Year 9 Science: Atomic theory: Rutherford, Bohr and the parts of an atom

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. How many protons and electrons are in a neutral atom of magnesium, atomic number 12?

2. An atom has 7 protons. Name the element.

3. In the gold foil experiment, why did most alpha particles pass straight through the foil?

4. Which particle did Thomson's plum pudding model include, and which part did Rutherford add?

5. A particle has 17 protons and 18 electrons. What is its overall charge?

Fix the mistake

6. Correct this statement: "Some alpha particles bounced back, so the gold foil experiment showed atoms are solid."

7. Correct this statement: "Electrons sit in the nucleus with the protons."

8. Correct this statement: "Neutrons are the negative particles."

9. Correct this statement: "Atomic number means protons plus neutrons added together."

Answer key (for parents and tutors)

1. How many protons and electrons are in a neutral atom of magnesium, atomic number 12?
   12 protons and 12 electrons, because the atomic number gives the protons and a neutral atom has equal numbers.
2. An atom has 7 protons. Name the element.
   Nitrogen, element 7.
3. In the gold foil experiment, why did most alpha particles pass straight through the foil?
   Atoms are mostly empty space, so most particles never came near a nucleus.
4. Which particle did Thomson's plum pudding model include, and which part did Rutherford add?
   Thomson's model included the electron; Rutherford added a small, dense, positive nucleus.
5. A particle has 17 protons and 18 electrons. What is its overall charge?
   −1, because 17 positive charges and 18 negative charges leave one extra negative (it is a chloride ion).
6. Correct this statement: "Some alpha particles bounced back, so the gold foil experiment showed atoms are solid."
   Most particles went straight through, so atoms are mostly empty space; the rare bounce-backs showed a tiny, dense, positive nucleus.
7. Correct this statement: "Electrons sit in the nucleus with the protons."
   Only protons and neutrons are in the nucleus; electrons are in shells around it, held by the attraction of opposite charges.
8. Correct this statement: "Neutrons are the negative particles."
   Neutrons have no charge; electrons are negative and protons are positive.
9. Correct this statement: "Atomic number means protons plus neutrons added together."
   The atomic number counts only the protons; protons plus neutrons is the mass number, which Part 2 covers.