

Elements, Molecules, and Mixtures

Atoms and Elements

All things are made of atoms. Atoms are tiny particles (PAR-tuh-kuhls). Your desk is made of atoms. Air is made of atoms. Even you are made of atoms. Atoms are very small. Do you know how many can fit in a teaspoon? Write a one. Write twenty-four zeroes after it. That many! No one can see them with just their eyes. It takes a strong microscope to see them.

A thing can be made of the same kind of atoms. That is called an element (ELL-em-ent). It is very hard to turn one element into another. Iron will always be iron. You can't turn it into other elements. You can heat it. You can hit it. You can drop it in acid. It doesn't matter what you do. It will still be iron. It may not look the same, but it will still be made of iron atoms.

There are about 100 types of atoms. They can be combined in many ways. Each way makes a different thing. This is called atomic arrangement (uh-TOM-ik uh-RANGE-muhnt).

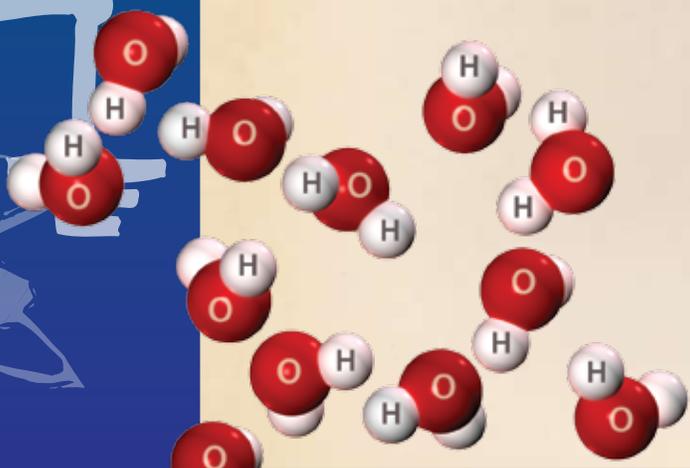
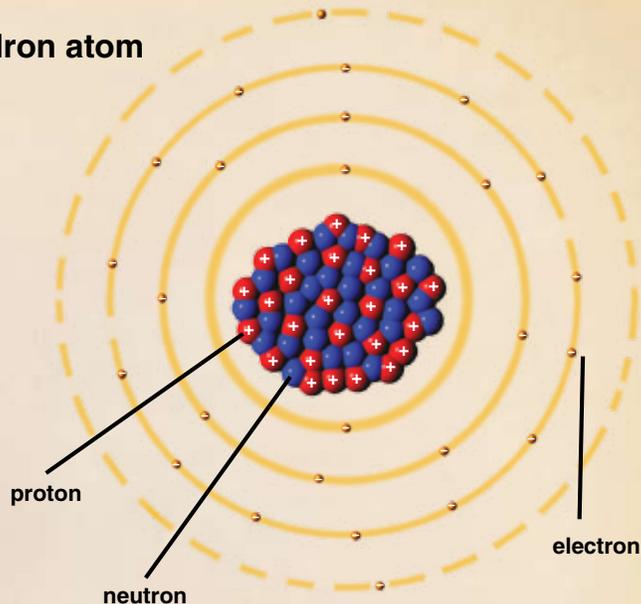
Molecules and Compounds

Atoms can clump up with other atoms. That makes molecules (MOL-uh-kyools). A molecule has some atoms. They are stuck together. A lot of the same clumps is a compound (KOM-pownd). The compound is a new thing. It is different from the elements that make it.

Water is a compound. It is made from two kinds of atoms. It has two hydrogen atoms. It has one oxygen atom. Each water molecule has three atoms. This is written as H_2O . The H stands for hydrogen. The number two means that there are two of those atoms. The O stands for oxygen. No number after the O means there is just one atom. Water is made of oxygen and hydrogen. It isn't like either of them. It is a compound. Compounds are not like their parts.

How are compounds made? They are made of elements. Reactive (ree-AK-tiv) elements join with others to make compounds.

