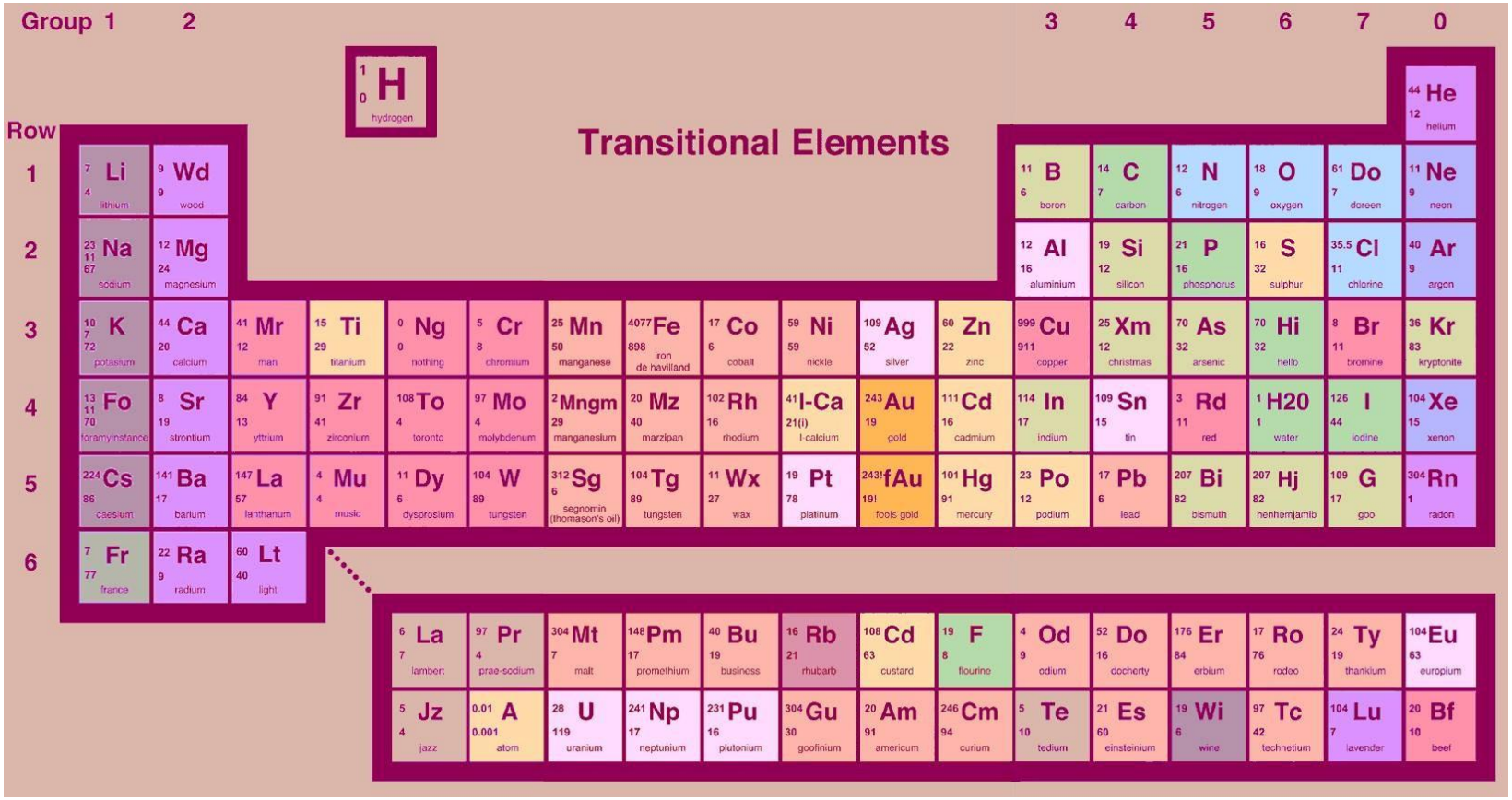
Groups in the Periodic table

Learning Outcomes

- Elements. Symbols of elements 1–36.
- The periodic table as a list of elements arranged to demonstrate trends in their physical and chemical properties.
- Brief statement of the principal resemblances of elements within each main group, in particular alkali metals, alkaline earth metals, halogens and noble gases.

