Measurement in Construction

Media Type: Microsoft® PowerPoint®
Duration: 75 slides

Goal: To explain systems and units of measurement and demonstrate proper measurement techniques.

Description: Measurement plays a crucial role in the architecture, construction and interior design industries. This presentation examines this role and describes the need for precise and accurate measurement. The U.S. customary system and the modern metric system are explained, and units of distance, weight and volume for each system are reviewed. Measurement techniques are also discussed and tips for proper measurement are provided. In addition, the process of drawing to scale is examined.

Objectives:
1. To identify the role of measurement in the construction industry.
2. To explain the U.S. customary system of measurement and recognize its units.
3. To explain the modern metric system of measurement and recognize its units.
4. To demonstrate proper measurement techniques.
5. To examine the process of drawing to scale.

Horizontal Alignment

Core-Subject Area	Foundation Concept	Basic Understanding
Language Arts	***Application of Writing Skills***	• Editing/proofreading • Composition mechanics • Informative and persuasive writing • Organizing logical arguments • Brainstorming • Utilizing reference materials • Creating bibliographies
	Analysis of Text & Information	• Drawing inferences and generalizations • Reading/content literacy • Critical thinking • Creative thinking • Expression of thoughts and ideas • Communication skills • Developing listening and comprehension skills • Creating visual representations

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Horizontal Alignment

Core-Subject Area	Foundation Concept	Basic Understanding
Math	***Logical Skills***	• Reasoning • Patterns • Problem solving • Real-life applications
	Mathematical Figures & Concepts	• Measurements • Fractions • Decimals • Percentages • Multiplication • Division • Addition • Subtraction
	Geometrical Figures, Principles & Applications	• Multidimensional relationships • Spatial relationships • Floor and space dimensions • Lines, patterns and shapes

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Lesson Plan

Student and Teacher Notes are available to print in outline format. You can access these documents under the "Printable Resources" section. If student licenses have been purchased, an interactive version of the Student Notes is available in the "Interactive Activities" section. If printing the full PowerPoint® is desired, you may download the file and print the handouts as needed.

Class 1: Begin class by passing out the *Measurement in Construction Vocabulary Handout*. Show the *Measurement in Construction - Introduction* segment. Follow the segment with its *Assessment*. Introduce the *Customary vs. Metric Project* for students to begin.

Slides 1-13

Class 2: Remind students to continue using the *Vocabulary Handout* as reference materials. Show slides 14 to 21 of the *Measurement in Construction - Units & Conversion* segment. Allow the remainder of the class to work on their *Project*.

Slides 14-21

Class 3: Show slides 22 to 34 of the *Measurement in Construction - Units & Conversion* segment. Pass out the *Unite Conversion Handout.* Follow the segment with its *Assessment*. Have students begin the *Conversion Activity*. If student licenses have been purchased, an interactive version of this *Activity* is available in the "Interactive Activities" section. Allow students to finish for homework if necessary.

Slides 22-34

Class 4: Review the *Conversion Activity* as a class. Remind students to continue using the *Vocabulary Handout*. Show slides 35 to 46 of the *Measurement in Construction - Techniques & Tips* segment of the presentation.

Slides 35-46

Class 5: Show slides 47 to 53 of the *Measurement in Construction - Techniques & Tips* segment. Follow the segment with its *Assessment*. Introduce the *Measuring Activity* and allow students the remainder of the class to work.

Slides 47-53

Class 6: Allow students the entire class period to finish the *Measuring Activity*. If/when the *Activity* discussion comes to an end, instruct students to continue work on their *Projects*.

Class 7: Show the *Measurement in Construction - Drawing to Scale* segment. Follow the segment with its *Assessment*. Introduce the *Scale Drawing & Model Project* and have students begin working on it.

Slides 54-75

Class 8: Administer the *Measurement in Construction Final Assessment*. Allow the remainder of the class for students to work on the *Scale Drawing & Model Project*.

Class 9: Distribute the *Measurement Costs Activity* and allow students time to complete it. If student licenses have been purchased, an interactive version of this *Activity* is available in the "Interactive Activities" section. Allow the remainder of the class for students to finish up their *Projects*.

Class 10: Students should share their *Scale Drawing & Model Project* with the class and turn in their *Customary vs. Metric Project*s.

Lesson Links

Construction Knowledge.net: Measurement Conversions

- http://www.constructionknowledge.net

Construction Zone: Construction Measurement

- http://www.constructionzones.com/Portals/85/ConstrMeasCurrSample.pdf

Career & Technical Student Organizations

SkillsUSA

- Architectural Drafting
- Cabinetmaking
- Carpentry
- Related Technical Math
- Technical Drafting

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LESSON PLAN

Career Connections

Using the *Career Connections Activity*, allow students to explore the various careers associated with this lesson. See the *Activity* for more details. *If student licenses have been purchased:* Students will select the interviews to watch based on your directions. *If only a teacher license is purchased:* Show students all the career interviews and instruct them to only complete the interview form for the required number of interviews.

- iCEV50355, James Rymer, Chief Estimator, Lee Lewis Construction
- iCEV50809, Kristen Harness, Design Manager, OfficeWorks
- iCEV50883, Sheryl Fox, Commercial Interior Designer, Canizaro Cawthon Davis

Lab Activities

Conversion

Directions:
Students will fill in the blanks provided by converting the units of measurement within a system. Then they should fill in the provided tables for converting units of measurement between systems. When necessary, they should round numbers to the nearest tenth. Allow students to keep the tables for future reference. If student licenses have been purchased, an interactive version of this *Activity* is available in the "Interactive Activities" section.

Measuring

Directions:
Students will work in groups of three or four to practice measuring distance, weight and volume in both U.S. customary units and metric units. Then they will participate in class discussion regarding challenges of measuring and tips for measuring accurately and precisely. See the *Measuring Teacher Instruction Sheet* for instructions and supplies needed.

Measuring Costs

Directions:
For this *Activity*, students will discuss the costs in measurements. Using the information provided, students will estimate the cost of building a floor for the spaces shown. Remind students to think about how large the space is as well as what is needed to properly quote each project. An *Answer Key* has been provided. If student licenses have been purchased, an interactive version of this *Activity* is available in the "Interactive Activities" section.

Projects

Customary vs. Metric

Directions:
Students will research the U.S. customary system and the modern metric system. Then they will write a report discussing their findings. They should include a brief history of each system, advantages and disadvantages of each system, and their opinion on which system is preferable. Students should include a bibliography documenting their sources according to your instruction.

Scale Drawing & Model

Directions:
Students will imagine their dream homes and create scale drawings and models. They should decide on a reasonable scale and develop a blueprint-like drawing and a simple roof-less model. Homes and elements involved (doors, windows, etc.) should be relatively realistic in terms of size and structure. Each room should be labeled with its purpose (living room, bedroom, etc.), room dimensions and the scaled down measurements used to make the drawing/model. For more details, see the *Scale Drawing & Model Project* handout.