Name: _____

Period: Select _____

Physical Science

Coon

Week 5 & 6

April 27th- May 1st

Ch 16: The Properties of Atoms and the Periodic Table

The properties of an element are determined by the structure of its atoms.

Essential Questions

What are the names and symbols of common elements?
What is the structure of the atom?
What is the electron cloud model of the atom?
How do you determine the atomic mass and mass number of an atom?
What are isotopes?
How do you determine the average atomic mass of an element?

Apriil 27th Begin Ch 16 Sect. 1 Reading Essentials	April 28th Finish Same	April 29th Begin Ch 16 Sect. 1 Science Notebook	April 30th Finish Same	May 1st Complete Ch 16 Sect. 1 Quiz
May 4th Begin Ch 16 Sect. 2 Reading Essentials	May 5th Finish Same	May 6th Begin Ch 16 Sect. 2 Science Notebook	May 7th Finish Same	May 8th Complete Ch 16 Sect. 2 Quiz

chapter 16

Properties of Atoms and the Periodic Table

Name: _____

section 1 Structure of the Atom

Period: Select

What You'll Learn

- the names and symbols of common elements
- what subatomic particles and quarks are
- how to describe the atom
- how electrons are arranged in an atom

Before You Read

You use symbols to make it easier to write certain things, such as $25.08 instead of twenty-five dollars and eight cents. On the following lines, write some symbols you may use to make writing easier.

_____

_____

Study Coach

Create a Quiz As you read this section, write a quiz question for each paragraph. After you finish reading the section, answer your quiz questions.

FOLDABLES™

A Organize Information

Make the following Foldable to help organize information about scientific shorthand, atomic components, and quarks.

Scientific Shorthand	Atomic Components	Quarks

Read to Learn

Scientific Shorthand

Do you have a nickname? Do you use abbreviations for long words or the names of states? Scientists also do this. In fact, scientists have developed their own shorthand, a way to shorten long, complicated names.

C, Al, Ne, and Ag are all chemical symbols for different elements. A chemical symbol is shorthand for the name of an element. Chemical symbols make writing names of elements easier. Chemical symbols are either one capital letter or a capital letter plus one or two small letters. The table shows the chemical symbols for some elements. For some elements, the symbol is the first letter of the element's name. For example, C is for carbon. For other elements, the symbol is the first letter plus another letter from its name. For example, Ca is for calcium. Some symbols come from the Latin names of elements. *Argentum* is Latin for "silver." Silver's symbol is Ag.

Symbols of Some Elements

Element	Symbol	Element	Symbol
Aluminum	Al	Iron	Fe
Calcium	Ca	Mercury	Hg
Carbon	C	Nitrogen	N
Chlorine	Cl	Oxygen	O
Gold	Au	Potassium	K
Hydrogen	H	Sodium	Na

How have elements been named?

Elements have been named in many different ways. Elements have been named to honor scientists, for places, or for the elements' properties. Other elements have been named using rules made by an international committee. No matter what the origin of the name, scientists worldwide use the same system of element names and chemical symbols. People everywhere know that H means hydrogen, O means oxygen, and H_2O means dihydrogen monoxide, or water.

Reading Check

1. **Identify** What is the symbol for dihydrogen monoxide?

