

STEM Earth Science Curriculum Map

Odessa Montour Junior Senior High School

First Week	Essential Questions	Content	Skills/Labs	Assessments	Standards
	<ol style="list-style-type: none"> 1. What is Earth Science? 2. What is STEM? 3. What is Collaboration? 	<ol style="list-style-type: none"> 1. <ul style="list-style-type: none"> • Geology • Astronomy • Meteorology • The nature of science 2. <ul style="list-style-type: none"> • STEM practices/project-based learning • The 7E Model • Argumentation skills 3. <ul style="list-style-type: none"> • Cooperative learning • Group assessment 	<p>Skills</p> <ol style="list-style-type: none"> 1. Create folders for the year, review classroom rules, discuss class expectations, and identify the different branches of Earth Science. 2. Model the style of learning experienced in a project based classroom. 3. Practice the art of cooperative learning and assess its effectiveness in the classroom environment. 	<ol style="list-style-type: none"> 1. Parent Signature 2. Student observations and interpretation of demonstration 3. Student Assessment of cooperative learning. 	<ol style="list-style-type: none"> 1. Standard 7 <ul style="list-style-type: none"> • Key Idea 1 • Key Idea 2 2. Standard 1 (SI) <ul style="list-style-type: none"> • Key Idea 1 <p>Standard 7</p> <ul style="list-style-type: none"> • Key Idea 1 <p>Standard 7</p> <ul style="list-style-type: none"> • Key Idea 2 3. Standard 6 <ul style="list-style-type: none"> • Key Idea 6

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
September/ October	<ol style="list-style-type: none"> 1. What are the sizes and distances of objects in the Solar System? 2. How did the Universe and solar system form? 3. How do we locate astronomical objects in the sky? 4. What are the characteristics and effects of orbits? 5. What are the relationships between the Earth, Sun, and Moon? 6. How does the Sun affect the Earth? 7. How does a star change as it ages? 	<ol style="list-style-type: none"> 1. <i>Chapter 1, Section 1</i> <ul style="list-style-type: none"> • Scale of the solar system • Distance units used in astronomy • Parallax • Types of galaxies 2. <i>Chapter 1, Section 3</i> <ul style="list-style-type: none"> • Doppler Effect • Big Bang and Steady State Theory • Nebular Theory 3. <i>Chapter 1, Section 2</i> <ul style="list-style-type: none"> • <i>Latitude and Longitude</i> • <i>Celestial Coordinates</i> • <i>Constellations</i> 4. <i>Chapter 1, Section 4</i> <ul style="list-style-type: none"> • Kepler's laws • Eccentricity • Orbital inclination • Precession 5. <i>Chapter 1, Section 5</i> <ul style="list-style-type: none"> • Lunar Phases • Newton's laws • Law of gravitation • Moon formation • Tides 6. <i>Chapter 1, Section 8</i> <ul style="list-style-type: none"> • Structure of the Sun • Sunspots • Solar flares • Earth's energy budget 7. <i>Chapter 1, Section 9</i> <ul style="list-style-type: none"> • HR diagram 	<p>Skills</p> <ol style="list-style-type: none"> 1. Create a scale model of the solar system 2. Model latitude and longitude 3. Model movement of galaxies and formation of solar system 4. Analyze an elliptical orbit 5. Track the moon and its phases 6. Calculate energy from an impact 7. Analyze sunspot and solar flare data 8. Create an HR diagram from star data <p>Labs</p> <ul style="list-style-type: none"> • Heat Transfer and Changes of State • Latitude and Longitude; Mapping (Havana Glen) • Impact Craters and Moon Features • Electromagnetic Spectrum 	<p>EarthComm</p> <ol style="list-style-type: none"> 1. Section 1; 1 Notes Section 1; 1 Vocabulary Section 1; 1 Evidence based claims Section 1; 1 Checking UP 2. Section 1; 3 Notes Section 1; 3 Vocabulary Section 1; 3 Evidence based claims Section 1; 3 Checking UP 3. Section 1; 2 Notes Section 1; 2 Vocabulary Section 1; 2 Evidence based claims Section 1; 2 Checking UP 4. Section 1; 4 Notes Section 1; 4 Vocabulary Section 1; 4 Evidence based claims Section 1; 4 Checking UP 5. Section 1; 5 Notes Section 1; 5 Vocabulary 	<ol style="list-style-type: none"> 1. Standard 6 <ul style="list-style-type: none"> • Key Idea 3 Standard 4 <ul style="list-style-type: none"> • 1.1b 2. Standard 4 <ul style="list-style-type: none"> • 1.2a, 1.2c 3. Standard 1 (SI) <ul style="list-style-type: none"> • Key Idea 1 Standard 6 <ul style="list-style-type: none"> • Key Idea 2 Standard 4 <ul style="list-style-type: none"> • 1.1c, 1.1d, 1.1e, 1.1f, 1.1g, 1.1h <ul style="list-style-type: none"> • Standard 1 (MA) <ul style="list-style-type: none"> • Key idea 2 Standard 6 <ul style="list-style-type: none"> • Key Idea 4 Standard 4 <ul style="list-style-type: none"> • 1.1b, 1.1f <ul style="list-style-type: none"> • Standard 1 (SI) <ul style="list-style-type: none"> • Key Idea 3 • Key Idea 5 Standard 4 <ul style="list-style-type: none"> • 1.1a, 1.1i <ul style="list-style-type: none"> • Standard 6 <ul style="list-style-type: none"> • Key Idea 5 Standard 4 <ul style="list-style-type: none"> • 1.2b <ul style="list-style-type: none"> • Standard 4

