5-E Classroom STEM Activity: Exploring STEM Careers

Here are some ideas for how middle school teachers could use this story as a launching point for integrated STEM learning. Our activities follow the 5-E Learning Cycle Model.



Part 1: Engage

- 1 Take an informal poll in your classroom:
 - a. How many of you believe many STEM careers are isolating and involve working alone?
 - b. How many of you know what you want to do as a career?
 - c. How many of you know the education path that trains you for that career and how much that path is likely to cost?
 - d. What conclusions can you draw from students' responses?
- 2 Have students read "STEM Myths Busted" in the Early Fall 2018 issue of *STEM Jobs*SM magazine.
 - a. Did anything surprise them?
 - b. What are their thoughts about the importance of collaboration in STEM?



Part 2: Explore

- 1 Break students into pairs and assign each pair one of the job spreads that can be found in the magazine or online at edu.STEMjobs.com/teacher-resources. Teacher can determine whether to assign them randomly or based on student interest.
- 2 Tell students that each pair will choose one job from their assigned job spread to investigate further. Teacher will monitor selections to avoid duplications. Students will research:
 - a. Duties and Responsibilities
 - i. What can someone in this career expect to do each day?
 - ii. What skills are used?
 - b. Education Required
 - i. What type of training is required to be qualified for this career?
 - ii. If formal schooling is required:
 1. Which program provides the best training? (computer science, communication, civil engineering, etc.)
 2. What schools in your area offer this program?
 3. What is the tuition cost for the applicable program at three of these schools?
 4. What is the graduation rate at these three schools?
 5. What is the job placement rate at these three schools?
 6. How long does it take the average student to complete the program at each of these three schools?
 - c. Salary
 - i. What is the average entry-level salary?
 - ii. What is the median salary?
 - iii. How long will you have to work to recoup tuition costs if you earn the entry-level salary? The median salary?
 - d. Job Prospects
 - i. Is there job growth projected for this career?
 - ii. What companies in your area are hiring for this career?
 1. Do they pay for continuing education?
 2. Are there opportunities for advancement and growth?
 3. Do they offer benefits?
 - a. How much do employees pay for health insurance?
 - b. Is there a retirement offering, like a 401K?

Recommended resources can be found at edu.STEMjobs.com/teacher-resources.



Part 3: Explain

- 1 Students will create a PowerPoint or Google Slides presentation of their findings to share with the class. Both students in each pair should contribute to both the creation and delivery of the presentation. Pairs will be graded according to the rubric in the Evaluate section, which should be shared with students when the assignment is given.
- 2 At the culmination of the presentations, poll students again:
 - a. Did anyone discover a career they never knew existed?
 - b. Did anyone discover a career they would consider pursuing?
 - c. Which career had the lowest education cost?
 - d. Which career had the highest salary?



Part 4: Elaborate

Students will submit a formal writing assignment responding to the following prompt:

What career was the most appealing to you and why?

Was this a career you would have considered previously?

Why or why not?

What courses should you take in high school to prepare you for the career or post-graduate training?



Part 5: Evaluate

Group presentations and individual contributions will be scored according to the following rubric. Individual writing assignments can be graded as desired.

5	4	3	2	1
The presentation was clear, concise, and thorough. It provided precise information and explanations.		The presentation was informative. It answered most of the questions posed in the prompt in an understandable way.		The presentation was unclear and only provided a small portion of the required information.
The student contributed to the group's research, understanding, and presentation in meaningful ways.		The student contributed somewhat to the group's research and/or presentation.		The student did not contribute to the group's research or presentation.

Standards Addressed:

Common Core State Standards - English and Language Arts

CCSS.ELA-LITERACY.RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-LITERACY.W.6.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.W.6.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

CCSS.ELA-LITERACY.W.6.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.W.6.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-LITERACY.SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.6.4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

CCSS.ELA-LITERACY.SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

CCSS.ELA-LITERACY.W.7.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.W.7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

CCSS.ELA-LITERACY.W.7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.W.7.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-LITERACY.SL.7.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.7.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

CCSS.ELA-LITERACY.SL.7.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

CCSS.ELA-LITERACY.W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.W.8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CCSS.ELA-LITERACY.W.8.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.W.8.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CCSS.ELA-LITERACY.SL.8.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

CCSS.ELA-LITERACY.SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

National Career Development Guidelines

ED1.K1 Recognize the importance of educational achievement and performance to the attainment of personal and career goals.

ED1.K7 Recognize that your educational achievement and performance can lead to many workplace options.

ED1.R7 Assess how well your educational achievement and performance will transfer to the workplace.

ED2.K5 Identify types of ongoing learning experiences available to you (e.g., two- and four-year colleges, technical schools, apprenticeships, the military, online courses, and on-the-job training).

ED2.R5 Assess how participation in ongoing learning experiences (e.g., two- and four-year colleges, technical schools, apprenticeships, the military, on-line courses, and on-the-job training) affects your personal and career goals.

ED2.K6 Identify specific education/training programs (e.g., high school career paths and courses, college majors, and apprenticeship programs).

CM3.R1 Assess the impact of career information on your plans and refine plans so that they reflect accurate, current, and unbiased career information.

CM3.K2 Recognize that career information includes occupational, education and training, employment, and economic information and that there is a range of career information resources available.

CM3.A2 Demonstrate the ability to use different types of career information resources (i.e., occupational, educational, economic, and employment) to support career planning.

CM3.K5 Identify occupations that you might consider without regard to your gender, race, culture, or ability.

Standards Addressed (Cont.):

Texas Essential Knowledge and Skills for Career Development

EC.1.D research current and emerging fields related to personal interest areas
EC.1.E determine academic requirements in career fields related to personal interest areas
EC.1.G research educational options and requirements using appropriate technology
EC.3.B explore opportunities for earning college credit in high school such as advanced placement courses, International Baccalaureate courses, dual credit, and local and statewide articulated credit
EC.3.E demonstrate decision-making skills related to school and community issues, programs of study, and career planning
EC.5.B use appropriate resources to compare and contrast salaries and educational requirements of at least three careers in the student's interest area
EC.5.C evaluate at least three career interests based on budget and salary expectations
EC.7.A demonstrate effective verbal, nonverbal, written, and electronic communication skills
CP.1.A identify the various career opportunities within one or more career clusters
CP.1.B identify the pathways within one or more career clusters
CP.2.A investigate career opportunities within the pathways
CP.2.B explore careers of personal interest
CP.2.C research the academic requirements for careers of personal interest
CP.2.D research the certification or educational requirements for careers of personal interest
CP.3.B identify the academic and technical skills needed
CPI.9.D determine continuing education opportunities that enhance career advancement and promote lifelong learning
CPII.9.A research and identify current or emerging occupations
CPII.9.B analyze future employment outlook
CPII.9.E identify the academic and technical entry requirements for employment in various high-skill, high-wage, or high-demand occupations
CPII.10.A evaluate and compare employment options such as salaries, benefits, and prerequisites
CPII.10.B compare rewards and demands for various levels of employment in a variety of careers
CPII.10.C determine continuing education opportunities that enhance career advancement and promote lifelong learning
CPII.10.D determine preparation requirements for levels of employment in a variety of careers

Texas Essential Knowledge and Skills - Math

6.14.A compare the annual salary of several occupations requiring various levels of post-secondary education or vocational training and calculate the effects of the different annual salaries on lifetime income
8.12.G estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college

ISTE Technology Standards

3a Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
3b Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
6a Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
6b Students create original works or responsibly repurpose or remix digital resources into new creations.
6d Students publish or present content that customizes the message and medium for their intended audiences.