

Lesson Plan

Course/Class: Chemistry 11	Name: Melissa Copland & Melissa Creighton	Date: 30/10/12
Topic: Mole, Mass, and Molar Mass	Unit 2: Stoichiometry	Grade: 11
<p>A. <i>Intents/Objectives/Purpose</i> (from NB Chemistry 111-112 Curriculum document)</p> <p><u>Pedagogical Objectives:</u></p> <p>115-3 Explain how a major scientific milestone revolutionized thinking in the scientific communities.</p> <ul style="list-style-type: none"> In particular, explain how the mole changed chemistry. <p><u>Scientific Objectives:</u></p> <p>321-1 Represent chemical reactions and the conservation of mass, using molecular models and balanced symbolic equations.</p> <ul style="list-style-type: none"> Define the law of conservation of mass. <p>323-1 Define molar mass and perform mole-mass inter-conversions for pure substances</p> <ul style="list-style-type: none"> Define the Mole in terms of the number of atoms in exactly 12 g of carbon-12 (Avogadro's number of particles). Define molar mass and determine the molar mass of an element and compound. Convert number of particles to mass and moles and perform mole-mass inter-conversions. 		

B. <i>Activities</i>	C. <i>Resources</i>	D. <i>Students are...</i>
<p>Administration/Homework</p> <ul style="list-style-type: none"> Take attendance Hand out Periodic Table of Elements Have one scale set up at each table group awaiting student's arrival. 	<ul style="list-style-type: none"> -Attendance sheet -Desks formed in groups prior to class -Periodic Table of Elements -5 scales (1 per table) 	<ul style="list-style-type: none"> -Sitting at desks in groups arranged ahead of time
<p>1. Introduction/Set/Advanced Organizers</p> <ul style="list-style-type: none"> Have power point set up on laptop connected to an overhead projector. Start class by drawing the students' attention to the front of the room, where 3 elements/compounds are found. Individually introduce Aluminum foil, Water, and Salt. Initiate interest by asking "What do these have in common?" GROUP DISCUSSION -Allow students to generate discussion in groups using their previous knowledge. Provide a hint to guide student discussion (has to do with amount, yet all have different masses). Discuss results of each small group in whole class discussion. Reveal the similarity (MOLES). Introduce the term MOLE, dispelling rumours about everyday use of the word (humour) and define it. 	<ul style="list-style-type: none"> -Ball of Aluminum foil (27g) -Beaker of water (18g) -Bag of table salt (58.5g) -Overhead projector and screen -Laptop -PowerPoint presentation 	<ul style="list-style-type: none"> -Listening -Observing the materials at front -Discussing in groups -Asking questions for clarification -Laughing at our funny jokes -Reading PowerPoint slides -Taking notes

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2. Clarifying/Creating-Understanding/Concept-Development

- Talk about the historical development of the mole and the implications of this discovery.
 - Simplicity in using 1 mole vs. 6.022×10^{23} particles
 - The usefulness of the mole in chemistry
- Introduce and define molar mass, with an emphasis on the units and how to find the molar mass of an element on the Periodic Table of Elements.
- Talk about how to calculate the molar mass of a compound and provide an example.

HNO_3 :

$$\text{H} \times 1 = 1.01 \text{ g/mol}$$

$$\text{N} \times 1 = 14.01 \text{ g/mol}$$

$$\text{O} \times 3 = 48.00 \text{ g/mol}$$

$$\underline{\hspace{1.5cm}} \\ 63.02 \text{ g/mol}$$

- GROUP WORK-Get students to work in groups to weigh one mole (in the form of a ball) of Aluminum. Report back to the class and emphasize relation between mass obtained and molar mass of Aluminum, asking class guiding questions as needed.
- Repeat activity with 2 moles of Aluminum, with 2 or 3 groups working together. Report back to class, allowing students to draw conclusions of their own.
- Ask the class how they would calculate the mass of 3 moles of Aluminum.
- Ask students to explain the relationship between mass, molar mass and number of moles using probing questions.
- Introduce the equation representing this relationship and provide a calculation example, with emphasis on how units are obtained (explain unit cancellation on Blackboard).

$$m = 12g$$

$$M = 12 \frac{g}{mol}$$

$$n = \frac{m}{M} = \frac{12g}{12 \frac{g}{mol}} = 12g * \frac{mol}{12g} = 1 mol$$

- State Law of Conservation of Mass, indicating its origin, and relate the concept to moles.
- Show YouTube video of example of this law in a chemical setting.

<http://www.youtube.com/watch?v=J5hM1DxaPLw&feature=related>

-Overhead projector and screen
 -Laptop with access to Internet
 -PowerPoint presentation
 -5 scales (1 per table)
 -5 balls of Aluminum foil (27g each, 1 per table)
 -Blackboard with chalk
 -Periodic Table of Elements

-Listening
 -Reading PowerPoint slides
 -Looking at their Periodic Table
 -Taking notes
 -Working in groups
 -Weighing balls of Aluminum foil
 -Recording and discussing results
 -Discussing concepts
 -Asking questions
 -Watching video

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<p>3. Coached/Guide-Practice/Seatwork</p> <ul style="list-style-type: none"> • Provide students with their homework assignment. Instruct students to work independently and ask for help when needed. • Walk around the room, to observe if students understand the concepts, determined by their ability to complete the assigned problems, providing appropriate feedback. • If students are struggling, provide guiding questions, to get them to understand on their own. Alternatively, suggest that students create an easier question that they can answer. This will get students to scaffold on their own, to ultimately get to the same result. • If students show advanced capabilities toward the subject matter, get them to create a more challenging problem, which they will have to eventually solve. Provide additional problems pertaining to concepts or areas of focus that students feel they need more practice with. 	<ul style="list-style-type: none"> -Copies of student homework sheet -Extra calculators -Extra problems of different difficulty levels 	<ul style="list-style-type: none"> -Working individually -Doing seatwork -Asking questions
<p>4. Closure/Summary</p> <ul style="list-style-type: none"> • Review of the mole, mass, and molar mass, the relationship between them, and the Law of Conservation of Mass, through the use of the following questions posed to the class: <ul style="list-style-type: none"> ➤ What do you know about the mole? (write students' answers on the blackboard, in the form of a concept map allowing their preconceptions to be included for discussion purposes) ➤ What is the molar mass and how do we find it? ➤ What is the relationship between moles, mass and molar mass? ➤ Why is the mole so important in chemistry? ➤ In your own words, what does the Law of Conservation of Mass say? <p>*Aid students as necessary.</p> • Relate the use of the mole to balancing chemical equations and indicate that this will be the main focus of the next lesson. 	<ul style="list-style-type: none"> -Overhead projector and screen -Laptop with access to Internet -PowerPoint presentation -Blackboard and chalk 	<ul style="list-style-type: none"> -Discussing concepts as a class -Providing explanations for concepts -Reviewing their notes -Taking notes (if needed) -Listening -Asking questions
<p>5. Homework</p> <ul style="list-style-type: none"> • Complete the homework assignment for the next day, if it is not yet finished. 	<ul style="list-style-type: none"> -Copies of student homework sheet 	<ul style="list-style-type: none"> -Reviewing notes -Doing homework sheet