

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)

- | | |
|--|--|
| <input type="checkbox"/> 0 Modeling/Formulating | <input type="checkbox"/> 1 Manipulating/Transforming |
| <input type="checkbox"/> 2 Inferring/Drawing Conclusions | <input type="checkbox"/> 1 Communicating |

Math Big Ideas

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

The intent of this task is to have students demonstrate their understanding of the act of measuring time, length and weight. Specifically, they are required to demonstrate their understanding of the arbitrariness of the starting point of the scale.

Pre-Activity

The most common approach is for the vet to get on the scale and weigh himself, then to get back on the scale holding the animal and subtract his weight to get the weight of the animal alone.

The classroom discussion should be directed toward the idea of “difference” rather than any mechanical method for restraining the animal!

1. **a.** Again, the key element is the idea of difference, i.e. the scale reading less the vet’s weight, which is 16 pounds.
b. In this situation the student must realize that addition is necessary to get a scale reading of 86 pounds.
2. 11:23
3. If you try to use this piece of ruler to measure something that you know is one inch long and you line up the left end of the broken ruler with one end of the object, the other end of the object will be at the 12 mark on the broken ruler. We can use the broken measure if we remember to subtract 11 inches from what we read on it.

	partial level	full level
Modeling/ Formulating (weight: 0)		
Transforming/ Manipulating (weight: 1)	Correctly calculate the values in 1 or 2 .	Correctly calculate the values in 1 and 2 .
Inferring/ Drawing Conclusions (weight: 2)	Devise a mechanical scheme in 3 (e.g. re-number the ruler.)	Devise a more general scheme for re-zeroing the ruler in 3 , which may use the concept of “difference”.
Communicating (weight: 1)	Give a fragile explanation of the measurement schemes.	Explain the measurement schemes clearly and expansively, particularly including a discussion of the use of “difference”.