

**Middle School Power Standards
Revised 6/30/08**

ISAT Sub Groups	Standards	Grade 5	Grade 6	Grade 7-ISAT	Grade 8
Inquiry	<p>11A: Know and apply concepts, principles and properties of scientific inquiry.</p> <p>11B: Know and apply concepts, principles and processes of technological design</p>	<ul style="list-style-type: none"> ●Collect data for investigations using scientific process skills including observing, estimating and measuring. ●Identify a design problem and propose possible solutions 	<ul style="list-style-type: none"> ●Construct charts, graphs and visualizations to display data. ●Build and test a prototype using available materials, instruments and technology. 	<ul style="list-style-type: none"> ●Interpret data, draw conclusions and report the results of a scientific investigation. ●Evaluate the test results based on established criteria and recommend improvements. 	<ul style="list-style-type: none"> ●Interpret, display, analyze and draw conclusions from the results of a scientific investigation. ●Design, test and evaluate a prototype based on given criteria.
Life Science	<p>12A: Know and apply concepts that explain how living things function, adapt and change.</p> <p>12B: Know and apply concepts that describe how living things interact with each other and with their environment.</p>	<p>Comparing Living Things</p> <ul style="list-style-type: none"> ●Describe the way scientists classify living things. <p>Reproduction and Change</p> <ul style="list-style-type: none"> ●Explain how traits are passed on through genes and chromosomes. <p>Adaptations</p> <ul style="list-style-type: none"> ●Describe how organisms become adapted to their environment. <p>Ecology</p> <ul style="list-style-type: none"> ●Identify natural cycles in an ecosystem (e.g. carbon dioxide, nitrogen, water cycles) <p>Respiration and Excretion</p> <ul style="list-style-type: none"> ●Describe how the body takes in and uses oxygen. <p>Living A Healthy Life</p> <ul style="list-style-type: none"> ●Describe how communicable diseases are spread, how to defend against them, and how to treat them. 	<p>Cells, Heredity and Classification</p> <ul style="list-style-type: none"> ●Compare and contrast plant/animal cells and prokaryotic/eukaryotic cells. ●Describe the structure and function of cell organelles. ●Describe general characteristics of photosynthesis and cellular respiration. ●Use a Punnett square to predict the probability of possible genotypes in offspring. ●Find evidence that shows how organisms have changed over time. 	<p>Environmental Science</p> <ul style="list-style-type: none"> ●Identify the organisms in a food chain or food web as either producers or consumers, and describe their role in the community ●Interpret diagrams of cycles in nature (e.g. water cycle, carbon cycle, nitrogen cycle). ●Compare and contrast biomes on Earth. ●Discuss major environmental problems and possible solutions. ●Compare renewable and nonrenewable resources, ways they can be conserved, and possible alternatives. 	

