

Understanding the Bohr Model



When atoms absorb energy, the electrons speed up and move further away from the nucleus. Eventually they lose this extra energy as light. Neils Bohr had a perplexing problem. He noticed that the light given off by the electrons of excited atoms never produced a full spectrum. Instead, the light consisted of bright lines of various frequencies with none of the in-between frequencies represented. He also had a complex equation into which he could substitute simple numbers, integers such as 1, 2, or 3, and the equation predicted the frequencies of the bright lines. The problem was, he did not know what these integers represented. The whole mystery unraveled, however, when Bohr developed a model of the atom with circular pathways for the electron. These pathways were at fixed distances from the nucleus. Electrons could be found only in these circular pathways. If an electron absorbed enough energy, it could jump up to another level, but it could never be found between levels. Inevitably, the electron lost energy and fell back down to a previous level, giving off the extra energy as a specific frequency of light. Bohr's mystery numbers represented the energy levels of the electrons.

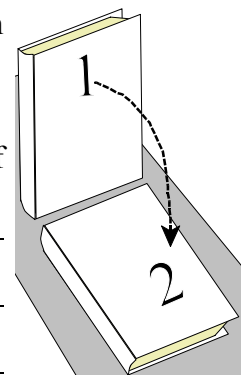
Refer to the introduction above and your knowledge of chemistry and the world to answer the questions below.

1. The drawing to the right shows a book in two possible positions on a table. In which position does the book have more energy? _____

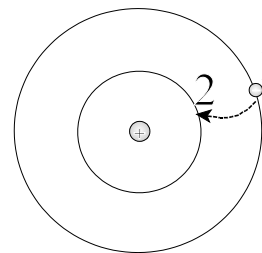
2. What will probably happen to the book if it is left in "position 1" for an extended period of time? Why? _____

3. Can the book stand between "position 1" and "position 2"? Explain. _____

4. If the book falls from "position 1" to "position 2," over and over, how does the energy change compare from one time to the next? _____



5. The drawing to the right shows an electron in “position 1.” What will happen to the electron over time? What is the evidence for this? _____



6. According to Bohr, can the electron referred to in the previous question be found between “position 1” and “position 2?” What is Bohr’s evidence? _____

7. When the electron moves from “position 1” to “position 2,” how does the energy change compare from one time to the next? _____

8. Barium always gives a green flame test. Why? _____

9. What is Bohr’s model of the atom? How does the evidence support his model? _____