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Strategy Name: Mass Manufacturing vs. Craftsman style production in a metal shop

Objectives:

Students will be learning the concepts of manufacturing mass production in a metal shop in contrast to craftsman production in terms of saving time, money, materials, and labor.

Time:

Set up and explanation should take about 1 class period to ensure each student knows their role and can perform the operations as if they were a machinist, already familiar with the steps.

The actual activity should take about 1 class period (53 minutes) and is repeatable. The more data points and parts made, the better.

Materials Needed:

- Punch Set Blueprints
- 3/8" Diameter steel rod
- 6 Lathes
- Various turning tools: turning, knurling, center drill, center,
- Stopwatch
- Google docs

Stock Process:

Two students will be given the blueprints and directions to make the punch. One student will be making the part from start to finish and the other student will be supervising, timing each operation and the overall time it took to make the punch and performing a quality check.

The rest of the class will be divided up into stations performing each operation separately with a second student timing them. They will have clipboards and a chart (that the students develop) to track the length of time it takes for the operator to do each step.

Tasks:

- Two students at the bandsaw, cutting parts to the correct length
- One student doing the facing and center drill
- One student knurling
- One student facing the center drill off and turning the end diameters
- One student measuring and cutting to length, turning to diameter
- One student turning taper and polishing.
- One student polishing and buffing
- One student doing a quality check
- The rest of the students will be time keepers, checking each operator to see how long it takes for each step to be completed.

Closure:

Students should share out their productivity data to the rest of the class. A giant chart for them to fill in their average times and parts made would be useful to visualize the information. Students can then discuss the advantages and disadvantages of the production line vs. the craftsman style production methods. Students could look at:

- How long did each step take on average
- How many parts did the manufacturing line make vs. the student working alone
- Contrast the waste for each student
- What did they like and dislike about their respective roles
- Were there safety concerns or issues with either side of production?
- Further study: Students could look at cost of production if they assigned \$/hr pay for each student and compare it to the craftsman.