Iron atom

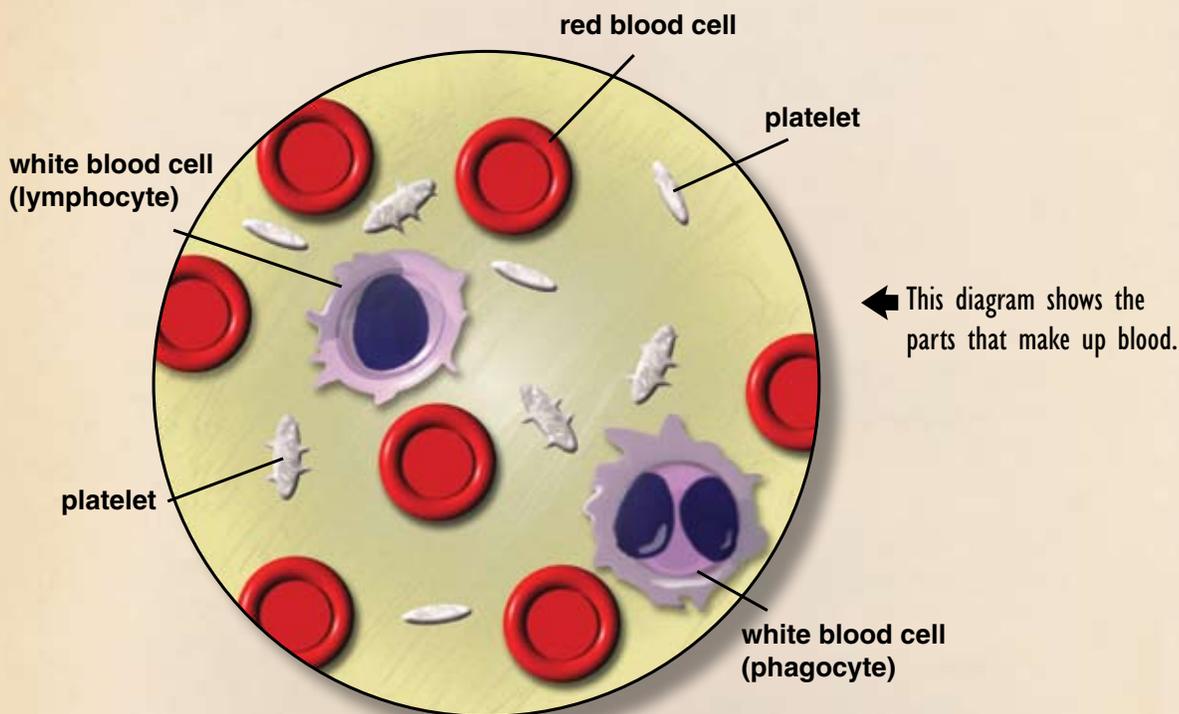


← Water molecules

Mixtures

A mixture is not the same as a compound. Air and blood are mixtures. They have many types of atoms and molecules. Not all of the atoms are in compounds. They can be separated. You just need to know how.

You can pull apart a mixture in steps. You use the properties of the things in the mixture. These are things such as their melting and boiling points. It can be how magnets affect them. You can use magnets to pull out the magnetic parts. It can be the size of its solid chunks. You can use a filter that sorts the big chunks from the small chunks.



Comprehension Question

What are molecules made of?

