

Name _____

PhET: Build an Atom Activity Guide

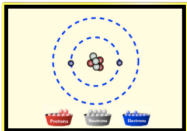
A lesson on Atoms, Atomic Structure, Ions, and Isotopes ... but it's way more fun than it sounds!!

Background: View these online videos ... [What is an Atom](#) / [Atomic Number and Mass Number](#) / [Atomic Mass Units](#)

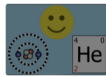
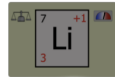
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Part One: The Atom

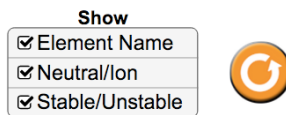
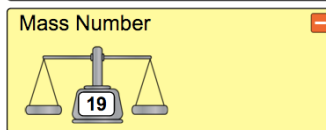
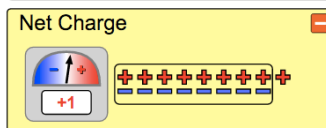
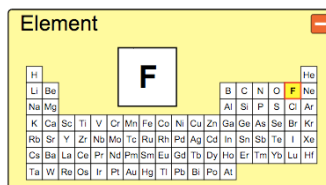
1. Go to [PhET: Build an Atom](#) and Select "Atom"



Atom

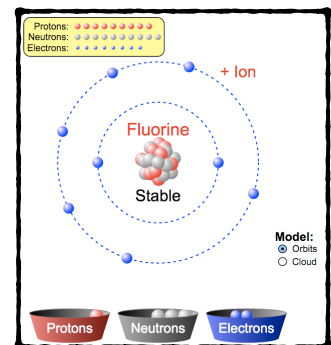


PhET: Build an Atom
phet.colorado.edu/en/simulation/build-an-atom



2. Expand the Net Charge and Mass Number boxes

3. Check Stable/Unstable



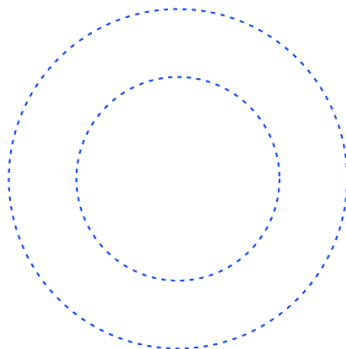
4. Add the correct number of Protons, Neutrons, and Electrons to build a Lithium Atom that is both Stable and Neutral. Draw the orbit model.

How many?

___ Protons

___ Neutrons

___ Electrons



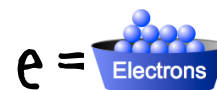
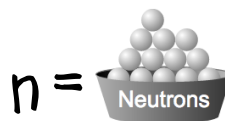
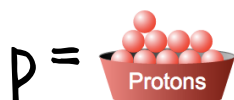
Element Name _____

*Mass Number _____ or _____

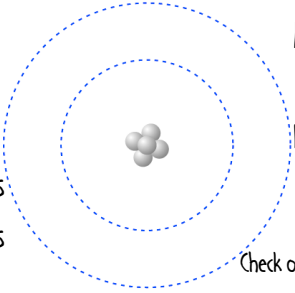
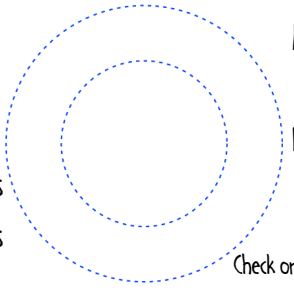
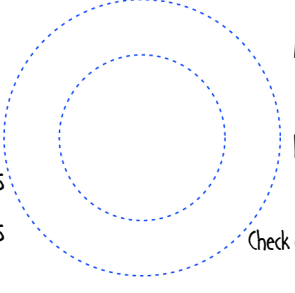
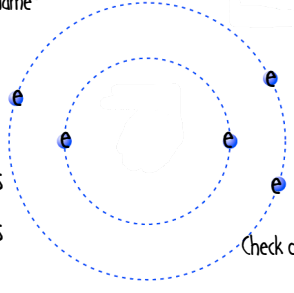
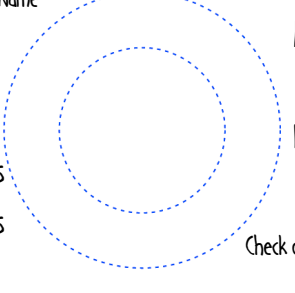
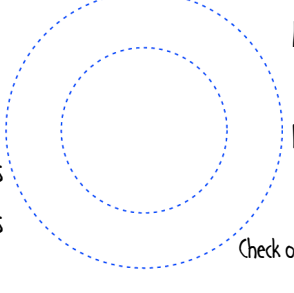
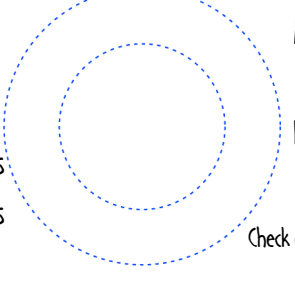
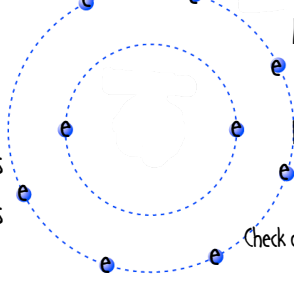
Net Charge _____