<p>Physical Science</p>	<p>12C: Know and apply concepts that describe properties of matter and energy and the interactions between them.</p> <p>12D: Know and apply concepts that describe force and motion and the principles that explain them.</p>	<p>Classifying Matter</p> <ul style="list-style-type: none"> ●Define the terms “element” and “atom” and describe how elements are classified on the periodic table. <p>Forms of Energy</p> <ul style="list-style-type: none"> ●Identify how sound energy moves and how it is used. <p>Electrical Energy</p> <ul style="list-style-type: none"> ●Identify how electrons cause objects to attract and repel and how they flow in a circuit. <p>Investigating Motion</p> <ul style="list-style-type: none"> ●Identify terms to measure motion (speed and velocity). 	<p>Introduction to Matter</p> <ul style="list-style-type: none"> ●Compare and contrast physical and chemical properties of matter. ●Compare and contrast the properties and phase changes of solids, liquids and gases. ●Compare and contrast elements, compounds and mixtures. ●Identify subatomic particles and describe terms used to compare them (i.e. atomic number, atomic mass, mass number). ●Describe characteristics of elements in major groups of the periodic table. 	<p>Interactions of Matter</p> <ul style="list-style-type: none"> ●Identify the number of valence electrons in an atom and how this relates to bonding. ●Compare and contrast ionic, covalent and metallic bonds. ●Describe how chemical reactions produce new substances with different chemical and physical properties. ●Interpret simple formulas and equations. ●Compare and contrast acids and bases (e.g. properties, formulas, household examples, pH, reaction to litmus). 	<p>Force and Motion</p> <ul style="list-style-type: none"> ●Describe Newton’s 1st law and give everyday examples. ●Describe Newton’s 2nd law and give everyday examples. ●Describe Newton’s 3rd law and give everyday examples. ●Describe the laws of Conservation of Momentum and Conservation of Energy and relate to issues in the real world. ●Use the four-step technique to solve motion problems. <p>Energy and Systems</p> <ul style="list-style-type: none"> ●Calculate work and power for simple machines and describe the relationship between them. ●Describe simple machines and calculate their efficiencies and mechanical advantage. ●Describe properties of vectors and why they are important. ●Describe what is necessary for an object to be in equilibrium. ●Analyze the motion of a projectile. <p>Vibrations, Waves and Sound</p> <ul style="list-style-type: none"> ●Apply appropriate terminology to wave phenomena and harmonic motion. ●Analyze the relationship between period, frequency, wavelength and speed of waves and solve simple problems. ●Describe the properties of reflection, refraction, diffraction, interference and absorption of waves. ●Describe how sounds are made and the factors that affect the speed of sound. ●Explain applications of sound (i.e. Doppler effect, echolocation, musical instruments, ultra sound, sonograms etc.)
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<p>Earth Science</p>	<p>12E: Know and apply concepts that describe the features and processes of the Earth and its resources</p> <p>12F: Know and apply concepts that explain the composition and structure of the universe and the Earth's place in it.</p>	<p>The Changing Earth</p> <ul style="list-style-type: none"> ●Identify the Earth's layers. <p>The Earth's Resources</p> <ul style="list-style-type: none"> ●Compare and contrast renewable and nonrenewable resources. <p>Climate</p> <ul style="list-style-type: none"> ●Describe how land and water affect climate. <p>Astronomy</p> <ul style="list-style-type: none"> ●Describe how scientists use instruments to study planets and stars. 	<p>Earth's Changing Surface</p> <ul style="list-style-type: none"> ●Compare latitude and longitude; true and magnetic north; and describe how a compass is used to find directions on Earth. ●Describe factors that affect mechanical and chemical weathering. ●Identify sources, types and properties of soil; how it is affected by climate; and methods of preventing soil damage and loss. ●Describe the process of wind erosion and deposition. ●Describe types of glaciers, ways in which they move and how they change the Earth. <p>Weather and Climate</p> <ul style="list-style-type: none"> ●Describe characteristics of the atmosphere and how energy is transferred within it. ●Describe the process of the water cycle. ●Identify how air masses form fronts and how they affect the weather. ●Describe types of severe weather including thunderstorms, tornadoes and hurricanes. ●Explain the difference between weather and climate and identify factors that affect climate. 	<p>Inside the Restless Earth</p> <ul style="list-style-type: none"> ●Compare and contrast rocks and minerals, describe their properties and the tests to identify them. ●Describe the formation and characteristics of igneous, sedimentary and metamorphic rocks. ●Identify types and formations of fossils and what they tell us about the past. ●Identify the layers of the Earth by their physical properties. ●Explain the effects that plate tectonics has on the Earth's crust (e.g. faults, folds, uplift, volcanoes, earthquakes). <p>Astronomy</p> <ul style="list-style-type: none"> ●Describe early ideas of the structure of the universe and the contributions of important scientists to our understanding of it. ●Describe the characteristics of stars. ●Describe the structure, formation and movement of the sun and members of the solar system. ●Compare and contrast characteristics of the inner and outer planets, including the effects of gravity and motion. ●Explain how the position of the moon, Earth and sun results in various moon phases and eclipses. 	
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