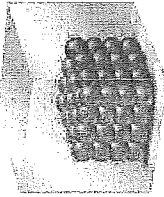
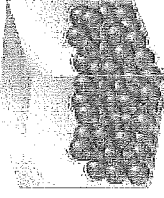
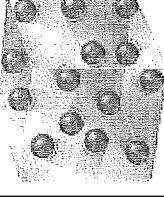


Use with textbook pages 16-27.

What is the matter?

Show what you know about states of matter.

1. Complete the following table by describing the three states of matter. The table has been partially completed to help guide you.

			
state of matter			
shape	fixed shape		
volume		fixed volume	
spaces between particles			particles are far apart (lots of space between particles)
movement of particles		particles can only vibrate	

2. Which row of the table below correctly describes a solid, a liquid, and a gas?

	Solid	Liquid	Gas
A.	has definite shape and volume	has definite volume and takes the shape of the container	shape and volume are determined by its surroundings
B.	shape and volume are determined by its surroundings	has definite volume and takes the shape of the container	has definite shape and volume
C.	shape and volume are determined by its surroundings	has definite shape and volume	has definite volume and takes the shape of the container
D.	has definite shape and volume	has definite shape and volume	has definite volume and takes the shape of the container

Use with textbook pages 16-27.

Matter all around us

Vocabulary

boiling point
change of state
conductivity
density
elements
gas
heat
kinetic
liquid
mass
matter
melting point
movement
particles
properties
solid
states
volume

Use the terms in the vocabulary box to fill in the blanks. Use each term only once. You will not need to use every term.

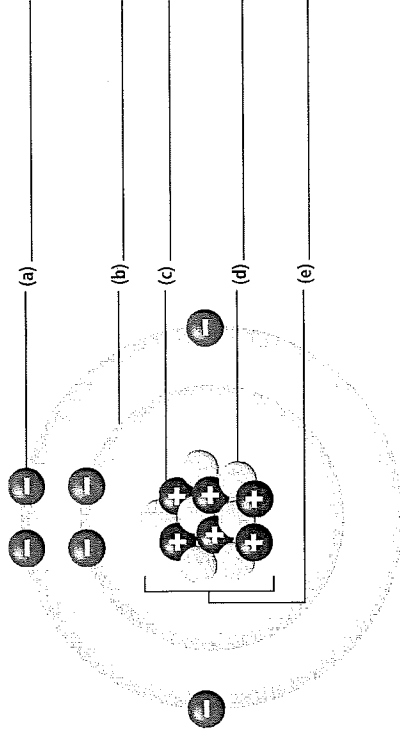
- _____ is anything that has mass and volume. According to the kinetic molecular theory, all matter is made of very small _____ that are constantly moving.
- _____ is the amount of matter in an object. The amount of space an object occupies is its _____. The ratio of a material's mass to its volume is its _____.
- There are three _____ of matter; solid, liquid and gas. Each of these can change when _____ is added or removed.
- The temperature at which ice turns to water is the _____. The temperature at which water turns to water vapour is the _____ through a material.
- _____ describes how easily electricity or heat can move through a material.
- _____ energy is the energy of movement.
- Particles of a _____ are packed so tightly together that they can only vibrate in place. Particles of a _____ are farther apart and can slide past each other. Particles of a _____ are very far apart and move around freely and quickly.
- The kinetic molecular theory describes what happens to the particles of matter during a _____.
- Oxygen and gold are examples of _____, which cannot be broken down or separated into simpler substances.

Use with textbook pages 28-33.

Atomic structure

1. Use the vocabulary terms that follow to label the parts of an atom. Place the correct term on the line next to each part of the atom. You will not need to use all the terms.

- atom
- nucleus
- proton
- neutron
- electron
- shell



2. Complete the following table describing the three subatomic particles.

	Proton	Neutron	Electron
electric charge			
location in the atom			

C. II and III only

D. I, II, and III

8. Which of the following describes what happens when heat is added to a substance?

- A. Particles lose kinetic energy and vibrate faster.
- B. Particles gain kinetic energy and vibrate faster.
- C. Particles gain kinetic energy and vibrate slower.
- D. Particles lose kinetic energy and vibrate slower.

