

Science 9 Learning Pathways (Concepts)

Unit Specific Concepts

<b>Periodic Table</b>				
Group elements according to their atomic number and properties				
	<b>Emerging</b> I have more learning to do	<b>Developing</b> I am almost there, but still have more learning to do	<b>Proficient</b> I am understanding the concept	<b>Extending</b> I've got this
	Using a data booklet, I can:	Using a data booklet, I can:	Using a data booklet, I can:	I can:
Elements	<ul style="list-style-type: none"> <li>○ <u>state</u> the name, symbol, atomic number, and relative atomic mass of an element</li> <li>○ <u>state</u> the charge that will form on an atom when it becomes ionized</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>deduce</u> the number of protons, neutrons and electrons in a given atom</li> <li>○ <u>deduce</u> the number of protons, neutrons and electrons in a given ion</li> <li>○ <u>name</u> ions</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>draw</u> Bohr diagrams for elements from numbers 1-20</li> <li>○ <u>draw</u> Bohr diagrams for the ions from numbers 1-20</li> <li>○ <u>draw</u> Lewis diagrams for elements from numbers 1-20</li> <li>○ <u>draw</u> Lewis diagrams for the ions from numbers 1-20</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> why ions are formed</li> </ul>
Trends in the Periodic Table	<ul style="list-style-type: none"> <li>○ <u>recognize</u> the rows of the periodic table as periods and the columns as families</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>list</u> the similarities between the elements in a family and a period</li> <li>○ <u>list</u> the differences between the elements in a family and a period</li> <li>○ <u>recognize</u> the elements that are diatomic</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> why elements become larger when you go down a family while across a period they do not</li> <li>○ <u>explain</u> the trend of metals/semi-metals/non-metals across the periodic table</li> <li>○ <u>state</u> why certain elements are diatomic</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain the connection</u> between the atomic size across a period to the charge found in nucleus</li> </ul>

## Compounds

The arrangement of electrons determines the compounds formed by elements

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	Using a data booklet, I can:	Using a data booklet, I can:	Using a data booklet, I can:	I can:
Covalent	<ul style="list-style-type: none"> <li>○ <u>recognize</u> a covalent compound given its formula</li> <li>○ <u>recognize</u> a covalent compound given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>name</u> a covalent compound given its formula</li> <li>○ <u>write the formula</u> for a covalent compound given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>model</u> a covalent compound showing how electrons are being shared between the two atoms</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> why covalent compounds share electrons</li> </ul>
Ionic	<ul style="list-style-type: none"> <li>○ <u>recognize</u> a binary ionic compound given its formula</li> <li>○ <u>recognize</u> a binary ionic compound given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>name</u> a binary ionic compound given its formula</li> <li>○ <u>write a formula</u> for a binary ionic compound given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>model</u> a binary ionic compound showing the movement of electrons from one valance shell to another</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> why ionic compounds donate and accept electrons</li> </ul>
Polyatomic Ions	<ul style="list-style-type: none"> <li>○ <u>recognize</u> a polyatomic ion given its formula</li> <li>○ <u>recognize</u> a polyatomic ion given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>recognize</u> an ionic compound containing polyatomic ions given its formula</li> <li>○ <u>recognize</u> an ionic compound containing polyatomic ions given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>name</u> an ionic compound containing polyatomic ions given its formula</li> <li>○ <u>write a formula for</u> an ionic compound containing polyatomic ions given its name</li> </ul>	
Multivalent Elements	<ul style="list-style-type: none"> <li>○ <u>recognize</u> a multivalent element given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>recognize</u> a multivalent ionic compound given its formula</li> <li>○ <u>recognize</u> a multivalent ionic compound given its name</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>name</u> a multivalent ionic compound given its formula</li> <li>○ <u>write a formula for</u> a multivalent ionic compound given its name</li> </ul>	

Ohm's Law				
	<b>Emerging</b> I have more learning to do	<b>Developing</b> I am almost there, but still have more learning to do	<b>Proficient</b> I am understanding the concept	<b>Extending</b> I've got this
	Using the Ohm's Law equation I can:	Using the Ohm's Law equation I can:	Using the Ohm's Law equation I can:	I can:
<b>Voltage, Current and Resistance</b>	<ul style="list-style-type: none"> <li>○ <u>know</u> that "I" represents the current and is measured in amperes (A)</li> <li>○ <u>know</u> that "R" represents resistance and is measured in ohms (<math>\Omega</math>)</li> <li>○ <u>know</u> that "V" represents voltage and is measured in volts (V)</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>deduce</u> the correct version of the ohm's law equation to use to answer a question</li> <li>○ <u>produce</u> an equation that shows the correct placement of given data into the equations</li> <li>○ <u>calculate</u> the unknown value in the equation</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>produce</u> an equation that shows the correct placement of given data into the equations including units</li> <li>○ <u>calculate</u> the unknown value in the equation including units</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> how voltage, current and resistance are connected (how does one affect the other)</li> </ul>

