teresa.weiler@rcsdk12.org MYP IB Earth Science Level 5 Unit Plans as of 9/1/15

Schedule

Title	Duration	Significant Concepts / Key & Related Concepts	AOI / Global Context	Unit Question Statement of Inquiry:
Unit 1 Modeling Earth Next Chapter by Teresa Weiler	4 weeks (20 hours)	**Key Concepts**  Systems **Related Concepts** Sciences ○ Models ○ Patterns	 Orientation in space and time	**Statement of Inquiry:** MODELS show PATTERNS that allow RELATIONSHIPS to be determined in ORIENTATION in SPACE. **Inquiry Questions:** F : What are the rules for interpreting contour maps and position determination? , C : What types of information can maps provide? , D : What can maps tell us?
Unit 1.5 Density Next Chapter by Teresa Weiler	1 week (5 hours)	**Key Concepts**  Relationships **Related Concepts** Sciences ○ Models ○ Patterns Other: Measurement skills	 Scientific and technical innovation  Other	**Statement of Inquiry:** Using METHODS we can see the RELATIONSHIP and PATTERNS between MODELS. **Inquiry Questions:** F : What is density? , C : How does changing the size or shape of a substance change the density? , D : How does natural phenomena depend

Title	Duration	Significant Concepts / Key & Related Concepts	AOI / Global Context	Unit Question Statement of Inquiry:
				on density?
Units 2 and 3 Weather Next Chapter by Teresa Weiler	6 weeks (40 hours)	**Key Concepts** Systems **Related Concepts** Sciences ○ Energy ○ Interaction ○ Patterns ○ Transformation	Scientific and technical innovation	**Statement of Inquiry:** Using MODELS and METHODS we can see how variables INTERACT with ENERGY to form SYSTEMS. **Inquiry Questions:** F : How are weather variables interrelated? , C : How can you use weather data to show weather patterns? , D : What can be learned by observing weather patterns?
Unit 4 Water and Climate Next Chapter by Teresa Weiler	4 weeks (20 hours)	**Key Concepts** Change **Related Concepts** Sciences ○ Consequences ○ Environment	Globalization and sustainability	**Statement of Inquiry:** GLOBAL SUSTAINABILITY CHANGES as a CONSEQUENCE of human actions on the natural ENVIRONMENT. **Inquiry Questions:** F : What are the factors that affect climate? , C ?: How have the factors that affect climate changed throughout the Earth's history , D : Can the earth sustain life in the future at the current rate of human consumption?

Title	Duration	Significant Concepts / Key & Related Concepts	AOI / Global Context	Unit Question Statement of Inquiry:
Unit 5 Astronomy Next Chapter by Teresa Weiler	5 weeks (25 hours)	**Key Concepts** Relationships **Related Concepts** Sciences ○ Evidence ○ Models Other: motions	Scientific and technical innovation	**Statement of Inquiry:** We use MODELS, METHODS and EVIDENCE to show the RELATIONSHIPS of PROCESSES. **Inquiry Questions:** F : What are the current theories of astronomy? , C : How have the theories changed with time? , D : How is the knowledge of the universe incomplete?
Unit 5.5 Earth's Shape Next Chapter by Teresa Weiler	1 week (5 hours)	**Key Concepts** Relationships **Related Concepts** Sciences ○ Evidence ○ Models	Scientific and technical innovation	**Statement of Inquiry:** EVIDENCE and MODELS show the RELATIONSHIPS of the WORLD **Inquiry Questions:** F : What is the name of the Earth's Shape? , C : How does evidence prove the Earth's shape? , D : The Earth is round?
Unit 6 Rocks and Minerals Next Chapter by Teresa Weiler	4 weeks (15 hours)	**Key Concepts** Relationships **Related Concepts**	Globalization and sustainability	**Statement of Inquiry:** The RELATIONSHIP between ENVIRONMENT and FORMATION influences our world.

