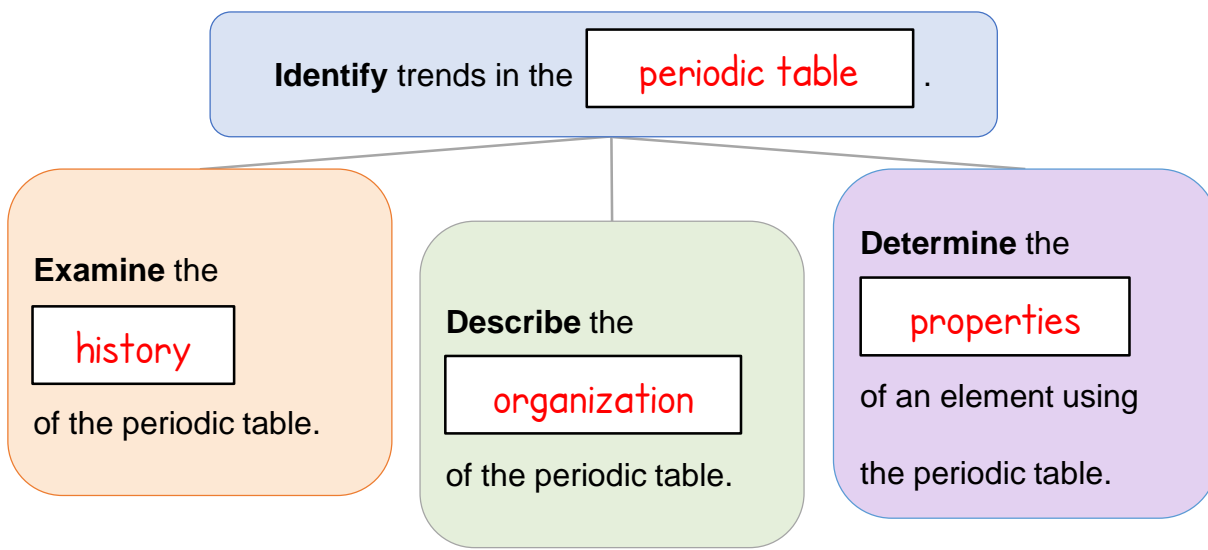




Lesson Question

How is the periodic table arranged?

Lesson Goals



Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

group	a vertical column of elements in the periodic table
periodic table	a table that organizes the chemical elements in order of increasing atomic number and that groups elements based on similarities in chemical properties and electron configurations
period	a horizontal row of elements in the periodic table
atomic mass	the average mass of all isotopes of an element



Elements

- Made up of only one type of **atom**
- Combine to form **compounds**
- Make up **all** matter in the universe
- Identified by:
 - Chemical **symbol**
 - **Atomic** number

Slide

2

The Periodic Table

The **periodic table** is an organized display of the elements.

History of the Periodic Table

Several chemists made contributions to the way elements are organized. These arrangements eventually led to the modern periodic table.

Year: 1789	Year: 1829	Year: 1865
Antoine Lavoisier wrote <i>Elementary Treatise of Chemistry</i> , which classified elements as acid- forming, gas-like, metallic, or earthy.	Johann Wolfgang Döbereiner arranged elements into groups of three based on similar properties.	John Newlands arranged elements according to their atomic mass .

Slide

2

Dmitri Mendeleev (1843–1907)

PROFILE

Produced the first **orderly** arrangement of known elements

Predicted existence of **new** elements based on his initial arrangement

The First Periodic Table

Dmitri Mendeleev

- Ordered elements by increasing atomic **mass**.
- Observed repetition of **chemical properties**.
- Left blank spaces for **unknown** elements.
- Used **patterns** to predict undiscovered elements.

4

Henry Moseley (1887–1915)

PROFILE

- Arranged elements in order of increasing atomic **number**
- Accounted for variations resulting from **isotopes**
- **Revised** the periodic table to the modern version

Slide

7

Trends in the Periodic Table

- As you move from left to right, the atomic number of each element increases by **one**.
- As atomic number increases, so does atomic mass

Classification of Elements on the Periodic Table

The **elements** of the periodic table fall into three general categories:

- **metals**
 - usually **shiny**
 - can be bent into a variety of shapes
 - good **conductors** of heat and electricity
 - most **solid**
 - examples: iron, tin, and gold
- **nonmetals**
 - many are **gases**
 - often dull and break easily when bent
 - do **not** conduct electricity or heat well
 - examples: carbon and sulfur

Instruction | Periodic Table

Slide

7

- **metalloids**
 - look like a **staircase** on the periodic table
 - have characteristics of **both** metals and nonmetals
 - examples: boron and polonium

9

Organization of the Periodic Table: Periods

A horizontal row of elements in the periodic table is called a **period**.

Periods follow particular **trends**.

