Before You Read

NAME: _____

What Are Atoms?

1. Circle T if the statement is TRUE or F if it is FALSE.

T F a) People have always agreed that matter is made of atoms.

T F b) Some atoms are large enough to see with our eyes.

T F c) All molecules contain more than one atom.

T F d) Atoms and molecules are two kinds of particles.

T F e) Atoms are made of even smaller parts.

2. Complete each sentence with a word from the list. Use a dictionary to help you.

atom chemical change physical change molecule particle

a) Melting is a _____.

b) Molecules can break apart into _____s during a chemical change.

c) _____s can form new molecules.

d) All atoms are _____s.

e) Chemical properties tell how and when atoms form _____s.

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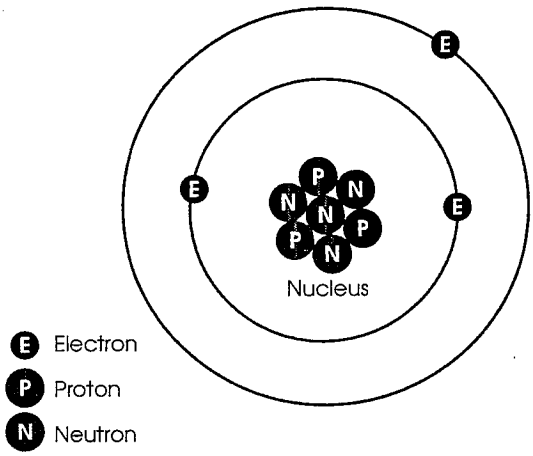
Reading Passage

What Are Atoms?

Matter is made of **atoms.** Atoms are sort of like building blocks or bricks in a building. Like blocks and bricks, some atoms fit together well to make something larger and some don't.

To understand chemical changes, we need to understand what atoms are. Atoms are the smallest bits of matter that get changed around during a chemical change. But, like building blocks, atoms don't change so they will fit better. Think of a child playing with building blocks. She wouldn't saw a block in half to make it fit better.



Atomic Model

About 200 years ago, scientists agreed that matter is made of atoms. It took another 100 years to learn what the main parts of atoms are and how they are arranged. This picture shows the three main parts of an atom. They are electrons, protons, and neutrons.

This is called an **atomic model**. A model is not a true picture of a thing. Scientists use models like this to help explain things that are hard to picture exactly. These are some ideas that the atomic model helps us understand:

1. Atoms are mostly empty space.

2. The three main parts of an atom are **electrons**, **protons**, and **neutrons**.

3. Most of the mass of an atom is in the small center area called the **nucleus**. The nucleus is where all the neutrons and protons are found.

4. Electrons circle the nucleus at different distances.

5. Neutrons and protons have about the same mass. Electrons have much less mass than neutrons or protons.

6. The number of electrons in an atom equals the number of protons. The number of neutrons is about the same but can be a little different.

7. Electrons have a minus (or **negative**) electrical charge. Protons have a plus (or **positive**) electrical charge. Neutrons have no charge.

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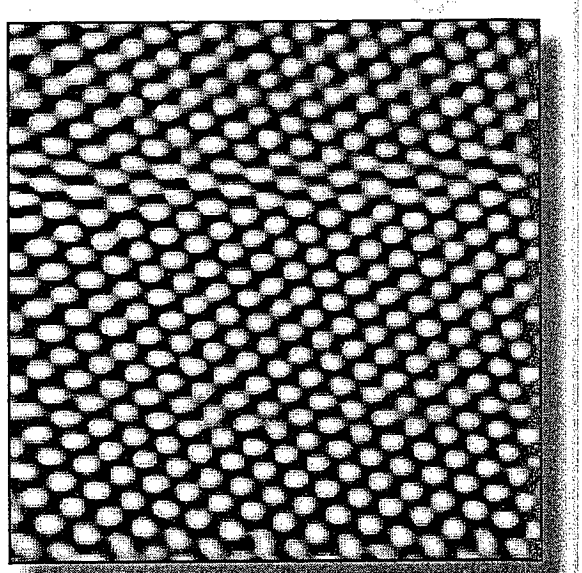
What Are Atoms?

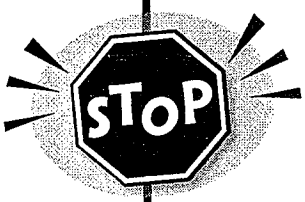
Now let's put all these ideas together: In an atom, small, negative electrons circle the nucleus. The nucleus is made of larger, positive protons and uncharged neutrons. Atoms are mostly empty space. Most of an atom's mass is in the middle. The number of electrons equals number of protons.



Actual atoms

Scientists have learned a lot more than this, but these are the most important things to remember about atoms.

