

COURSE: General Science
Grade Level: 9

MAIN/ GENERAL TOPIC	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW:	WHAT THE STUDENT WILL BE ABLE TO DO:	Assessments:	WHEN STUDENT DOES IT:
Intro. To Earth Science NYS standard 1 Analysis, Inquiry, & Design	What is Science?	-What skills at attributes do scientists use to learn about the world? -What is scientific inquiry? -How do scientific theories differ from scientific laws?	-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	Construct scale models Discover how to speed up evaporations	test	September
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 represent elevation, relief, and slope?	-The topography of an area includes the area's elevation, relief, & landforms -there are 3 main types of landforms: plains, mountains, plateaus -Maps & globes are drawn to scale & use symbols to represent topography & other features on Earth's surface -the equator and prime meridian are the baselines for measuring distances on Earth's surface; lines of latitude & longitude form a grid that can be used to find locations anywhere on Earth -3 common projections are: Mercator, equal-area, & conic -with computers, mapmakers can store, process & display map data electronically - computers produce maps using data from many sources, such as, satellites & GPS -mapmakers use contour lines to represent elevation, relief, and slope on topographic maps	Know the importance of lines of latitude & longitude & 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 Chapter project	September October
Minerals	-Properties of minerals -How minerals form	-What is a mineral? -How are minerals identified? -How do minerals form from magma and lava? -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	Compare the density of different minerals. Discover the effect minerals in toothpaste have on the toothpaste's ability to clean.	test	October

			<p>occurs</p> <ul style="list-style-type: none"> -minerals are the source of gemstones, metals, & 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 & mined. Then the rock must be processed to extract the metal. 			
Rocks	<ul style="list-style-type: none"> -classifying rocks -igneous rocks -sedimentary rocks -rocks from reefs -metamorphic rocks -rock cycle 	<ul style="list-style-type: none"> -What characteristics do geologists use to identify rocks? -What are the 3 main groups of rocks? -What characteristics are used to classify igneous rocks? -How are igneous rocks used? -How do sedimentary rocks form? -What are the 3 major types of sedimentary rocks? -How are sedimentary rocks used? -How do coral reefs form? -What evidence do limestone deposits from coral reefs provide about Earth's history? -Under what conditions do metamorphic rocks form? -How do geologists classify metamorphic rocks? -How are metamorphic rocks used? 	<ul style="list-style-type: none"> -when studying a rock sample, geologists observe the rock's mineral composition, color, & texture. -3 major rock groups: igneous, sedimentary, metamorphic -igneous rocks are classified by their origin, texture, & mineral composition -igneous rocks have been used to make tools and building materials -most sedimentary rocks are formed through a series of processes; erosion, deposition, compaction, & cementation -3 major sedimentary rock groups: clastic, organic, & chemical -sedimentary rocks have been used as building materials & tools -when coral animals die, their skeletons remain, more corals build on top of them, gradually forming a reef -limestone deposits that began as coral reefs provide evidence of how Earth's surface has changed. These deposits also provide evidence of past environments -Heat pressure, deep beneath Earth's surface can change any rock into metamorphic rock -geologists classify metamorphic rock according to the arrangement of the grain that makes up the rocks. -certain metamorphic rocks are used for building and sculpture -forces deep inside Earth & at the surface produce a slow cycle that builds, destroys, and changes rocks in the crust 	Identify the different types of rocks	<p>Test</p> <p>Make a collection of rocks in your area</p>	<p>October</p> <p>November</p>

