



Chemical Quantities

Mole Activity → Weighing as a Means of Counting

Purpose: To measure the masses of common compounds (salt, sugar, baking soda) and objects (microscope slide, chalk) and then calculate the moles and atoms of each element from your experimental masses.

Materials: Sodium chloride, sodium bicarbonate (baking soda), silicon dioxide (sand), and calcium carbonate (chalk).

Equipment: Digital balance and plastic spoons (1 teaspoon).

Procedure: Data Table A

1. Write the chemical formula for each compound and calculate the molar mass (1 decimal place).
2. Weigh one level teaspoon of sodium chloride. Record its mass (**2 decimal places**) in Table A.
3. Repeat steps 1-3 for sodium bicarbonate and silicon dioxide.
4. Calculate the moles of the compound, the moles of each element and the atoms of each element. **Show all work for Data Table A, in the Data Analysis Section on pages 2 and 3.**

Data Table A - Final answers go in the data table below. Data table must be in pen!

Name	Formula	Molar Mass (calculate on a separate sheet)	Mass of One Teaspoon (grams)	Moles (#1)	Molecules or Formula Units (#2)	Atoms of Each Element (#3)
Sodium chloride (salt)				1a	2a	Na = Cl =
Sodium hydrogen carbonate (baking soda)				1b	2b	Na = H = C = O =
Silicon dioxide (glass slide)				1c	2c	Si = O =

Procedure: Data Table B

1. Write the chemical formula for the compound and calculate the molar mass (1 decimal place).
2. Weigh a piece of chalk; record the mass (2 decimal places) in grams in the column labeled BEFORE in Table B.
3. Write your name on the pavement with the piece of chalk that was just weighed.
4. Weigh the piece of chalk again and record its mass (2 decimal places) in the column labeled AFTER in Table B.
5. Calculate the number of atoms of calcium, carbon and oxygen it takes to write your name on the pavement with a piece of chalk. **Show all work for Data Table B, in the Data Analysis Section on page 4.**

Data Table B - Final answers go in the data table below. Data table must be in pen!

Name	Formula	Molar Mass (calculate on a separate sheet)	Chalk Mass BEFORE writing name (grams)	Chalk Mass AFTER writing name (grams)	Mass of Chalk used in writing your name	Total # of Atoms (show work on pg. 4)
Calcium carbonate (chalk)						

Data Analysis Section - Data Table #1

Use what you have learned in class and in this lab to answer the following questions below. For FULL credit use dimensional analysis, show all work, label all units and put all answers on the correct line. All answer must show correct significant figures and scientific notation! Record your answers in Column #2 in Data Table A.

1. Calculate the number of moles of one level teaspoon for each of the following: *HINT: Start with your given: the mass of a teaspoon of the compound.*

a. Sodium chloride Answer: _____

b. Sodium hydrogen carbonate Answer: _____

c. Silicon dioxide Answer: _____

2. Calculate the molecules or formula units found in one level teaspoon of the following compounds. *HINT: Start with your given: the mass of a teaspoon of the compound.* Record your answers in Column #2 in Data Table A.

a. Sodium chloride Answer: _____

b. Sodium hydrogen carbonate Answer: _____

c. Silicon dioxide Answer: _____



3. Calculate the atoms of each element found in one level teaspoon of the following compounds. *HINT: Start with your given: the mass of a teaspoon of the compound. Record your answers in Column #3 in Data Table A.*

a. Sodium chloride

Atoms Na = _____

Atoms Cl = _____

b. Sodium hydrogen carbonate

Atoms Na = _____

Atoms H = _____

Atoms C = _____

Atoms O = _____

c. Silicon dioxide

Atoms Si = _____

Atoms O = _____



Data Analysis Section - Data Table B

For FULL credit use dimensional analysis, show all work, label all units and put all answers on the correct line. All answer must show correct significant figures and scientific notation!

1. Calculate the total number of atoms that it took for you to write your name on the pavement with a piece of chalk. Record your answer in last column in Data Table B.

a. Calcium Carbonate

Total Atoms = _____

Application Questions:

Answer questions in complete sentences, including the question in your answer.

1. In step 2 you measured equal volumes of three different compounds, salt, baking soda or sand. Which of the three compounds in Table A has the greatest number of moles in one teaspoon?

2. Which of the three compounds, salt, baking soda or sand, has the greatest number of atoms?

