

Isotopes

The number of protons in a nucleus determines the identity of the element. For example, any atom having 6 protons will be a "carbon" atom. If we were to add an extra proton to the nucleus, we would have an entirely different element. For example,



On the other hand, if we add an extra NEUTRON to a nucleus we simply end up with the same element, just a little heavier, since the charge on the nucleus would be unchanged.

ISOTOPES of a given element have the same ATOMIC NUMBER but a *different* ATOMIC MASS.

In other words, isotopes have the same number of protons but a different number of neutrons. An isotope is identified by its mass number, the sum of the protons and neutrons. The most common isotope of Carbon has a mass number of 12 and can be written as Carbon-12, two other isotopes are Carbon-13 and Carbon-14. Despite their different mass numbers, all three carbon isotopes react the same way chemically.

PART I. Answer the questions based on the above reading

1. What is an isotope?
2. What does the number next to isotopes signify?
3. How can you tell isotopes of the same element apart?

PART II. For each of the following isotopes, write the number of protons, neutrons, and electrons. Assume all atoms are neutral.

	Nitrogen-15	Nitrogen-20
# of protons		
# of neutrons		
# of electrons		

	Sodium-12	Sodium-20
# of protons		
# of neutrons		
# of electrons		

PART III. Fill in the isotope name and any missing information on the chart. Use your periodic table and the information provided. Assume all atoms are neutral.

	-10	-12
# of protons		6
# of neutrons		
# of electrons	6	