Modern periodic table



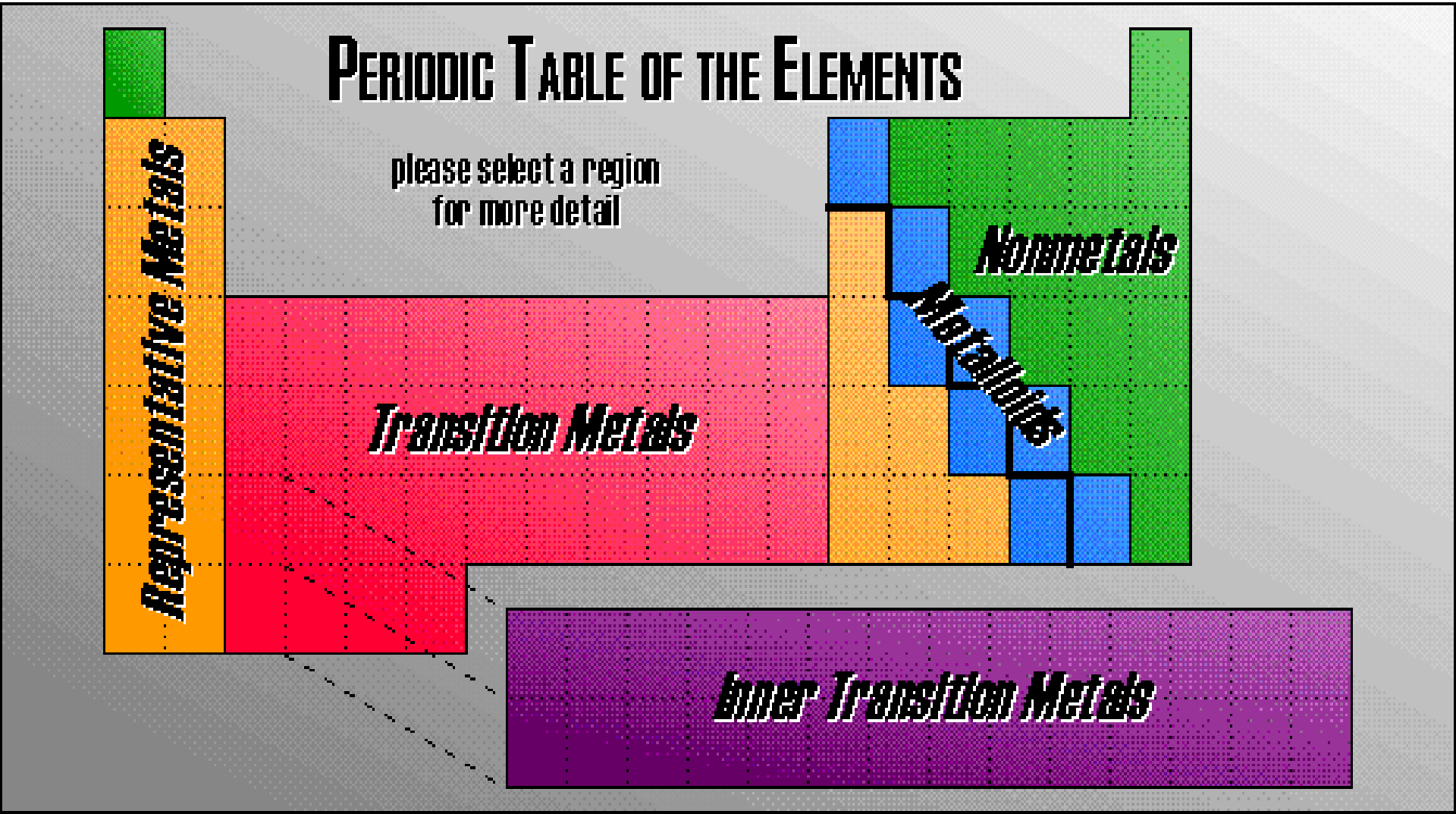
*Periods

- The period number of an element signifies the highest unexcited energy level for an electron in that element.
- It also tells us the number of energy levels occupied by electrons.