		<ul style="list-style-type: none"> • Classification of stars • Luminosity • Star life cycles 		<p>Section 1; 5 Evidence based claims Section 1; 5 Checking UP</p> <p>6. Section 1; 8 Notes Section 1; 8 Vocabulary Section 1; 8 Evidence based claims Section 1; 8 Checking UP</p> <p>7. Section 1; 9 Notes Section 1; 9 Vocabulary Section 1; 9 Evidence based claims Section 1; 9 Checking UP</p> <p>Chapter 1 Challenge Chapter 1 Exam Chapter 1 Notebook</p> <p>CHAPTER REVIEW Reviewing Earth Science</p> <p>1. Pages: 19-20 Questions: 2, 5, 7 Pages: 283-285 Questions: 16, 20, 24 Pages: 292-293 Questions: 46-49</p> <p>2. Pages 290-292 Questions: 36, 41, 42, 43</p> <p>3. Pages 255-257 Questions: 2, 3, 4, 5, 6, 7, 9, 12, 13, 14, 15, 16</p>	<ul style="list-style-type: none"> • 1.2b
--	--	---	--	--	--

				4. Pages 283-285 5. Pages 276-278, 283-285 6. Pages 283-285 7. Pages 290-292 8. Pages 290-292	
--	--	--	--	---	--

>

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
October/ November/ December	<ol style="list-style-type: none"> Where are volcanoes and Earthquakes Located? How can we measure the movement of Earth's lithospheric plates? What drives the movement of Earth's lithospheric plates? How do Plate boundary environments differ? How have the continents moved throughout Earth's history? How are earthquakes created? How can we detect earthquakes? How are earthquakes classified? 	<ol style="list-style-type: none"> <i>Chapter 2, Section 1</i> <ul style="list-style-type: none"> Volcanism Mid-ocean ridge Hot-spot volcanism Earthquakes Earthquake patterns and plate tectonics faults <i>Chapter 2, Section 2</i> <ul style="list-style-type: none"> Lithospheric plate movement <i>Chapter 2, Section 3</i> <ul style="list-style-type: none"> Earth's layered structure Thermal convection as the driving force of plate tectonics Subduction of plates <i>Chapter 2, Section 5</i> <ul style="list-style-type: none"> Oceanic Trenches Volcanism at plate boundaries Hot-Spot Volcanism Continental Accretion Plate Tectonics <i>Chapter 2, Section 6</i> <ul style="list-style-type: none"> Paleogeography 	<p>Skills</p> <ol style="list-style-type: none"> Plot the locations of Earthquakes and Volcanoes Use GPS to calculate the rate and direction of plate movement Investigate density using various fluids and rock samples Examination of plate boundaries and the surface features created at each Create maps of Earth's continents in the present, past, and future Model the release of energy to create an Earthquake Determine the epicenter of an earthquake Rank earthquakes by their intensities <p>Labs</p>	<p>EarthComm</p> <ol