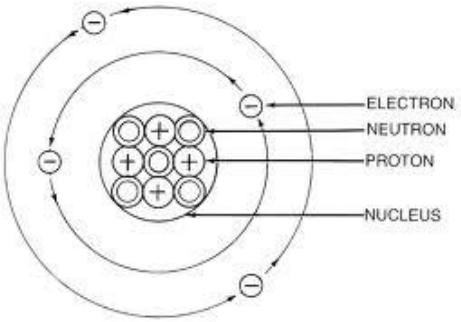
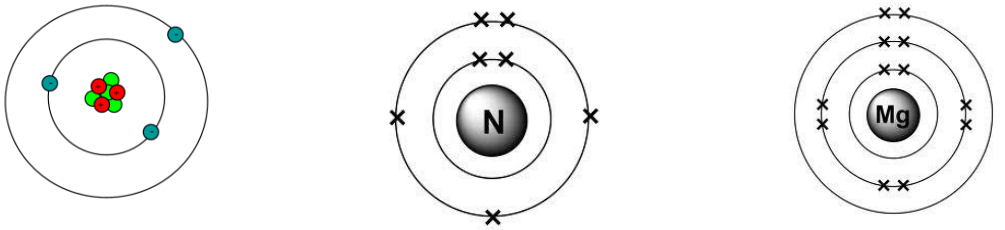
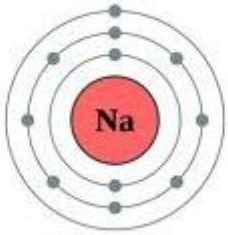
SOLUTIONS

<table>
<tr><td>Q</td><td>Outcome</td><td></td></tr>
<tr><td>1.</td><td>1</td><td>Give a definition of the term “matter”
Matter is the substances around us that take up volume and have mass.</td></tr>
<tr><td>2.</td><td>2</td><td>Complete this table of the parts of an atom:
<table>
<tr><td>Particle</td><td>Charge</td><td>Location in atom</td></tr>
<tr><td>Proton</td><td>Positive</td><td>In the nucleus</td></tr>
<tr><td>Neutron</td><td>Neutral</td><td>In the nucleus</td></tr>
<tr><td>Electron</td><td>Negative</td><td>Around the outside</td></tr>
</table></td></tr>
<tr><td>3.</td><td>2</td><td>Draw an atom and label all particles.
 
</td></tr>
<tr><td>4.</td><td>2</td><td>Draw an electron configuration diagram for the following atoms:
Lithium Nitrogen Magnesium
 

Make sure you have the correct number of electrons in each shell.</td></tr>
<tr><td>5.</td><td>3</td><td>Fill in the table
<table>
<tr><th>Atom</th><th>Atomic No.</th><th>Mass No.</th><th>Protons</th><th>Neutrons</th><th>Electrons</th></tr>
<tr><td>$^{12}_{6}C$</td><td>6</td><td>12</td><td>6</td><td>6</td><td>6</td></tr>
<tr><td>$^{5}_{3}Li$</td><td>3</td><td>5</td><td>3</td><td>2</td><td>3</td></tr>
<tr><td>$^{35}_{17}Cl$</td><td>17</td><td>35</td><td>17</td><td>18</td><td>17</td></tr>
<tr><td>$^{39}_{19}K^{+}$</td><td>19</td><td>39</td><td>19</td><td>20</td><td>18</td></tr>
<tr><td>$^{16}_{8}O^{2-}$</td><td>8</td><td>16</td><td>8</td><td>8</td><td>10</td></tr>
</table></td></tr>
</table>

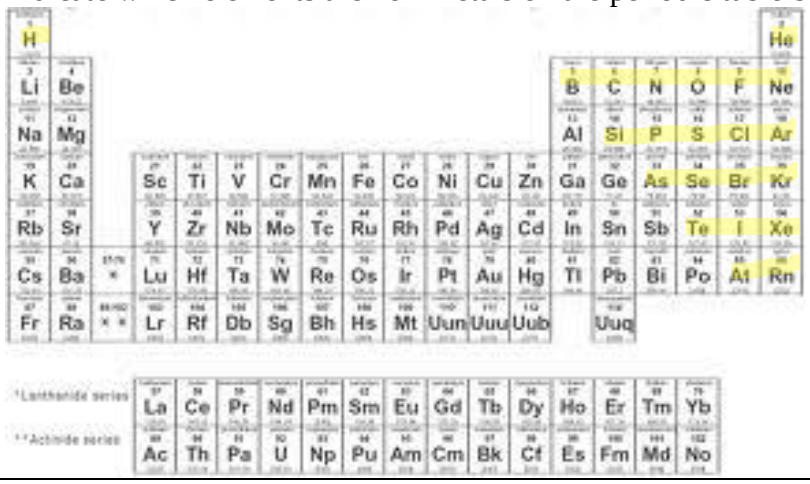
<table>
<tr><td>6.</td><td>4</td><td>Columns in the periodic table are called ___groups___.
Rows in the periodic table are called __periods___</td></tr>
<tr><td>7.</td><td>4</td><td>How many valence electrons does sodium have? 1
Describe two ways this can be determined:
Draw an electron configuration diagram
 

