Adaptive Learning in the Classroom: Putting the Learning Back in Student Learning

Dr. Jason S. Overby
Charleston, South Carolina, USA
Online Homework

While online homework is an important and established teaching tool, there is an inherent flaw.

Online homework makes assumptions that students are ready to be assessed...

Online homework cannot tell us why a student misses a particular problem...
Student Learning

Lecture  Learning  Assessment

Heterogeneous  Individualized  Homogeneous
Adaptive Technology

Methodology

Determine the concepts an individual student knows and does not know, and then teach those concepts using a personalized study plan

Focus on the metacognitive skills of the students
Which one of the following options gives the correct procedure to calculate the number of moles of a substance given the mass?

\[
\text{mol of substance} = \frac{\text{mass}}{\text{molar mass}}
\]

mass x molar mass would give units of g/mol, not mol.
One of your answers is almost correct. You wrote:

✓ molecular, ✓ weight

The correct answer is:

The **molecular mass** of a substance is the mass per mole of a substance, in units of g/mol.

The mass per mole of a substance is the **molar mass**.
Which of the following options correctly describe a polyatomic ion? Select all that apply.

- The atoms of a polyatomic ion are held together by covalent bonds.
- The charge on a polyatomic ion belongs to the whole unit.
- A polyatomic ion always contains two or more different elements.
- The individual atoms of a polyatomic ion are covalently bonded.
- Although most polyatomic ions contain two different elements, some contain two atoms of the same element, e.g., peroxide (O_2^2-).
LearnSmart Reports

Current Learning Status

View your progress learning the concepts in each module. You can see how much you have left to learn in your current assignments and how much time you should spend in past modules to refresh those concepts you might forget. Practicing will help you remember longer and will prevent your knowledge from decaying.

It is common to forget things — especially new things. By refreshing what you have just learned, you can remember it longer. If you don’t practice, your new knowledge will decay until you have forgotten everything.

Your status

<table>
<thead>
<tr>
<th>Module</th>
<th>Assignment and Initial Learning</th>
<th>Refresh and Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completion status</td>
<td>Items left</td>
</tr>
<tr>
<td>Chapter 1. Chemistry: The Science of Change</td>
<td>2%</td>
<td>58</td>
</tr>
<tr>
<td>Chapter 2. Atoms and the Periodic Table</td>
<td>21%</td>
<td>21</td>
</tr>
<tr>
<td>Chapter 3. Quantum Theory and the Electronic Structure of Atoms</td>
<td>7%</td>
<td>62</td>
</tr>
<tr>
<td>Chapter 4. Periodic Trends of the Elements</td>
<td>6%</td>
<td>40</td>
</tr>
<tr>
<td>Chapter 5. Ionic and Covalent Compounds</td>
<td>4%</td>
<td>57</td>
</tr>
</tbody>
</table>
# LearnSmart Reports

## Most Challenging Learning Objectives

The learning objectives that are the hardest for you are listed below. You can look these up in your book in order to study them further.

<table>
<thead>
<tr>
<th>Click a module to see the learning objectives that challenged you the most.</th>
<th>Page:</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Chapter 1. Chemistry: The Science of Change</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 2. Atoms and the Periodic Table</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 3. Quantum Theory and the Electronic Structure of Atoms</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 5. Ionic and Covalent Compounds</td>
<td></td>
</tr>
<tr>
<td>Compare and contrast different types of molecules: diatomic (homo vs binuclear) and polyatomic.</td>
<td>Page 150</td>
</tr>
<tr>
<td>Demonstrate the Lewis dot symbol for a given element.</td>
<td>Page 141</td>
</tr>
<tr>
<td>Summarize the procedure for drawing the Lewis dot symbol for an element.</td>
<td>Page 141</td>
</tr>
<tr>
<td>Summarize how to predict the charges of monatomic ions using group numbers.</td>
<td>Page 146</td>
</tr>
<tr>
<td>Recall the use of Roman numerals to indicate the charge of a metal that forms more than one cation.</td>
<td>Page 147</td>
</tr>
<tr>
<td>+ Chapter 6. Representing Molecules</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 8. Chemical Reactions</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 9. Chemical Reactions in Aqueous Solutions</td>
<td></td>
</tr>
<tr>
<td>+ Chapter 16. Acid and Base</td>
<td></td>
</tr>
</tbody>
</table>
## LearnSmart Reports

**Module Details**

View how hard each module was for you by seeing how many questions you answered correctly. You can drill down to see which sections were more difficult for you in order to study them further.

