Year long Pacing Chart for 7th Grade Science

Quarter	Topic/Chapter
1st Quarter - 9 weeks Earth's History / Earth's Systems	Minerals-3 Rocks-4 Fossils-10 Geologic Timeline-11 Weathering-5 Erosion- 6 Earth's Structure- 2 Plate Tectonics-7
2nd Quarter Earth and Human Activity/Energy Resources	Earthquakes-9 Volcanoes- 9 Natural Resources-18
3rd Quarter Waves, Sound, Electromagnetic Waves, Light Electricity and Magnetism if time permits	Waves-15 Sound-16 Electromagnetic Waves-17 Light-18 Electricity-19 Magnetism-20
4th Quarter Forces, Motion and Energy Pulley Unit	Describing Forces-1 Laws of Motion-2 Pulley Unit- UW Madison

Grade: 7 **Quarter:** 1

Unit: Earth's History / Earth's Systems

Timeline: 8-9 weeks

Standard SCI.ESS1: Students use science and engineering practices, crosscutting concepts, and an understanding of **Earth's place in the universe** to make sense of a phenomena and solve problems.

Standard CI.ESS2: Students use science and engineering practices, crosscutting concepts, and an understanding of **Earth's Systems** to make sense of a phenomena and solve problems.

Standard CI.ESS3: Students use science and engineering practices, crosscutting concepts, and an understanding of **Earth's and Human Activity** to make sense of a phenomena and solve problems.

DCI Learning Elements:
SCI.ESS1.C.m Rock strata and the fossil record can be used as evidence to organize the relative occurrence of major historical events in Earth's history. **SCI.ESS2.A.m Energy flows and matter cycles within and among Earth's systems, including the sun and Earth's interior as primary energy sources. Plate tectonics is one result of these processes.** **SCI.ESS2.B.m Plate tectonics is the unifying theory that explains movements of rocks at Earth's surface and geological history. Maps are used to display evidence of plate movement.** **SCI.ESS2.C.m Water movement causes weathering and erosion , changing landscape features.** **SCI.ESS2.E.m The fossil record documents the existence, diversity, extinction,and change of many life forms throughout history.**

Three Dimensional Performance Indicators:
MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how geologic time scale is used to organize Earth's 4.6 billion year old history. MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives plate tectonics. MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

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.
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

Essential Questions:

1. How do the movements within the Earth cause changes to the surface and how will those changes affect the earth's surface?
2. How is Earth structured based on the theory of plate tectonics?
3. What have scientists learned about Earth's past by studying rocks and fossils?
4. How does water movement cause weathering and erosion as well as change landscape features?

Vocabulary:

Supercontinent (Pangea)	Crust
Continental drift	Mantle
Sea floor spreading	Core
Mid ocean ridge	Lithosphere
Plate tectonics	Asthenosphere
Divergent	Magnetosphere
Transform	Rock cycle
Convergent	Igneous
Subduction	Metamorphic
Convection	Sedimentary
Fossils	Erosion
	Weathering
	Deposition

Student-Centered Learning Targets:

- I can provide evidence to support the theory of continental drift.
- I can explain what seafloor spreading is and how it supports the theory of continental drift.
- I can provide evidence to support seafloor spreading.
- I can model and explain the theory of plate tectonics.
- I can distinguish between the 3 types of plate boundaries.

- I can illustrate how tectonic plates move.
- I can explain how plate motion affects the rock cycle.
- I can explain the specific landforms created by plate movement.
- I can identify the 3 compositional layers and the 5 physical layers of the Earth.
- I can describe how the Earth's biosphere has changed over time.
- I can describe the rock cycle and how the 3 main rocks are formed.
- I can analyze and provide evidence on how the Earth continuously recycles.

