## Ridiculous Rulers and other Zany Measurement Ideas

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A Longitudinal Examination of Children's Developing Knowledge of Measurement: Mathematical and Scientific Concept and Strategy Growth from Pre-K through Grade 5

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http://childrensmeasurement.org/

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## Purpose of the Presentation

- Introduce measurement learning trajectories as resources to guide the instruction of geometric measurement topics.
- Provide examples of measurement tasks consistent with the CCSS-M's treatment of measurement.

## Our learning trajectory about Length Measurement

- Eight levels:
  - (1) Length Quantity Recognizer
  - (2) Length Comparer
  - (3) End-to-End Length Measurer
  - (4) Length Unit Relater and Repeater
  - (5) Consistent Length Measurer
  - (6) Conceptual Ruler Measurer
  - (7) Integrated Conceptual Path Measurer
  - (8) Coordinated, Integrated Abstract Measurer with Derived Units



(Barrett et al., in press)



Less than 25% of our nation's Grade 4 students answered an item like this one correctly in 2000.

Just 60% of our nation's Grade 8 students answered an item like this one correctly in 2000.

(Kloosterman et al., 2004)



Ridiculous Ruler 1: Even intervals are marked, yet they are labeled with non-sequential integer values



Ridiculous Ruler 2: Even intervals are marked, yet labeled with inconsistent differences between label values



Ridiculous Ruler 3: Even intervals are marked and labeled with consistent differences, yet the labeled values begin at 3 rather than 0



Ridiculous Ruler 4: Uneven intervals are marked, yet they are labeled by integers increasing by 1



Ridiculous Ruler 5: Uneven intervals are marked, but the labels for each mark are based on an actual unit measurement between 0 and each mark.

Five Ways to Use a fragment of a ruler to measure well!





along a broken ruler:





Here the endpoints are marked, and we find the difference: 6 - 2 = 4. So the length is 4 inches.

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## Summary: Lessons Learned about Task Design

- Pose simple tasks that involve making comparisons.
- Prepare tasks that highlight student's thinking about unit and repeated units.
  - Vary the representation of the unit.
  - Provide concrete manipulatives (strips, tiles, or cubes), but not enough to completely cover or fill.
- Invite students to share their solutions and highlight those that involve identifying and operating on groups of units.