Learning Target: I can develop and use models to compare and contrast the structure of atoms, ions and isotopes.

## **Build an Atom Phet Lab**

1.	You build an	atom that has	the following components:
			5 protons

5 protons (P

6 neutrons (N)

2 electrons (E)

Which element this atom is on this periodic table below:

Н																	He
Li	Be											В	C	N	0	F	Ne
Na	Mg											Al	Si	P	S	CI	Ar
K	Ca	Sc	Ti	٧	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rh	Sr	Y	71	Nh	Mo	To	Ru	Rh	Pd	An	Cd	In	Sn	Sh	Te	1	Xe

## The mass of this atom is:

- a. 3 mass units
- b. 4 mass units
- c. 6 mass units
- d. 7 mass units
- e. 11 mass units

## The charge of this atom is:

- a. 0, this is a neutral atom
- b. -3
- c. -
- d. +1
- e. +3
- 2. You start with your atom:

4 protons

5 neutrons

4 electrons

You want to change your atom's properties.

Mark YES if a change will work, and mark NO if it will not work.

A. Hydrogen, Sodium, Fluorine, Xenon, Calcium, and Iron are all different elements.

If you want to change the type of element your atom is, you can either:

Add a proton

or Add a neutron

or Add an electron

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	B. If you want to <b>change the charge</b> of your atom, you can either:
	(Select)
	Add a proton
	or Add a neutron
	or Add an electron
	C. If you want to <b>change the mass</b> of your atom, you can either:
	Add a proton (Select)
	or Add a neutron
	or Add an electron
D	24 44
	ild an Atom
	rning Objectives:
	Draw models that show atoms or ions.
2.	Use information about the number of protons, neutrons, and electrons to
	<ul> <li>Identify an element and its position on the periodic table</li> </ul>
	Draw models of atoms
	Determine if the model is for a atom or an ion.
2	
3.	Predict how changing the number protons, neutrons, or electrons will change the element, the charge, and the mass of an atom or ion.
Dir	ections:
	Explore the <b>Build an Atom</b> simulation with your partner (about 5 minutes). As you explore, talk
	about what you find with your partner.
4.	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?
	B. You can call the center of the atom, the <b>nucleus</b> . Most atoms in our environment have a <b>stable</b> nucleus.
	C. Play around with the lab until you figured out what makes an atom stable.  What makes an atom stable?
	What makes an atom unstable?



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D.	Everything around us is made up of different elements. The air has $Oxygen(O)$ and $Nitrogen(N)$
	Plants and people have lots of Carbon (C). Helium (He) is in balloons. Hydrogen (H) is in water
	Play until you discover which particle (or particles) determines the name of the element you
	build. What did you discover?

E. Test your idea by identifying the element for the 3 cases.

	Particles	What Element?	What Determines the Element?	Circle the Element
1.	Protons: 7 Neutrons: 7 Electrons: 7		☐ Proton ☐ Neutron ☐ Electron	H
2.	Protons: 9 Neutrons: 9 Electrons: 7		☐ Proton ☐ Neutron ☐ Electron	He
3.	Protons: 8 Neutrons: 7 Electrons: 7		☐ Proton ☐ Neutron ☐ Electron	H

5.	Play until you discover what affects the charge of your atom or ion.
	What is a rule for making

A An atom neutral (one with 0 extra charge)								
	Δ	An atom	noutral	lane	with (	avtra	charge)	9

B.	A +ion	(positive	ion.	one	with extra	positive	charge)?	,

~								
( ).	A - ion	(negative	10n.	one with	extra	negative	charge	12

 Show a neutral atom, a positive ion, and a negative ion. (These examples should be consistent with the rules you discovered.) All of your examples should also have a <u>stable nucleus</u>.

83	Number of Particles?	Draw Your Atom or Ion	What is the Charge?
Neutral	Protons: Neutrons: Electrons:		
+ Ion	Protons: Neutrons: Electrons:		

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opes.									
- Ion	Protons: Neutrons: Electrons:								
Play until you discover what affects the <b>mass</b> of your atom or ion.									
Which partic	les are heavy and v	which particles are light?							
What is a rule	e for determining t	he mass?							
		out what changes for each of these actions to an atom or ion. You on. If you have new ideas, rewrite your rules.							
Action	What Changes?	How Does it Change?							
۸ ما ما م	☐ Element	. 01,							
Add a Proton	☐ Charge	-10							
1100011	□ Mass								
Action	What Changes?	How Does it Change?							
5	☐ Element	.00							
Remove a Neutron	☐ Charge								
rediron	□ Mass								
Action	What Changes?	How Does it Change?							
Damaria	☐ Element								
Remove an Electron	☐ Charge								
	□ Mass								
Action	What Changes?	How Does it Change?							
Add	☐ Element								
Add an Electron	☐ Charge								
2.000	□Mass								

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