

Grade 6 Science

Unit 1 Earth

Estimated Time Frame for unit	Big Ideas	Essential Question	Concept (Know)	Competency (Do)	Suggested Resources	Vocabulary	PA Content / Keystone Standard	Suggested Lessons & Activities
	Scientists use specific methods to investigate problems.	What causes the great variation at Earth's surface?	The Earth is mostly rock, with a metallic core.	Explain how the scientific method could be applied to solve a problem.	http://www.k12reader.com/reading-comprehension/Grade3/Wk21_Scientific_Method.pdf	Observation Hypothesis Experiment Analyze Theory Law	S8.A.2.1.1 S8.A.2.1.2 S8.A.2.1.3 S8.A.2.1.4 S8.A.2.1.5 S8.A.2.1.6	Mr. Edmonds "Scientific Method Song" https://www.youtube.com/watch?v=WEXMB5wsl0w
	Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate.	What causes the great variation at Earth's surface?	The Earth is mostly rock, with a metallic core.	Describe the four section of the earth. Distinguish between molten and solid state.	What is Earth Science? Intro to Unit activity: http://www.ck12.org/workbook/CK-12-Earth-Science-For-Middle-School-Workbook/section/1.0/ CSD Science K-6 Wiki "The Earth's interior with plate tectonics" PowerPoint	Inner core Outer core Mantle Crust Molten Solid	S8.D.1.1.1	Label sections of the earth http://www.encyclopedia.com/subjects/astronomy/planets/earth/Inside.shtml Earth structure/interior/mapping Earth Slide Shows and (graphic organizers) http://www.coscience.com/home/ForStudents/MiddleSc

					http://piers.wikispaces.com/Lesson+5+-+Plate+Tectonics			http://www.hoolEarthScience.com/Default.aspx
	Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate	What causes the great variation at Earth's surface?	Earth materials (rocks and soils) can be classified by their composition and texture and those features can be interpreted to infer the history of the material.	Create a rock cycle.	<p>Reading Resources Rocks:</p> <p>https://www.readworks.org/pasages/hard-rocks</p> <p>CSD Science K-6 Wiki "Rock_cycle" PowerPoint</p> <p>http://studentcenters.wikispaces.com/Part+3+-+Rocks+and+Minerals</p>	<p>Igneous rock</p> <p>Sedimentary rock</p> <p>Metamorphic rock</p> <p>Heat</p> <p>Pressure</p> <p>Cooling</p> <p>Melting</p> <p>Weathering</p> <p>Erosion</p>	<p>S8.D.1.1.1</p> <p>S8.A.1.3.4</p> <p>S8.A.1.1.4</p>	<p>http://www.calacademy.org/teachers/resources/lessons/rock-cycle-roundabout/</p> <p>Write a story for a younger child.</p> <p>http://www.discovery.com/teacher/free-lesson-plans/rocks.cfm</p> <p>Rocks Lessons and Activities</p> <p>http://missdoctorbailer.com/resources_6th.cfm?subpage=1613431</p>
	Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate	What causes the great variation at Earth's surface?	Some changes in Earth's surface are gradual, such as the lifting up of mountains or their wearing away by erosion and weathering.	Compare and contrast weathering versus erosion.	<p>Weathering Erosion:</p> <p>http://www.ck12.org/workbook/CK-12-Earth-Science-For-Middle-School-Workbook/section/9.0/</p>	<p>Weather</p> <p>Erosion</p> <p>Deposition</p>	<p>S8.A.1.3.2</p> <p>S8.A.1.3.3</p> <p>S8.D.1.1.2</p>	<p>http://sbsciencematters.com/lesson-units/6th-grade/6th-earth-science-weathering-erosion/</p> <p>http://www.selmausd.org/site/Default.aspx?PageID=2473</p>