Elements, Molecules, and Mixtures

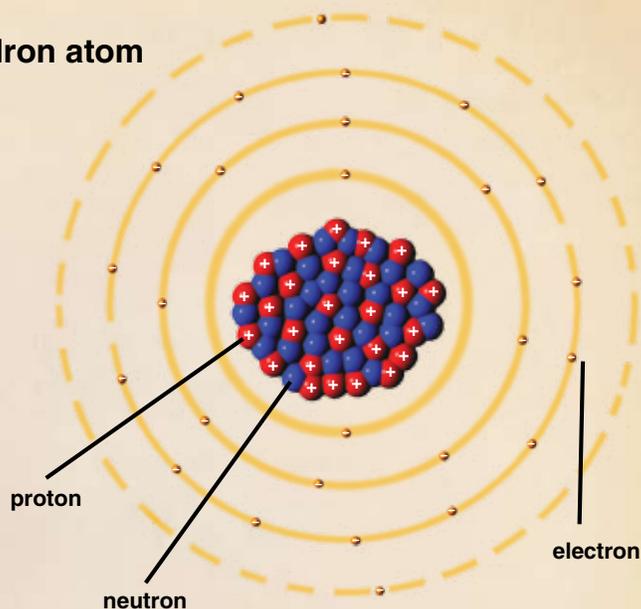
Atoms and Elements

All matter is made of atoms. Atoms are tiny particles (PAR-tuh-kuhls). Even air is made of atoms. Atoms are small. A million billion billion of them fit in a teaspoon. No one can see them without help. It takes a strong microscope to see them.

A thing can be made of the same kind of atoms. That is called an element (ELL-em-ent). It is very hard to turn one element into another element. Iron will always be iron. You can't turn it into other elements. You can heat it. You can hit it. You can drop it in acid. It doesn't matter what you do. It will still be iron. It may not look the same. It will still be made of iron atoms.

There are about 100 types of atoms. They can be put together in many ways. Each way makes a different thing. This is called atomic arrangement (uh-TOM-ik uh-RANGE-muhnt).

Iron atom

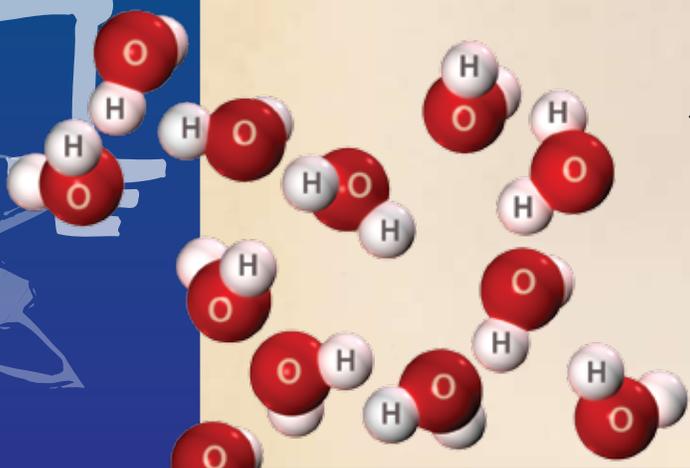


Molecules and Compounds

Atoms join to make molecules (MOL-uh-kyools). A molecule has some atoms stuck together. That is a compound (KOM-pownd). The compound is different from the elements that make it.

Water is made from hydrogen and oxygen. But it isn't like either of them. Water is a compound. Each water molecule has two kinds of atoms. There are two hydrogen atoms and one oxygen atom. This is written as H_2O . The H stands for hydrogen. The number two means that there are two of those atoms. The O stands for oxygen. No number after the O means there is just one atom.

How are compounds made? They are made of reactive (ree-AK-tiv) elements. Reactive elements join with others. Some elements are very reactive. Some are not. Very reactive elements are very likely to join up to make compounds.