*Groups

- Elements in the same group have the same number of electrons in their outermost energy level.
- This number is equal to the group number.
- The outer electrons are called valence electrons. Because they have the same number of valence electrons, elements in a group share similar chemical properties.

Classifying Elements- Metals

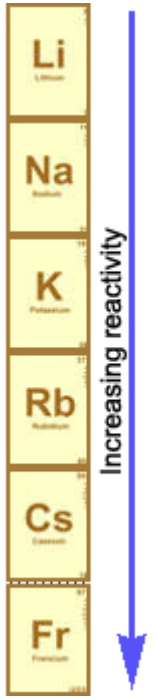


*Metals

- Metals are lustrous (shiny), malleable (can be hammered) and Ductile (can be stretched)
- are good conductors of heat and electricity.
- Usually hard.

*Alkali metals

- Group 1
- Very reactive
- Low density
- Soft-can be cut with a knife
- Burn in air to form oxides
- React with water to form hydroxides
- Form +1 ions



Alkaline Metals 1
Learning outcome

Demonstration of the reaction with water of lithium, sodium and potassium.

*Sodium

- Sodium + Oxygen → Sodium oxide
- Sodium + Water → Sodium Hydroxide + Hydrogen gas
- Stored in oil to prevent them from reacting with air or water

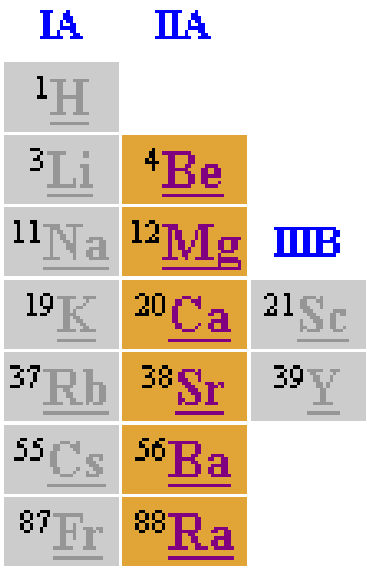
*

- Write a chemical equation to represent these word equations for Sodium.

- Repeat for Lithium and Potassium.
- Do in pencil!!

*Alkaline Earth Metals

- Group 2
- Reactive
- Harder than group one
- Burn in air to form oxide
- React with water to form hydroxides
- Form +2 ions

