

Name: \_\_\_\_\_

Class: \_\_\_\_\_ Date: \_\_\_\_\_

# THE ATOM

**ESSENTIAL QUESTION:** What important \_\_\_\_\_ does the \_\_\_\_\_  
Table tell us about the \_\_\_\_\_ of \_\_\_\_\_?

VOCAB

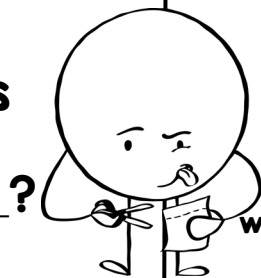


A \_\_\_\_\_ form of  
\_\_\_\_\_ that cannot  
be \_\_\_\_\_ down into  
simpler substances.

TOPIC QUESTIONS:

1

What is an  
\_\_\_\_\_?



An atom is the  
\_\_\_\_\_ part of a  
\_\_\_\_\_ element that  
can \_\_\_\_\_.

The word 'atom' comes  
from the Ancient Greek  
adjective '\_\_\_\_\_',  
which means *indivisible* or  
\_\_\_\_\_ *able to be* \_\_\_\_\_.

QUICK WATCH:

Just How Small is an Atom?

<https://bit.ly/2DtuV5f>

Complete the table below.

Analogy	My Guess (circle one)	Actual
If the atoms of a grapefruit were blown up to the size of blueberries, then the grapefruit would be the size of...	A) basketball B) school bus C) box store D) large island E) United States F) Earth	
If an atom were blown up to the size of a football stadium, then its nucleus would be the size of...	A) car B) soccerball C) apple D) marble E) pea	
The density of an atom's nucleus is about the same as if you stuffed which of the following into a 1 foot by 1 foot by 1 foot-sized box...	A) elephant B) blue whale C) box store D) metropolitan city E) Every person on Earth's car	

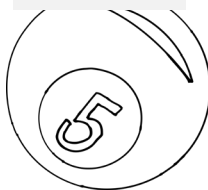
2

How has the  
\_\_\_\_\_ of an atom  
changed  
over  
\_\_\_\_\_?

The concept of an atom has changed over time as more and more \_\_\_\_\_ has been  
done and \_\_\_\_\_ have evolved. \_\_\_\_\_ can help us understand the different models.

DALTON'S  
THEORY

1803



Billiard ball: Atoms  
are \_\_\_\_\_.  
All atoms of the same  
element are \_\_\_\_\_.

THOMSON'S  
THEORY

1897



Chocolate chip cookie: Atoms  
are a \_\_\_\_\_.  
\_\_\_\_\_ substance with  
negatively-charged particles  
\_\_\_\_\_ about.

RUTHERFORD'S  
THEORY

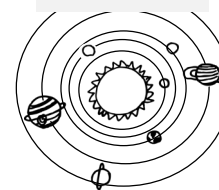
1908



Cherry with a pit: Atoms  
are made mostly of  
\_\_\_\_\_ space with a  
\_\_\_\_\_, positively-  
charged \_\_\_\_\_.

BOHR'S  
THEORY

1913



Solar system:  
\_\_\_\_\_ move in definite  
\_\_\_\_\_ around the  
nucleus.

CURRENT  
THEORY

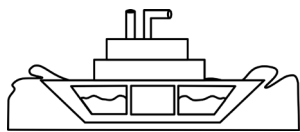
NOW!



Cotton ball: Electrons  
do \_\_\_\_\_ move in  
orbits but instead at  
high \_\_\_\_\_ to  
form an 'electron  
\_\_\_\_\_'.  
\_\_\_\_\_.

3

What are the particles?



The root *sub* means “under” or “\_\_\_\_\_”.

The \_\_\_\_\_ subatomic particles, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_, are the \_\_\_\_\_ that make up an \_\_\_\_\_.

**amu** = \_\_\_\_\_ **Mass Unit**  
A \_\_\_\_\_ unit of mass used to measure the \_\_\_\_\_ of subatomic particles.

Particle			
Charge			
Symbol	$p^+$	$n^0$	$e^-$
Mass			



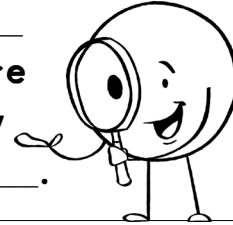
Protons are like the ‘\_\_\_\_\_’ of the atom. Every type of atom has a \_\_\_\_\_ number of protons.



