

What is an Atom?

Fifth Grade

Activity: 2

Time: 1 Class Period

General Description

The teacher will introduce the basic structure of an atom. Students will explain how the number of protons is the identifier of the element. Students will practice how to find the number of neutrons by using the atomic mass and the periodic table.

Objectives

Students will identify the basic atomic structure of an element.

Students will use the Periodic table to find the number of protons, neutrons, and electrons of an element.

Students will identify specific elements using the Periodic Table.

Arizona State Standards

SC05 S5C1 PO1 Identify that matter is made of smaller units called:

- molecules (e.g., H₂O, CO₂)
- atoms (e.g., H, N, Na)

Teacher Information

Everything we see, touch, smell, is made up of matter. All matter is made up of atoms. It is difficult for student to understand a concept that they can not see or touch therefore allowing them the opportunity to draw different atoms is helpful.

Materials

Teacher Notes - Activity Card 5-2a

Periodic Table of Elements - Activity Card 5-2b

Research sources

Internet sites

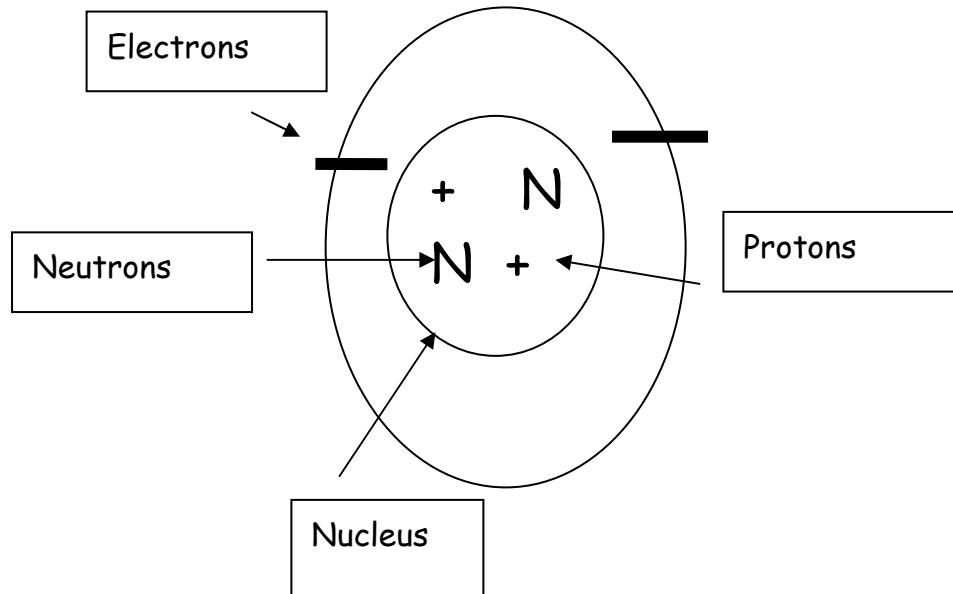
Construction Paper

Markers/colored pencils

Procedures/Exploration

1. Ask students what they think matter is. Write these ideas on the board.
2. Ask them if air is matter. Clarify that air is matter since it takes up space; use a balloon to prove this concept.
3. Explain that all matter is made up of atoms. These are particles that we can not see with our eyes.
4. Draw a simple atom of Helium on the board or over head for students to look at; see picture below. Include in the drawing the protons, electrons, neutrons and nucleus.
5. Using the periodic table show them how you knew what to draw. Relate the Periodic Table to a drawing manual.

6. Explain that each element has a specific number of protons; protons are positive particles of the nucleus.
7. Explain that the number of electrons always equals the number of protons.
8. Show them how to find the number of neutrons which is the number of protons subtracted from the atomic number.
9. Assign different elements to the students and have them draw them accurately.



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Teacher Notes

Atom

- ◆ Every element has characteristics specific to that element.
- ◆ Elements are made up of many particles.
- ◆ One individual particle is called an atom.
- ◆ An atom has those specific characteristics of that element. An atom of the same elements will always have those same specific characteristics.
- ◆ Every atom is made of three parts, protons, neutrons, and electrons.
- ◆ Protons and neutrons make up the nucleus
 - Protons are positively charged
 - Neutrons have a neutral charge
- ◆ Electrons travel around the nucleus in shells.
- ◆ Electrons are negatively charged.
- ◆ Atoms are found in nature without a charge. They are considered to be neutral.