9. Which of the following changes of state require the removal of heat?

I.	melting
II.	boiling

A. I only

B. II only

C. both I and II

D. neither I nor II

10. Which of the following is the temperature at which a solid changes into a liquid?

- A. boiling point
- B. melting point
- C. both A and B
- D. neither A nor B

11. Which of the following is the temperature at which a liquid changes into a gas?

- A. boiling point
- B. melting point
- C. both A and B
- D. neither A nor B

Use with textbook pages 16-27.

Investigating matter

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ volume	A. amount of mass in a certain volume of a substance
2. _____ density	B. amount of matter in a substance or an object
3. _____ state	C. cannot be broken down into simpler substances
4. _____ conductivity	D. amount of space that a substance or object takes up
5. _____ element	E. measure of how easily electricity or heat can pass through
	F. can be solid, liquid, or gas

Circle the letter of the best answer.

6. Which of the following describes mass?

- A. state of matter
- B. anything with mass and volume
- C. amount of matter in an object
- D. amount of space that an object occupies

7. Which of the following are the main points of the kinetic molecular theory?

I.	Particles are constantly moving.
II.	All matter is made up of very small particles.
III.	There are empty spaces between particles in a substance.

A. I and II only

B. I and III only

Use with textbook pages 28–33.

The atom

Vocabulary

Bohr	neutrons
Dalton	positive
electrons	protons
energy	shells
mass	subatomic particles
negative	Rutherford
neutral	Thomson

Use the terms in the vocabulary box to fill in the blanks. You can use each term more than once. You will not need to use every term.

- _____ suggested that matter is made up of atoms.
- _____ proposed that atoms contain negatively charged particles later called _____.
- _____ discovered the nucleus and its subatomic particles. He suggested that the nucleus was made up of positively charged particles called _____ and particles with no charge called _____.
- _____ proposed that electrons are located in _____ around the nucleus.
- Electrons have different amounts of _____ and can jump back and forth between the energy levels.
- All atoms are made up of three _____: protons, electrons, and neutrons.
- Protons have a _____ charge, electrons have a _____ charge, and _____ have no electric charge.
- _____ and _____ cluster together to form the nucleus of an atom.

Use with textbook pages 28–33.

Contributions to atomic theory

Scientist

Bohr	_____
Dalton	_____
Rutherford	_____
Thomson	_____

Match each scientist to the statements describing his contribution to the atomic theory. Identify who was the first to propose these ideas. Each scientist may be used more than once.

- Atoms cannot be created, destroyed, or divided into smaller particles.

- Electrons occupy specific energy levels or shells.

- Most of the mass of the atom is in the tiny, dense, positively charged nucleus.

- Most of the atom is empty space.

- All matter is made of small particles called atoms.

- All atoms of the same element are identical.

- Atoms contain negatively charged particles.

- The nucleus contains positively charged particles called protons and particles with no electric charge called neutrons.

- Different elements combine together to form compounds.

- Electrons move around a central nucleus.

Use with textbook pages 28-33.

Atomic theory

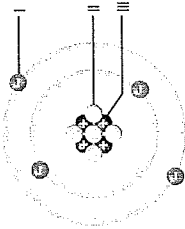
Match each Descriptor on the left with the corresponding Scientist on the right. Each Scientist may be used more than once.

Descriptor	Scientist
1. _____ discovered the nucleus	A. Bohr
2. _____ suggested that all matter is made of atoms	B. Dalton
3. _____ proposed the "raisin bun" model of the atom	C. Rutherford
4. _____ observed streams of negatively charged particles in gas discharge tubes	D. Thomson
5. _____ proposed that electrons exist in energy levels	

Circle the letter of the best answer.

- Which of the following was not part of Dalton's atomic theory?
 - All matter is made of small particles called atoms.
 - Atoms can be created or destroyed.
 - Atoms of the same element are identical.
 - Atoms of one element are different from the atoms of other elements.
- Which of the following was not part of Rutherford's atomic theory?
 - Most of the mass of the atom is concentrated in electrons.
 - Most of the atom is empty space.
 - The nucleus is the tiny, dense, central core of the atom.
 - The nucleus contains protons and neutrons.

Use the following diagram of an atom to answer questions 8 and 9.



