**Determining Concentration Worksheet Answers**

Fill in this table with the reflected light values for standards A-G and the two unknown samples.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Sample** | **Concentration (drops/20 ml)** | **Reflected light (%)** |
| **Standards** | A | 50 | **31** |
| B | 30 | **36** |
| C | 20 | **38** |
| D | 10 | **40** |
| E | 5 | **43** |
| F | 1 | **44** |
| G | 0 | **45** |
| **Unknowns** | 1 | ? | **40** |
| 2 | ? | **33** |

**Plot the reflected light values for the standards versus the concentration below.**

**Instructions for determining the concentrations of your unknown solutions:**

1. Plot a straight line through as many of the points that you plotted for the standards as you can. Use a ruler to draw a line that best fits the data. Look at all the points and line up the ruler so that some of the points fall above the line, and some below. Draw a single line that that passes through the *middle* of the points.
2. Locate the reflected light value for Unknown 1 on the y-axis. Match it to the location on the standards line; then see what the corresponding concentration is.

Concentration of Unknown 1: **15** drops/vial

Repeat for Unknown 2.

Concentration of Unknown 2: **40** drops/vial

**Answer the following questions.**

1. Determine the percent change between the reflected light value of Standard A and Standard D.
2. Determine the percent change between the concentration of Standard A and Standard D.
3. Compare your answers to questions 1 and 2. What do you notice?

The percent change between reflectivity values and the concentrations are very similar, being 29% and 20%, respectively. (Ideally these values should be equal, but they are unequal due to experimental error.)

1. The actual concentration for Unknown 1 is **15 drops/cuvette**, and the actual concentration for Unknown 2 is **40 drops/cuvette**.

Calculate the *percent error* for the concentration you determined for your Unknowns. Use the following formula:

Unknown 1 Unknown 2

% error = (15-15)/15 x 100 % error = (40-40)/40 x 100

= 0 x 100 = 0 x 100

= 0 % = 0 %

(Expect students to obtain experimental errors not equal to 0 since their experimental values will differ from the actual values.)