Name _____ Date _____

Setting the Table

The periodic table is a chart of the chemical elements arranged to show patterns of chemical or physical properties. The elements are arranged on the table based on properties they have in common. Match each term to its definition. You can use the periodic table on page 20 as a reference.

alkali metals	transition	metals
atomic number	alkaline earth metals	naturally
families	noble	periods
rare earth metals		

1. transition — Elements in the middle of the periodic table are known as these kinds of metals.
2. noble — These gases are considered inactive. They do not react with other elements.
3. metals — Most of the elements are considered to be these.
4. alkali metals — These refer to Group I metals.
5. periods — Horizontal rows are called this.
6. atomic number — The elements are arranged by this.
7. families — Vertical columns are called groups or this.
8. alkaline earth metals — These refer to Group II metals.
9. rare earth metals — For convenience, these are placed at the bottom so the periodic table does not become too wide to be represented in chart form.
10. naturally — There are 92 elements, from hydrogen to uranium that occur in this manner.

Name _____ Date _____

Real-World Applications

Many of the elements on the periodic table have everyday uses. Match each term in the word box to its description.

tungsten	helium	platinum	nickel	chlorine	chromium
sulfur	neon	lead	tin		

1. tungsten — This metal glows when electricity is passed through it. It is used as the filament wire in electric light bulbs.
2. platinum — This shiny metal is used in jewelry and in catalytic converters for cars.
3. sulfur — This yellow nonmetal with a distinct odor is used in the manufacture of gunpowder, the vulcanization of rubber, and in insecticides and medicinal drugs.
4. nickel — This is a strong gray metal used in the manufacture of some types of batteries.
5. neon — This inert gas glows when electricity passes through it, making it useful for displays and signs.
6. chromium — This shiny, mirrorlike metal is mixed with iron to make stainless steel.
7. chlorine — In gas form, this element is poisonous. Small amounts in liquid form can purify water by killing bacteria and other organisms.
8. helium — This gas is lighter than air so it makes balloons rise or float. It is also used as a coolant and in rocket fuel as a pressurizing gas.
9. lead — This very dense malleable metal is used in plumbing solder, bullets, and shields against radiation.
10. tin —

Name _____ Class _____ Date _____

Directed Reading A *continued*

GROUP 14: CARBON GROUP

16. The metalloids _____ and _____, both in Group 14, are used to make computer chips.
17. What are three compounds of carbon that are necessary for living things on Earth?

_____

18. The hardest material known is _____.
19. What are some of the uses of diamond?

_____

_____

20. What form of carbon is used as a pigment?

_____

GROUP 15: NITROGEN GROUP

21. Nitrogen is a _____ at room temperature.
22. Each element in the Nitrogen Group has _____ electrons in the outer level.
23. Nitrogen from the air can react with what element to make ammonia for fertilizer?

_____

GROUP 16: OXYGEN GROUP

24. How is oxygen different from the other four elements in Group 16?

_____

_____

25. The element _____ can be found as a yellow solid in nature and is used to make sulfuric acid.
26. Why is oxygen important?

_____

_____

_____

Name _____ Class _____ Date _____

Directed Reading A *continued*

GROUP 17: HALOGENS

27. The atoms of _____ need to gain only one electron to have a complete outer level.
28. What important use do the halogens iodine and chlorine have in common?

_____

_____

29. Halogens combine with most metals to form _____, such as _____.
30. How does chlorinating water help protect people?

_____

_____

_____

GROUP 18: NOBLE GASES

_____31. Which of the following statements about noble gases is NOT true?
   a. They are colorless and odorless at room temperature.
   b. They have a complete set of electrons in their outer energy level.
   c. They normally react with other elements.
   d. All of them are found in Earth's atmosphere in small amounts.

32. The atoms of _____ have a full set of electrons in their outer level.
33. The low _____ of helium makes blimps and weather balloons float.

