

Unit 1 The Scientist Tool Box

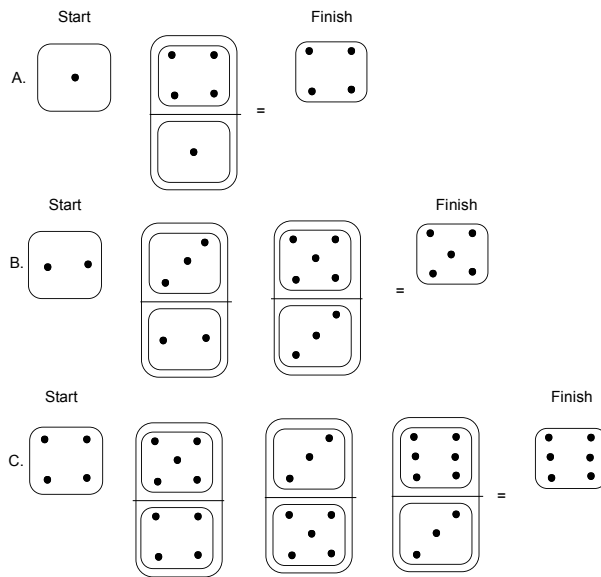
Dimension Analysis

Name _____
 Date ____/____/____

Why? In science we take measurements. For those measurements to have any meaning they must contain both a number and a unit, e.g. 12 inches. Numbers alone don't relay enough information. Often we will take measurements in one unit and have to convert them to another unit for the measurements to be useful. Dimension Analysis is the process of converting units.

Model 1: Dominoes

The game below is called equivalent measures.



Critical Thinking Questions:

1. Highlight the starting value (1 dot) in yellow, 4 dots in pink, 2 dots in blue, and 3 dots in orange. What color pattern do you notice in set A? Set B? Set C?

How does the color pattern correspond to the numbers on the dominos?

2. Look at the first set of dominoes labeled A. The first domino is known as the starting value, the second domino is called a conversion factor. Draw and label the starting value and the conversion factor in the space below.

3. Now look at the second set of dominoes labeled B. Draw and label the starting value and the conversion factors (there are 2) in the space below.

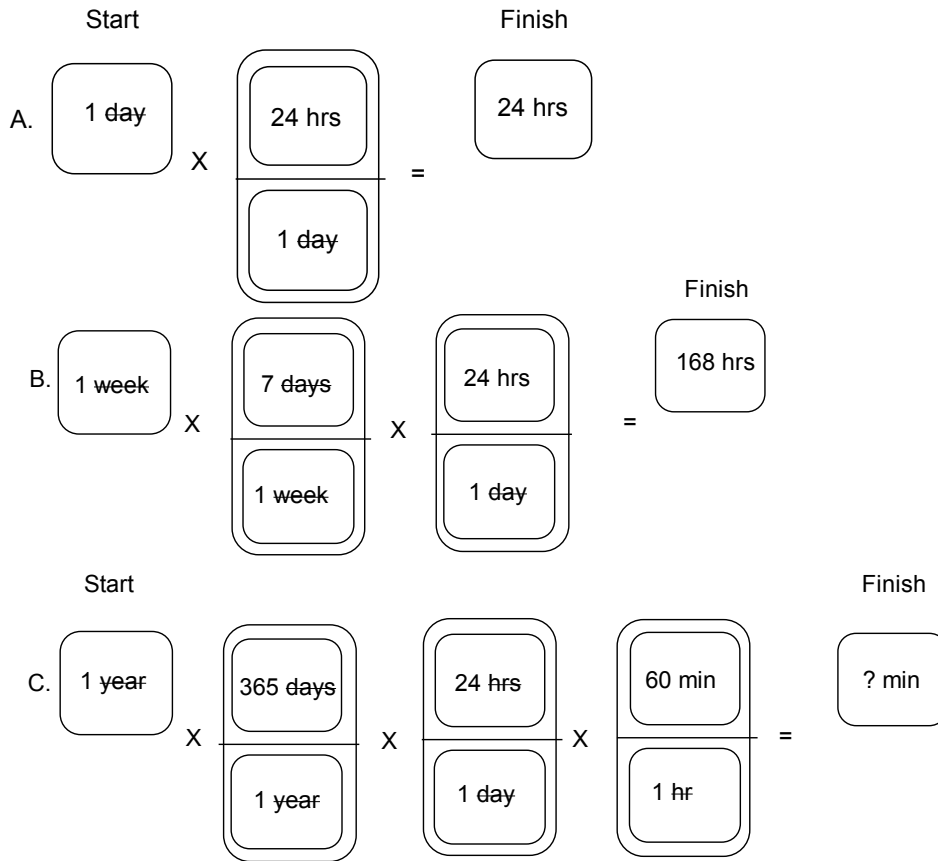
4. Now look at the third set of dominoes labeled C. Draw and label the starting value and the conversion factors (there are 3) in the space below.

