

## Mole Ratios Lab

The reactants in a chemical reaction combine in simple whole number ratios. However reactions do not always occur in 1:1 proportions. Some positive ions require multiple negative ions in order to form stable compounds. This experiment illustrates this important factor in chemistry. The ratio in which the chemicals react is the same as the ratio of the number of molecules of each reactant in the reaction. Since moles and molecules are directly proportional to each other it is also the ratio of moles of each reactant involved in the reaction.

### Pre-Lab Questions

- 1) What does a balanced chemical equation tell you?
- 2) What must be true of all balanced chemical equations?

### Procedure:

- 1) Place the 96 well microplate on a dark background. Select a long row of wells near the edge of the plate. Add 1 drop of calcium (II) nitrate to the first well, 2 to the second well, 3 to the third well, and so on until you finish with 9 drops in the ninth well.
- 2) Now count down with the sodium oxalate: 9 drops in the first well, 8 drops in the second well, and so on until you add 1 drop to the ninth well. This way there will be a total of 10 drops added to each well.
- 3) Mix the solution in each of the wells with a toothpick and then allow at least five minutes for the reaction to complete.

Your data table should have three lines of information:

Well number

#drops of calcium(II) nitrate/# drops of sodium oxalate

A sketch of how much precipitate is in each well

It will look something like this:

1	2	3	4	5	6	7	8	9
1:9	2:8 or 1:4	etc						

After waiting five minutes, hold the plate up and observe the size of the precipitate "button" in each of the wells. Estimate the size of each of the "buttons" by looking through the side of the plate. Record your estimate by making a sketch. Draw a line of nine wells and use your pen to color in the size of the button in each well.

Now repeat the procedure using lead (II) nitrate and sodium iodide in a different row on the plate. Make a data table for this reaction similar to the first one you made.

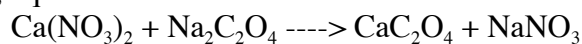
### Post Lab Questions

Write a formal report for this experiment conforming to the format shown in class.

1) Which of the wells had the largest amount of precipitate (calcium oxalate)?

2) What is the calcium to oxalate ratio for this well?

3) Balance the following equation:



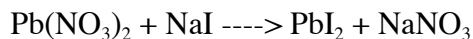
4) What is the ratio of the coefficients for the reactants in the balanced equation?

5) How does this ratio compare to the ratio you found by experimentation?

6) Which of the wells had the largest amount of precipitate (lead iodide)?

7) What is the lead to iodide ratio for this well?

8) Balance the following equation:



9) What is the ratio of the coefficients for the reactants in the balanced equation?

10) How does this ratio compare to the ratio you found by experimentation?