

©Advanced Manufacturing eCTE

The following resources are related to the <u>Advance CTE Career Cluster</u>. This Cluster covers areas such as engineering, research and development, automation and artificial intelligence, equipment maintenance, safety protocols, and quality control.

A Possible Futures–Engineering and Design arizonafuture.org/programs/

(Grades 6-10) Free engineering lessons aligned to Arizona Career Literacy standards.

AZ PBS Careers in Engineering engineering--technology/careers

(Grades 5-8) Free resources to guide students to explore careers in engineering.

AZ PBS Learning-Manufacturing Process factories2/manufacturing

(Grades 5-8) The manufacturing process involves taking raw materials through a variety of steps to produce a finished product.

AZ PBS What is a Semiconductor? <u>az.pbslearningmedia.org/resource</u>

(Grades 5-8) Semiconductors are in everything from your cell phone to rockets. But what exactly are they, and what makes them so special? Find out from MIT Electrical Engineering and Computer Science.

Classroom Assembly Activities assembly line-activities

(Grades 5-8) Students experience how to form an assembly line by setting up mini-factories in the classroom.

Engineering Design Process <u>teachengineering.org</u>

(Grades K-8) This process emphasizes open-ended problemsolving and encourages learning from failure.

Engineering for Kids <u>engineeringforkids.com/</u> (Grades K-8) Accredited, interactive engineering programs.

EVERFI Endeavor endeavor-stem-activities

(**Grades 6-8**) Career exploration projects in game design, prototype design, and data-related challenges.

First Robotics *firstinspires.org/robotics*

(**Grades 4-12**) Robotics is a perfect STEM lesson as it encompasses all skills.

Henry Ford Museum-Invention Convention <u>curriculum-resources/invention-convention</u> (Grades K-12) Free hands-on curriculum to activate students' critical thinking and the impact of inventions in their lives. Students apply STEM, invention, and entrepreneurial skills to build real-world solutions.

Hour of Engineering by Siemens <u>Hour of Engineering</u> (Grades 6-8) Discover the world of engineering and explore design challenges.

Manufacturing Institute <u>themanufacturinginstitute.org/students/</u> (Grades 7-12) Manufacturing resources for students - <u>manufacturing coloring pages</u>

My American Farm <u>games/subjects/engineering</u> (Grades K-5) Fun, educational games created by the American Farm Bureau.

PBS Learning- Engineering Systems <u>engineering-systems-processes</u> (Grades 6-8) Free robotics lessons based on science standards.





It is rocket science

Project Lead the Way Automation and Robotics ptw.org/curriculum

(Grades 6-8) Combine mechanisms with automation and solve real-life problems of mechanical and electrical engineers, and software developers.

Rube Goldberg Machine- Teach Engineering simp machines lesson05 activity1

(Grades 5-12) Open-ended, hands-on, fun challenge employs the engineering design process. Develops student creativity and problem-solving skills.

Science Buddies–Build a Prosthetic Hand science-fair-projects

(Grades 5-8) Practice material resourcing and the manufacturing assembly process.

Semi Hi-Tech U- Introduction to Microelectronics semi.org/foundation

(Grades 2-12) Free lessons developed by teachers on a variety of topics impacted by the microelectronics industry.

Solve It Challenges schoolsup.org/solveit

(Grades 6-12) Free real-world challenges using the Engineering Design Process.

Start-Up STEM <u>startupstemllc.net/</u>

(Grades K-5) Hands-on teacher PD for elementary educators to learn how to write STEM lessons and build a STEM community.

STEM Activities- Science Buddies stem-activities/

(Grades 5-8) Free real-world challenges using the Engineering Design Process.

Teach STEM Explorers- AZ Educational Foundation *teachstem*

(Grades 5-8) Free lessons on engineering design processes and inventions.

TryEngineering (IEEE) <u>tryengineering.org/explore-resources</u> Free computer-science, binary basics, AI, and machine learning

ree computer-science, binary basics, AI, and machine learning resources.

ZSpace Franklin's Lab and Newton's Park



zspace.com/solutions/stem (Grades K-8) Virtual platform for elementary students to learn how to build electrical circuits.