5. Why do you think the conversion factors are called conversion factors?

6. Examine your drawings and the model and in a complete sentence write the 1 rule associated with the game equivalent measures.



Model 2: Dimension Analysis Dominoes



Critical Thinking Questions:

7. What are the starting values in model #2?

A. _____, B. _____, C. _____

8. What is the conversion factor in the first set of dominoes, A? Draw it below.

9. You identified the conversion factor as the domino with 24 hrs on the top half and 1 day on the bottom half. What can be said about 24 hours and 1 day in terms of length of time?

10. What is the relationship between the top (value) square in a conversion factor and the bottom value in the same conversion factor?
11. Did you notice that the word *day* in the starting unit and in the conversion factor is crossed out? Why do you think it is crossed out?
12. Examine all of the conversion factors in model #2. Write a definition of a conversion factor below. Use complete sentences.
13. In the space below come up with and draw three new conversion factors, they cannot appear in model #2, they do not have to apply to the problems in Model #2.
14. What mathematical operation is being used to convert from 1 day to 24 hrs, 1 week to 168 hrs, and 1 year to ? min. Is it addition, subtraction, multiplication, or division?
15. If you notice part c doesn't have an answer. How many minutes are in 1 year?



Critical Thinking Questions:

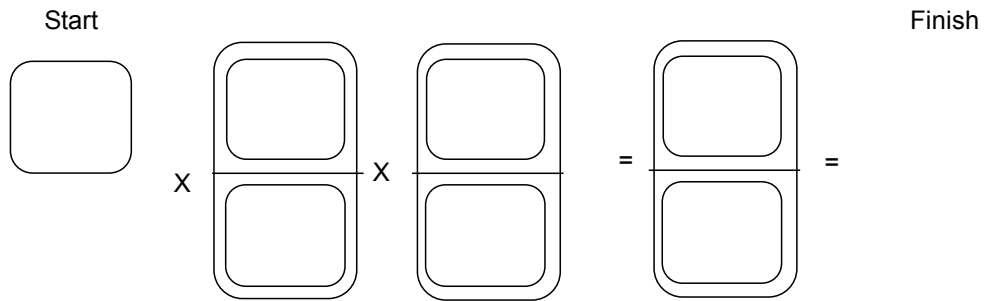
16. Try solving the following problems using the chemistry conversion factors listed in the problem.

- a. Convert 200 grams to pounds. Conversion Factor 1 lb = 454 g

Start Finish

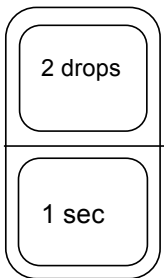
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b. Convert 350 milliliters to gallons. Conversion Factor 1000 mL = 1 Liters, 1 gallon = 3.79 Liters



c. How many gallons of water are wasted in one day if a leaky faucet drips at a rate of 2 drops per second and 1 drop of water is 0.5 mL? 1L = 1000 mL and 1 gallon = 3.79 Liters

Start



17. Write a clear explanation of the dimensional analysis process, using metric conversions milligrams, grams, and kilograms.