The model on page 8 shows one kind of atom, called a lithium atom. There are about 100 other kinds of atoms, each with its own numbers of electrons, protons, and neutrons.



Suppose the atomic model shown did not have the electrons, protons, and neutrons named. How could you tell which were the PROTONS?

_____

_____

_____

All of these things about atoms were figured out before anyone ever saw an atom. People just thought hard about how matter behaved in experiments. They got ideas, which led to more experiments. After many years, they came up with this model of the atom.

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After You Read


What Are Atoms?


1. Put a check mark (✓) next to the answer that is most correct.

a) Which is true about an atom?

- ○ **A** Atoms have no mass.
- ○ **B** Atoms are mostly empty space.
- ○ **C** Most of the space in an atom is taken up by the nucleus.
- ○ **D** Electrons have much more mass than protons or neutrons.

b) Which two things have about the same mass?

- ○ **A** protons and atoms
- ○ **B** atoms and electrons
- ○ **C** neutrons and protons
- ○ **D** electrons and protons

c) Which did scientists understand first?

- ○ **A** Matter is made of atoms.
- ○ **B** Electrons circle the nucleus.
- ○ **C** Atoms are mostly empty space.
- ○ **D** Atoms are made of electrons, protons, and neutrons.

2. Fill in each blank with a word from the list. Some words will be used more than once.

electron nucleus neutron proton

a) _____s circle the nucleus.

b) The _____ is made up of neutrons and protons.

c) _____s have a plus charge.

d) Most of the mass of an atom is in the _____.

e) Atoms have the same number of _____s and _____s.

f) _____s have no charge.

After You Read

NAME: _____

What Are Atoms?

3. Tell what kind of **electrical charge** electrons, protons, and neutrons have.

_____

_____

4. Where are electrons, protons, and neutrons found in an atom?

_____

_____

Extensions & Applications

5. On the next page are a table and a diagram about atoms for you to complete.

a) Show what you have learned about electrons, protons, and neutrons by filling in the table on the next page.

- **A.** In each box under Mass, write **a lot** or **a little.**
- **B.** In each box under Charge, write **plus, minus** or **zero.**
- **C.** In each box under Position, write **inside** or **outside.**
- **D.** In the last boxes on the right, put a **check mark** in the two boxes for the parts of an atom that have equal mass.

b) Show what you have learned about electrons, protons, and neutrons by labeling the diagram of the atom on the next page.

6. a) After scientists decided matter is made of atoms, it took about 100 years to figure out the parts of an atom. Why do you think it took so long?

_____

_____

b) Is an atomic model the same as a real atom?

_____

_____

c) How is an atomic model useful?

_____

_____

NAME: _____

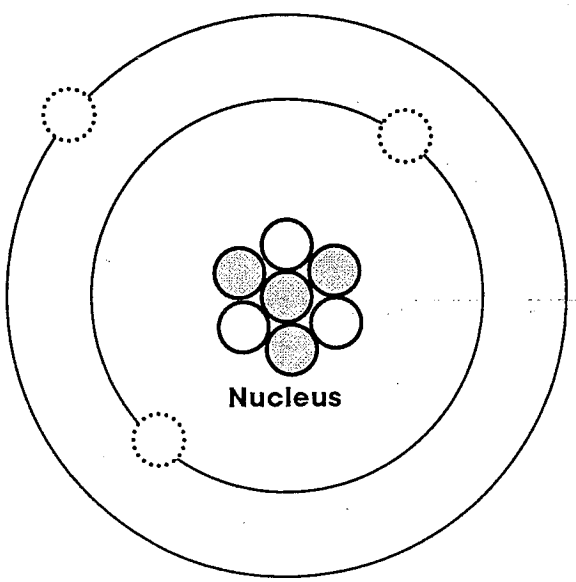
What Are Atoms?

5. a) Complete the table with information from the reading passage.

Atom Part	A. How much mass? A lot or a little?	B. Electrical Charge plus, minus, or zero?	C. Position inside or outside the nucleus?	D. Which two have about equal mass?
Electron				
Proton				
Neutron				

b) Label the parts of the atom in the diagram below. Write **E** in the circle if it is an ELECTRON. Write **P** in the circle if it is a PROTON. Write **N** in the circle if it is a NEUTRON.

Atomic Model

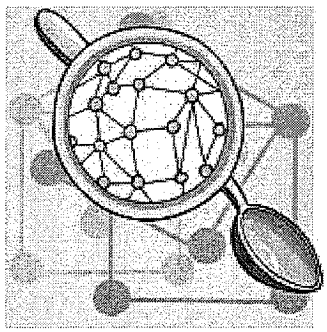


Atoms

By Cindy Grigg

volume	matter	gold	object
measure	measured	grams	joined
even	dream	join	dreams
objects	material	still	space
other	another		

Directions: Fill in each blank with the word that best completes the reading comprehension.