_____

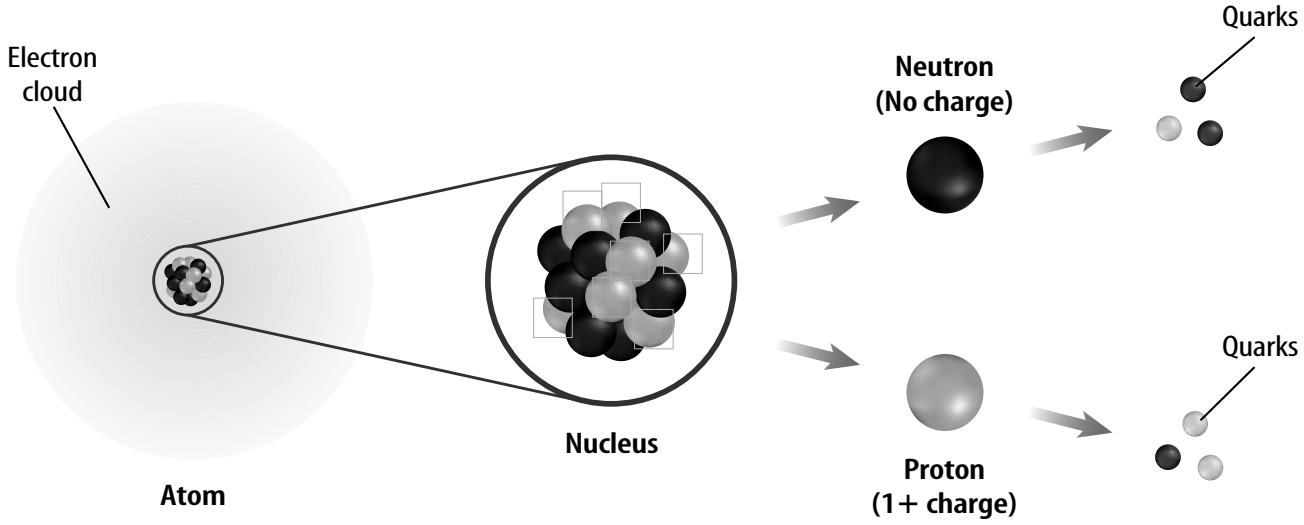
Atomic Components

An element is matter that is made up of one type of atom. An **atom** is the smallest piece of matter that still has the properties of the element. For example, the element silver is made up of only silver atoms. The element hydrogen is made up of only hydrogen atoms.

The figure below shows the structure of the atom. Atoms are made up of protons, neutrons, and electrons. **Protons** are particles with an electrical charge of 1+. **Neutrons** are particles with no electrical charge. **Electrons** are particles with an electrical charge of 1–. The **nucleus** is the small, positively charged center of the atom. It is made up of protons and neutrons. The nucleus is surrounded by a cloud containing electrons. The number of protons in an atom determines which element it is. For example, all atoms with 47 protons are silver atoms. All atoms with 1 proton are hydrogen atoms.

Picture This

2. **Label** Put a check sign on each proton shown in the nucleus.



Select

Quarks—Even Smaller Particles

Are protons, neutrons, and electrons the smallest particles that exist? Scientists hypothesize that electrons are not made up of smaller particles. If this is true, electrons are one of the most basic types of particles. But protons and neutrons are made up of smaller particles called **quarks**. So far, scientists have discovered six different quarks. Scientists theorize that protons are made up of three quarks. The quarks in a proton are held together with a force called the strong nuclear force. Neutrons are made up of another arrangement of three quarks. Scientists are still studying protons and neutrons to better understand them.

Reading Check

3. **Compare** Which is smaller, a proton or a quark?

_____

How do scientists find quarks?

To study quarks, scientists accelerate, or speed up, charged particles until they are moving extremely fast. Then they force the particles to collide with—or smash into—protons. The collision causes the protons to break apart. The Fermi National Accelerator Laboratory in Illinois has a machine that can accelerate particles fast enough to smash protons. This machine, called a Tevatron, is in a circular tunnel. The tunnel is 6.4 km in circumference. Scientists use electric and magnetic fields in the Tevatron to accelerate and smash particles.

How do scientists study quarks?

Think it Over

4. **Describe** How do scientists study the makeup of protons?

_____

_____

_____

_____

Scientists use different kinds of devices to detect the new particles that are made when particles are smashed together. Just as traffic investigators can tell what happened at an accident by looking at tire tracks and other clues, scientists gather information about the particles to find out what happened when they collided. One way to do this is by using a device called a bubble chamber. A bubble chamber is filled with liquid. The particles leave tracks of bubbles as they pass through the liquid—like tire tracks. Scientists examine the bubble tracks to determine what happened when the particles collided.

Why was it hard to find the sixth quark?

Finding evidence that quarks existed was not easy. Scientists found five quarks and hypothesized that a sixth quark existed. But it took a team of nearly 450 scientists from around the world several years to find the sixth quark. The tracks of the sixth quark were hard to detect. They were hard to detect because there was evidence of the sixth quark in only about one billionth of a percent of proton collisions. The sixth quark is called the *top* quark.

Models—Tools for Scientists

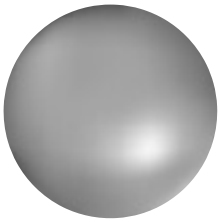
Scientists use models to represent things that are difficult to visualize—or picture in your mind. Scaled-down models let you visualize something that is too large to see. Models of buildings, the solar system, and airplanes are scaled-down models. Scaled-up models are used to represent things that are too small to see. Scientists have developed scaled-up models to help them study the atom. To give you an idea of how small the atom is, it would take about 50,000 atoms stacked on top of each other to equal the thickness of a sheet of aluminum foil.

For a model of the atom to be useful, it must accurately represent everything we know about matter and how the atom behaves. As they learn more about atoms, scientists must change their models to include the new information.

How has the atomic model changed?

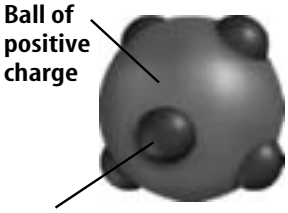
People have not always known that matter is made up of atoms. Around 400 B.C., a Greek philosopher named Democritus came up with the idea that atoms make up all substances. Another famous Greek philosopher, Aristotle, did not agree with Democritus' theory. Aristotle believed that each kind of matter was uniform, or the same all the way through, and not made of smaller particles. Aristotle's incorrect theory was accepted for about two thousand years. But in the 1800s, an English scientist named John Dalton was able to prove that atoms existed.

