WAMC Lab Template

Math Concept(s): Lines, Angles & Triangles
Source / Text: CORD Geometry Textbook
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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):

Lab Plan

Lab Title: Triangle Popsicle Stick Lab

Prerequisite skills: Understanding of the Triangle Sum Theorem and all the different types of triangles.

Lab objective: To have students engage in leadership activities while learning how to build different types of triangles using measurements and angles.

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

Mathematics K–12 Learning Standards:

- G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

Standards for Mathematical Practice:

- MP.1 Makes sense of problems and persevere in solving them
- MP.7 Look for and make use of structure
- MP.8 Look for and express regularity in repeated reasoning

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

- RST.9-10.1 Cite specific textual evidence to support analysis of technical texts, attending to the precise details of explanations or descriptions.
- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- RST.9-10.4 Determine meaning of symbols, key terms, or other domain specific words and phrases as they are used in specific technical context
- RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed verbally or mathematically into words.

- W.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners building on others' ideas and expressing their own clearly and persuasively.
- SL.9-10.4 Present information, findings, and supportive evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
- L 9-10.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

K-12 Science Standards

- HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.*

Technology

- 1.2.1 Communicate and collaborate to learn with others.
- 1.3.2 Locate and organize information from a variety of sources and media.
- 2.2.1 Develop skills to use technology effectively.
- 2.4.1 Formulate and synthesize new knowledge.

Engineering

- HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

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

- Student Worksheet
- Popsicle Sticks (different colors)
- Craft Putty
- Rulers/Straight Edge

Set-Up Required:

- Teacher will need to cut popsicle sticks into specific sizes so all are exact size for all student groups.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- 2A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Cooperative Learning:

- Students will need to be able to work together in groups and collaborate on the responsibilities each teammate will have in the exercise.

Expectations:

- Students will need to be able to show that they understand the concepts of building triangles using measurements and angles.

Timeline:

- Students will have 30 minutes to work through multiple different problems together and then with their partner reflect on the project.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Show students how we can see lots of different types of triangles in our everyday life. Have students point out how to figure out angles using objects in our classrooms.

Career Applications

- Construction
- Architect
- Landscape Designer
- Carpenter
- Gardener
- Engineer
- Mechanic
- Optometrists

Optional or Extension Activities

- Knowing the Optometrists use angles to make sure the eyeglass lenses are at the right angle for maximum viewing for clients. I would have students research what other careers use angles that we might not have come up with. (i.e. – Race Car drivers, Hydroplane drivers, etc…)