Lesson Planning Template **Teacher: DeSIRE**

📆Date:	Topic: Career Opportunities in STEM and Advanced Manufacturing	Time Required: 45 minutes

🎯**Learning Target/Objectives:**

- I can describe the career that I intend to pursue as an adult.
- I can describe several careers in various areas of STEM and Advanced Manufacturing.

📜**Vocabulary:**

- Career
- Salary
- Job
- Wage
- STEM

Color Legend:
Red = Essential
Blue = Enrichment
Purple = In Depth

❓**Guiding Questions:**

- What careers in STEM and Advanced Manufacturing would allow me to do what I love doing?
- What careers in STEM and Advanced Manufacturing cater to my skills and aptitudes.

📚**Lesson Design Details:**
Activity 1: Students will complete a career inventory survey that will suggest three careers that they might pursue based on their responses

Activity 2: Students will prepare a 3-minute presentation defining two of the suggested careers and explaining why they would be interested in pursuing the career they found most interesting (whether it was recommended by the questionnaire or not).

Key Points:
Manufacturing is imperative to the U.S. economy, and has been deemed “a vital engine of our economic growth, innovation, and competitiveness” by the U.S. Department of Defense.

American manufacturers contribute more than $2.35 trillion to the national economy, making it the most impactful sector today. Manufacturers are essential, and so are their employees.

Some Advanced Manufacturing career options and jobs

Computer-aided design (CAD) *technician* - National average salary: $56,189 per year

> Primary duties: CAD technicians often study industrial technology and technology management, using CAD software to design and manufacture products and organize and perform production runs. They develop expertise within the CAD software and can use it to manufacture a variety of products.

Computer hardware engineer - National average salary: $106,813 per year

Primary duties**:** Computer hardware engineers conduct research and lead development of hardware systems, parts and overall functionality. They test all components, establish production specifications and upgrade older systems to be compatible with newer ones.

Electrical engineer - National average salary: $95,119 per year

Primary duties: An electrical engineer creates, builds and tests electrical systems, from small devices like a computer keyboard to large items like vehicles or airplanes. They develop electrical testing methods to establish quality assurance, improve production through establishing more efficient ways to use electrical power, manage projects or research and ensure all required codes and safety standards are met.

Electronics technician - National average salary: $54,352 per year

Primary duties: An electronics technician helps engineers develop and design electrical products, components and parts. They create prototypes and use diagnostic tools to test, review or repair equipment and products.

Fabricator - National average salary: $53,175 per year

Primary duties: A fabricator creates a finished product by assembling parts according to instructions. They inspect the finished item and complete quality assurance. Being a fabricator requires the ability to read blueprints and renderings, understand the latest technology and have dexterity to put fitting parts together.

Machinist - National average salary: $61,741 per year

Primary duties: Machinists create metal parts, tools, components and instruments by using specialized and sophisticated computer-controlled machine tools, lasers or water jets. They follow blueprints and renderings from computer-aided design (CAD) and can produce one unique item or a batch of many quantities.

Mechanical engineer - National average salary: $89,424 per year

Primary duties: Mechanical engineers design and supervise the manufacture of machines, products and components for a variety of uses or industries, like elevators, escalators, helicopters, electric generators or medical equipment. They analyze, test and interpret schematic drawings to best execute production.

Mechatronics engineering technician - National average salary: $72,901 per year

Primary duties: Mechatronics engineering technicians apply mechanical, electrical and computer engineering theories and principals to modify, develop and test machines and equipment used in various parts of the manufacturing process.

Robotics engineers - National average salary: $107,080 per year

Primary duties: Robotics engineers design, build, program and test complex electromechanical robots and automation devices that are used in manufacturing. They create new designs or enhance and update existing ones for improving efficiency.

Career Opportunities in STEM

STEM Shortage

The current shortage of professionals with STEM degrees, combined with the growing diversity of our nation's population, has provided incentive to US businesses seeking STEM talent to pay close attention to gender, racial, and ethnic diversity at every level.

Girls in STEM

Girls and minorities are more eager to join STEM than we may realize, and their potential is limitless. In NAF's STEM academies, 41% of students are female and 67% are from minority backgrounds.

STEM Careers: Everything You Need to Know

https://www.bestcolleges.com/careers/stem/

Benefits of Pursuing a STEM Career

- Many STEM jobs boast above-average median salaries
- According to the Bureau of Labor Statistics (BLS), the median annual salary for all computer and information technology jobs was over $100,000 in 2023.
- Demand for STEM professionals is rising
- The BLS projects 11% growth in STEM jobs between 2022 and 2032. This need for more STEM workers is primarily fueled by ongoing tech advancements and the growing use of artificial intelligence.

Science Careers

Science involves understanding and analyzing the natural and physical world around us. As a science major, you can pursue jobs in fields like biology, astronomy, environmental science, physics, and so on. Some science fields may require you to earn a graduate degree.

