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2573720.8658537 15176510.886598 55344213105 30938933784 26507705.493506 12883002408 13151371.04878 18787647890 3504724 56192431.833333 20362735383 24133075.075

Balancing Act

Name _____

Atoms are not _____ or _____ during a chemical reaction. Scientists know that there must be the _____ number of atoms on each _____ of the _____. To balance the chemical equation, you must add _____ in front of the chemical formulas in the equation. You cannot _____ or _____ subscripts!

- 1) Determine number of atoms for each element. $\square \text{Mg} + \square \text{O}_2 \rightarrow \square \text{MgO}$
- 2) Pick an element that is not equal on both sides of the equation. Mg = Mg =
- 3) Add a coefficient in front of the formula with that element and adjust your counts. O = O =
- 4) Continue adding coefficients to get the same number of atoms of each element on each side.

Try these:



$$\begin{array}{ll} \text{Ca} = & \text{Ca} = \\ \text{O} = & \text{O} = \end{array}$$



$$\begin{array}{ll} \text{N} = & \text{N} = \\ \text{H} = & \text{H} = \end{array}$$



$$\begin{array}{ll} \text{Cu} = & \text{Cu} = \\ \text{O} = & \text{O} = \\ \text{C} = & \text{C} = \end{array}$$



$$\begin{array}{ll} \text{H} = & \text{H} = \\ \text{O} = & \text{O} = \end{array}$$

T. Trimpe 2006 <http://sciencespot.net/>**± PhET Simulation - Concentration**

Solutions consist of a solute dissolved into a solvent, e.g., a salt dissolved in water. There is often a need to quantify how much solute is present per unit solution volume. Concentration is most commonly expressed in terms of molarity (as molar or M), which is the number of moles (mol) per liter (L) of solution. A one molar solution can be expressed as follows:

$$1 \text{ M} = \frac{1 \text{ mol}}{1 \text{ L}} \text{ or } 1 \frac{\text{mol}}{\text{L}}$$

Every solute is limited in how much of can be dissolved into solution at a given temperature and pressure. These limitations exist because of the nature of dissolution, which involves the interaction between solute and solvent molecules. The point at which no more solute can be dissolved into solution is called the "saturation point", and the concentration at which it occurs is considered the compound's solubility. If too much solute is added to a solution, the concentration must be diluted by adding more solvent, or the saturation point must be raised by appropriately adjusting the temperature and sometimes the pH. A solution can be considered "dilute" when the concentration is less than half of the saturation point for the conditions, but dilute is a qualitative description that has no fixed definition.

Click on the image below to explore this [simulation](#), which shows how concentration is affected by various processes. When you click the simulation link, you may be asked whether to run, open, or save the file. Choose to run or open it.

When the simulation is opened, you will see a container filled to $\frac{1}{2}$ L with water. You can select a solute using the Solute dropdown menu, and add it as a solid or concentration solution (using the respective radio buttons). The Concentration meter can be dragged (both the display and the sensor) to anywhere in the simulation, but the sensor must be submerged in the mixture to read the concentration. You can also add water and remove the mixture using the respective taps and evaporate the mixture using the Evaporation scale bar.

Part A

Use the PhET simulation to identify what happens to the concentrations of a dilute Drink mix mixture or a pure Drink mix solution for the following scenarios. A pure Drink mix solution can be obtained by draining all the mixture, then adding Drink mix to the container as a Solution (radio button in the upper right area of the simulation). Note that the Concentration meter can be placed toward the bottom of the container or in the stream of the Drink mix.

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In this section we will look at the general properties of the probability density function.

So you can choose your birth and baptismal sponsor. We offer the following suggestions. Please feel free to choose the person or persons that mean the most to you. You may also choose someone that you feel would be a good role model for your child. This does not mean that your sponsor has to be your child's biological parent. This means that your sponsor will be there for your child during his/her life.

ANSWER *See the following page.*

Energy savings are best measured relative to baseline values for the same system. The energy savings

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From the beginning, most energy will be used to move energy from the sun to the Earth, from the Earth to the atmosphere, and eventually through the ocean.

For more information about the study, please contact Dr. John P. Wilson at (404) 727-6777 or via e-mail at jpwilson@veterans.gov.

■ Previous literature on song and language in

PhET Collision Lab

Directions: Go to the website <http://phet.colorado.edu/en/simulation/collision-lab>

Make sure the Job box is checked!

200

Part 1

Scenario #1:

- Make a hypothesis about initial and final momentums *before* playing with the sim.
 - Make a data table for the following: mass, velocity and momentum of each ball before and after.
 - What is the relationship between the initial and final *total* momentums?
 - Describe the motion of the balls before and after the collision?

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Scenario E1: Elastic collision between balls of unequal mass

- Make a hypothesis about initial and final momentums *before* playing with the sim.
 - Make a data table for the following; mass, velocity and momentum of each ball before and after.
 - What is the relationship between the initial and final *total* momentums?
 - Describe the motion of the balls before and after the collision?

Part 2

Create 3 more distinct scenarios in 1-d including one totally inelastic collision. Make a hypothesis whether or not each will follow conservation of momentum. Collect some data and prove or disprove your hypothesis.

Summary: Describe the main ideas learned in this activity regarding initial and final total momentum in 1-d collisions.

