VSC - Science

Print pages on legal paper, landscape mode.

Grade PK	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 8
Standard 2.0 Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.	**Standard 2.0** Earth/Space Science: Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.
A. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet	**A**. Materials and Processes That Shape A Planet
	1. Investigate objects and materials in the		**1.** Describe and compare properties of a variety of Earth					

	environment.		materials.					
	a. Observe and describe a variety of natural and human-made objects found in familiar environments (school, neighborhood, etc.).		**a.** Classify a collection of rocks based on the properties that distinguish one type from another.					
	b. Examine and describe Earth materials. • rocks • soil • water		**b.** Collect soil from different locations and compare the properties of the samples. • Color • Texture • Reaction to water • Remains of living things					
	c. Using examples, describe that objects and materials, such as trees, rocks, and hills on Earth's surface can change.		**c.** Use examples of observations from places around the school and neighborhood to describe ways Earth materials can change. • Changes caused by					

			• humans and other animals • Changes caused by water, wind, etc.					
					2. Recognize and explain how physical weathering and erosion cause changes to the earth's surface.	**2.** Cite and describe the processes that cause rapid or slow changes in Earth's surface.	**2.** Cite evidence to demonstrate and explain that physical weathering and chemical weathering cause changes to Earth materials.	
					a. Investigate and describe how weathering wears down Earth's surface. • Water • Ice • Wind	**a.** Identify and describe events such as tornadoes, hurricanes, volcanic eruptions, earthquakes, and flooding which change surface features rapidly.	**a.** Identify examples of physical weathering, such as the effect of wind, ice, etc. and describe the changes caused in each.	
					b. Cite evidence to show that erosion shapes and reshapes the earth's surface as it moves from one location to another. • Water • Ice	**b.** Recognize that the natural force of gravity causes changes in the Earth's surface features as it pulls things towards Earth, as in mud and rock slides, avalanches, etc.	**b.** Describe the changes in materials caused by each of the chemical weathering processes listed: • Rusting/tarnishing • Dissolving by acid rain	

					• Wind			
						c. Cite examples that demonstrate how the natural agents of wind, water, and ice produce snow changes on the Earth's surface such as carving out deep canyons and building up sand dunes.	**c.** Compare physical and chemical weathering and provide examples if changes caused in Earth materials or features by each of these processes.	
						3. Explain how rock is formed from combinations of different minerals and that smaller rocks come from the breakage and weathering of bedrock (solid rock underlying soil components) and larger rocks; soil is made partly from weathered rock, partly from plant remains-and also contains many living organisms.		
						a. Observe and classify a collection of minerals based on their physical properties. • Color • Luster • Hardness		

						• Streak		
						b. Identify components of a variety of rocks and compare the physical properties of rocks with those of minerals to note major differences.		
						c. Describe ways that the following processes contribute to changes always occurring to the Earth's surface. • Erosion • Transport • Deposit		
							4. Differentiate among sedimentary, igneous, and metamorphic rocks based upon the processes by which they are formed.	
							a. Identify and describe the processes that form sedimentary rock. • Deposition • Compaction • Cementation	
							b. Identify and describe the processes that form igneous	

							rocks. • Volcanic eruptions • Igneous intrusions	
							c. Identify and describe the processes that form metamorphic rocks. • High Temperature • Pressure	
							d. Cite features that can be used as evidence to distinguish among the three types of rocks and relate these features to the processes that form each rock type.	
							e. Describe the processes that change one form of rock into another (rock cycle).	
B. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History	**B**. Earth History
								1. Explain how sedimentary rock is formed periodically, embedding plant and animal remains and leaving a record of the sequence in which the plants and animals appeared and

								disappeared.
								a. Explain how sedimentary rock buried deep enough may be reformed by pressure and heat and these reformed rock layers may be forced up again to become land surface and even mountains.
								b. Cite evidence to confirm that thousands of layers of sedimentary rock reveal the long history of the changing surface of the Earth.
								c. Explain why some fossils found in the top layers of sedimentary rock are older then those found beneath in lower layers. • Folding • Breaking • Uplift • Faulting • Tilting
					2. Recognize and explain that fossils provide evidence about the plants and animals that			**2.** Recognize and explain that fossils found in layers of sedimentary rock provide evidence of changing life forms.

					lived long ago and about the nature of the environment at that time.			
					a. Recognize and explain that the remains or imprints of plants or animals can become fossils.			**a.** Recognize how different types of fossils are formed, such as petrified remains, imprints, molds and casts.
					b. Describe the physical structures of an animal or plant based on its fossil remains.			**b.** Recognize and explain that the fossil record of plants and animals describes changes in life forms over time.
					c. Identify what an animal or plant fossil is able to tell about the environment in which it lived. • Water • Land			
C. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics	**C**. Plate Tectonics
				1. Gather information and provide evidence about the physical environment, becoming familiar with the details of geological features,			**1.** Recognize and describe the internal and external structure of the Earth.	

