

Bell Work, Apr 7 – Apr 11, 2014

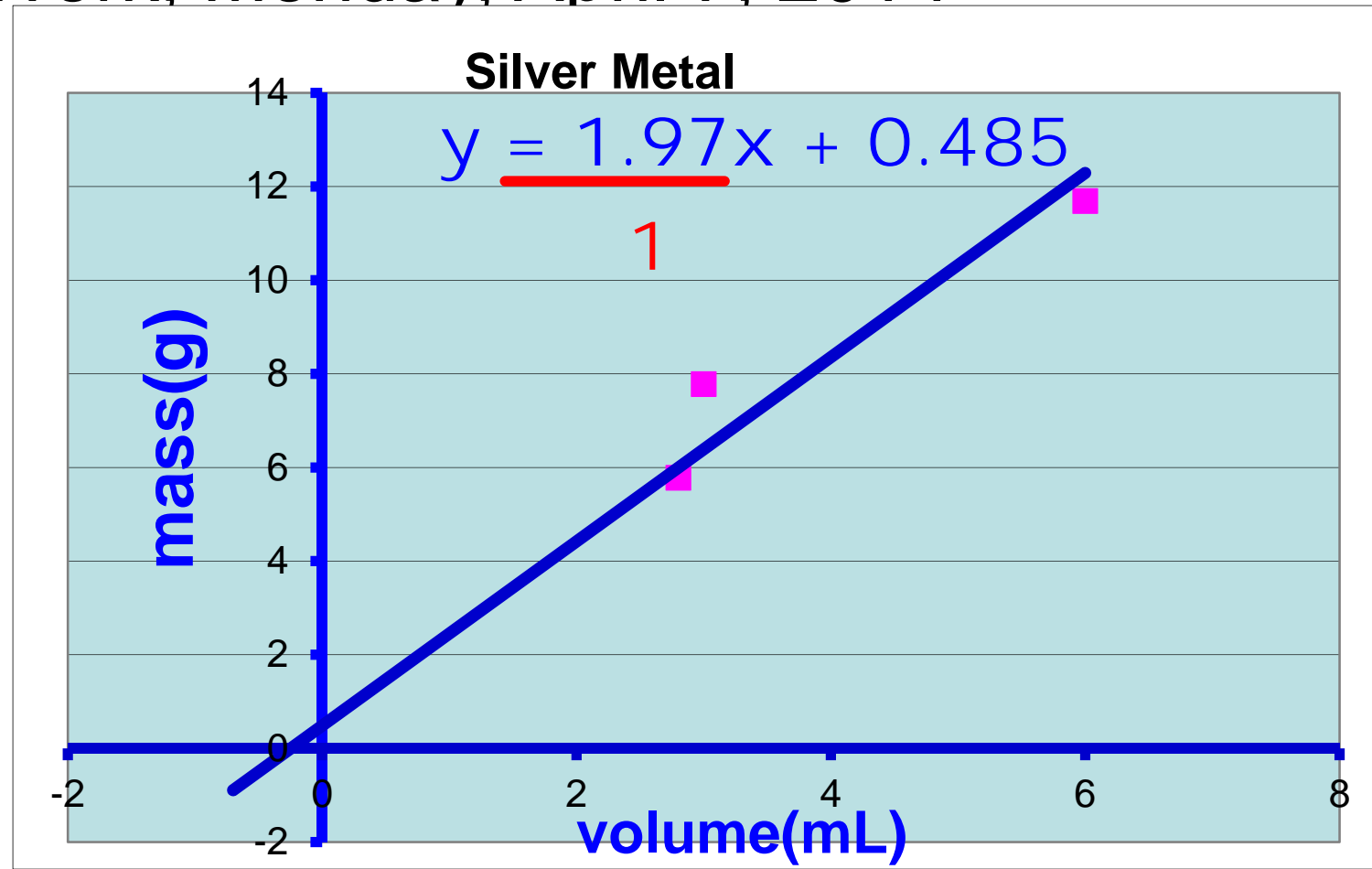
Mass & Volume, States of Matter

5% rule, slope, % error, graphical
representations of density .