	Weathering and Erosion are agents of change on Earth's surface	Describe how soil forms? Recognize soil horizons in soil profile. Differentiate among the factors of soil formation.	Soil forms from weathering the solid bedrocks into smaller pieces. A distinct layer with a soil profile is called a soil horizon.	Students will be able to describe the characteristics of different soil types.	https://kidsgarden.org/lesson-plans-soil-texture-and-composition/	Loam Silt Sand Clay Organic matter	3.3.3.A1 3.3.4.A1 3.3.5.A1	http://www.thescienceofsoil.com/teacher-resources https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/edu/?cid=nrcs142p2_054303
	Scientists use several methods to learn about Earth's long history.	Explain why scientists need a geologic time scale. Distinguish among eons, eras, periods and, epochs. Characterize the groups plants and animals that dominated eras in Earth's history. Explain methods by which fossils are preserved.	Scientist organize geologic time to help them communicate about Earth's history. The time scale is divided into units called eons, eras, periods, and epochs. Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the at time	Students will be able to create a table for the geologic time scale. Students can compare and contrast the geologic time periods. Explain how fossil provide evidence for models about the models about the change in Earth's surface and features over time.	https://wqed.pbselearningmedia.org/resource/es05.sci.ess.earthsys.lp_funfossils/fun-with-fossils/#.W1Yd7PIKjIU http://www.fossils-facts-and-finds.com/fossil_lesson_plans.html http://beyondpenguins.ehe.osu.edu/issue/learning-from-the-polar-past/learning-about-fossils-through-hands-	Cast Mold Eons Eras, period Epochs Altered hard pars Evolution Trace fossils	3.3.4.A3 3.3.7.A3	Fossil labs casts and molds https://www.gns.cri.nz/Home/Learning/Science-Topics/Fossils/Lesson-Plans

			Fossils provide scientist with a record of the history of life on Earth		on-science-and-literacy https://www.teachengineering.org/lessons/view/cub_rock_lesson_03			
	Scientists use several methods to learn about Earth's long history.	<p>Explain why scientists need a geologic time scale.</p> <p>Distinguish among eons, eras, periods and, epochs.</p> <p>Characterize the groups plants and animals that dominated eras in Earth's history.</p> <p>Explain methods by which fossils are preserved.</p>	Heat flow from the earth and motion within the earth lead the outer shell of the earth to move around in large rigid pieces (plates) and leads to the creation and destruction of ocean basins, motion of continents.	Apply how the rock cycle is a miniature version of plate movement.	<p>Reading resources Earthquakes/rocks:</p> <p>https://www.readworks.org/sites/default/files/passages/970_fossils_and_earth_quakes_0.pdf</p> <p>https://www.readworks.org/sites/default/files/passages/1010_preparing_for_a_disaster_0.pdf</p> <p>http://www.ck12.org/workbook/CK-12-Earth-Science-For-Middle-School-Workbook/section/6.0/</p>	<p>Convection</p> <p>Plate tectonics</p> <p>Subduction</p> <p>Uplift</p>	<p>S8.C.2.1.2</p> <p>S8.D.1.1.2</p>	<p>Radiation, Convection, Conduction VIDEO (rap style song)</p> <p>http://www.teachertube.com/viewVideo.php?video_id=159713</p> <p>Plate Tectonics Lessons and Activities</p> <p>http://missdoctorbailer.com/resources_6th.cfm?subpage=1339877</p> <p>http://sbscience.matters.com/lesson-units/6th-grade/6earth-plate_tectonics/</p>

			Some changes in Earth's surface are abrupt, such as earthquakes, volcanoes, meteor impacts, and landslides.	Describe how plate tectonics creates earthquakes, volcanoes and mountain belts. Discuss how meteor impacts and landslides are abrupt changes.	Volcanoes: http://www.ck12.org/workbook/CK-12-Earth-Science-For-Middle-School-Workbook/section/8.0/ http://piers.wikispaces.com/Earthquakes+Assignment	Earthquakes Mountain building Volcanoes Magma Lava Meteor Landslide	S8.D.1.1.2	Create a map of the earthquakes over time. http://earthquake.usgs.gov/earthquakes/?source=sitenav Use the printables to label parts of a volcano http://sbscience.matters.com/lesson-units/6th-grade/6earth-earthquakesvolcanoes/ http://www.enchantedlearning.com/subjects/astromy/planets/earth/Inside.shtml
	The composition, structure, and properties of Earth's atmosphere form the basics of weather and climate.	What causes the great variation at Earth's surface?	The Earth is surrounded by a thin blanket of air.	Layers of the atmosphere and the properties specifically of the Troposphere and its relation to weather.	Atmosphere: http://www.ck12.org/workbook/CK-12-Earth-Science-For-Middle-School-Workbook/section/15.0/ Atmosphere/Water/Weather/Climate Powerpoints and Resources http://www.cposcience.com/home/ForStudents/MiddleSchoolEarthScience	Troposphere Mesosphere Ionosphere Exosphere Thermosphere Ozone Layer Barometer Thermometer Anemometer	S8.A.2.2.2 S8.A.2.2.3 S8.D.2.1.2 S8.D.2.1.3	http://www.discveryeducation.com/teacher/free-lesson-plans/understanding-weather.cfm Experiment on green house effect Graphing Temperature Activity

