WAMC Lab Template

Math Concept(s): A.CED.1-3

Source / Text: OSPI Equipment Safety

Developed by: Ken Marmion E-Mail: kmarmion@nthurston.k12.wa.us

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

This lab is for students to gain an understanding of area and the need for space in a work zone during operation of tools and equipment used in construction skill shop area. The best way to avoid an accident is to prevent it from happening in the first place. This can be done if you and others recognize the vital importance of safety and make it a part of your daily routine developing safe work habits and attitudes. Knowing your surroundings and the space you need to operate machinery is vital through high level training, planning, preparation and most importantly awareness of your surroundings.

Lab Plan

Lab Title: Safe Work Zone Area

Prerequisite skills:

- Student ability to work in small groups and be cooperative member of the group.
- Work with measuring devices including ability to read a ruler, measuring tape and speed square accurately and convert to measurements in inches and feet.
- Professional skills; on time, on task, willing to learn, clean up and inventory return tools and supplies.

Lab objective: Each student will understand the concept of area and need to work in a safe work environment within the lab by performing the task and demonstrating tool use in safe OSHA approved.

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards: **A. CED. 1 through 4**

- Create equations and inequalities in one variable and use them to Solve problems. *Include equations arising from linear and quadratic Functions, and simple rational and exponential functions.*
- Create equations in two or more variables to represent relationships Between quantities; graph equations on coordinate axes with labels And scales.

Standards for Mathematical Practice:

- (1) Seeing Structure In Expression
- (2) Reasoning with Equations and Inequalities

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening): SL. 11-12.1

- Initiate and participate effectively in a range of collaborative discussion (one-on one, in groups, and teacher-led) with diverse partners, topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

K-12 Science Standards: *HS-ETS1*

- *Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics*

Technology

- Cell phone or calculator for completion lab write up wksht.

Engineering

- Engineers understand special recognition of area and its uses.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☒ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION
Creativity and Innovation
☒ Think Creatively
☐ Work Creatively with Others
☐ Implement Innovations
Critical Thinking and Problem Solving
☐ Reason Effectively
☒ Use Systems Thinking
☐ Make Judgments and Decisions
☒ Solve Problems
Communication and Collaboration
☐ Communicate Clearly
☒ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS
Information Literacy
☒ Access and Evaluate Information
☐ Use and manage Information
Media Literacy
☐ Analyze Media
☐ Create Media Products
Information, Communications and Technology (ICT Literacy)
☐ Apply Technology Effectively

LIFE & CAREER SKILLS
Flexibility and Adaptability
☒ Adapt to Change
☐ Be Flexible
Initiative and Self-Direction
☒ Manage Goals and Time
☐ Work Independently
☐ Be Self-Directed Learners
Social and Cross-Cultural
☐ Interact Effectively with Others
☒ Work Effectively in Diverse Teams

Productivity and Accountability
☒ Manage Projects
☐ Produce Results
Leadership and Responsibility
☐ Guide and Lead Others
☒ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Shop representation Area
- Shop tools/Equipment; Planner, Table Saw, Drill Press/ Milling Machine, Metal Band Saw, Tool Grinder, Radial Arm Saw.
- Shop Layout Reference Map/ Blank with exits and emergency locations.
- Graph Paper/ Post-it notes.
- Pencils
- Tape Measures/ Rulers
- Yellow tape
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Set-Up Required:

- Large room area 60x80
- Tables with tool representations of type of tool/equipment
- Lab equipment with presenter
- Computer monitor with large screen projector

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Work Creatively with other peers
- Communicate clearly
- Manage Projects
- Health and safety literacy
- Access and evaluate information

Cooperative Learning:

- Break students into groups; 6 Groups of 5 with 1 measurer, 1 calculator, 2 recorders/time keepers, 1 Reporter-Lead
- Group presentation of results of lab work.

Expectations:

- Students are expected to complete lab with group along with worksheet working creatively and professionally with their peers.
- Communicate clearly with group and manage project in timely manner.
- Turn in all documents in a timely manner.

Timeline:

- First 10 minutes; review goals and objects with examples; student question drawing of shop layout.
- 5 min; break into groups assign duties
- 5 min; Review lab with materials and data with worksheets to class.
- Student Lab wksht and 6 station rotation with 6 groups, 5 min each station.
- Exit review of wksht and or concerns issues in completing in timely mannor.
- Completion of full lab with-in; (55min periods)
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Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Students will be prepared to safely work in a construction trade and home use equipment assuring safety for themselves and workers around them.
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Career Applications

- Students will identify the stages of progress within the construction trades for safe work area.
- Students will demonstrate and explain the importance of safety in the construction industry through safe work practice.

Optional or Extension Activities

- Possible Work Base Learning opportunities for older students
- Apprenticeship opportunities for school to work

Lab Instructions:

I. **Lab Site: Where are we?** Construction skill Lab Layout about 75x80 feet. All shop tools necessary for wood construction and carpentry class. Students Draw out the Lab area with location of tool area on Blank Paper Details exit doors, emergency stations, fire extinguishers etc.

II. **Topic of Instruction:** Introduction of need for shop Safety and how science and math fit into the presentation. How math is a part of construction and needed daily for measuring, figuring angles, determine slopes, geometric and algebraic functions.

III. **Introduction of the lesson**: The setting in a applied math construction skills 1 class first week of lab work with tools in the shop area.

IV. **What is the Goal:** Each construction skills student will understand the concept of area and need to work in a safe work environment within the lab by performing the task and demonstrating tool use in safe OSHA approved way.

V. Expectations:

- Students are expected to complete lab with group along with worksheet working creatively and professionally with their peers.
- Communicate clearly with group and manage project in timely manner.
- Turn in all documents in a timely manner.

VI. Group Selection:

- 6 Groups of 5 students
- Select your team: 1 measurer, 1 calculator, 2 recorders/time keepers, 1 Reporter-Lead

VII. **Materials for lab:** Measurer pick up packet for group and become familiar with what items are. Back Ground: Students should have already been familiar with operation of a tape measure, ruler, tape, pencil, drawing & sketch practices.

VIII. Safety Zone Worksheet: Review worksheet with Groups, going over standards and instructions for individual stations.

IX. **Set Start time to complete each station area:** 5 min for each station.

X. **Assign each group to station area and begin lab format:** Explain teacher will be monitoring all stations for Student participation. Work Performance Grade! Also wait for signal (Whistle) to move to next station. Be sure to label your corner areas with tape provided. Note concerns or questions as you are at each station for safety concerns.

XI. **For this lab demo we will only be doing 2 stations: Stop presentation and move to end task.**

XII. **End Task:** Complete work sheet with all group participants. Note all concerns on safety in the tool operation. Are the tapes over lapping?

XIII. **Review the safety concerns on tool operation; Math is important!**

XIV. **. The best way to avoid an accident is to prevent it from happening in the first place.**

XV. **Turn in your Student worksheets. With all of your drawings to your group leader and turn with your materials Packet.**