PERIODIC TRENDS

Warning: It is risky to proceed without a periodic table!

WHAT IS A TREND?

It is a predictable change in a particular direction.

REVIEW

A **period** is a row of elements on the periodic table.

A **group** is a column of elements on the periodic table.

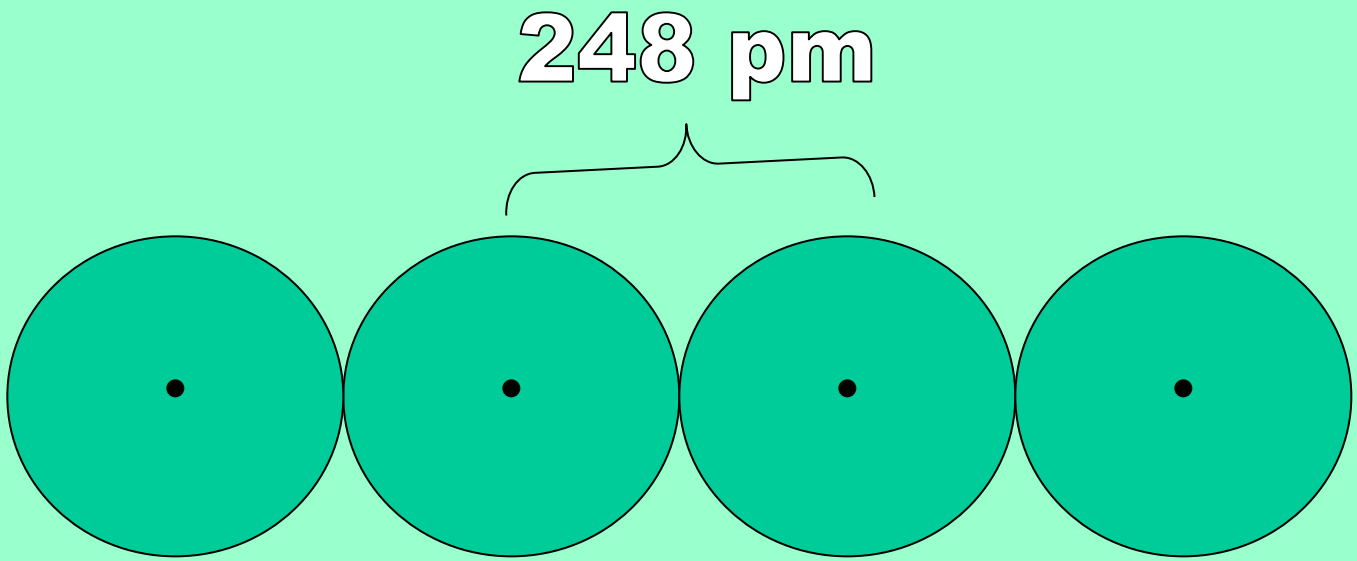
TREND 1

Atomic Radius

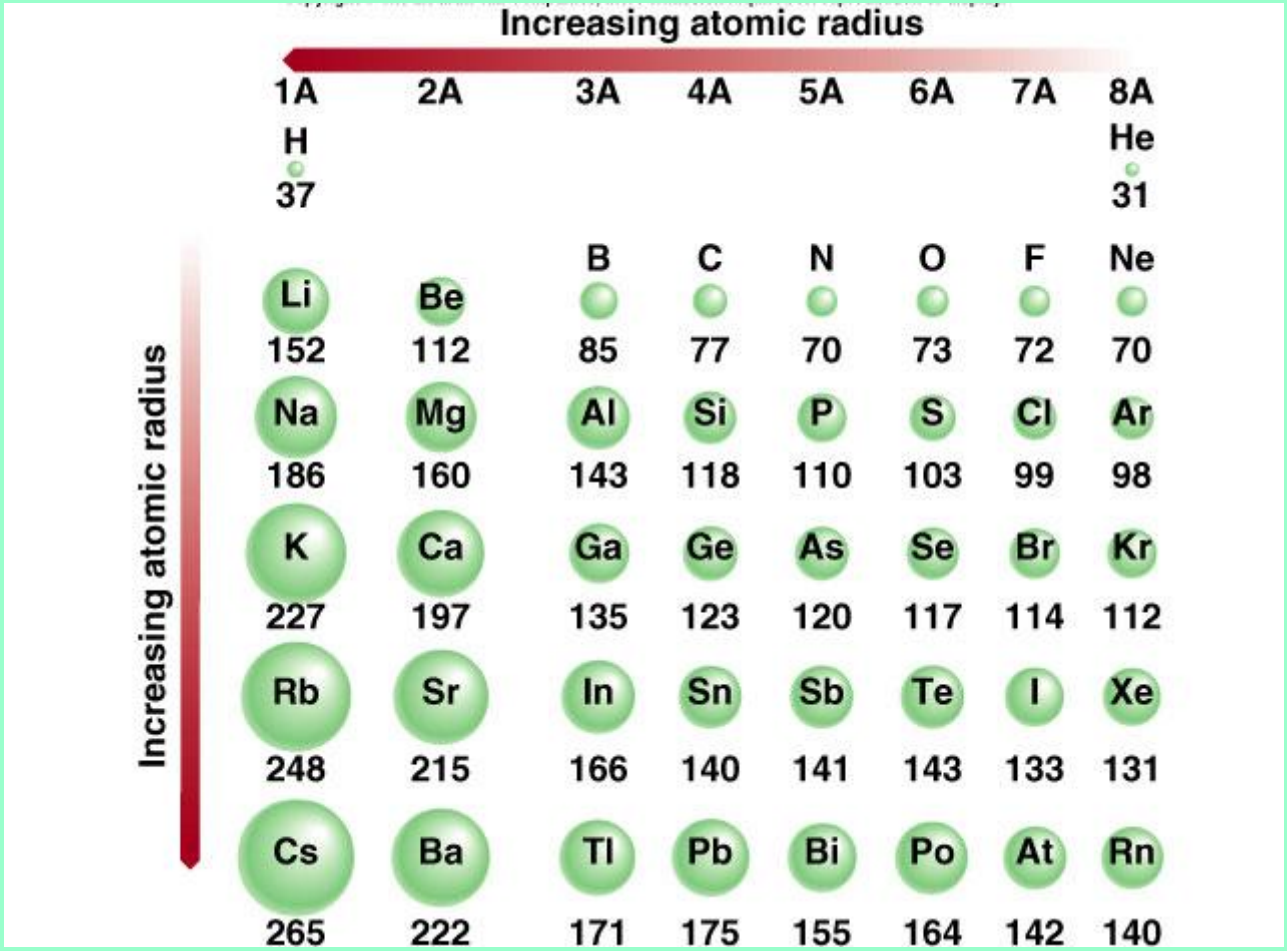
Atomic Radius

is ½ the distance between the nuclei of 2 identical atoms in the gaseous state.

example: Iron atoms



Radius = ?


Increasing atomic radius
Increasing atomic radius
1A 2A 3A 4A 5A 6A 7A 8A
H 37
He 31
B C N O F Ne
Li 152
Be 112
85 77 70 73 72 70
Na 186
Mg 160
Al 143
Si 118
P 110
S 103
Cl 99
Ar 98
K 227
Ca 197
Ga 135
Ge 123
As 120
Se 117
Br 114
Kr 112
Rb 248
Sr 215
In 166
Sn 140
Sb 141
Te 143
I 133
Xe 131
Cs 265
Ba 222
Tl 171
Pb 175
Bi 155
Po 164
At 142
Rn 140

