MCS MYP Advanced Studies 6 Science Subject Group Overview

Unit Name	Solar System and Beyond	Earth-Moon-Sun	Earth's Changing Landscape I	Earth's Changing Landscape II	Water in Earth's Processes	Climate and Weather	STEM Conservation Capstone
CAPSTONE Connective Theme	Energy Harvested In Our Solar System	Seasonal Energy Resources	Energy in Earth Surfaces I	Energy in Earth Surfaces II	Hydroelectric Energy	Atmospheric Energy	Community Conservation
Time Frame	4.5 Weeks	4.5 Weeks	4 Weeks	5 Weeks	5 Weeks	8 Weeks	5 Weeks
Standards	S6E1.a., b., c., d., e. S6E6.a	S6E2.a., b., c. S6E3.d. S6E6.a	S6E3.c. S6E5.a., f. S6E6.a	S6E5.b., c., d., e., g., h. S6E6.c	S6E3.a., b.,c. S6E6.b.	S6E4.a., b., c., d., e.	S6E6.b

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	Science & Engineering Practices	Science & Engineering Practices ● Students will ask questions to determine changes in models of Earth's position in the Solar System and origins of the universe. ● Students will develop a model to represent the position of the solar system and develop a model to explain the interaction of gravity and inertia. ● Students will ask questions to compare and contrast comets, asteroids, and meteoroids. ● Students will ask questions to determine the differences between renewable/sustainable energy resources.	Science & Engineering Practices ● Students will develop and use models to demonstrate the phases of the moon. ● Students will construct an explanation of the cause of solar and lunar eclipses. ● Students will analyze and interpret data to relate the tilt of the Earth to the distribution of sunlight. ● Students will analyze and interpret data to create graphic representations of the causes and effects of waves, currents, and tides. ● Students will ask questions to determine the differences between renewable/sustainable energy resources.	Science & Engineering Practices ● Students will ask questions to identify and communicate, using graphs and maps, the composition, location, and subsurface topography of the world's oceans. ● Students will ask questions to compare and contrast Earth's crust, mantle, inner and outer core. ● Students will construct an explanation of how movement of lithospheric plates can cause major geologic events. ● Students will ask questions to determine the differences between renewable/sustainable energy resources.	Science & Engineering Practices ● Students will plan and carry out an investigation of the characteristics of soil, minerals and how minerals contribute to rock formation. ● Students will construct an explanation of how to classify rocks. ● Students will ask questions to identify types of weathering, agents of erosion and deposition. ● Students will develop a model to demonstrate how natural processes and human activity change Earth's surface. ● Students will construct an argument using maps and data to support a claim of how fossils show evidence of Earth's changing surface, climate, and rise in global temperatures over the past century.	Science & Engineering Practices ● Students will ask questions to determine where water is located on Earth's surface. ● Students will plan and carry out investigations to illustrate the role of the Sun's energy in the cycling of water. ● Students will ask questions to communicate, using graphs and maps, the composition, location, and subsurface topography of oceans. ● Students will design and evaluate solutions for sustaining water, soil, and air.	Science & Engineering Practices ● Students will analyze and interpret data to compare and contrast Earth's atmospheric layers. ● Students will plan and carry out investigations to demonstrate how energy from the sun transfers heat to air, land, and water. ● Students will develop a model demonstrating unequal heating and global winds systems. ● Students will analyze and interpret weather data to explain the effects of moisture evaporating from the ocean on weather patterns and events. ● Students will construct an explanation of the relationship between air pressure, weather fronts, and air masses.	Science & Engineering Practices ● Students will design and evaluate solutions for sustaining water, soil, and air. ● Students will ask questions to determine the differences between renewable/sustainable energy resources and how they are used in our everyday lives.. (Renewable - Sustainable resource examples: Hydro, solar, wind, geothermal, tidal, biomass) (Nonrenewable energy resource examples: fossil fuels, oil, coal, and natural gas)

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	Approaches To Learning Instructional Strategies	**Critical Thinking:** Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument. **Research:** Finding, interpreting, judging and creating information. **Collaboration:** Working effectively with others.	**Critical Thinking:** Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument. **Research:** Finding, interpreting, judging and creating information. **Collaboration:** Working effectively with others.	**Critical Thinking:** Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument. **Research:** Collect and analyze data to identify solutions and make informed decisions. **Collaboration:** Working effectively with others.	**Critical Thinking:** Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument. **Communication:** Collaborate with peers and experts using a variety of digital environments and media. **Collaboration:** Working effectively with others.	**Critical Thinking:** Use models and simulations to explore complex systems and issues **Research:** Collect and analyze data to identify solutions and make informed decisions. **Collaboration:** Working effectively with others.	**Critical Thinking:** Use models and simulations to explore complex systems and issues **Research:** Collect and analyze data to identify solutions and make informed decisions. **Collaboration:** Working effectively with others.	**Creative Thinking:** Generating novel ideas and considering new perspectives. Transfer skills: Combine knowledge, understanding and skills to create products or solutions. **Research:** Collect and analyze data to identify solutions and make informed decisions.