style="list-style-type: none"> Section 2; 1 Notes Section 2; 1 Vocabulary Section 2; 1 Evidence based claims Section 2; 1 Checking UP Section 2; 2 Notes Section 2; 2 Vocabulary Section 2; 2 Evidence based claims Section 2; 2 Checking UP Section 2; 3 Notes Section 2; 3 Vocabulary Section 2; 3 Evidence based claims Section 2; 3 Checking UP Section 2; 5 Notes 	<ol style="list-style-type: none"> Standard 4 <ul style="list-style-type: none"> 2.1l Standard 4 <ul style="list-style-type: none"> 2.1l Standard 4 <ul style="list-style-type: none"> 2.1a, 2.1b, 2.1k, 2.1l, 2.1n Standard 4 <ul style="list-style-type: none"> 2.1n, 2.1p Standard 6 <ul style="list-style-type: none"> Key Idea 5 Standard 4 <ul style="list-style-type: none"> 2.1o TOPO MAPS Standard 1 (MA) <ul style="list-style-type: none"> Key Idea 1 Standard 6 <ul style="list-style-type: none"> Key Idea 2 Standard 6 <ul style="list-style-type: none"> Key Idea 3 Standard 4

		<ul style="list-style-type: none"> • Paleomagnetism • Development on Plate Tectonics <p>6. <i>Chapter 2, Section 10</i></p> <ul style="list-style-type: none"> • Earthquakes • Seismic Waves • Focus and Epicenter <p>7. <i>Chapter 2, Section 11</i></p> <ul style="list-style-type: none"> • Seismometers • Travel-time curves <p>8. <i>Chapter 2, Section 12</i></p> <ul style="list-style-type: none"> • Earthquake Magnitude • Hazards • Preparedness • Local Geology and earthquakes 	<ul style="list-style-type: none"> • Volcano Hazards?(after section 1) • Magnetism, seafloor spreading, and subduction zones (after section 3) • Tectonic and Past environments (Havana Glen) 	<p>Section 2; 5 Vocabulary Section 2; 5 Evidence based claims Section 2; 5 Checking UP</p> <p>5. Section 2; 6 Notes Section 2; 6 Vocabulary Section 2; 6 Evidence based claims Section 2; 6 Checking UP</p> <p>6. Section 2; 10 Notes Section 2; 10 Vocabulary Section 2; 10 Evidence based claims Section 2; 10 Checking UP</p> <p>7. Section 2; 11 Notes Section 2; 11 Vocabulary Section 2; 11 Evidence based claims Section 2; 11 Checking UP</p> <p>8. Section 2; 12 Notes Section 2; 12 Vocabulary Section 2; 12 Evidence based claims Section 2; 12 Checking UP</p>	<ul style="list-style-type: none"> • 2.1q • Standard 4 <ul style="list-style-type: none"> • 2.1j 7. Standard 4 <ul style="list-style-type: none"> • 2.1j 8. Standard 7 <ul style="list-style-type: none"> • Key Idea 2 Standard 4 <ul style="list-style-type: none"> • 2.1l
--	--	---	--	--	--

				<p>Chapter 2 Challenge Chapter 2 Exam Chapter 2 Notebook</p> <p>Reviewing Earth Science</p> <ul style="list-style-type: none"> Chapters 1 and 3 Chapter review questions 	
--	--	--	--	---	--

