

AMSTI COURSE OF STUDY CORRELATION  
Eighth Grade

	STANDARD	MODULE
<b>Matter and Its Interactions</b>		
1	Analyze patterns within the periodic table to construct models (e.g., molecular-level models, including drawings; computer representations) that illustrate the structure, composition, and characteristics of atoms and molecules.	<p><b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b></p> <p>To also include:</p> <ul style="list-style-type: none"> <li>• Electrical Conductivity, <i>GLOBE</i></li> </ul>
2	Plan and carry out investigations to generate evidence supporting the claim that one pure substance can be distinguished from another based on characteristic properties.	<p><b>Exploring the Properties of Matter, STC Secondary</b></p> <p><b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b></p> <p>To also include:</p> <ul style="list-style-type: none"> <li>• Electrical Conductivity, <i>GLOBE</i></li> </ul>
3	Construct explanations based on evidence from investigations to differentiate among compounds, mixtures, and solutions.	<p><b>Exploring the Properties of Matter, STC Secondary</b></p> <p><b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b></p> <p>To also include:</p> <ul style="list-style-type: none"> <li>• Electrical Conductivity, <i>GLOBE</i></li> </ul>
3a	Collect and analyze information to illustrate how synthetic materials (e.g., medicine, food additives, alternative fuels, plastics) are derived from natural resources and how they impact society.	<p><b>Exploring the Properties of Matter, STC Secondary</b></p> <p><b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b></p> <p>To also include:</p> <ul style="list-style-type: none"> <li>• Electrical Conductivity, <i>GLOBE</i></li> </ul>
4	Design and conduct an experiment to determine changes in particle motion, temperature, and state of a pure substance when thermal energy is added to or removed from a system.	<p><b>Exploring the Properties of Matter, STC Secondary</b></p>
5	Observe and analyze characteristic properties of substances (e.g., odor, density, solubility, flammability, melting point, boiling point) before and after the substances combine to determine if a chemical reaction has occurred.	<p><b>Exploring the Properties of Matter, STC Secondary</b></p> <p><b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b></p> <p>To also include:</p> <ul style="list-style-type: none"> <li>• Electrical Conductivity, <i>GLOBE</i></li> </ul>

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6	Create a model, diagram, or digital simulation to describe conservation of mass in a chemical reaction and explain the resulting differences between products and reactants.	<b>Exploring the Properties of Matter, STC Secondary</b>  <b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b> To also include: • Electrical Conductivity, GLOBE
7	Design, construct, and test a device (e.g., glow stick, hand warmer, hot or cold pack, thermal wrap) that either releases or absorbs thermal energy by chemical reactions (e.g., dissolving ammonium chloride or calcium chloride in water) and modify the device as needed based on criteria (e.g., amount/concentration, time, temperature).*	<b>Experimenting with Mixtures, Compounds, and Elements, STC Secondary</b> To include: • Electrical Conductivity, GLOBE
<b>Motion and Stability: Forces and Interactions</b>		
8	Use Newton's first law to demonstrate and explain that an object is either at rest or moves at a constant velocity unless acted upon by an external force (e.g., model car on a table remaining at rest until pushed).	<b>Experimenting with Forces and Motion, STC Secondary</b>
9	Use Newton's second law to demonstrate and explain how changes in an object's motion depend on the sum of the external forces on the object and the mass of the object (e.g., billiard balls moving when hit with a cue stick).	<b>Experimenting with Forces and Motion, STC Secondary</b>
10	Use Newton's third law to design a model to demonstrate and explain the resulting motion of two colliding objects (e.g., two cars bumping into each other, a hammer hitting a nail).*	<b>Experimenting with Forces and Motion, STC Secondary</b>
11	Plan and carry out investigations to evaluate how various factors (e.g., electric force produced between two charged objects at various positions; magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) affect the strength of electric and magnetic forces.	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>  <b>Experimenting with Forces and Motion, STC Secondary</b>
12	Construct an argument from evidence explaining that fields exist between objects exerting forces on each other (e.g., interactions of magnets, electrically charged strips of tape, electrically charged pith balls, gravitational pull of the moon creating tides) even when the objects are not in contact.	<b>Experimenting with Forces and Motion, STC Secondary</b>
<b>Energy</b>		
13	Create and analyze graphical displays of data to illustrate the relationships of kinetic energy to the mass and speed of an object (e.g., riding a bicycle at different speeds, hitting a table tennis ball versus a golf ball, rolling similar toy cars with different masses down an incline).	<b>Experimenting with Forces and Motion, STC Secondary</b>

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14	Use models to construct an explanation of how a system of objects may contain varying types and amounts of potential energy (e.g., observing the movement of a roller coaster cart at various inclines, changing the tension in a rubber band, varying the number of batteries connected in a series, observing a balloon with static electrical charge being brought closer to a classmate's hair).	<b>Experimenting with Forces and Motion, STC Secondary</b>
15	Analyze and interpret data from experiments to determine how various factors affect energy transfer as measured by temperature (e.g., comparing final water temperatures after different masses of ice melt in the same volume of water with the same initial temperature, observing the temperature change of samples of different materials with the same mass and the same material with different masses when adding a specific amount of energy).	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>
16	Apply the law of conservation of energy to develop arguments supporting the claim that when the kinetic energy of an object changes, energy is transferred to or from the object (e.g., bowling ball hitting pins, brakes being applied to a car).	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>  <b>Experimenting with Forces and Motion, STC Secondary</b>
<b>Waves and Their Applications in Technologies for Information Transfer</b>		
17	Create and manipulate a model of a simple wave to predict and describe the relationships between wave properties (e.g., frequency, amplitude, wavelength) and energy.	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>
17a	Analyze and interpret data to illustrate an electromagnetic spectrum.	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>
18	Use models to demonstrate how light and sound waves differ in how they are absorbed, reflected, and transmitted through different types of media.	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>
19	Integrate qualitative information to explain that common communication devices (e.g., cellular telephones, radios, remote controls, Wi-Fi components, global positioning systems [GPS], wireless technology components) use electromagnetic waves to encode and transmit information.	<b>Electricity, Waves, and Information Transfer, STC Secondary</b>