



Chem Skills Worksheet #10: Percent Error

When scientists need to compare the results of two different measurements, the absolute difference between the values is of very little use. (Is being off by 9 cm a lot or a little? It depends on whether you are measuring the length of a piece of paper or the distance to San Francisco from San Jose.) Scientists use the percent error between the two measurements to compare values.

To compare your value to an accepted value, you first subtract the two values and then take the absolute value of the difference so that you have a positive number. Then you divide this result by the accepted value to get a decimal answer, and finally multiply by 100% to get the percent error.

$$\text{So, } \% \text{ error} = \frac{|\text{Accepted value} - \text{Experimental Value}|}{\text{Accepted value}} \times 100 \%$$

1. Working in the laboratory, a student finds the density of a piece of pure aluminum to be 2.850 g/cm³. The accepted value for the density of aluminum is 2.699 g/cm³. What is the student's percent error? | $[(2.850 \text{ g/cm}^3 - 2.699 \text{ g/cm}^3) / 2.699] \times 100 =$

5.59%

2. A student experimentally determines the specific heat of water to be 4.29 J/g °C. He then looks up the specific heat of water on a reference table and finds that is is 4.18 J/g °C. What is his percent error?

3. A student takes an object with an accepted mass of 200.00 grams and masses it on his own balance. He records the mass of the object as 196.5 g. What is his percent error? | $[(196.5\text{g} - 200.0\text{g}) / 200.0\text{g}] \times 100 =$

1.75%

4. In a laboratory, a student finds the boiling point of water at sea level to be 102.0 °C. The true value of the boiling point of water at sea level is 100.0 °C. What is the student's percent error?

5. The experimentally obtained value for the melting point of a substance is 51.0°C and the accepted value for the melting point of this same substance is 53.0 °C. What is the percent error for this experimental value? | $[(51.0^\circ\text{C} - 53.0^\circ\text{C}) / 53.0^\circ\text{C}] \times 100$

3.8%

6. A student measures the mass and volume of a piece of copper in the laboratory and uses his data to calculate the density of the metal. According to his results, the copper has a density of 8.37 g/cm³. Curious about the accuracy of his results, the student consults a reference table and finds that the accepted value for the density of copper is 8.92 g/cm³. What would be the student's percent error?