Dalton Model Dalton's model of the atom was a solid sphere, as shown in the first figure on the right. Dalton's model helped scientists explain why chemical reactions occur. Scientists then could use chemical symbols and equations to describe these reactions.



Dalton's Model

Thomson Model In 1904, English physicist Joseph John Thomson decided from his experiments that atoms contained small, negatively charged particles. He thought these "electrons" were spread out evenly throughout a positively charged sphere. His model, shown in the second figure, looks like a ball of chocolate chip cookie dough.



Thomson's Model

Think it Over

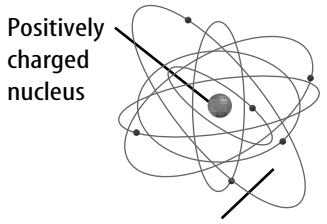
5. **Explain** Why have scientists developed scaled-up models to study the atom?

Picture This

6. **Identify** What part of Thomson's model are represented by the "chocolate chips" in the ball of cookie dough?

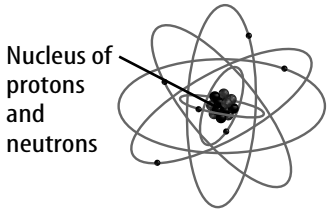
Select

Rutherford Model In 1911, another British physicist, Ernest Rutherford, thought that almost all the mass of an atom and all its positive charge were concentrated in the nucleus of an atom. He also thought the nucleus of an atom was surrounded by electrons, as shown in the first figure.



Rutherford's Model

Bohr Model In 1913, Danish physicist Neils Bohr hypothesized that electrons travel in fixed orbits around the nucleus of the atom, as the second figure shows. One of Bohr's students, James Chadwick, found that the nucleus contained positive protons and neutral neutrons.



Bohr's Model

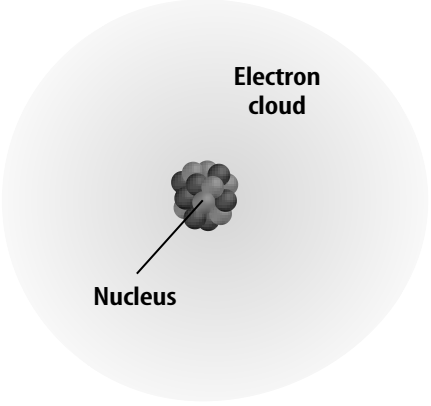
Reading Check

7. **Explain** What did Chadwick discover about the nucleus of an atom?

What is the electron cloud model?

The model of the atom has changed over time. By 1926, scientists had developed the electron cloud model of the atom in use today. An **electron cloud** is the area around the nucleus of an atom where its electrons are most likely found. The electron cloud is 100,000 times larger than the diameter of the nucleus. However, each electron in the cloud is much smaller than a single proton.

Scientists do not really know where in the electron cloud the electrons might be. Electrons move so fast and have such a small mass that it is impossible to describe exactly where they might be. It is best to describe their location as somewhere in the cloud. Think of the spokes on a spinning bicycle wheel. The spokes are moving so quickly that you can't tell exactly where any one spoke is. All you see is a blur. The spokes lie somewhere in the blur. An electron cloud is similar. It is a blur containing all of the electrons somewhere within it. The figure illustrates what an electron cloud might look like.



Electron Cloud Model

Picture This

8. **Compare and Contrast** How are Dalton's model (see figure on previous page) and electron cloud models of the atom similar? How are they different?

Similar:

Different:

Select

After You Read

Mini Glossary

atom: the smallest piece of matter that still has the properties of the element

electron: particle with an electrical charge of 1–

electron cloud: the area around the nucleus of an atom where its electrons are most likely found