<p>Plate Tectonics</p>	<p>-Earth's Interior -Convection & the Mantle -Drifting Continents -Sea-Floor Spreading -Theory of Plate Tectonics</p>	<p>-How have geologists learned about Earth's inner structure? -What are the characteristics of Earth's crust, mantle, & core? -How is heat transferred? -What causes convection currents in Earth's mantle? -What was Alfred Wegener's hypothesis about the continents? -What evidence supported Wegener's hypothesis? -Why was Wegener's hypothesis rejected by most scientists of his day? -What is the process of sea-floor spreading? -What is the evidence for sea-floor spreading? -What happens at deep-ocean trenches? -What is the theory of plate tectonics? -What are the three types of plate boundaries?</p>	<p>-Geologists have used 2 main types of evidence to learn about Earth's interior: direct-from rock samples & indirect-from seismic waves -Three main layers of Earth vary in size, composition, temperature, & pressure -crust: layer of solid rock including dry land & ocean floor -mantle: very hot, solid rock-divided into layers based on physical characteristics -Core: mostly metals iron and nickel. Liquid outer core and solid inner core -heat transfer: radiation, conduction, convection -heating & cooling of fluid, changes in the fluid's density, and the force of gravity combine to set convection currents into motion -heat from the core & mantle cause convection currents in the mantle -Wegener's hypothesis was that all continents had once been joined in a single landmass & have since drifted apart -Wegener gathered evidence from different scientific fields to support his idea of continental drift. He studied fossils, land features, & evidence of climate change -Wegener couldn't provide a satisfactory answer for the force that pushes or pulls the continents -in sea-floor spreading, the sea floor 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 -several types of evidence supported Hess's theory of sea-floor spreading; eruption of molten material, magnetic stripes in the rocks of the ocean floor, and ages of the rocks -in a process taking tens of millions of years, part of the ocean floor sinks back into the mantle at deep-ocean trenches -the theory of plate tectonics explains the formation, movement, and subduction of Earth's plates -3 plate boundaries: divergent, convergent, transform</p>	<p>Predict what Earth will look like as students map the movement of the continents</p>	<p>test</p>	<p>November</p>
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Earthquakes	<ul style="list-style-type: none"> -Forces in Earth's Crust -Earthquakes & seismic waves -Monitoring Earthquakes -Earthquake safety 	<ul style="list-style-type: none"> -How does stress in the crust change Earth's surface? -Where are faults usually found, & why do they form? -What land features result from the forces of plate movements? -How does the energy of an earthquake travel through Earth? -What are the scales used to measure the strength of an earthquake? -How do scientists locate the epicenter of an earthquake? -How do seismographs work? -How do geologists monitor faults? -How are seismographic data used? -How do geologists determine earthquake risk? -What kinds of damage does an earthquake cause? -What can be done to increase earthquake safety and reduce earthquake damage? 	<ul style="list-style-type: none"> -Tension, compression, & shearing work over millions of years to change the shape & volume of rock. -Faults usually occur along plate boundaries, where the forces of plate motion push or pull the crust so much the crust breaks: normal, reverse, & strike-slip faults form. -Over millions of years, the forces of plate movement can change a flat plain into landforms such as anticlines, synclines, folded & fault-block mountains, & plateaus. -Seismic waves carry energy from an earthquake away from the focus, through Earth's interior, & across the surface. -3 commonly used ways of measuring earthquakes are: Mercalli, Richter, & moment magnitude scales. -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 & records the drums vibrations. -To monitor faults, geologists have developed instruments to measure changes in elevation, tilting of land surface, & ground fault movements -Seismographs & fault-monitoring devices provide data used to map faults & detect changes in faults. Geologists are also trying to use these data to develop a method to predict earthquakes. -Geologists can determine earthquake risk by locating where faults are active & where past earthquakes have occurred. -Cause of earthquake damage include shaking, liquefaction, aftershocks, & tsunamis. -The best way to protect yourself is to drop, cover, and hold. -To reduce earthquake damage, new buildings must be made stronger and more flexible. Older buildings may be modified to withstand stronger quakes. 	Locate and earthquakes epicenter	test	November