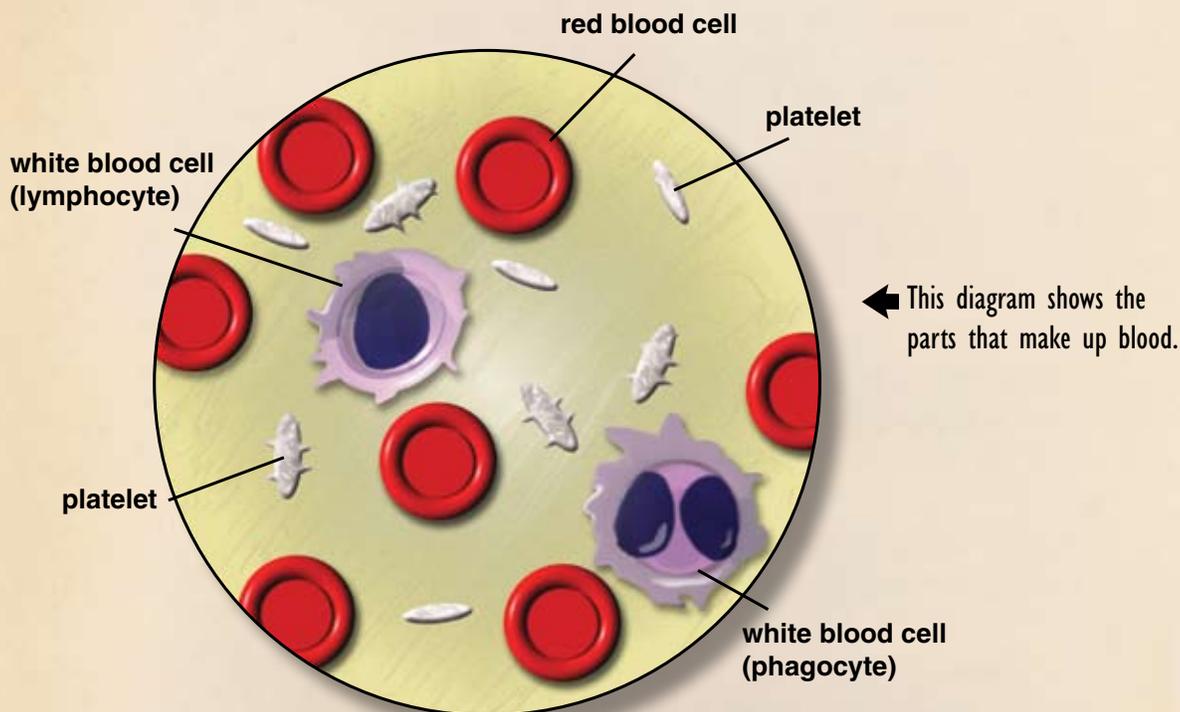


← Water molecules

Mixtures

A mixture is not the same as a compound. Air and blood are mixtures. They have many types of atoms and molecules. Not all of the atoms are in compounds. They can be separated. You just need to know how.

You can separate a mixture in steps. You use the properties of the things in the mixture. These are things such as their melting and boiling points. It can be how magnets affect them. It can be the size of its solid chunks. You can use magnets to pull out the magnetic parts. You can use a filter that sorts the big chunks from the small chunks.



Comprehension Question

How are atoms and molecules related?

Elements, Molecules, and Mixtures

Atoms and Elements

All matter is made of atoms. Atoms are tiny particles (PAR-tuh-kuhls). Even air is made of atoms. Atoms are small. A million billion billion of them fit in a teaspoon. No one can see them without help. It takes a strong microscope to see them.

When something is made of the same kind of atoms, it is called an element (ELL-em-ent). It is very hard to turn one element into another element. In other words, iron will always be iron. You can't turn it into other elements. You can heat it. You can hit it. You can drop it in acid. It doesn't matter what you do. It will still be iron. It may not look the same, but it will still be made of iron atoms.

There are about 100 types of atoms. They can be put together in many ways. Each way makes something different. This is called atomic arrangement (uh-TOM-ik uh-RANGE-muhnt).

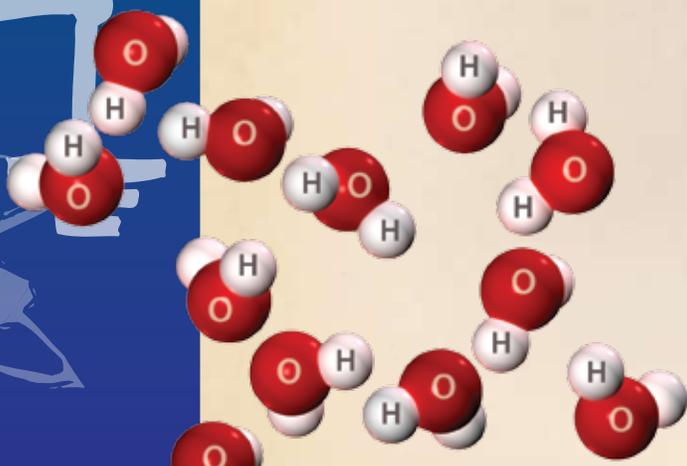
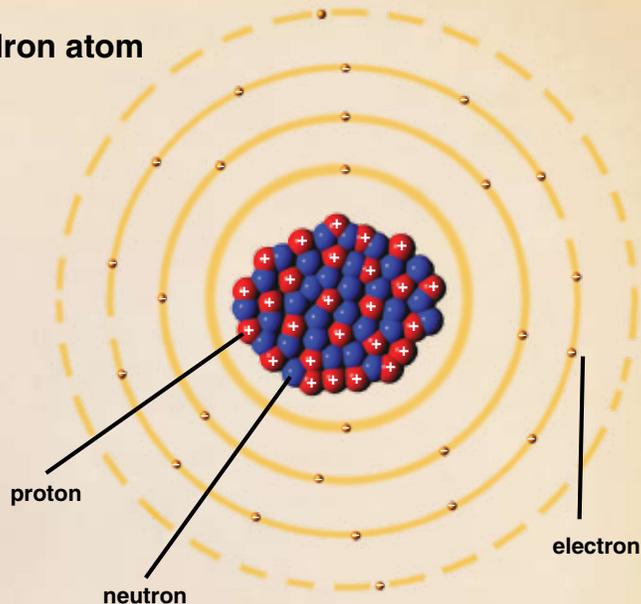
Molecules and Compounds

