

Lesson Plan

Course Title: Manufacturing Systems

Session Title: Safety is no accident

Performance Objective:

Students will understand the importance of safety.

Specific Objectives:

1. Understand the importance of personal safety in a manufacturing setting.
2. Understand the importance of following safety precautions when using a variety of power equipment/tools.
3. Demonstrate and apply safety rules and regulations on a daily basis in a manufacturing setting.

Preparation

TEKS Correlations:

Manufacturing Systems:

123.43(3)(C)

...Identify areas where quality, reliability, and safety can be designed into a product system;

123.43(6)(C)

...Use a variety of tools, equipment, machines, and materials to manufacture products;

123.43(7)(A)

...Master relevant safety tests;

123.43(7)(B)

...Follow safety manuals, instructions, and requirements; and

123.43(18)(H)

...Complete his/her work according to established criteria.

Interdisciplinary Correlations:

English:

110.xx(6)(A) – Vocabulary Development

...Expand vocabulary through...listening and discussing...

110.xx(6)(B) – Vocabulary Development

...Rely on context to determine meanings of words...

Math:

111.36

M.1A



Compare and analyze various methods for solving a real-life problem.

Integrated Physics and Chemistry:










112.42(1)(A)

Demonstrate safe practices during field and laboratory investigations.

| |
|---|
| |
| Teacher Preparation: |
| References: Komeck, Lawson, and Horton. <u>Manufacturing Technology</u> (Delmar: 1990). |
| Instructional Aids: <ol style="list-style-type: none"> 1. Personal Safety Rules PowerPoint 2. Vocabulary PowerPoint 3. Vocabulary Handout 4. Safety is no accident rubric |
| Materials Needed: <ol style="list-style-type: none"> 1. Poster board (for the safety poster activity) 2. Markers 3. Note taking paper 4. Safety equipment (goggles, gloves, ear protectors, etc.) |
| Equipment Needed: <ol style="list-style-type: none"> 1. Computer with PowerPoint 2. Infocus projector |
| Learner Preparation: |
| VOCABULARY: Safety OSHA Safe eye wear Hearing protection Proper clothing |
| Lesson Plan |
| Introduction (LSI Quadrant I): SAY: We have discussed several important concepts related to the manufacturing process. However, one new area is of extreme importance to you and our class as we work with tools and equipment. This area is called safety. Safety can be divided into 2 main groups—personal safety and safe practices that are designed to protect you and equipment/tool safety. These are rules designed to protect not only you but also the equipment and tools we have in our lab. (Allow 10-12 minutes for the power point and note taking.) |
| Outline |
| Outline (LSI Quadrant II): Instructors can use the PowerPoint presentation, slides, handouts, and note pages in conjunction with the following outline. |

| MI | Outline | Notes to Instructor |
|---|--|--|
|  | <p>Using the power point titled, "Personal Safety Rules," have each student copy the presentation word for word as you go through it.</p> | <p>District policies may dictate that you provided IEP students with a copy of the information without taking the notes. I would suggest that you have all students attempt to copy this presentation and then give the ones required by ARD a copy at a later time.</p> |
|  | <p>On subsequent days, each piece of power equipment should be addressed with note taking and discussion until you have covered all the equipment in your lab. Examples for the band saw and drill press have been provided as a guide for you to use. Once all the equipment that you will use in this class has been covered, give your students a safety test before you allow them to go to work in the lab.</p> | <p>I make my students pass the test with a 90 before they can go to work. Keep all the tests (even on the IEP students) on file for the entire school year. This is for your protection if needed in the future.</p> |

Copy and paste Multiple Intelligences Graphic in appropriate place in left column.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |
| Verbal Linguistic | Logical Mathematical | Visual Spatial | Musical Rhythmic | Bodily Kinesthetic | Intra-personal | Inter-personal | Naturalist | Existentialist |

Application

Guided Practice (LSI Quadrant III):

SAY: For the rest of the class time today, you are going to create a safety poster that depicts one of the personal safety rules from today's notes. This poster is to be as colorful as possible and have the words needed to fully illustrate the safety rule you have selected. It will be due at the end of class today (or you can give a 2nd day for your students to work on this assignment).