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Volcanoes	<ul style="list-style-type: none"> -volcanoes & plate tectonics -properties of magma -Volcanic eruptions -volcanic landforms 	<ul style="list-style-type: none"> -Where are most of Earth's volcanoes found? -How do hot spot volcanoes form? -Why is it helpful to know the physical and chemical properties of a substance? -What causes some liquids to flow more easily than others? -What factors determine the viscosity of magma? -What happens when a volcano erupts? -What are the two types of volcanic eruptions? -What are a volcano's stages of activity? - What landforms do lava & ash create? -How does magma that hardens beneath the surface create landforms? -What other distinctive features occur in volcanic areas? 	<ul style="list-style-type: none"> -Volcanic belts form along the boundaries of Earth's plates -A volcano forms above a hot spot when magma erupts through the crust & reaches the surface -Each substance has a particular set of physical & chemical properties. These properties can be used to identify a substance or predict how it will behave -Because liquids differ in viscosity, some liquids flow more easily than others -The viscosity of magma depends upon its silica content and temperature -When a volcano erupts, the force of the expanding gases pushes magma from the magma chamber through the pipe until it flows or explodes out the vent -Geologists classify volcanic eruptions as quiet or explosive -geologists often use the terms active, dormant, or extinct to describe a volcano's stage of activity 	Discover if there is a pattern in the locations of earthquakes and volcanoes.	Test	November
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<p>Weathering & Soil Formation</p>	<p>-rocks & weathering -how soil forms -soil conservation</p>	<p>-How do weathering & erosion affect Earth's surface? -What are the causes of mechanical weathering and chemical weathering? -What determines how fast weathering occurs? -What is soil made of & how does it form? -How do scientists classify soils? -What is the role of plants & animals in soil formation? -Why is soil a valuable resource? -How can soil lose its value? -What are some ways that soil can be conserved?</p>	<p>-Weathering & erosion work together continuously to wear down & carry away the rocks at Earth's surface. -The causes of mechanical weathering include freezing & thawing, release of pressure, plant growth, actions of animals, & abrasion -The causes of chemical weathering include the action of water, oxygen, carbon dioxide, living organisms, and acid rain -The most important factors that determine the rate at which weathering occurs are the type of rock & the climate -soil is a mixture of particles, minerals, decayed organic material, water, and air -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. -Scientists classify the different types of soil into major groups based on climate, plants, & soil composition -some soil organisms make humus, the material that makes soil fertile. Other organisms mix the soil & make spaces in it for air & water -soil is one of Earth's most valuable natural resources b/c everything that lives on land, including humans, depends directly or indirectly on soil -the value of soil is reduced when soil loses its fertility & when topsoil is lost due to erosion -soil can be conserved through contour plowing, conservation plowing, and crop rotation</p>	<p>Test how fast water drains through different types of soil</p>	<p>Test Chapter project</p>	<p>November December</p>
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Erosion & Deposition	<ul style="list-style-type: none"> -Changing Earth's surface -Water erosion -The force of moving water -glaciers -waves -wind 	<ul style="list-style-type: none"> -What processes wear down & build up Earth's surface? -What causes the different types of mass movement? -What process is mainly responsible for shaping the surface of the land? -What features are formed by water erosion & deposition? -What causes groundwater erosion? -What enables water to do work? -How does sediment enter rivers and streams? -What factors affect a river's ability to erode & carry sediment? -What are the two kinds of glaciers? -How does a valley glacier form and move? -How do glaciers cause erosion & deposition? -What gives waves their energy? -How do waves erode a coast? -What features result from deposition by waves? -How does wind cause erosion? -What features result from deposition by wind? 	<ul style="list-style-type: none"> -weathering, erosion, & deposition act together in a cycle that wears down & builds up Earth's surface -Gravity causes mass movement, including landslides, mudflows, slump, and creep -moving water is the major agent of erosion that has shaped Earth's land surface -through erosion, a river creates valleys, waterfalls, flood plains, meanders, and oxbow lakes -depositions create alluvial fans & deltas. It can also add soil to a river's flood plain. -groundwater can cause erosion through a process of chemical weathering -as gravity pulls water down a slope, the water's potential energy changes to kinetic energy -most sediment washes or falls into a river as a result of mass movement & runoff -a river's slope, volume