Bell Work, Monday, April 7, 2014

**Sketch
the graph**

Volume	Mass
2.8	5.78
3	7.78
6	11.69

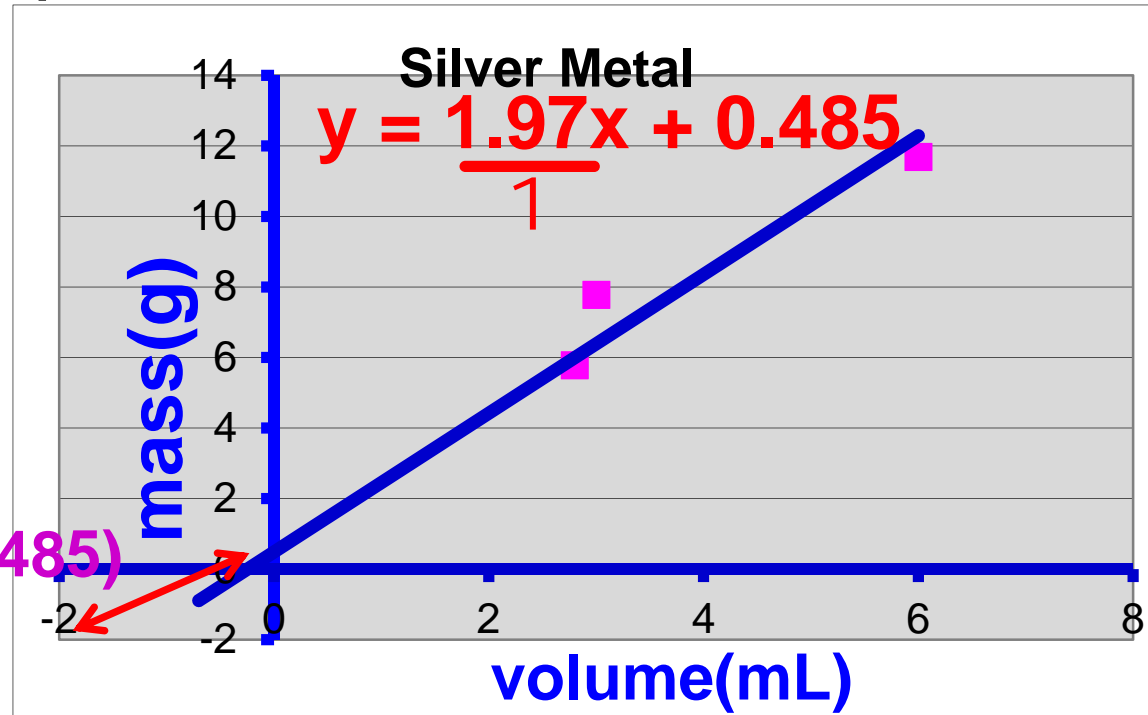


1. For the silver metal, what does a slope of 1.97 g/ mL mean ?
2. What is density? What does the slope or the line represent?
3. What does the y-intercept of 0.485 mean? Hint: write the x, y coordinates.
4. What is negligible?

Bell Work, April 7, 2014

1. For a piece of silver metal, what does a slope of 1.97 mean?

1 mL has a mass of 1.97 g.
Every time the volume changes by 1 mL, the mass changes by 1.97 g.



