

Main General Topic	Sub-Topic	Essential Questions	What The Student Will Know	What The Student Will Be Able To Do	Assessments & Activities	When The Student Does It
Intro earth science  NYS Standard 1: Analysis, Inquiry, & Design  Scientific Method	What is science?  Types of scientists involved with earth science	What skills or attributes do scientists use to learn about the world?  What is scientific inquiry?  How do scientific theories differ from scientific laws?  What type of scientists are involved in the study of earth science and what do they study?	Skills scientists use: observing, inferring, predicting  The many ways scientists study the natural world  Scientific law describes observed patterns in nature, but doesn't provide an explanation for it  Geologist: rocks, meteorologist: weather, astronomer: space, spelunkers: caves; cosmologist – beginnings of the universe; mineralogists: minerals; climatologist: climates; seismologist: earthquakes; volcanologist: volcanoes, and hydrologist: water	Construct scale models  Discover how to speed up evaporations	Test/Alternate Assessment	SEP
Mapping Earth's Surface  NYS Standard 2: Information Systems	Exploring Earth's Surface  Models of Earth  Maps and Computers  Topographic Maps	What does the topography of an area include?  What are the main types of landforms?  How do maps & globes represent Earth's surface?  What reference points are used to locate points on Earth?  What are 3 common map projections?  How does computer mapping differ from earlier ways of making maps?  What sources of data are used in making computer maps?  How do mapmakers	The topography of an area includes the area's elevation, relief, and landforms.  There are 3 main types of landforms: (Geographic features): plains, mountains, plateaus  Maps and globes are drawn to scale and use symbols to represent topography and other features on Earth's surface  The equator and prime meridian are the baselines for measuring distances on Earth's surface; lines of latitude and longitude form a grid that can be used to find locations anywhere on Earth  With computers, mapmakers can store, process, and display map data electronically	Know the importance of lines of latitude and longitude and physical features when locating borders on a map.  Create a scale map of a piece of land and draw a map of its physical features  Use a topographic map to pinpoint a location	Test/Alternate Assessment  Chapter project  Make contour map (draw or clay) including specific features  Walking tour using GPS  Fieldtrip to USGS to view contour maps and map making and/or usage	SEP  OCT

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		represent elevation, relief, and slope?	Computers produce maps using data from many sources, such as satellites, GPS, and camera with GPS  Mapmakers use contour lines to represent elevation, relief, and slope on topographic maps			
Minerals	Properties of Minerals  How minerals form	What is a mineral?  How are minerals identified?  How do minerals form from water solutions?  How are minerals used?  How are ores processed to obtain metals?	A mineral is a naturally occurring, inorganic solid that has a crystal structure and a definite chemical composition  Each mineral has characteristic properties that can be used to identify it  Density = Mass/Volume  Minerals form as hot magma cools inside Earth or as lava hardens on the surface. When the liquids cool to a solid, they form crystals  When elements & compounds that are dissolved in water leave a solution, crystallization of minerals occurs.  Minerals are the source of gemstones, metals, and a variety of materials used to make many products.  To produce metal from a mineral, a rock containing the mineral must be located through prospecting and mining. Then the rock must be processed to extract the metal.	Compare the density of different minerals.  Discover the effect minerals in toothpaste have on the toothpaste's ability to clean.	Test/Alternate Assessment  Compare how different kinds of toothpaste clean  Grow crystals by dissolving sugar or salt in water and adding string to the container (rock candy)  Identify items in the room that are metallic.  Fieldtrip to NYS Museum.	OCT

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Rocks	Classifying rocks Igneous rocks Sedimentary rocks Metamorphic rocks Rock cycle	<p>What characteristics do geologists use to identify rocks?</p> <p>What are the 3 main groups of rocks?</p> <p>How are igneous rocks used?</p> <p>How do sedimentary rocks form?</p> <p>How are sedimentary rocks used?</p> <p>How do coral reefs form?</p> <p>What evidence do limestone deposits from coral reefs provide about Earth history?</p> <p>Under what conditions do metamorphic rocks form?</p> <p>How do geologists classify metamorphic rocks?</p> <p>How are metamorphic rocks used?</p>	<p>When studying a rock sample, geologists observe the rock's mineral composition, color &amp; texture.</p> <p>3 major rock groups: igneous, sedimentary, and metamorphic</p> <p>Igneous rocks are classified by their origin, texture, and mineral composition</p> <p>Igneous rocks have been used to make tools and building materials</p> <p>Most sedimentary rocks are formed through a series of processes: erosion, deposition, compaction, and cementation.</p> <p>Sedimentary rocks have been used as building materials and tools.</p> <p>When coral animals die, their skeletons remain; more corals build on top of them gradually forming a reef.</p> <p>Limestone deposits that began as coral reefs provide evidence of how Earth's surface has changed. These deposits also provide evidence of past environments.</p> <p>Heat &amp; pressure deep beneath Earth's surface can change any rock into metamorphic rock.</p> <p>Geologists classify metamorphic rock according to the arrangement of the grain that makes up the rocks.</p> <p>Certain metamorphic rocks are used</p>	Identify the different types of rocks	<p>Test/Alternate Assessment</p> <p>Make a collection of rocks in your area.</p> <p>Field trip to a cemetery to do rubbings, compare rocks used as headstones, and view differential weathering.</p> <p>Rocks – use a dichotomous key and/or a flowchart.</p>	OCT  NOV