					nce/tabid/246/Default.aspx http://www.seldm.ausd.org/page/2487			Write a summary of the experiment
	The composition, structure, and properties of Earth's atmosphere form the basics of weather and climate.	Clouds vary in shape, size, height of formation and type of precipitation.	The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns.	Create a diagram of the water cycle. Explain how water is important in determining climatic patterns.	H ₂ O Cycle Presentation	Precipitation Condensation Evaporation Transpiration Storage Runoff Infiltration	S8.A.3.1.1 S8.D.1.3.1	http://www.enchantedlearning.com/subjects/astronomy/planets/earth/Inside.shtml Label the printable of the water cycle.
	The composition, structure, and properties of Earth's atmosphere form the basics of weather and climate.	Energy is transferred throughout Earth's atmosphere.	The atmosphere circulates in large scale patterns which steer weather systems due to heat from the sun.	Describe how convection drives the water cycle.	H ₂ O Cycle Presentation	Convection	S8.C.2.1.2 S8.C.2.2.1 S8.D.2.1.2 S8.D.2.1.3	Create a model of the H ₂ O cycle
	The composition, structure, and properties of Earth's atmosphere form the basics of weather and climate.	Atmospheric properties, such as temperature, air pressure, and humidity describe weather conditions.	Large scale wind patterns drive surface currents in the oceans and affects weather due to the heat energy associated with climates and storms around the world.	Explain how ocean temperature varies and effects the formation of hurricanes.	CSD Science K-6 Wiki	Hurricanes Typhoons Gulf Stream	S8.C.2.1.2 S8.C.2.2.1 S8.D.2.1.2 S8.D.2.1.3	Math conversions of Fahrenheit to Celsius. Graph of temperatures.

	Energy is neither created nor destroyed.	How do energy transformations explain that energy is neither created nor destroyed?	Thermal energy is transferred into mechanical energy to push or pull an object.	Explain how thermal energy can be transformed to mechanical energy. Explain relationship between wind and mechanical force in terms of tornado.	Reading Resources Lightning (Weather): https://www.readworks.org/sites/default/files/passages/1080_Lightning_and_fire.pdf http://piers.wikispaces.com/Thermal+Energy+and+Heat	Thermal Energy Heat Mechanical or Kinetic Energy Force	S8.C.2.1.2 S8.C.2.2.1 S8.D.2.1.2 S8.D.2.1.3	Earth's Energy http://sbsciencematters.com/lesson-units/6th-grade/6physical-energy/ http://www.discovery.education.com/teachers/free-lesson-plans/wonder-of-weather.cfm
	Energy is transformed from one form to another, but transformation between forms often results in the loss of useable energy through the production of heat.	How do energy transformations explain that energy is neither created nor destroyed?	Thermal energy is transferred from warmer to cooler objects, until the objects reach the same temperature.	Provide examples of heat transferring from warmer to cooler objects.	CSD Science K-6 Wiki "Conservation of Energy" PowerPoint	Conservation Of Energy	S8.C.2.1.2 S8.C.2.2.1 S8.D.2.1.2 S8.D.2.1.3	Hot pack vs. Cold pack Thermal Energy Lesson Activity Links http://missdoctorbailer.com/resources_6th.cfm?subpage=1613035
	Clouds vary in shape, size, height of formation and type of precipitation.	How do energy transformations explain that energy is neither created nor destroyed?	Heat energy is usually a by-product of an energy transformation. Sun is the main source of energy.	Explain how different types of clouds form. Describe how the sun drives all weather on Earth.	CSD Science K-6 Wiki "Cloud Formation" PowerPoint Sun energy reading resources: https://www.readworks.org/sites/default/files/passag	Cumulus Stratus Nimbus Cirrus Alto Radiation	S8.C.2.1.2 S8.C.2.2.1 S8.D.2.1.2 S8.D.2.1.3	H ₂ O Cycle Condensation demo or lab

			<p>Energy from the sun warms air and water, which creates moving currents within them. This movement causes changes on the Earth's surface.</p>	<p>Draw a diagram of how convection currents are created and influence weather.</p>	<p>es/1070 a ball of energy.pdf</p>	<p>Convection Current</p>		
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Grade 6 Science