HYDROGEN

_____34. Which of the following statements about hydrogen is NOT true?
   a. It is useful as rocket fuel.
   b. It is the most abundant element in the universe.
   c. Its physical properties are closer to those of nonmetals than to those of metals.
   d. It has two electrons in its outer energy level.

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A CH 5,2 (p 114-121)

Section: Grouping the Elements

_____ 1. What gives elements in a family or group similar properties?
   a. the same atomic mass
   b. the same number of protons in their nuclei
   c. the same number of electrons in their outer energy level
   d. the same number of total electrons

GROUP 1: ALKALI METALS

_____ 2. Which of the following is NOT true of alkali metals?
   a. They can be cut with a knife.
   b. They are usually stored in water.
   c. They are the most reactive of all the metals.
   d. They can easily give away their outer electron.

3. Metals that share both physical and chemical properties are called _____.

GROUP 2: ALKALINE-EARTH METALS

4. Atoms of _____ have two outer-level electrons.

5. What are two products made from calcium compounds?

_____

_____

_____

6. In what way does calcium help you?

_____

_____

_____

7. Name three alkaline-earth metals besides calcium.

_____

_____

_____

Name _____ Class _____ Date _____

Directed Reading A *continued*

GROUPS 3–12: TRANSITION METALS

_____ 8. Which of the following characteristics does NOT describe transition metals?
   a. They are good conductors of thermal energy.
   b. They are more reactive than alkali and alkaline-earth metals.
   c. They have one or two electrons in the outer energy level.
   d. They are denser than elements in Groups 1 and 2.

9. Metals that are less reactive than alkali metals and alkaline-earth metals are called _____.

10. How is mercury different from other transition metals?

_____

_____

11. Two rows of transition metals are placed at the bottom of the periodic table to save space. Elements in the first row are called _____. Elements in the second row are called _____.

12. Which lanthanide forms a compound that enables you to see red on a computer screen?

_____

13. Which actinide is used in some smoke detectors?

_____

GROUP 13: BORON GROUP

14. Why did Emperor Napoleon III of France use aluminum dinnerware?

_____

_____

_____

15. What are some of the uses of aluminum?

_____

_____

_____

40A

13
Al
Aluminum
27.1

← atomic number
← element symbol
← element name
← mass number

P 13
E 13
N 14

27 mass
13 protons
14 neutrons

inside left

Atomic Number

inside right

What does atomic number mean — use proton, nucleus and electron in good sentences

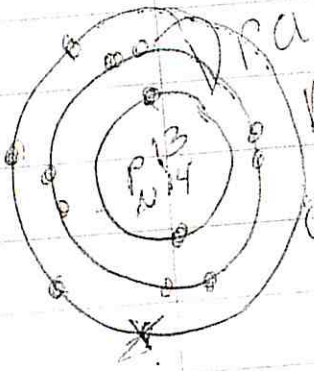
(5 sentences)

5 Facts about his element

- solid, liquid, gas
- m, nm, mD
- name physical properties
- name chemical properties
- where is it found?
- when was discovered?
- who discovered it?

Draw my atom

Level	# held
1	2
2	8
3	18
4	32
5	50



Element name

MASS number

Explain how your element is used

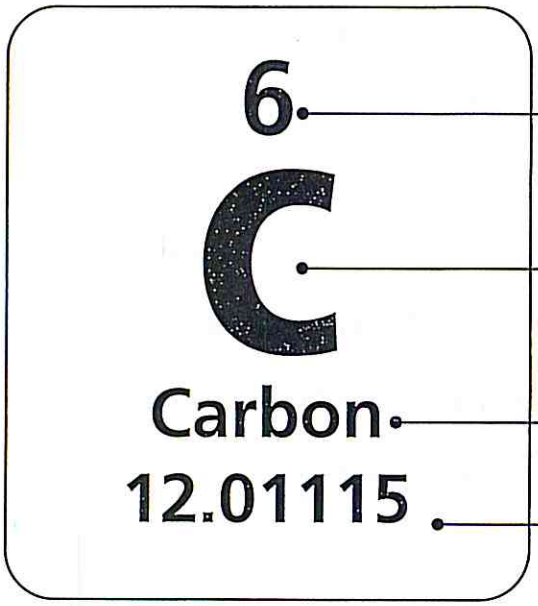
What is mass number mea
Use proton + neutron, nu