				observing and mapping locations of hills, valleys, rivers, and canyons.				
				a. Identify and describe some natural features of continents. • Mountains • Valleys • Rivers • Canyons			**a.** Recognize and describe that the Earth's mantle • Lies between the core and the crust • Is very hot • Has properties of both solids and liquid	
				b. Describe the natural features in their immediate outdoor environment, and compare the features with those of another region in Maryland.			**b.** Recognize and describe that the Earth's core • Is at the center of the Earth • Is very hot • Is dense and metallic	
				c. Identify and describe some features of the ocean floor. • Mountains • Valleys • Canyons			**c.** Identify and describe the Earth's crust. • The solid crust consists of separate plates • The plates constantly move at a slow pace in different directions • The plates interact with one another as a	

							result of plate motion.	
				d. Recognize and explain that an ocean floor is land covered by water.				
							2. Recognize and explain how major geologic events are a result of the movement of Earth's crustal plates.	
							a. Recognize and describe the evidence for plate movement. • Shape of continents • Continuity of geologic features and fossils on the continents • Ocean rifts, seafloor spreading • Global patterns of earthquakes and volcanoes	
							b. Recognize and explain that major geologic events (earthquakes, volcanic activity, sea floor spreading) occur along crustal plate boundaries.	
D. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy	**D**. Astronomy
	1. Observe celestial objects		**1.** Observe and describe changes		**1.** Identify and describe the	**1.** Identify and compare properties, location, and	**1.** Recognize that objects of our solar system are	**1.** Identify and describe the components of the

	that are visible in the day and night sky.		over time in the properties, location, and motion of celestial objects.		variety of objects in the universe through first-hand observations using the unaided eye, binoculars or telescopes or videos and/or pictures from reliable sources.	movement of celestial objects in our solar system.	interrelated.	universe.
	a. Identify and describe the sun, moon and stars.		**a.** Identify and record observable properties of the sun, moon, and stars.		**a.** Observe and describe the stars and the planets as seen through a telescope, graphically in pictures or in video clips from reliable sources.	**a.** Recognize that like all planets and stars, the Earth is spherical in shape.	**a.** Recognize that Earth and its closest star, the sun, are part of a disk-shape galaxy of stars and that our galaxy is one of billions of galaxies.	**a.** Recognize that a galaxy contains billions of stars that cannot be distinguished by the unaided eye because of their great distance from Earth, and that there are billions of galaxies.
	b. Describe ways in which the daytime and nighttime skies are different.		**b.** Identify and record the apparent visible changes in the shape of the moon over two months of observations.		**b.** Identify the sun as the Earth's closest star.	**b.** Identify the properties of the planet Earth that make it possible for the survival of life as we know it. • Temperature • Location • Presence of an atmosphere • Presence of water (solid, liquid, and gas)	**b.** Construct models with accurate scale that represent the position of the Earth relative to the sun and to other planets.	**b.** Identify that our solar system is a component of the Milky Way Galaxy.
			c. Observe and record changes in		**c.** Recognize that stars are like the	**c.** Compare the properties of at least one	**c.** Identify and describe the general pattern of movement	**c.** Identify and describe the various types of

			the location of the sun and moon in the sky over time.		sun, some are smaller and some larger.	other planet in our solar system to those of Earth to determine if it could support life, as we know it.	of all objects in our solar system.	galaxies
			d. Describe and compare the patterns of change that occur in the sun and the moon.		**d.** Recognize and describe that the stars are not all the same in apparent brightness.	**d.** Identify and describe physical properties of comets, asteroids, and meteors.	**d.** Recognize that the pull of gravity causes the pattern of motion of celestial objects.	**d.** Identify and describe the type, size, and scale, of the Milky Way Galaxy.
					e. Recognize that the pattern of stars in the sky stays the same although their locations in the sky appear to change with the seasons.	**e.** Provide evidence that supports the idea that our solar system is sun-centered.		
		2. Recognize that there is a relationship between the sun and the earth.				**2.** Recognize and describe the causes of the repeating patterns of celestial events.		**2.** Identify and explain celestial phenomena using the regular and predictable motion of objects in the solar system.
		a. Identify ways that the sun affects the earth including that the sun warms the earth and provides light.				**a.** Describe the rotation of the planet Earth on its axis.		**a.** Identify and describe the relationships among the period of revolution of a planet, the length of its solar year, and its distance from the sun.
						b. Recognize and		**b.** Identify and explain

						describe that the rotation of planet Earth produces observable effects • The day and night cycle. • The apparent movement of the sun, moon, planets, and stars		the relationship between the rotation of a planet or moon on its axis and the length of the solar day for that celestial object.
						c. Describe the revolution of the planet Earth around the sun.		**c.** Identify and explain the cause of the phases of the moon.
						d. Recognize and describe that the revolution of the planet Earth produces effects. • The observable patterns of stars in the sky stay the same although different stars can be seen in different seasons. • Length of year		**d.** Describe how lunar and solar eclipses occur.
						e. Verify with models and cite evidence that the moon's apparent shape and position		**e.** Identify and describe how the shape and location of the orbits of asteroids and comets

						change.		affect their periods of revolution.
								3. Recognize and explain the effects of the tilt of Earth's axis.
								a. Recognize and describe that Earth's axis is tilted about 23¼° from vertical with respect to the plane of its orbit and points in the same direction during the year.
								b. Recognize and describe that the tilt of Earth's axis causes • Changes in the angle of the sun in the sky during the year • Seasonal differences in the northern and southern latitudes
								c. Recognize and describe how the tilt of Earth's axis affects the climate in Maryland.
								4. Recognize and explain how the force of gravity causes the tides.

