**Valence Electrons and Reactivity**

Question: How do valence electrons determine an element’s chemical properties?

Watch the video to walk you through the first three examples. Fill in the information as it is presented on the screen.



 EX 1: Typical neutral atom of **carbon**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_



EX 2: Typical neutral atom of **Beryllium**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_



EX 3: Typical neutral atom of **Neon**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_

**Now…try some on your own!**



 1: Typical neutral atom of **Oxygen**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_



2: Typical neutral atom of **Boron**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_



3: Typical neutral atom of **aluminum**.

 Atomic # \_\_\_\_\_\_\_\_\_ Mass # \_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Protons (+) | Neutrons (0) | Electrons (-) |
|  |  |  |

What energy level is being filled in this atom? \_\_\_\_\_\_

Is this energy level full? \_\_\_\_\_\_\_\_\_\_

**QUESTIONS!!**

4. How many valence electrons are found in a neutral atom of beryllium? \_\_\_\_\_\_\_\_\_\_\_

5. How many valence electrons are found in a neutral atom of aluminum?\_\_\_\_\_\_\_\_\_\_\_

6. How many valence electrons are found in a neutral atom of boron? \_\_\_\_\_\_\_\_\_\_\_

**Reactivity! What does it mean?**

If an atom has 1, 2, or 3 valence electrons, it will give those away. If an atom has 4 valence electrons, it would like to share its electrons with another atom. If an atom has 5, 6, or 7 valence electrons, it would like to gain electrons to fill its outer shell.

**Complete the chart below:**

|  |  |  |
| --- | --- | --- |
| Given: | From Diagrams: | Choose **ONE** column then place one ✓ for each atom listed to show how an atom reacts based on the number of valence electrons. |
| Neutral Atom | Number of Valence Electrons | Remove 1, 2, or 3 electrons to have the layer below become the valence shell that is already full | Just needs 1, 2, or 3 electrons to fill the valence shell | Shares electrons rather than giving up or receiving electrons |
| Carbon |  |  |  |  |
| Beryllium |  |  |  |  |
| Oxygen |  |  |  |  |
| Boron |  |  |  |  |
| Aluminum |  |  |  |  |

**QUESTIONS!!**

7. Why was neon not included on the chart above? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Will helium, neon, or argon atoms react with other atoms? \_\_\_\_\_\_\_\_\_ Why or why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (you may need to look at your Periodic Table Basics Bohr models.)

9. If two electrons are removed from beryllium during a reaction, which energy level becomes the valence shell? \_\_\_\_\_\_\_\_\_\_\_\_\_

10. Does it make sense that a chlorine atom would accept two electrons? \_\_\_\_\_\_ Why or why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Identifying Elements**

Identify the name of the element based on the clue provided. \*\*All atoms are considered neutral atoms\*\*

|  |
| --- |
| Mystery Atoms |
| Clue: This element is made from atoms with … | Predicted identitiy |
| 2 electrons |  |
| 47 protons |  |
| 2 more protons than oxygen |  |
| 3 fewer electrons than silicon |  |
| 11 electrons |  |

**Conclusion Questions**

Use your whole worksheet as well as your interactive notebook to answer the questions below.

11. The number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be used to identify an element.

12. Which elements did you determine would not react with others?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. What information do you need in order to determine the number of neutrons in a neutral atom of an element? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. Which energy level (electron shell) fills first? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. How many electrons can be in the …

 a. first shell \_\_\_\_\_\_\_\_\_\_\_\_\_

 b. second shell \_\_\_\_\_\_\_\_\_\_\_

 c. third shell \_\_\_\_\_\_\_\_\_\_\_

16. When drawing a Bohr model, what must you do with each electron shell before you move to the next one? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. How do you determine the number of electrons in a neutral atom? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_