

ID's HAPPY WEDNESDAY!!!
ON!!

Agenda

- HOMEWORK CHECK:

- 1. PHET ACTIVITY: Build an Atom
(BLUE SG: pgs. 3-5)**
- 2. Science Geek: Atomic Review**
- 3. Atoms Revisited SG: pgs. 7-8**

**HW: FINISH Atoms Revisited in
SG/Test Corrections due Friday**

Homework: Science Geek Atomic Structure Review (WRITE EACH QUESTION/ANSWER IN YOUR NOTEBOOK)

Atomic Structure Review

Multiple-choice exercise

Choose the correct answer for each question.

Show all questions

1 / 18 =>

The charge and mass number of an electron are:

- ? charge = -1, Mass number = 0
- ? charge = +1, Mass number = 0
- ? charge = +1, Mass number = 1
- ? charge = 0, Mass number = 1

Close Window

Build an Atom (3.02)

File Help

Build Atom **Game**

Protons: ●●●●●●●●
 Neutrons: ●●●●●●●●
 Electrons: ●●●●●●●●●●●●●●●●

Carbon
 Stable

- Ion

Model:
 Orbits
 Cloud

Protons Neutrons Electrons

Element

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn						

Symbol

12 ⁻⁴
 C
 6

Mass Number

12

Net Charge

+ + + + +
 - - - - -

Show element name
 Show neutral/ion
 Show stable/unstable

Reset All

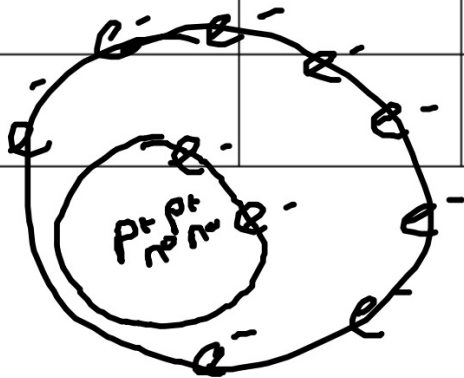
Build an Atom

Directions:

1. Explore the *Build an Atom* simulation with your partner for a few minutes.
2. Using *Build an Atom*, talk with your partner as you play with the parts of atoms to find ...
 - A. What parts go in the center of the atom? What is the center called?
 - B. Explore until you discover a good rule for making the center of the atom "stable". What seems to make the center of the atom "unstable"?
 - C. Use the table below to record three examples – at least 1 stable and at least 1 unstable – that shows your rules for stability work and include a drawing of your nucleus.



	What is in your nucleus?	Draw your nucleus	Is it stable or unstable?	What <u>Element</u> is it?
1			stable	} protons, neutrons determine if the atom is stable
2			unstable	
3				



$$\text{mass number} = p^+ + n^0$$

3. Everything around us is made up of different elements. The air has Oxygen and Nitrogen. Plants and people have lots of Carbon. Helium is in balloons. Hydrogen and Oxygen are in water.

- Explore until you discover a rule for what determines the name of the element you build. What did you find determines the element?
- Test your idea by identifying the element for the 3 cases. Write down the information you use to determine the element.

example	Atom or Ion has	What Element is it?
1	# of protons: 6 # of neutrons: 6 # of electrons: 6	Carbon - 12
2	# of protons: 7 # of neutrons: 6 # of electrons: 6	Nitrogen - 13
3	# of protons: 6 # of neutrons: 7 # of electrons: 7	Carbon - 13

Charge - 1

4. Explore until you discover some good rules about the charge of your atom or ion.

- What is a rule for making:

1) A neutral atom which has no charge.

protons = electrons

2) A positive ion which has positive charge?

More protons⁺ than electrons⁻

3) A negative ion which has negative charge?

more electrons than protons

- Talk about how you used the tools in the simulation helped you decide if the atom had a positive, negative, or 0 charge.

- Complete the following table with three examples of atoms and ions (1 neutral with 0 extra charges, 1 with a positive charge, and 1 with a negative charge) that show your rules for charge work and include a drawing of your atom. (All of your examples should also have a stable nucleus.)



	What is in your atom or ions?	Draw your atom or ion	What is the charge?	Is it a neutral atom, positive ion, or negative ion?
1	# of protons: 5 # of neutrons: # of electrons: 4		+1	Positive ion = <u>Cation</u>
2	# of protons: 5 # of neutrons: # of electrons: 5		0	atom
3	# of protons: 5 # of neutrons: # of electrons: 6		-1	negative = anion ion

5. Explore until you discover some good rules about the mass of your atom or ion.
- What is a rule for determining the mass?

mass number = protons + neutrons

6. **Using all of your rules**, figure out what changes for each of these changes to an atom or ion. Copy this table and make predictions, then test your ideas with the simulation. If you have new ideas, rewrite your rules.

Make the change:	What changes also? Element name, charge, mass?
Add a proton	Element, mass #, charge ⁺¹
Remove a neutron	mass # down by 1 → isotope
Remove an electron	Charge +1
Add an electron	Charge -1

Isotope → same element (# of p^+)
different number of neutrons.

