Manufacturing Your Way to a **Brighter Future**

Grades 9-12

CA²VES | FLATE

This lesson explores the potential of finding a career in manufacturing while challenging students to consider and use science and engineering principles.

It is designed to be used with the EducateWorkforce course "Exploring Advanced Manufacturing" developed through a partnership between two National Science Foundation Centers for the Advancement of Technological Education, CA²VES and FLATE. It is important for students to be exposed to as many career options as possible to help them find what best suits their talents, interests and skills.

Lesson Objectives:

After completing this course, the learner will be able to:

- Explain how modern advanced manufacturing differs from common perceptions of the manufacturing industry
- Describe what you would see in a modern manufacturing facility
- Differentiate between various career pathways within the manufacturing industry including: production, maintenance, quality assurance, logistics, process development, and safety
- Describe the education and skill requirements needed to have a successful career in manufacturing
- Compare average manufacturing salaries to the average salaries in other industries

Level:

Grades 9-12

Lesson Duration:

Three 45-minute class periods. Can be condensed or extended as needed.

Summary of Tasks/Actions:

Day 1 – Exploring Advanced Manufacturing

1. *5 min — Introduction*

   > As a possible hook into the lesson, start a brief discussion by asking the students to brainstorm as a whole class what they think technology is. Collect examples in classroom of old technology to get them thinking (a pencil, a fork, a book). There is no need here to finish the discussion here, just get the students thinking. Familiarize the students with the navigation of the course, pointing out how they access the eBook (you may want to have this downloaded for them beforehand), and courseware. Go over the course introduction, goals, and objectives with them briefly, highlighting how this course is relevant to them.

2. *15 min — Exploring Advanced Manufacturing*

   > Have the students explore the first module, watch the videos, read the accompanying ebook pp. 1-8 for more information, and complete the "Perceptions of Manufacturing Activity," "Manufacturing Sectors Activity," and "Careers in Manufacturing Activity."

3. *10 min — Introduce and watch the TED talk video "How I built a toaster from scratch."*

   > Revisit your earlier conversation about technology and ask the students how hard it would be to make a pencil if there were no more pencil factories? How hard would it be to make a toaster?

Summary of Tasks/Actions (cont.):

Day 1 – Exploring Advanced Manufacturing (cont.)

4. *15 min — Toaster video discussion activity*

   Ask the students to discuss in their groups the question, "How is manufacturing important in our everyday lives?" Give the students time to think, discuss, and share with one another in partners or small groups before asking for some ideas from the whole group. (See Student Handout 1).

Day 2 – Manufacturing Career Clusters

1. *15 min — Explore the "Manufacturing Career Clusters" module*

   Explore the module by reading the material and watching the videos.

2. *20 min — Make a graphic organizer comparing the education, responsibilities and skills of two or three manufacturing career clusters.*

   Have them explain which cluster appeals to you the most (See Student Handout 2 and Teacher Handout 1). This could be done as another group activity or individually.

3. *10 min — End to the lesson*

   As an end to the lesson, ask the students to explore the "A Hands-on Virtual Experience" section of the course. This gives them a taste for virtual reality which will likely be a big part of their future work experience.

Day 3 – Next Steps

1. *20 min — Next Steps Exploration*

   Have the students explore the content, videos, and links in the Next Steps portion of the course.

2. *25 min — Identify people in your community who work in manufacturing and ask if they would be willing to be interview subjects.*

   Your experts may not be easily accessible for students to interview, and so creating an email survey may be more practical. Divide students into groups to write interview questions using Google docs (for in person interviews) or Google Forms (for an email survey). Students will likely need help writing questions. Scaffolding this by brainstorming as a whole class or in groups, suggesting question categories, and providing examples will be helpful to them (See Teacher Handout 2).

3. *Going Beyond*

   Have the student groups put the data they collect into a graph to visually represent the response of the people that they interviewed. Have them analyze their data by drawing 2-3 conclusions on what it tells them about a career in manufacturing?

Materials/Equipment:

- EducateWorkforce.com online course "EAM101 Exploring Advanced Manufacturing"
- "Exploring Advanced Manufacturing" eBook
- Access to Google Apps or similar applications

References:

- Center for Aviation and Automotive Technological Education using Virtual E-Schools (CA²VES)
- TED Talks video https://www.ted.com/talks/thomas_thwaites_how_i_built_a_toaster_from_scratch?language=en#t-11338

Take Home Task: Interview someone you know who works in the manufacturing sector (student will need help formulating questions.)