Title	Duration	Significant Concepts / Key & Related Concepts	AOI / Global Context	Unit Question Statement of Inquiry:
		Sciences ○ Environment ○ Form		**Inquiry Questions:** F : What are different characteristics of rocks and minerals? , C : How does structure show the environment of formation? , D : Earth Science Rocks! Right? (Are rocks/minerals more important than money?)
Unit 7 Dynamic Earth Next Chapter by Teresa Weiler	4 weeks (20 hours)	**Key Concepts** Change **Related Concepts** Sciences ○ Energy ○ Movement Other: skill using charts	Orientation in space and time Other	**Statement of Inquiry:** ENERGY and MOVEMENT CHANGE NATURAL LANDSCAPES. **Inquiry Questions:** F : How can earthquake epicenter distances be determined? , C : Why do density differences cause fluids to flow? , D : How is crustal movement predictable?
Unit 8 Weathering, Erosion and Deposition Next Chapter by Teresa Weiler	3 weeks (15 hours)	**Key Concepts** Change **Related Concepts** Sciences ○ Energy ○ Environment ○ Interaction	Orientation in space and time	**Statement of Inquiry:** Our NATURAL LANDSCAPE CHANGES with the INTERACTION of ENERGY. **Inquiry Questions:** F : What are weathering, erosion and deposition? , C : How does the interaction between

Title	Duration	Significant Concepts / Key & Related Concepts	AOI / Global Context	Unit Question Statement of Inquiry:
		○ Movement		elements change the environment? , D : How do landscapes influence our lives?
Unit 9 Earth's Histroy Next Chapter by Teresa Weiler	2 weeks (10 hours)	**Key Concepts** Relationships **Related Concepts** Sciences ○ Environment ○ Evidence Other: time and correlation	Orientation in space and time	**Statement of Inquiry:** By looking at the EVIDENCE in the ENVIRONMENT we can RELATIONSHIPS between EPOCHS and ERAS. **Inquiry Questions:** F : What techniques are there for determining rock ages? , C : How can logic help unlock the puzzle of geologic time? , D : What can the age of a rock tell us?

NYS Earth Science Standards

Unit Topic	Time Frame (Weeks)	NY State Standards *See the chart below for descriptions.*	Significant Concept
Introduction (Density, Measurement and Graphing)	1	1.M1, 1.S3, 2.3, 4.1.2c, 4.2.1b, 4.3.1ac, 6.3, 6.4, 6.5, 6.6, 7.1, 7.2	➢ The standards of scientific investigation are practiced: measurement, graphing, rounding, and equations.
Mapping	4	1.E1, 1.M1, 1.S3, 4.1.1cdfi, 4.1.2c, 4.2.1bgjlq, 6.2, 6.3, 7.2	➢ Mapping elevations and accurately reading and interpreting topographic maps.
Weather	8	2.1, 2.3, 4.1.1f, 4.1.2g, 4.2.1, 4.2.1bcdefghi, 4.2.2abd, 6.4, 6.5, 7.2	➢ Weather variables interrelate in a complex way.
Climate	4	1.E1, 1.S3, 2.3, 4.1.1, 4.1.1abfh, 4.1.2g, 4.2.1abfi, 4.2.2abcd, 6.4, 6.5, 6.6, 7.2,	➢ There are many factors that affect the world's climate.
Astronomy	4	1M2, 1S1, 4.1.1abcdfgh, 4.1.2abcd, 4.2.2a, 6.3, 6.4	➢ Outer space, our solar system, and motions of the Earth and Moon affect our weather and climate.
Earth's Shape	1	1M1, 4.1.1deh, 4.1.21h	➢ Measurements of the Earth and parts of the Earth relate to astronomy, mapping and weather.
Rocks/Minerals	3	4.2.1fjlmw, 4.3.1abc, 6.2, 6.6, 7.1	➢ The Earth's resources are limited.
Earthquakes and Plate Tectonics	2	2.3, 4.1.2j, 4.2.1bjklmnop, 6.5, 7.2	➢ Study of the dynamic crust is needed to locate epicenters of Earthquakes.
Weathering, Erosion and Deposition	2	1.E1, 1.M1, 1.M2, 1.S2, 2.3, 4.1.2d, 4.2.1abklnopqrstuvw, 4.2.2acd, 4.3.1b, 6.1, 6.2, 6.4, 6.6, 7.2	➢ Earth materials are broken, moved and transported.
Earth's History	2	2.3, 4.1.2cdefghij, 4.3.1c, 6.3, 7.1, 7.2	➢ The Earth's past is varied and has implications on the Earth's future.