of flow, & shape of its streambed all affect how fast the river flows & how much sediment it can erode -there are two kinds of glaciers: continental and valley -glaciers can form only in an area where more snow falls than melts. Once the depth of snow & ice reaches more than 30-40 meters, gravity begins to pull the glacier downhill -the 2 processes by which glaciers erode the land are plucking and abrasion -when a glacier melts, it deposits the sediment it eroded from the land, creating various landforms -the energy in waves comes from wind that blows across the water's surface -waves shape the coast through erosion by breaking down rock & transporting sand & other sediment -waves shape a coast when they deposit sediment, forming coastal features such as beaches, spits, and barrier beaches -wind causes erosion by deflation & abrasion -wind erosion & deposition may form sand dunes & loess deposits 	Explore the current flow of a river or stream	test	December
A Trip through Geological Time	<ul style="list-style-type: none"> -fossils -relative age of rocks -radioactive dating -Geologic time scale -early Earth -eras of Earth's history 	<ul style="list-style-type: none"> -How do fossils form? -What are the different kinds of fossils? -What does the fossil record tell about organisms & environments of the past? -What is the law of superposition? -How do geologists determine the relative age of rocks? -How are index fossils useful to geologists? -What happens during 	<ul style="list-style-type: none"> -Most fossils form when living things die & are buried by sediments. The sediments slowly harden into rock & preserve the shapes of the organisms. -Fossils found in rock include petrified fossils, molds & casts, carbon films, & trace fossils. Other fossils form when remains of organisms are preserved in tar, amber, or ice. -The fossil record provides evidence about the history of life & past environments 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 layers below it. -To determine relative age, geologists also study 	<p>Use fossils and geologic features to interpret the relative ages of rock layers.</p> <p>Make a model of geologic time.</p>	test	January

		<p>radioactive decay? -What can be learned from radioactive dating? -Why is the geologic time scale used to show Earth's history? -What are the different units of the geologic time scale? -When did Earth form? -How did Earth's physical features develop during Precambrian Time? -What were early Precambrian organisms like? - What were the major events in the Paleozoic era? -What were the major events in the Mesozoic era? -What were the major events in the Cenozoic era?</p>	<p>extrusions & intrusions in igneous rock, faults & gaps in the geologic record. -Index fossils are useful b/c they tell the relative ages of the rock layers in which they occur. -During radioactive decay, the atoms of one element break down to form atoms of another. -Geologists use radioactive dating to determine the absolute ages of rocks. -Geologists use the geologic time scale to show the time span of Earth's history. -After Precambrian time, the units of the geologic time scale are eras & periods -Scientists hypothesize that Earth formed at the same time as the other planets & the sun about 4.6 billion years ago. -During early Precambrian Time, an atmosphere, oceans, & continents formed. -Scientists have found fossil of single-celled organisms in rocks that formed about 3.5 billion years ago. -At the beginning of the Paleozoic Era, many different kinds of organisms evolved. -During the Permian Period, about 260 million years ago, the supercontinent Pangaea formed.</p>			
Energy Resources	<p>-fossil fuels -renewable sources of energy -nuclear energy -energy conservation</p>	<p>-How do fuels provide energy? -What are the 3 major fossil fuels? -Why are fossil fuels considered nonrenewable resources? -What forms of energy does the sun provide? -What are some renewable sources of energy? -What happens during a nuclear fission reaction? -How does a nuclear power plant produce electricity? -How does a nuclear fission reaction occur? -What are 2 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 -The 3 major fossil fuels are coal, oil, & natural gas -Since fossil fuels take hundreds of millions of years to form, they are considered nonrenewable resources -the sun constantly gives off energy in the forms of heat and light -in addition to solar energy, renewable sources of energy include water, wind, biomass fuels, geothermal, & hydrogen - During nuclear fission, when a neutron hits a U-235 nucleus, the nucleus splits apart into 2 smaller nuclei & 2 more neutrons -In a nuclear power plant, the heat released from fission reactions is used to change water into steam. The steam then turns the blades of a turbine to generate electricity. -In nuclear fusion, 2 hydrogen nuclei combine to create a helium nucleus, which has slightly less mass than 2 hydrogen nuclei. The lost mass is converted into energy. -One way to preserve our current energy resources is to increase the efficiency of our energy use. Another way is to conserve energy whenever possible</p>		test	January