neutron: particle with no charge

nucleus: the small, positively charged center of the atom

proton: particle with an electrical charge of 1+

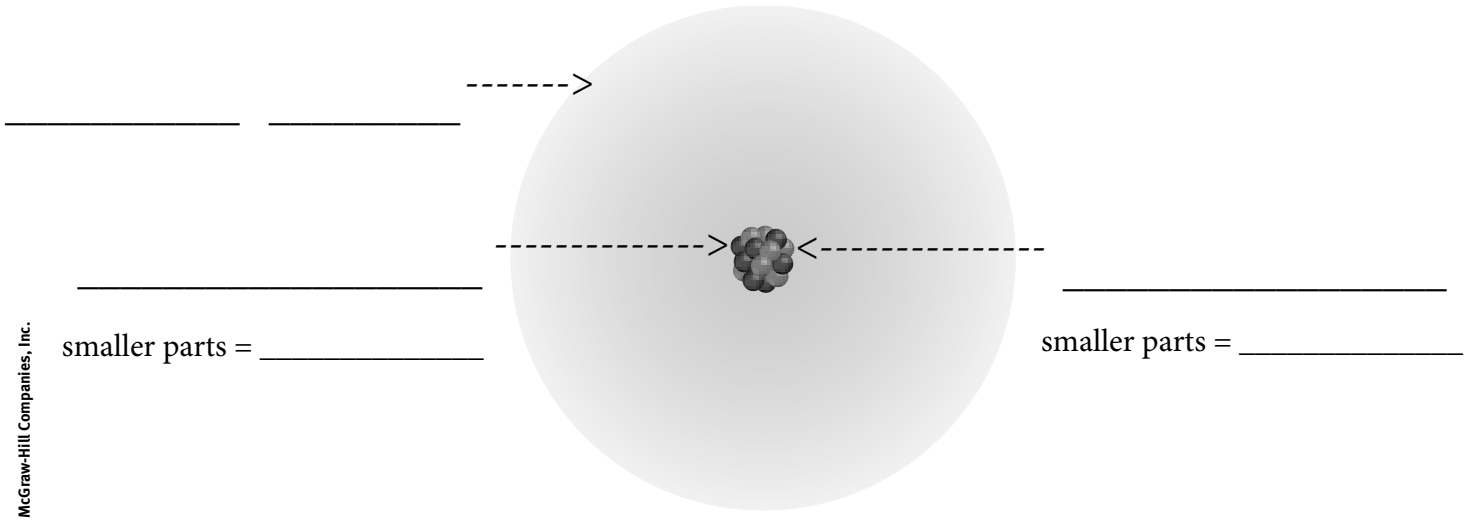
quark: smaller particle that makes up protons and neutrons

1. Review the terms and their definitions in the Mini Glossary. Write a sentence describing what parts make up an atom.

_____

_____

2. Below is a model of an atom. Label and describe each part of the atom. If any particles are made up of even smaller particles, list these also.



3. Study Coach As you read this section, you created a quiz question for each paragraph. Did answering these quiz questions after you read the section help you learn the material? Why or why not?

_____

_____

_____

End of Section

Select

Name _____ **Date** _____

Properties of Atoms and the Periodic Table

Period: Select

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Properties of Atoms and the Periodic Table
	• An atom is the smallest unit of an element that still has all the properties of the element.
	• An atom is made up of a positively charged nucleus and negatively charged electrons.
	• Quarks are so tiny that they orbit the nucleus with the electrons.
	• Isotopes of an element only differ in their number of neutrons.
	• An element's chemical and physical properties may be predicted by its location on the periodic table.

FOLDABLES™ Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a few sentences about what you know about atoms.

Name _____ Date _____

Properties of Atoms and the Periodic Table

Section 1 Structure of the Atom

Scan *Section 1 and write down three things you might learn from this section.*

1. _____

2. _____

3. _____

Review Vocabulary

Define element *to show its scientific meaning.*

element _____

New Vocabulary

Use your book or a dictionary to define the following terms.

atom _____

nucleus _____

proton _____

neutron _____

electron _____

quark _____

electron cloud _____

Academic Vocabulary

Use a dictionary to define neutral *as it might be used in this section.*

neutral _____

Name _____ **Date** _____

Section 1 Structure of the Atom (continued)

Period: Select

Main Idea	Details

Scientific Shorthand

I found this information on page _____.

Identify *some of the elements and their symbols by filling in the table. Reference a periodic table to help you.*

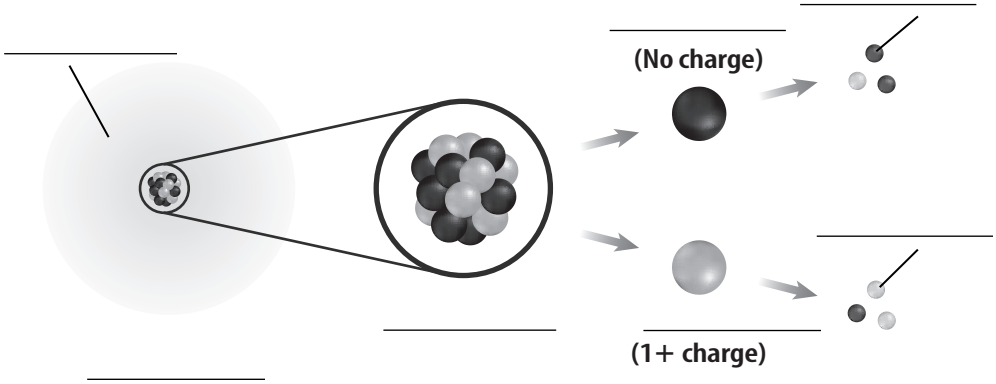
Symbol	Name
Pt	
	tungsten
Rn	
	iodine
B	
	lithium
Cu	
	cesium
Ni	
	lead
Es	
	helium

Subatomic Particles

I found this information on page _____.

