

### Atoms and Elements Worksheet

1. Which statement is not part of Dalton's atomic theory?

- a) Each element is composed of indestructible particles called atoms.
- b) All atoms of a given element have the same mass and other properties.
- c) Atoms are themselves composed of protons, neutrons, and electrons.
- d) Atoms combine in simple whole-number ratios to form compounds.

2. Which statement best summarizes the nuclear model of the atom that emerged from Rutherford's gold foil experiment?

- a) The atom is composed of a dense core that contains most of its mass and all of its positive charge, while low-mass negatively charged particles compose most of its volume.
- b) The atom is composed of a sphere of positive charge with many negatively charged particles within the sphere.
- c) Most of the mass of the atom is evenly distributed throughout its volume.
- d) All of the particles that compose an atom have exactly the same mass.

3. Which English physicist discovered the smaller and more fundamental particle called the electron?

- a) Ernest Rutherford *gold foil experiment*
- b) John Dalton *atomic theory*
- c) J.J. Thomson
- d) Antoine Lavoisier *law of conservation of mass*

4. What discoveries did the aforementioned English physicist discover about the electron?

- 1) electrons are negatively charged
- 2) electrons are much smaller than subatomic particles
- 3) electrons are uniformly present
- 4) atoms must have a positive and negative charge  
(neutral charge =  $p + e$ )

5. In the chart below, compare the parts of an atom:

Protons	Neutrons	Electrons
- positive charge	- neutral charge	- negative charge
- equal to atomic #	- 1 amu	- $1/2000^{\text{th}}$ amu
- 1 amu	- dwells in nucleus	- dwells outside nucleus
- dwells in nucleus	- causes isotopes	- causes ions

positive = cations (loss of electrons)      negative = anions (gain of electrons)



6. How many electrons does the predictable (most common) ion of fluorine contain?

- a) 1  
b) 4  
c) 9  
d) 10

7. What is the charge of the Cr ion that contains 21 electrons?

- D 3

+ 24 protons

- g) 2+

-21 electrons

- ### h) 3+

+3

- 10

8. Which element is a main-group metal with an even atomic number?

- b) Ca

- d) Se

9. On this periodic table label: 1) family names; 2) charges; 3) metals, nonmetals, and metalloids.




A hand-drawn periodic table illustrating common oxidation states. The elements are arranged in a grid where color indicates the typical charge:

- Alkali metals** (Group 1): +1
- Alkaline earth metals** (Group 2): +2
- (varied charges) TRANSITION METALS** (Groups 3-10): Various colors (green, orange, teal) indicating different possible charges.
- Halogens** (Group 17): -1
- Noble gases** (Group 18): 0

The diagram shows a diagonal sequence of colored boxes from top-left to bottom-right, representing the range of oxidation states available to transition metals, from +3 down to -1.

[illegible]

Key

-  = nonmetals
-  = metalloids
-  = metals