Subatomic Particles and Notation

Student Worksheet | g09_u03_w10

Today I can: use atomic number and mass number to count protons, neutrons, and electrons in neutral atoms; write nuclide notation; and explain charge.
Time/use: 95 minutes; class, homework, club, tutoring, or independent study.
Vocabulary: proton, neutron, electron, atomic number, mass number, nuclide, neutral, charge, nucleus.

A. Quick checks

1. Give charge/location/relative mass for a proton.

2. Give charge/location/relative mass for a neutron.

3. Give charge/location/relative mass for an electron.

4. What identifies an element: protons, neutrons, or electrons?

5. Define atomic number Z.

6. Define mass number A.

7. Why is A not the periodic-table average mass?

B. Guided application

8. For $^{23}_{11}\mathrm{Na}$, count p, n, e in a neutral atom.

9. For $^{35}_{17}\mathrm{Cl}$, count p, n, e in a neutral atom.

10. Write nuclide notation for 8 protons and 10 neutrons.

11. An atom has $Z = 26$ and $A = 56$. Count neutrons.

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12. Explain why changing neutrons does not change element identity.

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13. A neutral atom has 15 electrons. What is Z?

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14. Correct: ${}^{12}_{6}\mathrm{C}$ has 12 protons.

C. Curiosity/application

15. Why are atomic symbols and notation useful in medical or space data tables?

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16. A diagram puts electrons as dots on circular tracks. State one helpful idea and one limitation.

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17. Plan a tactile or card-based model that keeps p/n/e distinct without implying actual scale.

Competition Corner

18. Samples A and B each have 17 protons; A has 18 neutrons, B 20. Compare identity and mass number.

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19. A neutral sample has mass number 40 and 22 neutrons. Identify Z, electron count, and likely element symbol using a provided periodic table.

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20. A claim says "electrons add almost all atom mass because there are many." Critique using relative masses and model limits.
