

## Development of the Periodic Table

### List

- describe how elements are arranged on the Periodic Table
- state the Periodic Law

### Notes

#### Definitions

- ★ Classification - grouping elements based on similarities
- ★ Cross Classification - classifying into more than one group at a time
  - ☆ Examples
    - ★ Deck of cards – Suits and Numbers
    - ★ Periodic Table – Groups or Families and Periods
  - ☆ Purpose - organize, explain, and predict information about the elements

#### History

- ★ Mendeleev's Periodic Table
  - ☆ Dmitri Mendeleev (1869) prepared a card for each of the known elements listing the
    - ★ symbol
    - ★ atomic mass
    - ★ chemical properties
      - ★ very active metal - loses electrons very easily
      - ★ active metal - loses electrons easily
      - ★ metal - loses electrons
      - ★ metalloid - gains or loses electrons
      - ★ nonmetal - gains electrons
      - ★ active nonmetal - gains electrons easily
      - ★ very active nonmetal - gains electrons very easily
  - ★ He arranged the cards in order of increasing atomic mass and noticed a pattern:
    - ★ MENDELEEV'S PERIODIC LAW: When the elements are arranged in increasing order of atomic mass, the chemical properties repeat themselves periodically.
  - ★ Mendeleev moved the card of the second and third very active metal, etc., by the card of the first very active metal, keeping the cards in order of mass.
    - ★ The cards thus arranged formed groups or families with similar properties.
    - ★ this arrangement forms the basis for the first Periodic Table
- ★ Moseley's Periodic Table (Modern Periodic Table)
  - ☆ Moseley noticed that when all the elements were arranged in order of mass a few were not in the right family with respect to properties
  - ☆ Moseley used a procedure called X-ray diffraction to determine the atomic number of the elements.
  - ☆ When the elements were arranged in increasing order of atomic number, the discrepancies in Mendeleev's table disappeared.
  - ☆ THE PERIODIC LAW: When the elements are arranged in increasing order of atomic number, the chemical properties repeat themselves periodically.
  - ☆ The modern Periodic Table is arranged in order of increasing atomic number.

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Answer the questions below by circling the number of the correct response

1. In the Periodic Table, the elements are arranged in order of increasing
  - (1) atomic size
  - (2) atomic mass
  - (3) atomic number
  - (4) ionization energy
2. The chemical properties of the elements are Periodic functions of their atomic
  - (1) spin
  - (2) mass
  - (3) isotopes
  - (4) number
3. Which pair contains elements which have the most similar chemical properties?
  - (1) Mg and Ca
  - (2) H and Li
  - (3) N and S
  - (4) Na and Cl
4. The element with an atomic number of 34 is most similar in its chemical behavior to the element with an atomic number of
  - (1) 19
  - (3) 31
5. Silicon is most similar in chemical activity to
  - (1) carbon
  - (2) sulfur
  - (3) lead
  - (4) nitrogen