Complete *the diagram showing how the parts of an atom are related.*

atom proton nucleus
electron cloud neutron quark



Name _____ **Date** _____

Section 1 Structure of the Atom (continued)

Period: Select

Main Idea

I found this information on page _____.

Details

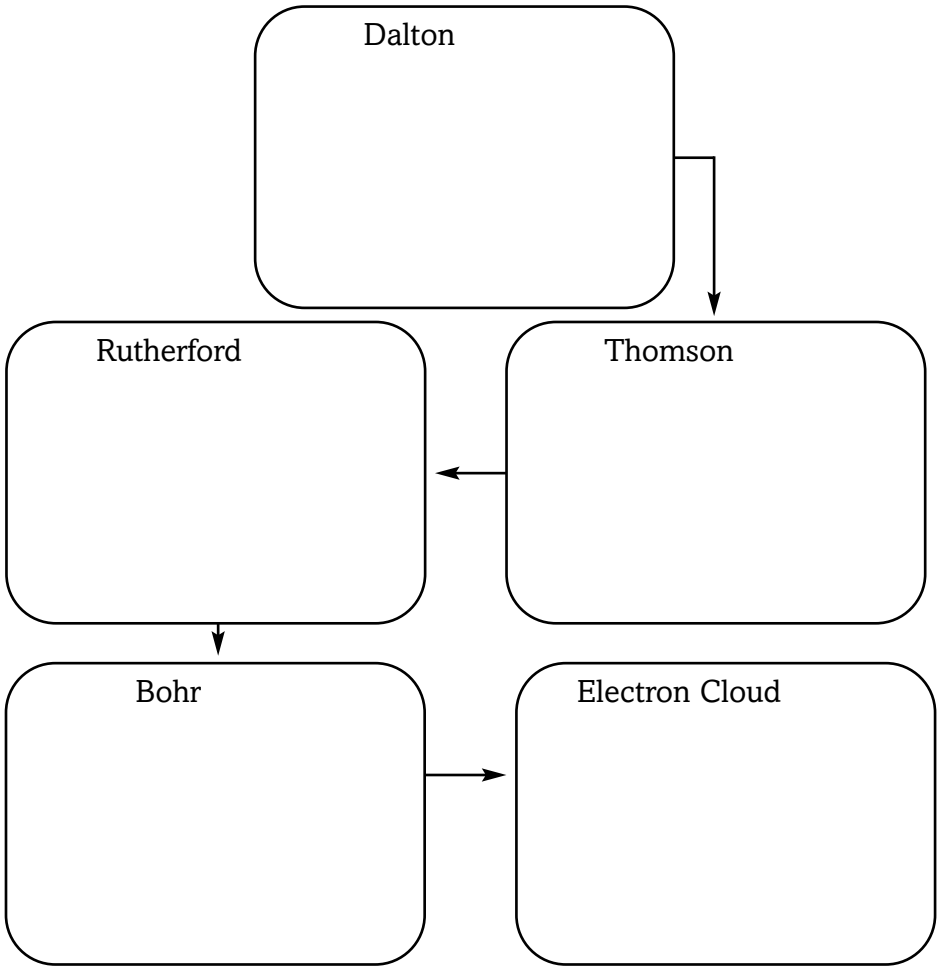
Summarize *key ideas about* quarks.

Theories about Quarks	Finding Quarks
Detecting Quarks	**Sixth Quark**

Models—Tools for Scientists

I found this information on page _____.

Create *a time line of the changes that have occurred in modeling the atomic structure since the 1800s. Sketch and label each model.*