Students should have 33-35 minutes to work on this activity based on a 45 minute class period.

Hand out the poster board and markers and let the students go to work.

Independent Practice (LSI Quadrant III):

Go over Vocabulary Handout.

Summary**Review (LSI Quadrants I and IV):**

Q. What does acronym OSHA mean?

A. *Occupational Safety and Health Administration*

Q. What are the 2 main areas of safety?

A. *Personal Safety and Equipment/Tool Safety*

Q. When using a piece of equipment, where should your concentration be, and why?

A. *Your concentration should be on your work so you do not have an accident.*

Evaluation**Informal Assessment (LSI Quadrant III):**

1. Grade the students on the note taking.
2. Evaluate the safety poster based on the rubric provided.
3. Grade the safety test at the conclusion of your safety unit.

Formal Assessment (LSI Quadrant III, IV):

Safety is no Accident Rubric.

Extension/Enrichment (LSI Quadrant IV):

There are many additional sources for safety information. Internet, tool distributors, safety journals, textbooks etc., can provide you with a wealth of information that can be shared with your students. Additional activities can be generated from these sources.

Manufacturing Systems

Safety is no Accident



Created by The University of North
Texas in partnership with the Texas
Education Agency

Personal Safety Rules

- We are safe for a reason – who can tell me why we have safety rules?



Wear Protective Eyewear

- Safety goggles – protects front and sides of eyes.
- Safety glasses – most only protect from the front.
- Face shield – good for students who wear glasses.



Roll up long sleeves

- Machines have moving cutters and belts—long sleeves can get caught in these items.



Roll up long hair

- Girls need to tie up their long hair to keep it out of cutters and belts.



Tuck in shirt tails and long clothing

- Protects against clothes getting caught in moving parts of equipment.



Remove jewelry

- Rings, watches and bracelets can get caught on cutters, blades and belts and you can lose fingers if jewelry is on.
- Ties should be removed for the same reasons as above.



Do not distract the operator of a machine

- When cutting or using a piece of equipment, your concentration should be on your work.
- Talking to others can cause a distraction and accidents can happen to the operator or others.



Wear correct footwear

- Open-toed shoes can be a problem in the lab.
- Shoes need to have good traction—not slick soles.
- Keep shoes tied to prevent falls.



Use the correct tool for the job

- Using the wrong tool for the wrong job can be very dangerous.
- A screwdriver is not a hammer and a hammer is not a screwdriver.



Follow the safety rules for each piece of equipment you will be using

- Manufacturer's of equipment always have recommended safety procedures to follow when using their equipment.



Safety Outline (Machine Name)

- Uses of the Machine.



Safety Outline (Machine Name)

- Specific steps to make the machine cut.



Safety Outline (Machine Name)

- Specific safety rules to follow.



Safety Outline (Machine Name)

- Any other important data that needs to be shared with the students.



Safety Outline (Machine Name)

- Observe ALL the personal safety rules when using the drill press.



PERSONAL SAFETY RULES

- I. Wear protective eyewear
 - A. Safety goggles—protects front and sides of eyes
 - B. Safety glasses—most only protect from the front
 - C. Face shield—good for students who wear glasses

- II. Roll up long sleeves
 - A. Machines have moving cutters and belts—long sleeves can get caught in these items.

- III. Roll up long hair
 - A. Girls need to tie up their long hair to keep it out of cutters and belts.

- IV. Tuck in shirt tails and long clothing
 - A. Protects against clothes getting caught in moving parts of equipment.

- V. Remove jewelry
 - A. Rings, watches and bracelets can get caught on cutters, blades and belts, and you can lose fingers if jewelry is on.
 - B. Ties should be removed for the same reasons.

- VI. Do not distract the operator of a machine
 - A. When cutting or using a piece of equipment, your concentration should be on your work.
 - B. Talking to others can cause a distraction and accidents can happen to the operator or others.

