

EARTH SCIENCE PREREQUISITE HIGH SCHOOL CONTENT EXPECTATIONS (28)
Cross-Referenced to the 5 -7th Grade Science Grade Level Content Expectations (GLCEs)

Earth Science Prerequisite HSCE	Grade Level(s)	5-7 Content Statement	5-7 Content Expectation
E3.p1A Explain the origin of Michigan landforms. Describe and identify surface features using maps and satellite images. <i>(prerequisite)</i>	(2)		No alignment in Middle School – the only “maps” mentioned are weather maps in 7th grade E.SE.02.21 Describe the major landforms of the surface of the Earth (mountains, plains, plateaus, valleys, hills).
E3.p1B Explain how physical and chemical weathering leads to erosion and the formation of soils and sediments. <i>(prerequisite)</i>	6	<i>E.SE.M.1 Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.</i>	E.SE.06.11 Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.
E3.p1C Describe how coastal features are formed by wave erosion and deposition. <i>(prerequisite)</i>	6	<i>E.SE.M.1 Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.</i>	E.SE.06.12 Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock in some areas and depositing sediments in other areas.
E3.p2A Identify common rock-forming minerals (quartz, feldspar, biotite, calcite, hornblende). <i>(prerequisite)</i>	NONE	<i>E.SE.M.4 Rock Formation- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them.</i>	Minerals referred to generally in 3rd grade, but no mineral identification in Middle School E.SE.03.14 Recognize that rocks are made up of minerals. E.SE.06.41 Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.
E3.p2B Identify common igneous (granite, basalt, andesite, obsidian, pumice), metamorphic (schist, gneiss, marble, slate, quartzite), and sedimentary (sandstone, limestone, shale, conglomerate)	6	<i>E.SE.M.4 Rock Formation- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them.</i>	E.SE.06.41 Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.

rocks and describe the processes that change one kind of rock to another. <i>(prerequisite)</i>			
E3.p3A Describe geologic, paleontologic, and paleoclimatologic evidence that indicates Africa and South America were once part of a single continent. <i>(prerequisite)</i>	NONE	E.SE.M.5 Plate Tectonics- The lithospheric plates of the Earth constantly move, resulting in major geological events, such as earthquakes, volcanic eruptions, and mountain building.	No alignment to geologic evidence of a single continent (Pangaea) E.SE.06.51 Explain plate tectonic movement and how the lithospheric plates move centimeters each year.
E3.p3B Describe the three types of plate boundaries (divergent, convergent, and transform) and geographic features associated with them (e.g., continental rifts and mid-ocean ridges, volcanic and island arcs, deep-sea trenches, transform faults). <i>(prerequisite)</i>	NONE	E.SE.M.5 Plate Tectonics- The lithospheric plates of the Earth constantly move, resulting in major geological events, such as earthquakes, volcanic eruptions, and mountain building.	No alignment to plate boundary types or the resulting geographic features E.SE.06.52 Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.
E3.p3C Describe the three major types of volcanoes (shield volcano, stratovolcano, and cinder cones) and their relationship to the Ring of Fire. <i>(prerequisite)</i>	NONE		Volcanoes referred to once in 3rd grade
E4.p1A Describe that the water cycle includes evaporation, transpiration, condensation, precipitation, infiltration, surface runoff, groundwater, and absorption. <i>(prerequisite)</i>	7	E.ES.M.8 Water Cycle- Water circulates through the four spheres of the Earth in what is known as the “water cycle.”	E.ES.07.11 Demonstrate, using a model or drawing, the relationship between the warming by the sun of the Earth and the water cycle as it applies to the atmosphere (evaporation, water vapor, warm air rising, cooling, condensation, clouds). E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.
E4.p1B Analyze the flow of water between the elements of a watershed, including surface	7	E.ES.M.8 Water Cycle- Water circulates through the four spheres of the Earth in what is known as the “water cycle.”	E.ES.07.82 Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers,