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			<p>for building and sculpture.</p> <p>Forces deep inside Earth and at the surface produce a slow cycle that builds, destroys, and changes rocks in the crust.</p>			
Plate Tectonics	<p>Earth's Interior</p> <p>Convection &amp; The Mantle</p> <p>Drifting Continents</p> <p>Sea-floor Spreading</p> <p>Theory of Plate Tectonics</p>	<p>How have geologists learned about Earth's inner structure?</p> <p>What are the characteristics of Earth's crust, mantle, and core?</p> <p>How is heat transferred?</p> <p>What causes convection currents in Earth's mantle?</p> <p>What was Alfred Wegener's hypothesis about the continents?</p> <p>What evidence supported Wegener's hypothesis?</p> <p>Why was Wegener's hypothesis rejected by most scientists of his day?</p> <p>What is the process of sea-floor spreading?</p> <p>What is the evidence for sea-floor spreading?</p> <p>What happens at deep-ocean trenches?</p> <p>What is the theory of plate tectonics?</p>	<p>Geologists have used 2 main types of evidence to learn about Earth's interior: direct: from rock samples and indirect: from seismic waves.</p> <p>Three main layers of Earth vary in size, composition, temperature, and pressure.</p> <p>Crust: layer of solid rock – divided into layers based on physical characteristics</p> <p>Core: mostly metals iron and nickel. Liquid outer core and solid inner core.</p> <p>Heat transfer: radiation, conduction, convection.</p> <p>Heating and cooling of fluids, changes in the fluid's density, and the force of gravity combine to set convection currents into motion.</p> <p>Heat from the core and mantle cause convection currents in the mantle.</p> <p>Wegener's hypothesis was that all continents had once been joined in a single landmass and have since drifted apart.</p>	<p>Predict what Earth will look like as students map the movement of the continents.</p>	<p>Test/Alternate Assessment</p> <p>Use an apple or orange as an example of the Earth's core.</p> <p>Make Oobleck (cornstarch and water) to illustrate the "plastic" consistency of the asthenosphere.</p> <p>Melt wax – Pangaea on molasses.</p> <p>Mystery box – using (senses) information we have, to make predictions about what we don't know.</p> <p>Debate b/w Ptolemy and Copernicus.</p> <p>Scientist-Day: Celebrate birthdays of famous people.</p> <p>Cooperative Learning – students write skit as other scientists</p>	NOV

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		<p>What are the three types of plate boundaries?</p>	<p>Wegener gathered evidence from different scientific fields to support his idea of continental drift. He studied fossils, land features, and evidence of climate change.</p> <p>Wegener couldn't provide a satisfactory answer for the force that pushes or pulls the continents.</p> <p>In sea-floor spreading, the seafloor spreads apart, along both sides of a mid-ocean ridge as new crust is added. As a result, the ocean floors move like conveyor belts, carrying the continents with them.</p> <p>Several types of evidence supported Hess' theory of seafloor spreading: eruption of molten material, magnetic stripes in the rocks of the ocean floor, and ages of the rocks.</p> <p>In a process taking tens of millions of years, part of the ocean floor sinks back into the mantle at deep ocean trenches.</p> <p>The theory of plate tectonics explains the formation, movement, and subduction of Earth's plates.</p> <p>Three plate boundaries: divergent, convergent, transform.</p>		<p>arguing Wegener's ideas.</p>	
Earthquakes	<p>Forces in Earth's Crust</p> <p>Earthquakes and seismic waves</p> <p>Monitoring earthquakes</p>	<p>How does stress in the crust change Earth's surface?</p> <p>Where are faults usually found and why do they form?</p> <p>What land features result from the forces of plate</p>	<p>Primary waves are the first waves from earthquake to arrive at a seismic station; secondary waves don't travel through liquid. Long waves cause the most damage.</p> <p>Faults usually occur along plate boundaries, where the forces of</p>	<p>Locate an earthquake's epicenter.</p>	<p>Test/Alternate Assessment</p> <p>Show website plotting points of earthquake and volcanic activity.</p>	NOV

