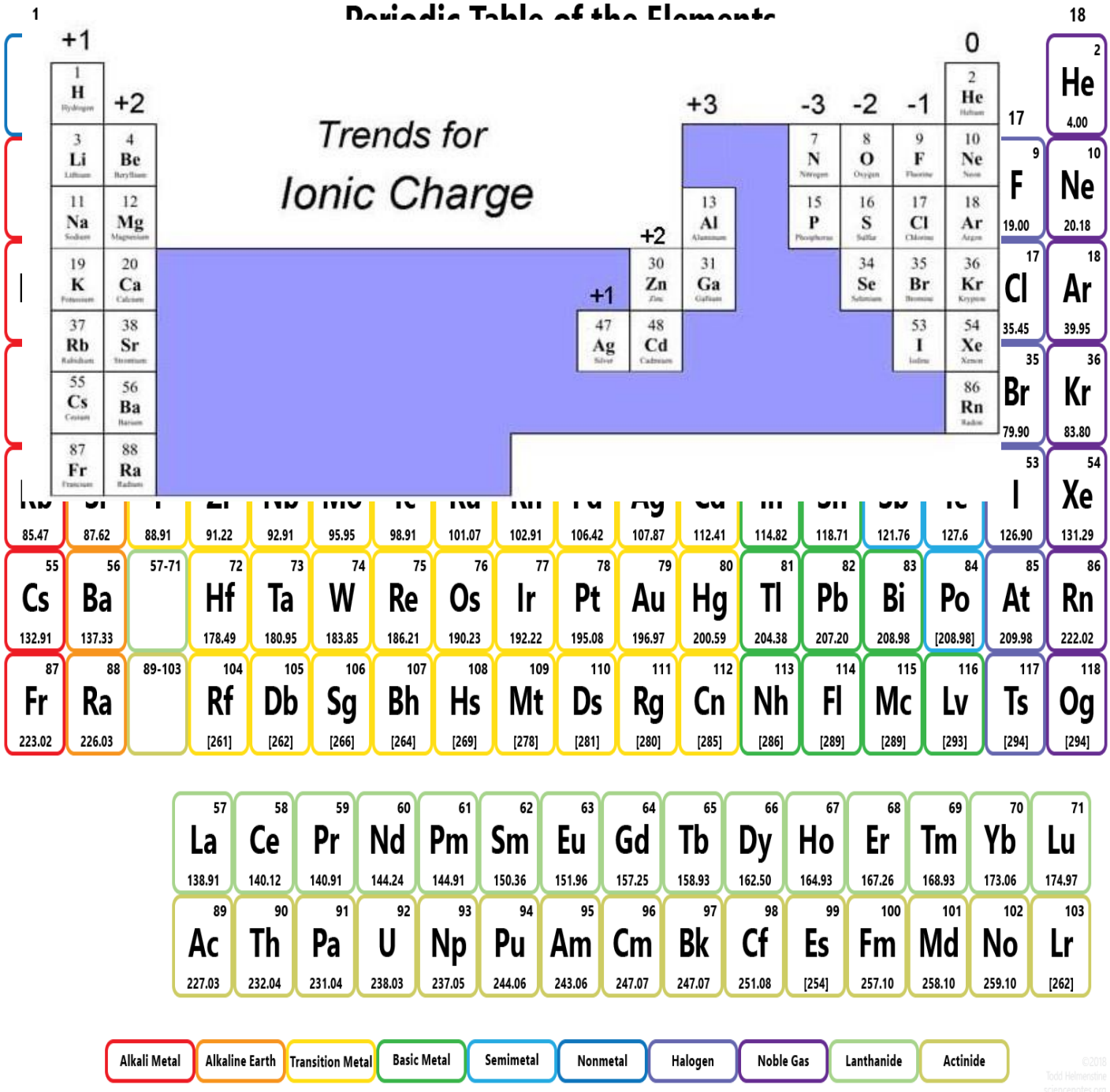
Identifying Chemical Elements

Chemical Elements

Periodic Table of Elements



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- **Protons (Atomic Number)** = Mass Number (atomic weight) - # of neutrons
- **Neutrons** = Mass Number – Protons
- **Mass Number** = # of electrons + # of neutrons + ion charge
- **Electrons** = # of protons ± ion charge
    - If there is a positive charge (+) contained, we subtract the # of and the ion charge to get the # of electrons
    - If there is a negative charge (-) contained, we add the # of protons and the ion charge to get the # of electrons

