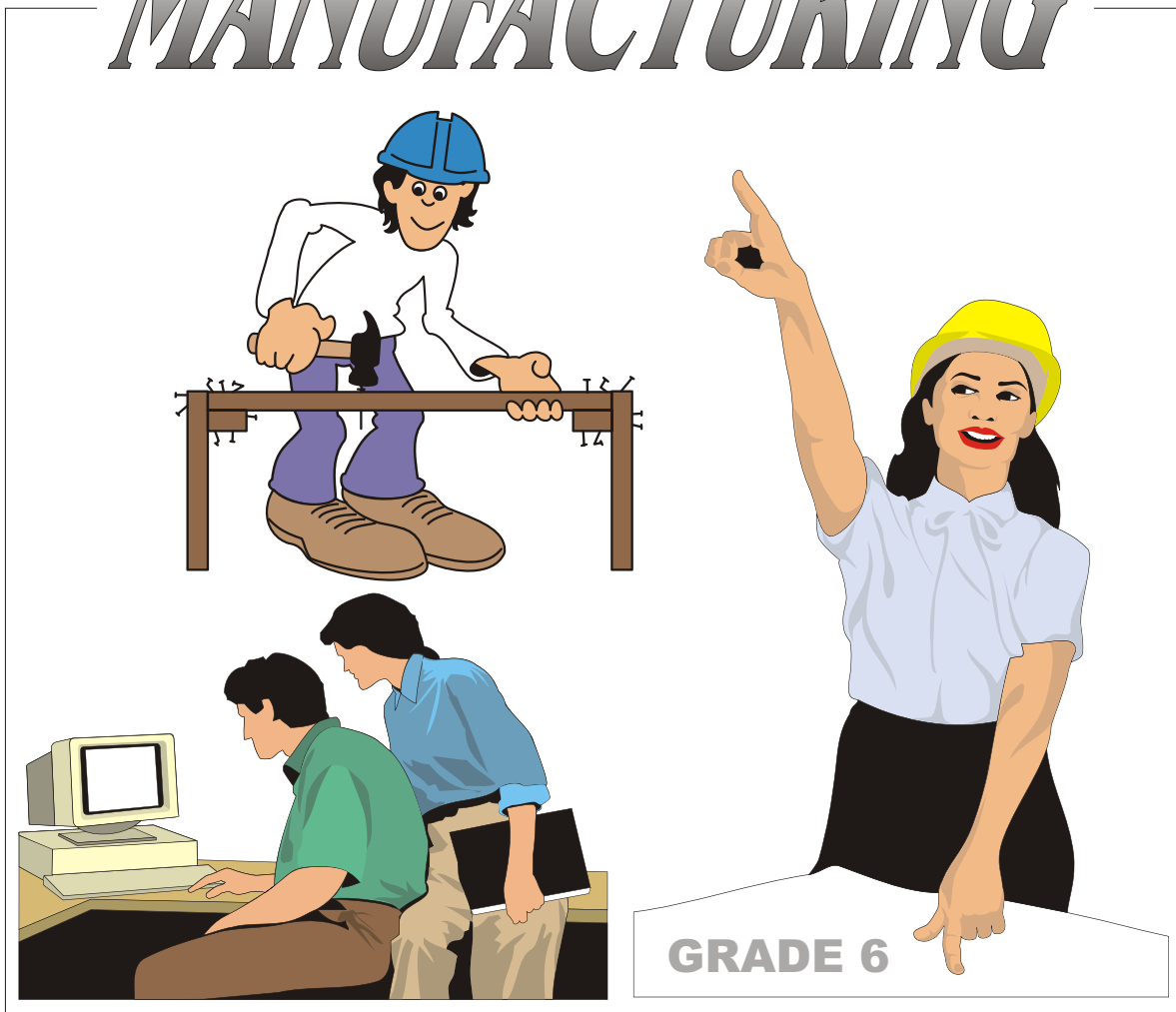


Introduction to Technology

MANUFACTURING



BIGELOW



MIDDLE SCHOOL
Newton, MA

TECHNOLOGY

EDUCATION

INTRODUCTION



Every day millions of people go to work to manufacture the products and to provide the services we depend on. The businesses where these people are employed function on the principle of "Team Work", without people working together, nothing could get accomplished. These businesses also need leaders to assure everyone and everything runs smoothly. These leaders, or "Supervisors", make decisions that keep the company going. Employees are hired to do specific jobs within the company.