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	<p>Earthquake safety</p> <p>Epicenter and focus of earthquakes</p>	<p>movements?</p> <p>How does the energy of an earthquake travel through Earth?</p> <p>What are the three main types of earthquake waves?</p> <p>What are the scales used to measure the strength of an earthquake?</p> <p>How do scientists locate the epicenter of an earthquake? (basic, general info.)</p> <p>How do seismographs work?</p> <p>How do geologists monitor faults?</p> <p>How is seismographic data used?</p> <p>How do geologists determine earthquake risk?</p> <p>What kind of damage does an earthquake cause?</p> <p>What can be done to increase earthquake safety and reduce earthquake damage?</p> <p>What are the epicenter and focus of an earthquake?</p> <p>How is the epicenter located?</p>	<p>plate motion push or pull the crust so much that the crust breaks.</p> <p>Over millions of years, the forces of plate movement can change a flat plain into landforms, such as mountains and plateaus.</p> <p>Seismic waves carry energy from an earthquake away from the focus, through Earth's interior, and across the surface.</p> <p>The most common way of measuring an earthquake in by using the Richter Scale.</p> <p>During an earthquake, seismic waves cause the seismograph's drum to vibrate, but the suspended weight with pen attached moves very little, therefore the pen stays in place and record's the drum's vibrations.</p> <p>To monitor faults, geologists have developed instruments to measure changes in elevation, tilting of land surface, and ground fault movements. Seismographs and fault monitoring devices provide data used to map faults and detect changes in faults. Geologists are also trying to use this data to develop a method to predict earthquakes.</p> <p>Geologists can determine earthquake risk by locating where faults are active and where past earthquakes have occurred.</p> <p>Causes of earthquake damage include shaking, liquefaction,</p>		<p>Given an US map and seismic information, students will locate the epicenter of an earthquake.</p>	

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			<p>aftershocks, and tsunamis.</p> <p>The best way to protect yourself is to drop, cover, and hold.</p> <p>To reduce earthquake damage, new buildings must be made stronger and more flexible. Older buildings may be modified to withstand stronger earthquakes. The focus of an earthquake is the point inside the earth where the earthquake originates.</p> <p>The epicenter is the area on the surface of the Earth that receives earthquake waves.</p>			
Volcanoes	<p>Volcanoes and plate tectonics</p> <p>Properties of magma</p> <p>Volcanic eruptions</p> <p>Volcanic land forms</p>	<p>Where are most of Earth's volcanoes found?</p> <p>How do hotspot volcanoes form?</p> <p>Why is it helpful to know the physical and chemical properties of a substance?</p> <p><u>Basic information</u></p> <p>What causes some liquids to flow more easily than others?</p> <p>What factors determine the viscosity of magma?</p> <p>What happens when a volcano erupts?</p> <p>What are the two types of volcanic eruptions?</p> <p>What are a volcano's stages</p>	<p>Volcanic belts form along the boundaries of Earth's plates.</p> <p>A volcano forms above a hotspot when magma erupts through the crust and reaches the surface.</p> <p>Each substance has a particular set of physical and chemical properties. These properties can be used to identify a substance or predict how it will behave.</p> <p>Because liquids differ in viscosity, some liquids flow more easily than others.</p> <p>The viscosity of magma depends on its silica content and temperature.</p> <p>When a volcano erupts, the force of the expanding gasses pushes magma from the magma chamber through the pipe until it flows or explodes out the vent.</p> <p>Geologists classify volcanic</p>	Discover if there is a pattern in the locations of earthquakes and volcanoes.	Test/Alternate Assessment	NOV

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		<p>of activity?</p> <p>How far can volcanic ash travel?</p> <p>What are the positive and negative effects of a major release of volcanic ash?</p> <p>What landforms do lava and ash create?</p> <p>How does magma that hardens beneath the surface create landforms?</p> <p>What other distinctive features occur in volcanic areas?</p>	<p>eruptions as quiet or explosive.</p> <p>Geologists often use the terms active, dormant, or extinct to describe a volcano's stage of activity.</p> <p>Positive – ash causes the refraction of sunlight, creating more colorful sunrises and sunsets.</p> <p>Negative – health problems (short and long term – asthma attacks and lung cancers).</p>			
Weathering and soil formation	<p>Rocks and weathering</p> <p>How soil forms</p> <p>Soil conservation</p>	<p>How do weathering and erosion affect Earth's surface?</p> <p>What are the causes of mechanical weathering and chemical weathering?</p> <p>What determines how fast weathering occurs?</p> <p>What is soil made of and how does it form?</p> <p>How do scientists classify soils?</p>	<p>Weathering and erosion work together continuously to wear down and carry away the rocks at Earth's surface.</p> <p>The causes of mechanical weathering include freezing and thawing, release of pressure, plant growth, actions of animals, and abrasion.</p> <p>The causes of chemical weathering include the action of water, oxygen, carbon dioxide, living organisms, and acid rain.</p>	Identify which size particles in soil provide the greatest porosity and permeability.	<p>Use long tubes, each containing different sized beads to observe porosity and permeability.</p> <p>Field trip to Howe Caverns</p> <p>Use shale rocks to demonstrate the freeze-thaw effect of weathering.</p>	<p>NOV</p> <p>DEC</p>

