WAMC Lab Template

Math Concept(s): Measuring lengths and using Pythagorean Theorem
Source / Text:
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Short Description (Be sure to include where in your instruction this lab takes place):

Students will be creating a square corner at the intersection of two 8' 2x4s using a pencil and a tape measure. This lab will occur on the floor area of the construction shop.

Lab Plan

Lab Title: Pythagorean Theorem is Your Friend, But You Can Cheat on Your Friend with a 3-4-5 Triangle

Prerequisite skills: Using tape measure to accurately determine distance
Knowledge of the Pythagorean Theorem

Lab objective: Students will perform measurements on 2/8' 2x4s and use the Pythagorean Theorem to create a perfectly square intersection of the timbers.

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

Mathematics K–12 Learning Standards:

- G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Standards for Mathematical Practice:

- Attend to precision

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

- One tape measure for every three students
- Two 8 foot 2x4s per group
- One pencil per group

- One Framing Square (for the teacher)

Each lab group will need the following:

- Three tape measures
- A calculator or may use calculator application on their phone
- Pen/Pencil
- Paper

Set-Up Required:

- Clear floor space (inside and outside)
- Assemble items and arrange to distribute to students
- Prepare to check accuracy

Lab Organization Strategies:

By working in groups with divided tasks, students will need to collaborate to accomplish the work of the lab. Each group will need to communicate effectively to make judgements and decisions such as how much extra material to order. Decisions as to which group member will do which part will need to be made and then students will need to accomplish their individual tasks independently.

Cooperative Learning:

- Each student will work in a group of three students to accomplish the lab.
- Groups will make decisions and problem solve together

Expectations:

- Each group will apply the Pythagorean Theorem to solve the problem of how to square two 2x8s with only a tape measure and a pencil.

Timeline:

- This lab will require 10 minutes of instruction to review the Pythagorean Theorem
- The lab can be completed with a single 50-minute class period.

Post Lab Follow-Up/Conclusions:

Discuss how students were able to apply the Pythagorean Theorem to the problem.
Ask if students used any other methods to accomplish the task.
Share best practices.
Conversation about when this would be used in the field (framing decks, walls…)
Discuss how to cheat on the Pythagorean Theorem (3-4-5 triangle)