*Lithium has two stable isotopes

Symbols for drawing:



5. Build these atoms. Then draw the Protons, Neutrons, and Electrons and fill in the missing information.

<p>Beryllium _____ Atomic Number</p> <p>_____ Mass number _____</p> <p>How many? _____ Protons <u>5</u> Neutrons _____ Electrons</p>  <p>Net Charge <u>+1</u></p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Carbon _____ Atomic Number</p> <p>_____ Mass number <u>12</u></p> <p>How many? _____ Protons _____ Neutrons _____ Electrons</p>  <p>Net Charge <u>0</u></p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>Hydrogen _____ Atomic Number</p> <p>_____ Mass number <u>3</u></p> <p>How many? _____ Protons _____ Neutrons _____ Electrons</p>  <p>Net Charge <u>0</u></p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>_____ Element Name _____ Atomic Number _____</p> <p>_____ Mass number _____</p> <p>How many? _____ Protons <u>6</u> Neutrons _____ Electrons</p>  <p>Net Charge <u>0</u></p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>_____ Element Name _____ Atomic Number _____</p> <p>_____ Mass number <u>16</u></p> <p>How many? _____ Protons _____ Neutrons _____ Electrons</p>  <p>Net Charge <u>0</u></p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Neon _____ Atomic Number _____</p> <p>_____ Mass number _____</p> <p>How many? _____ Protons <u>10</u> Neutrons _____ Electrons</p>  <p>Net Charge <u>0</u></p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>Nitrogen _____ Atomic Number _____</p> <p>_____ Mass number _____</p> <p>How many? _____ Protons _____ Neutrons _____ Electrons</p>  <p>Net Charge <u>-1</u></p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Fluorine _____ Atomic Number _____</p> <p>_____ Mass number _____</p> <p>How many? _____ Protons _____ Neutrons _____ Electrons</p>  <p>Net Charge _____</p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>