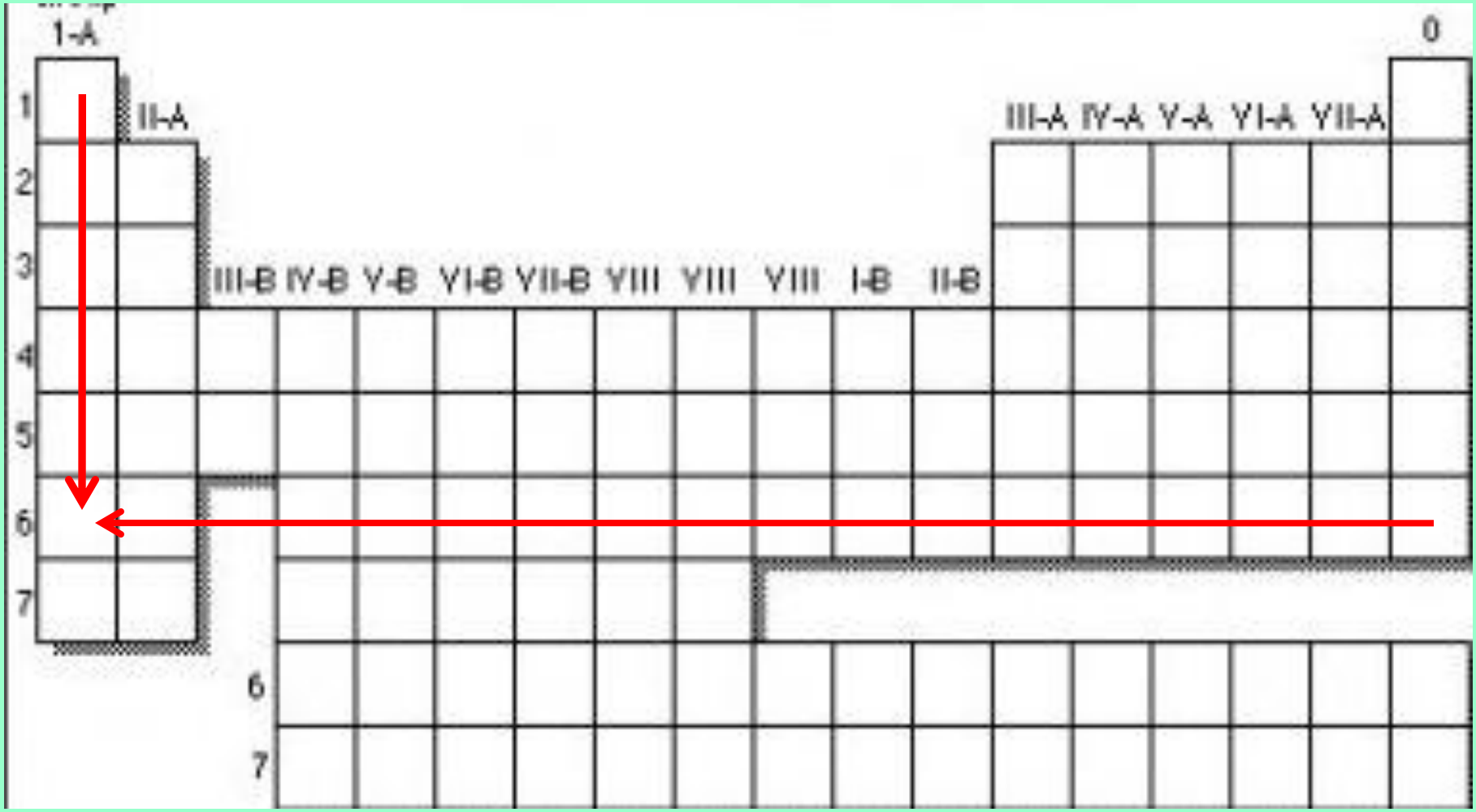
group trend

The radii get larger as one reads down a family.

period trend

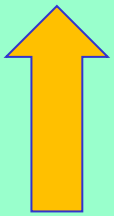
The radii get larger as one reads from right to left across a period.

Atomic Radius Trend Summary



Which atom has the largest radius?

Mg Cl Na P



TREND 2

Electronegativity

Electronegativity

-describes the power
of an atom in a compound
to attract electrons to itself.