Fresh Water	<ul style="list-style-type: none"> -water on Earth -surface water -water underground -using freshwater resources -water to drink 	<ul style="list-style-type: none"> -How does Earth's water move through the water cycle? -Where are fresh water & salt water found on Earth? -What is a river system? -What are the characteristics of ponds & lakes? -What are 3 types of wetlands & why are they important? -How does water move through underground layers of soil & rock? -How do people obtain water from an aquifer? -How do people use water? -What are some ways to conserve available fresh water? -How do scientists classify sources of water pollution? -What factors affect water quality? -Why is drinking water often treated before people drink it? 	<ul style="list-style-type: none"> -In the water cycle, water moves from bodies of water, land, & living things on Earth's surface to the atmosphere & back to Earth's surface. -Most of Earth's water-about 97%- is salt water found in oceans. Only 3% is fresh water. -A river & all its tributaries together make up a river system -in general, ponds are smaller & shallower than lakes. Sunlight usually reaches to the bottom of all parts of a pond. -Lakes are generally bigger & deeper than ponds. Sunlight doesn't reach the bottom of all areas of lakes. -3 common types of freshwater wetlands are marshes, swamps, & bogs -wetlands provide habitats for many living things. Wetlands help people by acting as natural filters and helping to control floods. -water underground trickles down b/w particles of soil & through cracks & spaces in layers of rocks -people can obtain groundwater from an aquifer by drilling a well below the water table -people use water for household purposes, industry, transportation, agriculture, & recreation -reducing water use, recycling water, & reusing water are 3 ways to conserve water -Scientists classify sources of water pollution by how they enter the water -Certain substances can affect the taste or color of water but are usually harmless. Other substances, such as certain chemicals and microorganisms, can be harmful to your health -Water often needs some treatment to ensure that it's clean & safe to drink 	Discover how drought has affected our state over the past century	Test Chapter project	January February
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<p>Ocean Motions</p>	<p>-wave action -tides -ocean water chemistry -currents & climate</p>	<p>-How does a wave form? -How do waves change near the shore? -How do waves affect shorelines & beaches? -What causes tides? -What affects the heights of tides? -How are tides a source of energy? -How salty is ocean water? -How do the temperature & gas content of ocean water vary? -How do conditions in the ocean change with depth? -What causes surface currents & how do they affect climate? -What causes deep currents and what effects do they have? -How does upwelling 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. -Near shore, wave height increases & wavelength decreases. -As waves come ashore, water washes up the beach at an angle, carrying sand grains. The water & sand then run straight back down the beach. Waves shape a beach by eroding the shore in some places & building it back up in others. -Tides are caused by the interaction of Earth, the moon, & the sun. -Changes in the positions of Earth, the moon, and sun affect the heights of the tides during a month. -The movement of huge amounts of water b/w high and low tides is a source of potential energy. -On average, one kilogram of ocean water contains about 35 grams of salts. -Like temperatures on land, temperatures at the surface of the ocean vary with location & the seasons. Gases in ocean water vary as well. -As you descend through the ocean, the water temperature decreases. Pressure increases continuously with depth in the ocean. -Surface currents, which affect water to a depth of several hundred meters, are driven mainly by winds. A surface current warms or cools the air above it, influencing the climate of the land near the coast. -Deep currents are caused by differences in the density of ocean water. Deep currents move and mix water around the world. They carry cold water from the poles toward the equator. -Upwelling brings up tiny ocean organisms, minerals, & 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>	<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 chapter project</p>	<p>February March</p>