Name _____ Date _____

Decoding the Elements

Each element is represented in a box on the periodic table. Each box gives information about the element. Use the terms in the word box to label the diagram. Then match each term to its definition.

element name	element symbol	atomic number	atomic mass



1. _____
2. _____
3. _____
4. _____

5. _____ This represents the element. While the English name sometimes matches, the Latin name was sometimes used to create this.

6. _____ This is the most commonly used word for the element.

7. _____ Designated by the number of protons in the nucleus, this determines horizontal placement on the table.

8. _____ This is determined by the weight of an atom.

Name _____ Date _____

Properties of Metals and Nonmetals

The elements on the periodic table are grouped by metals and nonmetals. Each group has distinct physical and chemical properties. Classify the phrases in the word box to complete the chart.

malleable	lustrous	thallium
gaseous at room temperature	ductile	brittle
forms negative ions	conductor	nonconductor
only forms positive ions	helium	titanium
receives electrons in chemical reactions	covalent bonding	metallic bonding
phosphorus	zinc	boron
selenium	nickel	gold
gives away electrons in chemical reactions	argon	

Properties of Metal Elements	Properties of Nonmetal Elements
malleable lustrous ductile conductor metallic bonding gives away electrons in chemical reaction	covalent bonding forms negative ions brittle nonconductor gaseous at room temp receives electrons in chemical reactions
Examples	**Examples**
zinc nickel gold titanium Thallium	selenium boron argon helium phosphorus

Name _____ Date _____

Elements and Their Symbols

Use the periodic table on page 20 to write the common name for each symbol.

1. Cu COPPER
2. Ca CALCIUM
3. Pb LEAD
4. I IODINE
5. K POTASSIUM
6. C CARBON
7. Sn TIN
8. Ni NICKEL
9. Al ALUMINUM
10. Au GOLD

Write the symbol for each element.

11. sulfur S
12. flourine F
13. xenon Xe
14. tungsten W
15. chromium Cr
16. silicon Si
17. mercury Hg
18. sodium Na
19. platinum Pf
20. arsenic As

Name _____ Date _____

Elemental Definitions Part I

Match each element in the word box to its description.

helium	bismuth	phosphorus
carbon	arsenic	selenium
bromine	chlorine	oxygen
fluorine		

1. Carbon — This element is found in all organic compounds and in all living organisms.
2. Selenium — This nonmetallic element's photoconductive properties make it useful as photocells and solar cells and as a semiconductor.
3. arsenic — This highly toxic element is used in medicines and rat poison.
4. phosphorus — This highly reactive, nonmetallic element occurs naturally in phosphates and is used in safety matches, pyrotechnics, and fertilizers.
5. flourine — This highly corrosive gaseous halogen element is the most reactive of all elements.
6. oxygen — This is a nonmetallic element that combines with most elements and is essential for plants and animals.
7. helium — This is a colorless, odorless, inert gaseous element.
8. bismuth — This white, crystalline, brittle metallic element is used in alloys.
9. bromine — This heavy, corrosive, reddish-brown nonmetallic element is used in the production of anti-knock gasolines, dyes, and photographic chemicals.
10. chlorine — This highly irritating gaseous halogen can be used as a disinfectant or bleaching agent.