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	Statement of Inquiry	Scientific and technical advancements have led to changes in the models used to explain the motion and orientation of objects in space. **Phenomenon:** Why is Earth the only planet in our solar system that is able to support life? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	System models can be used to demonstrate and explain the motion and orientation of the Earth, Moon, and Sun. **Phenomenon:** Why doesn't everyone experience four seasons? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	Scientific and technical innovations allow us to visualize, model, and explain changes to the Earth's surface. **Phenomenon:** Why do we see major geologic events in the Ring of Fire? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	Scientific and technical innovations allow us to visualize, model, and explain changes to the Earth's surface. **Phenomenon:** What drives weathering, erosion, and deposition and how do these processes impact Earth's surface? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	Sustainable management of the Earth's water resources means that human needs must be balanced with those of the natural world. **Phenomenon:** How does human activity impact the water cycle? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	Innovations and advancements in science and technology allow meteorologists to identify patterns and more accurately predict weather systems. **Phenomenon:** Why do different parts of the Earth experience different climates? **CER:** Students answer the phenomenon in a Claim-Evidence-Reasoning constructed response as a formative assessment. Allow students to make edits to their constructed response throughout the unit for a final summative submission.	Scientific and technological advancements have allowed for the use of renewable and sustainable energy resources. **Phenomenon:** How can we expand the use of natural resources, such as hydro, solar, wind, geothermal, and tidal as sources of energy without contributing to pollution of land, air, or water?

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	Global Context	**Scientific and Technical Innovation** Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.	**Orientation in Time and Space** Students will explore personal histories; homes and journeys; turning points in humankind; discoveries; explorations and migrations of humankind; the relationships between, and the interconnectedness of, individuals and civilizations, from personal, local and global perspectives.	**Scientific and Technical Innovation** Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.	**Scientific and Technical Innovation** Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.	**Globalization and Sustainability** Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; the opportunities and tensions provided by world interconnectedness; the impact of decision-making on humankind and the environment.	**Scientific and Technical Innovation** Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.	**Globalization and Sustainability** Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; the opportunities and tensions provided by world interconnectedness; the impact of decision-making on humankind and the environment.
	UN Sustainable Development Goals	**Goal 7 -** Ensure access to affordable, reliable, sustainable and modern energy for all. **Goal 12 -** Ensure sustainable consumption and production patterns.	**Goal 7 -** Ensure access to affordable, reliable, sustainable and modern energy for all. **Goal 12 -** Ensure sustainable consumption and production patterns.	**Goal 15** - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	**Goal 15** - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	**Goal 6 -** Ensure availability and sustainable management of water and sanitation for all. **Goal 14** - Conserve and sustainably use the oceans.	**Goal 13 -** Take urgent action to combat climate change. **Goal 14 -** Conserve and sustainably use the oceans, seas and marine resources for sustainable development.	**Goal 11** - Make cities and human settlements inclusive, safe, resilient and sustainable. **Goal 17** - Strengthen the means of implementation and revitalize the global partnership for sustainable development.