Chapter 16 Section 1 Quiz — Structure of the Atom

Period: Select _____ Name: _____

1. Which of the following methods would be most useful for describing atoms?

Select

A. visualizing with microscope

B. observing in a test tube

C. constructing a model

D. touching with bare hands

---

2. An atom containing six positive charges and six negative charges has _____ charge.

Select

A. a positive

B. a negative

C. a strong negative

D. no net

---

3. Scientists have broken down protons and neutrons into smaller particles called _____.

Select

A. nuclei

B. quarks

C. vacuoles

D. isotopes

---

4. Democritus believed that the universe was made of empty space and _____.

Select

A. molecules

B. compounds

C. elements

D. atoms

---

5. Atoms consist of a positively charged center called a(n) _____.

Select

A. proton

B. neutron

C. electron

D. nucleus

---

6. The negative charged particles outside the nucleus of an atom are _____.

Select

A. extracellular material

B. electrons

C. neutrons

D. quarks

---

7. Which of the following atomic particles is electrically neutral?

Select

A. neutron

B. proton

C. electron

D. positron

---

8. Which of the following models of the atom reflects the unpredictable motion of the electron?

Select

A. solid ball the same throughout

B. small ball within a large shell containing empty space

C. ball of raisin-cookie dough with raising representing electrons

D. electron cloud

Select

9. Aristotle believed that matter was _____.

Select

A. composed of atoms

B. uniform throughout

C. composed of molecules

D. capable of being broken does into smaller parts

---

10. The discovery of the sixth quark was accomplished by _____.

Select

A. using the Hubble Space telescope

B. bombarding gold foil with alpha particles.

C. experimenting with a cathode ray tube

D. studying proton collisions

---

11. Which of the following atomic particles is positively charged?

Select

A. neutron

B. electron

C. proton

D. negatron

---

12. What nineteenth-century English scientist offered proof that atoms existed?

Select

A. Aristotle

B. Democritus

C. John Dalton

D. Isaac Newton

STOP This is the end of the test. When you have completed all the questions and reviewed your answers, either: (Best option-->) upload in focus or (Second Choice -->) email or Remind it. Otherwise hand in a hard copy to the drop box at Leon High School.

Select

chapter 16

Properties of Atoms and the Periodic Table

Name: _____

section 2 Masses of Atoms

Period: Select _____

What You'll Learn

- the difference between the atomic mass and the mass number of an atom
- how to identify components of isotopes
- how to interpret the average atomic mass of an element

Before You Read

Which metric unit do you use to measure the amount of gas that a car's gas tank holds? Which metric unit would you use to measure the distance to the next town? Explain why you would use these units and not smaller units.

_____

_____

_____

Mark the Text

Highlight As you read the text under each heading, highlight the main ideas. After you finish reading the section, review the highlighted main ideas to help you learn the important topics of the section.

Read to Learn

Atomic Mass

Neutrons and protons are much more massive than electrons. Since the nucleus contains the neutrons and protons, it contains most of the mass of an atom. The mass of a proton is about the same as the mass of a neutron—about 1.67×10^{-24} g, as shown in the table. The mass of a proton or a neutron is about 1,800 times greater than the mass of an electron. The mass of an electron is so small that it is not even considered when finding the mass of an atom.

Subatomic Particle Masses

Particle	Mass (g)
Proton	1.6726×10^{-24}
Neutron	1.6749×10^{-24}
Electron	9.1093×10^{-28}

Applying Math

1. **Comparing Decimals** Which has a larger mass, a proton or a neutron?

_____

What is the atomic mass unit?

What unit would you use to estimate the height of your school building? Kilometers would be difficult to use. You probably would use a more appropriate unit, such as meters. Just as the kilometer is not the right unit for measuring the height of a building, scientists found that the gram was not the right unit for measuring the mass of an atom.

A useful unit gives numbers that are easy to work with. The unit used for measuring atomic particles is called the atomic mass unit (amu). The mass of a proton or neutron is almost equal to 1 amu. This is not a coincidence. The amu was defined that way. The amu is one-twelfth the mass of a carbon atom. A carbon atom contains six protons and six neutrons, or twelve particles. Since most of the mass of an atom is in the nucleus, each proton and neutron has a mass nearly equal to 1 amu.

How do protons identify elements?

Remember that atoms of different elements have different numbers of protons. In fact, the number of protons tells you what type of atom you have and vice versa. For example, every carbon atom has six protons. Also, every atom with six protons is carbon.

The **atomic number** of an element is the number of protons in an atom of the element. Since carbon has six protons, the atomic number of carbon is six. If you are given any one of the following for an element—its name, number of protons, or atomic number—you can find the other two.

What is the mass number?

The **mass number** of an atom is the sum of the number of protons and the number of neutrons in the nucleus of an atom. The table below shows this.

Mass Numbers of Some Atoms

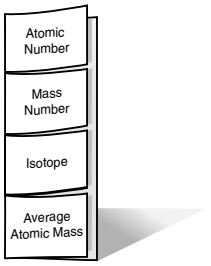
Element	Symbol	Atomic Number	Protons	Neutrons	Mass Number	Average Atomic Mass*
Boron	B	5	5	6	11	10.81 amu
Carbon	C	6	6	6	12	12.01 amu
Oxygen	O	8	8	8		16.00 amu
Sodium	Na	11	11	12		22.99 amu
Copper	Cu	29	29	34		63.55 amu

*The atomic mass units are rounded to two decimal places.

FOLDABLES™

B Find the Main Idea

Make the following Foldable to help take notes on the main ideas from this section.



Picture This

2. **Complete** the table by finding the mass numbers for oxygen, sodium, and copper.

Select

Applying Math

3. **Apply** The element uranium has a mass number of 238, and an atomic number of 92. How many neutrons does an atom of uranium have?

_____

How is the number of neutrons found?

If you know the mass number and atomic number of an atom, you can find the number of neutrons it contains.

number of neutrons = mass number − atomic number

Atoms of the same element with different numbers of neutrons can have different properties. For example, carbon with a mass number of 12 is called carbon-12. Carbon-14, with a mass number of 14 is radioactive. Carbon-12 is not radioactive.