Neutrons add \_\_\_\_\_ to an atom, but they are \_\_\_\_\_ so they don’t add \_\_\_\_\_.



Electrons are so, so \_\_\_\_\_ that they are essentially \_\_\_\_\_.



4

Where are the subatomic \_\_\_\_\_?

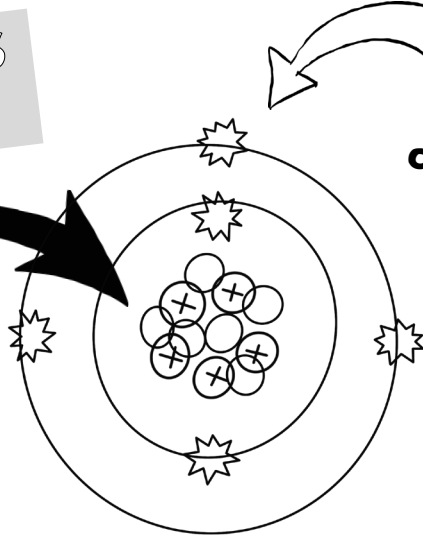
The modern atomic theory is that electrons exist in a ‘cloud’ surrounding an extremely tiny, dense nucleus.

We often still \_\_\_\_\_ the atom in the ‘\_\_\_\_\_’ model (like the solar system with electrons in specific orbits around the nucleus) because it makes it \_\_\_\_\_ to diagram and \_\_\_\_\_ atoms’ behavior.

**BORON'S ATOM**

**nucleus**

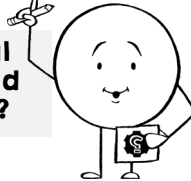
\_\_\_\_\_ and \_\_\_\_\_ are packed into the extremely \_\_\_\_\_ nucleus at the \_\_\_\_\_ of the atom.



**electron cloud**

‘Massless’ \_\_\_\_\_ circle the nucleus \_\_\_\_\_ of times per \_\_\_\_\_.

Why is there an equal number of protons and electrons in an atom?



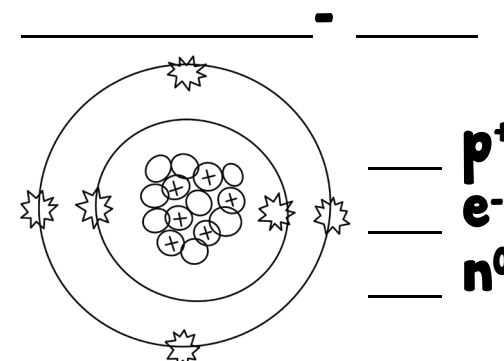
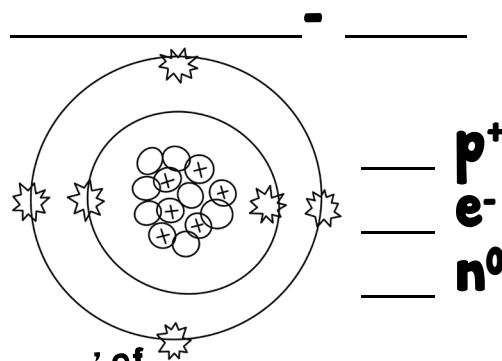
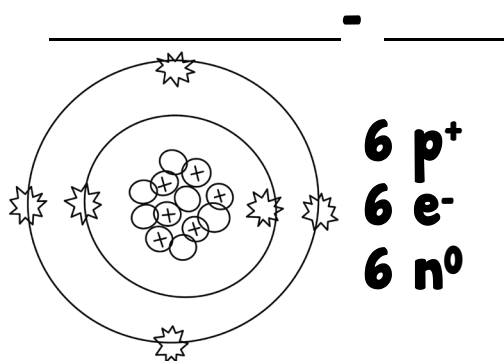
Pick a color for each subatomic particle and color the Bohr model for Boron.