7. Design challenges:

Design a positive ion with a charge of +2
include a drawing:

Number of protons	<u>5</u>
Number of neutrons	<u>5</u>
Number of electrons	<u>3</u>



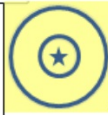
What element is your ion? Boron

What mass is your ion? 10

Is the nucleus of your ion stable or unstable?
—

Design neutral, stable atom with a mass of 7
include a drawing:

Number of protons	<u>3</u>
Number of neutrons	<u>4</u>
Number of electrons	<u>3</u>

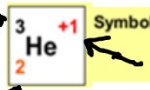


What element is your atom? Lithium

What is the charge of you atom? 0

8. What does the tool called **Symbol** tell you about what parts are in an atom or ion?

(usually decimal) mass #



charge
up

- What rules can you use to tell how many protons, neutrons and electrons make an atom or ion?
- Check your ideas and write down two examples that show your rules work and include a drawing for each.

protons = atomic #
(whole #)

9. **Partner Discussion.** Make sure you know working definitions for: nucleus, proton, neutron, electron, atom, ion, charge, neutral, atomic mass, and element.

10. If you have extra time, click on the "Game" Tab at the top and try a few times. What was your high score?

**Words we are learning:
Right now on page 6**

Nucleus

proton

neutron

electron

atom

ion

charge

neutral

atomic mass

element

Background Information

Study Guide pages: 7-8

1. Atoms are made of three subatomic particles (sub- means under). These particles are themselves made up of quarks. Fill out the table to compare the three subatomic particles..

Name of Subatomic Particle	Symbol of Subatomic Particle	Charge of Subatomic Particle	Relative Mass of Subatomic Particle	Location in atom
Protons				
Neutrons				
Electrons				

2. The known elements are organized in the _____ arranged by _____.
3. Elements are determined by the number of _____ it contains.
4. Neutral Atoms have the same the number _____ and _____.
5. When atoms gain _____, they make negative ions called _____.
6. When atoms lose _____, they make positive ions _____.
7. Most of the mass of an atom is in the _____ which contains _____ and _____.
8. _____ are elements with different masses due to a change in _____.

Background Information

1. Atoms are made of three subatomic particles (sub- means under). These particles are themselves made up of quarks. Fill out the table to compare the three subatomic particles..

Name of Subatomic Particle	Symbol of Subatomic Particle	Charge of Subatomic Particle	Relative Mass of Subatomic Particle	Location in atom
Protons	p^+	+1	1	in nucleus
Neutrons	n^0	0	1	in nucleus
Electrons	e^-	-1	0	outside

2. The known elements are organized in the Periodic Table arranged by

Atomic Number

3. Elements are determined by the number of protons it contains.
4. Neutral Atoms have the same the number protons and electrons.
5. When atoms gain electrons, they make negative ions called anions.
6. When atoms lose electrons, they make positive ions cations.
7. Most of the mass of an atom is in the nucleus which contains protons and neutrons.
8. Isotopes are elements with different masses due to a change in neutrons.

Analysis Questions

9. If an atom has 65 protons, what is the atomic number?

10. What is the mass number of a lithium atom that has three protons and two neutrons?

What is the difference between mass number and atomic mass?

11. How many neutrons are in a beryllium atom that has four protons and a mass number of nine?

12. An atom has 30 protons and 35 neutrons, therefore the atomic number is _____ and the mass number is _____.

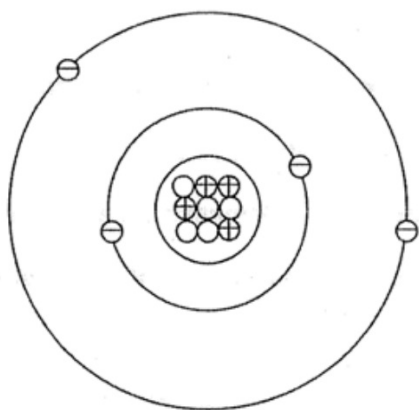
13. If the atomic number of an element is 20 and the mass number is 42,

a. How many protons does the atom have?

b. neutrons?

c. electrons?

14. Below is a diagram of an atom of an element. Count the subatomic particles then determine the identity of the atom.



Number of protons _____

Number of neutrons _____

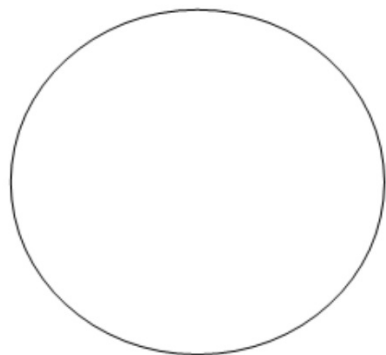
Number of electrons _____

Atomic Number _____

Mass Number _____

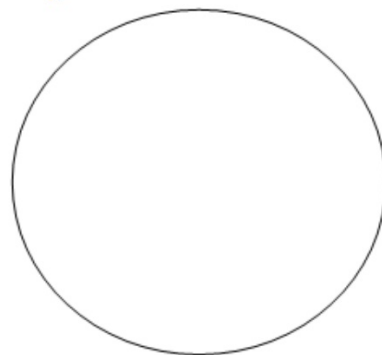
Element _____

15. Determine the amounts of the subatomic particle for each element given. Then draw the atom.



Element: B Protons:

Neutrons: Electrons:



Element: Na Protons:

Neutrons: Electrons: