# Spearfish School District Curriculum/ Pacing Guide
# Grade 6

| Instructional Focus | Focus Summary |
|---|---|
| 1<br>Earth's History and Plate Tectonics<br>**Suggested Time Frame:**<br>**30 Class Days** | • Geologic Time Scale (age of the Earth)<br>• Fossils<br>• Continental Drift Theory<br>• Plate Tectonics<br>• Plate Boundaries and Seafloor Spreading<br>• Earth's Layers |
| 2<br>Rocks and Earth's Surface Systems<br>**Suggested Time Frame:**<br>**20 Class Days** | • Rock Types<br>• Rock Cycle<br>• Weathering, Erosion, and Deposition |
| 3<br>Water, Weather, and Climate<br>**Suggested Time Frame:**<br>**25 Class Days** | • Water Cycle<br>• Weather<br>• Air Currents<br>• Severe Weather<br>• Greenhouse Effect<br>• Climate<br>• Ocean Currents |
| 4<br>Natural Resources<br>**Suggested Time Frame:** | • Earth's Spheres<br>• Renewable and Nonrenewable Resources<br>• Renewable and Nonrenewable Energy |

| Instructional Focus | Focus Summary |
|---|---|
| **15 Days** | |
| 5<br>Human Impact on the Environment<br>**Suggested Time Frame:**<br>**10 Days** | • How humans have impacted the planet in both negative and positive ways. |
| 6<br>Space and Earth's Place In It<br>**Suggested Time Frame:**<br>**20 Days** | • Universe and Stars<br>• Planets and Solar Systems<br>• Earth-Sun-Moon System |

## Spearfish School District Curriculum/ Pacing Guide
## Grade/

| Instructional Focus 1 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Plate Tectonics and large scale system interactions<br><br>**Suggested Time Frame: 30 Class Days** | Age of Earth, Fossils | **MS-ESS1-4** Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.<br>• **ESS1.C The History of Planet Earth** The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. | - I can identify and name the 3 main fossil types.<br>- I can use evidence to explain the age of the Earth. | - Fossil<br>- Trace Fossil<br>- Mold Fossil<br>- Cast Fossil<br>- Era<br>- Eon<br>- Geologic Time Scale | - Savvas curriculum<br>- Fossil Lab<br>- Around the Clock<br>- Geologic Time Scale String Model<br>- Earth's History as Football Field Video |
| | Continental Drift Theory and Plate Tectonics | **MS-ESS2-3** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.<br>• **ESS2.B Plate Tectonics and Large-Scale System Interaction** Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.<br>• **ESS1.C The History of Planet Earth** Tectonic process continually generate new ocean seafloor at ridges and destroy old seafloor at trenches.<br><br>**MS-ESS2-2** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.<br>• **ESS2.A Earth's Materials and Systems** The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These | - I can describe what the 'Continental Drift Theory' is and who is credited with the theory.<br>- I can use evidence to explain how the tectonic plates may have shaped the Earth over time. | - Continental Drift Theory<br>- Plate Tectonics<br>- Convection Current | - Savvas curriculum<br>- Alfred Wegener Videos (music video and biography)<br>- Fossil Evidence Supporting Continental Drift<br>- Convection Current Lab Demonstration |
| | Plate Boundaries and Seafloor Spreading | | - I can differentiate between three plate boundary types.<br>- I can model what each plate boundary looks like and list events that occur at each.<br>- I can use evidence to explain how geoscience processes can change Earth's surface over time.<br>- I can describe how temperature and density can impact convection currents. | - Convergent Boundary<br>- Divergent Boundary<br>- Transform Boundary<br>- Seafloor Spreading<br>- Subduction<br>- Density | - Savvas curriculum<br>- Snack Tectonics Lab<br>- Mount Saint Helens Case Study |
| | Earth's Layers | | - I can use a model to identify and represent Earth's layers. | - Asthenosphere<br>- Lithosphere<br>- Crust<br>- Mantle<br>- Outer Core<br>- Inner Core | - Savvas curriculum<br>- Earth's Layers Model |

| Instructional Focus 1 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | | interactions have shaped Earth's history and will determine its future. | | | |