In this activity you will all be hired as employees of our company and take part in designing a company name and logo. The company will take on the task of designing, manufacturing, and marketing a useful product to the public (school). Everyone will participate in the design process and everyone will vote on the best design. A president (or CEO) will be randomly selected and he/she will oversee all processes. We will also select supervisors of the three company Divisions: Manufacturing, Quality Control / Assembly, and Marketing. These "Supervisors" will oversee what goes on in their respective group. (Remember, teamwork is the key to our success.)

For the company to be successful, the following steps must be completed.

procedure

- 1. Select a company name (As a company)**
- 2. Fill out a job application (Individual)**
- 3. Chose your preferred area of work (Individual)**
- 4. Design key chains (Individual)**
- 5. Select a key chain design (everyone votes)**
- 6. Manufacture the product (Manufacturing)**
- 7. Design and manufacture the packages (Q.C./A)**
- 8. Make posters (Marketing)**
- 9. Package the product (Q.C./A)**
- 10. Market the product (Marketing)**

NAME: _____

CLASS: _____

Manufacturing Research

You've probably seen ads in magazines and on television sponsored by names such as Xerox, Pepsi, IBM, and General Motors. These are huge companies that hire thousands of workers to produce goods or to provide services for us. As consumers, thousands of products are available to us daily, but often we forget about the factories and companies behind those products. This TLA will explore the ways companies operate and the products they produce.



Each of the following questions are worth 10 points out of a possible 100.

1. **Make up 3 different names that we could use for our company.**
1. _____ 2. _____ 3. _____
2. **List 6 job titles common in our world today. (HINT: architect, store clerk, lawyer, etc.).**
1. _____ 2. _____ 3. _____
4. _____ 5. _____ 6. _____
3. **What does it mean when we say products are "Mass Produced"?** _____

4. **What does it mean when we say products are "Custom Manufactured"?** _____

5. **What is one advantage of "Mass Producing" parts or products?** _____

6. **What is sometimes sacrificed when companies "Mass Produce" products?** _____

7. **Pretend you have just purchased the new X-Box video game. When you got home you opened it up and found out it was defective? What can you do about it?** _____

8. **How does a "Jig" or a "Fixture" help in Manufacturing parts or products?** _____

9. **What are the responsibilities of the Marketing Division of a company?** _____

10. **List 3 ways companies advertise their products**
1. _____
2. _____
3. _____

NAME: _____

CLASS: _____

Job Application

Before you can begin work, all employees must fill out a job application. This gives the employer all the information they need about you personally and professionally. It is also a chance for you to tell the employer what you do well and to list any extra talents you might have that would help your chances in getting hired. You want to try and convince the employer that you are the best person for the job.



Personal Information

Name (Last, Middle, First)		Social Security Number		Date
Mailing Address		City	State	Zip Code
Home Phone	Cell Phone	email Address		
Date available for work (When can you start?)		Can you come before or after school if needed? Yes <input type="radio"/> No <input type="radio"/>		
Position Desired (Circle one) Manufacturing Quality Control / Assembly Marketing		Current Salary (Allowance)	Expected Salary (Prize)	

Education (Schools you attended)

Name of School	From (Date Started)	To (Date finished)
Name of School	From (Date Started)	To (Date finished)

Additional Information

Are you over the age of 10? Yes <input type="radio"/> No <input type="radio"/>	Are you legally eligible for employment in the U.S.? Yes <input type="radio"/> No <input type="radio"/>
Have you ever been convicted of a crime? Yes <input type="radio"/> No <input type="radio"/> (If yes, explain)	
Do you have any special training or skills? (Additional spoken or written languages, computer software knowledge, machine operation experience, personal relations experience, professional memberships, etc.)	
Have you ever been enlisted in the military? Yes <input type="radio"/> No <input type="radio"/>	
How did you hear about our company and this job opening?	
Signature	Date
----- Do not write below this line (For office use only) -----	
Position Granted	Salary Granted

NAME: _____

CLASS: _____

How are Products Manufactured?