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	Key Concepts	**Systems and system models (MYP/CCC)** Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	**Change (MYP/CCC)** Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	**Change (MYP/CCC)** Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	**Change (MYP/CCC)** Change is a conversion, transformation or movement from one form, state, or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.	**Systems and system models (MYP/CCC)** Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	**Systems and system models (MYP/CCC)** Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	**Relationships (MYP)** Relationships are the connections and associations between properties, objects, people and ideas - including the human community's connections with the world in which we live. Any change in a relationship brings consequences.
	Related Concepts	Movement (MYP) Models (MYP/CCC)	Movement (MYP) Models (MYP/CCC)	Transformation (MYP) Energy (MYP/CCC)	Transformation (MYP) Energy (MYP/CCC)	Environment (MYP) Balance (MYP)	Environment (MYP) Patterns (MYP/CCC)	Environment (MYP)
	Design Cycle **Transdisciplinary**	<u>Connecting Core Ideas</u> ●Origins of the Universe ●Milky Way Galaxy ●Engineering & Technology ●Gravity ●Inertia ●Formation of the Solar System ●Structure of the Solar System Human Energy Needs	<u>Connecting Core Ideas</u> ●Lunar Cycle (Eclipses) ●Day/Night ●Seasons ●Elliptical Orbit ●Tilt of the Earth ●Revolution/Rotation ●Direct/Indirect Sunlight ●Gravity ●Tides Human Energy Needs	<u>Connecting Core Ideas</u> ●Plate Tectonics ●Land Features ●Catastrophic Events Human Energy Needs	<u>Connecting Core Ideas</u> ●Rock Strata ●Rock Cycle ●Thermal Energy Transfer ●Mineral Formation ●Weathering ●Erosion ●Deposition ●Land Features Human Energy Needs	<u>Connecting Core Ideas</u> ●Water Cycle ●Thermal Energy Transfer ●Sunlight ●Temperature ●Salinity Human Energy Needs	<u>Connecting Core Ideas</u> ●Ocean and Atmosphere Patterns ●Waves, Currents ●Water Cycle ●Air Masses ●Unequal Heating and Rotation of the Earth ●Weather ●Natural Hazards Human Energy Needs	<u>Connecting Core Ideas</u> ● Direct/Indirect Sunlight ● Weathering ● Erosion ● Deposition ● Water Cycle ● Thermal Energy Transfer ● Temperature ● Renewable and Non-Renewable Resources ● Global Climate Change

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	MYP Assessments/ Performance Tasks	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**	**Common Assessments Title and Criterion:**
		Solar System & Beyond Common Formative Assessments Solar System & Beyond Unit Assessment Paper I and Paper II (A,D) Scientific Investigation: Relative Distance from the Sun Scientific Investigation: Planets in our Solar System (B,C)	Earth-Moon-Sun Common Formative Assessments Earth-Moon-Sun Unit Assessment Paper I and Paper II (A,D)	Earth's Changing Landscape I Common Formative Assessments Earth's Changing Landscape Unit Assessment Paper I and Paper II (A,D)	Earth's Changing Landscape II Common Formative Assessments Earth's Changing Landscape II Unit Assessment Paper I and Paper II (A,D) Earth's Changing Landscape Scientific Investigation (B,C)	Water in Earth's Processes Common Formative Assessments Water in Earth's Processes Unit Assessment Paper I and Paper II (A,D) Water in Earth's Processes Scientific Investigation (B,C) Capstone Action Proposal MYP Design A.i., ii., iv. MYP Design B.i., iv. MYP Design C.i.	Climate and Weather Common Formative Assessments Climate and Weather Unit Assessment Paper I and Paper II (A,D) Climate and Weather Scientific Investigation (B,C) Capstone Project Summary MYP Design C.iii. MYP Design D.ii., iii., iv.	Culminating Capstone Product/Presentation MYP Design B.iii. MYP Design C.iv. MYP Science A.ii. MYP Science D.ii., iii.

	Differentiation For Tiered Learners	Lab-Aids Experiences Capstone Connections Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Lab-Aids Experiences Capstone Connections Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Lab Aids Experiences Capstone Connections Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Lab Aids Experiences Capstone Connections Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Lab Aids Experiences Capstone Action Proposal Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Lab Aids Experiences Capstone Project Summary Discovery Education High School Environmental Science Techbook NGSS Case Study 7: Gifted and Talented Students NGSS: All Standards, All Students Extensions - Enrichment Tasks/Projects	Culminating Capstone Product/Presentation

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	Capstone Elements	Capstone Connections Launch Task: Designing and Building a Solar Oven Capstone Connections Task: MSGA Weathering, Erosion, and Deposition Survey (Pre-Game #1)	Mercedes-Benz Stadium Field Trip #1: We Can Work Together Capstone Connections Task: Field Trip Reflection and MSGA Applications (MYP D)	Capstone Connections Task: MSGA Energy Audit Capstone Connections Task: Discussion: Energy Sources, Pollution Reduction, Minimizing Erosion (Pre-Game #2)	Capstone Connections Task: MSGA Weathering, Erosion, and Deposition Exploring Solutions (Post-Game #1) Mercedes-Benz Stadium Field Trip #2: Building Sustainability Capstone Connections Task: Field Trip Reflection and MSGA Applications/Solutions (Post-Game #2) (MYP D)	Capstone Action Proposal Capstone Connections Task: The Interaction of Abiotic and Biotic Factors Influencing Ecosystems (Pre-Game #3)	Mercedes-Benz Field Trip #3: Depending on Each Other Capstone Connections Task: Field Trip Reflection and MSGA Applications (Post-Game #3) (MYP D) Capstone Project Summary	Culminating Capstone Product/Presentation

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