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Ocean Zones	<ul style="list-style-type: none"> -exploring the ocean -ocean habitats -resources from the ocean 	<ul style="list-style-type: none"> -For what reasons have people studied the ocean? -What are the main sections of the ocean floor? -What are the different ocean zones? -How are marine organisms classified? -What conditions must organisms in intertidal zones tolerate? What are the conditions in the neritic zone? What are the conditions in the open ocean? -How do people use living resources from the ocean? -What are some nonliving ocean resources? -What are the sources of ocean pollution? 	<ul style="list-style-type: none"> -people have studied the ocean since ancient times; b/c the ocean provides food and serves as a route for trade & travel. Modern scientists have studied the characteristics of the ocean's waters and the ocean floor. -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. -Ocean zones include: intertidal, neritic, and open-ocean -Scientists classify marine organisms according to where they live & how they move. -Organisms that live in the intertidal zones must be able to tolerate changes in both salinity & temperature of the water, as well as periods of being underwater & periods of being exposed to air. -the shallow water of the neritic zone receives sunlight & a steady supply of nutrients from the land. 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. -The open ocean differs from the neritic zone in 2 important ways. 1st only a small part of the open ocean receives sunlight. 2nd the water has fewer nutrients. -People depend heavily on fishes & other ocean organisms for food. Ocean organisms also provide materials that are used in products such as detergents & paints. -Some nonliving ocean resources include water, fuels, and minerals. -Although some ocean pollution is the result of natural occurrences, most pollution is related to human activities. 		test	March
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<p>Atmosphere</p>	<p>-Air around you -air pressure -layers of atmosphere -Air quality</p>	<p>-What is the composition of Earth's atmosphere? -How is the atmosphere important to living things? -What are some of the properties of air? -What instruments are used to measure air pressure? -How does increasing altitude affect air pressure & density? -What are the 4 main layers of the atmosphere? -What are the characteristics of each layer? -What are the major sources of air pollution? -What causes smog & acid rain? -What can be done to improve air quality?</p>	<p>-Earth's atmosphere is made up of nitrogen, oxygen, carbon dioxide, water vapor, & many other gases, as well as particles of liquids & solids -Earth's atmosphere makes conditions on Earth suitable for living beings -b/c air has mass, it also has density and pressure -2 common kinds of barometers are mercury and aneroid -air pressure decreases as altitude increases. As air pressure decreases, so does density -Scientists divide Earth's atmosphere into 4 main layers classified according to changes in temperature. These layers are: troposphere, stratosphere, mesosphere, & thermosphere -troposphere-layer where Earth's weather occurs -stratosphere-contains the ozone layer -mesosphere-protects Earth's surface from being hit by most meteoroids --thermosphere-outermost layer of atmosphere -some air pollution occurs naturally. But many types of air pollution are the result of human activities. -burning fossil fuels can cause smog & acid rain -In the US, the federal & state governments have passed laws & regulations to reduce air pollution</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>Test Chapter project</p>	<p>March April</p>
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Weather factors	<ul style="list-style-type: none"> -energy in Earth's atmosphere -heat transfer -winds -water in the atmosphere -precipitation 	<ul style="list-style-type: none"> -In what forms does energy from the sun travel to Earth? -What happens to the sun's energy when it reaches Earth? -How is temperature measured? -In what 3 ways is heat transferred? -How is heat transferred in the troposphere? -What causes winds? -How do local winds & global winds differ? -Where are the major global wind belts located? -What is humidity & how is it measured? -How do clouds form? -What are the 3 main types of clouds? -What are the common types of precipitation? -How is precipitation measured? 	