Look around you; what do you see? Everything- and I do mean everything- you see is made up of matter. Matter is the "stuff" that makes up everything. **Matter** is anything that has mass and takes up space.

Mass is the *(1)* _____ of how much *(2)* _____ makes up the *(3)* _____ . Mass is *(4)* _____ in *(5)* _____ . A nickel has the mass of about one gram. Mass is related to how much something weighs. But mass and weight are not the same things.

Matter has *(6)* _____ . This is just *(7)* _____ way of saying that matter takes up space. **Volume** is a measure of how much *(8)* _____ something takes up. Volume is measured in liters.

Even some things you can't see are matter. Air is matter. You can't see air, but you can see things that air moves. Blow on a piece of paper. Watch a tree outside. You will see the paper move and will probably be able to see the leaves blowing on the tree. Moving air caused them to move. You can *(9)* _____ touch air. Blow up a balloon. Poke the balloon with your finger. You can feel that something is inside the balloon.

Things like *(10)* _____ or ideas are not matter. They are not made of any "stuff." They do not take up space. You can't touch an idea or a *(11)* _____ .

Collect a group of *(12)* _____ that seem to have nothing in

common. For instance, let's say you have a nail, an orange, and a dog. These things don't seem to have anything in common, do they? The dog is alive. The nail and the orange are not alive. The nail is made of metal. The orange came from a tree. They have different colors, sizes, and shapes. But there is one thing that they do have in common: they are made up of atoms.

All matter is made up of atoms. Atoms are too small to see. **Atoms** are small particles that make up all matter. Two or more atoms can join together. They make larger particles of matter. Two atoms are *(13)* _____ too small to be seen. But many of these larger particles can *(14)* _____ together to make the matter you see.

Think about holding a tiny piece of sand in your hand. If you drop the piece of sand on the kitchen floor, it is very hard to find it again. Now think about dropping a whole bucket of sand on the kitchen floor. It would make a large pile of sand. But don't really do that because your mom would not be happy! One piece of sand is like one atom. The bucket of sand is like a group of atoms *(15)* _____ together to make one large piece of matter.

We know there are many different kinds of atoms. Some matter is made up of only one kind of atom. A piece of iron is made of only one kind of atom.
(16) _____ is only one kind of atom. If all the atoms are the same kind, we say that piece of matter is an element. An **element** is made of only one kind of atom. All the atoms of an element are the same.

(17) _____ matter is made of more than one kind of atom. Two different kinds of atoms join together to make water. Two different kinds of atoms join together to make the salt you put on your French fries.

Water and salt are very different. They are both *(18)* _____ .
They both have mass. They both take up space. They are both made of atoms. They are different because they are made of different kinds of atoms.

Name _____ Date _____

Atoms

1. What is matter? (A) A measure of how much space something takes up (B) The measure of how much material makes up the object (C) Anything that has mass and takes up space	2. Atoms are: (A) Small particles that make up all matter (B) Too small to see (C) Both A and B
3. An element is: (A) Not made of atoms (B) Made of different kinds of atoms (C) Made of only one kind of atom	4. Air is: (A) Mass (B) Atoms (C) Matter
5. Dreams and ideas are: (A) Not matter (B) Matter (C) Atoms	6. Water and salt are different because: _____ _____
7. All matter is made of: (A) Atoms (B) Mass (C) Elements	8. From reading paragraph 9, we could infer (guess) that _____ and _____ are two elements. _____ _____

Name _____ Date _____

Atoms

What are two ways to measure matter? What units are used? Write a paragraph and explain.

Name _____ Date _____

Atoms

How do we know that something we can't see (like air) is matter? Write a paragraph and explain.

Name _____ Date _____

(Key 1 - Answer ID # 0489828)

Word Chop

Each word has been split into two parts. Put the word parts together and write each word below. Use each word part only once.

Word List

ano	am	ir	ab	eleme	nt
mo	ge	ll	gr	me	instan
am	volu	en	ve	asure	ng
go	rial	hol	sti	er	on
me	at	jo	in	oup	gr
mate	ali	dre	ect	obj	
le	ding	ev	ace	ther	
sayi	ot	sp	ld	matt	
lar	om	ce	ve	her	

1. _____	2. _____	3. _____
4. _____	5. _____	6. _____
7. _____	8. _____	9. _____
10. _____	11. _____	12. _____
13. _____	14. _____	15. _____
16. _____	17. _____	18. _____
19. _____	20. _____	21. _____
22. _____	23. _____	24. _____