Standard Number	Description
Standard 1	**Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.**
1.E1	Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints.
1.M1	Abstraction and symbolic representation are used to communicate mathematically.
1.M2	Deductive and inductive reasoning are used to reach mathematical conclusions.
1.S1	The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.
1.S2	Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.
1.S3	The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.
Standard 2	**Students will access, generate, process, and transfer information, using appropriate technologies.**
2.1	Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.
2.3	Information technology can have positive and negative impacts on society, depending upon how it is used.
Standard 4	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 4.1	**The Earth and celestial phenomena can be described by principles of relative motion and perspective.**
4.1.1	Explain complex phenomena, such as tides, variations in day length, solar insolation, apparent motion of the planets, and annual traverse of the constellations.
4.1.1a	Most objects in the solar system are in regular and predictable motion.
4.1.1b	Nine planets move around the Sun in nearly circular orbits.
4.1.1c	Earth's coordinate system of latitude and longitude, with the equator and prime meridian as reference lines, is based upon Earth's rotation and our observation of the Sun and stars.
4.1.1d	Earth rotates on an imaginary axis at a rate of 15 degrees per hour. To people on Earth, this turning of the planet makes it seem as though the Sun, the moon, and the stars are moving around Earth once a day. Rotation provides a basis for our system of local time; meridians of longitude are the basis for time zones.
4.1.1e	The Foucault pendulum and the Coriolis effect provide evidence of Earth's rotation.
4.1.1f	Earth's changing position with regard to the Sun and the moon has noticeable effects.
4.1.1g	Seasonal changes in the apparent positions of constellations provide evidence of Earth's revolution.
4.1.1h	The Sun's apparent path through the sky varies with latitude and season.
4.1.1i	Approximately 70 percent of Earth's surface is covered by a relatively thin layer of water, which responds to the gravitational attraction of the moon and the Sun with a daily cycle of high and low tides.
4.1.2	Describe current theories about the origin of the universe and solar system.
4.1.2a	The universe is vast and estimated to be over ten billion years old. The current theory is that the universe was created from an explosion called the Big Bang.
4.1.2b	Stars form when gravity causes clouds of molecules to contract until nuclear fusion of light elements into heavier ones occurs. Fusion releases great amounts of energy over millions of years.
4.1.2c	Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials.
4.1.2d	Asteroids, comets, and meteors are components of our solar system.
4.1.2e	Earth's early atmosphere formed as a result of the outgassing of water vapor, carbon dioxide, nitrogen, and lesser amounts of other gases from its

	interior.
4.1.2f	Earth's oceans formed as a result of precipitation over millions of years. The presence of an early ocean is indicated by sedimentary rocks of marine origin, dating back about four billion years.
4.1.2g	Earth has continuously been recycling water since the outgassing of water early in its history. This constant recirculation of water at and near Earth's surface is described by the hydrologic (water) cycle.
4.1.2h	The evolution of life caused dramatic changes in the composition of Earth's atmosphere. Free oxygen did not form in the atmosphere until oxygen-producing organisms evolved.
4.1.2j	Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations.
Key Idea 4.2	**Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.**
4.2.1	Use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of Earth's plates.
4.2.1a	Earth systems have internal and external sources of energy, both of which create heat.
4.2.1b	The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion.
4.2.1c	Weather patterns become evident when weather variables are observed, measured, and recorded. These variables include air temperature, air pressure, moisture (relative humidity and dewpoint), precipitation (rain, snow, hail, sleet, etc.), wind speed and direction, and cloud cover.
4.2.1d	Weather variables are measured using instruments such as thermometers, barometers, psychrometers, precipitation gauges, anemometers, and wind vanes.
4.2.1e	Weather variables are interrelated.
4.2.1f	Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement.
4.2.1g	Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmospheric cross-sections, and computer models.
4.2.1h	Atmospheric moisture, temperature and pressure distributions; jet streams, wind; air masses and frontal boundaries; and the movement of cyclonic systems and associated tornadoes, thunderstorms, and hurricanes occur in observable patterns. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
4.2.1i	Seasonal changes can be explained using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather
4.2.1j	Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction).
4.2.1k	The outward transfer of Earth's internal heat drives convective circulation in the mantle that moves the lithospheric plates comprising Earth's surface.
4.2.1l	The lithosphere consists of separate plates that ride on the more fluid asthenosphere and move slowly in relationship to one another, creating convergent, divergent, and transform plate boundaries. These motions indicate Earth is a dynamic geologic system.
4.2.1m	Many processes of the rock cycle are consequences of plate dynamics. These include the production of magma (and subsequent igneous rock formation and contact metamorphism) at both subduction and rifting regions, regional metamorphism within subduction zones, and the creation of major depositional basins through down-warping of the crust.
4.2.1n	Many of Earth's surface features such as mid-ocean ridges/rifts, trenches/subduction zones/island arcs, mountain ranges (folded, faulted, and volcanic), hot spots, and the magnetic and age patterns in surface bedrock are a consequence of forces associated with plate motion and interaction.
4.2.1o	Plate motions have resulted in global changes in geography, climate, and the patterns of organic evolution.
4.2.1p	Landforms are the result of the interaction of tectonic forces and the processes of weathering, erosion, and deposition.
4.2.1q	Topographic maps represent landforms through the use of contour lines that are isolines connecting points of equal elevation. Gradients and profiles can be determined from changes in elevation over a given distance.
4.2.1r	Climate variations, structure, and characteristics of bedrock influence the development of landscape features including mountains, plateaus, plains, valleys, ridges, escarpments, and stream drainage patterns.