2. What is density? Slope?

Density (D) is the amount of mass (m) in each unit of volume (V).
In this case, each 1 mL of volume contains 1.97 g of mass. $D = m/v$

Slope = $\frac{\text{rise}}{\text{run}} = \frac{y}{x} = \frac{\text{mass}}{\text{volume}} = \text{Density}$

3. What does the y-intercept of 0.485 mean? Coordinates (x,y) = (0, 0.485)
When the volume is zero, the mass = 0.4855 g

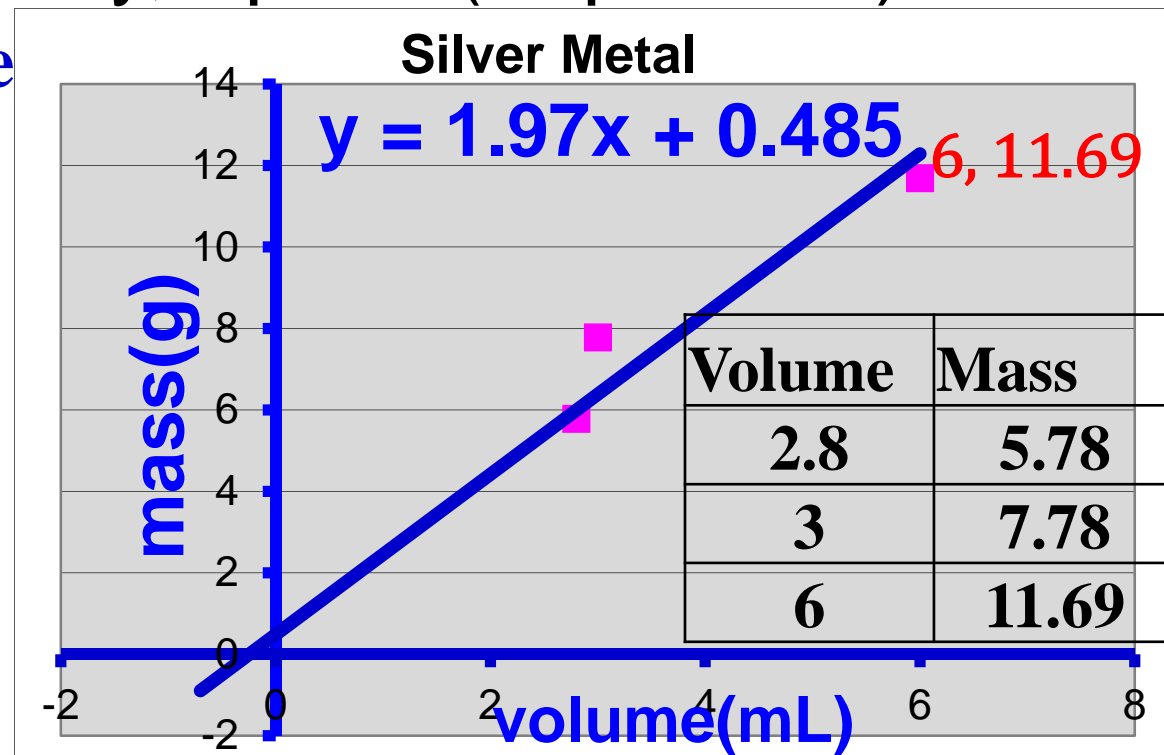
4. What is negligible? Insignificant or a value of zero.

Bell Work, Tuesday, April 8 (6 question)

1. Label the coordinate of the data point with the maximum value of y.

2. State the 5% rule for the y-intercept?

If the absolute value of the y intercept is = or < 5% of the maximum y value, it is negligible and equals zero.



3. Is the y-intercept on this graph negligible?

Do the 5% test: 11.69 is the max y value.

5% of 11.69 = $0.05 \times 11.69 = 0.585$ $0.485 < 0.585$

So, the y-intercept is negligible and can be assumed to be zero.

4. What do you do if the y-intercept is -0.485?

Use the absolute value: change -0.485 to + 0.485

Bell Work, Tuesday, April 8

5. Rewrite the equation of the line show the y-intercept is negligible.

$$y = 1.97x + 0$$

or $y = 1.97x$

6) What is the significance of a negligible y-intercept?

It shows that your graph is an accurate representation of your results.