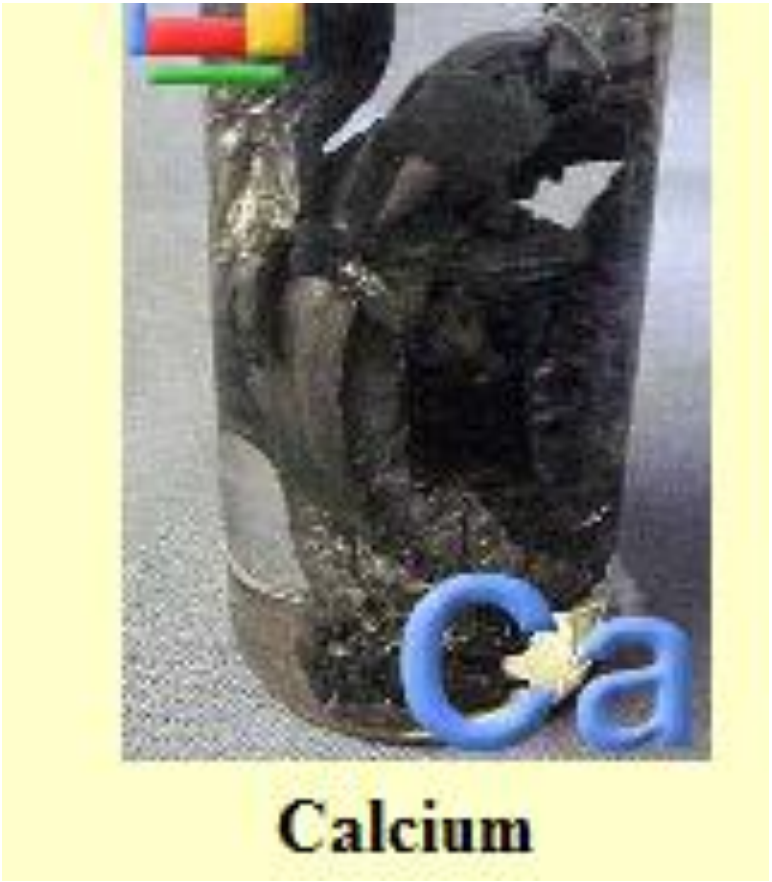


Beryllium

Beryllium

Barium

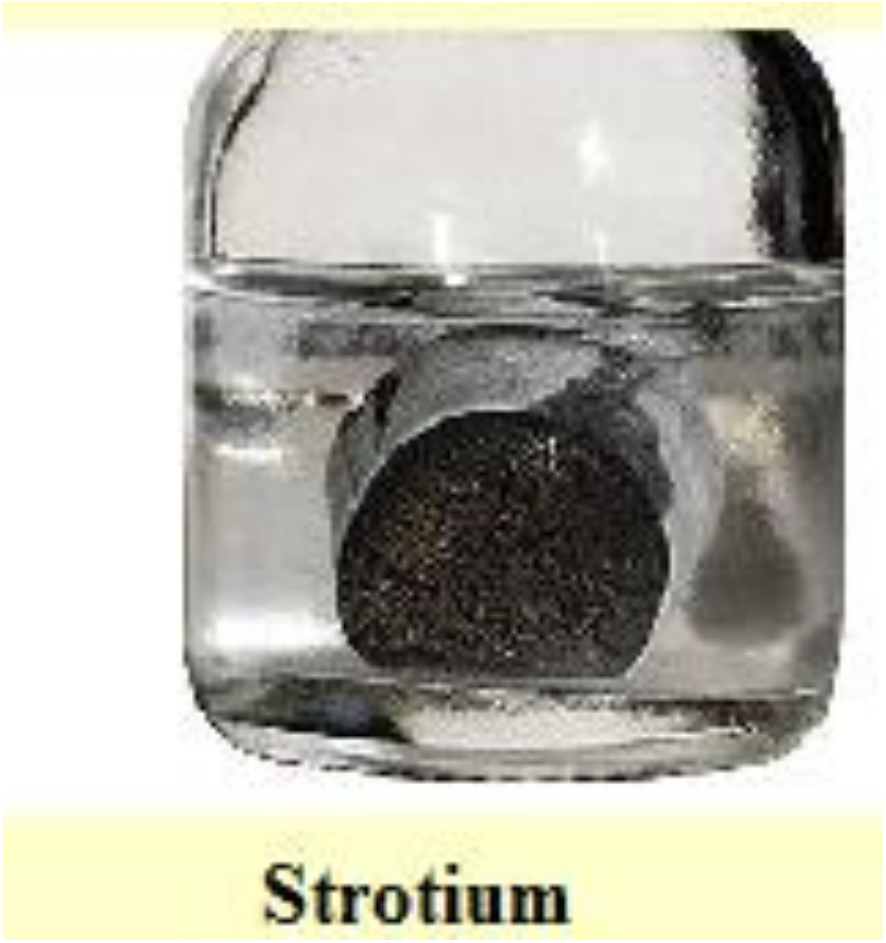
calcium



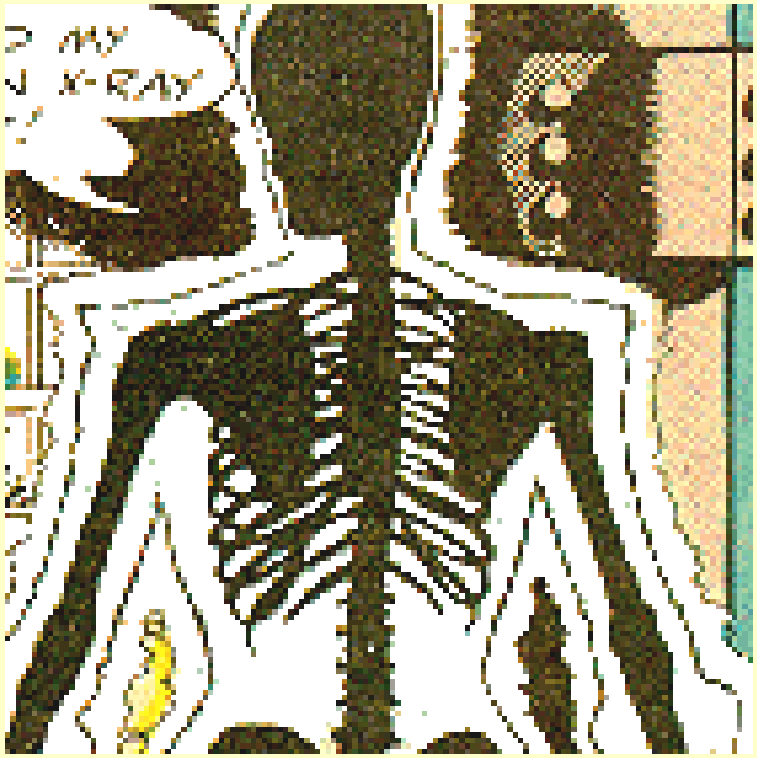
Magnesium

Magnesium

Strontium



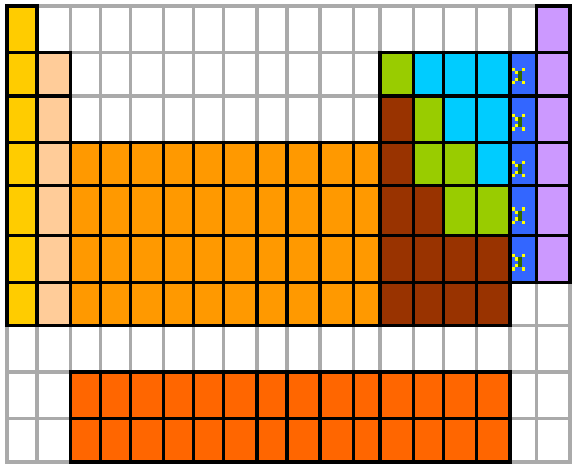
Radium



Radium

*Halogens

- Group 7
- Highly Reactive
- Chlorine, Bromine, Iodine
- React with hydrogen to form acids
- Form -1 ions



Chlorine

- Green gas
- Chlorine + Hydrogen → Hydrogen Chloride gas
- Hydrogen chloride gas dissolves in water to form Hydrochloric acid.
- Chlorine reacts with sodium to form Sodium Chloride [Table Salt]

