WAMC Lab Template

Math Concept(s): Using proportion to measure
Source / Text: Mathematics: A Contextual Approach to Algebra 1
Developed by: Lyle Prouse   E-Mail: prouse@skschools.org   Date: 06/21/22

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: Using proportion to measure

Prerequisite skills: Write a proportion, solve a proportion

Lab objective: Measure objects using shadows to create a proportional relationship

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

Mathematics K–12 Learning Standards:

- CCSS.Math.Content.7.RP

Standards for Mathematical Practice:

- Analyze proportional relationships and use them to solve real-world and mathematical problems

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

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K-12 Science Standards

- MS.PS1.1

Technology

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Engineering

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

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

Materials

- Tape measure, calculator

Set-Up Required:

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Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

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Cooperative Learning:

- Students will work in teams of two measure the height of their partner and then measure their partners shadow and then the shadow of flag pole.

Expectations:

- Write and solve a proportion to ascertain the height of a tall object

Timeline:

- The lab will take one 50 minute period

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- This can be extended to finding the angle of the sun to introduce trigonometric functions

Career Applications

- Construction trades, architecture

Optional or Extension Activities

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WAMC Lesson Plan

Name(s): Lyle Prouse
Email Address:prouse@skschools.org
Lesson Title: Date: 6/21/22
Text: STEM Correlation: Math   Lesson Length:50 minutes

Big Idea (Cluster): A proportion is an equality of two ratios, a ratio is a comparison of two quantities	
Mathematics K–12 Learning Standards: CCSS.7.RP	
Mathematical Practice(s): Analyze proportional relationships and use them to solve real-world and mathematical problems.	
Content Objectives: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.	Language Objectives (ELL):
Vocabulary: Ratio, proportion	Connections to Prior Learning: Natural numbers, integers, fractions, decimals, percentages
Questions to Develop Mathematical Thinking: Do fractions represent a proportion •	Common Misconceptions: • How to form a ratio, ratio and fractions are the same.

Assessment (Formative and Summative):

- Formative: Complete assigned problems on big ideas math website. Summative: Unit quiz

Materials:

- Tape measure, calculators, https://static.bigideasmath.com/protected/content/pe/ca/g7_05.pdf

Instruction Plan:

Introduction: To enable students understand the concepts of ratio and proportion
Explore: • distinguish between absolute comparison and relative comparison • see ratios as comparing part to part and fractions as comparing part to whole, where the quantities being compared have the same units. • see rates as the ratio of two quantities having different units • appreciate the importance of order when dealing with ratios • find equivalent ratios • divide a number into a given ratio
When I observe students: They will be able to solve problems involving proportions
Questions to Develop Mathematical Thinking as you observe: How does this relate to the rate of change/slope?
Answers: The slope is a ratio of the vertical change to the horizontal change.
Summarize: Students will consolidate their understanding of the relationship between ratio and proportion.

Career Application(s): Construction, management, farming, computer science, architecture

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

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