

Lab Template

Text: Applied Mathematics (CORD)

Volume: _____ **Chapter:**

Unit number: 9 **Title of unit:** Using Ratios and Proportions

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Attach the Following Documents:

- 1. Lab Instructions**
- 2. Student Handout(s)**
- 3. Assessment Tool:** assessment of student journal notes, complete with data table, sketches, and notes

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

Students will measure the length of 3 objects and then measure their shadow lengths when placed vertical under a bright sun. Students will compute ratio of shadow length to physical length. They will then measure the shadow lengths of 3 objects of unknown lengths and try to determine their physical length using their aforementioned ratios. Students will then check their accuracy by physically measuring these 3 objects and compare their findings with their predictions of lengths based on shadow ratios.

Using Shadows & Ratios to Determine Height

LAB PLAN

TEACHER: (*Teacher Prep/Lab Plan*)

- ♣ **Lab Objective:** Students will use ratios determined from shadow measurements to determine the height of additional objects.

- ♣ **Statement of prerequisite skills needed** (*Vocabulary, Measurement Techniques, Formulas, etc.*) measuring skills in the metric system

- ♣ **Vocabulary:** ratio, proportion

- ♣ **State Standards addressed:** (*Highlight "Green" Standards, you may use your District's Power Standards if applicable*)
Math: 7.2.B (solve single and multi-step problems and verify the solutions)
 - ♣ **Reading:**
 - ♣ **Writing:**
 - ♣ **Leadership:** work in 2-3 person teams, each person with a specific task
 - ♣ **SCAN Skills/Workplace Skills:**

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

Materials: 10+ meter tape measure (in centimeters), pencil, desk lamp, miscellaneous items, and student journals

⤴ Set-Up Required: plug in desk lamp, have various objects handy, have cm measuring tape available. Demonstrate to students how to measure shadows using the scaled down version of the sun (desk lamp), being careful to keep objects vertical.

⤴ **Lab Organizational Strategies:**

- ⤴ Grouping/Leadership/Presentation Opportunities: teacher appointed groups
- ⤴ Cooperative Learning: students self-assign duties of 2 measurers and 1 recorder
- ⤴ Expectations: stay on task, be accurate in measurements, create labeled sketches
- ⤴ Time-line: 1 to 1.5 hours depending on number of objects being measured

⤴ **Post Lab Follow-Up/Conclusions** *(to be covered after student completes lab)*

- ⤴ Discuss real world application of learning from lab: aerial photo interpretation, indirect measuring
- ⤴ Career Applications: forestry, any career needing ratio use for indirect measurement
- ⤴ Optional or Extension Activities: students can create a lab for our use that would take this lesson even further such as re-positioning spotlights and comparing results and accuracy.