features (lakes, streams, rivers, wetlands) and groundwater. <i>(prerequisite)</i>			wetlands) and groundwater
E4.p1C Describe the river and stream types, features, and process including cycles of flooding, erosion, and deposition as they occur naturally and as they are impacted by land use decisions. <i>(prerequisite)</i>	NONE		“Rivers” mentioned in 2nd grade Otherwise, minimal alignment with “watershed” GLCE E.ES.07.82
E4.p1D Explain the types, process, and beneficial functions of wetlands. <i>(prerequisite)</i>	NONE		Minimal alignment with “watershed” GLCE E.ES.07.82
E4.p2A Describe the composition and layers of the atmosphere. <i>(prerequisite)</i>	7	<i>E.FE.M.1 Atmosphere- The atmosphere is a mixture of nitrogen, oxygen and trace gases that include water vapor. The atmosphere has different physical and chemical composition at different elevations.</i>	E.FE.07.12 Compare and contrast the composition of the atmosphere at different elevations.
E4.p2B Describe the difference between weather and climate. <i>(prerequisite)</i>	7	<i>E.ES.M.7 Weather and Climate- Global patterns of atmospheric and oceanic movement influence weather and climate.</i>	E.ES.07.71 Compare and contrast the difference and relationship between climate and weather.
E4.p2C Explain the differences between fog and dew formation and cloud formation. <i>(prerequisite)</i>	NONE	<i>E.ES.M.8 Water Cycle- Water circulates through the four spheres of the Earth in what is known as the “water cycle.”</i>	“fog” and “dew” are referred to in 1st and 2nd grade, otherwise minimal alignment in 7th grade E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.
E4.p2D Describe relative humidity in terms of the moisture content of the air and the moisture capacity of the air and how these depend on the temperature. <i>(prerequisite)</i>	NONE		
E4.p2E Describe conditions associated with frontal boundaries (cold, warm, stationary, and	7	<i>E.ES.M.7 Weather and Climate- Global patterns of atmospheric and oceanic movement influence weather and climate.</i>	E.ES.07.74 Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the

occluded). <i>(prerequisite)</i>			movement of major air masses and the jet stream across North America using a weather map.
E4.p2F Describe the characteristics and movement across North America of the major air masses and the jet stream. <i>(prerequisite)</i>	7	<i>E.ES.M.7 Weather and Climate- Global patterns of atmospheric and oceanic movement influence weather and climate.</i>	E.ES.07.74 Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the movement of major air masses and the jet stream across North America using a weather map.
E4.p2G Interpret a weather map and describe present weather conditions and predict changes in weather over 24 hours. <i>(prerequisite)</i>	7	<i>E.ES.M.7 Weather and Climate- Global patterns of atmospheric and oceanic movement influence weather and climate.</i>	E.ES.07.74 Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the movement of major air masses and the jet stream across North America using a weather map.
E4.p2H Explain the primary causes of seasons. <i>(prerequisite)</i>	5	<i>E.ES.M.6 Seasons- Seasons result from annual variations in the intensity of sunlight and length of day due to the tilt of the axis of the Earth relative to the plane of its yearly orbit around the sun.</i>	E.ES.05.61 Demonstrate using a model, seasons as the result of variations in the intensity of sunlight caused by the tilt of the Earth on its axis, and revolution around the sun.
E4.p2I Identify major global wind belts (trade winds, prevailing westerlies, and polar easterlies) and that their vertical components control the global distribution of rainforests and deserts. <i>(prerequisite)</i>	7?	<i>E.ES.M.1 Solar Energy- The sun is the major source of energy for phenomena on the surface of the Earth.</i>	Minimal alignment: No major wind belts are addressed E.ES.07.13 Describe how the warming of the Earth by the sun produces winds and ocean currents.
E4.p3A Describe how glaciers have affected the Michigan landscape and how the resulting landforms impact our state economy. <i>(prerequisite)</i>	6	<i>E.SE.M.1 Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.</i>	E.SE.06.12 Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock in some areas and depositing sediments in other areas.
E4.p3B Explain what happens to the lithosphere when an ice sheet is removed. <i>(prerequisite)</i>	6	<i>E.SE.M.5 Plate Tectonics- The lithospheric plates of the Earth constantly move, resulting in major geological events, such as earthquakes, volcanic eruptions, and mountain building.</i>	Ice sheet removal is not mentioned E.SE.06.53 Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.
E4.p3C Explain the formation of the Great Lakes. <i>(prerequisite)</i>	6?	<i>E.SE.M.1 Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each</i>	Great Lakes not specifically mentioned E.SE.06.12 Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock

		<i>having a different chemical composition and texture.</i>	in some areas and depositing sediments in other areas.
E5.p1A Describe the motions of various celestial bodies and some effects of those motions. <i>(prerequisite)</i>	5	<i>E.ST.M.2 Solar System Motion- Gravity is the force that keeps most objects in the solar system in regular and predictable motion.</i>	E.ST.05.21 Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.
E5.p1B Explain the primary cause of seasons. <i>(prerequisite)</i>			Redundant with E4.p2H
E5.p1C Explain how a light year can be used as a distance unit. <i>(prerequisite)</i>	NONE		
E5.p1D Describe the position and motion of our solar system in our galaxy. <i>(prerequisite)</i>	5	<i>E.ST.M.2 Solar System Motion- Gravity is the force that keeps most objects in the solar system in regular and predictable motion.</i>	Minimal alignment: CEs address motion within the solar system, not motion within our galaxy E.ST.05.21 Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.