**Assessments:** How do my students demonstrate their understanding and how do I measure their learning?

Formative:

- Fossil Lab
- Geologic Time Scale Clock Model
- Snack Tectonics Lab
- Fossil Evidence Supporting Continental Drift
- Seafloor Spreading Data Display Activity
- Earth's Layers Model

Summative:

- Geologic Time Scale String Activity
- Mt. St. Helen's Case Study

| Instructional Focus 2 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Earth Materials and Systems<br><br>**Suggested Time Frame: 20 Class Days** | Rock Types | **MS-ESS2-1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.<br>• **ESS2.A Earth's Materials and Systems** All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. | - I can identify a rock type as igneous, metamorphic, or igneous by its main characteristics.<br>- I can explain characteristics of how each rock type is formed. | - Sedimentary<br>- Igneous<br>- Metamorphic<br>- Extrusive<br>- Intrusive<br>- Magma<br>- Lava | - Savvas curriculum<br>- Name that Rock Lab |
| | Rock Cycle | | - I can explain how each rock type can change into one another in an open cycle.<br>- I can explain and/or create a model that explains how energy drives the rock cycle. | - Rock Cycle<br>- Heat and Pressure<br>- Melting<br>- Sediment<br>- Sedimentation<br>- Weathering<br>- Heating and Cooling<br>- Density | - Savvas curriculum<br>- Crayon Lab<br>- Starburst Lab<br>- Diary of a Rock |

| Instructional Focus 2 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | Weathering, Erosion, and Deposition | **MS-ESS2-2** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.<br>• **ESS2.C The Roles of Water in Earth's Surface Processes** Water's movements - both on the land and underground - cause weathering and erosion, which change the land's surface features and create underground formations. | - I can explain how geoscience processes have changed the earth's surface over time. | - Weathering<br>- Erosion<br>- Deposition | - Savvas curriculum |

**Assessments**: How do my students demonstrate their understanding and how do I measure their learning?

Formative:
- Rock vs. Rock
- Starburst Lab
- Crayon Lab
- Name That Rock Lab (dichotomous key)

Summative:
- Rock Cycle Story

| Instructional Focus 3 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Water, Weather, and Climate<br><br>**Suggested Time Frame:**<br>**25 Class Days** | Water Cycle | **MS-ESS2-1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.<br>• **ESS2.C The Roles of Water in Earth's Surface Processes** Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. | - I can develop a model to describe how the cycling of the Earth's water is driven by energy from the Sun and the force of gravity. | - Water Cycle<br>- Evaporation<br>- Condensation<br>- Precipitation<br>- Humidity | - Savvas curriculum<br>- Puddle Befuddlement Lab Demonstration<br>- Cloud in a Jar Lab |

| Instructional Focus 3 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | | • **ESS2.C The Roles of Water in Earth's Surface Processes** Global movements of water and its changes in form are propelled by sunlight and gravity. | | | |
| | Weather and Air Currents | **MS-ESS2-5** Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.<br>• **ESS2.C The Roles of Water in Earth's Surface Processes** The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.<br>• **ESS2.D Weather and Climate** Because these patterns are so complex, weather can only be predicted probabilistically. | - I can find data to provide evidence for how the motions and interactions of air masses result in changing weather.<br>- I can describe the different types of weather fronts and the weather that happens at each of them. | - High Pressure System<br>- Low Pressure System<br>- Weather Front<br>- Precipitation<br>- Warm Front<br>- Cold Front<br>- Stationary Front<br>- Occluded Front | - Savvas curriculum |
| | Greenhouse Effect | **MS-ESS3-5** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.<br>• **ESS3.D Global Climate Change** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in EArth's mean surface temperature (global warming) Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that | - I can describe how the greenhouse effect can impact the heating and cooling of Earth. | - Greenhouse Effect<br>- Radiation | - Savvas curriculum |