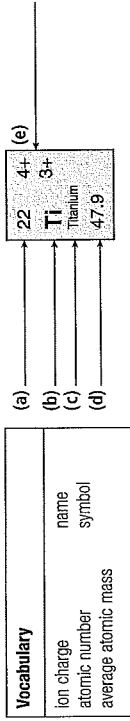
- Which of the following is the structure labelled II in the diagram?
 - atom
 - proton
 - neutron
 - electron
- Which of the following exists in energy levels?
 - I only
 - II only
 - III only
 - II and III only
- What is the electrical charge of the nucleus of an atom?
 - neutral charge
 - positive charge
 - negative charge
 - It depends on the element
- The nucleus of the atom contains which of the following subatomic particles?
 - electron
 - proton and neutron
 - proton and electron
 - proton, neutron, and electron

Use with textbook pages 52-57.

What is in the box?

Test your knowledge how information is displayed for each element in the periodic table.

- Use the vocabulary words listed to label the diagram.



Examine the periodic table entry for each of the following elements and complete the blanks below.

2.

- atomic number _____
- average atomic mass _____
- ion charge _____
- number of protons _____

3.

- name of element _____
- ion charge _____
- number of protons _____
- average atomic mass _____

4.

- atomic number _____
- average atomic mass _____
- ion charge _____
- symbol of element _____

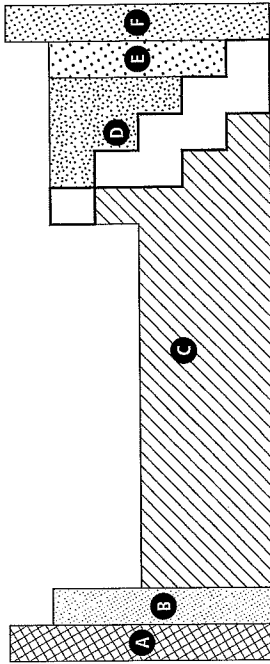
5.

- name of element _____
- average atomic mass _____
- ion charge _____
- number of protons _____

Name _____ Date _____

Use with textbook pages 52-57.

Families of elements



Use the simplified periodic table shown above to answer questions 1 to 12. To which region does each element or family belong? Place the letter corresponding to the shaded region on the blank line. You can use regions more than once.

You can use the periodic table on page 201 to help you answer these questions.

1. helium _____
2. lithium _____
3. fluorine _____
4. beryllium _____
5. halogens _____
6. noble gases _____
7. alkali metals _____
8. alkaline earth metals _____
9. non-metallic elements that are strongly reactive _____
10. metallic elements that are strongly reactive _____
11. metallic elements that are reactive _____
12. non-metallic elements that are very unreactive _____

Name _____ Date _____

Use with textbook pages 52-57.

Using the periodic table

Vocabulary

average atomic mass	metalloids
atomic number	multiple ion charge
electrons	noble gases
families	non-metals
good	periodic table
halogens	periods
ions	poor
ion charge	properties
metals	

Use the terms in the vocabulary box to fill in the blanks. You can use each term more than once. You will not need to use every term.

1. The _____ organizes the elements according to their physical and chemical _____.
2. The periodic table is divided into seven horizontal rows called _____ and 18 vertical columns called _____.
3. _____ elements are _____ appear on the left side of the periodic table. These elements are _____ conductors of heat and electricity.
4. _____ elements are _____ appear on the right side of the periodic table. These elements are _____ conductors of heat and electricity.
5. The _____ form a zigzag staircase arrangement on the periodic table. These elements have properties similar to both _____ and _____.
6. The _____ refers to the number of protons that an atom has in the nucleus.
7. The _____ is the weighted average of the masses of the atoms of an element.
8. A(n) _____ is an electric charge that forms on an atom when it gains or loses electrons.
9. Some metals, like platinum and cobalt, form _____ in more than one way. In other words, they have a(n) _____.

Use with textbook pages 52-57.

The periodic table and chemical properties

Term	Descriptor
1. _____ halogens	A. most reactive metals
2. _____ noble gases	B. most reactive non-metals
3. _____ alkali metals	C. have properties of both metals and non-metals
4. _____ alkaline earth metals	D. most unreactive elements
	E. includes beryllium and magnesium

Circle the letter of the best answer.