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		<p>What are the roles of plants and animals in soil formation?</p> <p>Why is soil a valuable resource?</p> <p>How can soil lose its value?</p> <p>What are some ways that soil can be conserved?</p>	<p>The most important factors that determine the rate at which weathering occurs are the types of rocks and the climate.</p> <p>Soil is a mixture of particles, minerals, decayed organic material, water and air.</p> <p>Soil forms as rock – is broken down by weathering and mixes with other materials on the surface. Soil is constantly being formed wherever bedrock is exposed.</p> <p>Scientists classify the different types of soil into different groups based on climate, plants, and soil composition.</p> <p>Some soil organisms make humus, the material that makes soil fertile. Other organisms mix with the soil and make spaces in it for air and water.</p> <p>Soil is one of Earth’s most valuable natural resources because everything that lives on land, including humans, depends directly or indirectly on soil.</p> <p>The value of soil is reduced when soil loses its fertility and when topsoil is lost due to erosion.</p> <p>Soil can be conserved through contour plowing, conservation plowing, and crop rotation.</p>		<p>Students create an illustrated rock book of three different types of rock.</p>	
Erosion and deposition	<p>Changing Earth surface</p> <p>Water erosion</p> <p>The force of moving</p>	<p>What processes wear down and build up Earth’s surface?</p> <p>What causes the different types of mass movement?</p>	<p>Weathering, erosion, and deposition act together in a cycle that wears down and builds up Earth’s surface.</p> <p>Gravity causes mass movement,</p>	<p>Explore the current flow of a river or stream.</p>	<p>Walking field trip to stream on Route 22 (Cherry Plain) to view the effects of erosion, deposition, and</p>	<p>DEC</p>

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	<p>water</p> <p>Glaciers</p> <p>Waves</p> <p>Wind</p>	<p>What process is mainly responsible for shaping the surface of the land?</p> <p>What features are formed by water erosion and deposition?</p> <p>What causes groundwater erosion?</p> <p>What enables water to do work?</p> <p>How does sediment enter rivers and streams?</p> <p>What factors affect a river's ability to erode and carry sediment?</p> <p>What are the two kinds of glaciers?</p> <p>How does a valley glacier form and move?</p> <p>How do glaciers cause erosion and deposition?</p> <p>What gives waves their energy?</p> <p>How do waves erode a coast?</p> <p>What features result from deposition by waves?</p> <p>How does wind cause erosion?</p> <p>What features result from deposition by wind?</p>	<p>including landslides, mud flows, slump, and creep.</p> <p>Moving water is the major agent of erosion that has shaped Earth's land surface.</p> <p>Through erosion, a river creates valleys, waterfalls, flood plains, meanders, and oxbow lakes.</p> <p>Deposition/Deposits create alluvial fans and deltas. Can also add soil to a river's flood plain.</p> <p>Groundwater can cause erosion through a process of chemical weathering.</p> <p>As gravity pulls water down a slope, the water's potential energy changes to kinetic energy.</p> <p>Most sediment washes or falls into a river as a result of mass movement and runoff.</p> <p>A river's slope, volume of flow, and shape of its stream bed all affect how fast a river flows and how much sediment it can erode.</p> <p>There are two kinds of glaciers: continental and valley.</p> <p>Glaciers can only form in an area where more snow falls than melts. Once the depth of snow and ice reaches more than 30-40 m, gravity begins to pull the glacier downhill.</p> <p>Two processes by which glaciers erode the land: plucking and abrasion.</p>		<p>stream velocity.</p>	

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			<p>When a glacier melts, it deposits a sediment it eroded from the land, creating various landforms.</p> <p>The energy in waves comes from wind that blows across the water's surface.</p> <p>Waves shape the coast through erosion, by breaking down rock and transporting sand and other sediment.</p> <p>Waves shape a coast when they deposit sediment.</p> <p>Wind causes erosion by deflation and abrasion.</p> <p>Wind erosion and deposition may form sand dunes and loess deposits.</p>			
A Trip Through Geological Time	Fossils Relative age of rocks Radioactive dating Geological time scale Early Earth Eras of Earth history	How do fossils form? What are the different kinds of fossils? What does the fossil record tell about organisms and environments of the past? What the Law of Superposition? How do geologists determine the relative age of rocks? How are index fossils useful to geologists? What can be learned from radioactive dating? Why is geological time scale	Most fossils form when living things die and are buried by sediments. The sediments slowly harden into rock and preserve the shapes of the organisms. Fossils found in rock include the remains of organisms, preserved in tar, amber, or ice. The fossil record provides evidence about the history of life and past environment on Earth. The fossil record also shows that different groups of organisms have changed over time. According to the Law of Superposition, in horizontal sedimentary rock layers, the oldest layer is at the bottom. Each higher layer is younger than the layer	Use fossils and geologic features to determine the relative ages of rock layers.	Students make their own fossils (models).	JAN

