A Piece of String

Math Domain
- ✓ Number/Quantity
- □ Chance/Data
- □ Shape/Space
- □ Function/Pattern
- □ Arrangement

Math Actions (possible weights: 0 through 4)
- 0 Modeling/Formulating
- 3 Inferring/Drawing Conclusions
- 2 Manipulating/Transforming
- 2 Communicating

Math Big Ideas
- □ Scale
- □ Continuity
- ✓ Equivalence
- □ Use of Limits
- □ Reference Frame
- □ Boundedness
- □ Invariance/Symmetry
- □ General/Particular
- ✓ Approximation
- □ Contradiction
- □ 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
<table>
<thead>
<tr>
<th>Category</th>
<th>partial level</th>
<th>full level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling/Formulating (weight: 0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transforming/Manipulating (weight: 2)</td>
<td>Show partial success in completing the table for 1.</td>
<td>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).</td>
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<tr>
<td>Inferring/Drawing Conclusions (weight: 3)</td>
<td>Make estimates that run in approximately the correct order (smallest estimates for the head and waist, largest for the pinky)</td>
<td>Make appropriate modifications to the original estimates that appropriately reflect the body characteristics of each situation in 2.</td>
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<tr>
<td>Communicating (weight: 2)</td>
<td>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.</td>
<td>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</td>
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