

Science 8 (1) - DRAFT

STRAND	SUBSTRAND	STANDARD	BENCHMARK	ESSENTIAL ELEMENTS	MATERIALS / RESOURCES	ASSESSMENTS
History and Nature of Science	Scientific Inquiry	The student will use multiple skills to design and conduct scientific investigations.	<p>The student will specify variables to be changed, controlled and measured.</p> <p>The student will use sufficient trials and adequate sample size to ensure reliable data.</p> <p>The student will use appropriate technology and mathematics skills to access, gather, store, retrieve and organize data.</p>	<p>8.I.B.1 Topic: Common elements of scientific investigation (Scientific Method) : gathering data, logical reasoning, innovative hypothesis/explanation</p> <ul style="list-style-type: none"> - Gathering evidence of moving continents (matching coastlines, fossils, landforms glacial evidence and rock types for plate tectonics theory) - Convection currents in the mantle as example of innovative hypothesis for explanation of plate movement <p>8.I.B.2 Topic: Generalizing more complex systems from investigations in simple systems</p> <ul style="list-style-type: none"> - Observation of convection in simple system used to explain weather patterns in complex system - Simple systems only have one variable, complex systems have many variables <p>8.I.B.3 (same as 7.I.B.2) Topic: Variables in scientific study</p> <ul style="list-style-type: none"> - Covered in Grade 7 standards 	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Chapter 1&2 Skills Workshop Workbook</p> <p>Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>
History and Nature of Science	C. Scientific Enterprise	The student will know that science and technology are human efforts that both influence and are influenced by civilizations and cultures worldwide.	The student will evaluate the credibility and validity of scientific and technological information from various sources.	<p>8.I.C.1 Topic: Credibility and validity of scientific and technological sources</p> <ul style="list-style-type: none"> - All information used in scientific studies should come from credible and valid sources such as scientific papers, journals, and magazines or personal communication with other scientists in the field of study - Be very cautious about using online sources. 	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Skills Workshop Workbook</p> <p>Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>

Science 8 (2) - DRAFT

<p>History and Nature of Science</p>	<p>Historic Perspectives</p>	<p>The student will understand how scientific discovery, culture, societal norms and technology have influenced one another in different time periods.</p>	<p>The student will relate personal experiences in scientific investigation to the experiences of scientists throughout history.</p> <p>The student will cite examples of how science and technology contributed to changes in agriculture, manufacturing, sanitation, medicine, warfare, transportation, information processing or communication.</p>	<p>8.I.D.2 (Same as 7.I.D.2) Topic: Culture and technology influence scientific study - Covered in Grade 7 standards</p>	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Skills Workshop Workbook Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>
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Science 8 (3) - DRAFT