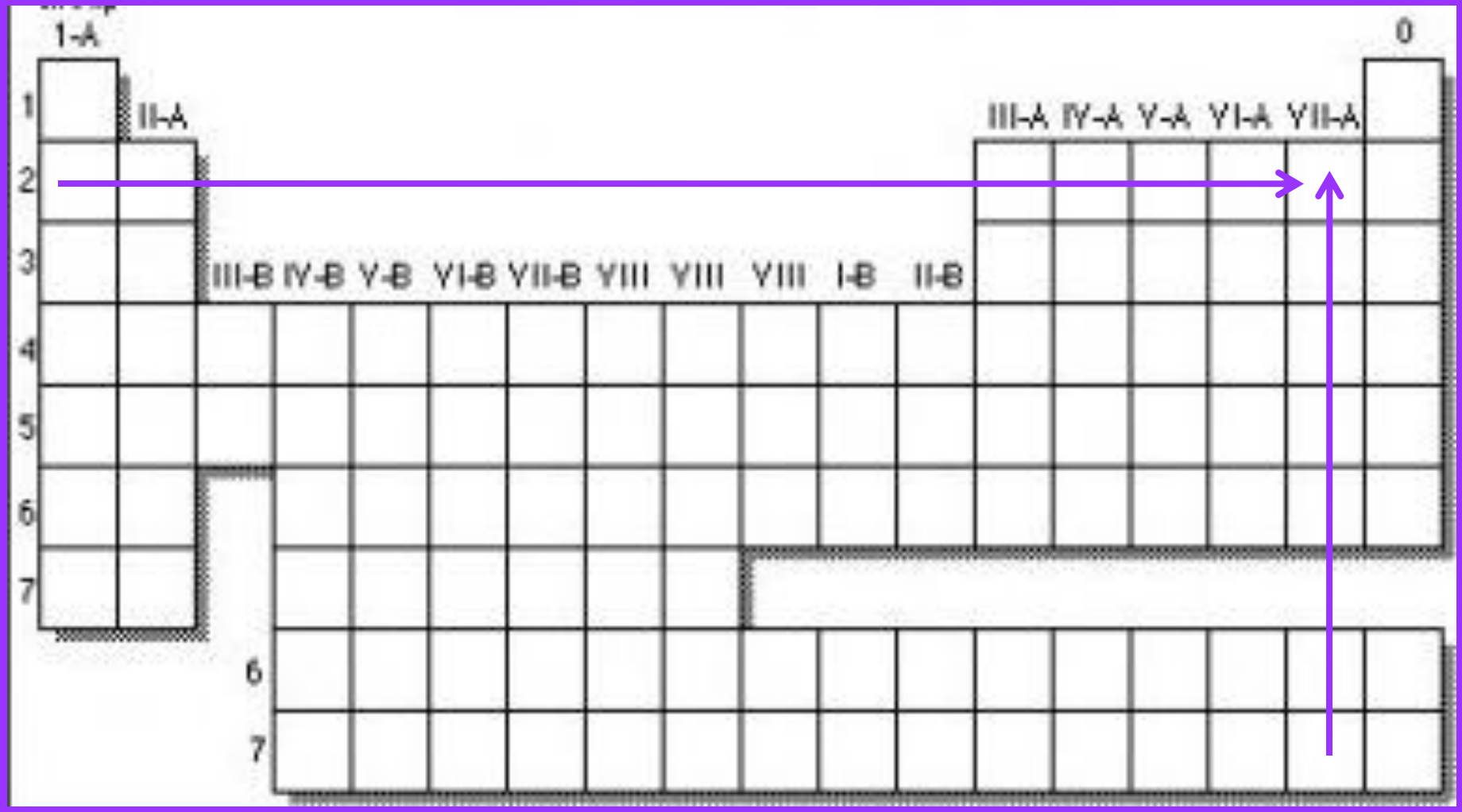
group trend

The electronegativity increases as one reads up a family.

period trend

The electronegativity gets larger as one reads from left to right across a period.

Electronegativity Trend Summary



Arrange elements in order of decreasing electron affinity.

C, O, Li, Na, Rb, Ne, F

F O C Li Na Rb Ne

TREND 3

Ionization Energy

Ionization Energy

is the energy required to remove an electron from an atom.