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		<p>used to show Earth's history (Hx).</p> <p>What are the different units of geologic time?</p> <p>When did Earth form?</p> <p>How did Earth's physical features develop during Precambrian time?</p> <p>What were early Precambrian organisms like?</p> <p>What were the major events during the Paleozoic era?</p> <p>What were the major events in the Mesozoic era?</p> <p>What were the major events in the Cenozoic era?</p>	<p>below it.</p> <p>To determine relative age, geologists also study extrusions and intrusions in igneous rock, faults and gaps in the geologic record.</p> <p>Index fossils are useful because they tell the relative age of the rock layers in which they occur.</p> <p>During radioactive decay, the atoms of one element breakdown to form atoms of another.</p> <p>Geologists use radioactive dating to determine the absolute ages of rocks.</p> <p>Geologists use the geologic time scale to show the time span of Earth's history.</p> <p>After Precambrian time, the units of the geological time scale are eras and periods.</p> <p>Scientists hypothesize that Earth formed at the same time as the other planets and the sun – about 4.6 billion years ago.</p> <p>During early Precambrian time, an atmosphere, oceans, and continents formed.</p> <p>Scientists have found fossils of single-celled organisms in rocks that formed about 3.5 billion years ago.</p> <p>At the beginning of the Paleozoic era, many different organisms evolved.</p>	<p>Use Reference Tables</p> <p>Dichotomous Key activity</p>		<p>JAN</p>

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			During the Permian period, about 260 million years ago, the supercontinent Pangaea formed.			
Energy Resources	<p>Fossil fuels</p> <p>Renewable sources of energy</p> <p>Nuclear energy</p> <p>Energy conservation</p>	<p>How do fuels provide energy?</p> <p>What are the three major fossil fuels?</p> <p>Why are fossil fuels considered non-renewable resources?</p> <p>What forms of energy does the sun provide?</p> <p>What are some renewable sources of energy?</p> <p>What happens during a nuclear fission reaction?</p> <p>How does a nuclear power plant produce electricity?</p> <p>How does a nuclear fission reaction occur?</p> <p>What are two ways to preserve our current energy sources?</p>	<p>When fuels are burned, the chemical energy that is released, can be used to generate another form of energy, such as heat, light, motion, or electricity.</p> <p>The three major fossil fuels: coal, oil, and natural gas.</p> <p>Since fossil fuels take hundreds of millions of years to form, they are considered non-renewable resources.</p> <p>The sun constantly gives off energy in the form of heat and light.</p> <p>In addition to solar energy, renewable sources of energy include water, wind, biomass fuels, geothermal, and hydrogen.</p> <p>Fission vs. Fusion</p> <p>Definitions</p> <p>Wastes</p> <p>Fission – splitting atoms, with a resultant release of energy.</p> <p>Fusion – joining atoms to create new ones, with a resultant release of energy.</p> <p>One way to preserve our current energy resources is to increase the efficiency of our energy use.</p>		<p>Test/Alternate Assessment</p> <p>Activity: Snowflake Impressions</p>	JAN

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			Another way is to conserve energy whenever possible.			
Ocean Motions	Wave action Tides Ocean water chemistry Currents & climate	<p>How does a wave form?</p> <p>How do waves change near the shore?</p> <p>How do waves affect shorelines &amp; beaches?</p> <p>What affects the heights of tides?</p> <p>How are tides a source of energy?</p> <p>How salty is ocean water?</p> <p>How do the temperature &amp; gas content of ocean water vary?</p> <p>How do conditions in the ocean change with depth?</p> <p>What causes surface <u>currents</u> &amp; how do they affect climate?</p> <p>What causes deep currents and what effects do they have?</p> <p>How does <u>upwelling</u> affect the distribution of nutrients in the ocean?</p>	<p>Most waves form when winds blowing across the water's surface transmit their energy to the water.</p> <p>Near shore, wave height increases &amp; wavelength decreases.</p> <p>As waves come ashore, water washes up the beach at an angle, carrying sand grains. The water &amp; sand then run straight back down the beach.</p> <p>Waves shape a beach by eroding the shore in some places &amp; building it back up in others.</p> <p>Tides are caused by the interaction of Earth, the moon, &amp; the sun.</p> <p>Changes in the positions of Earth, the moon, and the sun affect the heights of the tides during a month.</p> <p>The movement of huge amounts of water b/w high and low tides during a month is a source of potential energy.</p> <p>On average, one kilogram of ocean water contains about 35 g or salts.</p> <p>Like temperatures on land, temperatures at the surface of the ocean vary with location and the seasons. Gases in ocean water vary as well.</p> <p>As you descend through the ocean, the water temperature decreases. Pressure increases continuously with depth in the ocean.</p>	<p>Model the movement of ocean water due to surface currents.</p> <p>Determine how to use data to determine the shape of the ocean floor.</p>	<p>Test/Alternate Assessment</p> <p>Chapter Project</p>	<p>FEB</p> <p>MAR</p>