5. What is the name of a horizontal row in the periodic table?

- A. column
- B. family
- C. period
- D. group

6. Which of the following are metalloids?

i.	silicon
ii.	boron
iii.	neon

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II, and III

Use the following diagram to answer questions 7 and 8.

30	2+
Zn	Zinc
65.4	

7. What does the "30" refer to?

- A. ion charge
- B. average atomic mass
- C. atomic number
- D. family number

8. What does the "2+" refer to?

- A. ion charge
- B. average atomic mass
- C. atomic number
- D. family number

9. To which of the following groups does oxygen belong?

- A. gas
- B. metal
- C. metalloid
- D. non-metal

10. Which of the following is the same as the atomic number of an element?

- A. number of protons
- B. number of neutrons
- C. number of electrons
- D. number of ion charges

Use with textbook pages 64-67.

The number game with atoms and ions

1. Complete the following sentences using the terms in parentheses.

- (a) The atomic _____ (number/mass) of an element is the same as the number of protons in the nucleus of an atom.
- (b) An _____ (atom/ion) of an element has the same number of protons as electrons.
- (c) A positively charged ion has _____ (lost/gained) electrons.
- (d) A negatively charged ion has _____ (lost/gained) electrons.

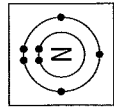
2. Complete the following table. Some answers are provided to help guide you. You can refer to the Bohr model chart on page 32 and the periodic table on page 202.

Element name	Atomic number	Ion charge	Atom or ion?	Number of protons	Number of electrons
beryllium	4	2+	ion	4	2
	11	0	atom		
chlorine		0		18	18
	7	3-			10
calcium		0			
		2-		16	
	3	+			
		3+		13	

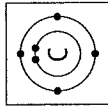
Use with textbook pages 64–67.

Analyzing Bohr model diagrams

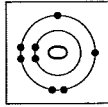
Fill in the blanks beside each Bohr model diagram. The first one has been partially completed to help guide you.



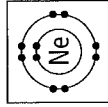
- (a) number of protons _____ 7
- (b) number of shells _____
- (c) number of electrons _____
- (d) number of valence electrons _____
- (e) Bohr model of _____ a nitrogen atom



- (a) number of protons _____
- (b) number of shells _____
- (c) number of electrons _____
- (d) number of valence electrons _____
- (e) Bohr model of a _____



- (a) number of protons _____
- (b) number of shells _____
- (c) number of electrons _____
- (d) number of valence electrons _____
- (e) Bohr model of an _____



- (a) number of protons _____
- (b) number of shells _____
- (c) number of electrons _____
- (d) number of valence electrons _____
- (e) Bohr model of a _____

5. The four elements above are in the same period. What do you notice about the number of shells for elements belonging to the same period?

Use the periodic table on page 202 to answer questions 8 to 12.

8. How many electrons are in the outermost shell of a sulphur (S) atom?

- A. 1
- B. 2
- C. 6
- D. 7

9. How many electrons are in the outermost shell of a fluorine (F) ion?

- A. 1
- B. 2
- C. 7
- D. 8

10. How many shells are there in the Bohr model of an aluminum (Al) atom?

- A. 1
- B. 2
- C. 3
- D. 4

11. Which of the following represents the Bohr model electron arrangement of a chlorine (Cl) atom?

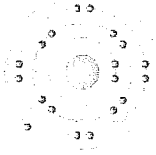
- A. 2, 15
- B. 2, 2, 13
- C. 2, 8, 7
- D. 2, 8, 8

12. What do a beryllium (Be) ion and a neon (Ne) atom have in common?

- A. They have full outer shells.
- B. They have the same number of electrons.
- C. They have the same number of electron shells.
- D. None of the above

The periodic table and atomic theory

Use the following Bohr model to answer questions 1 to 6.



Match the Term on the left with the corresponding Number on the right. Each Number may be used more than once. Refer to the diagram above.

Term	Number
1. _____ number of shells	A. 0
2. _____ number of protons	B. 1
3. _____ total number of electrons	C. 2
4. _____ number of valence electrons	D. 3
5. _____ number of electron(s) it has to lose to become stable	E. 4
6. _____ number of shells holding the maximum number of electrons	F. 19
	G. 20

Circle the letter of the best answer.

7. What is the maximum number of electrons that the first electron shell can hold?

- A. 1
- B. 2
- C. 4
- D. 8