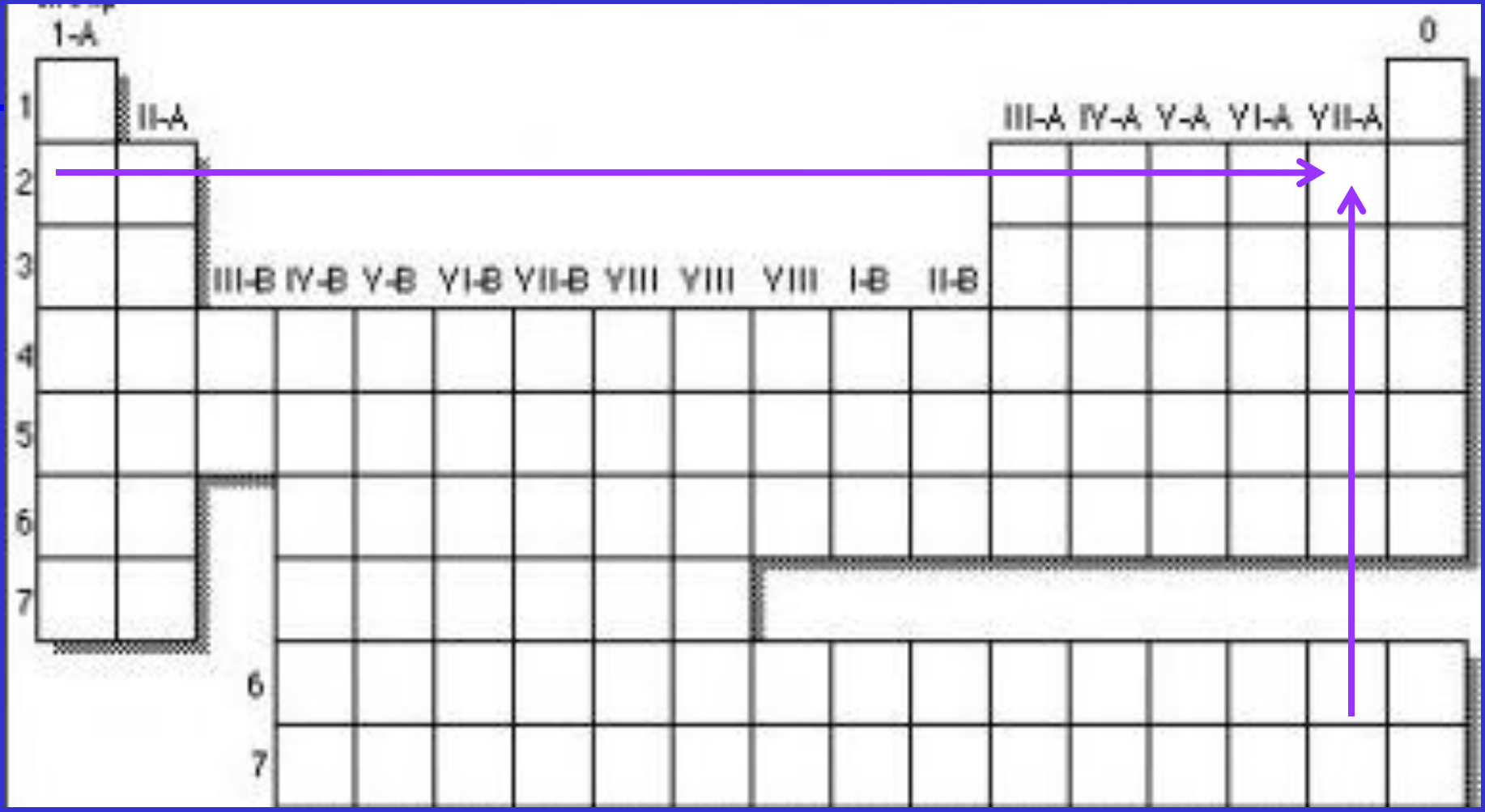
group trend

The ionization E increases as one reads up a family.

period trend

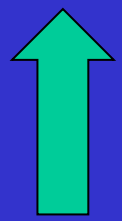
The ionization E gets larger as one reads from left to right across a period.

Ionization Energy Trend Summary



Which element would have the highest ionization E?

Cl Na I In



IONIC RADII

The radius of a **metal** will decrease after it ionizes, because metals lose Electrons.

The radius of a **nonmetal** will increase after it ionizes, because nonmetals gain electrons.

