Name: _____ Date: _____

Atoms and the Periodic Table

Circle group

Everything you can touch is made of atoms, from a coin to the air in a balloon. An atom is the smallest piece of an element that still has the traits of that element. Atoms are far too small to see, even with a normal microscope.

An atom has three kinds of tiny parts, called particles. Protons have a positive charge. Neutrons have no charge. Both are packed into a tiny center called the nucleus. Electrons have a negative charge. They move around the nucleus, in the space outside it. Most of an atom is empty space.

What makes one element different from another? It is the number of protons in its atoms. Every hydrogen atom has one proton. Every carbon atom has six. Every oxygen atom has eight. This number is called the atomic number. If an atom gains or loses a proton, it turns into a different element.

The periodic table lists all the known elements in order of atomic number. Each row is called a period. Each column is called a group. Elements in the same group tend to act in the same ways. For example, the noble gases, like helium and neon, rarely react with other elements. But the alkali metals, like sodium and potassium, react easily.

The table also helps scientists predict. When Dmitri Mendeleev put the elements in order, he left gaps. The gaps were for elements no one had found yet. He said what they would be like. Later finds matched what he said very closely.

When atoms of different elements bond, they make a compound. Water is a compound with two hydrogen atoms and one oxygen atom. Chemists use the table to see how atoms will join.

Questions

1. What is an atom?

_____

_____

2. What are the three kinds of particles in an atom? Where is each one?

_____

_____

3. What decides which element an atom is?

_____

4. How many protons does an oxygen atom have?

5. How is the periodic table set up?

6. What do elements in the same group share?

7. Why did Mendeleev leave gaps in his table?

8. What would happen to a carbon atom if it gained two protons?

Words to know

atom: the smallest piece of an element that still has that element's properties
nucleus: the tiny center of an atom, made of protons and neutrons
proton: a particle in the nucleus with a positive charge
electron: a tiny particle with a negative charge that moves around the nucleus
atomic number: the number of protons in an atom of an element
compound: a substance made when atoms of different elements join together

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Atoms and the Periodic Table

Triangle group

Everything you can touch, from a coin to the air in a balloon, is made of atoms. An atom is the smallest piece of an element that still has the properties of that element. Atoms are far too small to see, even with an ordinary microscope.

An atom has three kinds of particles. Protons carry a positive charge, and neutrons carry no charge. Both are packed into a tiny center called the nucleus. Electrons carry a negative charge and move around the nucleus in the space outside it. Most of an atom is empty space.

What makes one element different from another is the number of protons in its atoms. Every atom of hydrogen has one proton. Every atom of carbon has six, and every atom of oxygen has eight. This number is called the atomic number. If an atom gains or loses a proton, it becomes a different element.

The periodic table arranges all the known elements in order of atomic number. Each row is called a period, and each column is called a group. Elements in the same group tend to behave in similar ways. For example, the noble gases, such as helium and neon, rarely react with other elements, while the alkali metals, such as sodium and potassium, react easily.

The table also helps scientists predict. When Dmitri Mendeleev arranged the elements, he left gaps for elements that no one had found yet, and he predicted what they would be like. Later discoveries matched his predictions closely.

Atoms can join together. When atoms of different elements bond, they form a compound, such as water, which is made of two hydrogen atoms and one oxygen atom. Chemists use the table to understand how atoms will combine.

Questions

1. What is an atom?

_____

_____

2. What are the three kinds of particles in an atom, and where is each found?

_____

_____

3. What decides which element an atom belongs to?

_____

_____

4. How many protons does an atom of oxygen have?

_____

_____

5. How is the periodic table arranged?

_____

_____

6. What do elements in the same group have in common?

_____

_____

7. Why did Mendeleev leave gaps in his table?

_____

_____

8. According to the passage, what would happen to an atom of carbon if it gained two protons?

_____

_____

Words to know

atom: the smallest piece of an element that still has that element's properties
nucleus: the tiny center of an atom, made of protons and neutrons
proton: a particle in the nucleus with a positive charge
electron: a tiny particle with a negative charge that moves around the nucleus
atomic number: the number of protons in an atom of an element
compound: a substance made when atoms of different elements join together

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Atoms and the Periodic Table

Square group

Everything you can touch, from a coin to the air inside a balloon, is composed of atoms. An atom is the smallest particle of an element that still retains the characteristic properties of that element, and atoms are far too minute to observe, even with an ordinary microscope.

