

## Earth Science Across The Grades K-7

The Office of School Improvement has developed the Science Across the Grades companion document to assist educators in their work with the Grade Level Content Expectations (GLCE). The Across the Grades K-7 document provides a look at each GLCE in a matrix format across the grades. This “cross-grade” document allows grade levels to be easily compared with each other. You will find three separate matrices which include the disciplines of Physical Science, Life Science, and Earth Science. Within each grade band, the expectations have been aligned to show progression of a concept from one grade to the next.

### The Grade Level Content Expectations

The Grade Level Content Expectations (GLCE) provide a set of clear and rigorous expectations for all students and provide teachers with clearly defined statements of what students should know and be able to do as they progress through school. The expectations represent a research-based approach to science development, promote the use of higher level thinking skills, and assure that all students will be prepared for future academic success.

### Our Goal

The Office of School Improvement encourages local and intermediate school districts to continue the stellar work they have begun over the past years supporting the implementation of the Grade Level Content Expectations. The resources that have been generated and shared throughout the state are a wonderful example of Michigan educators’ commitment to help students attain the concepts and skills necessary to meet these expectations. Within the hands of teachers, the Grade Level Content Expectations are converted into exciting and engaging learning for Michigan’s students. The art of teaching is what makes the content of learning become a reality. Through the collaborative efforts of Michigan educators we can enable our young people to attain the highest standards, and thereby open doors for them to have fulfilling and successful lives.

Physical

Life

Earth

#### Contact:

Michigan Department of Education  
Office of School Improvement  
Kevin Richard  
(517) 373-4223  
[www.michigan.gov/mde](http://www.michigan.gov/mde)



Professional Organizations whose members have contributed to the Development of Michigan's K-8 Grade Level Content Expectations



Office of School Improvement

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SCIENCE GRADE LEVEL CONTENT EXPECTATIONS ACROSS THE GRADES

EARTH SCIENCE K-7

	K	1	2	3	4	5	6	7
Earth Systems		<p><b>E.ES.01.11</b> Identify the sun as the most important source of heat which warms the land, air, and water of the Earth.</p> <p><b>E.ES.01.12</b> Demonstrate the importance of sunlight and warmth in plant growth.</p>						<p><b>E.ES.07.11</b> 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).</p> <p><b>E.ES.07.12</b> Describe the relationship between the warming of the atmosphere of the Earth by the sun and convection within the atmosphere and oceans.</p> <p><b>E.ES.07.13</b> Describe how the warming of the Earth by the sun produces winds and ocean currents.</p>
		<p><b>E.ES.01.21</b> Compare daily changes in the weather related to temperature (cold, hot, warm, cool); cloud cover (cloudy, partly cloudy, foggy); precipitation (rain, snow, hail, freezing rain); wind (breezy, windy, calm).</p> <p><b>E.ES.01.22</b> Describe and compare weather related to the four seasons in terms of temperature, cloud cover, precipitation, and wind.</p>						

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Earth Systems		<p><b>E.ES.01.23</b> Describe severe weather events.</p> <p><b>E.ES.01.24</b> Describe precautions that should be taken for human safety during sever weather conditions (thunderstorms, lightning, tornadoes, high winds, blizzards, hurricanes).</p>						
		<p><b>E.ES.01.31</b> Identify the tools that might be used to measure temperature, precipitation, cloud cover, and wind.</p> <p><b>E.ES.01.32</b> Observe and collect data of weather conditions over a period of time.</p>						
				<p><b>E.ES.03.41</b> Identify natural resources (metals, fuels, fresh water, farmland, and forests).</p>				

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	K	1	2	3	4	5	6	7
Earth Systems				<p><b>E.ES.03.42</b> Classify renewable (fresh water, farmland, forests) and non-renewable (fuels, metals) resources.</p> <p><b>E.ES.03.43</b> Describe ways humans are protecting, extending, and restoring resources (recycle, reuse, reduce, renewal).</p> <p><b>E.ES.03.44</b> Recognize that paper, metal, glass, and some plastics can be recycled.</p>				<p><b>E.ES.07.42</b> Describe the origins of pollution in the atmosphere, geosphere, and hydrosphere (car exhaust, industrial emissions, acid rain, and natural sources), and how pollution impacts habitats, climatic change, threatens or endangers species.</p>
				<p><b>E.ES.03.51</b> Describe ways humans are dependent on the natural environment (forests, water, clean air, earth materials) and constructed environments (homes, neighborhoods, shopping malls, factories, and industry).</p>				

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	K	1	2	3	4	5	6	7
				<b>E.ES.03.52</b> Describe helpful or harmful effects of humans on the environment (garbage, habitat destruction, land management, renewable and non renewable resources).				
						<p><b>E.ES.05.61</b> 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.</p> <p><b>E.ES.05.62</b> Explain how the revolution of the Earth around the sun defines a year.</p>		
								<p><b>E.ES.07.71</b> Compare and contrast the difference and relationship between climate and weather.</p>
<b>Earth Systems</b>								<p><b>E.ES.07.72</b> Describe how different weather occurs due to the constant motion of the atmosphere from the energy of the sun reaching the surface of the Earth.</p> <p><b>E.ES.07.73</b> Explain how the temperature of the oceans affects the different climates on Earth because water in the oceans holds a large amount of heat.</p>