Isotopes

Not all atoms of an element have the same number of neutrons. Atoms of the same element that have different numbers of neutrons are called **isotopes**. For example, boron atoms can have mass numbers of 10 or 11. To find the number of neutrons in an isotope, you can use the formula above. Look at the table on the previous page. Notice that boron has an atomic number of five. That means it has five protons. Substitute these numbers into the formula to get $11 - 5 = 6$ and $10 - 5 = 5$. So, boron isotopes have either five or six neutrons.

Think it Over

4. **Determine** What is the same in two isotopes of an element? What is different?

_____

_____

_____

How can isotopes be used?

Atoms can be used to find the age of bones and rocks that are millions of years old. Radioactive isotopes release nuclear particles and energy as they decay into another element. The time it takes for half of the radioactive isotopes in a piece of rock or bone to change into another element is called its half life. Scientists use half lives of radioactive isotopes to measure time.

The table below lists the half-lives of some radioactive elements. It also lists the elements that the radioactive elements decay into. For example, it would take 5,715 years for half of the carbon-14 atoms in a rock to change into atoms of nitrogen-14. After another 5,715 years, half of the remaining carbon-14 atoms will change, and so on. These radioactive "clocks" can be used to measure different periods of time.

Half-Lives of Radioactive Isotope

Radioactive Element	Changes to This Element	Half-Life
uranium-238	lead-206	4,460 million years
potassium-40	argon-40, calcium-40	1,260 million years
rubidium-87	strontium-87	48,800 million years
carbon-14	nitrogen-14	5,715 years

Picture This

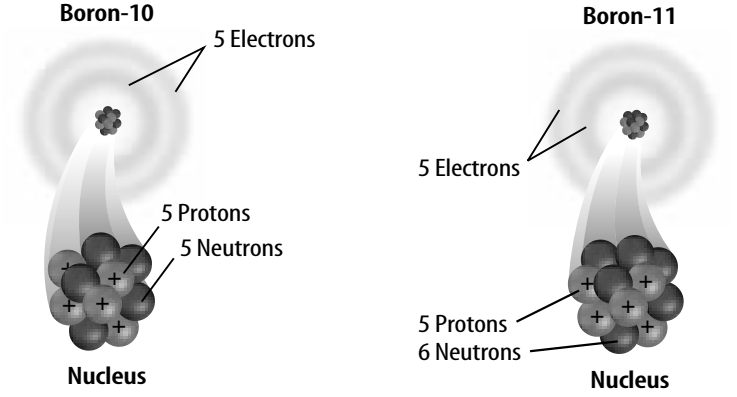
5. **Apply** How many years would it take half of the atoms in uranium-238 to change into lead-206?

_____

Select

How do you identify isotopes?

The figure shows models of the two isotopes of boron. Because the numbers of neutrons in the isotopes is different, their mass numbers are different. To identify an isotope, use the name of the element followed by the mass number of the element. For example, the isotopes of boron are boron-10 and boron-11, because boron isotopes have mass numbers of either 10 or 11.



Most elements have more than one isotope. Because of this, each element has an average atomic mass. The **average atomic mass** of an element is the weighted-average mass of the mixture of its isotopes. For example, four out of five atoms of boron are boron-11. That means one out of five atoms is boron-10. To find the average atomic mass of boron, solve the following equation:

$$\frac{4}{5}(11\text{ amu}) + \frac{1}{5}(10\text{ amu}) = 10.8\text{ amu}$$

The average atomic mass of boron is 10.8 amu. You round the average atomic mass to the nearest whole number to find the most abundant isotope of an atom. For example, the average atomic mass of boron, 10.8, rounds to 11. So, the most abundant isotope of boron is boron-11.

Picture This

6. Draw and Label Carbon-12 is an isotope with 6 protons and 6 neutrons. Draw a model of carbon-12. Label the protons and neutrons.

Applying Math

7. Apply The element magnesium has an average atomic mass of 24.305. What is the most abundant isotope of magnesium?

_____

Select

After You Read

Mini Glossary

atomic number: a number equal to the number of protons in an atom

average atomic mass: the weighted-average mass of the mixture of isotopes of an element