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			<p>Surface currents, which affect water to a depths. Of several hundred meters, are driven mainly by winds.</p> <p>A surface current warms or cools the air above it, influencing the climate of the land near the coast.</p> <p>Deep currents are caused by differences in the density of ocean water. Deep currents move and mix water around the world. [Convection cells] They carry cold water from the poles toward the equator.</p> <p>Upwelling brings up tiny ocean organisms, minerals, &amp; other nutrients from the deeper layers of the water. Without this motion, the surface waters of the open ocean would be very scarce in nutrients.</p>			
Ocean Zones	<p>Exploring the ocean</p> <p>Ocean habitats</p> <p>Resources in the ocean</p>	<p>For what reasons have people studied the ocean?</p> <p>What are the main sections of the ocean floor?</p> <p>What are the differe3nt ocean zones?</p> <p>How are marine organisms classified?</p> <p>What conditions must organisms in the intertidal zone tolerate?</p> <p>What are the conditions in the neritic zone?</p> <p>What are the conditions in the open ocean?</p>	<p>People have studied the ocean since ancient times b/c the ocean provides food and serves as a route for trade and travel.</p> <p>Modern scientists have studied the characteristics of the ocean's waters and the ocean floor.</p> <p>If you could travel along the ocean floor, you would see the continental shelf, the continental slope, the abyssal plain, and the mid-ocean ridge.</p> <p>Ocean zones include: intertidal, neritic, and open-ocean.</p> <p>Scientists classify marine organisms according to where they live &amp; how they move.</p>		Test/Alternate Assessment	MAR

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		<p>How do people use living resources from the ocean?</p> <p>What are some nonliving ocean resources?</p> <p>What are the sources of ocean pollution?</p>	<p>Organisms that live in the intertidal zones must be able to tolerate changes in both salinity &amp; temperature of the water, as well as periods of being underwater &amp; periods of being exposed to air.</p> <p>The shallow water of the neritic zone receives sunlight and a steady supply of nutrients from the land.</p> <p>The light and nutrients enable large plantlike algae to grow. Coral reefs can form only in shallow, tropical ocean water. Kelp forests grow in cold, neritic waters where the ocean has a rocky floor.</p> <p>The open ocean differs from the neritic zone in 2 important ways. First, only a small part of the open ocean receives sunlight. Second, the water has fewer nutrients.</p> <p>People depend heavily on fishes (grammar: fish = one kind; fishes = more than one kind) &amp; other ocean organisms for food. Ocean organisms also provide materials that are used in products such as detergents &amp; paints.</p> <p>Some nonliving ocean resources include water, fuels, and minerals.</p> <p>Although some ocean pollution is the result of natural occurrences, most pollution is related to human activities.</p>		<p>Possibly tour a landfill</p>	

Main General Topic	Sub-Topic	Essential Questions	What The Student Will Know	What The Student Will Be Able To Do	Assessments & Activities	When The Student Does It
Atmosphere	Air around you Air pressure Layers of atmosphere Air quality	<p>What is the composition of Earth's atmosphere?</p> <p>How is the atmosphere important to living things?</p> <p>What are some of the properties of air?</p> <p>What instruments are used to measure air pressure?</p> <p>How does increasing altitude affect air pressure and density?</p> <p>What are the four MAIN layers of the atmosphere?</p> <p>What are the characteristics of each layer?</p> <p>What are the major sources of air pollution?</p> <p>What causes smog and acid rain?</p> <p>What can be done to improve air quality?</p>	<p>Earth's atmosphere is made up of nitrogen, oxygen, carbon dioxide, water vapor, and many other gasses, as well as particles of liquids and solids.</p> <p>Earth's atmosphere makes conditions on Earth suitable for living beings.</p> <p>Because air has mass, it also has density and pressure.</p> <p>Two common kinds of barometers are mercury and aneroid.</p> <p>Air pressure decreases as altitude increases. As air pressure decreases, so does density.</p> <p>Scientists divide Earth's atmosphere into 4 main layers, classified according to changes in temperature.</p> <p>THESE LAYERS ARE:</p> <p><u>TROPOSPHERE</u> <u>STRATOSPHERE</u> <u>MESOSPHERE</u> <u>THERMOSPHERE</u></p> <p>Troposphere – layer where Earth's weather occurs.</p> <p>Stratosphere – contains the ozone layer.</p> <p>Mesosphere – protects the Earth's surface from being hit by most meteors.</p> <p>Thermosphere – outermost layer of</p>	<p>Discover how a barometer detects changes in air pressure.</p> <p>Discover what is causing the "hole" in the ozone layer and what is being done about it.</p> <p>Pronunciation</p>	<p>Test/Alternate assessment</p> <p>Chapter project</p> <p>Density of soda compared with water</p> <p>Food coloring dropped in water.</p>	<p>MAR</p> <p>APR</p>

