

Math Domain

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|---|--------------------------------------|---|
| <input checked="" type="checkbox"/> Number/Quantity | <input type="checkbox"/> Shape/Space | <input type="checkbox"/> Function/Pattern |
| <input type="checkbox"/> Chance/Data | <input type="checkbox"/> Arrangement | |

Math Actions (possible weights: 0 through 4)

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|--|--|
| <input type="checkbox"/> 0 Modeling/Formulating | <input type="checkbox"/> 2 Manipulating/Transforming |
| <input type="checkbox"/> 3 Inferring/Drawing Conclusions | <input type="checkbox"/> 2 Communicating |

Math Big Ideas

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|---|---|--|
| <input type="checkbox"/> Scale | <input type="checkbox"/> Reference Frame | <input type="checkbox"/> Representation |
| <input type="checkbox"/> Continuity | <input type="checkbox"/> Boundedness | <input type="checkbox"/> Invariance/Symmetry |
| <input checked="" type="checkbox"/> Equivalence | <input type="checkbox"/> General/Particular | <input type="checkbox"/> Contradiction |
| <input type="checkbox"/> Use of Limits | <input checked="" type="checkbox"/> Approximation | <input type="checkbox"/> Other |

The intent of this task is to have students demonstrate their ability to measure length using non-standard units and to make reasonable estimates of the linear dimensions of various body parts.

1. The results of 4th grade student’s measurements will be close to the following:

- head: about 3 times
- waist: about 3 times
- wrist: about 10 times
- ankle: about 7 times
- pinky: about 30 times

Their estimates may be substantially different.

2. Student’s are expected to recognize the differences in proportion between their own body and that of a baby, a sumo wrestler, and a skeleton. Their answers should reflect observations such as:

- a baby’s head is in larger proportion to the rest of the body, thus the head ratio estimate for the baby should be smaller than the 4th grader
- the sumo wrestler has a very large stomach, so his waist ratio should be smaller than the 4th grader
- the skeleton has a significantly smaller waist than a complete body, so this estimate should be larger than the 4th grader

	partial level	full level
Modeling/ Formulating (weight: 0)		
Transforming/ Manipulating (weight: 2)	Show partial success in completing the table for 1 .	Put all measurements correctly into the table for 1 , and show evidence of understanding the relative positions of the “exactly” integers and the “more than-less than” integers (e.g. no fractional answers are given).
Inferring/ Drawing Conclusions (weight: 3)	Make estimates that run in approximately the correct order (smallest estimates for the head and waist, largest for the pinky)	Make appropriate modifications to the original estimates that appropriately reflect the body characteristics of each situation in 2 .
Communicating (weight: 2)	Communicate answers in 1 which are not consistent as to “exactly” vs. “more than/less than” or Provide answers for 2 but give no explanation of assumptions.	Communicate consistent answers in 1 and give clear explanations for the answers in 2 , especially where they differ from the results for the student’s own body