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
January/ February	<ol style="list-style-type: none"> What are minerals? How are Igneous Rocks classified? How are Sedimentary Rocks classified? How are Metamorphic Rocks classified? How are Earth's past events ordered? How are fossils used to determine Earth's history? 	<ol style="list-style-type: none"> <i>Chapter 3, Section 1</i> <ul style="list-style-type: none"> Rocks and minerals Mineral Identification Physical properties of minerals <i>Chapter 3, Section 2</i> <ul style="list-style-type: none"> Igneous rock formation Igneous rock identification Igneous environments <i>Chapter 3, Section 3</i> <ul style="list-style-type: none"> Bedrock Sedimentary rock formation Sedimentary rock identification Sedimentary environments <i>Chapter 3, Section 4</i> <ul style="list-style-type: none"> Metamorphic rock formation 	<p>Skills</p> <ol style="list-style-type: none"> Examine a series of minerals and their properties to correctly identify them Develop a scheme to identify igneous rocks based on their observations Produce models to learn how sedimentary rocks form and apply this knowledge to the ESRT identification chart Model deformation during metamorphism and apply observations to metamorphic rock identification. Create a model of the geologic time scale. Simulate the laws of succession and radioactive decay and apply to ordering geologic events. 	<p>EarthComm</p> <ol style="list-style-type: none"> Section 3; 1 Notes Section 3; 1 Vocabulary Section 3; 1 Evidence based claims Section 3; 1 Checking UP Section 3; 2 Notes Section 3; 2 Vocabulary Section 3; 2 Evidence based claims Section 3; 2 Checking UP Section 3; 3 Notes Section 3; 3 Vocabulary Section 3; 3 Evidence based claims 	<ol style="list-style-type: none"> Standard 7 <ul style="list-style-type: none"> Key Idea 1 Standard 6 <ul style="list-style-type: none"> Key Idea 6 Standard 4 <ul style="list-style-type: none"> 3.1a, 3.1b Standard 4 <ul style="list-style-type: none"> 1.2c, 2.1m, 3.1c Standard 4 <ul style="list-style-type: none"> 1.2f, 2.1m, 2.1w, 3.1c Standard 4 <ul style="list-style-type: none"> 2.1m, 3.1c Standard 6 <ul style="list-style-type: none"> Key Idea 3 Standard 4 <ul style="list-style-type: none"> 1.2h, 1.2j <ul style="list-style-type: none"> Standard 4

		<ul style="list-style-type: none"> • Metamorphic rock identification • Regional metamorphism • Contact metamorphism <p>5. <i>Chapter 3, Section 7 and Chapter 8, Section 5</i></p> <ul style="list-style-type: none"> • Principle of superposition • Principle of original horizontality • Principle of lateral continuity • Principle of crosscutting relationships • Unconformities • Geologic maps and cross-sections • Geologic time scale • Units of geologic time • Relative Dating • Absolute dating <ul style="list-style-type: none"> • <i>Chapter 8, Section 6</i> <ul style="list-style-type: none"> • Fossils • Fossilization • Geologic time scale 	<p>6. Create a fossil and use to identify the geologic age of a rock</p> <p>Labs</p> <ul style="list-style-type: none"> • Mineral ID • Rock Cycle (Havana Glen) • Rocks and Stream Ion Concentration (Havana Glen) 	<p>Section 3; 3 Checking UP</p> <p>4. Section 3; 4 Notes Section 3; 4 Vocabulary Section 3; 4 Evidence based claims Section 3; 4 Checking UP</p> <p>5. Section 3; 7 & 8; 5 Notes Section 3; 7 & 8; 5 Vocabulary Section 3; 7 & 8; 5 Evidence based claims Section 3; 7 & 8; 5 Checking UP</p> <p>6. Section 8; 6 Notes Section 8; 6 Vocabulary Section 8; 6 Evidence based claims Section 8; 6 Checking UP</p> <p>Chapter 3 & 8 Challenge Chapter 3 & 8 Exam Chapter 3 & 8 Notebook</p>	<ul style="list-style-type: none"> • 1.2i, 1.2j
--	--	---	---	---	--