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			<p>atmosphere.</p> <p>Some air pollution occurs naturally. But many types of air pollution are the result of human activities.</p> <p>Burning fossil fuels can cause smog and acid rain.</p> <p>In the U.S. the federal and state governments have passed laws and regulations to reduce air pollution.</p>			
Weather Factors	<p>Energy in Earth's atmosphere</p> <p>Heat transfer</p> <p>Winds</p> <p>Water in the atmosphere</p> <p>Precipitation</p>	<p>In what form does energy, from the sun, travel to the Earth?</p> <p>What happens to the sun's energy when it reaches Earth?</p> <p>How is temperature measured?</p> <p>In what three ways is heat transferred.</p> <p>How is heat transferred in the atmosphere?</p> <p>What causes winds?</p> <p>How do local winds and global winds differ?</p> <p>Where are the major global wind belts located?</p> <p>What is humidity and how is it measured?</p> <p>How do clouds form?</p> <p>What are the three main types of clouds?</p>	<p>Most energy from the sun travels to the Earth in the form of visible light and infrared radiation. A small amount arrives as Ultraviolet radiation.</p> <p>Some sunlight is absorbed or reflected by the atmosphere before it can reach the surface; the rest passes through to the surface.</p> <p>When the surface is heated, it radiates energy back into the atmosphere as infrared radiation.</p> <p>Air temperature is usually measured with a thermometer.</p> <p>Heat is transferred by radiation, conduction, and convection.</p> <p>Radiation, conduction, and convection work together to heat the troposphere.</p> <p>Winds are caused by differences in air pressure.</p> <p>Local winds are caused by unequal heating of Earth's surface within a small area.</p>	<p>Visit a greenhouse: Zema's in Stephentown?</p>	<p>Test/Alternate assessment</p> <p>Chapter project</p> <p>Morning weather forecasts (A.M. announcements)</p>	APR

Main General Topic	Sub-Topic	Essential Questions	What The Student Will Know	What The Student Will Be Able To Do	Assessments & Activities	When The Student Does It
		<p>What are the common types of precipitation?</p> <p>How is precipitation measured?</p>	<p>Like local winds, global winds are created by the unequal heating of the Earth's surface. But, unlike local winds, global winds occur over a large area.</p> <p>The major global wind belts are the Trade Winds, the Polar Easterlies, and the Prevailing Westerlies.</p> <p>Relative humidity can be measured with a psychrometer.</p> <p>Clouds form when water vapor in the air condenses to form liquid water or ice crystals.</p> <p>Scientists classify clouds based on their shape and altitude: cirrus, cumulous, and stratus.</p> <p>Common types of precipitation are: Rain, sleet, freezing rain, snow, and hail.</p> <p>Scientists measure precipitation with various instruments: rain gauges and measuring sticks.</p>			
Weather Patterns	<p>Air masses and fronts</p> <p>Storms</p> <p>Predicting weather</p>	<p>What are the major types of air masses in North America and how do they move?</p> <p>What are the main types of fronts?</p> <p>What type of weather is associated with cyclones and anti-cyclones?</p> <p>What are the main kinds of storms and how do they form?</p> <p>What measures can you take</p>	<p>Four major types of air masses influence the weather in North America: maritime tropical, continental tropical, maritime polar, and continental polar.</p> <p>In the continental U.S., air masses are commonly moved by the Prevailing Westerlies and Jet Streams.</p> <p>Colliding air masses can form four different types of fronts: cold, warm, stationary, and occluded.</p> <p>Cyclones and decreasing air</p>	<p>Predict when and where a hurricane will come ashore.</p> <p>Determine how a weather map communicates data.</p>	<p>Test/alternate assessment</p> <p>Chapter project</p> <p>Tornado tube lab</p> <p>Visit from Steve La Pointe, CBS6</p> <p>Trip to the National Weather Service – Albany, NY</p>	<p>APR</p> <p>MAY</p>

Main General Topic	Sub-Topic	Essential Questions	What The Student Will Know	What The Student Will Be Able To Do	Assessments & Activities	When The Student Does It
		<p>to ensure safety in a storm?</p> <p>How do weather forecasts predict the weather?</p> <p>How has technology helped to improve weather forecasts?</p> <p>What can be learned from the information on weather maps?</p>	<p>pressure are associated with clouds, wind, and precipitation. Dirt devils and snow devils.</p> <p>Descending air in an anti-cyclone generally causes dry, clear weather.</p> <p>Thunderstorms form in large cumulonimbus clouds.</p> <p>During thunderstorms, avoid places where lightning may strike. What causes thunder? What is lightning? Also avoid objects that conduct electricity – metal objects and bodies of water.</p> <p>Tornadoes – most commonly develop in thick, cumulonimbus clouds.</p> <p>The safest place during a tornado is in a storm shelter or basement of a well-built building.</p> <p>A hurricane begins over warm ocean water as a low pressure area or tropical disturbance.</p> <p>If you hear a hurricane warning and are told to evacuate, leave the area immediately.</p> <p>All year round, most precipitation begins in clouds as snow.</p> <p>If you are caught in a snowstorm, try to find shelter from the wind.</p> <p>Meteorologists use maps, charts, and computers, to analyze weather data and to prepare weather forecasts.</p>			