Identify Unknown Chemical Elements of their Electrons, Protons, Neutrons, Ionic Charges, and Mass Numbers

Step #1:

- Look at what the question is asking for to find the unknown chemical element.
- Example Question: Write the unknown chemical symbol of: an ion of 1+ charge, atomic number 55, and mass number 133.

Step #2:

- Find the atomic number (protons), charge, and mass number in the periodic table.
- Hint: the atomic number will always give you the unknown chemical element as the answer!

Step #3:

- After looking for the given charge, atomic number, and mass number, identify the unknown element. Cs (Cesium) is the unknown chemical element symbol.

Example 1:

Write the unknown chemical symbol of: 18 electrons, 18 neutrons, and an ion charge of 1–.

Step #1:

- Look at what the question is asking for to find the unknown chemical element.

Step #2:

- Since the atomic number (protons), and mass number are not given, find the protons first to get the mass number from the periodic table and subtract by the number of neutrons.
- Hint: the atomic number or the formula to find the # of protons will always give you the unknown chemical element as the answer!
- **Protons** = Mass Number – # of neutrons
- **Mass Number** = # of electrons + # of neutrons + ion charge

  = (18 + 18 – 1) = 35
- **Protons** = 35 – 18 = 17 protons (atomic number)

Step #3:

- After finding the # of protons of the given formula, look at the periodic table and find the unknown chemical element to get the answer. Cl (Chlorine) is the unknown chemical element symbol.

Example 2:

Write the unknown chemical symbol of: The ion charge of 2+, atomic number 38, and mass number 87.

Step #1:

- Look at what the question is asking for to find the unknown chemical element.

Step #2:

- Find the atomic number (protons), charge, and mass number in the periodic table or use the formula for finding the # of protons.
- Hint: the atomic number will always give you the unknown chemical element as the answer!

- **Protons** = Mass Number – # of neutrons, where **Mass Number** = # of electrons + # of neutrons + ion charge
- **Ion charge** = +2
- **Electrons** = 38 +2 ion charge => 38 – 2 = 36
- **Neutrons** = Mass Number – Atomic Number = 87 – 38 = 49
- **Protons** = (36 + 49 + 2) – 49

  = 87 – 49 = 38 protons

Step #3:

- After looking for the given charge, atomic number, and mass number, identify the unknown element from the periodic table. Sr (Strontium) is the unknown chemical element.

Example 3:

Write the unknown chemical symbol of: 86 electrons, 142 neutrons, and an ion charge of 4+.

Step #1:

- Look at what the question is asking for to find the unknown chemical element.

Step #2:

- Since the atomic number (protons), and mass number are not given, find the protons first to get the mass number from the periodic table and subtract by the number of neutrons.
- Hint: the atomic number will always give you the unknown chemical element as the answer!
- **Protons** = Mass Number – # of neutrons
- **Mass Number** = # of electrons + # of neutrons + ion charge

  = (86 + 142 + 4) = 232
- **Protons** = 232 – 142 = 90 protons (atomic number)

Step #3:

- After finding the # of protons of the given formula, look at the periodic table and find the unknown chemical element to get the answer. Th (Thorium) is the unknown chemical element.

Disclaimer: We did not include all of the resources conferred to formulate this handout. We encourage students to conduct further research to find additional resources. The format of this list is not commensurate with a standard format.