

## Lab Framework

**Text:**CORD Classic

**Unit number and title:**Unit 6 Working with Lines and Angles

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### Lab Title

## Measurement of Angles

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**Short Description:** Measure the rise and run of stair and ramps on campus. Determine if they are to code set in the Washington State Building Code.

### LAB PLAN

**TEACHER:** Teacher Prep/ Lesson Plan

- **Lab Objective**
- The student will be able to name the different parts of lines, angles and circles.
- The student will be able to measure line segments and angles
- The student will be able to compare and evaluate building measurements and if they meet Washington State Building code requirements.
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
  - Understanding of new vocabulary
  - Use of measurement tools (i.e. rulers, tape measure, yardstick)
  - Understanding of Line Segments and Angles
- **New Vocabulary**
- Angle, Center of Circle, Circle, Circumference, Compass, Degree, Diameter,
- Line, Line Segment, Parallel Lines, Perpendicular Lines, Point, Protractor,
- Radius, Ray, Rotate, Vertex of Angle
- **Materials List**
  - pencil, rulers, plumb line, calculators, string, protractor, measuring tape, line level, ruler, drawing paper, Waching State Building Code Book.
- **GLEs addressed**
  - Math: 1.1.8 Apply estimation strategies in situations involving multi step computations of rational numbers using addition, subtraction, multiplication, division, powers, and square roots to predict or determine reasonableness of answers.
  - 1.2.3 Apply unit conversions within measurement systems, U.S. or metric, to maintain an appropriate level of precision.
  - 2.2.1 Select and use relevant information to construct solutions.
  - 2.2.2 Apply mathematical concepts and procedures from number sense, measurement, geometric sense, probability and statistics, and/or algebraic sense to construct solutions.
  - 5.1.1 Apply concepts and procedures from two or more content strands, including number sense, measurement, geometric sense, probability and statistics, and/or algebraic sense, in a given problem or situation.
  - 5.3.2 Understand that mathematics is used in many occupations or careers
  - Reading: 1.3.2 Understand and apply content/academic vocabulary.
  - Writing: 2.2.1 Demonstrates understanding of different purposes for writing.

- **Leadership Skills**

**Students will help each other solving problems in construction and application of formulas.**

**Students will be working in teams and will have opportunities to be group a group leader.**

- **SCAN Skills**
- Problem Solving -
- Recognizes that a problem exists (i.e., there is a discrepancy between what is and what should or could be), identifies possible reasons for the discrepancy, and devises and implements a plan of action to resolve it. Evaluates and monitors progress, and revises plan as indicated by findings.
- Mathematica -
- A. Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- B. Uses quantitative data to construct logical explanations for real world situations
- **Set-up information**  
Have instructional handouts ready. Divide class into teams of 4. Have them people to the positions of Leader, Recorder, Measurer, Equipment Manager. The students are to measure the rise and run of three sets of stairs and one entrance ramp with the use of the equipment provided. Discuss Accuracy and why it is important in their measurements. Have each group find the required code for building stairs and ramps in Washington State. Each team is to create an accurate drawing to a reduced scale to represent each set of stairs and the ramp.
- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; **-Timeline required**)  
90 minutes in class time to complete lab. Students are to work in 4 person engineering team. Each team is to have a Leader, a recorder/drawer, a measurer, and a equipment manager. Teams are to work independently. Teams are not to come to the City Licensing Manager (Teacher) unless all other avenues have been expended.  
  
5 minutes to create teams and assign positions  
10 minutes to locate Building Code requirements  
45 minutes to get measurements of stair/ramp  
20 minutes to make drawings
- **Teacher Assessment of student learning** (scoring guide, rubric)  
Rubric for scoring will be developed
- **Summary of learning** (to be finished after student completes lab)
  - discuss real world application of learning from lab
  - opportunity for students to share/present learning
- **Optional activities**
- Students will write in their journals on what they learned from the lab and how it may help to make decisions on purchasing/repairing/altering a house they may own in the future.
- **Career Applications**  
Contractors, Home Repairs, Cement Layer, Drafting/CADD

**LAB TITLE: Line Segments and Angles**

**STUDENT INSTRUCTIONS:**

- **Statement of problem addressed by lab**  
You are to form a team of 4 engineers. Your team is assigned to ensure Clover Park High School meets Washington State Building Code in the rise versus run in their stairs and ramps. The requirement is for student safety and the disabled people who come into the building.
- **Grouping instructions and roles**  
You have three minutes to assign positions in your 4 man team. You need a team leader, a recorder/drawer, a measurer, and a equipment operator.
- **Procedures** – steps to follow/instructions
  1. Your team is to set up a reference to measure by. A horizontal referance and plumb line form a 90 degree angle.
  2. Determine how you will measure the rise and run of the set of stairs/ramp.
  3. Take measurements.
  4. Make representative drawing
  5. Determine if it is to code
  6. Turn in equipment when finnished
  7. Each student Journals on where there could be errors in construction or their teams measurements. You are to journal on where else these building requirements would be necesary (think about your future homes).
- **Outcome instructions**  
Turn in completed project with journal.
- **Assessment instructions** (peer-teacher)  
Based on Rubric

## Lab Data Collection

**Student:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Unit:** \_\_\_\_\_

**Lab Title:**

**Criteria:** Write the problem/objective in statement form

**Data Collection:** Record the collected/given data

**Calculations:** Complete the given calculations to solve for an answer(s)

**Summary Statement:**

**Other Assessment(s)**