GLOSSARY:

Alkali metals: The group of soft metallic elements that form alkali solutions when they combine with water. They include lithium, sodium, potassium, rubidium, cesium, and francium. They have one electron in their outer shell, and therefore react easily with other elements and are found in nature only in compounds.

Atomic number: The number of protons in the nucleus of an atom. In electrically neutral atoms, this number is also equal to the number of electrons orbiting about the atom's nucleus. The atomic number of an element determines its position in the Periodic Table.

Electrolyte: A conducting medium in which the flow of current is accompanied by the movement of matter in the form of ions.

Hydrogen: A colorless, odorless, flammable gas that combines chemically with oxygen to form water: the lightest of the known elements. (Atomic no. 1, Symbol: H)

Macro-mineral: Any mineral required in the diet in relatively large amounts, especially calcium, iron, magnesium, phosphorus, potassium, and zinc.

Magnesium: A lightweight, silvery-white metallic element of the alkaline-earth group that burns with an intense white flame. It is an essential component of chlorophyll and is often used in lightweight alloys, flash photography, and fireworks. (Atomic no. 12, symbol: Mg)

Noble gases: Any of the six gases - helium, neon, argon, krypton, xenon, and radon. The outermost electron shell of atoms of these gases is full, so they do not react chemically with other substances except under distinct special conditions.

Periodic Table: A table that organizes the elements by arranging them in order of increasing atomic number. Elements with similar properties are arranged in the same column (called a group), and elements with the same number of electron shells are arranged in the same row (called a period).

Potassium: A soft, highly reactive, silvery-white metallic element of the alkali group occurring in nature only in compounds. It is necessary for the growth of plants and is used especially in fertilizers. (Atomic no. 19, Symbol: K)

Primordial: Pertaining to or existing at or from the very beginning.

Sodium: A soft, lightweight, silvery-white metallic element of the alkali group that reacts explosively with water. It is the most abundant alkali metal on Earth, occurring especially in common salt. Sodium is very malleable, and its compounds have many uses in industry. (Atomic no. 11, Symbol: Na)

Ununoctium: A super heavy, synthetic, radioactive element with a short half-life. (Atomic no. 118, Symbol: Uuo)

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Show Me Science Advanced

Chemistry Periodic Table of Elements

Potassium (K) and Magnesium (Mg)

K4610DVD

***Advanced* Teachers Guide**

SYNOPSIS:

The organizational structure of the periodic table of elements helps us understand their properties and how they relate to the world around us. This issue describes how the vertical columns and horizontal rows are determined while highlighting the groups of elements.

Magnesium (Mg) and potassium (K) are the focus of this issue. They are two elements important to many functions of the human body. Potassium is one of the main blood minerals, or electrolytes, that play a number of important roles especially in nerve cell function. Magnesium is a vital regulator of basic health. It is necessary for the energy-production process that occurs inside the mitochondria within cells. Magnesium is a macro-mineral which is needed by the body in large amounts.

CURRICULUM UNITS:

- Chemistry
- Engineering
- Environmental science
- History and nature of science
- Physics

CAREER OPPORTUNITIES:

- Athletic trainer
- Agriculture
- Chemist
- Engineer
- Nutritionist
- Physicist

PROGRAM OVERVIEW:

The Periodic Table is organized with elements specified in rows, or periods, according to increasing atomic number. Metals are on the left of the periodic table, while nonmetals are located on the right. Some in the middle are called metalloids because they have characteristics of both metals and nonmetals.

The periodic table is purposely arranged into vertical classifications called groups. Columns of elements help define element groups. Some of the notable groups of elements include the noble gases (column 18), the halogens (column 17), the alkali metals (column 1) and the alkaline earth metals (column 2).

The transition metals are located in the center of the periodic table. They include many of the common metals, such as copper, iron, silver and gold. The two rows below the main body of the table are called the lanthanide and actinide series. They include the very heavy metallic elements, such as uranium and plutonium.

This issue goes in depth regarding the elements potassium (K) and magnesium (Mg) and their roles in the health of the human body. Potassium helps to control the proper balance of fluids in cells, helps with the contraction of muscles, and is involved in the transmission of chemical messages between nerve cells. Potassium aids in digestion of food, and in the proper function of the eyes. Magnesium is needed for more than 300 biochemical reactions in the body. It helps maintain normal muscle and nerve function, keeps heart rhythm steady, supports a healthy immune system, and keeps bones strong.

ISSUES & CRITICAL THINKING:

1. Have students research the history of the periodic table. Discuss how the table became organized, and how gaps were eventually filled.

2. Ask students to research the alkali metals and explain why elements such as potassium share this group with the other elements in this group. Discover the health effects of the other alkali metals.

3. Ask students to list foods that are beneficial to potassium or magnesium intake. Discuss the implications of too much and/or too little of each. Relate this to proper functioning of the heart, nerve cells and muscle cells.

4. Research what percentage of the human body is made of all of the various elements. Include “trace amounts” of many elements.

5. When vegetables are grown in soil that is low in iodine, a condition results that affects the endocrine (hormone) system. Research and describe this. What is done by the food industry to prevent this condition?