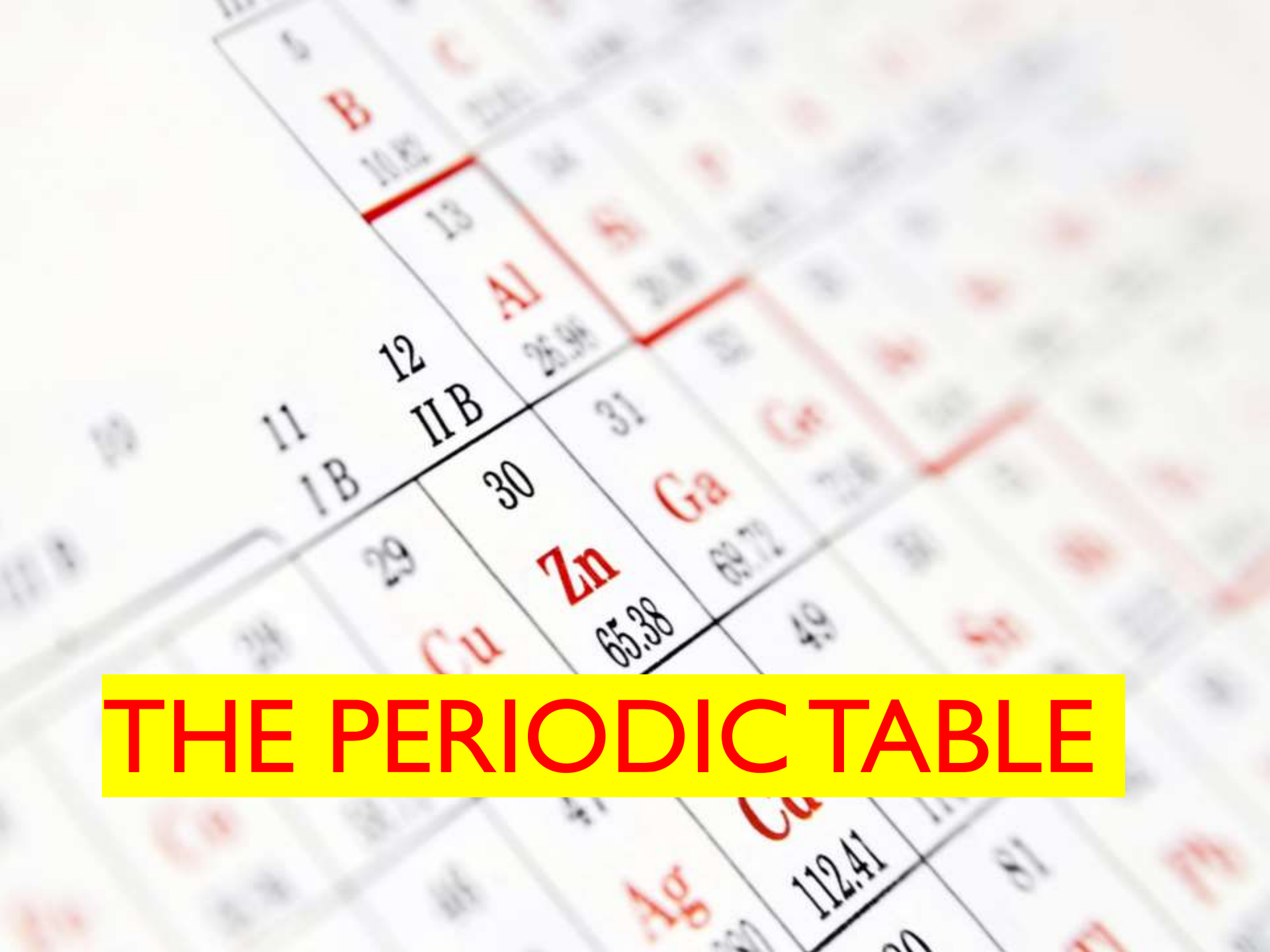

THE PERIODIC TABLE

THE PERIODIC TABLE

- The periodic table is a scientific chart that arranges all known chemical elements in a systematic manner.
- It helps students understand relationships among elements.
- Elements with similar properties are placed together.
- It allows easy comparison of elements.
- It forms the foundation of chemistry.


Periodic Table of Elements

WHAT IS AN ELEMENT?

- An element is a pure substance made up of only one type of atom.
- Each element has unique atomic structure and properties.
- Elements cannot be broken down by chemical methods.
- Examples include hydrogen, oxygen, iron, and carbon.
- All matter is formed from elements.

NEED FOR CLASSIFICATION

- As more elements were discovered, studying them individually became difficult.
- Classification helps group similar elements.
- It reduces confusion and simplifies learning.
- It helps predict properties of unknown elements.
- Systematic study becomes possible.

EARLY ATTEMPTS OF CLASSIFICATION

- Scientists used physical and chemical properties for classification.
- Early methods were simple but incomplete.
- They helped identify similarities among elements.
- They laid the foundation for future work.
- They introduced the idea of periodicity.

DOBEREINER'S TRIADS

- Dobereiner grouped elements into sets of three.
- These groups were called triads.
- The middle element had average atomic mass.
- Elements showed similar properties.
- Example: Lithium, Sodium, Potassium.

LIMITATIONS OF TRIADS

- Only few elements could be grouped.
- Many elements did not fit.
- System was incomplete.
- Could not classify all known elements.
- A better method was required.