Name _____ Date _____

Elemental Definitions Part II

Match each element in the word box to its description.

sulfur	nitrogen	neon
cobalt	polonium	zirconium
calcium	lithium	hydrogen
boron		

1. nitrogen — This is the most abundant element in air.
2. sulfer — This is a pale yellow element that occurs widely in nature in several free and combined allotropic forms.
3. hydrogen — This is a colorless, highly flammable gaseous element and it is the most abundant element in the universe.
4. cobalt — This hard, brittle metallic element resembles nickel and iron in appearance.
5. calcium — This is a silvery, moderately hard metallic element that makes up about 3 percent of the earth's crust and is a basic part of most plants and animals.
6. neon — A rare, inert gaseous element, it is colorless but glows reddish-orange when electricity is passed through it.
7. boron — This is a soft brown amorphous or crystalline nonmetallic element. It is important in the field of atomic energy.
8. lithium — A soft, silvery, highly reactive metallic element, it is used as a heat transfer medium.
9. polonium — This is a naturally radioactive metallic element.
10. zirconium — This is a lustrous, grayish-white, strong, ductile metallic element.

Name _____ Class _____ Date _____

Directed Reading A *continued*

13. Most elements are _____, which can be found to the left of the zigzag line on the periodic table.

14. Most metals are _____, which means that they can be drawn into thin wires.

15. Most metals are _____ at room temperature.

16. Most metals are malleable. What does this mean?

_____

_____

17. What metal is flattened into sheets that are made into cans and foil?

_____

18. What elements are found to the right of the zigzag line on the periodic table?

_____

19. Semiconductors, also called _____, are the elements that border the zigzag line on the periodic table.

DECODING THE PERIODIC TABLE

_____20. Which elements often share properties?
- a. those in a period
- b. those in a group
- c. those with the same color
- d. those in a horizontal row

_____21. The physical and chemical properties of the elements change
- a. within a group.
- b. within a family.
- c. across each period.
- d. across each group.

22. For most elements, the _____ has one or two letters, with the first letter always capitalized.

23. Horizontal rows of elements on the periodic table are called _____.

24. Vertical columns of elements on the periodic table are called _____, or _____.

25. Some elements, such as _____, are named after scientists. Others, such as _____, are named after places.

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A CHS.1 (p106-113)

Section: Arranging the Elements

1. Why do you think scientists might have been frustrated by the organization of the elements before 1869?

_____

_____

_____

_____

_____

_____

DISCOVERING A PATTERN

_____ 2. Which arrangement of elements did Mendeleev find produced a repeating pattern of properties?
   a. by increasing density
   b. by increasing melting point
   c. by increasing shine
   d. by increasing atomic mass

3. When something occurs or repeats at regular intervals, it is called _____.

4. Mendeleev's table, which shows elements' properties following a pattern that repeats every seven elements, is called the _____.

5. How was it possible that Mendeleev was able to predict the properties of elements that no one knew about?

_____

_____

_____

_____

_____

_____

Name _____ Class _____ Date _____

Directed Reading A *continued*

CHANGING THE ARRANGEMENT

_____ 6. How did Moseley solve the problem of the elements that did not fit the pattern according to their properties?
   a. He rearranged the elements by atomic mass.
   b. He discovered protons, neutrons, and electrons.
   c. He disproved the periodic law.
   d. He determined the elements' atomic number and then arranged them by atomic number.

7. When the repeating chemical and physical properties of elements change periodically with the elements' atomic numbers, it is called the _____.

PERIODIC TABLE OF THE ELEMENTS

_____ 8. Which information is NOT included in each square of the periodic table in your text?
   a. atomic number
   b. chemical symbol
   c. melting point
   d. atomic mass

9. How can you tell on the periodic table that carbon is a solid at room temperature?

_____

_____

_____

THE PERIODIC TABLE AND CLASSES OF ELEMENTS

10. Elements are classified as metals, nonmetals, or metalloids according to their _____.

11. The number of _____ in the outer energy level of an atom helps determine which category an element belongs in.

12. How can the zigzag line on the periodic table help you?

_____

_____

_____