Unit 2 Space

Estimated Time Frame for unit	Big Ideas	Essential Question	Concept (Know)	Competency (Do)	Suggested Resources	Vocabulary	PA Content / Keystone Standard	Suggested Lessons & Activities
	Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate.	What causes the great variation at Earth's surface?	Everything on or near the Earth is pulled toward Earth's center by a gravitational force. Celestial revolutions are caused by gravitational attraction.	Describe the two factors that effect gravity: distance and size.	http://www.harcourtschool.com/activity/science_up_close/616/Deploy/interface.html Solar System Math Connections: http://quest.nasa.gov/vft/#wtd	Gravity Distance Size	S8.A.3.3.2 S8.D.3.1.1 S8.D.3.1.2	Space Science Lessons and Activities http://missdoctorbailer.com/resources_6th.cfm?subpage=1353610 Space Intro WebQuest Activity: http://mrscienceut.net/SolarSystem.html
	Using the law of motion and gravity, astronomers can understand the orbits and the properties of the planets and other objects in the solar system.	How was the solar system formed? What is the relationship of size and distance between objects in the solar system?	The solar nebula theory is how the solar system was created. Gravity is the relationship between distance and size. The larger the size the larger the gravity; the	Create a concept map, foldable, venn diagram etc. of the differences between the Terrestrial and the Jovian planets. Students could	https://www.exploratorium.edu/rohn/weight/	Solar nebula Terrestrial planets (inner planets) Jovian planets (outer planets) Ellipse Asteroids Meteorite Meteoroids	3.3.6.B1.	https://www.exploratorium.edu/rohn/weight/ http://www.discoveryeducation.com/teachers/free-lesson-plans/the-story-of-the-solar-system.cfm https://www.education.com/lesson-

		<p>What are the differences between the Terrestrials planets?</p> <p>Compare and contrast the composition of the terrestrial planet to the Jovian planets.</p> <p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>	<p>larger the distance the smaller the gravity pull.</p> <p>The Terrestrial planets are solid, close to the Sun and have no rings and between and 2 moons. The Jovian planets consists of H and He, have many rings and moons.</p> <p>Planets are round, circle the Sun, and clear their orbit.</p>	<p>illustrate a book for the solar nebula.</p> <p>Students can go to web sites and investigate their weight on other planets (gravity)</p>		<p>Meteors</p> <p>Comets</p> <p>Astronomic al units</p> <p>Eccentricity</p> <p>Belts</p> <p>Zones</p> <p>Kuiper belts</p>		plan/the-solar-system/
	Using the law of motion and gravity, astronomers an understand the orbits and the properties of the planets and other objects in the solar system.	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences</p>	The Earth's rotation around its tilted axis causes day and night.	Explain why we have day and night based on the rotation of the Earth.	https://space-unit.wikispaces.com/Day%2C+Night+and+Seasons	Day Night Rotation	<p>S8.A.3.3.2</p> <p>S8.D.3.1.1</p> <p>S8.D.3.1.2</p>	

		<p>between the Terrestrials planets?</p> <p>Compare and contrast the composition of the terrestrial planet to the Jovian planets.</p> <p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>						
	Using the law of motion and gravity, astronomers an understand the orbits and the properties of the planets and other objects in the solar system.	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences between the Terrestrials planets?</p>	The Earth's revolution around the Sun and tilt causes the seasons throughout the year.	Explain how the relationship between the Earth's revolution and tilt cause differences in energy intensity that create seasons.	CSD Science K-6 Wiki "Seasons_powerp oint" PowerPoint	<p>Vernal Equinox</p> <p>Autumnal Equinox</p> <p>Summer Solstice</p> <p>Winter Solstice</p>	<p>S8.A.3.3.2</p> <p>S8.D.3.1.1</p> <p>S8.D.3.1.2</p>	<p>Video for Seasons and other topics in this unit:</p> <p>http://www.neok12.com/Seasons.htm</p>

		<p>Compare and contrast the composition of the terrestrial planet to the Jovian planets.</p> <p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>						
	Using the law of motion and gravity, astronomers can understand the orbits and the properties of the planets and other objects in the solar system.	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences between the Terrestrial planets?</p> <p>Compare and contrast the</p>	The Moon's revolution around the Earth in respect to the Sun allows us to see the lit part of the moon and gives rise to the lunar phases.	<p>Describe the phases of the moon.</p> <p>Explain how the moon reflects sunlight to create the phases.</p>	<p>CSD Science K-6 Wiki "Phases_of_the_moon(1).ppt" PowerPoint</p> <p>http://www.uen.org/core/displayLessonPlans.do;jsessionid=D424FE2898CCC40A8AAD05BBDF162FDA?courseNumber=3060&standardId=1241&objectiveId=1242</p>	<p>Waxing</p> <p>Waning</p> <p>Reflect</p>	<p>S8.A.3.3.2</p> <p>S8.D.3.1.1</p> <p>S8.D.3.1.2</p>	<p>http://www.slcschools.org/departments/curriculum/science/Grade-3-to-6/Grade-3/documents/s1-o2-lesson-moon-observation.pdf</p> <p>http://www.cascaeducation.ca/CSA/CSA_Astro9/files/html/module3/lessons/lesson4/phasesMoon.html</p> <p>Video: http://www.harcourtschool.com/activity/science_up_c</p>