Atoms can join to make molecules (MOL-uh-kyools). A molecule has two or more atoms stuck together. They become a new substance called a compound (KOM-pownd). A compound has different properties from the elements that make it.

For example, water is made from hydrogen and oxygen. But it isn't like either of them. Water is a compound. Each water molecule has two kinds of atoms. There are two hydrogen and one oxygen atom. This is written as H_2O . The number two means that there are two hydrogen atoms in the molecule. No number after the O means there is just one atom of oxygen.

Compounds are made by reactive (ree-AK-tiv) elements. Reactive elements join easily with others. Some elements are very reactive. Some are not. The more reactive an element, the more likely it will form compounds.

Iron atom

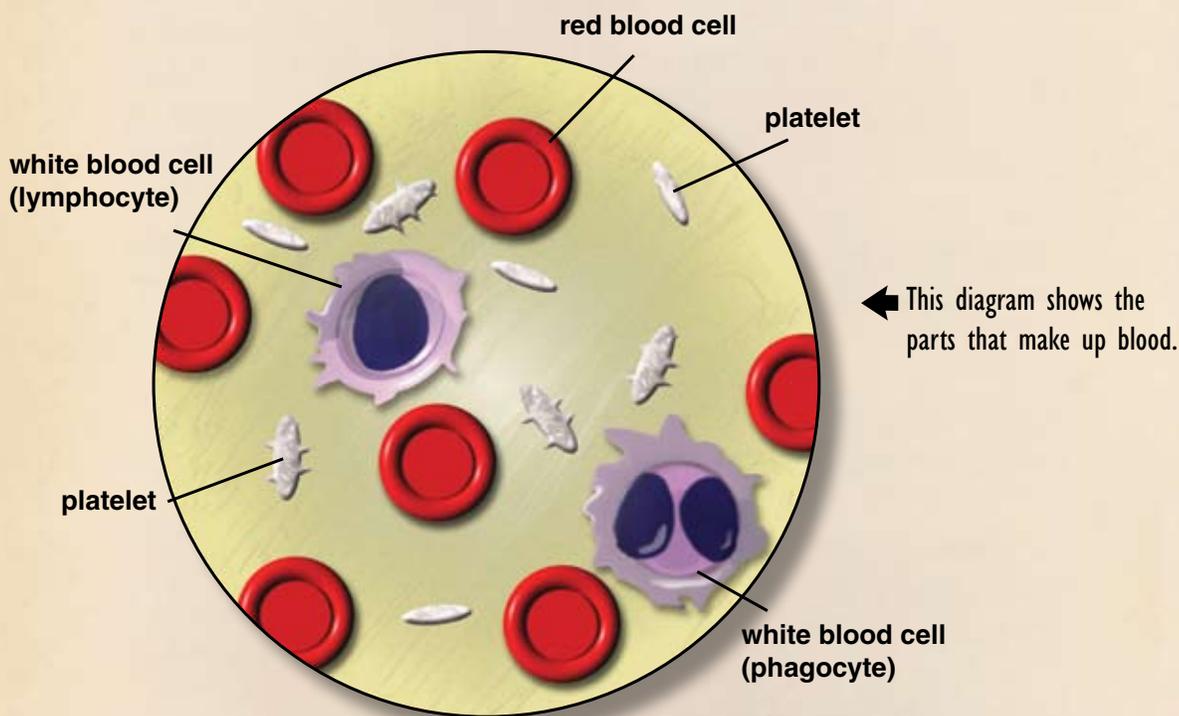


← Water molecules

Mixtures

A mixture is not the same as a compound. Some everyday mixtures are air and blood. They contain many different types of atoms and molecules. Not all of the atoms and molecules are joined through reactions. They can be separated easily if you know how.

The way to separate a mixture is to use the properties of the substances in the mixture. These properties are things such as the melting and boiling points. Another is whether or not it is magnetic. And one more property is the size of its solid chunks. You can use magnets to separate out the magnetic molecules. You can use a sieve to separate the big chunks from the small chunks.



