Activity 14 Measuring Mass as a Means of Counting.

**Purpose**
To determine the mass of several samples of chemical compounds and use the data to count atoms.

*Try to carry out all steps by first asking other students for help. If no one can provide you with the answer, only then ask the teacher. An important purpose of this activity is to help you become more independent in doing science activities.*

**Materials needed**
- apron
- balance scale
- plastic spoon
- samples of NaCl\(_{(s)}\), CaCO\(_3\)(s), and H\(_2\)O\(_(l)\)
- weighing paper or watch glass
- collecting beaker for each type of sample

*(Try not to contaminate samples by putting them into the wrong beaker.)*
- calculator

**Procedure**
Collect all the materials needed and carefully bring them to your work area. *There should be nothing in your work space except what is needed for this activity.* (No bookbags or other materials you brought to the room.)

1. Place a piece of weighing paper on the balance scale and record its mass in the table beneath “NaCl\(_{(s)}\).”
2. Put one spoonful of NaCl\(_{(s)}\) onto the weighing paper on the balance scale and record the mass of the sample and the weighing paper.
3. Carefully remove the sample of dispose of it in the proper collecting container. *(Reminder: Try not to contaminate samples by putting them into the wrong beaker.)*
4. Repeat steps 1, 2, and 3 using CaCO\(_3\)(s). Record your results in the “CaCO\(_3\)(s)” column.
5. Place a dry watch glass on the balance scale and record its mass in the “H\(_2\)O\(_(l)\)” column.
6. Pour one spoonful of H\(_2\)O\(_(l)\) into the watch glass and record the mass of the H\(_2\)O\(_(l)\) and watch glass.
7. Dispose properly of the H\(_2\)O\(_(l)\). Then return all the other materials to their dispensing area.
8. Make the calculations required to complete the table. If you need help, use the additional directions given in your textbook (see the page at the top.)
9. Answer the questions.
Table of Results and Calculations

<table>
<thead>
<tr>
<th></th>
<th>NaCl$_{\text{(s)}}$</th>
<th>CaCO$_{3\text{(s)}}$</th>
<th>H$<em>2$O$</em>{\text{(l)}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass of weighing paper or watch glass (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass of sample + weighing paper or watch glass (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass of sample (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molar mass of compound (g/mol)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moles of each compound</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Moles of each element in the compound</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Atoms of each element in the compound</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions

1. Which of the three spoonful-sized samples had the greatest mass?

2. Which of the samples had the greatest number of moles?

3. Which of the samples had the greatest number of atoms?

4. Name some possible errors that might affect your results/conclusions.

5. On a separate piece of paper, write a paragraph or two about what you learned in doing this activity, and staple it to this paper.
Chemistry

Activity 14 Measuring Mass as a Means of Counting

Notes:

Applicable NJCCCS: 5.1 and 5.6

Applicable textbook chapter: “Chemical Quantities” (“Blue” 7/“Red” 10)

Materials needed per group
- apron
- balance scale
- plastic spoon
- samples of NaCl(s), CaCO₃(s), and H₂O(l)
- weighing paper or watch glass
- collecting beaker for each type of sample
- calculator

Scoring rubric:

1 pt. ea. for correctly finding the mass for each sample
1 pt. ea. for correctly calculating the molar mass and number of moles
1 pt. ea. for correctly calculating the moles of each element in the compound
1 pt. ea. for correctly calculating the number of atoms of each element

2 pt. for acceptable answers to questions 1 – 4.
1 pt. for an acceptable paragraph or two about what student learned.