An atom contains three varieties of particles. Protons carry a positive electrical charge, while neutrons carry no charge at all; both are concentrated in a tiny central region called the nucleus. Electrons carry a negative charge and move around the nucleus, occupying the space outside it. Remarkably, the overwhelming majority of an atom is empty space.

What distinguishes one element from another is the number of protons in its atoms. Every hydrogen atom contains exactly one proton, every carbon atom contains six, and every oxygen atom contains eight. This quantity is known as the atomic number, and if an atom were to gain or lose a proton, it would become an entirely different element.

The periodic table organizes all the known elements in order of increasing atomic number. Each horizontal row is designated a period, and each vertical column is designated a group. Elements within the same group tend to exhibit similar behavior: the noble gases, such as helium and neon, rarely react with other elements, whereas the alkali metals, such as sodium and potassium, react readily.

The table also enables scientists to make predictions. When Dmitri Mendeleev arranged the elements, he deliberately left gaps for elements that had not yet been discovered, and he predicted their characteristics. Subsequent discoveries corresponded closely with his predictions.

Atoms can also combine. When atoms of different elements bond, they form a compound, such as water, which consists of two hydrogen atoms and one oxygen atom. Chemists rely on the periodic table to understand how atoms will combine.

Questions

1. How does the passage define an atom?

_____

_____

2. Identify the three varieties of particles in an atom and the location of each.

_____

_____

3. What determines the identity of an element?

_____

_____

4. How many protons does every oxygen atom contain?

_____

_____

5. Describe the organization of the periodic table.

_____

_____

6. What characteristic do elements in the same group share?

_____

_____

7. What reasoning led Mendeleev to leave gaps in his arrangement?

_____

_____

8. Based on the passage, what would a carbon atom become if it gained two protons, and why?

_____

_____

Words to know

atom: the smallest piece of an element that still has that element's properties
nucleus: the tiny center of an atom, made of protons and neutrons
proton: a particle in the nucleus with a positive charge
electron: a tiny particle with a negative charge that moves around the nucleus
atomic number: the number of protons in an atom of an element
compound: a substance made when atoms of different elements join together

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Atoms and the Periodic Table

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Atoms and the Periodic Table

Easier · 285 words · Flesch-Kincaid grade 5.7

1. The smallest piece of an element that still has the traits of that element.
2. Protons and neutrons are in the nucleus. Electrons move around the nucleus, in the space outside it.
3. The number of protons in it, called the atomic number.
4. Eight.
5. In order of atomic number, with rows called periods and columns called groups.
6. They tend to act in the same ways.
7. He thought there were elements no one had found yet. The pattern showed where they should go, and later finds matched what he said.
8. It would have eight protons, so it would turn into oxygen.

Triangle: Atoms and the Periodic Table

This passage · 288 words · Flesch-Kincaid grade 7.9

1. The smallest piece of an element that still has the properties of that element.
2. Protons and neutrons are packed into the nucleus. Electrons move around the nucleus in the space outside it.
3. The number of protons in its atoms, which is called the atomic number.
4. Eight.
5. In order of atomic number, in rows called periods and columns called groups.
6. They tend to behave in similar ways.
7. He predicted that there were elements no one had found yet. The pattern showed him where they should fit, and later discoveries matched his predictions.
8. It would have eight protons, so it would become oxygen, a different element.

Square: Atoms and the Periodic Table

Harder · 302 words · Flesch-Kincaid grade 12.5

1. The smallest particle of an element that still retains the characteristic properties of that element.
2. Protons and neutrons are concentrated in the nucleus. Electrons move around the nucleus, occupying the space outside it.
3. The number of protons in its atoms, known as the atomic number.
4. Eight.
5. Elements are ordered by increasing atomic number, in horizontal rows called periods and vertical columns called groups.

6. They tend to exhibit similar behavior.
7. The pattern indicated that some elements had not yet been discovered, so he left places for them and predicted their characteristics. Later discoveries matched closely.
8. Oxygen, because it would then have eight protons, and the number of protons determines the element.