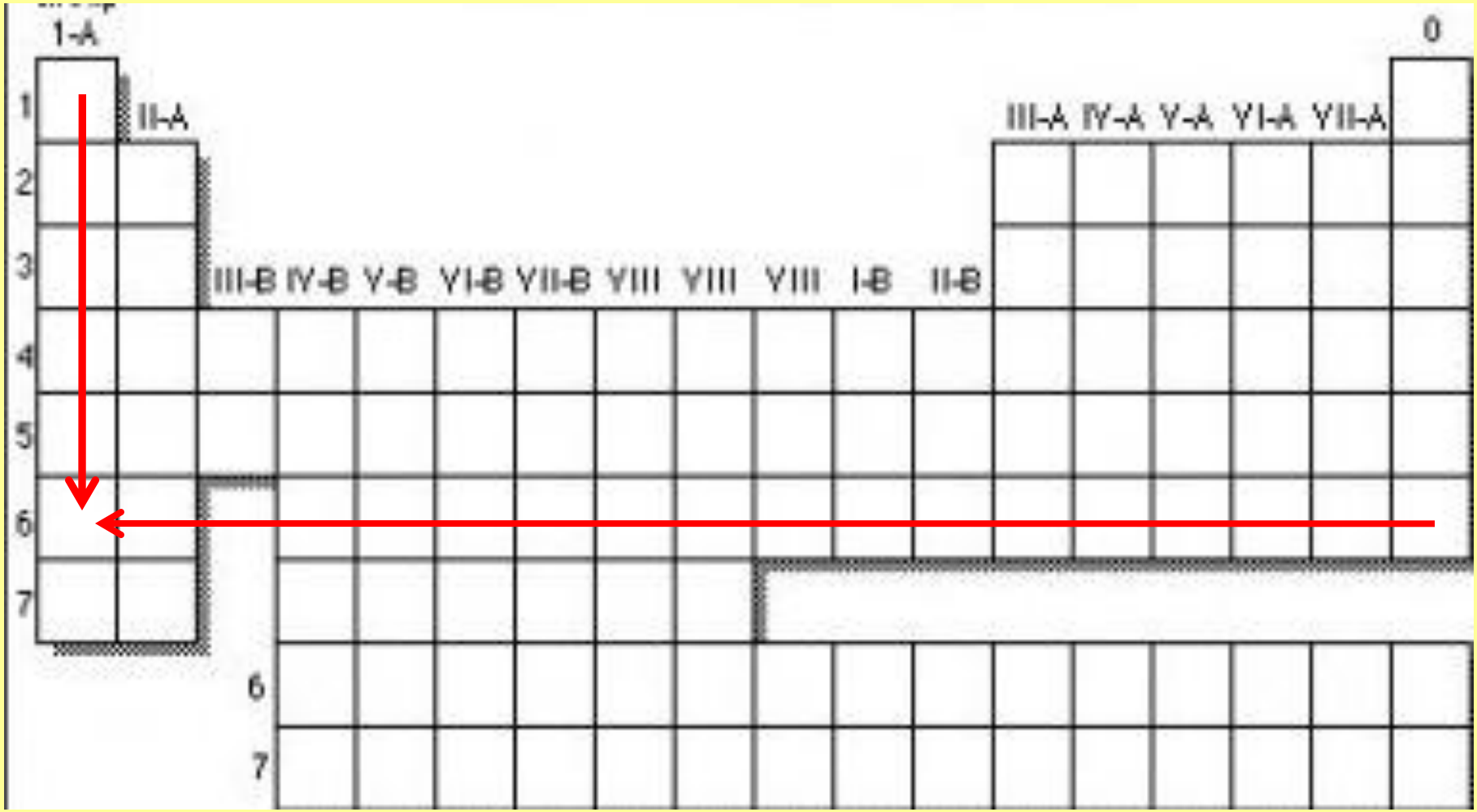
group trend

The radii get larger as one reads down a family.

period trend

The radii get larger as one reads from right to left across a period.

Atomic Radius Trend Summary



Will fluorine get larger or smaller when it ionizes?

