

Architecture, Construction, Communications & Transportation

PATHWAY: Metals Technology

COURSE: Machining Operations II

UNIT 1: ACCT\_MOII\_1 Machine Lab Safety

**
Annotation:**

This unit will allow students to enhance their understanding and abilities concerning lab safety when in a shop and operating machinery. \*Teacher’s Note: The lesson should serve as a review since much of the material covered in this unit should have been covered in previous units. The majority of this unit will take place in a lab setting.

 **Grade(s):**

|  |  |
| --- | --- |
|  | 9th |
| x | 10th |
| x | 11th |
| x | 12th |

**Time:**

10 Hours

**Author:**

**Dr. Chesley Chambers**

**Students with Disabilities:**

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided appropriately. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation. Many students (both with and without disabilities) who struggle with reading may benefit from the use of text reading software or other technological aids to provide access to printed materials. Many of these are available at little or no cost on the internet.

 **GPS Focus Standards:**

**ACCT-MOII-1. Students will demonstrate safety in the machining lab and classroom.**

a. Demonstrate general safety rules for the machining laboratory.

b. Demonstrate the specific safety rules applicable to the machine shop equipment.

**GPS Academic Standards:**

**NONE**



 **Enduring Understandings:**

As equipment changes and processes change it brings about new safety concerns. A good safety culture should continue to improve with these changes. Having a good safety awareness will allow students to be able to be well prepared for their futures in whatever careers paths they take.

**Essential Questions:**

* How does safety directly impact your shop performance?

• What are some safety precautions you should look for before beginning to work?

• How is a fire extinguisher utilized in a shop?

• Why is understanding the difference in the various types of fire extinguishers important?

**Knowledge from this Unit:**

Students will:

* Learn safe working procedures for the lathe and milling machine.

• Identify correct and safe working habits.

• Distinguish the difference in the various classes of fire extinguishers used in the shop.

* Discuss machine guarding and its use.

**Skills from this Unit:**

Students will be able to:

• Utilize appropriate Personal Protection Equipment.

• Properly set up and use machine guards

* Safely clean the machines and dispose of the waste after use.

**
Assessment Method Type:**

|  |  |
| --- | --- |
|  | Pre-test |
| x | Objective assessment - multiple-choice, true- false, etc. |
|  | \_x\_ Quizzes/Tests\_\_ Unit test |
|  | Group project |
|  | Individual project |
|  | Self-assessment - May include practice quizzes, games, simulations, checklists, etc. |
|  | \_\_ Self-check rubrics \_\_ Self-check during writing/planning process\_\_ Journal reflections on concepts, personal experiences and impact on one’s life\_\_ Reflect on evaluations of work from teachers, business partners, and competition judges\_\_ Academic prompts\_\_ Practice quizzes/tests |
|  | Subjective assessment/Informal observations |
|  | \_\_ Essay tests\_\_ Observe students working with partners\_\_ Observe students role playing |
|  | Peer-assessment  |
|  | \_\_ Peer editing & commentary of products/projects/presentations using rubrics\_\_ Peer editing and/or critiquing |
|  | Dialogue and Discussion |
|  | \_\_ Student/teacher conferences\_\_ Partner and small group discussions\_\_ Whole group discussions\_\_ Interaction with/feedback from community members/speakers and business partners |
|  | Constructed Responses |
|  | \_\_ Chart good reading/writing/listening/speaking habits\_\_ Application of skills to real-life situations/scenarios |
|  | Post-test |

**Assessment Attachments and / or Directions:**

**Machine Lab Safety Unit Test**

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• **LESSON 1: Introduction to Metal shop safety.**

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1.Identify the standards. Standards should be posted in the classroom.

 **ACCT-MOII-1. Students will demonstrate safety in the machining lab and classroom.**

a. Demonstrate general safety rules for the machining laboratory.

b. Demonstrate the specific safety rules applicable to the machine shop equipment.

2. Review Essential Questions. Post Essential Questions in the classroom.

* How does safety directly impact your shop performance?

• What are some safety precautions you should look for before beginning to work?

• How is a fire extinguisher utilized in a shop?

• Why is knowing the difference in the various types of fire extinguishers important?

