

Manufacturing Processes

Overview

This project is a presentation that students create. Students are put into groups of two and are given a specific manufacturing topic as well as a grading rubric. With the topic and list of requirements, the students create a presentation that covers the main topics. They can do a power point, inspiration, informative speech, or hands on/visual activity to get their topic across to the others in the class.

Enduring Results

Upon completion of this project, students will

1. Understand the many manufacturing processes used in industry.
2. Be aware of the large impact manufacturing has on society.
3. Know how different products are manufactured and why.

Objectives

List the objectives in your lesson. Please use numerical format

1. Students will become aware of the manufacturing world that surrounds our everyday lives.
2. Students will understand how products are made and the many different manufacturing processes that are used in production.

Teacher Preparation

The teacher must have topics and grading rubrics prepared for students. The teacher must also prepare to have internet access and library access for multiple days so students can perform research.

Content Outline

CASTING

Minimum requirements to be covered:

1. Expendable mold casting
 2. Permanent mold casting
 3. Ceramic casting
 4. Centrifugal casting
- **Include how each different processes works**
 - Advantages/Disadvantages
 - What types of equipment are needed
 - What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
 - What type of products are made with this process

2. Drilling
3. Turning
4. Broaching
5. High energy beam machining
6. Tapping
7. Planing

- **Include how each different processes works**
- Advantages/Disadvantages
- What types of equipment are needed
- What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
- What type of products are made with this process

Conditioning

Minimum requirements to be covered:

1. Hardening
2. Tempering
3. Heat treating
4. Hot dipping
5. Hard drawing
6. Case hardening

- **Include how each different processes works**
- Advantages/Disadvantages
- What types of equipment are needed
- What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
- What type of products are made with this process

Finishing

Minimum requirements to be covered:

1. Galvanizing
2. Organic finishing
3. Inorganic finishing
4. Plating – copper, silver, zinc, nickel, chrome
5. Polishing

6. Honing

- **Include how each different processes works**
- Advantages/Disadvantages
- What types of equipment are needed
- What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
- What type of products are made with this process

Mechanical Fasteners

Minimum requirements to be covered

1. Rivets
2. Pins/shear pins
3. Nuts
4. Washers
5. Screws
6. Rivets
7. Bolts
8. Self sealing fasteners

- **Include how each different processes works**
- Advantages/Disadvantages
- What types of equipment are needed
- What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
- What type of products are made with this process

Bonding

Minimum requirements to be covered:

1. welding
 - a. MIG
 - b. TIG
 - c. Computer assisted
2. brazing
3. soldering
4. diffusion bonding
5. adhesive bonding

6. resistance welding

- **Include how each different processes works**
- Advantages/Disadvantages
- What types of equipment are needed
- What careers are associated with the process
 - i. Where you can go to school in this area for a related degree
 - ii. How long the degree will take
 - iii. Salary Range in this area when completed
- What type of products are made with this process

Activities/Case Studies

Upon completion of creating a presentation or visual activity, students will present their topic to the rest of the class. The more interactive the presentation is, the better. I've had several presentations where students were falling asleep. However, the students who put more time and effort into their project created great presentations that involved the entire class and allowed everyone to experience their topic in some way, shape, or form.

Manufacturing Processes

Time: The lesson took me five, 90 minute blocks to create and present with a class of 16 students.

Assessment

Grading Rubric

Manufacturing Presentations

Names _____

0 – 5 points

6 – 10 points

11 – 15 points

CONTENT	None of the required content was covered	Some of the required content was covered, but not all of it.	All required content was covered. Also, good effort was made to include other content.
PRESENTATION STYLE	Presentation was bleak, lacked creativity, and didn't get the point across well.	Presentation was average. It got the point across, but didn't have any WOW factor.	Presentation was clear, concise, and included great visuals. Class was interested and enjoyed the presentation.
VISUALS	No attempt was made to include visuals in presentation	Minimal effort was given to include visuals. Those that were used weren't the best suited for the subject at hand.	The presentation included good visual aids that helped the class understand the process being covered.
OVERALL EFFORT	Group showed no effort. Didn't participate in activity and overall performance was poor.	Group gave minimal effort and did just enough to squeak by. Presentation was mediocre overall.	Group worked well together and gave a good effort to the project. Presentation and content showed effort that went above and beyond minimum requirements.

Total points earned - _____

Total points possible - 60

Resources

The internet is the key to this activity. Students found a majority of their content, visuals, and activities on the net.

About the Author

My name is Joe Letko. I was born and raised in Ashland WI, and now teach 40 miles away in Maple WI. I spend my free time bow hunting, walleye fishing, and snowmobiling. I graduated from UW-Stout in May of 04 and landed this job shortly there after.

Being my first year, I'm lacking on "good activities" because I haven't had a lot of experience. So this activity is one that worked well for me, but by no means is outstanding. It worked well in my department because at the present time we are teaching specific topics such as woods and welding, and not informing the students about the many other manufacturing processes that are out there.

If you have any questions regarding this activity or anything else, I can be reached at jletko@maple.k12.wi.us