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			<p>Technological improvements in gathering weather data and using computers have improved the accuracy of weather forecasting.</p> <p>Standard symbols on weather maps show fronts, areas of high and low pressure, types of precipitation, and temperature.</p>			
Climate and Climate Change	<p>What causes climate?</p> <p>Climate regions</p> <p>Long term changes in climate</p> <p>Global changes in the atmosphere</p>	<p>What factors influence temperature?</p> <p>What factors influence precipitation?</p> <p>What causes the seasons?</p> <p>What factors are used to classify climates?</p> <p>What are the six main climate regions?</p> <p>What principle do scientists follow in studying ancient climates?</p> <p>What changes occur on Earth's surface during an ice age?</p> <p>What factors can cause climate change?</p> <p>What events can cause short-term climate change?</p> <p>How might human activities be affecting the temperature of Earth's atmosphere?</p> <p>How have human activities affected the ozone layer?</p>	<p>Main factors influencing temperature are latitude, altitude, distance from large bodies of water, and ocean currents.</p> <p>Main factors influencing precipitation are prevailing winds, the presence of mountains, and seasonal winds.</p> <p>The seasons are caused by the tilt of the Earth's axis as the Earth travels around the sun.</p> <p>Scientists classify climates according to two major factors: temperature and precipitation.</p> <p>Six main climate regions: tropical rainy, dry, temperate maritime, temperate continental, polar, and highlands.</p> <p>The tropics have two types of rainy climates: tropical wet and tropical wet and dry.</p> <p>Dry climates can be arid and semi-arid climates.</p> <p>Three kinds of temperate marine climates: marine west coast, humid sub-tropical, and Mediterranean.</p> <p>Temperate continental climates are</p>	<p>Graph and interpret data about the best time of year to visit various cities to enjoy particular recreational activities.</p> <p>Mountains in Colorado and California.</p>	Test/Alternate assessment	MAY

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			<p>only found on continents in the Northern Hemisphere and include humid continental and sub-arctic.</p> <p>Polar climate is the coldest climate region and includes the ice cap and tundra climates.</p> <p>Temperature falls as altitude increases so highland regions are colder than regions that surround them.</p>			
Earth, Moon, and Sun	<p>Earth in space</p> <p>Gravity and motion</p> <p>Phases, eclipses, and tides</p> <p>Earth's moon</p> <p>Traveling into space</p>	<p>How does Earth move in space?</p> <p>What causes the cycle of seasons on Earth?</p> <p>What determines the strength of force of gravity between two objects?</p> <p>What two factors combine to keep the moon and Earth in orbit?</p> <p>What causes the phases of the moon?</p> <p>What are solar and lunar eclipses?</p> <p>What causes the tides?</p> <p>What features are found on the moon's surface?</p> <p>What are some characteristics of the moon?</p> <p>How did the moon form?</p> <p>How does a rocket work?</p>	<p>Earth moves through space in two major ways: rotation and revolution.</p> <p>Earth has seasons because its axis is tilted as it revolves around the sun.</p> <p>The strength of the force of gravity between two objects depends on: the masses of the objects and the distance between them.</p> <p>Newton concluded that: inertia and gravity combine to keep Earth and the moon in their orbits.</p> <p>Changing relative positions of the moon, Earth, and sun, causes the phases of the moon, eclipses, and tides.</p> <p>The phase of the moon that you see depends on how much of the sunlit side of the moon faces Earth.</p> <p>A solar eclipse occurs when the moon passes directly between the Earth and the sun.</p> <p>During a lunar eclipse, Earth blocks sunlight from reaching the moon.</p>		<p>Test/Alternate Assessment</p> <p>Computer project to create eclipse models</p>	<p>MAY</p> <p>JUN</p>

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		<p>What is the main advantage of a multi-stage rocket?</p> <p>What was the space race and what were the major events in the human exploration of the moon?</p> <p>What are the roles of the space shuttles, space station, and space probes?</p>	<p>Tides are caused mainly by differences in how much the moon's gravity pulls on different parts of the Earth.</p> <p>Features on the moon's surface include maria, craters, and highlands.</p> <p>The moon is dry and airless. Compared to the Earth, the moon is small and has large variations in its surface temperature.</p> <p>Scientists theorize that a planet-sized object collided with Earth to form the moon.</p> <p>A rocket moves forward when gasses shooting out of the back of the rocket push it in the opposite direction.</p> <p>The main advantage of a multi-stage rocket is that the total weight of the rocket is greatly reduced as the rocket rises.</p> <p>The rivalry between the U.S. and the Soviet Union over the exploration of space was known as the Space Race.</p> <p>The American effort to land astronauts on the moon was named the Apollo program.</p> <p>NASA has used space shuttles to perform many important tasks. These include taking satellites and carrying astronauts and equipment to and from space stations.</p>			