





<b>Topic: Beginning with Science</b>	<b>Learning Goals</b> <ul style="list-style-type: none"> <li>• Explain the scientific principles of earth space science</li> <li>• Distinguish the processes and tools used to investigate phenomena</li> <li>• Explain and distinguish forces and physical/chemical changes affect matter on Earth</li> </ul>
<b>1.01 Welcome to Earth Space Science</b>	<b>At the end of this lesson, you will be able to:</b> <ul style="list-style-type: none"> <li>• define Earth as a system</li> <li>• identify and describe the spheres of Earth</li> </ul>
Define:	
<ul style="list-style-type: none"> <li>• Hydrosphere</li> <li>• Biosphere</li> <li>• Geosphere</li> <li>• Exosphere</li> <li>• Atmosphere</li> <li>• Cryosphere</li> </ul>	
<b>1.02 Scientific Investigation</b>	<b>At the end of this lesson, you will be able to:</b> <ul style="list-style-type: none"> <li>• know and apply the scientific method to a variety of scenarios</li> <li>• identify which questions can be answered by science</li> <li>• identify science vs. pseudoscience</li> <li>• design an experiment based on scientific questions</li> </ul>
What does try to explain?	
What are the 5 qualifications for something to be experimented on scientifically?	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>
What is the Scientific Method?	
Define:	
<ul style="list-style-type: none"> <li>• Hypothesis</li> <li>• Theory</li> <li>• Law</li> </ul>	
Science or Pseudoscience	
How are Science and Pseudoscience different?	

What is an example of pseudoscience?																								
<b>1.03 Theories and Laws</b>	<b>At the end of this lesson, you will be able to:</b> <ul style="list-style-type: none"><li>• Differentiate between scientific theories and laws</li><li>• Recognize that theories do not become laws and laws do not become theories</li><li>• Identify theories and laws specific to Earth Space Science</li><li>• Recognize how models explain and laws in science</li></ul>																							
Define: <ul style="list-style-type: none"><li>• Theory</li></ul>																								
Define: <ul style="list-style-type: none"><li>• Laws</li></ul>																								
What common misconception is there between theories and laws?																								
What are models in science important?																								
<b>1.04 Measurement</b>	<b>At the end of this lesson, you will be able to:</b> <ul style="list-style-type: none"><li>• Determine appropriate measurements for different scenarios</li><li>• Explain why we use metric measurement units in science</li><li>• Determine appropriate graphing strategies for a variety of scenarios</li></ul>																							
What are some ways we can quantify matter?	<ol style="list-style-type: none"><li>1.</li><li>2.</li><li>3.</li><li>4.</li><li>5.</li></ol>																							
What is the difference between 32°C and 32°F ?																								
Metric System versus U.S.  (fill in the comparison chart)	<table><tr><td></td><td>Metric</td><td>U.S.</td></tr><tr><td><b>Length</b></td><td><input type="text"/></td><td><input type="text"/></td></tr><tr><td><b>Weight</b></td><td><input type="text"/></td><td><input type="text"/></td></tr><tr><td><b>Mass</b></td><td><input type="text"/></td><td><input type="text"/></td></tr><tr><td><b>Speed</b></td><td><input type="text"/></td><td><input type="text"/></td></tr><tr><td><b>Volume</b></td><td><input type="text"/></td><td><input type="text"/></td></tr><tr><td><b>Temperature</b></td><td><input type="text"/></td><td><input type="text"/></td></tr></table>				Metric	U.S.	<b>Length</b>	<input type="text"/>	<input type="text"/>	<b>Weight</b>	<input type="text"/>	<input type="text"/>	<b>Mass</b>	<input type="text"/>	<input type="text"/>	<b>Speed</b>	<input type="text"/>	<input type="text"/>	<b>Volume</b>	<input type="text"/>	<input type="text"/>	<b>Temperature</b>	<input type="text"/>	<input type="text"/>
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Define: <ul style="list-style-type: none"><li>• Mass</li><li>• Weight</li><li>• Temperature</li><li>• Volume</li><li>• Length</li><li>• Time</li></ul>																								

<p>Define:</p> <ul style="list-style-type: none"> <li>• Precision</li> <li>• Accuracy</li> </ul>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Accurate Precise</p>  </div> <div style="text-align: center;"> <p>Not Accurate Precise</p>  </div> <div style="text-align: center;"> <p>Accurate Not Precise</p>  </div> <div style="text-align: center;"> <p>Not Accurate Not Precise</p>  </div> </div>
<p>What are the eight types of graphs?</p>	<ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> <li>6.</li> <li>7.</li> <li>8.</li> </ol>
<p><b>1.05 Atomic Structure and Forces</b></p>	<p>At the end of this lesson you will be able to:</p> <ul style="list-style-type: none"> <li>• Describe subatomic particles</li> <li>• Identify properties of protons, neutrons, and electrons</li> <li>• Describe changes in atomic theory over time</li> <li>• Identify major atomic bonds</li> <li>• Identify strong and weak nuclear forces</li> </ul>
<p>Define</p> <ul style="list-style-type: none"> <li>• Atom</li> <li>• Chemical properties</li> <li>• Physical properties</li> <li>• Subatomic particles</li> </ul>	
<p>History of Atomic Theory</p>	<p>Name the scientist and their contribution to Atomic Theory</p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> <li>6.</li> </ol>