Determine which Manufacturing System (**Mass Production** or **Custom Manufacturing**) would support the following pro and con arguments and write your answers in the spaces provided.

MANUFACTURING SYSTEMS

Pros:

Many pieces can be manufactured at once, low cost per unit, fast production times

Cons:

Quality is sometimes sacrificed, must make many of the same product, therefore it is hard to make changes in the manufacturing process

Name this manufacturing System

Pros:

Many different products can be made, products can be modified easily, individual products are monitored more closely

Cons:

Longer to make each piece, higher costs per unit, can only make very few units at a time

Name this manufacturing System

Open Bag #1 and place all of its contents on the table in front of you. With your partners, determine which products were mass produced and which were custom manufactured. When you think you know the answers, write the name of the products under the correct Manufacturing System.

How are these products made?

Mass Production Manufacturing

Custom Manufacturing

NAME: _____

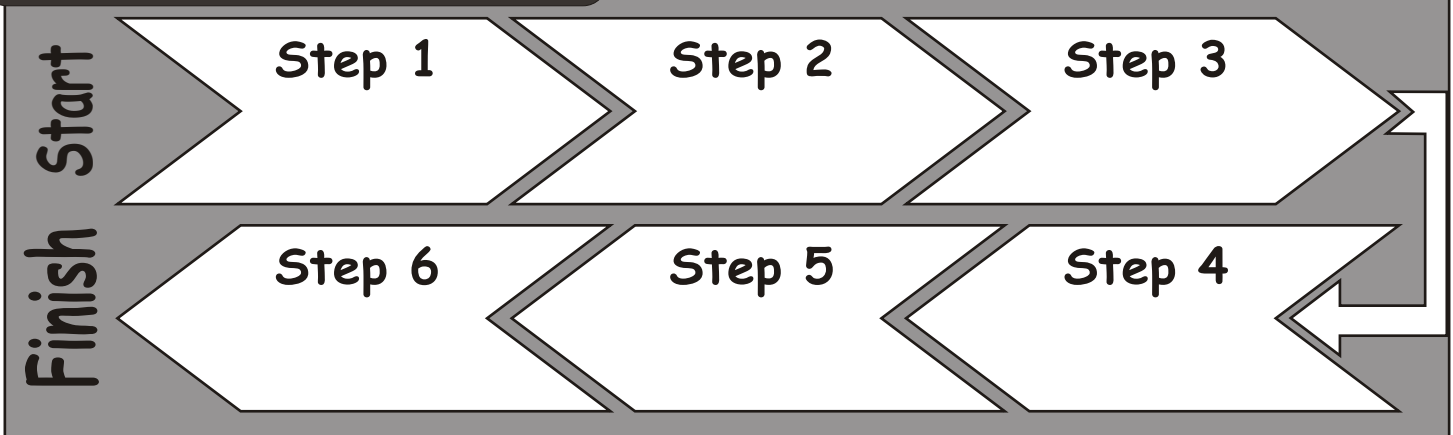
CLASS: _____

How are Products Manufactured?

Open Bag #2 and place all of its contents on the table in front of you. Examine the product and try to imagine how this product was manufactured. Use the pictures to create a manufacturing time line of steps from start to finish. Once you think you have determined the correct manufacturing steps, simply write the letter of the picture in the correct step.



MANUFACTURING PROCESS



COST ACCOUNTING CHALLENGE

Your band, the "Destiny's Child" has just released its new hit single "Loose My Breath". Your concert is this weekend at the Fleet Center, and your agent has told you that you only have 100 cd's to sell. 10 radio stations are requesting 2 cd's each for free. You must give them the cd's to promote your new hit single. Each cd costs **\$8.00** to make and will sell for **\$20.00** each. If you sell all of the remaining cd's, how much profit will your band make? (HINT: Determine the cost of making all of the cd's first) Use the space below for your math. ?PRIZES?

Will you be singing the blues?