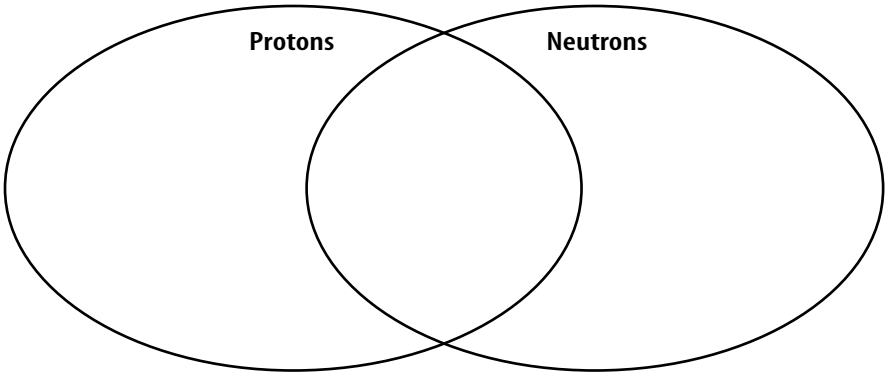
isotopes: atoms of the same element that have different numbers of neutrons

mass number: the sum of the number of protons and the number of neutrons in an atom

1. Review the terms and their definitions in the Mini Glossary. How can you find the number of protons and neutrons in an atom of an element from the atomic number and the mass number?

2. Complete the Venn diagram by writing the given phrases in the correct area.

- determines which isotope
- equals the atomic number
- equals the mass number



3. Mark the Text Tell how you could use a set of red and blue marbles to teach a friend about the atomic number and mass number of an element.

End of Section

Select

Name _____ **Date** _____

Properties of Atoms and the Periodic Table

Section 2 Masses of Atoms

Period: Select

Preview *Section 2 of your book, using the checklist below.*

- Read all section titles.
- Read all boldfaced words.
- Read all charts and graphs.
- Look at all the pictures and read their captions.
- Think about what you already know about masses of atoms.

Write three facts you learned.

1. _____

2. _____

3. _____

Review Vocabulary

Define mass *to show its scientific meaning.*

mass _____

New Vocabulary

Use your book or dictionary to define the following key terms.

atomic number _____

mass number _____

isotope _____

average atomic mass _____

Academic Vocabulary

Use a dictionary to find the scientific meaning of define.

define _____

_____

Name _____ **Date** _____

Section 2 Masses of Atoms (continued) Period: Select

Main Idea	Details
Atomic Mass *I found this information on page* _____.	**Organize** *the information on* atomic mass *to complete the outline.* **Atomic Mass** **A.** Nucleus of atom **1.** _____ **2.** _____ **3.** _____ **B.** Atomic mass unit **1.** _____ **2.** _____ **3.** _____ **C.** Protons **1.** _____ **2.** _____ **3.** _____ **4.** _____ **D.** Mass number **1.** _____ **2.** _____

Name _____ **Date** _____

Section 2 Masses of Atoms (continued) Period: Select

Main Idea

Isotopes

I found this information on page _____.

Details

Model *carbon-12 and carbon-14 by sketching each atom.*

- Remember that carbon's atomic number is 6.
- Label each atom's protons, neutrons, and electrons.
- Show the charges of the particles.

Carbon-12

Carbon-14

Analyze *how you would determine which isotope of an element is the most abundant if you know the element's average atomic mass.*

_____

_____

_____

_____

CONNECT IT

While exploring on your grandfather's farm, you come across what appears to be ancient Native American artifacts, arrowheads, and tools. Explain how you could find out the age of these pieces and if they are, in fact, an archeological find.

_____

_____

Chapter 16 Section 2 Quiz

Masses of Atoms

Name: _____

Period: Select _____

1. The atomic mass of an element is _____ of that element.

Select

A. ○ the average mass of an atom

B. ○ the number of protons plus the number of neutrons of an atom

C. ○ the number of protons in each atom

D. ○ the number of electrons in each atom

---

2. The ___ of an element is the number of _____ of an atom of that element.

Select

A. ○ atomic mass, electrons in the nucleus

B. ○ mass number, neutrons in the nucleus

C. ○ mass number, protons plus neutrons in the outermost energy level

D. ○ atomic number, protons in the nucleus

---

3. The _____ of an atom is the number of neutrons plus protons.

Select

A. ○ atomic number

B. ○ nucleus number

C. ○ mass number

D. ○ half-life

---

4. _____ are atoms of the same element that have different numbers of neutrons.

Select

A. ○ Compounds

B. ○ Isotopes

C. ○ Alpha particles

D. ○ Beta particles

---

5. The atomic number of manganese is 25; its mass number is 55. How many neutrons does an atom of manganese have in its nucleus?

Select

A. ○ 25

B. ○ 30

C. ○ 55

D. ○ 80

---

6. The mass of an electron is _____.

Select

A. ○ negligible

B. ○ the mass of the neutrons plus the mass of the protons

C. ○ equal to the mass of a proton

D. ○ equal to the mass of the nucleus

---

7. The mass of proton is measured in _____.

Select

A. ○ nanograms

B. ○ microns

C. ○ atomic mass units

D. ○ minutiae

This is the end of the test. When you have completed all the questions and reviewed your answers, either: (Best option-->) upload in focus or (Second Choice -->) email or Remind it. Otherwise hand in a hard copy to the drop box at Leon High School.

Select