Mass Number \rightarrow 4

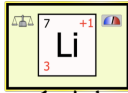
Net Charge \rightarrow 0

Atomic Number \rightarrow 2

He

Part Two: Symbol

1. Select "Symbol"



Symbol

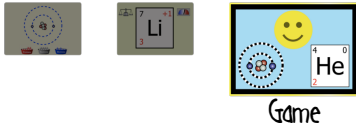


2. Build these Atoms. Fill in the missing information.

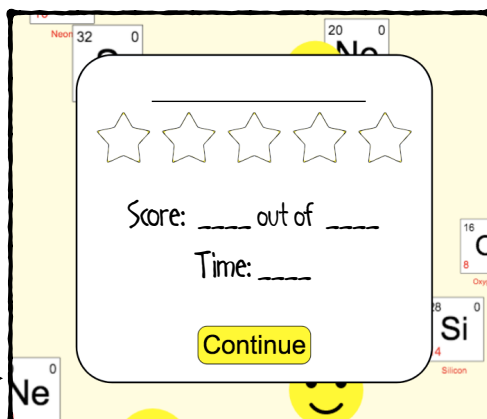
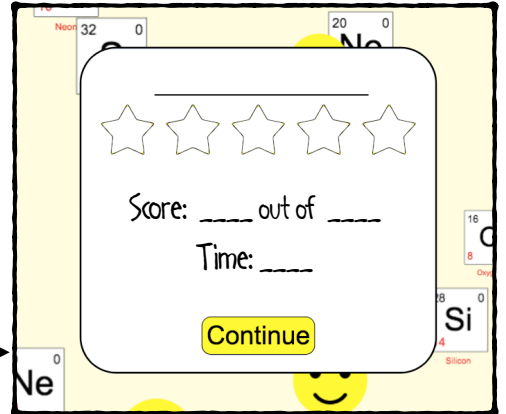
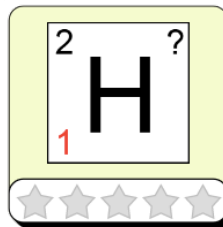
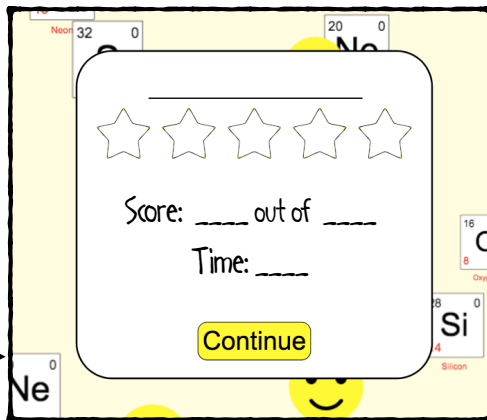
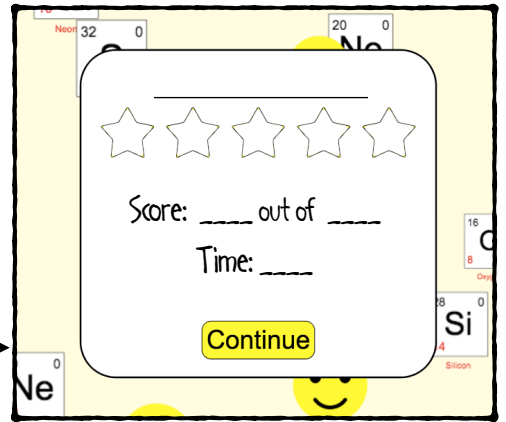
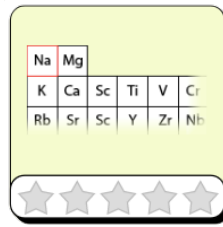
<p>Element Name _____</p> <p>How many? <u>5</u> Protons <u>6</u> Neutrons <u>5</u> Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Element Name _____</p> <p>How many? <u>3</u> Protons <u>2</u> Neutrons <u>2</u> Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>Element Name _____</p> <p>How many? <u>4</u> Protons ___ Neutrons ___ Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Element Name _____</p> <p>How many? <u>5</u> Protons ___ Neutrons <u>2</u> Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>Element Name _____</p> <p>How many? <u>6</u> Protons <u>7</u> Neutrons <u>5</u> Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Element Name _____</p> <p>How many? ___ Protons ___ Neutrons <u>9</u> Electrons</p> <p>_____</p> <p>Symbol F</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>
<p>Element Name _____</p> <p>How many? ___ Protons ___ Neutrons ___ Electrons</p> <p><u>18</u></p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>	<p>Nitrogen</p> <p>Element Name _____</p> <p>How many? ___ Protons <u>7</u> Neutrons ___ Electrons</p> <p>_____</p> <p>Symbol _____</p> <p>How many stable isotopes of this element can you make? _____</p> <p>Check one: <input type="checkbox"/> Stable <input type="checkbox"/> Unstable</p>

Part Three: The Game

1. Select "Game"



2. Play all 4 games and record your best score.



Part Four: Understanding the Atom

- Use your completed activity guide and the PhET: Build an Atom simulation to complete the missing information.

Use these words:

Atomic Mass (mass number)

Protons

Neutrons

Electrons

Atomic Number

Ion

Neutral

Changing the number of _____ will change the name of the element.	Changing the number of _____ makes an atom stable or unstable and creates different isotopes of the same element with a different _____.
Changing the number of _____ gives an atom a neutral charge or causes it to take on a positive or negative charge.	The _____ of an atom is the same as its number of protons.
A _____ atom has the same number of protons as it does electrons.	An atom with a positive or negative net charge is called an _____.

- Do some research to answer the following:

How are **Orbit** and **Electron Cloud** models of the atom different?

Watch these videos: [Electron Cloud Model and Atomic Orbits / Drawing Electron Configuration Diagrams](#)

<https://www.youtube.com/watch?v=YGaBiffw5A> / www.fuseschool.org/topics/66/contents/345

How is Atomic Mass calculated for elements on the Periodic Table?

Watch these videos: [Relative Atomic Mass / Why Aren't Atomic Masses Whole Numbers / Calculating Relative Atomic Mass](#)

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