

Science Activity Sheet

Quarter 2 – MELC 7

Week 7

The Mole Concept



REGION VI – WESTERN VISAYAS

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Science 9

Activity Sheet No. 7- The Mole Concept

First Edition, 2020

Published in the Philippines
By the Department of Education
Region 6 – Western Visayas

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Introductory Message

Welcome to Science 9!

The **Learning Activity Sheet** is a product of the collaborative efforts of the Schools Division of Escalante City and DepEd Regional Office VI - Western Visayas through the Curriculum and Learning Management Division (CLMD). This is developed to guide the learning facilitators (teachers, parents and responsible adults) in helping the learners meet the standards set by the K to 12 Basic Education Curriculum.

The **Learning Activity Sheet** is self-directed instructional materials aimed to guide the learners in accomplishing activities at their own pace and time using the contextualized resources in the community. This will also assist the learners in acquiring the lifelong learning skills, knowledge and attitudes for productivity and employment.

For learning facilitator:

The **Science Activity Sheet** will help you facilitate the leaching learning activities specified in each Most Essential Learning Competency (MELC) with minimal or no face-to-face encounter between you and learner. This will be made available to the learners with the references/links to ease the independent learning.

For the learner:

The **Science Activity Sheet** is developed to help you continue learning even if you are not in school. This learning material provides you with meaningful and engaging activities for independent learning. Being an active learner, carefully read and understand the instructions then perform the activities and answer the assessments. This will be returned to your facilitator on the agreed schedule.

Name of Learner: _____
Grade and Section: _____ Date _____

SCIENCE 9 ACTIVITY SHEET No.7
The Mole Concept

I. Learning Competency with Code

Use the mole concept to express mass of substances. **(S9MT-III-19)**

II. Background Information for Learners

Do you know how chemists were able to know the number of atoms or molecules that enter a chemical reaction? Remember that atoms are indivisible. You cannot see them, feel them, or weigh them but you can count them by using the Avogadro's number.

This learning activity will help you find out how to express the number of atoms, particles and molecules in a substance.

III. Accompanying DepEd Textbook

Department of Education. (2014). K to 12 Basic Education Curriculum
Science 9 Learner's Material p.151, Pasig, Philippines.

IV. Activity Proper

Activity 1

Directions: Study pp. 148-150 about Avogadro's number and do the following:

1. Copy and complete Table 4A- Molar Mass of Some Common Elements and Table B – Molar Mass of Some Common Compounds Refer and answer the guide questions nos. 6-9 on page 151. Write your answer on a separate sheet of paper.
2. Copy and complete Table 7 – Molar Relationships and answer guide questions nos. 14-16 on page 154. Write your answer on a separate sheet of paper.

V. Reflection

Which would you prefer 2 grams of gold or 2 grams of silver considering equal price per gram of the given substance? Prove your answer.

VI. ANSWER KEY

Reflection:

1. Answer may vary. But if I were to choose between 2 grams of Gold and 2 grams of Silver, I would prefer Gold has an atomic weight of 197g/mol X 2gms.=394 mol, While silver has an atomic weight of 108 g/mol X 2 g/mol= 216 mo. in terms of no. of particles gold has more number of particles compared to silver.

Activity 1

Table 4-A: Molar Mass of Some Common Elements

Element	Symbol	Mass(g)	Molar Mass (g/mol)
Sulfur (Asupre)	S	32.07	32.07
Lead (Tingga)	Pb	207.20	207.20
Copper (Tanso)	Cu	63.55	63.55

Table 4-B: Molar Mass of Some Common Compounds

Compound	Chemical Formula	Mass (g)	Molar Mass (g/mol)
Water	H ₂ O	18.02	18.02
Table salt	NaCl	58.44	58.44
Table sugar	C ₁₂ H ₂₂ O ₁₁	342.34	342.34

Answers to the Guide Questions:

Q6. No, because based on the answers in Table-4-A and 4- B, the mass of different substances differ from one another.
 Q7. The mass of the substances in Table 4-A and 4-B differs from one another.
 Q8. Yes, because one mole of any substance have the same number of particles which is equal to Avogadro's number (6.02×10^{23}).
 Q9. One mole of different kinds of substances has the same number of particles but different masses.

Activity 5

Table 2. Molar Relationships

Substance	Molar mass (g/mol)	Particle Representative	Mass (g)	Number of Moles	Number of Particles
Carbon Dioxide (CO ₂)	44. 01	molecule	110.03	2.5	1.505 X 10 ²⁴
Gold (Au)	197.00	atom	197.00	1	
Glucose (C ₆ H ₁₂ O ₆)	180.18	molecule	360.36	2	1.205 X 10 ²⁴
Calcium Fluoride (CaF ₂)	78.08	Formula unit	234.24	3	1.806 X 10 ²⁴
Nitrogen gas (N ₂)	28.02	molecule	140.10	5	3.010 X 10 ²⁴

Answers to the Guide Questions:

14 A particle is called an atom when it represents an element; a molecule when it represents a molecular compound (CO₂, CH₄, H₂O and other compounds alike) and elements (N₂, O₂, H₂ and other diatomic molecules); and formula unit when it represents ionic compounds (NaCl, CaF₂, KCl).

15. Mass divided by the molar mass is equal to the number of moles.

16. Show how you will compute for the number of particles given the following:

a. Mass of the sample

Number of moles x molar mass = mass

$$\frac{\text{g}}{\text{Mole}} \times \text{Mole} = \text{g}$$

Number of particles divided by Avogadro's number X molar mass equals mass

$$\frac{\text{Number of particles}}{6.02 \times 10^{23} \text{ particles}} \times \frac{1 \text{ mole}}{\text{g}} = \text{g}$$

b. Number of moles of the sample

Mass divided by the molar mass = number of moles

$$\frac{\text{g}}{\text{g/mol}} = \text{mol}$$

number of particles divided by Avogadro's number = number of moles

number of particles

$$\frac{6.02 \times 10^{23} \text{ particles/mole}}{\text{mole}} = \text{mole}$$

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