WAMC Lab Template

Math Concept(s): Similar Triangles
Source / Text: Geometry in Construction
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Attach the following documents:

- Lab Instructions: Students will build a scale model of a house truss. Teacher will give the truss plans out of the GIC book. It will have some of the dimensions and others will need to be figured out. Similar triangles will help them find the vertical truss supports and the length of the roof line joist.
- Student Handout(s): They will be given a plan not to scale, to measure and cut the balsa wood into pieces to construct the roof truss.
- Rubric and/or Assessment Tool: We will stack them side by side and note the outliers.

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

Lab Plan

Lab Title: Truss Building

Prerequisite skills: X-acto knife/saw use, ruler/scale use

Lab objective: Use similar triangles to get exact measurements

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

Mathematics K–12 Learning Standards:

HS.G.SRT.4
HS.G.SRT.2
HS.G.SRT.5

Standards for Mathematical Practice:

- Makes sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Use appropriate tools strategically
- Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- RST.9-10.4
- RST.9-10.7

K-12 Science Standards

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Technology

- 1.2.1
- 2.4.1

Engineering

-

Leadership/21st Century Skills:

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation ☐Think Creatively ☐Work Creatively with Others ☐ Implement Innovations **Critical Thinking and Problem Solving** X Reason Effectively ☐ Use Systems Thinking ☐ Make Judgments and Decisions ☐ Solve Problems **Communication and Collaboration** ☐ Communicate Clearly X Collaborate with Others	**Information Literacy** X Access and /evaluate Information ☐ Use and Manage Information **Media Literacy** ☐ Analyze Media ☐ Create Media Products **Information, Communications and Technology (ICT Literacy)** ☐ Apply Technology Effectively	**Flexibility and Adaptability** ☐ Adapt to Change ☐ Be Flexible **Initiative and Self-Direction** ☐ Manage Goals and Time X Work Independently ☐ Be Self-Directed Learners **Social and Cross-Cultural** X Interact Effectively with Others ☐ Work Effectively in Diverse Teams **Productivity and Accountability** ☐ Manage Projects X Produce Results **Leadership and Responsibility** ☐ Guide and Lead Others ☐ Be Responsible to Others

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

Materials

- Balsa wood strips, cutting tools with cutting boards, glue, wax paper, ruler with correct scale, pins, and tape.

Set-Up Required:

- Indoor activity: Students get a cutting board (one each), plastic shoe box one per table with small supplies, 1 balsa strip per student (table leader passout), 3 to 4 students per table. (teacher gives plan from GIC book)

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- 2C.3
- 2C.5

Cooperative Learning:

- Students must share materials.
- Students are encouraged to talk and share ideas.
- Students are given a truss plan from the teacher (copy plans from GIC book).
- Once all the dimensions are figured out, get a balsa strip.
- Each student does one. Some may do two.
- Each student measures all truss parts (cut as you go).
- Measurements should be compared between students to ensure accuracy.
- When all parts are cut out, glue the parts together.
- Let the truss dry (superglue dries fast).
- When all are done, compare and grade.
- If you are done, help others.

Expectations:

- Teams will make enough trusses for their house

Timeline:

- 2-3 class periods

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Doing Gable end trusses it is helpful to calculate bracing from the ground. Then climbing the ladder only one time.

Career Applications

- Building construction, Architect, Structural Engineer

Optional or Extension Activities

- Start attaching roof trusses to the model house.

Formative assessment:

Walk around the room to check students' work. Looking for the shape and size of the truss. Point them to a student that can help.

Summative assessment:

Collect all the trusses from each team. Set them side by side. Remove the outliers and measure. Grade given according to specifications.