

## **Geometry Involved in Building Stairs**

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The principal has asked the class to build stairs that will be used in the gym to allow students to access the stage directly from the gym floor.

### **Objectives:**

#### **Geometry Skills**

##### **I. Geometry Skills**

- √ Students will find angle relationships such as vertical angles, linear pairs, complementary angles, and supplementary angles
- √ Students will identify relationships between and among points, lines, and planes (such as midpoint, distance, collinear, coplanar, parallel and skew lines).
- √ Students will find the intersection of lines, planes, and solids.
- √ Students will connect geometric diagrams with algebraic representations. Students will integrate construction such as segments and angles, segment bisectors, perpendiculars, angle bisectors, parallel lines, circles, arcs, and polygons.
- √ Students will describe, draw, and construct 2-dimensional and 3 dimensional figures.
- √ Students will represent\_ geometric figures and properties using coordinates. Students will connect the concepts of slope, distance, and midpoint to coordinate geometry.

##### **II. Career Technology Skills**

##### **III. Communication Skills**

##### **IV. Problem Solving Skills**

#### **Materials Needed:**

Lumber, nails, tools, graph paper

#### **Tasks:**

Along with the assistance of the carpentry teacher, students will:

1. decide upon specs used for stairs
2. determine unit rise and unit run of stairs to be built
3. look at basic design standards for stairs.
4. decide on total distance between the floor and landing area (rise)
5. determine width of each stair tread
6. determine horizontal distance covered by set of stairs (run)
7. use coordinate geometry to make a scale drawing of a staircase and to calculate the distances on the stairs
8. determine materials needed and their cost
9. build stairs

10. use a plumb line, line level, and protractor to measure slope angle made by staircase

**Evaluation:**

A rubric will be used to evaluate the following:

1. appearance
2. plumbness
3. levelness
4. do stairs meet local code
5. built with 15% or less waste
6. project completed on time

Teacher observations

Written report

N.B. This project should be implemented after the students have been introduced to the various concepts listed in geometry objectives

*This project courtesy of the East Ridge High School Construction Career Academy  
Chattanooga, Tennessee*