Bell Work, Wednesday, April 9

- 1. A handbook gives the density of calcium as 1.54 g/cm^3 . What is the percent error of a density calculation of 2.25 g/cm^3 based on lab measurements?**
- 2. Determine the Percent Range for the following densities:**
 - 6.2 g/cm^3 , 7.0 g/cm^3 , 7.3 g/cm^3**
- 3. Define characteristic properties.**
- 4. For a given substance, such as aluminum, does density change when the size of the sample changes or is the density the same for all samples of a substance?**

Why?

Bell Work, Answer, Wednesday, 4/9/14

1. $\text{Percent Error} = \frac{|\text{Accepted Value} - \text{Experimental Value}|}{\text{Accepted Value}} \times 100$

Accepted Value = 1.54, Experimental Value = 2.25

$$\% \text{ Error} = \frac{|1.54 - 2.25|}{1.54} \times 100 = \frac{|-0.71|}{1.54} \times 100 = \frac{0.71}{1.54} \times 100$$

Percent error = 46.10%

2. $\% \text{ range} = \frac{\text{Highest Value} - \text{Lowest Value}}{\text{Lowest Value}} \times 100$

Highest value = 7.3

Lowest Value = 6.2

$$\% \text{ range} = \frac{7.3 - 6.2}{6.2} \times 100 = 17.7\%$$

Bell Work, Wednesday, April 9

3. Characteristic properties are properties that are unique to each substance and can be used to identify a substance. Some examples of these properties are:

- Density – amount of mass per unit volume.**
- Boiling Point – temperature that the stuff boils.**
- Melting/ Freezing Point- temperature that the stuff melts/ freezes.**

4. Density is always the same for each unique substance.

- Example: density of aluminum always 2.70 g/ mL, & water always = 1 g/mL for all masses of water & aluminum. This is because density is a characteristic property unique to each substance.**

Bell Work, Thursday , April 10



1. Below is a list of substances and their densities:

water	1.00 g/mL
iron	7.87 g/mL
lead	11.34 g/mL.

You are given a 1.00 kilogram sample of each.

Which sample has the greatest mass?

- a. The water**
- b. The lead**
- c. The iron**
- d. They all have the same mass.**

2. Which sample has the greatest volume?

Bell Work, Thursday , April 10

You are given a 1.00 kilogram sample of each.