3. Identify and review the ***unit*** vocabulary. Terms may be posted on word wall. Definitions can be found in **Intro to Metal Shop Safety Vocabulary Guide**.

|  |  |  |
| --- | --- | --- |
| OSHA | Combustible Materials | Protective Clothing |
| Unsafe Practice | PPE | Awareness Barriers |
| Machine Shields | Fire Extinguisher Classes | Unsafe Acts |

4. Interest approach – Mental set

 Have students recall the first time they walked into the Metals shop. What are some of the things that first caught their attention? Was it the equipment, smell, sound, clutter, or organization of the shop? Explain to them that many of the things that first caught their attention are directly related to shop safety.

1. Give the students a tour of the shop. Have them take notes throughout the tour. Make sure to identify equipment and safety procedures and PPE.
2. As you go through and describe each piece of equipment and its use, demonstrate how to turn them on and off. Allow some of the students to practice turning them on and off with your supervision.
3. At each machine, provide its specific function and examples of what it is used for.
4. It is very important for the students to realize what parts can be made with each piece of equipment. This helps them remember its use. After the tour for review, go around the room and ask them which machine is used in making certain things.
5. Have students make a diagram of the shop demonstrating the machines locations within the shop. On the reverse, have the students list the machines available in the shop, including their functions, proper safety operation, location of power switch, and any specific safety concerns.
6. Summary: This lesson is necessary for proper PPE when using the equipment in a shop, learning the emergency shut off for the machinery, and learning about safety guarding.

• **LESSON 2: Fire Extinguishers**

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1. Review Essential Questions. Post Essential Questions in the classroom.

* How is a fire extinguisher utilized in a shop?
* Why is knowing the various types of fire extinguishers important?

1. Give a second tour of the shop this time identifying the fire extinguisher, first aid kit, and PPE locations. Have students take notes throughout the tour. Students can add to their shop diagram the location of this safety equipment. Students should also add to their list on the reverse the four fire extinguisher classes and their symbols, the contents of the first aid kit, and what PPE are available and their functions.
2. Discuss the proper use for each type fire extinguisher and how to distinguish them. This should include talking about the OSHA requirements for location of fire extinguishers.

 Class A: Ordinary Combustibles (Identified by a Green Triangle)

 Class B: Flammable Liquids (Identified by a Red Square)

 Class C: Electrical Equipment (Identified by a Blue Circle)

 Class D: Combustible Metals (Identified by a Yellow Star)

1. Have students practice locating and identifying each fire extinguisher and its type by allowing them to practice the path to the fire extinguisher and returning with the correct one. This could be done by dividing the students into groups of 2 or 3 and placing them in different locations of the shop. Give each group a different scenario that would call for a need of a specific fire extinguisher. Have the groups take turns retrieving the correct fire extinguisher.
2. Discuss with students about how when a fire does happen, the stress level becomes high. Have a class discussion about the importance of knowing what to do and practicing it before it happens.
3. Have students end this lesson by taking the safety test. **\*Key?** ACCT-MOH – 1- Safety test
4. This lesson focuses on the significance of knowing the location and use of fire extinguishers. Students will learn and practice the proper reaction to fires in the shop. At the completion of this lesson students will be tested on their knowledge of safety.

• **ATTACHMENTS FOR LESSON PLANS**

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**NONE**

• **NOTES & REFLECTION:**



The majority of this unit will take place in the lab. Be sure to have all the necessary equipment and supplies in the lab before class begins.

**
Culminating Unit Performance Task Title:**

***Equipment Safety Presentation***

**Culminating Unit Performance Task Description/Directions/Differentiated Instruction:**

Assign the students a piece of equipment. They will use their notes and any additional research to compile a presentation of the equipment’s main functions and necessary safety precautions that should be used when it is in use.

Have students present their piece of equipment to the class using a PowerPoint presentation, poster board, or any other form of presentation you find acceptable.

**Attachments for Culminating Performance Task:**

• **Equipment Safety Presentation Rubric**

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Web Resources:**

* http://www.fire-extinguisher101.com/
* http://www.safetyequipment.org/
* http://www.osha.com/

**Materials & Equipment:**

* Class A,B,C,D fire extinguishers
* Safety glasses
* Projection Equipment
* Computer with Internet Access
* Machine shop equipment, lathe, mill, drill press, saw, etc.

**21st Century Technology Used:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Slide Show Software |  | Graphing Software |  | Audio File(s) |
|  | Interactive Whiteboard |  | Calculator |  | Graphic Organizer |
|  | Student Response System |  | Desktop Publishing  |  | Image File(s) |
|  | Web Design Software |  | Blog |  | Video |
|  | Animation Software |  | Wiki |  | Electronic Game or Puzzle Maker |
|  | Email |  | Website |  |  |