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Earth Systems								<p><b>E.ES.07.74</b> 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.</p>
								<p><b>E.ES.07.81</b> Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.</p> <p><b>E.ES.07.82</b> Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater.</p>
Solid Earth	<p><b>E.SE.00.11</b> Identify Earth materials (air, water, soil) that are used to grow plants.</p>						<p><b>E.SE.06.11</b> Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.</p>	

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Solid Earth		<b>E.SE.01.12</b> Describe how Earth materials contribute to the growth of plant and animal life.					<b>E.SE.06.12</b> 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.	
				<b>E.SE.03.13</b> Recognize and describe different types of earth materials (mineral, rock, clay, boulder, gravel, sand, soil).  <b>E.SE.03.14</b> Recognize that rocks are made up of minerals.			<b>E.SE.06.13</b> Describe how soil is a mixture, made up of weather eroded rock and decomposed organic material.  <b>E.SE.06.14</b> Compare different soil samples based on particle size and texture.	
			<b>E.SE.02.21</b> Describe the major landforms of the surface of the Earth (mountains, plains, plateaus, valleys, hills).	<b>E.SE.03.22</b> Identify and describe natural causes of change in the Earth's surface (erosion, glaciers, volcanoes, landslides, and earthquakes).				
				<b>E.SE.03.31</b> Identify Earth materials used to construct some common objects (for example: bricks, buildings, roads, glass).  <b>E.SE.03.32</b> Describe how materials taken from the Earth can be used as fuels for heating and transportation.				

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Solid Earth							<p><b>E.SE.06.41</b> Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.</p>	
							<p><b>E.SE.06.51</b> Explain plate tectonic movement and how the lithospheric plates move centimeters each year.</p> <p><b>E.SE.06.52</b> Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.</p> <p><b>E.SE.06.53</b> Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.</p>	
							<p><b>E.SE.06.61</b> Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or man-made magnet.</p> <p><b>E.SE.06.62</b> Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on land and sea.</p>	

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Fluid Earth			<p><b>E.FE.02.11</b> Identify water sources (wells, springs, lakes, rivers, oceans).</p> <p><b>E.FE.02.12</b> Identify household uses of water (drinking, cleaning, food preparation).</p>					<p><b>E.FE.07.11</b> Describe the atmosphere as a mixture of gases.</p> <p><b>E.FE.07.12</b> Compare and contrast the composition of the atmosphere at different elevations.</p>
			<p><b>E.FE.02.13</b> Describe the properties (visible, flowing, melting, dew) of water as a liquid (lakes, rivers, streams, oceans).</p> <p><b>E.FE.02.14</b> Describe the properties (hard, visible, freezing, ice) of water as a solid (ice, snow, iceberg, sleet, hail).</p>					
			<p><b>E.FE.02.21</b> Describe how rain collects on the surface of the Earth and flows downhill into bodies of water (streams, rivers, lakes, oceans) or into the ground.</p>					
			<p><b>E.FE.02.22</b> Describe the major bodies of water on the Earth's surface (lakes, ponds, oceans, rivers, streams).</p>					
					<p><b>E.ST.04.11</b> Identify common objects in the sky, such as the sun and the moon.</p>	<p><b>E.ST.05.11</b> Design a model that describes the position and relationship of the planets and other objects (comets and asteroids) to the sun.</p>		

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Earth in Space and Time					<b>E.ST.04.12</b> Compare and contrast the characteristics of the sun, moon and Earth, including relative distances and abilities to support life.			
					<b>E.ST.04.21</b> Describe the orbit of the Earth around the sun as it defines a year.	<b>E.ST.05.21</b> Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.		
					<b>E.ST.04.22</b> Explain that the spin of the Earth creates day and night.  <b>E.ST.04.23</b> Describe the motion of the moon around the Earth.  <b>E.ST.04.24</b> Explain how the visible shape of the moon follows a predictable cycle which takes approximately one month.	<b>E.ST.05.22</b> Explain moon phases as they relate to the position of the moon in its orbit around the Earth, resulting in the amount of observable reflected light.  <b>E.ST.05.23</b> Recognize that nighttime objects (stars and constellations) and the sun appear to move because the Earth rotates on its axis and orbits the sun.  <b>E.ST.05.24</b> Explain lunar and solar eclipses based on the relative positions of the Earth, moon, and sun, and the orbit of the moon.		
					<b>E.ST.04.25</b> Describe the apparent movement of the sun and moon across the sky through day/night and the seasons.	<b>E.ST.05.25</b> Explain the tides of the oceans as they relate to the gravitational pull and orbit of the moon.		

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Earth in Space and Time					<p><b>E.ST.04.31</b> Explain how fossils provide evidence of the history of the Earth.</p> <p><b>E.ST.04.32</b> Compare and contrast life forms found in fossils and organisms that exist today.</p>		<p><b>E.ST.06.31</b> Explain how rocks and fossils are used to understand the age and geological history of the earth (timelines and relative dating, rock layers).</p>	
							<p><b>E.ST.06.41</b> Explain how Earth processes (erosion, mountain building, and glacier movement) are used for the measurement of geologic time through observing rock layers.</p> <p><b>E.ST.06.42</b> Describe how fossils provide important evidence of how life and environmental conditions have changed.</p>	