Comprehension Question

Compare and contrast atoms and molecules.

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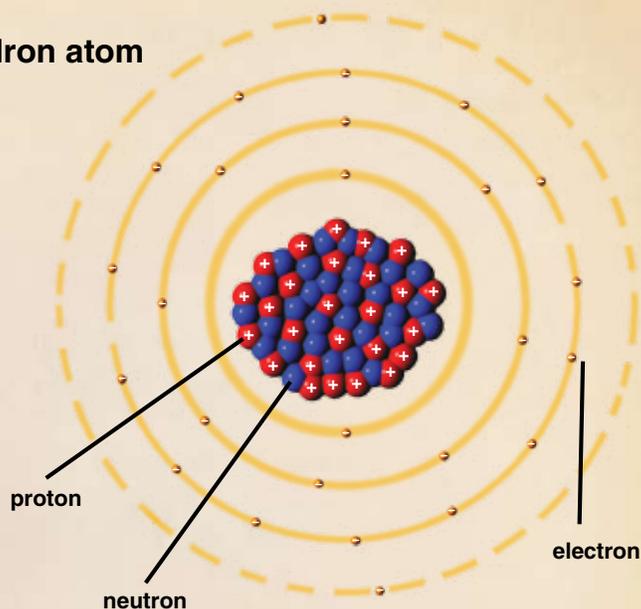
Atoms and Elements

Everything is made of atoms. Atoms are tiny particles (PAR-tuh-kuhls). Your desk, the air around you, even you are made of atoms. Atoms are so small that a million billion billion of them fit on a teaspoon. Humans can only see them with powerful electron microscopes.

When a substance is made entirely of the one kind of atom, it is called an element (ELL-em-ent). Elements cannot be easily transformed into other elements. In other words, iron will always be iron. You can heat it, hit it, or drop it in acid. No matter what you do, it will still be iron. It may not look the same after so much abuse, but it will still be composed of iron atoms.

There are about 100 different elements. They can be put together in many different ways. Each different way makes one of the millions of different things that exist. This is called atomic arrangement (uh-TOM-ik uh-RANGE-muhnt).

Iron atom

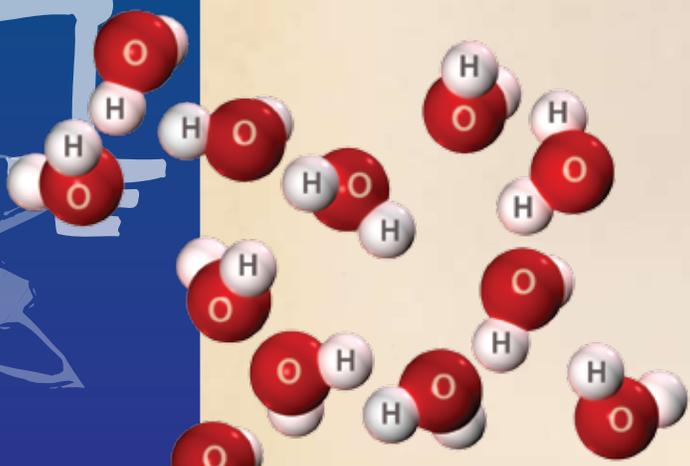


Molecules and Compounds

Atoms combine to make molecules (MOL-uh-kyools). In molecules, the component atoms share electrons. Together, they become a new substance called a compound (KOM-pownd). A compound has different properties from the elements that went into it.