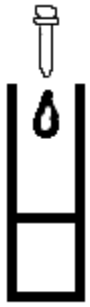
Or look at group number. Group 1 elements have 1 valence electron.</td></tr>
<tr><td>8.</td><td>4</td><td>Using the group number, determine how many valence electrons each of the following elements have:
Magnesium:_2_ Boron:_3_ Oxygen:_6_ Silicon:_4_</td></tr>
<tr><td>9.</td><td>6</td><td>Why do group 1 elements form +1 ions?
Atoms want to have full outer electron shells. Group 1 elements lose 1 electron to have a full outer electron shell.

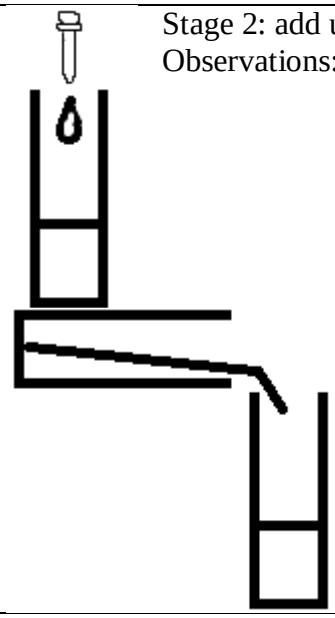
Why do group 8 elements not form ions?
They have full outer electron shells and so remain neutral.</td></tr>
<tr><td>10.</td><td>5</td><td>Give the common ionic form for the following elements (FROM MEMORY):
<table>
<tr><td>Ion name</td><td>Ion formula</td></tr>
<tr><td>Copper</td><td>Cu^{2+}</td></tr>
<tr><td>Potassium</td><td>K^{+}</td></tr>
<tr><td>Silver</td><td>Ag^{+}</td></tr>
<tr><td>Oxide</td><td>O^{2-}</td></tr>
<tr><td>Nitrate</td><td>NO_3^{-}</td></tr>
<tr><td>Sulfide</td><td>S^{2-}</td></tr>
<tr><td>Sulfate</td><td>SO_4^{2-}</td></tr>
<tr><td>Hydroxide</td><td>OH^{-}</td></tr>
<tr><td>Lead</td><td>Pb^{2+}</td></tr>
</table></td></tr>
<tr><td>11.</td><td>7</td><td>Fill in the table
<table>
<tr><td>Chemical Name</td><td>Number and type of atom</td><td>Chemical Formula</td></tr>
<tr><td>Sodium Chloride</td><td>1 Sodium: 1 Chlorine</td><td>NaCl</td></tr>
<tr><td>Lithium Fluoride</td><td>1 Lithium: 1 Fluorine</td><td>LiF</td></tr>
<tr><td>Copper Oxide</td><td>1 Copper: 1 Oxygen</td><td>CuO</td></tr>
<tr><td>Copper Chloride</td><td>1 Copper: 2 Chlorine</td><td>$CuCl_2$</td></tr>
<tr><td>Magnesium Hydroxide</td><td>1 Magnesium: 2 Oxygen: 2 Hydrogen</td><td>$Mg(OH)_2$</td></tr>
<tr><td>Copper Nitrate</td><td>1 Copper: 2 Nitrogen: 6 Oxygen</td><td>$Cu(NO_3)_2$</td></tr>
<tr><td>Aluminium Carbonate</td><td>2 Aluminium: 3 Carbon: 9 Oxygen</td><td>$Al_2(CO3)_3$</td></tr>
</table></td></tr>
<tr><td>12.</td><td>8</td><td>Write balanced ionic formula for the following compounds. This must be done without looking at a valency table.</td></tr>
</table>