| Instructional Focus 3 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | | knowledge wisely in decisions and activities. | | | |
| | Ocean and Atmospheric Currents | **MS-ESS2-6** Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.<br>• **ESS2.C The Roles of Water in Earth's Surface Processes** Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.<br>• **ESS2.D Weather and Climate** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns.<br>• **ESS2.D Weather and Climate** The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. | - I can describe how density and temperature impacts a convection current.<br>- I can develop a model to describe how unequal heating of the Earth cause patterns in atmospheric and oceanic circulation and determines local climates. | - Surface Currents<br>- Deep Ocean Currents<br>- Salinity<br>- Density<br>- Coriolis Effect<br>- Jet Streams<br>- Local Winds<br>- Global Winds | - Savvas curriculum<br>- Rainbow Stacking Density Lab<br>- Ocean Currents Lab |
| | Climate | | - I can develop a model to describe how unequal heating of the Earth cause patterns in atmospheric and oceanic circulation and determines local climates.<br>- I can compare and contrast characteristics between weather and climate. | - Climate Change<br>- Greenhouse Effect | - Savvas curriculum |
| | Severe Weather | **MS-ESS3-2** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.<br>• **ESS3.B Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihood of future events. | - I can use data about natural hazards to forecast future catastrophic events and to learn ways to mitigate their effects. | - Thunderstorm<br>- Hurricane<br>- Blizzard<br>- Tornado<br>- Flood<br>- Drought | - Savvas curriculum<br>- National Geographic Extreme Weather Simulator<br>- Severe Weather Bachelor/ette |
| **Assessments**: How do my students demonstrate their understanding and how do I measure their learning? | | | | | |

| Instructional Focus 3 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Formative:<br>● Draw your own weather fronts<br>● Rainbow Stacking Lab<br>● Ocean Currents Lab<br><br>Summative:<br>● | | | | | |

| Instructional Focus 4 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Natural Resources<br><br>**Suggested Time Frame:**<br>**20 Class Days** | Earth's Spheres | **MS-ESS3-1** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.<br>● **ESS3.A Natural Resources** Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. | - I can engage in a whole class discussion about the Earth's four different spheres.<br>- I can list and describe Earth's four spheres. | - Lithosphere<br>- Hydrosphere<br>- Atmosphere<br>- Biosphere | - Savvas curriculum |
| | Renewable and Nonrenewable Resources | | - I can use evidence to explain Earth's uneven distribution of resources.<br>- I can define what fossil fuels are and list examples.<br>- I can research and list the pros and cons of fossil fuels.<br>- I can identify and list types of renewable resources there are.<br>- I can research and list pros and cons of renewable energy. | -Renewable<br>- Nonrenewable<br>-Sustainable<br>- Natural<br>- Synthetic<br>- Scarce<br>- Pollution<br>- Petroleum<br>- Coal<br>- Natural Gas<br>- Fracking<br>- Industry<br>- Infrastructure<br>- Pollution | - Savvas curriculum<br>- Cookie Mining Lab<br>- Natural Resources Argument |
| | Renewable and Nonrenewable Energy | | - I can identify and list types of renewable resources.<br>- I can research and list pros and cons of renewable energy.<br>- I can engage in a case study about what nuclear energy is, its risks and benefits, and past accidents that have occurred. | - Nuclear Energy<br>- Solar Energy<br>- Wind Energy<br>- Hydroelectric Energy<br>- Geothermal Energy | - Savvas curriculum<br>- Nuclear energy example videos (Chernobyl documentary; Nuclear energy explained) |

| | | | | | |
|---|---|---|---|---|---|
| | | | | - Efficiency<br>- Biomass | |

**Assessments**: How do my students demonstrate their understanding and how do I measure their learning?

Formative:

- Renewable vs. Nonrenewable Debate
- Nuclear Disaster Case Studies (Ukraine, U.S.A., Japan)

Summative:

-

| Instructional Focus 5 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Human impact on the Environment<br><br>**Suggested Time Frame: 15 Class Days** | Human Impact on the Earth | **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.<br>● **ESS3.B Human Impact on Earth's Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.<br>● **ESS3.B Human Impact on Earth's Systems** Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless activities and technologies involved are engineered otherwise.<br><br>**MS-ESS3-4** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. | - I can engage in discussion about some of the things humans practice that have harmed the Earth. In some ways, beyond repair.<br>- I can engage in discussion about some of the things humans practice that have benefited the Earth.<br>- I can engage in discussion about how, typically, the larger the concentration of people in an area, the more harm that can and will be done to the environment.<br>- I can research a way in how humans have impacted the Earth, create an artifact of my research, and share the artifact with others. | - Pollution | - Savvas curriculum<br>- Lorax movie (original)<br>- Lorax Choice Board<br>- Human Impact Project |

| Instructional Focus 5 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | | • **ESS3.C Human Impact on Earth's Systems** Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless activities and technologies involved are engineered otherwise. | | | |

**Assessments**: How do my students demonstrate their understanding and how do I measure their learning?

Formative:
- Lorax Project

Summative:
- Human Impact Project

| Instructional Focus 6 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| Earth and the Solar System/The Universe and the Stars<br><br>**Suggested Time Frame: 20 Class Days** | Earth - Sun - Moon System | **MS-ESS1-1** Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.<br>• **ESS1.B Earth and the Solar System** This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential | - I can correctly identify and order the different phases of the moon.<br>- I can engage in discussion about what solstices and equinoxes are.<br>- I can engage in discussion and determine what the Earth's axis is, what angle it is tilted to, and what this causes to happen on Earth.<br>- I can identify what the main causes are of Earth's tides. (Sun and moon's gravitational pull) | - Illuminated<br>- Lunar<br>- Waxing<br>- Waning<br>- Gibbous<br>- Crescent<br>- Equinox<br>- Solstice<br>- Tides | - Savvas Curriculum<br>- Oreo Lab<br>- Lunar Cycle Paper Model |

| Instructional Focus 6 | Strand | Targeted Standards-based Essential Skills & Concepts | Learning Goals / Essential Questions For Instructional Focus | Essential Vocabulary | Resources |
|---|---|---|---|---|---|
| | | intensity of sunlight on different areas of Earth across the year. | | | |
| | Planets and Solar System | **MS-ESS1-3** Analyze and interpret data to determine scale proportions of objections in the solar system.<br>● **ESS1.B Earth and the Solar System** The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. | - I can correctly state the order of the planets in our solar system.<br>- I can describe the differences between jovian planets and terrestrial planets.<br>- I can list key features that make a dwarf planet, a dwarf planet.<br>- I can accurately state the order of a star's life cycle. | - Terrestrial Planets<br>- Jovian Planets<br>- Solar System<br>- Gas Giant<br>- Dwarf Planet<br>- Moon<br>- Star<br>- White Dwarf<br>- Red Giant<br>- Blue Dwarf<br>- Nebula<br>- Supernova | - Savvas curriculum<br>- Planet Superhero<br>- Life Cycle of a Star<br>- Constellation Creation<br>- Scale of the Solar System Website<br>- Google Arts and Culture Tours |
| | Universe and Galaxies | **MS-ESS1-2** Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.<br>● **ESS1.A The Universe and Its Stars** Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.<br>● **ESS1.B Earth and the Solar System** The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. | - I can explain gravity's role on Earth and in outer space.<br>- I can engage in discussions about the many different large scale objects in our reality. (Galaxies, Nebulae, Black Holes, the Universe)<br>- I can explore the vastness of our universe | - Galaxy<br>- Milky Way Galaxy<br>- Universe<br>- Light Year<br>- Black Hole<br>- Asteroid<br>- Meteoroid<br>- Meteor<br>- Meteorite | - Savvas curriculum<br>- Universe Size Comparison Video<br>- Scale of the Universe Video<br>- Black Hole Theories<br>- Google Arts and Culture Tours |

**Assessments**: How do my students demonstrate their understanding and how do I measure their learning?

Formative:
- Oreo Lab (Lunar Cycle)
- Life Cycle of a Star
- Solar System Planets and their Order (mnemonic device)

Summative:
- Lunar Cycle Paper Model
- Planet Superhero