# TOPIC QUESTIONS:

5

What is an \_\_\_\_\_ of an atom?

Isotopes are atoms of the \_\_\_\_\_ element that have different numbers of \_\_\_\_\_.



These are like different '\_\_\_\_\_', of carbon! These atoms of carbon all exist in nature, but the most \_\_\_\_\_ isotope of carbon is Carbon-12.

What does the -12, -13, and -14 written after the element name tell you? This is called isotopic notation.

6

What

do

Table squares provide about \_\_\_\_\_?

gas



liquid



solid

State at Room Temperature

Some periodic tables tell you the \_\_\_\_\_ of matter of the element at \_\_\_\_\_ temperature.

Chemical Symbol

A one or two \_\_\_\_\_ symbol that \_\_\_\_\_ the element. The \_\_\_\_\_ letter is always \_\_\_\_\_.

Element Name

The elements are named using \_\_\_\_\_ and \_\_\_\_\_ word roots based on their properties, after \_\_\_\_\_ bodies, after \_\_\_\_\_, after \_\_\_\_\_, and after \_\_\_\_\_.



F

Fluorine  
18.998

9

Atomic #

The Atomic Number is like the 'ID' (\_\_\_\_\_ ) of the element. It tells how many \_\_\_\_\_ the atoms of that element \_\_\_\_\_.

Atomic Mass

The weighted \_\_\_\_\_ mass of \_\_\_\_\_ of the element.

NOT THE SAME AS

Mass Number

The mass number is the \_\_\_\_\_ number of protons and neutrons. To figure out the number of neutrons in an atom's most \_\_\_\_\_ isotope, \_\_\_\_\_ the atomic mass on the periodic table to the nearest \_\_\_\_\_ number. 18.998 rounds to → \_\_\_\_\_ ... Then, \_\_\_\_\_ the number of protons (the \_\_\_\_\_ ). 19 subtract \_\_\_\_\_ → 10 So, fluorine atoms have \_\_\_\_\_ neutrons

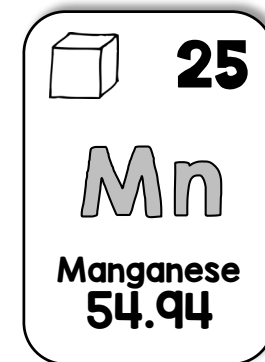
# SUM IT UP!

Match each statement with the correct word from the word bank.

- \_\_\_\_\_ 1. The smallest particle of an element that retains the properties of that element
- \_\_\_\_\_ 2. A positively charged subatomic particle
- \_\_\_\_\_ 3. A negatively charged subatomic particle
- \_\_\_\_\_ 4. A subatomic particle with no charge
- \_\_\_\_\_ 5. The central part of an atom containing protons and neutrons
- \_\_\_\_\_ 6. Atoms with the same number of protons but different numbers of neutrons
- \_\_\_\_\_ 7. Total number of protons and neutrons in the nucleus
- \_\_\_\_\_ 8. The weighted average of the masses of the isotopes of an element

WORD BANK
A. ATOMIC MASS
B. NUCLEUS
C. ATOM
D. ISOTOPE
E. NEUTRON
F. PROTON
G. MASS NUMBER
H. ELECTRON

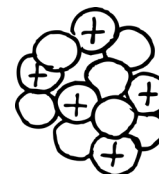
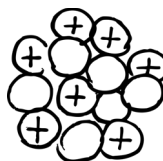
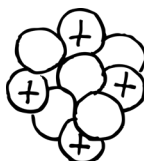
9. Label each part of the Periodic Table square:



10. Complete the table below by referencing a periodic table. The first row has been completed as an example.

	Chemical Symbol	Atomic Number	Atomic Mass	Mass Number	Isotopic Notation	# of protons	# of electrons	# of neutrons (Show work : Mass Number - Atomic #)
Phosphorous	P	15	30.97	31	Phosphorous - 31	15	15	$31 - 15 = 16$
Aluminum								
Potassium								
Argon								
Lead								

11. These are the nuclei of three different atoms. Write the isotopic notation for each (for example, Carbon - 13)



How are you feeling about the basics of Atoms? Circle one:

