Electron Arrangement and Valence

Student Worksheet | `g09_u04_w13`

I can: use a grade-appropriate shell model to count valence electrons, connect arrangement to likely ion charge, and name model limits.
Vocabulary: electron shell, valence electron, core electron, period, group, ion, configuration.

1. What is a valence electron?

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2. For a neutral atom, how does electron count relate to atomic number?

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3. Give shell counts for Na (11 e): 2,8,_____.

   ____

4. Give shell counts for Mg (12 e).

   ____

5. Give shell counts for O (8 e).

   ____

6. How many valence electrons does Al have in 2,8,3?

   ____

7. Which atom likely loses one electron: Na or Cl? Explain.

   ____

8. Which atom likely gains two electrons: O or Ne? Explain.

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9. Draw/describe a shell model for Ne.

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10. Why is a shell drawing not a literal electron photograph?

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11. Which period contains an atom with occupied shells 2,8,1?

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12. Predict ion charge from 2,8,2 after losing valence electrons.

    ____

13. Predict ion charge from 2,8,7 after gaining one.

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14. Compare core and valence electrons in Si, 2,8,4.

15. State one reason valence patterns help predict chemical behavior.

16. Why should a simple 2,8,8 filling rule not be extended without qualification to every element?

17. Make a table for Li, O, F, Ne: shell counts and valence electrons.

18. An unknown neutral atom has 2,8,6. Predict its likely common ion and explain electron count.

19. Two diagrams show 2,8,1 and 2,8,8. Compare likely reactivity without calling the prediction a guarantee.

20. Critique: "electrons travel on colored circular tracks at fixed distances."