## Periodic Table

(label/color)

- Rows
- Columns
- Atomic Number
- Atomic Mass
- Symbol
- Columns
- Metals
- Nonmetals
- Metalloids
- Rare Earth Elements
- Noble Gases

1 H Hydrogen 1.008																	2 He Helium 4.003																
3 Li Lithium 6.941	4 Be Beryllium 9.012																	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180										
11 Na Sodium 22.990	12 Mg Magnesium 24.305																	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.948										
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.64	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.8																
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.906	44 Ru Ruthenium 101.07	45 Rh Rhodium 101.07	46 Pd Palladium 106.36	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.29																
55 Cs Cesium 132.905	56 Ba Barium 137.327																	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.222	78 Pt Platinum 195.084	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222	
87 Fr Francium 223	88 Ra Radium 226																	104 Rf Rutherfordium 261	105 Db Dubnium 262	106 Sg Seaborgium 266	107 Bh Bohrium 264	108 Hs Hassium 277	109 Mt Meitnerium 268	110 Ds Darmstadtium 271	111 Rg Roentgenium 272	112 Uub Ununbium 285							
																		57 La Lanthanum 138.905	58 Ce Cerium 140.12	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 145	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.930	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967	
																		89 Ac Actinium 227	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 252	100 Fm Fermium 257	101 Md Mendelevium 258	102 No Nobelium 259	103 Lr Lawrencium 262	

## Define

- Bond
- Ionic Bond
- Covalent Bond

What are the four fundamental forces?

- 1.
- 2.
- 3.
- 4.

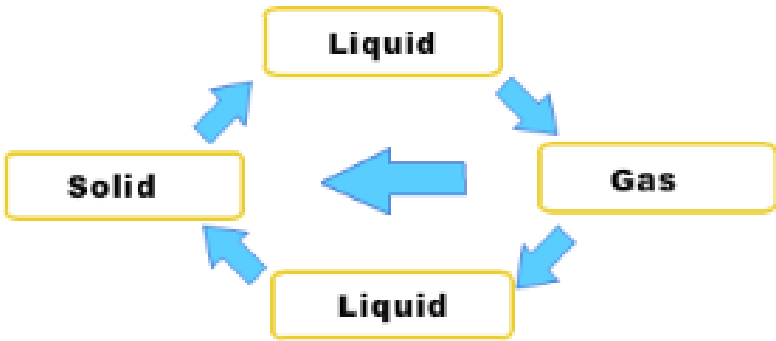
**1.06 Matter and Energy**

At the end of this lesson you will be able to:

- Identify the four phases of matter
- Describe heat as energy transferred by convection, conduction and radiation
- Explain the connection of heat energy to change in temperature and states of matter

## Define

- Physical properties
- Law of Conservation of Matter

States of Matter (fill in the table using the interactive in the lesson on page 2 of Lesson 1.06)	<table><tr><th>States of Matter</th><th>Particle Arrangement</th><th>Particle Motion</th><th>Example</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	States of Matter	Particle Arrangement	Particle Motion	Example																
States of Matter	Particle Arrangement	Particle Motion	Example																		
Chemical versus Physical changes	List some examples of physical changes:  List some examples of chemical changes:																				
Define <ul style="list-style-type: none"><li>● Conservation of Energy</li></ul> Types of Energy <ul style="list-style-type: none"><li>● Gravitational Potential</li><li>● Nuclear</li><li>● Mechanical</li><li>● Electrical</li><li>● Elastic Potential</li><li>● Radiant</li><li>● Chemical</li><li>● Thermal</li></ul>																					
What are the three main types of Energy tranfers	1.  2.  3.																				
Phase Changes  (label each arrow with the respective phase change) <ul style="list-style-type: none"><li>● Melting</li><li>● Freezing</li><li>● Boil/Evaporate</li><li>● Condensation</li><li>● Sublimation</li></ul>	 <pre>graph TD     Solid[Solid] --&gt; Liquid1[Liquid]     Liquid1 --&gt; Gas[Gas]     Gas --&gt; Liquid2[Liquid]     Liquid2 --&gt; Solid</pre>																				