4.2.1s	Weathering is the physical and chemical breakdown of rocks at or near Earth's surface. Soils are the result of weathering and biological activity over long periods of time.
4.2.1t	Natural agents of erosion, generally driven by gravity, remove, transport, and deposit weathered rock particles. Each agent of erosion produces distinctive changes in the material that it transports and creates characteristic surface features and landscapes. In certain erosional situations, loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
4.2.1u	The natural agents of erosion include: streams (running water), glaciers (moving ice), wave action, wind, and mass movement.
4.2.1v	Patterns of deposition result from a loss of energy within the transporting system and are influenced by the size, shape, and density of the transported particles. Sediment deposits may be sorted or unsorted.
4.2.1w	Sediments of inorganic and organic origin often accumulate in depositional environments. Sedimentary rocks form when sediments are compacted and/or cemented after burial or as the result of chemical precipitation from seawater.
4.2.2	Explain how incoming solar radiation, ocean currents, and land masses affect weather and climate.
4.2.2a	Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations in: the intensity, characteristics of the materials absorbing the energy, and duration.
4.2.2b	The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's surface occurs as the result of radiation, convection, and conduction.
4.2.2c	A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.
4.2.2d	Temperature and precipitation patterns are altered by: natural events and human influences
Key Idea 4.3	**Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.**
4.3.1	Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them.
4.3.1a	Minerals have physical properties determined by their chemical composition and crystal structure.
4.3.1b	Minerals are formed inorganically by the process of crystallization as a result of specific environmental conditions.
4.3.1c	Rocks are usually composed of one or more minerals.
Standard 6	**Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.**
Key Idea 6.1	**Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.**
Key Idea 6.2	**Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.**
Key Idea 6.3	**The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.**
Key Idea 6.4	**Equilibrium is a state of stability due either to a lack of change or a balance between opposing forces.**
Key Idea 6.5	**Identifying patterns of change is necessary for making predictions about future behavior and conditions.**
Key Idea 6.6	**In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.**
Standard 7	**Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.**
Key Idea 7.1	**The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/ technology/society, consumer decision making, design, and inquiry into phenomena.**
Key Idea 7.2	**Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.**

