

UNDERSTANDING ATOMIC STRUCTURE

PART 1: PARTS OF AN ATOM

Draw a picture of the modern day model of the atom – the “Nuclear Atom”.

Indicate where the following are located:

- | | | |
|-------------|-------------------|------------|
| 1. nucleus | 2. electron cloud | 3. protons |
| 4. neutrons | 5. electrons | |

PART 2: PROTONS AND NEUTRONS

1. What charge do the following have? protons _____ neutrons _____
2. Where are protons and neutrons located? _____
3. Determine the number of protons in atoms of the following elements:

a. Oxygen	_____	b. Zinc	_____	c. Iodine	_____
d. Potassium	_____	e. Lead	_____	f. Silver	_____
4. Determine the atomic number and identity of the following examples:

a. An atom with 79 protons	_____	b. An atom with 17 protons	_____
c. An atom with 24 protons	_____	d. An atom with 1 proton	_____
5. Determine the mass number and the identity for the following examples:

a. An atom with 9 protons and 10 neutrons	_____	_____
b. An atom with 29 protons and 34 neutrons	_____	_____
c. An atom with 80 protons and 120 neutrons	_____	_____
6. Determine the number of neutrons in the following atoms:

a. An atom of Nitrogen with a mass number of 15	_____
b. An atom of Nitrogen with a mass number of 14	_____
c. An atom of Hydrogen with a mass number of 1	_____
d. An atom of Hydrogen with a mass number of 2	_____

e. An atom of Argon with a mass number of 40 _____

PART 3: ELECTRONS

7. Which subatomic particle is the smallest? - protons, neutrons, or electrons? _____

8. What does it mean for an atom to be neutral? _____

9. Determine the number of electrons in the following neutral atoms.

a. An atom of sulfur _____ b. An atom of Helium _____ c. An atom with 92 protons _____

10. Determine the number of protons and the identity of the following neutral atoms.

a. An atom with 20 electrons: _____

b. An atom with 6 electrons: _____

c. An atom with 26 electrons: _____

PART 4: REPRESENTING ELEMENTS WITH THEIR NUCLEAR SYMBOL

11. What does the superscript (top) number stand for? _____

12. What does the subscript (bottom) number stand for? _____

13. Write the nuclear symbol for the following elements:

a. An atom of oxygen with a mass number of 15 _____

b. An atom of aluminum with 14 neutrons _____

c. An atom of fluorine with 10 neutrons _____

14. Determine the number of protons, neutrons, and electrons in the following atoms:

Symbol	Protons	Neutrons	Electrons
$^{31}_{15}\text{P}$			
$^{23}_{11}\text{Na}$			
$^{58}_{28}\text{Ni}$			
$^{119}_{50}\text{Sn}$			

PART 5: ISOTOPES

15. When representing elements by their isotope name/symbol, you write the name or symbol followed by a dash and a number. Ex. Oxygen-17 What does the number represent? _____

16. Write the isotope name/symbol for the following elements:

- a. An atom with 5 protons and 5 neutrons: _____
- b. An atom with 3 protons and a mass number of 7: _____
- c. A neon atom with a mass number of 21: _____

17. How can you determine the number of protons in an atom when given just the isotope name/symbol?

18. How can you determine the number of neutrons in an atom when given just the isotope name/symbol?

19. What is an isotope?

20. What is the difference between “mass number” and “atomic mass”?

20. Explain how you would calculate the average atomic mass for an element. Be sure to state what information you must be given in order to run your calculations.

PART 6: LOCATING ELEMENTS ON THE PERIODIC TABLE

21. Identify the Group (vertical column) and the Period (horizontal row) that each of the following are in:

- | | | | | | |
|-------------|--------------|---------------|--------------|--------------|---------------|
| a. Chlorine | Group: _____ | Period: _____ | b. Krypton | Group: _____ | Period: _____ |
| c. Hydrogen | Group: _____ | Period: _____ | d. Magnesium | Group: _____ | Period: _____ |
| e. Lead | Group: _____ | Period: _____ | f. Aluminum | Group: _____ | Period: _____ |

22. Identify the element that is located in the following spots:

- | | | | |
|-------------------------|-------|-------------------------|-------|
| a. In Group 1, Period 4 | _____ | b. In Group 7, Period 3 | _____ |
| c. In Group 2, Period 6 | _____ | d. In Group 4, Period 5 | _____ |
| e. In Group 8, Period 1 | _____ | f. In Group 5, Period 2 | _____ |