Will barium get larger or smaller when it ionizes?

Metallic Character

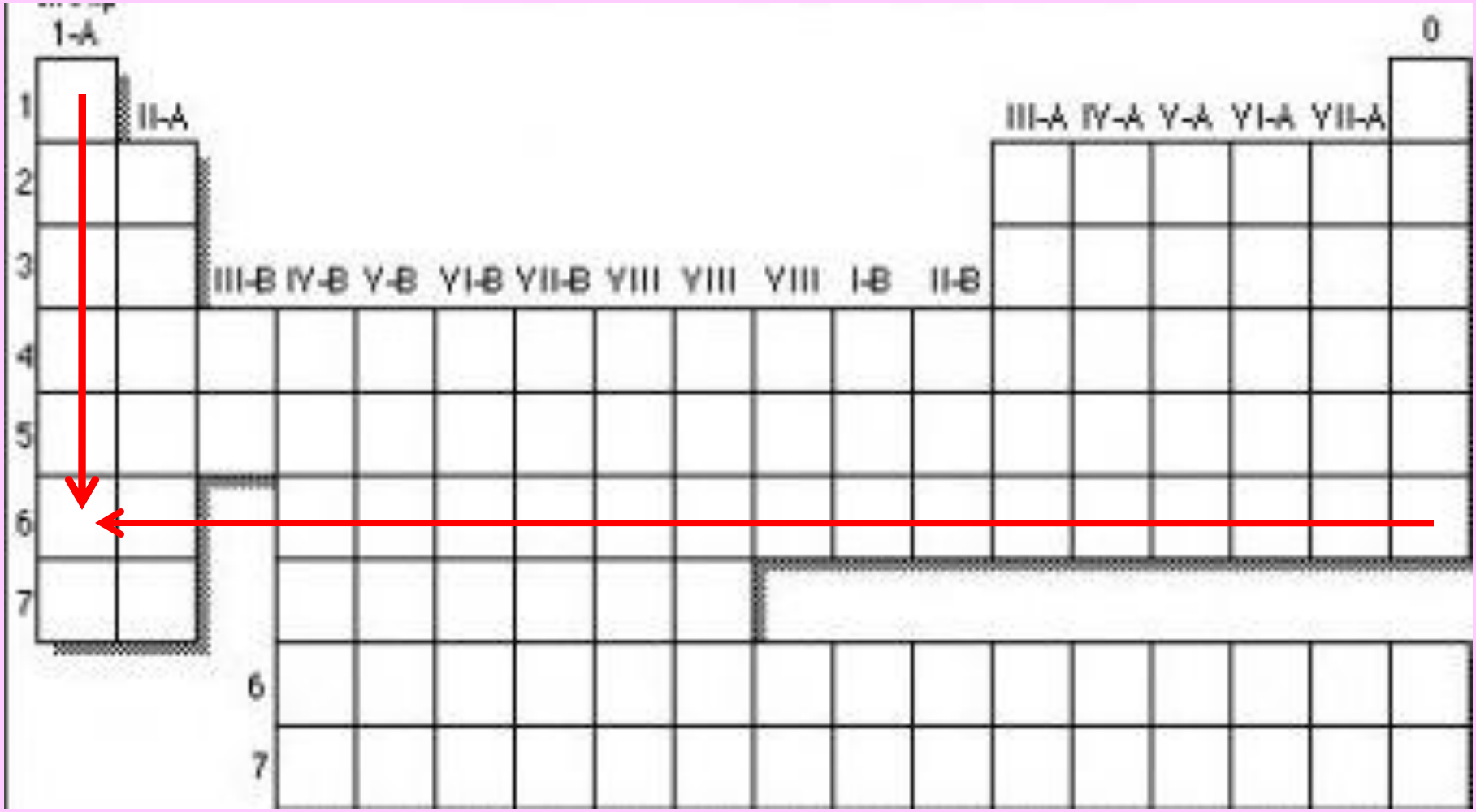
group trend

Metallic character gets larger as one reads down a family.

period trend

The metallic character gets larger as one reads from right to left across a period.

Metallic Character Trend Summary



Overall Trend Summary