- The atomic number **increases** from left to right.
- The atomic **mass** increases from left to right.

Organization of the Periodic Table: Groups

A vertical column of elements in the periodic table is called a **group**.

- Group **number** (e.g., Group 1)
- Group **name** (e.g., Group 1A)

Elements within a group have similar **chemical** properties.

- Same number of **valence** electrons

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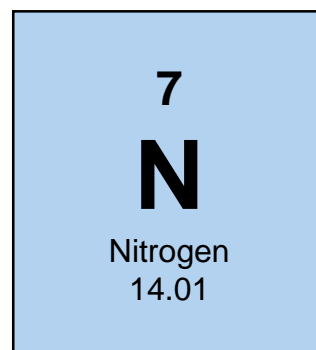
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Elements of the Periodic Table: Information about Each Element

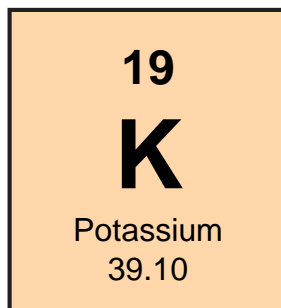
There is one square per element on the periodic table. Each square contains important information about the element.

Example: Nitrogen

- Atomic number:
- Chemical symbol:
- Name of element:
- Atomic mass:

**Elements of the Periodic Table: Example**

You can use the information in an element's square to determine the number of protons, electrons, and neutrons in an atom.



Example: Potassium

- Number of protons (same as atomic number):
- Number of electrons (equal to the number of protons):
- Number of neutrons (subtract number of protons from atomic mass):
 $39 - 19 =$

**Lesson
Question**

How is the periodic table arranged?

**Answer**

(Sample answer) The periodic table is arranged in periods and groups. Periods are horizontal rows of elements that follow particular patterns. For example, atomic number and atomic mass increase from left to right. Groups are vertical columns of elements that have similar chemical properties. Elements in the same group have the same number of valence electrons. The elements of the periodic table fall into three general categories: 1) metals, 2) nonmetals, and 3) metalloids.

Slide

2

Review: Key Concepts**SCIENTISTS WHO CREATED THE PERIODIC TABLE**

Dmitri Mendeleev

- Created first **orderly** arrangement of known elements
- Ordered elements by atomic **mass**

Henry Moseley

- Arranged elements by atomic **number**
- Revised the periodic table to the **modern** version

Slide

2

Review: Key Concepts

ARRANGEMENT OF THE PERIODIC TABLE

Periods – horizontal **rows** that follow particular patterns

- Atomic **number** increases from left to right
- Atomic **mass** increases from left to right

Groups – vertical **columns** that have similar chemical properties

- **Same** number of valence electrons

Three categories of elements:

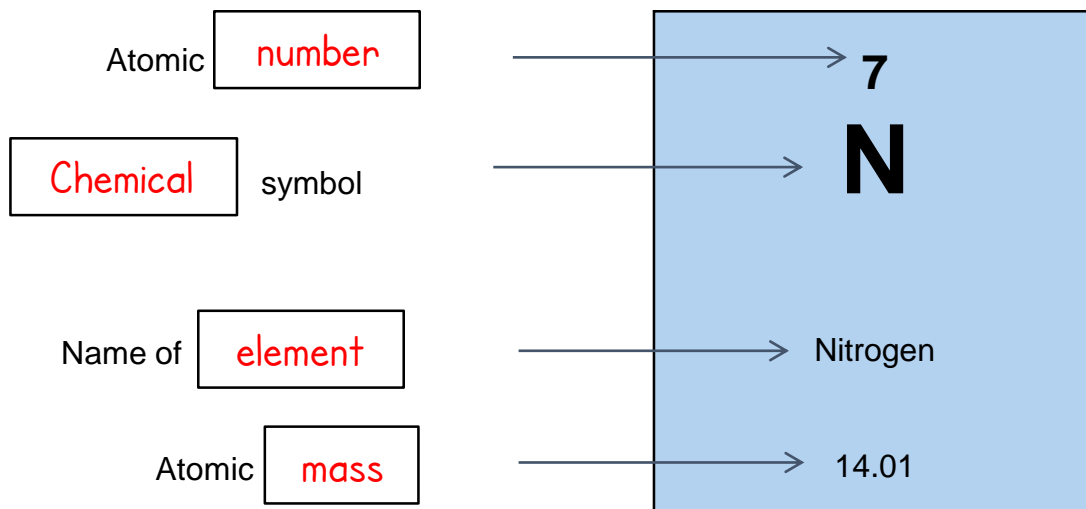
- Metals
- **Nonmetals**
- Metalloids

Slide

2

Review: Key Concepts

INFORMATION ABOUT EACH ELEMENT





Summary

Periodic Table

Use this space to write any questions or thoughts about this lesson.