NAME: _____

CLASS: _____

DESIGN SHEET



Use the boxes below to sketch **at least 8** different designs of what you want a key chain to look like. Keep the designs simple. The key chain designs must appeal to everyone. (for instance, a key chain with a football on it would not appeal to everyone, since not all people play football).

The key chains
may be
designed either:

Horizontal OR

V
e
r
t
i
c
a
l



DIVISION TASKS



Below is the sequence of events to follow in each "Division" of the mass production process. These steps should be discussed in each group and agreed upon by everyone. (You might change the list a little, before it suits the group's needs.) Then you will determine what jobs will be needed to complete all the division tasks. The Supervisor will be in charge of assigning jobs and making sure each employee stays on task.

DIVISION TASKS

JOBS

MANUFACTURING

- Make a final set of working drawings for our product
- Manufacture one prototype (this is an exact replica of the finished product)
- Develop a flow chart to represent the flow of materials throughout the manufacturing process
- Make jigs and fixtures to aid in all machining processes
- Assign individual jobs and make sure each person knows what he/she is responsible for

- Drilling Fixture Designer / Maker
- Drilling Technician
- Milling Machine Manufacturer
- Sanding Specialist

MARKETING

- Select two colors for the key chains
- Develop a marketing scheme for our product
- Assess the consumer market to determine who we will primarily be selling to
- Design and make posters, advertisements, commercials, speeches, etc. to market our product
- Determine the cost of our product and make a spreadsheet of our expenses
- Make a cost accounting chart to record all expenses and sales progress

- Student Poster Designer
- Adult (Faculty / Parent) Poster Designer
- Announcement Specialist
- Commercial Coordinator
- Logo Developer

Q.C. ASSEMBLY

- Design a package for the product to be placed, protected, and marketed in
- Create the package using the computer and print out an original to be copied
- Make the packages by cutting them to size and folding them
- Develop Go / No Go gages for the inspection of each piece after each step
- Inspect all pieces being made after each manufacturing process
- Assemble the product
- Package the product

- Quality Control Inspector
- Package Design Engineer
- Assembling Specialist
- Computer Aided Design Engineer

NAME: _____

CLASS: _____

Post Test



Now that we have finished the Manufacturing TLA, let's see how much you have learned about how products are made and the companies that make them. Answer the following questions in the spaces provided. (Ask a parent or guardian to help you if you get stuck)

Each question is worth 5 points except as noted

1. **What was your job title?** _____
Describe what you had to do for your specific job _____

2. **How could your job have been changed to make the production process better?**

3. **Could a robot replace your job? Explain why or why not?** **YES** **NO**

4. **Pretend you have just purchased a product from the store, only to find out it is defective. What can you do to assure you are going to receive the goods you want at the quality you expect?** _____

5. **Explain the rights consumers have for returning defective goods?** _____

6. **List 2 reasons for packaging a product**
1. _____
2. _____
7. **List 2 ways that "generic" products differ from "brand name" products**
1. _____
2. _____
8. **Explain the difference between products that are "Mass Produced" and those that are "Custom Manufactured"** _____

9. **How did the use of jigs and fixtures help us in the manufacturing process?** _____

10. **What are the responsibilities of the Marketing Division of our company?** _____

11. **What are the responsibilities of the Manufacturing Division of our company?** _____

