High School Science Virtual Learning

Chemistry
Dilutions

May 1, 2020

High School Chemistry
Lesson: May 1, 2020

Objective/Learning Target:

Students will be able to calculate the molarity of a diluted solution.

Let's Get Started:

1. What is the equation for molarity?

2. 3 moles of solute are dissolved in water to a volume of 2 L. What is the molarity of the solution?

Let's Get Started: Answer Key

1. What is the equation for molarity? M=mol/L

2. 3 moles of solute are dissolved in water to a volume of 2 L. What is the molarity of the solution?
M = mol/L = (3 mol)/(2 L) = 1.5 L

Molarity Review:

- Molarity is the concentration of a solution.
  - For example, if you make Kool-Aid and put a LOT of sugar in, it has a high sugar concentration. This would be a high molarity.
  - If you put very little sugar in, it has a low concentration. This would be a low molarity.
- If you need a review of what a solution or molarity is, this video will help.

Lesson Activity:

Directions:
1. Watch this video.
2. Answer these questions. The answer key is at the bottom of the document.

Note: $M_1V_1=M_2V_2$ is used for dilutions. All other molarity questions use M=mol/L.

Practice

Complete the following questions using the information you learned during the lesson activity.

Questions:

1. What is the concentration of 5 L solution that was prepared from 0.2 L solution of a 12 M solution?
2. 25 mL of a stock solution was diluted to a volume of 500 mL. If the concentration of the final diluted solution was 0.03 M, what was the molarity of the stock solution?
3. 3 L of a 2 M stock solution are available. If 20 mL of that solution are diluted to a molarity of 0.5 M, what is the volume of the diluted solution?

Once you have completed the practice questions check with the answer key.

1. $M_1 = 12\ M$
   $V_1 = 0.2\ L$
   $M_2 = ?$
   $V_2 = 5\ L$
   $M_1 V_1 = M_2 V_2 \rightarrow (12\ M)(0.2\ L) = M_2(5\ L)$
   $M_2 = 0.48\ M$

Once you have completed the practice questions check with the answer key.

2. M_1 = ?
    V_1 = 25 mL
    M_2 = 0.03 M
    V_2 = 500 mL
    $M_1V_1 = M_2V_2$ $\rightarrow$ M_1(25 mL)=(0.03 M)(500 mL)
    M_1 = 0.6 M

Once you have completed the practice questions check with the answer key.

3. $M_1 = 2$ M
$V_1 = 20$ mL
$M_2 = 0.5$ M
$V_2 = ?$
$M_1 V_1 = M_2 V_2 \rightarrow (2 \text{ M})(20 \text{ mL}) = (0.5 \text{ M}) V_2$
$V_2 = 80$ M

More Practice:

Follow the links below to do more practice.
1. This worksheet has answer key at the bottom.
2. This worksheet has a short explanation at the beginning.

Additional Practice:
Click on this link for additional practice.