		<p>composition of the terrestrial planet to the Jovian planets.</p> <p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>						lose/611/deploy/interface.html
	Using the law of motion and gravity, astronomers can understand the orbits and the properties of the planets and other objects in the solar system.	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences between the Terrestrial planets?</p> <p>Compare and contrast the composition of the terrestrial</p>	The rhythms of the Earth are caused by 3 celestial motions: The Earth's rotation, revolution around the sun, and the Moon's revolution around the Earth.	Give the relationship between day/night, month, year to revolution versus rotation of either the moon or the Earth to generate a calendar.	<p>Moon Phases:</p> http://sciencenetlinks.com/esheets/moon-phases/	<p>Rotation</p> <p>Revolution</p> <p>Month</p> <p>Year</p> <p>Day</p>	<p>S8.A.3.3.2</p> <p>S8.D.3.1.1</p> <p>S8.D.3.1.2</p>	<p>Moon Phases</p> <p>http://www.slcschools.org/departments/curriculum/science/Grade-3-to-6/Grade-6/documents/s1-o1-lesson-moon-light-through-the-month.pdf</p> <p>Revolution & Seasons</p> <p>http://www.uen.org/Lessonplan/preview?LPid=11537</p>

		<p>planet to the Jovian planets.</p> <p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>						
	<p>Using the law of motion and gravity, astronomers an understand the orbits and the properties of the planets and other objects in the solar system.</p>	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences between the Terrestrials planets?</p> <p>Compare and contrast the composition of the terrestrial planet to the Jovian planets.</p>	<p>The moons effect on the world oceans due to gravity.</p>	<p>Describe how the moon has a greater effect on tides than the Sun.</p>	http://www.space.com/55-earths-moon-formation-composition-and-orbit.html	<p>Tides</p> <p>Gravity</p>		https://space-unit.wikispaces.com/Lunar+Cycle+and+Tides

		<p>How do moons and rings form?</p> <p>What is the differences between planets and dwarf planets?</p>						
	Using the law of motion and gravity, astronomers an understand the orbits and the properties of the planets and other objects in the solar system.	<p>How was the solar system formed?</p> <p>What is the relationship of size and distance between objects in the solar system?</p> <p>What are the differences between the Terrestrials planets?</p> <p>Compare and contrast the composition of the terrestrial planet to the Jovian planets.</p>	How technology influenced space exploration?	Challenger Trip	<p>Reading Resources Space Exploration: https://www.readworks.org/sites/default/files/passages/1130_from_the_earth_to_outer_space.pdf</p> <p>Reading Resources Space Travel: https://www.readworks.org/sites/default/files/passages/1120_nj_physics_professor_has_the_right_stuff_0.pdf</p>	<p>Satellites</p> <p>Telescopes</p> <p>Radio</p> <p>Refractive</p>	<p>S8.A.1.1.1</p> <p>S8.A.1.2.1</p> <p>S8.A.1.2.4</p> <p>S8.A.2.2.3</p>	<p>http://www.history.com/topics/space-race (use as an intro to the space race of the mid 20th century)</p> <p>Also for an intro: “The Great Space Race” card game with scoresheet. (hard copy of this activity is with Donnelly)</p> <p>http://www.scholastic.com/teachers/lesson-plan/nasa-challenging-space-frontier-teachers-guide</p>

		How do moons and rings form?						
		What is the differences between planets and dwarf planets?						

ONLINE, OPEN SOURCE EARTH SCIENCE TEXTBOOK:

https://archive.org/details/ost-earth-sciences-ck_12_earth_science_for_middle_school_001

Earth Science Graphic Organizers/Notes (general)

<http://www.loudoun.k12.va.us/Page/76148>

<http://www.middleschoolscience.com/earth.htm>

https://ims.ode.state.oh.us/ODE/IMS/Lessons/Web_Content/CSC_LP_S01_BA_L08_I01_01.pdf

Space Science—misc. web resources

<https://sites.google.com/a/leanderisd.org/6th-grade-science-leander-middle-school/chemistry-unit/unit-5>

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=SolarSys&Display=Educ&Page=All>

<http://www.lcps.org/Page/86425>