

Atomic Identity and Periodic Table Entries

- Sample entry from the periodic table:

6
C
Carbon
12.01
- **Atomic Number:** this is the number of protons in the nucleus of every atom of this element.
- **Chemical symbol**
- **Element name**
- **Average atomic mass:** roughly the number of protons + number of neutrons in the nucleus

Q: What makes atoms of one element different from atoms of another element?

A: The number of protons found in the nucleus (the atomic number)

- Atoms that have the same number of protons are considered to be the same element.

Normally, atoms want to have a net charge of zero. This means that **the number of protons and the number of electrons must be equal.**

1. What element has atomic number 5?
2. What is the atomic number for the element "oxygen"?
3. "Be" is the chemical symbol for which element?
4. "Ne" is the chemical symbol for which element?
5. What is the average atomic mass for Aluminum?

Isotopes

- **Mass Number:** The total number of **protons** and **neutrons** in the nucleus of an atom.
 - This does not usually appear on the periodic table.
- **#protons + #neutrons = mass number**
- **Isotopes:** atoms that have the same number of protons, but different numbers of neutrons.
- The names are written as **element name – mass number**.
 - Ex: Carbon-12
 - Ex: Lithium-7



Q: How many **protons** are in the nucleus of a Carbon-12 isotope? How about a Carbon-13 isotope?

A: Both Carbon-12 and Carbon-13 have 6 protons in their nuclei (that's plural for "nucleus."). Remember that the identity of an element is determined by the atomic number (number of protons in the nucleus).

Q: How many neutrons are in the nucleus of a Carbon-12 isotope?

A: There are 6 neutrons. We get this by doing subtraction:
 Mass number – atomic number = number of neutrons

Q: How many neutrons are in the nucleus of a Nitrogen-15 isotope?

A:

Q: How many neutrons are in the nucleus of a Neon-22 isotope?

A:

Some Isotope Calculations

- Fill in the missing information in the table:

Isotope Name	# Protons	Mass #	# Neutrons	# Electrons
Boron-10				
Boron-11				
	15	31		
	10	21		
	3		3	
	8		7	

- **To find the number of protons:**

- If you know the name of the element, then use the atomic number of the element. This is on the periodic table.
- If you don't know which element it is, then subtract: **mass number - # neutrons**

- **To find the mass number:**

- If it is given in the isotope name, use that.
- If it is not given, then add: **# neutrons + # protons**

- **To find the number of neutrons:**

- If it is given, use that.
- If it is not given, then subtract: **mass number – atomic number**

- **To find the number of electrons:**

- It's the same as the number of protons (atomic number)