**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_**

Converting from One Metric Unit to Another

Skills you need to do this include:

1) memorize the metric prefixes names and symbols
2) determine which of two prefixes represents a larger amount
3) determine the exponential "distance" between two prefixes
4) significant figure rules
5) scientific notation

The key skill in solving these problems is to construct a conversion factor. This conversion factor will make the old unit go away (micrograms and km in the top two examples) and create the new unit (pm and cm) in its place. Along with this change, there will be a change in the value of the number.

Let's focus on the first example: Convert 2.50 g to picograms

**STEP ONE:** Write the value (and its unit) from the problem, then in order write: 1) a multiplication sign, 2) a fraction bar, 3) an equals sign, and 4) the unit in the answer. Put a gap between 3 and 4. All that looks like this:



The fraction bar will have the conversion factor. There will be a number and a unit in the numerator and the denominator.

**STEP TWO:** Write the unit from the problem in the denominator of the conversion factor, like this:



**STEP THREE:** Write the unit expected in the answer in the numerator of the conversion factor.



**STEP FOUR:** Examine the two prefixes in the conversion factor. In front of the LARGER one, put a one.



There is a reason for this. I'll get to it in a second.

**STEP FIVE:** Determine the absolute distance between the two prefixes in the conversion unit. Write it as a positive exponent in front of the other prefix.



Now, multiply and put into proper scientific notation format. Don't forget to write the new unit. Sometimes, the exponential number is in the denominator. You must move it to the numerator and when you do so, remember to change the sign. Also, DO NOT move the unit with it. That unit has been cancelled and is no longer there.

1. **Given either the name or the symbol of the prefix, give the other:**
2. c
3. k
4. T
5. 
6. d
7. milli
8. femto
9. giga
10. pico
11. hecto
12. **Given the prefix size, give its name:**
13. 10-15
14. 1,000
15. 109
16. 10-2
17. 0.000001
18. **On a separate sheet of paper, calculate the following. Provide your final answer in the correct scientific notation format.**

16. 750 micrograms to g

17. 0.25 megameters to cm

18. 23.8 fg to kg

19. 2.77 kg to mg

20. 2.90 cm to terameters

21. 45.6 microliters to megaliters

22. 1.08 kg to g

23. 9.57 x 10¯8 mm to nanometers

24. 2.00 L to mL

25. 35.28 mL to L