NEWLANDS' LAW OF OCTAVES

- Elements arranged by increasing atomic mass.
- Every eighth element showed similar properties.
- Compared to musical octaves.
- Worked well for lighter elements.
- Important historical step.

LIMITATIONS OF LAW OF OCTAVES

- Worked only up to calcium.
- Failed for heavier elements.
- No space for new elements.
- Some dissimilar elements were grouped.
- Hence not accepted.

MENDELEEV'S PERIODIC TABLE

- Elements arranged by atomic mass.
- Similar elements placed together.
- Left gaps for undiscovered elements.
- Predicted properties of new elements.
- Major breakthrough in chemistry.

MERITS OF MENDELEEV'S TABLE

- Predicted new elements accurately.
- Corrected atomic masses.
- Provided systematic arrangement.
- Encouraged scientific discovery.
- Used widely for many years.

LIMITATIONS OF MENDELEEV'S TABLE

- Position of hydrogen unclear.
- Isotopes not explained.
- Some elements reversed.
- Atomic mass was not perfect basis.
- Needed modification.

MODERN PERIODIC TABLE

- Based on atomic number.
- Proposed by Henry Moseley.
- More accurate than atomic mass.
- Solved previous problems.
- Used today.

MODERN PERIODIC LAW

- Properties depend on atomic number.
- Periodicity appears regularly.
- Based on electronic configuration.
- Explains trends clearly.
- Foundation of modern chemistry.

STRUCTURE OF PERIODIC TABLE

- Consists of periods and groups.
- Periods are horizontal rows.
- Groups are vertical columns.
- There are 7 periods.
- There are 18 groups.

PERIODS

- Periods indicate number of shells.
- Properties change across a period.
- Atomic size decreases left to right.
- Each period has fixed length.
- Gradual variation observed.

GROUPS

- Groups show similar chemical properties.
- Same valence electrons present.
- Similar reactivity.
- Vertical arrangement.
- Important for predicting behavior.

VALENCE ELECTRONS

- Electrons in outermost shell.
- Decide chemical properties.
- Same group has same valence electrons.
- Determine bonding.
- Control reactivity.

METALS

- Located on left side.
- Good conductors.
- Malleable and ductile.
- Mostly solids.
- Used in daily life.

NON-METALS

- Located on right side.
- Poor conductors.
- May be solid, liquid or gas.
- Form acidic oxides.
- Essential for life.

METALLOIDS

- Have properties of metals and non-metals.
- Located between both.
- Used as semiconductors.
- Silicon is common example.
- Important in electronics.

ALKALI METALS

- Group 1 elements.
- Highly reactive.
- Soft metals.
- React with water.
- Stored in kerosene.

ALKALINE EARTH METALS

- Group 2 elements.
- Less reactive than alkali metals.
- Harder metals.
- Found as compounds.
- Examples: Calcium, Magnesium.

HALOGENS

- Group 17 elements.
- Highly reactive non-metals.
- Form salts.
- Used as disinfectants.
- Examples: Chlorine, Iodine.

NOBLE GASES

- Group 18 elements.
- Chemically inert.
- Full valence shell.
- Exist as gases.
- Used in balloons and lights.

TRANSITION ELEMENTS

- Located in middle.
- Show variable valency.
- Form colored compounds.
- Good conductors.
- Used in industries.

ATOMIC NUMBER

- Number of protons.
- Unique for each element.
- Determines identity.
- Basis of modern table.
- Represented by Z.

ATOMIC MASS

- Sum of protons and neutrons.
- Measured in amu.
- Average value.
- Different isotopes exist.
- Important physical property.

ISOTOPES

- Same atomic number.
- Different mass number.
- Same chemical properties.
- Different physical properties.
- Used in medicine.

PERIODICITY

- Repetition of properties.
- Occurs at regular intervals.
- Based on electron configuration.
- Explains trends.
- Key feature.

ATOMIC SIZE TREND

- Decreases across period.
- Increases down group.
- Due to nuclear charge.
- Affects reactivity.
- Important trend.

METALLIC CHARACTER

- Ability to lose electrons.
- Decreases across period.
- Increases down group.
- Forms positive ions.
- Related to size.

NON-METALLIC CHARACTER

- Ability to gain electrons.
- Increases across period.
- Decreases down group.
- Forms negative ions.
- Linked to electronegativity.

ELECTRONEGATIVITY

- Ability to attract electrons.
- Increases across period.
- Decreases down group.
- Fluorine highest.
- Important in bonding.

VALENCY

- Combining capacity.
- Depends on valence electrons.
- Same group same valency.
- Determines formula.
- Basic concept.

USES OF PERIODIC TABLE

- Predicts properties.
- Helps understand reactions.
- Used in research.
- Easy comparison.
- Learning tool.

IMPORTANCE IN DAILY LIFE

- Used in medicine.
- Used in electronics.
- Used in construction.
- Supports technology.
- Guides material use.

IMPORTANCE IN EDUCATION

- Builds strong foundation.
- Helps exams.
- Improves logical thinking.
- Essential for higher studies.
- Core chemistry topic.

OVERALL SUMMARY

- Organizes elements.
- Based on atomic number.
- Shows trends.
- Helps prediction.
- Essential in chemistry.

CONCLUSION

- Periodic table is backbone of chemistry.
- Makes learning systematic.
- Helps understand matter.
- Encourages scientific thinking.
- Chemistry becomes easier.

THANK YOU

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