Resources:
● Chap 11 ● Chap 2 Lesson 2 ● Chap 4 Lesson 1 ● Chap 16 Lesson 3 & 4 ● Chap 7 **Gizmos:** Plate Tectonics, Rock Cycle, Rock Classification, Building Pangea, Weathering

7 Grade: 7 **Quarter:** 2

Unit: Earth and Human Activity/ Alternative Energy

Timeline: 7-8 weeks

Standard SCI.ESS3: Students use science and engineering practices, crosscutting concepts, and an understanding of the **Earth and human activity** to make sense of phenomena and solve problems.

DCI: Learning Element
SCI.ESS3.A.m Humans depend on Earth's land, oceans, fresh water, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes. **SCI.ESS3.B.m Patterns can be seen through mapping the history of natural hazards in a region and understanding related geological forces.** **SCI.ESS3.C.m Human activities have altered the hydrosphere, atmosphere, and**

lithosphere which in turn has altered the biosphere. Changes to the biosphere can have different impacts for different living things. Activities and technologies can be engineered to reduce people's impacts on Earth.

SCI.ESS3.D.m Evidence suggests human activities affect global warming. Decisions to reduce the impact of global warming depend on understanding climate science, engineering capabilities, and social dynamics.

Three- Dimensional Performance Indicators
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. 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. MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. 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. MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Essential Questions:
1. What forces cause changes to the earth's surface? 2. What impact do changes to the Earth's surface have on society? 3. Why is it important to manage natural resources wisely?

Vocabulary	
Seismometer	Hot spot
Seismogram	Shield
Epicenter	Composite
Focus	Cinder cone
Richter Scale	Viscosity
Earthquake	Renewable
Fault	Nonrenewable
Seismic waves	Nuclear
Primary wave	Wind Farm
Secondary wave	Solar Energy

Surface Wave Volcano Magma Lava	Geothermal Hydro electric Biomass

Student-Centered Learning Targets
● I can explain how and where earthquakes occur. ● I can identify how scientists monitor earthquake activity. ● I can illustrate how volcanoes are classified. ● I can analyze the different factors that contribute to the eruption style of a volcano. ● I can explain how volcanoes are formed. ● I can identify the dangers of a volcano and earthquake. ● I can analyze a map of past geologic hazards and predict future hazard zones. ● I can compare and contrast nonrenewable and renewable resources. ● I can analyze the pros and cons of each renewable resource and the importance of renewable resources for our future. ● I can explain why it is important to conserve energy on a global scale.

Resources:
● **Chap 8, Chap 9** ● **Chap 18** ● **Unit Resource** **Gizmos:** Recording Station, Determination of Epicenter

Grade: 7 **Quarter:** 3

Unit: Electricity, Magnetism and Waves

Timeline: 7-8 weeks

Standard SCI.PS4: Students use science and engineering practices, crosscutting concepts, and an understanding of **waves and their applications in technologies for information transfer** to make sense of phenomena and solve problems.

DCI Learning Element:
SCI.PS4.A.m A simple wave model has a repeating pattern with a specific wavelength, frequency, and amplitude, and mechanical waves need a medium through which they are transmitted. This model can explain many phenomena including sound and light. Waves can transmit energy. **SCI.PS4.B.m The construct of a wave is used to model how light interacts with objects.** **SCI.PS4.C.m Waves can be used to transmit digital information. Digitized information is comprised of a pattern of 1s and 0s.**

Performance Indicator:
MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

Essential Questions:
1. How do electric circuits and devices transform energy? 2. How are electric charges and magnetic fields related? 3. How can you describe and use electromagnetic waves? 4. How are waves reflected, absorbed and transferred? 5. How does the amplitude of a wave relate to the energy in a wave?

