### SCIENCE

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Earth

# 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 researchbased 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.



Office of School Improvement

www.michigan.gov/mde

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











GRADE LEVEL CONTENT EXPECTATIONS



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	<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.				5
	E.ES.01.12 Demonstrate the importance of sunlight and warmth in plant growth.				
	<ul> <li>E.ES.01.21 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).</li> <li>E.ES.01.22 Describe and compare weather related to the four seasons in terms of temperature, cloud</li> </ul>				
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	<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).
	<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.
	<b>E.ES.07.13</b> Describe how the warming of the Earth by the sun produces winds and ocean currents.



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### SCIENCE GRADE LEVEL CONTENT EXPECTATIONS ACROSS THE GRADES

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	К	1	2	3	4	5
				<b>E.ES.03.42</b> Classify renewable (fresh water, farmland, forests) and non- renewable (fuels, metals) resources.		
Earth Systems				<ul> <li>E.ES.03.43 Describe ways humans are protecting, extending, and restoring resources (recycle, reuse, reduce, renewal).</li> <li>E.ES.03.44 Recognize that paper, metal, glass, and some plastics can be recycled.</li> </ul>		
				<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).		

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	E.ES.07.42 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.

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К	1	2	3	4	5	6	7
			E.ES.03.52 Describe				
			helpful or harmful				
			effects of humans on the environment				
			(garbage, habitat				
			destruction, land				
			management,				
			renewable and non				
			renewable resources).				
					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.		
					E.ES.05.62 Explain how		
					the revolution of the		
					Earth around the sun		
					defines a year.		
							E.ES.07.71 Compa
							and contrast the
							difference and
							relationship betwee
							climate and weather
							E.ES.07.72 Describ
							how different weath
							occurs due to the
							constant motion of
							the atmosphere fro
							the energy of the s
							reaching the surfac
							of the Earth.
							E EC 07 72 Eucle
							E.ES.07.73 Explain how the temperatu
							of the oceans affect
							the different climate
							on Earth because
							water in the oceans
							holds a large amour
							of heat.

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	К	1	2	3	4	5
Earth Systems						
Solid Earth	<b>E.SE.00.11</b> Identify Earth materials (air, water, soil) that are used to grow plants.					

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	<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.
	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.
	<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.
<b>E.SE.06.11</b> Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.	



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	К		2	3	4	5
		E.SE.01.12 Describe				
		how Earth materials				
		contribute to the				
		growth of plant and				
		animal life.				
				E.SE.03.13 Recognize		
				and describe different		
				types of earth		
				materials (mineral,		
				rock, clay, boulder,		
				gravel, sand, soil).		
				E.SE.03.14 Recognize		
				that rocks are made		
				up of minerals.		
Earth						
Еа			E.SE.02.21 Describe	E.SE.03.22 Identify		
id			the major landforms	and describe natural		
Solid			of the surface of the	causes of change in		
S			Earth (mountains,	the Earth's surface		
			plains, plateaus,	(erosion, glaciers,		
			valleys, hills).	volcanoes, landslides,		
				and earthquakes).		
				E.SE.03.31 Identify		
				Earth materials used		
				to construct some		
				common objects (for		
				example: bricks,		
				buildings, roads,		
				glass).		
				E.SE.03.32 Describe		
				how materials taken		
				from the Earth can be		
				used as fuels for		
				heating and		
				transportation.		

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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.	
<ul> <li>E.SE.06.13 Describe how soil is a mixture, made up of weather eroded rock and decomposed organic material.</li> <li>E.SE.06.14 Compare different soil samples</li> </ul>	
based on particle size and texture.	

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Sold Earth	5
Solid Earth	

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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.	
E.SE.06.51 Explain plate tectonic movement and how the lithospheric plates move centimeters each year.	
E.SE.06.52 Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.	
<b>E.SE.06.53</b> Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.	
<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.	
<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.	

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			<ul> <li>E.FE.02.11 Identify water sources (wells, springs, lakes, rivers, oceans).</li> <li>E.FE.02.12 Identify household uses of water (drinking, cleaning, food</li> </ul>			
			preparation). <b>E.FE.02.13</b> Describe the properties (visible, flowing, melting, dew) of water as a liquid (lakes, rivers, streams, oceans).			
Fluid Earth			<b>E.FE.02.14</b> Describe the properties (hard, visible, freezing, ice) of water as a solid (ice, snow, iceberg, sleet, hail).			
			<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.			
			<b>E.FE.02.22</b> Describe the major bodies of water on the Earth's surface (lakes, ponds, oceans, rivers, streams).			
					<b>E.ST.04.11</b> Identify common objects in the sky, such as the sun and the moon.	<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.

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		<b>E.FE.07.11</b> Describe the atmosphere as a mixture of gases.
		<b>E.FE.07.12</b> Compare and contrast the composition of the atmosphere at different elevations.
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					<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.		
and Time					<b>E.ST.04.22</b> Explain that the spin of the Earth creates day and night.	<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.		
Earth in Space					<b>E.ST.04.23</b> Describe the motion of the moon around the Earth.	<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.04.24</b> Explain how the visible shape of the moon follows a predictable cycle which takes approximately one month.	<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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	К	1	2	3	4	5
					<b>E.ST.04.31</b> Explain how fossils provide evidence of the history of the Earth.	
					<b>E.ST.04.32</b> Compare and contrast life forms found in fossils and organisms that exist today.	
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6       7         E.ST.06.31 Explain       how rocks and fossils are used to understand the age and geological history of the earth (timelines and relative dating, rock layers).       image: constraint of the earth (timelines and relative dating, rock layers).         E.ST.06.41 Explain       how Earth processes (erosion, mountain building, and glacier movement) are used for the measurement of geologic time through observing rock layers.         E.ST.06.42 Describe       how fossils provide important evidence of how life and environmental conditions have changed.	T	=/	
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