Instructor: _____Urquhart_____School: ____Kalkaska High School_____

Subject: _____Geology of the National Parks_____ Grade(s): _____9-12_____

Instructional Materials: _____

Month	Topics	MCF Benchmarks, or Grade Level Content Expectations (GLCEs)
Week 1	Intro and Key Concepts	E3.1A Discriminate between igneous, metamorphic, and sedimentary rocks and describe the processes that change one kind of rock into another. E3.1B Explain the relationship between the rock cycle and plate tectonics theory in regard to the origins of igneous, sedimentary, and metamorphic rocks. E3.1c Explain how the size and shape of grains in a sedimentary rock indicate the environment of formation (including climate) and deposition. E3.1d Explain how the crystal sizes of igneous rocks indicate the rate of cooling and whether the rock is extrusive or intrusive.

Week 2	Hawaii, Haleakala Nat. Parks	E3.3C Describe the motion history of geologic features (e.g., plates, Hawaii) using equations relating E3.4 Earthquakes and Volcanoes Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves. E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. E3.4C Describe the effects of earthquakes and volcanic eruptions on humans. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.
Week 3	Cascades, Mt. St. Helens and Crater Lake	E3.4 Earthquakes and Volcanoes Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves. E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized. E3.4C Describe the effects of earthquakes and volcanic eruptions on humans. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.

Week 4	Mt. Rainier	E3.4 Earthquakes and Volcanoes Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves. E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized. E3.4C Describe the effects of earthquakes and volcanic eruptions on humans. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.
Week 5	Newberry and Craters of the Moon	E3.4 Earthquakes and Volcanoes Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves. E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized. E3.4C Describe the effects of earthquakes and volcanic eruptions on humans. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.

Week 6	Sierra Nevada's and Yosemite	E2.2C Describe natural processes in which heat transfer in the Earth occurs by conduction, convection, and radiation. E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.
Week 7	Yellowstone	E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized. E3.4C Describe the effects of earthquakes and volcanic eruptions on humans. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.
Week 8	Grand Tetons, Southern Rockies	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.
Week 9	Colorado Plateau	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.

Week 10	Grand Canyon	E5.3C Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age. E5.3D Describe how index fossils can be used to determine time sequence.
Week 11	Zion	E5.3C Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age. E5.3D Describe how index fossils can be used to determine time sequence. E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.
Week 12	Bryce	E5.3C Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age. E5.3D Describe how index fossils can be used to determine time sequence. E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.

Week 13	Arches, Petrified Forrest	E5.3C Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age. E5.3D Describe how index fossils can be used to determine time sequence. E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.
Week 14	Death Valley, Big Bend, Carlsbad, Oregon Pipe	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.
Week 15	Devils Tower, Mt. Rushmore, Theodore Roosevelt	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.
Week 16	Great Smokey Mountains, Everglades	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.

Week 17	Sleeping Bear Nat. Lakeshore	E4.p3A Describe how glaciers have affected Michigan landscape and how the resulting landforms impact our state economy. E4.p3B Explain the formation of the Great Lakes
Week 18	Isle Royale and Acadia	E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.