bromine

bromine

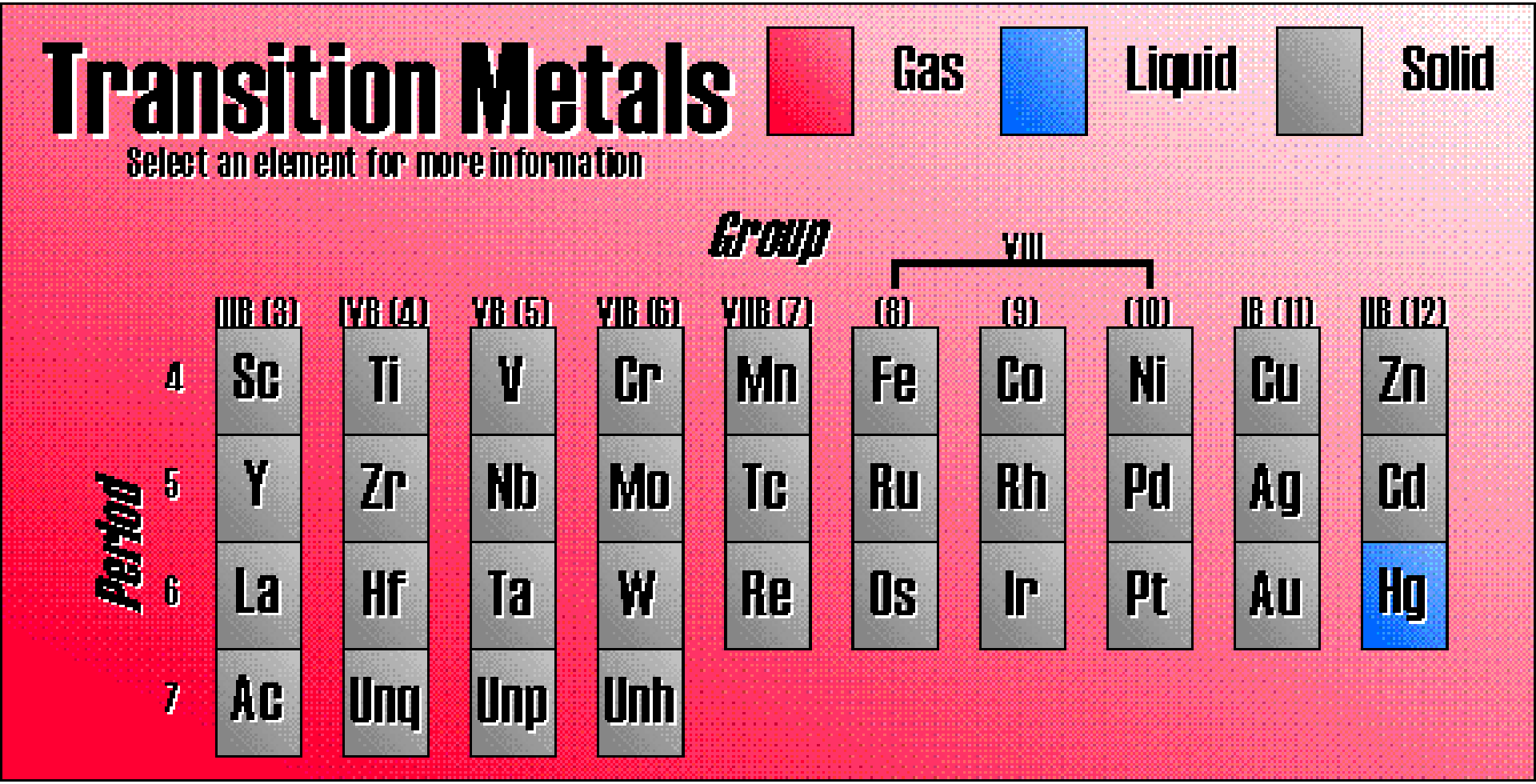
raisinette

iodine

Noble Gases

- Group 8
- Helium , Neon, Argon
- are very unreactive
- Do not form ions.
- Have full outer shell of electrons, are stable.
- used to make lighted signs, refrigerants, and lasers.

Transition metals



Transition Metals

- The transition elements are located in groups IB to VIIIB.
- These elements are very hard, with high melting points and boiling points. The transition metals are good electrical conductors.
- They form positively charged ions.

More on these later.