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
March	<ol style="list-style-type: none"> Where is Earth's water found? What characteristics of Earth's surface make it suitable for human activities? How can we use topographic maps to describe the surface of Earth? How do glaciers change the landscape? How does wind affect the landscape? What types of processes shape coastal regions? 	<ol style="list-style-type: none"> <i>Chapter 4, Section 1</i> <ul style="list-style-type: none"> Heat capacity of water Density of water in different states Atomic structure of water Distribution of water The water cycle <i>Chapter 4, Sections 3 & 7</i> <ul style="list-style-type: none"> Angle of repose Mass movement Soil classification Soil horizons Soil formation Physical weathering Chemical weathering Chapter <ul style="list-style-type: none"> Topographic Maps Gradients Latitude and Longitude Topographic Profiles <i>Chapter 4, Section 8</i> <ul style="list-style-type: none"> Glacial formation and movement Glacial erosion and deposition Action of glacial meltwater Effect of glaciers on stream evolution <i>Chapter 4, Section 9</i> 	<p>Skills</p> <ol style="list-style-type: none"> Calculate the amount of energy required to melt ice. Illustrate where water is stored and how it moves between reservoirs. Test porosity, permeability, retention, and capillarity of different substrates and determine their angle of repose. Use of known elevations to create a topographic map Model glacial meltwater, landscapes, erosional and depositional features. Design and carryout experiments to demonstrate the relationships between grain size and wind speed. Create waves and investigate the effect of wave impacts on various shorelines. <p>Labs</p> <ul style="list-style-type: none"> High and Low Gradient Streams Sediments in Streams, Pebble Count (Havana Glen) 	<p>EarthComm</p> <ol style="list-style-type: none"> Section 4; 1 Notes Section 4; 1 Vocabulary Section 4; 1 Evidence based claims Section 4; 1 Checking UP Section 4; 3 & 7 Notes Section 4; 3 & 7 Vocabulary Section 4; 3 & 7 Evidence based claims Section 4; 3 & 7 Checking UP Section 4; 8 Notes Section 4; 8 Vocabulary Section 4; 8 Evidence based claims Section 4; 8 Checking UP Section 4; 9 Notes Section 4; 9 Vocabulary Section 4; 9 Evidence based claims Section 4; 9 Checking UP Section 4; 10 Notes 	<ol style="list-style-type: none"> Standard 4 <ul style="list-style-type: none"> 1.2e, 1.2g Standard 4 <ul style="list-style-type: none"> 1.2g, 1.2t Standard 1 (M.A.) <ul style="list-style-type: none"> Key Idea 1, 3 Standard 6 <ul style="list-style-type: none"> Key Idea 2 Standard 4 <ul style="list-style-type: none"> 2.1p, 2.1t, 2.1u Standard 4 <ul style="list-style-type: none"> 2.1p, 2.1t, 2.1u Standard 1 (A.I.D.) <ul style="list-style-type: none"> Key Idea 1 Standard 4 <ul style="list-style-type: none"> 2.1p, 2.1t, 2.1u

		<ul style="list-style-type: none"> • Sediment transport • Wind erosion • Wind deposition <p>6. <i>Chapter 4, Section 10</i></p> <ul style="list-style-type: none"> • Ocean waves • Coastal erosion • Coastal deposition • Emergent and submergent coastlines 		<p>Section 4; 10 Vocabulary Section 4; 10 Evidence based claims Section 4; 10 Checking UP</p> <p>Chapter 4 Challenge Chapter 4 Exam Chapter 4 Notebook</p>	
--	--	---	--	--	--