For example, water is a compound of hydrogen and oxygen, but it isn't like either of them. Each water molecule has two hydrogen and one oxygen atom. The atomic arrangement is written as H_2O . The number two means that there are two hydrogen atoms in the molecule; no number after the O means there is just one oxygen.

Compounds are made by reactive (ree-AK-tiv) elements that join easily with others in chemical reactions. Some elements are very reactive; some are not. The more reactive an element, the more likely it will form compounds.

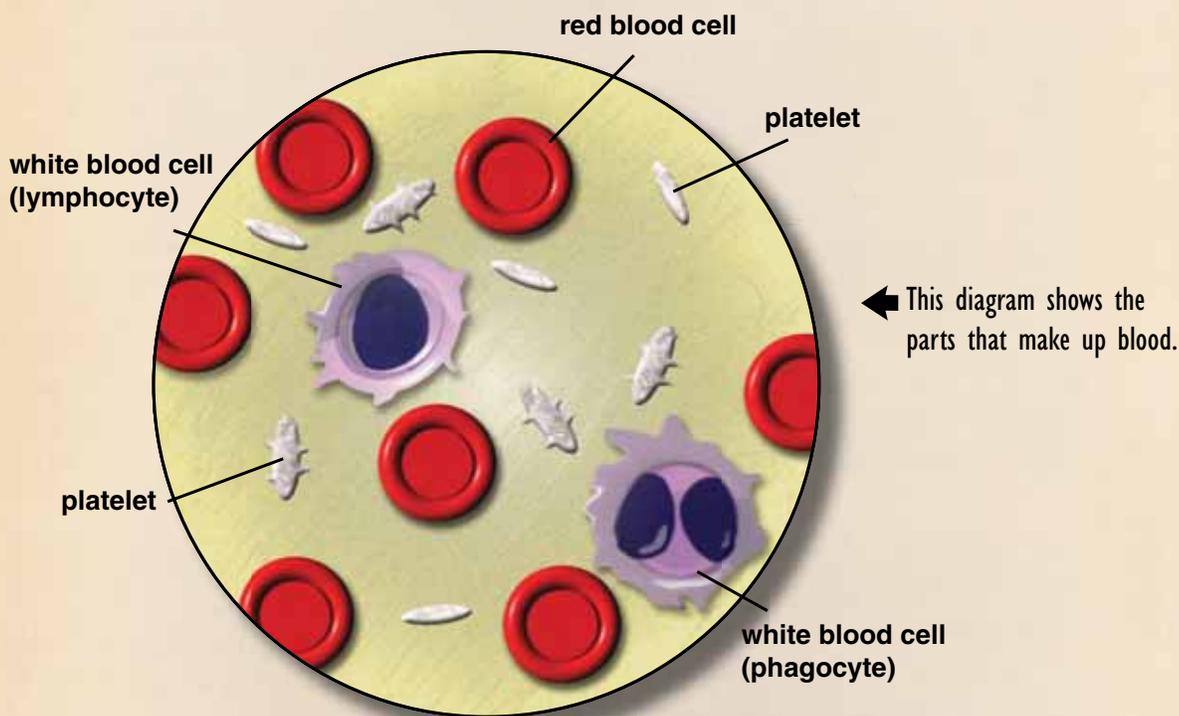


← Water molecules

Mixtures

A mixture is not the same as a compound. Some everyday mixtures are air and blood. They contain many different types of atoms and molecules, and not all of them are the product of chemical reactions. They can be separated easily if you know how.

To separate a mixture, use the properties of the substances in the mixture such as their melting and boiling points. Magnetic ingredients or ingredients that form solid chunks are easy to separate out. Magnets can separate out the magnetic molecules. A sieve can separate the big chunks from the small chunks.



Comprehension Question

Describe the role of atoms in elements, compounds, and mixtures.