Unit 1	Topic	Labs/Activities	Summative	Monday	Tuesday	Wednesday	Thursday	Friday
1	Intro	What not to do Observation				Sept 2	Sept 3	Sept 4
	Mapping	Stirring the Alpha Lat/long Making a Contour Map		Sept 7	Sept 8	Sept 9	Sept 10	Sept 11
	Mapping	Gradient/Topo…	Topo Map (D)	Sept 14	Sept 15	Sept 16	Sept 17	Sept 18
	Mapping	Topo continued	Exam (A)	Sept 21	Sept 22	Sept 23	Sept 24	Sept 25
1.5	Density	Density of H2O *Layers of the Atm*		Sept 28	Sept 29	Sept 30	Oct 1	Oct 2
2	Weather	Temp and color Relative Humidity		Oct 5	Oct 6	Oct 7	Oct 8	Oct 9
	Weather	Weather Analysis	Weather analysis (C)	Oct 12	Oct 13	Oct 14	Oct 15	Oct 16
	Weather	*Planetary Winds*	Exam (A)	Oct 19	Oct 20	Oct 21	Oct 22	Oct 23
	Weather 2	Isoline yarn and reg. q		Oct 26	Oct 27	Oct 28	Oct 29	Oct 30
3	Weather 2	Fronts Prelab Fronts		Nov 2	Nov 3	Nov 4	Nov 5	Nov 6
	Weather 2		Exam (A)	Nov 9	Nov 10	Nov 11	Nov 12	Nov 13
4	Climate	Capillarity	Climate Project (D)	Nov 16	Nov 17	Nov 18	Nov 19	Nov 20
	Climate	Climate Zones		Nov 23	Nov 24	Nov 25	Nov 26	Nov 27
	Climate	Shadow Study		Nov 30	Dec 1	Dec 2	Dec 3	Dec 4
	Climate	*CO2 and Global Warming*	Exam (A)	Dec 7	Dec 8	Dec 9	Dec 10	Dec 11
5	Astronomy	Eccentricity	Astronomy Models (D)	Dec 14	Dec 15	Dec 16	Dec 17	Dec 18
	Astronomy	Sun's Path		Dec 21	Dec 22	Dec 23	Dec 24	Dec 25
Vacation				Dec 28	Dec 29	Dec 30	Dec 31	Jan 1
5	Astronomy	Phases of the Moon		Jan 4	Jan 5	Jan 6	Jan 7	Jan 8
	Astronomy			Jan 11	Jan 12	Jan 13	Jan 14	Jan 15
	Review		Midterm (A)	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22
Exam Week				Jan 25	Jan 26	Jan 27	Jan 28	Jan 29
5.5	Earth's Shape	Polaris -		Feb 1	Feb 2	Feb 3	Feb 4	Feb 5
6	Minerals	Mineral Hardness Mineral Density	Min Density (B)	Feb 8	Feb 9	Feb 10	Feb 11	Feb 12

Vacation				Feb 15	Feb 16	Feb 17	Feb 18	Feb 19
6	Rocks	Mineral ID Igneous		Feb 22	Feb 23	Feb 24	Feb 25	Feb 26
	Rocks	Sedimentary Metamorphic		Feb 29	Mar 1	Mar 2	Mar 3	Mar 4
	Rocks	Rock/Min Review	Exam	Mar 7	Mar 8	Mar 9	Mar 10	Mar 11
7	Earthquakes	Haiti	Dynamic Project (C)	Mar 14	Mar 15	Mar 16	Mar 17	Mar 18
	Earthquakes	Chili		Mar 21	Mar 22	Mar 23	Mar 24	Mar 25
Vacation				Mar 28	Mar 29	Mar 30	Mar 31	Apr 1
7	Plate Tectonics	Pangaea *Plate Tectonics study*		Apr 4	Apr 5	Apr 6	Apr 7	Apr 8
	Plate Tectonics	Dynamic review	Exam (A)	Apr 11	Apr 12	Apr 13	Apr 14	Apr 15
8	Weathering	Surface Area Alka Seltzer		Apr 18	Apr 19	Apr 20	Apr 21	Apr 22
	Erosion	Rock Abrasion		Apr 25	Apr 26	Apr 27	Apr 28	Apr 29
	Deposition	Settling Rate	Settling Rate (B) Exam (A)	May 2	May 3	May 4	May 5	May 6
9	Earth's History	Horizontal Fault Block Tilted Fault Block		May 9	May 10	May 11	May 12	May 13
	Earth's History	Radioactivity	Exam (A)	May 16	May 17	May 18	May 19	May 20
10	Review			May 23	May 24	May 25	May 26	May 27
	Review			May 30	May 31	June 1	June 2	June 3
	Lab Test			June 6	June 7	June 8	June 9	June 10
				June 13	June 14	June 15	June 16	June 17
Exam Week				June 20	June 21	June 22	June 23	June 24