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
April/May	<ol style="list-style-type: none"> 1. How does Earth's atmosphere respond to regional differences in pressure created by unequal heating of the surface? 2. What components make up the weather? 3. How can we predict severe weather? 4. What other factors can affect regional climates? 	<ol style="list-style-type: none"> 1. <i>Chapter 5, Section 1</i> <ul style="list-style-type: none"> • Atmospheric circulation • Air pressure • Wind • Coriolis effect • Global wind belts • Jet streams 2. <i>Chapter 5, Section 2</i> <ul style="list-style-type: none"> • Air masses • Air temperature and density • Relative humidity • Cloud formation • Precipitation • Weather maps 3. <i>Chapter 5, Sections 3, 4, and 5</i> <ul style="list-style-type: none"> • Development of thunderstorms • Lightning and thunder 	<p>Skills</p> <ol style="list-style-type: none"> 1. Model the factors that affect global winds 2. Create and study weather maps and instruments that are used to create forecasts for their local area. 3. Investigate the relationships between severe storm phenomena, their causes, and most likely places of occurrence. 4. Compare wind weather data and physical features of different communities to determine how they affect local weather. <p>Labs</p>	<p>EarthComm</p> <ol style="list-style-type: none"> 1. Section 5; 1 Notes Section 5; 1 Vocabulary Section 5; 1 Evidence based claims Section 5; 1 Checking UP 2. Section 5; 2 Notes Section 5; 2 Vocabulary Section 5; 2 Evidence based claims Section 5; 2 Checking UP 3. Section 5; 3, 4 and 5 Notes Section 5; 3, 4 and 5 Vocabulary 	<ol style="list-style-type: none"> 1. Standard 4 <ul style="list-style-type: none"> • 2.2a, 2.2b, 2.1e, 2.1f 2. Standard 2 <ul style="list-style-type: none"> • Key Idea 1 <p>Standard 6</p> <ul style="list-style-type: none"> • Key Idea 5 <p>Standard 4</p> <ul style="list-style-type: none"> • 2.1c, 2.1d, 2.1g, 2.1h <ul style="list-style-type: none"> • Standard 2 <ul style="list-style-type: none"> • Key Idea 3 <p>Standard 4</p> <ul style="list-style-type: none"> • 2.1c, 2.1d, 2.1g

		<ul style="list-style-type: none"> Flash floods and topography Downbursts Tornado development Cyclones Tornado Intensity Tropical cyclones, storms, and depressions Development of hurricanes Weather safety <p>4. <i>Chapter 5, Sections 8 and 9</i></p> <ul style="list-style-type: none"> Surface ocean currents El Nino Climate, local and global Factors affecting climate - latitude, elevation, geography 	<ul style="list-style-type: none"> Angle of Insolation and the heating of Earth's surface Ocean Currents and Hurricane Tracking Havana Glen Wrap-Up 	<p>Section 5; 3, 4 and 5 Evidence based claims Section 5, 3, 4 and 5 Checking UP</p> <p>4. Section 5; 8 & 9 Notes Section 5; 8 & 9 Vocabulary Section 5; 8 & 9 Evidence based claims Section 5; 8 & 9 Checking UP</p> <p>Chapter 5 Challenge Chapter 5 Exam Chapter 5 Notebook</p>	<ul style="list-style-type: none"> Standard 6 <ul style="list-style-type: none"> Key Idea 6 Standard 4 <ul style="list-style-type: none"> 2.1i, 2.2c, 2.2d
--	--	--	--	--	--

Month	Essential Questions	Content	Skills/Labs	Assessments	Standards
June	1. How can I pass the Earth Science Regents Exam?	<ol style="list-style-type: none"> Content Review Earth Science Reference table Practice Must know facts 	<p>Skills</p> <ol style="list-style-type: none"> 	<ol style="list-style-type: none"> Reviewing Earth Science <ul style="list-style-type: none"> Week 1 <ul style="list-style-type: none"> Introductory Chapter and Chapter 1 Chapter 2 and 3 Chapter 4 and 5 Week 2 <ul style="list-style-type: none"> Chapter 6 and 7 Chapter 8 and 9 Week 3 <ul style="list-style-type: none"> Chapter 10 and 11 	<ol style="list-style-type: none"> All of them

				<ul style="list-style-type: none">• Chapter 12 <ol style="list-style-type: none">2. Review Notes Packet3. Earth Science Reference Table Scavenger Hunt4. 100 ways to pass the Earth Science regents	
--	--	--	--	---	--

Additional Content

1. Yearlong Labs
 - a. Height and path of the Sun throughout the year
 - b. Havana Glen Stream Monitoring