water **1.00 g/mL**

iron **7.87 g/mL**

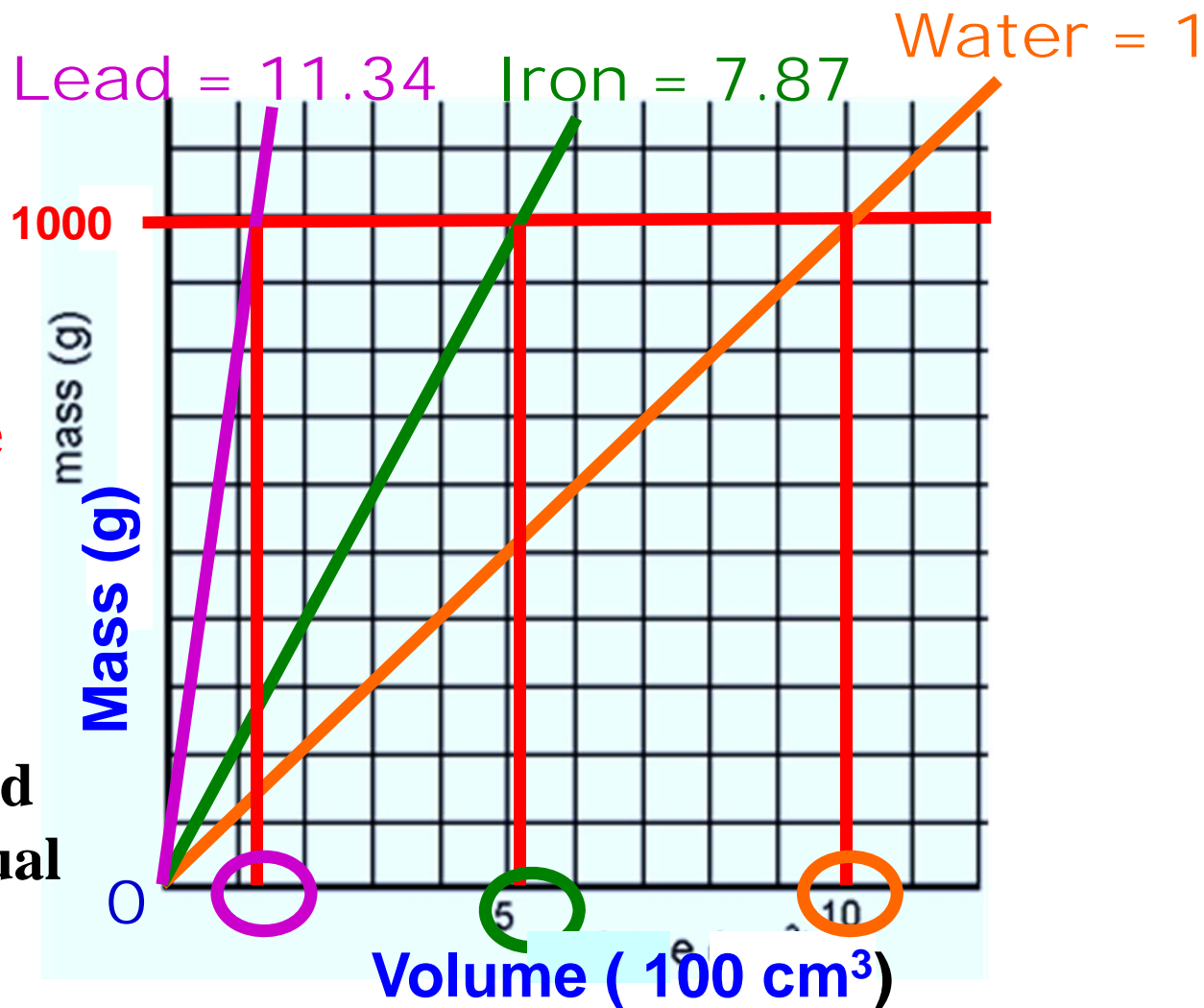
lead **11.34 g/mL**

2. Which sample has the greatest volume?

Density is the slope of the line.

1 kg of water has the greatest volume.

(note: the slopes of iron & lead are not plotted with their actual slopes. Their positions are shown relative to water.)



Bell Work, Thursday , April 10

3. What is the relationship between mass and volume?

Density. You can convert between mass & volume using density.

4. The mass of a 5.00 cm³ sample of clay is 11 g. What is the density of the clay? $m = 11g$ $v = 5.00 \text{ cm}^3$

$$D = \frac{m}{v} \quad D = \frac{11g}{5.00 \text{ cm}^3} = 2.2 \text{ g} / 1 \text{ cm}^3$$

5. Find the mass of a 1.50 cm³ sample of aluminum whose density is 2.70 g/cm³.

$$m = ?g \quad v = 1.50 \text{ cm}^3 \quad D = \frac{m}{v} \quad 2.70 \text{ g/cm}^3 = \frac{x \text{ g}}{1.50 \text{ cm}^3}$$

x = mass

$$\frac{2.70}{1} = \frac{x}{1.50} \quad 1.50 \cdot 2.7 = 1 \cdot x \quad = 4.05 \text{ g}$$

Bell Work, Monday, 4/14/14

- 1. The density of gold is 19.3 g/cm³. What is the volume, in cubic centimeters, of a sample of gold that has a mass of 715 g?**

$$D = 19.3 \text{ g/cm}^3$$

$$V = ?, \text{ cm}^3$$

$$m = 715 \text{ g?}$$

$$D = \frac{m}{V}$$

$$19.3 \text{ g/cm}^3 = \frac{715 \text{ g}}{V}$$

$$\frac{19.3 \text{ g/cm}^3}{1} = \frac{715 \text{ g}}{V}$$

$$37.046 \text{ cm}^3$$

$$37.0 \text{ cm}^3$$