

Structure Of The Atom (p. 506 - 511)

I. Scientific Shorthand

1. List four ways how chemical symbols were created in the periodic table of elements?

- P. 506
1. First letter of element's name. (Sometimes first letter + another letter.)
 2. Derived from Latin. (Argentum = Silver)
 3. Named to honor scientists (Einsteinium)
 4. Rules established by international committee

II. Atomic Components

1. Define the term atom.

P. 507
Atom - smallest piece of matter that still retains the property of the element.

2. Define the term nucleus.

Nucleus - small, positively-charged center of an atom (composed of protons + neutrons)

3. Match the subatomic particles with the correct definitions.

1. C. - Protons A. Neutral particles that do not have an electric charge.
2. A. - Neutrons B. Particles that have an electrical charge of (-1).
3. B. - Electrons C. Particles that have an electrical charge of (+1).

III. Quarks - Even Smaller Particles

1. Electrons are not composed of smaller particles.

Circle One : True False

2. Define the term quarks.

Quarks - smaller particles that make up protons + neutrons

3. How many quarks combined create a proton and a neutron?

Proton = 3 quarks

Neutron = 3 quarks

(Up, Charmed, Top = +2/3 charge
Down, Strange, Bottom = -1/3 charge)

+1 Charge ← Proton = 2 - Up Quarks, 1 - Down Quark
Neutral ← Neutron = 2 - Down Quarks, 1 - Up Quark

4. How do scientists find quarks?

Accelerating charged particles to tremendous speeds and collide with protons

5. What is the name of the machine that produces isolated quarks?

Tevatron

Splits protons apart

What is the name of the research laboratory?

Fermi National Accelerator Laboratory

Where is the laboratory located?

Batavia, Illinois

IV. Models - Tools For Scientists

1. Democritus named the smallest particles atoms because they could not be divided.
2. What theory did John Dalton propose to explain why the elements in a compound always joined in the same way?

All matter is made up of individual particles called atoms
(Can't be divided / Solid, tiny spheres / Proportionate)

V. Visualizing The Atomic Model

100g sample of magnesium combines with 65.8g oxygen (same as 10g magnesium + 65.8g oxygen)

1. Match the atomic structure model discoverer with the correct definition.

- | | |
|------------------------------|--|
| 1. <u>B.</u> - Democritus | A. Negative charges scattered all over positive-charged atom
(Fluorescent beam passed between (+)-charged plates) |
| 2. <u>E.</u> - J. Dalton | B. Tiny, solid particles that could not be divided |
| 3. <u>A.</u> - J. Thomson | C. Electrons travel in fixed orbits around atom's nucleus |
| 4. <u>D.</u> - E. Rutherford | D. Positively-charged nucleus surrounded by electrons
(Alpha particles spread out from gold foil sheet) |
| 5. <u>C.</u> - N. Bohr | E. Solid sphere that combined in similar proportions |

2. Define the term electron cloud.

Electron Cloud - area around the nucleus of an atom where it electrons are most likely located.

3. How does the electron cloud compare to the size of the nucleus?

100,000 X larger (1 proton = 2,000 electrons)

4. The exact location of an electron can be determined.

Circle One : True

False

Ex - Bicycle wheel spokes
- Airplane propeller
- B.L.O.

p. 508

Dividing Paper DEMO

p. 509

p. 510

Chocolate Chip Ice Cream

Chips = Electrons
Vanilla = Protons

Incorrect

Structure Model

Nucleus = marble
Electron Cloud = Astradome

p. 511