10 Popular Science Jobs			
Jobs	**Minimum Degree Required**	**Median Annual Salary (May 2023)**	**Job Growth Rate (2022-2032)**
Agricultural and Food Scientist	Bachelor's degree	$76,400	6%
Astronomer	Doctoral degree	$127,930	5%
Atmospheric Scientist	Bachelor's degree	$92,860	4%
Chemical Technician	Associate degree	$56,750	3%
Environmental Scientist	Bachelor's degree	$78,980	6%
Epidemiologist	Master's degree	$81,390	27%
Medical Scientist	Doctoral degree	$100,890	10%
Nuclear Technician	Associate degree	$101,740	-1%
Physicist	Doctoral degree	$155,680	5%
Zoologist and Wildlife Biologist	Bachelor's degree	$70,600	3%

Technology Careers

Technology careers offer the chance to work at the cutting edge of innovation. According to the BLS, jobs for computer and technology professionals are projected to grow far faster than the average for all jobs between 2022 and 2032.

In this STEM field, you could design and build software as a software developer. Or you could protect computer systems from cyber threats as a cybersecurity analyst.

10 Popular Tech Jobs			
Job	**Minimum Degree Required**	**Median Annual Salary (May 2023)**	**Job Growth Rate (2022-2032)**
Computer and Information Research Scientist	Master's degree	$145,080	23%
Computer Network Architect	Bachelor's degree	$129,840	4%
Computer Programmer	Bachelor's degree	$99,700	-11%
Computer Support Specialist	High school diploma or associate degree	$60,810	5%
Computer Systems Analyst	Bachelor's degree	$103,800	10%
Database Administrator	Bachelor's degree	$101,510	7%
Database Architect	Bachelor's degree	$134,700	10%
Information Security Analyst	Bachelor's degree	$120,360	32%
Software Developer	Bachelor's degree	$132,270	26%
Web Developer	Bachelor's degree	$84,960	17%

Engineering Careers

Engineering is all about using math and science to build computers, machines, buildings, and other structures. Popular engineering specializations include civil, mechanical, and electrical engineering. According to the BLS, architecture and engineering professionals earned a median salary of $91,420 in 2023 — that's over $40,000 more than the median salary for all jobs.

10 Popular Engineering Jobs			
Job	**Minimum Degree Required**	**Median Annual Salary (May 2023)**	**Job Growth Rate (2022-2032)**
Aerospace Engineer	Bachelor's degree	$130,720	6%
Chemical Engineer	Bachelor's degree	$112,100	8%
Civil Engineer	Bachelor's degree	$95,890	5%
Electrical Engineer	Bachelor's degree	$106,950	4%
Environmental Engineer	Bachelor's degree	$100,090	6%
Industrial Engineer	Bachelor's degree	$99,380	12%
Marine Engineers and Naval Architect	Bachelor's degree	$100,270	1%
Mechanical Engineer	Bachelor's degree	$99,510	10%
Nuclear Engineer	Bachelor's degree	$125,460	1%
Petroleum Engineer	Bachelor's degree	$135,690	2%

Math Careers

Math jobs generally entail using math fundamentals to analyze, calculate, and interpret data. You could become an actuary for a company to analyze cost and risk. Or you could teach math as a secondary or postsecondary educator. You'll need at least a master's degree to become a mathematician or statistician.

Popular Math Jobs

Job	Minimum Degree Required	Median Annual Salary (May 2023)	Job Growth Rate (2022-2032)
Actuary	Bachelor's degree	$120,000	23%
Data Scientist	Bachelor's degree	$108,020	35%
High School Math Teacher	Bachelor's degree	$65,220 (all teachers)	1% (all teachers)
Math Professor	Doctoral degree	$81,020	3%
Mathematician	Master's degree	$116,440	2%
Operations Research Analyst	Bachelor's degree	$83,640	23%
Statistician	Master's degree	$104,110	32%

📝**Materials/Resources:**

- Digital Journal (Google Slides RECOMMENDED):

📋**Closing (Check for Understanding):**

- Discussion Review - students will share
  - Answers to Guiding Questions
  - Any surprises they experienced

Category	Standard Organization	Standard/Benchmark Code & Description
Career Exploration	**NCSCOS (CTE)**	**EY30.01.01:** Explore the nature of the world of work and the various career clusters, including Advanced Manufacturing and STEM.
Self-Knowledge	**NCSCOS (CTE)**	**CD.01:** Understand the relationship between self-knowledge (interests/skills) and career goals through tools like career inventories.
Engineering Roles	**ITEEA (STEL)**	**STEL-1O:** Assess how scientific, mathematics, engineering, and technological knowledge contribute to the design of products or systems.

Management & Planning	**ITEEA (STEL)**	**STEL-2Z:** Use management processes in planning, organizing, and controlling work within a technological or engineering context.
Career-Ready Skills	**ITEEA (STEL)**	**STEL-1P:** Analyze the rate of technological development (e.g., AI/Robotics) and predict its impact on future careers.
Personal Learning Goals	**ISTE (Students)**	**1.1.a:** Students articulate and set personal learning goals and develop strategies leveraging technology to achieve them.
Digital Identity	**ISTE (Students)**	**1.2.a:** Cultivate and manage a digital identity and reputation, recognizing the rights and responsibilities of working in a digital world.
Real-World Issues	**ISTE (Students)**	**1.3.d:** Build knowledge by actively exploring real-world issues and problems, such as the current STEM labor shortage.
Workplace Readiness	**NCSCOS (CTE)**	**WE.01:** Demonstrate employability skills (communication/collaboration) required for professional presentations on career interests.