

**Pennsylvania Governor's Institute  
for Mathematics Educators  
2004**

**Names of Group Members:** Carol Balaz  
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**Topic/Theme:** Conversion of Customary Linear Units

**Level:** Grade 4

**Time Element:** Two days

**NCTM Standards Addressed:**

- Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems.
- Develop fluency in adding, subtracting, multiplying, and dividing whole numbers.
- Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results.
- Understand such attributes as length, area, weight, volume, and size of angle and select appropriate type of unit for measuring each attribute.
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.
- Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement.
- Understand that measurements are approximations and understand how differences in units affect precision.
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.
- Select and use benchmarks to estimate measurements.

**PA Math Standards Addressed:**

- 2.1.3. L Demonstrate knowledge of basic facts in four basic operations.
- 2.2.3. F Determine the reasonableness of calculated answers.

- 2.3.5. D Convert linear measurements within the same system.
- 2.3.3. E Determine the appropriate unit of measure.
- 2.3.3. G Estimate and verify measurements.
- 2.4.3. B Use measurements in everyday situations ( e.g., determine the geography of the school building).

**Math Assessment Anchors Addressed:**

- M4.A.2.1 Use operations to solve problems (may include word problems).
- M4.B.1.2 Convert linear measurements within the same system.
- M4.B.2.1 Select and/or use appropriate tools and/or measurements.
- M4.B.2.2 Estimate measurements of figures.

**Reading Assessment Anchors Addressed:**

- R4.A.2.1 Identify the meaning of vocabulary from various subject areas.

**Objectives:**

Students will be able to estimate, verify and convert linear measurements within the same system.

**Instructional Strategies and Plan (include strategies used to help different types of learners, i.e. auditory, visual, etc.):**

**Prerequisites**

- Students have experienced using math tools to measure in inches, feet, and yards.
- Students have performed linear conversions transforming from inches to feet to yards with units and sub-units.
- Students are familiar with the vocabulary for linear measuring: height, width, length, and depth.

**Day 1 Activity**

- Teacher reviews prior lessons and activities involving linear measurement.

- Teacher will use transparent ruler on overhead projector to review measurements with students. Students will have their customary rulers (Math tools) on their desks.
- Teacher will review linear vocabulary using a chart demonstrating height, length, width, and depth.
- Simultaneously students will demonstrate these linear measurements by tracing their fingers across their textbook.
- Teacher will use overhead with a figure showing how to measure its length, width, height, and depth. Students will point to measurements on the screen to demonstrate their ability to identify these attributes.
- Students will practice measuring lines drawn on the board by the teacher using their measuring tapes.
- Teacher will distribute worksheet to students and discuss the first three columns.
- Students will be assigned groups to complete columns 2 and 3.
- At end of class teacher and students will check columns 2 and 3 for accuracy and comprehension of activity.

### **Day 2 Activity**

- Teacher will do a quick oral review with students of vocabulary.
- Students will discuss with teacher how to convert from inches to feet and yards explaining the rules for conversion.
- Students will work with groups to convert measurements and complete column 4.
- Groups will then switch papers to check each others work. The groups will refer to the teacher any discrepancies they find.

### **Materials/Resources:**

- Overhead projector
- Charts for vocabulary
- Transparent ruler
- Transparency with figures for measuring (page 1 of worksheet)
- Worksheet
- Rulers and Measuring tapes
- Items to measure: Math book, door, chalkboard, desk

### **Interdisciplinary Connections:**

- **Reading:** Language skills- math vocabulary for linear measurements.

- **Technology:** Computer sites for Extensions/Enrichment  
Overhead projector

**Assessment Strategies:**

- **Formative Evaluation (checking student understanding during the lesson):**
  - Observing and monitoring students' work
  - Accurate worksheet completion
- **Summative Evaluation (how will it be determined that the objectives were achieved?):**
  - In their Math journals the students will explain how to convert linear units from smaller to larger units and vice-versa.
  - Students will also describe in their journals real-world situations where they will need to know how to use these skills.

**Correctives/Remediation:**

- Remediation will be done daily as work is corrected in a collective group.
- Skills will be re-taught as necessary.

**Extensions/Enrichment:**

- <http://pbskids.org/cyberchase/games/bodymath/bodymath.html>
- <http://cyberchase.com> now go to *Games Central* to play *Sleuth on the Loose* or *Wacky Ruler*
- <http://www.gamequarium.com/measurement.html> Students may do *Equivalent Customary Measurement* or *Measure it! Inches Level*

## **Special Accommodations (special needs students)**

- **Description of the Special Needs Student Selected:**
- **Student's Name: Jimmy**

Jimmy is diagnosed with Asperger's syndrome. He is above grade level in decoding and fluency in reading. Jimmy loves to read anything that is fact based and quickly memorizes and recites the facts. He has great difficulty with problem solving and inferential thinking. Jimmy has poor fine motor skills and has trouble writing within boundaries and organization of his written work. He has strong rote math facts but has severe difficulty with the organization of multi-step sequences and problem solving. When he is presented with these types of math problems, he crawls under the desk and refuses to come out.

- **Accommodations to Use with this Student:**
  - Teacher will follow student's I.E.P.
  - Teacher will give a copy of the worksheet and lesson plan to Jimmy's emotional support teacher. The emotional support teacher will review this sheet with Jimmy before the lesson is given.
  - Jimmy would be put into a group of his peers that he associates with. The students will hold the tape measure for smaller measurements (inches) while Jimmy reads off the measurements. For larger measurements (feet) Jimmy can measure and record on his own answers.
  - Jimmy 's worksheet should be enlarged to provide more space for his answers.
  - A time-out space will be provided for Jimmy to go to if he gets upset and refuses to work.
  - If assistance is needed, Jimmy may work with the teacher or go to his emotional support classroom for help.
  - Jimmy can use the conversion chart in his math book to help him convert measurements.