								a. Identify and describe the cause of high and low tides.
E. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere	**E**. Interactions of Hydrosphere and Atmosphere
		1. Describe observable changes in water on the surface of the Earth.	**1.** Recognize and describe that the surface of Earth is more than half covered with water.	**1.** Recognize and describe that water can be found as a liquid or a solid on the Earth's surface and as a gas in the Earth's atmosphere.		**1.** Recognize and describe that the amount of water on Earth continues to stay the same even though it may change from one form to another.		**1.** Cite evidence to explain the relationship between the hydrosphere and atmosphere.
		a. Cite examples of the sun's effect on what happens to water on the Earth's surface. • Water disappears from puddles, wet surfaces after rain, any open container, etc. • Water can be a	**a.** Identify the many locations where water is found.	**a.** Describe that air is a substance that surrounds us and contains such things as oxygen, water vapor (gas), pollen, dust, etc.		**a.** Describe how water on Earth changes. • Condensation • Precipitation • Evaporation ***44. Water Wonders, Part A*** ***44. Water Wonders, Enrichment***		**a.** Describe the composition of the atmosphere and hydrosphere.

		liquid or a solid and go back and forth from one form to another						
			b. Describe the changes that occur to water found anywhere.	**b.** Observe and explain what happens when liquid water disappears. • Turns into water vapor (gas) in the air • Can reappear as a liquid or solid when cooled, such as clouds, fog, rain, snow, etc. ***44. Water Wonders, Part A*** ***44. Water Wonders, Enrichment***		**b.** Explain that the sun is the main source of energy that causes the changes in the water on Earth. ***44. Water Wonders, Part A*** ***44. Water Wonders, Enrichment***		**b.** Recognize and describe the water cycle as the distribution and circulation of Earth's water through the glaciers, surface water, groundwater, oceans, and atmosphere. ***44. Water Wonders, Part A*** ***44. Water Wonders, Enrichment***
						c. Describe the relationship between the		**c.** Identify and describe how the temperature and

						amount of energy from the sun and the quantity of water that is changed.		precipitation in a geographic area are affected by surface features and changes in atmospheric and ocean content. • Relative location of mountains • Volcanic eruptions • Proximity to large bodies of water • Heat energy of ocean currents ***29. Rain Reasons,, Part C***
						d. Describe the processes that maintain a continuous water cycle. ***44. Water Wonders, Part A***		
2. Describe the weather using observations.	**2.** Investigate and gather information about changes in weather.	**2.** Describe that some events in nature have repeating patterns.			**2.** Recognize and describe that each season has different weather conditions			**2.** Recognize and describe the various factors that affect climate.
a. Observe and describe the weather using senses.	**a.** Observe and describe different weather conditions using senses.	**a.** Observe and compare day-to-day weather changes.			**a.** Describe different seasonal weather conditions using data collected from weather			**a.** Identify and describe how the temperature and precipitation of an area are affected by surface and ocean features.

					instruments, models or drawings.			• Relative location of mountains • Proximity to large bodies of water • Warm and cold ocean currents ***29. Rain Reasons, Part C***
b. Describe qualititative changes in weather, such as temperatures, precipitation, wind, etc.	**b.** Record observations using pictures, pictographs, or written/oral language.	**b.** Observe, record, and compare weather changes from month to month.			**b.** Compare average daily temperatures during different seasons.			**b.** Recognize and describe the global effects of volcanic eruptions, greenhouse gases, and El Nino.
	c. Describe qualitative changes in weather, such as temperatures, precipitation, wind, etc	**c.** Compare temperatures and type and amount of precipitation across the months.			**c.** Compare average daily wind speed and direction during different seasons.			
		d. Identify the impact of weather changes on daily activities.			**d.** Compare average daily precipitation during different seasons. • Amount			

					• Type			
		e. Identify and describe patterns of weather conditions based on data collected.						
								3. Identify and describe the atmospheric and hydrospheric conditions related to weather systems.
								a. Identify and describe weather patterns associated with high and low pressure systems and frontal systems.
								b. Identify and describe the atmospheric and hydrospheric conditions associated with the formation and development of hurricanes, tornadoes, and thunderstorms.
								c. Identify and describe how various tools are used to collect weather data and forecast weather conditions. • Barometer • Thermometer

								• Anemometer • Psychrometer

*Note: Highlighting identifies proposed assessment limits. All highlighted Indicators will be tested on the **Grades 5 and 8** MSA. The highlighted Objectives under each highlighted Indicator identify the limit to which MSA items can be written. Although all content standards are tested on MSA, not all Indicators and Objectives are tested. Objectives that are not highlighted will not be tested on MSA, however are an integral part of Instruction.*

Date: 12/30/2005