


EXAMPLES 

- *How many centimeters are in a hectometer?*

Find the **multiplication factor** in exponent form. In this case, the multiplication factor for *centi-* is 10^{-2} . The multiplication factor for *hecto-* is 10^2 . Now, find the *absolute value* of the difference of the exponents.

$$-2 - 2 = 4$$

The **number** that you get (in this case, "4") tells you how many zeros to place after the number one (1) to get the **correct answer**. There are 10^4 , or 10,000 centimeters in a hectometer.

- *How many times larger is a kilogram than a gram?*

Find the **multiplication factor** in exponent form. In this case, the multiplication factor for *kilo-* is 10^3 . A gram **does not have** a multiplication factor in exponent form. Find the *absolute value* of the difference of the exponents.

$$3 - 0 = 3$$

The **number** you get tells you how many zeros to place after the number one to get the answer. In this case, a kilogram is 10^3 or 1,000 times larger than a gram.

PRACTICE 

1. How many milligrams are in one gram?
2. How many centimeters are in a kilometer?
3. How many microliters are in one liter?
4. How many nanoseconds are in one second?
5. How many micrograms are in one kilogram?
6. How many milliliters are in a megaliter?
7. A deciliter is how many times larger than a milliliter?
8. A micrometer is how many times smaller than a millimeter?
9. The wavelength of red light is 650 nanometers. How much bigger is the wavelength of a water wave that measures 2 meters?
10. A first grader measures 1 meter high. How much bigger is this first grader compared to the height of a bug that measures 1 millimeter high?
11. What is the name of the distance that is 10^{-9} smaller than a meter?
12. What is the name of the distance that is 10^3 larger than a meter?
13. What is the name of a volume that is 1,000 times larger than a milliliter?
14. What is the name of a mass that is 10^{-6} smaller than a gram?
15. A length of time that is 0.000000001 second is also called a what?