- VII. Wear correct footwear
 - A. Open toed shoes can be a problem in the lab.
 - B. Shoes need to have good traction—not slick soles.
 - C. Keep shoes tied to prevent falls.

VIII. Use the correct tool for the job

- A. Using the wrong tool for the wrong job can be very dangerous.
- B. A screwdriver is not a hammer and a hammer is not a screwdriver.

IX. Follow the safety rules for each piece of equipment you will be using

- A. Manufacturer's of equipment always have recommended safety procedures to follow when using their equipment.

DRILL PRESS SAFETY

- I. Uses of a drill press
 - A. Drilling holes
 - B. Sanding
 - C. Routing edges

- II. Drilling speeds
 - A. Metal--slow and with some lubricant (cutting oil)
 - B. Wood--a medium speed
 - C. Plastic materials--high to prevent heat build up and melting

- III. Specific safety rules to follow
 - A. Be sure bit is tight in the chuck of the drill (use the chuck key).
 - B. Remove chuck key before starting.
 - C. Do not “force” the drill bit into the material--let the bit do the cutting.
 - D. Use a moderate, steady pressure as you drill.
 - D. Place a piece of scrap lumber on the table before and while you drill.
 - 1) This protects the metal table top
 - 2) Reduces the splitting of the wood being drilled
 - F. Clamp round material
 - G. Clamp small pieces to be drilled
 - H. Remove the bit when finished and return it to its proper place.
 - I. Clean the area

- IV. Observe all the personal safety rules when using the drill press.

For axle drilling, we use a 3/16” diameter drill bit. Wheels can be sanded on the drill press to make the diameter smaller or the thickness of the wheel thinner. Both of these operations are demonstrated by me before they are allowed to do these activities on the drill press.

BAND SAW SAFETY

- I. Uses of a band saw
 - A. Cut irregular shapes (car bodies)
 - B. Cut short straight lines

- II. How to cut
 - A. Use a steady, smooth push of the material into the blade
 - B. Avoid sharp turns--blade will break
 - C. Do not back out of a cut--blade will break

- III. Specific safety rules to follow
 - A. Upper guard is to be set 1/4 inch above material being cut
 - B. Do not stand to the right of the machine and watch--when the blade breaks, it most often goes in that direction.
 - C. Do not remove scrap material from the table while the machine is on.
 - D. When a blade breaks, turn off the machine and inform the instructor.
 - E. Clamp small pieces
 - F. Clamp round material to be cut
 - G. Instructor changes blades
 - H. Turn the band saw off when finished
 - I. Clean the area

- IV. Observe all the personal safety rules when using the drill press.

We use 6 teeth per inch hook tooth blade that is 1/4 wide to cut the balsa wood bodies. Students keep the scraps from cutting the front view of the car and tape them back in place to cut the top of the car.

Safety is No Accident (Safety Poster) Rubric

| | Exceptional | Above Average | Average | Below Average | Unacceptable | Comments |
|---|--|--|--|---|--|-----------------|
| Criteria | 20-16 | 15-11 | 10-6 | 5-1 | 0 | |
| Creative interpretation of safety rule | Original idea | Good idea, shows some original thought | Good idea, little originality | Little creativity in the poster | Words only, no creativity | |
| Appropriate design and artwork | Excellent graphics and extreme detail | Good graphics and detail | Some graphics, not much detail | Few graphics, little detail | No design or artwork on poster | |
| | 50-45 | 44-35 | 34-25 | 25-10 | 10-0 | |
| Safety rule illustrated | Safety rule is very clearly illustrated | Safety rule is clear, but illustrations need work | Safety rule is clear, graphics poor | Safety rule is not clear, graphics confusing | Rule is missing and no graphic | |
| | 10-9 | 8-7 | 6-5 | 4-3 | 2-0 | |
| Neatness and eye appeal | Poster is neat, visually appealing and gets your attention | Poster is neat, and colorful, but not eye catching | Poster is good, limited use of color and idea does not stand out | Poster is not neat, lacks any color and idea is not clear | Very sloppy work and poster is illegible | |