---

Click a module to see the sections that challenged you the most.

<table>
<thead>
<tr>
<th>Module</th>
<th>Avg. time spent (hh:mm:ss)</th>
<th>Questions correct/total</th>
<th>Page</th>
<th>Correctness</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Chapter 1. Chemistry: The Science of Change</td>
<td>0:02:15</td>
<td>1 / 5</td>
<td>Page 3</td>
<td>20%</td>
</tr>
<tr>
<td>+ Chapter 2. Atoms and the Periodic Table</td>
<td>0:09:19</td>
<td>10 / 36</td>
<td>Page 33</td>
<td>28%</td>
</tr>
<tr>
<td>+ Chapter 4. Periodic Trends of the Elements</td>
<td>0:50:40</td>
<td>3 / 3</td>
<td>Page 107</td>
<td>100%</td>
</tr>
<tr>
<td>- Chapter 5. Ionic and Covalent Compounds</td>
<td>0:06:31</td>
<td>4 / 25</td>
<td>Page 141</td>
<td>16%</td>
</tr>
<tr>
<td>5.1 Compounds</td>
<td>0:00:06</td>
<td>0 / 1</td>
<td>Page 141</td>
<td>0%</td>
</tr>
<tr>
<td>5.2 Lewis Dot Symbols</td>
<td>0:00:23</td>
<td>0 / 2</td>
<td>Page 141</td>
<td>0%</td>
</tr>
<tr>
<td>5.3 Ionic Compounds and Bonding</td>
<td>0:00:00</td>
<td>0 / 0</td>
<td>Page 143</td>
<td>N/A</td>
</tr>
</tbody>
</table>
LearnSmart Reports

Self-Assessment

View how aware you were of whether or not you knew the answers to the questions you practiced. By being able to correctly identify what you know and what you don’t know, you can focus your studies and prepare effectively.

Aware that you knew the answer:

You were conscious of the fact that you knew the correct answer. If you have a high percent in this category, you are well on your way to mastering the subject. You should still practice once in a while to keep your new knowledge fresh – you don’t want to get rusty.

Aware that you didn’t know the answer:

You knew that you didn’t know the answer. That is OK! It takes time to learn new things. What is important is that you know which material you should study more. This is the first step towards improving. Just keep practicing and you will quickly learn the material!

Unaware that you knew the answer:

You thought you didn’t know the answer, even though you actually did. When you are learning new material, it is easy to be uncertain about what you truly know and don’t know. One way to gain confidence is to keep practicing. As you get more questions correct you will start to trust in your new knowledge!

Unaware that you didn’t know the answer:

You thought you knew the answer, but got the question wrong. If you have a high percent in this category, be careful! You may think you know the material better than you really do. You don’t want to do poorly on a test by not preparing well enough. Practice more to make certain you have learned the material!
Adaptive Reading Technology

Methodology

Facilitate the reading process by identifying what students know and do not know through adaptive assessments and adjust that content so it is most beneficial to the student.
Your next assignment is about:
Quantum Theory and the Electronic Structure of Atoms

In this assignment you should focus on learning the following:
- 3.1 Energy and Energy Changes
- 3.2 The Nature of Light
- 3.3 Quantum Theory
- 3.4 Bohr's Theory of the Hydrogen Atom
- 3.5 Wave Properties of Matter
- 3.6 Quantum Mechanics
- 3.7 Quantum Numbers
- 3.8 Atomic Orbitals

Next topic to learn
Click here to get started.
Assignment progress: 13%
There is no deadline

Don't Forget!
Keep refreshing to make your new knowledge stick!
Summary & Conclusions

Adaptive technology is a powerful tool for engaging students in a personalized learning environment.

Adaptive technology allows students to take charge of their learning at their own pace.

Adaptive reading is now a complementary tool for personalized student learning.