

Name : _____

Date : _____

INTRODUCTION TO ISOTOPES WORKSHEET

1. Define isotope.

2. In a neutral atom, how does the number of electrons compare to the number of protons?
Why is this important?

3. In the isotope symbol of each atom, there is a superscripted (raised) number called the mass number. This number is also used in the hyphenated atom representation, e.g., carbon-12.

a. How is the mass number determined? _____

b. Why is it called the mass number? _____

4. Consider the following set of isotope symbols: ${}^{204}_{82}\text{Pb}$, ${}^{82}_{35}\text{Br}$, ${}^{78}_{35}\text{Br}$, ${}^{208}_{82}\text{Pb}$, ${}^{204}_{78}\text{Pt}$, ${}^{205}_{82}\text{Pb}$

a. Which symbols in this set are isotopes of each other?

b. How did you arrive at the above conclusion?

c. Which symbol is not an isotope of any other symbols?

5. Can two atoms with the same mass number ever be isotopes of each other? Explain.

6. Complete the following chart:

Isotope Name	Atomic #	Mass #	# of Protons	# of Neutrons	# of Electrons
Potassium-37					
Oxygen-17					

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Answers

1. Define isotope.

Atoms of the same element have the same number of protons but different numbers of neutrons.

2. In a neutral atom, how does the number of electrons compare to the number of protons? Why is this important?

Number of protons = Number of electrons. Positive and negative charges must be balanced out.

3. In the isotope symbol of each atom, there is a superscripted (raised) number called the mass number. This number is also used in the hyphenated atom representation, e.g., carbon-12.

a. How is the mass number determined? Mass number = Number of protons + Number of neutrons

b. Why is it called the mass number? Because most of the atom's mass is concentrated in protons and neutrons.

4. Consider the following set of isotope symbols: ${}^{204}_{82}\text{Pb}$, ${}^{82}_{35}\text{Br}$, ${}^{78}_{35}\text{Br}$, ${}^{208}_{82}\text{Pb}$, ${}^{204}_{78}\text{Pt}$, ${}^{205}_{82}\text{Pb}$

a. Which symbols in this set are isotopes of each other?

i. ${}^{204}_{82}\text{Pb}$, ${}^{205}_{82}\text{Pb}$, and ${}^{208}_{82}\text{Pb}$. ii. ${}^{82}_{35}\text{Br}$ and ${}^{78}_{35}\text{Br}$.

b. How did you arrive at the above conclusion?

The atomic number is the same. Mass numbers are different.

c. Which symbol is not an isotope of any other symbols?



5. Can two atoms with the same mass number ever be isotopes of each other? Explain.

No. If they have the same mass number and different atomic numbers, they are atoms of different elements.

6. Complete the following chart:

Isotope Name	Atomic #	Mass #	# of Protons	# of Neutrons	# of Electrons
Potassium-37	19	37	19	18	19
Oxygen-17	8	17	8	9	8