Protons' Jobs

- ◆ All atoms have a specific number of protons.
- ◆ The number of protons identifies the element from which the atom comes from.
- ◆ Atomic number signifies the number of protons.
- ◆ Protons and Neutrons: Together they equal the mass number, sometimes called the atomic mass.
 - ✓ Have the students identify an element by its atomic number.
 - ✓ Have students determine the number of protons in a particular element. Give them the following formula: atomic mass minus the atomic number will give the number of neutrons.
- ◆ An element's atomic number will never change, if there is a different atomic number than you have a different element.
- ◆ Atomic mass can vary from atom to atom of the same element. The atomic mass varies due to the variation of neutrons. These variations are called isotopes.

Symbols

- ◆ Chemical symbols are used to denote specific elements without have to write out the whole name.
- ◆ Have students' practice finding the symbols for different elements. You can do this as a game such as "popcorn" or just call on students.

Periodic Table

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Periodic Table of The Elements

1 Hydrogen 1.0080 H		2 Helium 4.003 He		3 Lithium 6.939 Li		4 Beryllium 9.012 Be		5 Boron 10.811 B		6 Carbon 12.01115 C		7 Nitrogen 14.007 N		8 Oxygen 15.999 O		9 Fluorine 18.998 F		10 Neon 20.183 Ne	
11 Sodium 22.990 Na		12 Magnesium 24.312 Mg		13 Aluminum 26.981 Al		14 Silicon 28.086 Si		15 Phosphorus 30.974 P		16 Sulfur 32.064 S		17 Chlorine 35.453 Cl		18 Argon 39.948 Ar		19 Potassium 39.102 K		20 Calcium 40.08 Ca	
37 Rubidium 85.47 Rb		38 Strontium 87.62 Sr		39 Yttrium 88.905 Y		40 Zirconium 91.22 Zr		41 Niobium 92.906 Nb		42 Molybdenum 95.94 Mo		43 Technetium 98.906 Tc		44 Ruthenium 101.07 Ru		45 Rhodium 102.91 Rh		46 Palladium 106.4 Pd	
55 Cesium 132.90 Cs		56 Barium 137.34 Ba		57 Lanthanum 138.91 La		72 Hafnium 178.49 Hf		73 Tantalum 180.95 Ta		74 Tungsten 183.85 W		75 Rhenium 186.21 Re		76 Osmium 190.2 Os		77 Iridium 192.2 Ir		78 Platinum 195.09 Pt	
87 Francium 223 Fr		88 Radium 226 Ra		89 Actinium 227 Ac		104 Rutherfordium 261 Rf		105 Dubnium 262 Db		106 Seaborgium 263 Sg		107 Bohrium 264 Bh		108 Hassium 265 Hs		109 Meitnerium 266 Mt		110 Darmstadtium 267 Ds	
101 Mendelevium 258 Md		102 Nobelium 259 No		103 Lawrencium 260 Lr		104 Rutherfordium 261 Rf		105 Dubnium 262 Db		106 Seaborgium 263 Sg		107 Bohrium 264 Bh		108 Hassium 265 Hs		109 Meitnerium 266 Mt		110 Darmstadtium 267 Ds	
111 Roentgenium 268 Rg		112 Copernicium 269 Cn		113 Nihonium 270 Nh		114 Flerovium 271 Fl		115 Moscovium 272 Mc		116 Livermorium 273 Lv		117 Tennessine 274 Ts		118 Oganesson 274 Og		119 Ununennium 275 Uue		120 Unbinilium 276 Uub	

NON METALS

gen and the alkali metals.
—The last (18) contains the *inert* gases.
—Group 17 includes the *halogens*.
—The elements intervening between groups 2 and 13 are called *transition elements*.
—Vertical columns, without Arabic numeral headings are called *subgroups*.
Periods—in a given period the properties of the elements gradually pass from a strongly metallic character to a non-metallic nature, with the last number of a period being an inert gas.

LIGHT METALS

In the periodic table the elements are arranged in order of increasing atomic weight. The elements in a vertical column are called *Groups*. A horizontal sequence of elements is called a *Period*. The most active elements are at the top right and bottom left of the table. A diagonal line separates metallic from non-metallic elements.
Groups—Elements within a group have similar properties and contain the same number of electrons in their outside energy shell.
—The first group (1) includes hydro-

Key

Information Color

Name of Element Red
Atomic Weight Yellow
Atomic Symbol Black
Atomic Number Green