<p>Earth and Space Science</p>	<p>Earth Structure and Processes</p>	<p>The student will identify Earth's composition, structure and processes.</p>	<p>The student will explain how earthquakes, volcanoes, sea-floor spreading and mountain building are evidence of the movement of crustal plates.</p> <p>The student will describe how features on the Earth's surface are created and constantly changing through a combination of slow and rapid processes of weathering, erosion, sediment deposition, landslides, volcanic eruptions and earthquakes.</p> <p>The student will describe the various processes and interactions of the rock cycle.</p> <p>The student will interpret successive layers of sedimentary rocks and their fossils to document the age and history of the Earth.</p> <p>The student will recognize that constructive and destructive Earth processes can affect the evidence of Earth's history.</p> <p>The student will classify and identify rocks and minerals using characteristics including but not limited to density, hardness and streak.</p>	<p>8.III.A.1 Topic: Plate Tectonics Evidence - Earthquakes epicenters outline plate boundaries - Volcanoes outline plate boundaries - Seafloor spreading is a process which moves plates away from spreading centers - Mountains often form where plates have collided</p> <p>8.III.A.2 Topic: Landforms change due to a variety of building and tearing down forces - Weathering is the breakdown of rocks from large pieces to smaller pieces - Physical weathering is the breakdown of rocks without changing the minerals - Chemical weathering results in the changing of minerals - Erosion is the movement of weathered rocks by wind, water, ice, and gravity - Sediment is weathered rock deposited in the lowest area. - Landslides are a form of erosion where masses of weathered rocks move down hill due to gravity - Volcanic eruptions will tend to build up areas of the crust - Earthquakes can modify landforms by triggering landslides.</p> <p>8.III.A.3 Topic: Rock Cycle - Igneous rocks are formed when lava/magma crystallizes (freezes) into a solid - Metamorphic rocks are igneous, sedimentary, or other metamorphic rocks changed by heat, pressure, and/or action of hot fluid - Sedimentary rocks are formed when sediments (small rock particles) are deposited and cemented together. - The rock cycle summarizes the changes that take place as rocks move from one category to another. - Complete a rock cycle diagram</p> <p>8.III.A.4 Topic: Geologic History - Cross sections of rock layers show relative</p>	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Chapter(s) 4-19</p> <p>Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>
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				<p>age relationship of rock strata</p> <ul style="list-style-type: none">- Write a summary of the history of a simple rock cross-section summary including sedimentary and igneous- Law of Superposition states that in a stack of horizontal sedimentary rocks the oldest rocks are at the bottom and the youngest rocks are at the top- Index fossils are numerous, easily identified fossils that cover a short time period used to accurately date sedimentary rocks- Most sedimentary rocks are originally deposited horizontally due to gravity- Relative age of rocks tells which rocks are older or younger not how old they are.- Cross-cutting means younger rocks are cutting across older rocks. <p>8.111.A.5</p> <p>Topic: Landform changes</p> <ul style="list-style-type: none">- Earth's history is recorded in changes in rock layers, and shape and structure of land.- Landforms change due to movement of plates by creating mountains- Weathering of rock changes land forms by rounding off mountain profiles- Alpine glaciation will carve mountains into rugged peaks- Continental glaciers create a more rounded landscape- Volcanic activity will build lava plateaus and volcanic mountains <p>8.III.A.6</p> <p>Topic: Mineral identification</p> <ul style="list-style-type: none">- Minerals can be identified by using a key and the physical properties of color, hardness, cleavage, streak, and luster.- Color is the surface color of a mineral- Hardness is a scratch test from 1-10 with one as softest and 10 as hardest- Cleavage is the breaking of a mineral along flat surfaces due to weakness in the chemical bonds.- Streak is the color of the powdered minerals- Luster is the light reflect of a minerals surface and is divided into 2 categories -	
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				metallic and nonmetallic		
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Science 8 (6) - DRAFT

<p>Earth and Space Science</p>	<p>Earth Structure and Processes</p>	<p>The student will investigate the impact humans have on the environment.</p>	<p>The student will identify and research an environmental issue and evaluate its impact.</p>	<p>8.I.A.1 Not assessed on MCA-II</p>		
<p>Earth and Space Science</p>	<p>The Water Cycle, Weather and Climate</p>	<p>The student will investigate how the atmosphere interacts with the Earth system.</p>	<p>The student will define radiation, conduction and convection and explain their effects on weather and climate.</p> <p>The student will identify the forces that create currents and layers in the Earth's atmosphere and water systems.</p> <p>The student will describe the effect of Earth's rotation on the winds and ocean currents.</p> <p>The student will collect and use data to predict the weather.</p> <p>The student will identify the composition and structures of the atmosphere.</p> <p>The student will describe climate changes that have occurred over time.</p>	<p>8.III.B.1 Topic: Heat transfer in the atmosphere - Conduction is the transfer of heat by direct contact - Convection is the transfer of heat in fluids like air and water by density differences. - Radiation is the transfer of heat by electromagnetic waves - All three processes play a part in heating the Earth 8.III.B.2 Topic: Cause of currents in air and water - Currents in water can be caused by surface winds or by density differences due to salinity differences - Currents in air (wind) are caused by temperature differences which cause density differences which create convection currents causing winds to blow from high pressure areas to low pressure areas 8.III.B.3 Topic: Coriolis affect - Both wind currents and water currents will be deflected to the right in the northern hemisphere (left in southern hemisphere) due to the rotation of the Earth. 8.III.B.4 Topic: Weather prediction - Higher barometric pressure means fair weather: Lower pressures indicates stormy weather - Higher dew points increase the potential for strong storms - Winds from SE indicate approaching storms: Winds from NW indicate colder temperatures - Temperatures rise as warm front passes: Temperatures fall as cold fronts pass - Precipitations is generally in front of a warm front and along and behind a cold front - Stratus clouds are associated with warm front weather and cumulus clouds with cold</p>	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Chapter(s)23-26</p> <p>Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>