<table>
<tr><td></td><td></td><td>
<table>
<tr><th>Name</th><th>Positive ion</th><th>Negative ion</th><th>Balanced Formula</th></tr>
<tr><td>Potassium Chloride</td><td>K^+</td><td>Cl^-</td><td>KCl</td></tr>
<tr><td>Potassium Oxide</td><td>K^+</td><td>O^{2-}</td><td>K_2O</td></tr>
<tr><td>Zinc Oxide</td><td>Zn^{2+}</td><td>O^{2-}</td><td>ZnO</td></tr>
<tr><td>Hydrogen Sulfide</td><td>H^+</td><td>S^{2-}</td><td>H_2S</td></tr>
<tr><td>Lead Sulfate</td><td>Pb^{2+}</td><td>SO_4^{2-}</td><td>$PbSO_4$</td></tr>
<tr><td>Lead Nitrate</td><td>Pb^{2+}</td><td>NO_3^-</td><td>$Pb(NO_3)_2$</td></tr>
<tr><td>Aluminium Hydroxide</td><td>Al^{3+}</td><td>OH^-</td><td>$Al(OH)_3$</td></tr>
<tr><td>Aluminium Sulfate</td><td>Al^{3+}</td><td>SO_4^{2-}</td><td>$Al_2(SO_4)_3$</td></tr>
</table>
</td></tr>
<tr><td>13.</td><td>9</td><td>Which of the following substances do you believe to be metals?

Substance A: gas at room temperature, does not conduct electricity
Substance B: shiny, soft and conducts electricity
Substance C: dull, hard, conducts electricity
Substance D: shiny, liquid at room temperature, conducts electricity

Answer: A is a non metal. C is a non metal (it is carbon-graphite)
B is a metal. D is a metal (it is mercury).</td></tr>
<tr><td>14.</td><td>9</td><td>Indicate which elements are non-metals on the periodic table below:
  </td></tr>
<tr><td>15.</td><td>12, 13</td><td>Separate the following compounds into acids and bases:
NaOH, HCl, LiOH, HNO_3, H_2SO_4, CH_3COOH
<table>
<tr><th>Acids</th><th>Bases</th></tr>
<tr><td>HCl, HNO_3, H_2SO_4, CH_3COOH</td><td>NaOH, LiOH</td></tr>
</table>
CH_3COOH is a tricky one. It is an acid because it splits into CH_3COO^- and H^+</td></tr>
<tr><td>16.</td><td>12, 13, 14</td><td>Identify whether each of the substances below is acidic, neutral or basic.
Substance A: pH of 3
Substance B: turns universal indicator blue
Substance C: has no effect on blue litmus paper and does not turn universal indicator green
Substance D: has a pH of 7
Substance E: reacts with a metal to produce hydrogen gas</td></tr>
</table>

		Substance F: turns universal indicator green Substance G: has a sour taste to it Substance H: has a soapy feel Acids: A,E, G | Neutral: D, F | Bases: B, C, H
17.	12, 13	Write the chemical formula for the following acids and bases/ Hydrochloric acid: HCl Sodium hydroxide: NaOH Nitric acid: HNO_3 Sulfuric acid: H_2SO_4 Copper hydroxide: $Cu(OH)_2$ Ethanoic acid: CH_3COOH
18.	14	My fish tank has a pH of 5. The fish store tells me my fish like to have a pH level of 6.5 Suggest a method of creating the right pH level in my fish tank. Because my pH is too low, I need to add a base to raise the pH.
19.	15	Classify the commonly used chemicals below as acids or bases.  ACID BASE ACID ACID BASE BASE
20.	16, 17, 18	Fill in the remainder of the chemical word equations Acid + base -> ____water____ +_____salt_____ Acid + metal -> ____hydrogen gas_____ + ___salt____ Acid + carbonate -> __salt____ + ____water___ + ___carbon dioxide___
21.	16, 17, 18	Put a circle around the reactants and a rectangle around the products for the following reactions. $Pb + O_2$ --> PbO_2 $NH_4OH + HBr$ --> $H_2O + NH_4Br$ $CH_4 + 2\ O_2$ --> $CO_2 + 2\ H_2O$
22.	16	Write down any observations you would expect to make at each stage of the experiment below.  Stage 1: add universal indicator to 10 ml of 1M acid Observations: solution is red

		 Stage 2: add universal indicator to 10 ml of 1M base Observations: solution is blue Stage 3: mix the acid with the base Observations: solution is green
23.	17	What observations would you expect to make when mixing a magneisum ribbon with hydrochloric acid in a test tube? Observations: bubbles/gas forming around metal. Metal may disappear into the solution. What are the reasons for these observations? This is an acid and metal reaction. Hydrogen gas forms. Metal turns into a salt/ionic compound and dissolves.
24.	16, 17, 18	Write the chemical formula and write the name of the salt that would be formed in each of the below reactions HCl + $NaCO_3$..... salt formed: NaCl sodium chloride Nitric acid + magnesium carbonate..... salt formed: $Mg(NO_3)_2$ magnesium nitrate Hydrochloric acid + copper hydroxide..... salt formed: $CuCl_2$ copper chloride Sulfuric acid + aluminium.... salt formed: $Al_2(SO_4)_3$ aluminium sulphate HNO_3 + Li.....salt formed: $LiNO_3$ lithium nitrate