Circuits				
	<b>Emerging</b> I have more learning to do	<b>Developing</b> I am almost there, but still have more learning to do	<b>Proficient</b> I am understanding the concept	<b>Extending</b> I've got this
	I can:	I can:	I can:	I can:
<b>Basics Components</b>	<ul style="list-style-type: none"> <li>o <u>recognize</u> a power source and its symbol</li> <li>o <u>recognize</u> a load/resistor and its symbol</li> <li>o <u>recognize</u> a conductor and its symbol</li> <li>o <u>recognize</u> a switch and its symbol</li> </ul>	<ul style="list-style-type: none"> <li>o <u>draw</u> a circuit diagram which contains a power source, load/resistor, conductor, and a switch</li> </ul>	<ul style="list-style-type: none"> <li>o <u>describe</u> the role of a power source in a circuit</li> <li>o <u>describe</u> the role of a load/resistor in a circuit</li> <li>o <u>describe</u> the role of a conductor in a circuit</li> <li>o <u>describe</u> the role of a switch in a circuit</li> </ul>	<ul style="list-style-type: none"> <li>o <u>explain</u> a circuit must contain a power source, load/resistor, conductor, and a switch.</li> <li>o <u>explain</u> how short circuits occur and why this is dangerous</li> </ul>
<b>Series Circuits</b>	<ul style="list-style-type: none"> <li>o <u>recognize</u> power sources as being connected in series or parallel in a diagram</li> <li>o <u>recognize</u> resistors as being connected in series or parallel in a diagram</li> </ul>	<ul style="list-style-type: none"> <li>o <u>draw</u> a circuit diagram which contains power sources in series</li> <li>o <u>draw</u> a circuit diagram which contains power sources in parallel</li> </ul>	<ul style="list-style-type: none"> <li>o <u>build</u> circuits containing power sources/resistors in series from circuit diagrams</li> </ul>	
<b>Parallel Circuits</b>	<ul style="list-style-type: none"> <li>o <u>recognize</u> power sources as being connected in series or parallel in a circuit</li> <li>o <u>recognize</u> resistors as being connected in series or parallel in a circuit</li> </ul>	<ul style="list-style-type: none"> <li>o <u>draw</u> a circuit diagram which contains resistors in parallel</li> <li>o <u>draw</u> a circuit diagram which contains resistors in parallel</li> </ul>	<ul style="list-style-type: none"> <li>o <u>build</u> circuits containing power sources/resistors in parallel from circuit diagrams</li> </ul>	
<b>Measurements</b>	<ul style="list-style-type: none"> <li>o <u>state</u> that a voltmeter measures voltage and is connected in parallel</li> <li>o <u>state</u> that an ammeter measures the current is connected in series</li> </ul>	<ul style="list-style-type: none"> <li>o <u>draw</u> a circuit diagram containing a voltmeter</li> <li>o <u>draw</u> a circuit diagram containing an ammeter</li> </ul>	<ul style="list-style-type: none"> <li>o <u>build</u> a circuit containing a voltmeter and measure the voltage</li> <li>o <u>build</u> a circuit containing an ammeter and measure the current</li> </ul>	<ul style="list-style-type: none"> <li>o <u>explain</u> the relationship between the change in voltage when adding resistors in either series or parallel</li> <li>o <u>explain</u> the relationship between the change in current when adding power sources in either series or parallel</li> </ul>
<b>Current Flow</b>	<ul style="list-style-type: none"> <li>o <u>state</u> that AC and DC relates to the direction of the flow of the current through a circuit</li> </ul>	<ul style="list-style-type: none"> <li>o <u>state</u> that AC refers to alternating current</li> <li>o <u>state</u> that DC refers to direct current</li> </ul>	<ul style="list-style-type: none"> <li>o <u>describe</u> AC current</li> <li>o <u>describe</u> DC current</li> </ul>	<ul style="list-style-type: none"> <li>o <u>compare</u> (similarities and differences) between AC and DC</li> </ul>

<b>Asexual Reproduction</b>				
The process which pre-existing cells make two identical copies of themselves				
	<b>Emerging</b> I have more learning to do	<b>Developing</b> I am almost there, but still have more learning to do	<b>Proficient</b> I am understanding the concept	<b>Extending</b> I've got this
	I can:	I can:	I can:	I can:
<b>Mitosis</b>	<ul style="list-style-type: none"> <li>○ <u>recognize</u> the stages of mitosis from diagrams</li> <li>○ <u>list</u> different forms of asexual reproduction</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>recognize</u> the stages of mitosis from a microscope slide or micrograph</li> <li>○ <u>label</u> the components of the cell that are involved in the process of mitosis</li> <li>○ <u>match</u> the different forms of asexual reproduction to its process</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> the process of mitosis, diagrams fully explained</li> <li>○ <u>compare</u> the different forms of asexual reproduction</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>incorporate</u> the basic understanding of DNA to the process of mitosis</li> <li>○ <u>evaluate</u> the different forms of asexual reproduction in relationship to their environment</li> </ul>

<b>Sexual Reproduction</b>				
The process through which sex cells are formed by the dividing of a parent cell twice, resulting in four daughter cells				
	<b>Emerging</b> I have more learning to do	<b>Developing</b> I am almost there, but still have more learning to do	<b>Proficient</b> I am understanding the concept	<b>Extending</b> I've got this
	I can:	I can:	I can:	I can:
<b>Meiosis</b>	<ul style="list-style-type: none"> <li>○ <u>recognize</u> the stages of meiosis from diagrams</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>label</u> the components of the cell that are involved in the process of meiosis</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> why the process of meiosis occurs</li> <li>○ <u>compare</u> the processes of mitosis and meiosis</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> the process of meiosis, diagrams fully explained</li> </ul>
<b>Human Sexual Reproduction</b>	<ul style="list-style-type: none"> <li>○ <u>state</u> the definition of crossing over within the process of meiosis</li> <li>○ <u>state</u> the definition of independent assortment</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>label</u> a diagram of gametes that are involved in the process of fertilization</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> the process of fertilization, diagrams fully explained</li> <li>○ <u>explain</u> how crossing over will produce gametes with different genetic combinations</li> <li>○ <u>explain</u> how independent assortment will give offspring are not genetically identical to either parent</li> </ul>	<ul style="list-style-type: none"> <li>○ <u>explain</u> the importance of genetic variation within a population</li> </ul>