Vocabulary:	
Magnet **Magnetic pole** **Magnetic force** **Electromagnet** **Turbine** **Electric generator** **Insulator** **Conductor** **Electric discharge** **Current** **Circuit**	**Ohm's law** **Voltage** **Resistance** **Series** **Parallel** **Waves** **Wavelength** **Frequency** **Amplitude** **Electromagnetic wave** **Reflection** **Refraction**

Student-Centered Learning Targets:
Electricity Chapter 19 ● I can explain how electrically charged objects interact. ● I can describe how objects become electrically charged. ● I can identify and describe the basic parts of electrical circuit. ● I can compare and contrast the two types of circuits. **Magnetism Chapter 20:** ● I can describe the difference between magnetic field and magnetic force. ● I can explain the applications of magnetism. ● I can explain the relationship between magnetism and electricity. **Waves Chapter 15:** ● I can describe waves and properties of waves. **Electromagnetic Waves Chapter 17:** ● I can describe the electromagnetic spectrum and how the waves differ.

Resources:
● **Chapters 19-20** ● **Chapters 15,17 (Waves)** ● **Unit resource for Electricity**

Gizmos: Longitudinal Waves, Waves

Grade: 7 **Quarter:** 4

Unit: Forces and Motion/Simple Machines

Timeline: 7-8 weeks
Standard SCI.PS2: Students use science and engineering practices, crosscutting concepts, and an understanding of **forces, interactions, motion and stability** to make sense of phenomena and solve problems.

Standard SCI.PS3: Students use science and engineering practices, crosscutting concepts, and an understanding of **energy** to make sense of phenomena and solve problems.

DCI Learning Element:
SCI.PS2.A.m Motion and changes in motion can be qualitatively described using concepts of speed, velocity, and acceleration (including speeding up, slowing down, and/or changing direction). **The role of the mass of an object must be qualitatively accounted for in any change of motion due to the application of a force (Newton's first and second law).** **For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).** **SCI.PS2.B.m Forces that act at a distance involve fields that can be mapped by their relative strength and effect on an object.** **SCI.PS3.A.m Kinetic energy can be distinguished from the various forms of potential energy.** **SCI.PS3.C.m When two objects interact, each one exerts a force on the other, and these forces can transfer energy between the interacting objects.**

Performance Indicator:
MS-PS2-1. Apply Newton's third law to design a solution to a problem involving the motion of two colliding objects. MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. MS-PS2-3. Ask questions about data to determine the factors that affect the strength of

electric and magnetic forces.
MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object (emphasis on qualitative descriptions of relationships).
MS-PS3-2. Develop a model to describe that when the distance between two objects changes, different amounts of potential energy are stored in the system (e.g. gravitational, magnetic or electrostatic potential energy).
MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

Essential Questions:

What makes things fall? What makes things balance?
What are some ways to describe motion?
How do forces change the motion of objects?
What is energy?

Vocabulary:

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Student-Centered Learning Targets
Describing Motion Chapter 1: I can describe speed. I can use a distance-time graph to calculate the average speed. I can describe how velocity can change. I can explain the three ways an object can accelerate. I can inference an object's motion based on a distance vs. time graph. **The Laws of Motion Chap 2:** I can explain and give examples of how friction affects the motion of two objects sliding past each other. I can describe what Newton's first law is and how it explains balanced and unbalanced forces. I can explain what inertia is and how it affects objects in motion. I can describe what Newton's second law of motion. I can describe what Newton's third law of motion. I can describe how momentum impacts objects in motion, using the law of conservation of momentum. **Work and Simple Machines Chap 3 Lesson 1:** I can describe how to show that work is being done on an object. I can explain how work on an object changes its energy. I can distinguish the differences between work and power. **Energy and Energy Resources Chap 5 Lesson 1 and 2:** I can define energy. I can differentiate the differences between potential and kinetic energy. I can describe the relationship between energy and work. I can explain the different types of energy. I can give an example when the law of conservation of energy is being used. I can describe how different types of energy are used.

Resources:
Textbook: Chapters 1-3, Chap 5 Lesson 1 and 2 Unit plan resource **Gizmos:** Distance-time, Sled Wars, Force and Fan Carts, Measuring Motion, Fan Cart Physics Levers Inclined Plane Pulleys Wheel and Axle