				<p>front weather</p> <p>8.III.B.5 Topic: Composition and structure of the atmosphere</p> <ul style="list-style-type: none"> - The temperature falls as you go up in the atmosphere - The pressure falls as you go up in the atmosphere - There is more ozone in the ozone layer (stratosphere) and more ions in the ionosphere (thermosphere) - Most weather is found in the troposphere (bottom most layer of the atmosphere) <p>8.III.B.6 Topic: Climate Change</p> <ul style="list-style-type: none"> - Rock layers of sandstone, limestone and shale indicate dramatically different environmental conditions in Minnesota in the past. - Dating of various glacial features in Minnesota indicate repeated changes in climate from temperate to arctic in the last few million years. 		
Earth and Space Science	The Universe	The student will compare objects in the solar system and explain their interactions with the Earth.	<p>The student will recognize that the sun is the principal energy source for the solar system and that this energy is transferred in the form of radiation.</p> <p>The student will explain how the combination of the Earth's tilted axis and revolution around the sun causes the progression of seasons and weather patterns.</p> <p>The student will compare and contrast the planets, taking into account their composition, mass and distance from the sun and recognize the conditions that have</p>	<p>8.III.C.1 Topic: Solar Radiation</p> <ul style="list-style-type: none"> - The electromagnetic spectrum refers to all forms of electromagnetic wave energy (radiation) including x-rays, gamma rays, ultraviolet, visible light, infrared (heat), and radio waves. <p>8.III.C.2 and 8.III.C.4 Topic 1: Earth tilt and revolution cause season and weather patterns Topic 2: Earth motion causes change in day length, length of year, phases of moon, eclipses, tides and shadows</p> <ul style="list-style-type: none"> - Animation of Earth's revolution shows axis pointed away from sun in winter, toward sun in summer, and parallel during equinox (Northern Hemisphere) - Seasons are not caused by changes in distance from sun but by consistent tilt of Earth's axis <p>8.III.C.3 Topic: Compare and contrast composition, mass, and distance from sun for the planets.</p>	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Chapter(s)27-30</p> <p>Teacher generated notes and activities</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>

			<p>allowed life to flourish on Earth.</p> <p>The student will use the predictability of the motions of the Earth, and sun to explain the length of day, length of year, phases of the moon, eclipses, tides and shadows.</p>	<p>Use to explain life on Earth</p> <ul style="list-style-type: none"> - Earth's mass/gravity holds a protective atmosphere, distance from sun creates temperature for liquid water, molten interior creates protective magnetic field and plate tectonics 		
Earth and Space Science	The Universe	The student will describe the composition and structure of the universe.	<p>The student will recognize that the universe consists of many billions of galaxies, each containing many billions of stars and that there are vast distances that separate these galaxies and stars from one another.</p> <p>The student will recognize that the sun is a medium-sized star and is the closest star to Earth. It is the central and largest body in the solar system and is one of billions of stars in the Milky Way Galaxy.</p>	<p>8.III.C.1 Topic: Vastness of the universe</p> <ul style="list-style-type: none"> - A light year is the distance light travels in a year (app 9 trillion kilometers) - The further away an object is in the universe the older the light is that we see from Earth. Looking out into space is like looking back in time. - Almost all of the objects in the universe are moving away from each other indicating an expanding universe. - The Big Bang Theory states that all matter and energy in the universe were a single entity 13.7 bya and exploded outwards expanding cooling and clumping into what we detect today. - Space travel is limited by the relatively slow spacecrafts humans have now compared to the vast distances in space. <p>8.III.C.2 Topic: Characteristics of our sun</p> <ul style="list-style-type: none"> - Sun is the center of our solar system - It is a medium sized star - It is the closest star to Earth - It is one of about 100 billion other stars in the Milky Way Galaxy 	<p><u>Modern Earth Science</u>, Sager et.al., Holt, Rinehart, and Winston (2002) Chapter(s)</p>	<p>Teacher generated tests and quizzes</p> <p>Daily assignments and lab sheets</p>