Name: Key Class: _____

Periodic Table Reading Guide

***Note: You may silently read these pages yourself, or put in your earbuds and follow along with the reading with the link sent to you in Classroom.**

Pages 102-104

The Periodic Table

The periodic table is like a library of information about chemical elements.

You can learn some properties of an element from its position on the periodic table.

Elements are organized in periods (rows) and groups (columns.)

The periodic table lists elements in order of atomic number. It increases from left to right.

Elements in each group have similar chemical properties and react with other elements in similar ways.

Metals, Nonmetals, and Metalloids

The three main regions of elements on the periodic table are shown in **Figure 1**. Excluding hydrogen, elements on the left side of the table are metals. Nonmetals are to the right side of the table. Metalloids form the narrow starstep regions between metals and nonmetals. ***(Recall the definition of these three types of elements.)***

What is a Metal?

Most of the elements on the periodic table are metals. Of all the known elements more than 3/4 are metals.

To be a metal, an element must have certain properties.

Physical Properties of Metals

Recall that physical properties are *characteristics used to describe or identify something* without changing *its makeup.* All metals share certain properties.

A **metal** is *an element that is generally shiny and is easily pulled into wires (DUCTILITY) or hammered into thin sheets (MALLEABILITY).* A metal is a good conductor of electricity and thermal energy. (heat)

Luster describes the ability of a metal to reflect light.

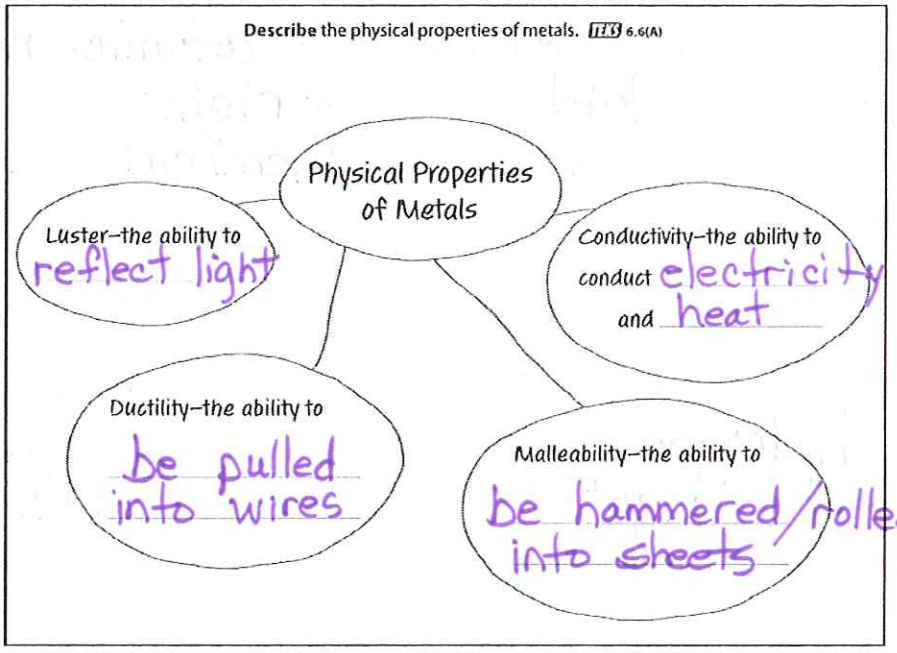
Ductility is *the ability of a substance to be pulled into thin wires.* A piece of gold with a mass of a paper clip can be pulled into a wire that is more than 3 km long.

Malleability is *the ability of a substance to be hammered or rolled into sheets.* A pile of a million thin sheets (of gold) would only be as high as a coffee mug. (That's how malleable gold is!)

The density, strength, boiling point and melting point of a metal are greater than those of other elements.

Except for mercury, all metals are solid at room temperature.

Fill in the Graphic Organizer with the information from the reading.



Chemical Properties of Metals

Recall that a chemical property is *the ability or inability of a substance to change into one or more new substances.* The chemical properties of metals can differ greatly.

However, metals in the same groups (column) have similar chemical properties.

Pages 114-115

The Elements of Life

96 % of the mass of your body comes from 4 elements.

Those four elements are:

oxygen (O) carbon (C) hydrogen (H) nitrogen (N)

Nonmetals are *elements that have no* metallic *properties.*

Two other nonmetals that makeup the body are phosphorus (P) and sulfur (S).

These six elements form the compound in proteins, fats, nucleic acids (DNA), and other large molecule in your body and all living things.

How are nonmetals different from metals?
(Recall the properties of metals from above.)

The properties of nonmetals are different from those of metals. Many nonmetals are gases at room temperature.

Those that are solid at room temperature have a dull surface, which means they have no **luster**.

Because nonmetals are poor conductors of electricity and thermal energy, they are good insulators.

Figure 2: Solid metals, like copper, are malleable, solid nonmetals, like sulfur, are brittle.

Page 117-119

Hydrogen

Of all the elements, hydrogen has the smallest atomic mass.

It is the most common element in the universe.

Hydrogen is most often classified as a nonmetal because it has many properties like those of nonmetals.

Hydrogen is a gas at room temperature.

However, in its liquid form, hydrogen conducts electricity like a metal does and in some reactions acts like a metal does.

Under conditions on Earth, hydrogen usually behaves like a nonmetal.

Metalloids

Between the metals and nonmetals are elements known as metalloids.

A **metalloid** is *an element that has physical and chemical properties of both metals and nonmetals.*

List the 8 elements that are metalloids: boron (B) silicon (Si) germanium (Ge) arsenic (As) antimony (Sb) tellurium (Te) polonium (Po) astatine (At)

Silicon is the most abundant(plentiful) metalloid in the universe.

Semiconductors

Recall that metals are good conductors of thermal energy and electricity and nonmetals are poor conductors.

A property of metalloids is the ability to act as a semiconductor. This property is useful in electronic devices such as computers, televisions, and solar cells.

Properties and Uses of Metalloids

Silicon and germanium are used in semiconductors. Boron is used in water softeners and laundry products (BORAX!). Boron also glows bright green in fireworks. Silicon is one of the most abundant (plentiful) elements on Earth. Sand, clay, and many rocks and minerals are made of silicon compounds.

Classify

4. Show when metalloids act as metals and nonmetals.

Metalloids

Like Metals	Like Nonmetals
conduct electricity at high temperatures "conductors"	stop electricity from flowing at low temperatures "insulators"

Complete the chart with information from the reading.

Metals, Nonmetals, and Metalloids

An element's position on the periodic table tells you a lot about the element.

By knowing that sulfur is a nonmetal, you know that it breaks easily and does not conduct electricity. You would not try to use oxygen as a semiconductor. You know that transition elements are strong, malleable, and do not react easily with water, so they would make good building materials. Understanding the properties of elements can help you decide which element to use in a given situation.

Follow up: Using the information from these notes and pages RH2 and RH3 in the back of the textbook (periodic table,) answer the following questions.

Classify each element as metal, nonmetal, or metalloid: (numbers in parentheses are atomic numbers)

metalloid boron (5) nonmetal carbon(6) metalloid silicon (14)

metal potassium (19) metal aluminum(13) nonmetal neon(10)

Based on the placement of the element on the periodic table, list four physical properties of Iodine (53)

dull brittle solid insulator

Log in to Brainpop using GSuite for education and watch the assigned ***video, quiz, and challenge. NOTE:*** Search"Periodic Table" if your assignment tab is not working. :/