NAME: _____

CLASS: _____

Post Test



12. What are the responsibilities of the QC / Assembly Division of our company? _____

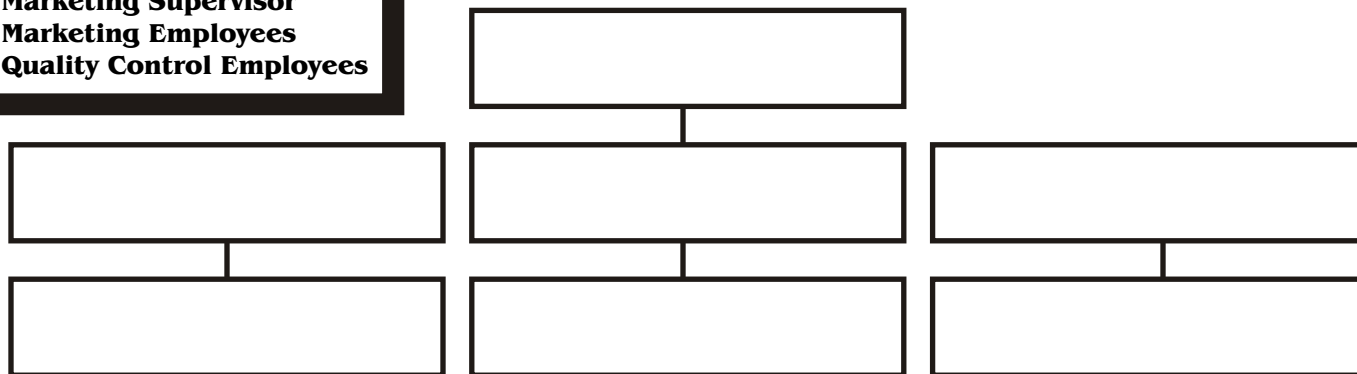
13. What do the letters "CEO" stand for? _____

14. What are the responsibilities of a "CEO" in a company? _____

15. What are the responsibilities of a "Supervisor" in a company? _____

16. Use the words in the list below to fill in the corporate structure chart. (15 points)

- Manufacturing Employees
- Quality Control Supervisor
- CEO
- Manufacturing Supervisor
- Marketing Supervisor
- Marketing Employees
- Quality Control Employees



17. Match the product with the correct manufacturing process (10 points)

Pencils

cars

gum drops

shoes

paper

bigelow key chains

Mass Production Manufacturing

Custom Manufacturing

SUPERVISOR: _____

MARKETING JOBS



Now you are ready to assign jobs to each person in the Marketing Division. Start by counting the number of people in your division and determine how many of each job will be needed to complete all of the "Division Tasks". Jobs can be assigned in two ways, either people can choose which job they prefer or the jobs can be given out randomly. If there are any arguments, then the jobs will need to be assigned randomly. The Supervisor is the boss and therefore has the last say in who does which job. Remember, you are working as a team, fighting and arguing will not be productive.

Marketing

- Student Poster Designer
- Adult (Faculty / Parent) Poster Designer
- Announcement Specialist
- Commercial Coordinator
- Logo Developer

Student Name

Job Title

SUPERVISOR: _____

MANUFACTURING JOBS



Now you are ready to assign jobs to each person in the Manufacturing Division. Start by counting the number of people in your division and determine how many of each job will be needed to complete all of the "Division Tasks". Jobs can be assigned in two ways, either people can choose which job they prefer or the jobs can be given out randomly. If there are any arguments, then the jobs will need to be assigned randomly. The Supervisor is the boss and therefore has the last say in who does which job. Remember, you are working as a team, fighting and arguing will not be productive.

Manufacturing

- Drilling Fixture Designer / Maker
- Drilling Technician
- Milling Machine Manufacturer
- Sanding Specialist

Student Name

Job Title

SUPERVISOR: _____

Q.C. / ASSEMBLY JOBS



Now you are ready to assign jobs to each person in the Q.C./Assembly Division. Start by counting the number of people in your division and determine how many of each job will be needed to complete all of the "Division Tasks". Jobs can be assigned in two ways, either people can choose which job they prefer or the jobs can be given out randomly. If there are any arguments, then the jobs will need to be assigned randomly. The Supervisor is the boss and therefore has the last say in who does which job. Remember, you are working as a team, fighting and arguing will not be productive.

Q.C. / Assembly

- Quality Control Inspector
- Package Designer
- Assembling Specialist
- Computer Aided Design Engineer

Student Name

Job Title

Entire Personnel

Below is the list of jobs for each student in the manufacturing company. The president is responsible for filling this sheet out and making sure each employee is doing their respective jobs each day.



Marketing

SUPERVISOR

Student Name

Job Title[illegible][illegible]

Manufacturing

SUPERVISOR

Student Name

Job Title[illegible][illegible]

Q.C. / Assembly

SUPERVISOR

Student Name

Job Title

[illegible]