<ul style="list-style-type: none"> -most energy from the sun travels to Earth in the form of visible light & infrared radiation. A small amount arrives as ultraviolet radiation. -some sunlight is absorbed or reflected by the atmosphere before it can reach the surface. The rest passes through to the surface. -when the surface is heated, it radiates energy back into the atmosphere as infrared radiation -air temperature is usually measured with a thermometer -heat is transferred by radiation, conduction, & convection -radiation, conduction, & convection work together to heat the troposphere -winds are caused by differences in air pressure -local winds are caused by unequal heating of Earth's surface within a small area -like local winds, global winds are created by the unequal heating of Earth's surface. But, unlike local winds, global winds occur over a large area. -the major global wind belts are the trade winds, the polar easterlies, and the prevailing westerlies. -relative humidity can be measured with a psychrometer -clouds form when water vapor in the air condenses to form liquid water or ice crystals -scientists classify clouds based on their shape & altitude: cirrus, cumulus, and stratus. -common types of precipitation are: rain, sleet, freezing rain, snow, & hail -Scientists measure precipitation with various instruments: rain gauges & measuring sticks 		Test Chapter project	April
Weather patterns	<ul style="list-style-type: none"> -air masses & fronts -storms -predicting weather 	<ul style="list-style-type: none"> -What are the major types of air masses in North America, & how do they move? -What are the main types of fronts? -What type of weather is associated with cyclones & anticyclones? -What are the main kinds of storms, & how do they form? -What measures can you take to ensure safety in a storm? -How do weather forecasters predict the weather? -How has technology helped to improve weather forecasts? -What can be learned from the information on 	<ul style="list-style-type: none"> -4 major types of air masses influence the weather in North America: maritime tropical, continental tropical, maritime polar, & continental polar -In continental US, air masses are commonly moved by the prevailing westerlies & jet streams -colliding air masses can form 4 types of fronts: cold, warm, stationary, & occluded -cyclones & decreasing air pressure are associated with clouds, wind & precipitation. -descending air in an anticyclone generally causes dry, clear weather -thunderstorms form in large cumulonimbus clouds -during thunderstorms, avoid places where lightning may strike. Also avoid objects that conduct electricity—metal objects & bodies of water -tornadoes most commonly develop in thick cumulonimbus clouds -the safest place during a tornado is in a storm shelter or basement of a well built building -a hurricane begins over warm ocean water as a low-pressure area or tropical disturbance -if you hear a hurricane warning & are told to evacuate, leave the area immediately 	<p>Predict when & where a hurricane will come ashore</p> <p>Determine how a weather map communicates data</p>	Test Chapter project	April May

		weather maps?	<ul style="list-style-type: none"> -all year round, most precipitation begins in clouds as snow -if you're caught in a snowstorm, try to find shelter from the wind -meteorologists use maps, charts, & computers to analyze weather data & to prepare weather forecasts -technological improvements in gathering weather data & using computers have improved the accuracy of weather forecasting -standard symbols on weather maps show fronts, areas of high & low pressure, types of precipitation, & temperature 			
Climate & climate change	<ul style="list-style-type: none"> -what causes climate -climate regions -long-term changes in climate -global changes in the atmosphere 	<ul style="list-style-type: none"> -What factors influence temperature? -What factors influence precipitation? -What causes the seasons? -What factors are used to classify climates? -What are the 6 main climate regions? -What principle do scientists follow in studying ancient climates? -What changes occur on Earth's surface during an ice age? -What factors can cause climate change? -What events can cause short term climate changes? -How might human activities be affecting the temperature of Earth's atmosphere? -How have human activities affected the ozone layer? 	<ul style="list-style-type: none"> -main factors influencing temperature are latitude, altitude, distance from large bodies of water, & ocean currents -Main factors influencing precipitation are prevailing winds, the presence of mountains, & seasonal winds -the seasons are caused by the tilt of Earth's axis as Earth travels around the sun -Scientists classify climates according to 2 major factors: temperature & precipitation -6 main climate regions: tropical rainy, dry, temperate maritime, temperate continental, polar, & highlands -the tropics have 2 types of rainy climates: tropical wet & tropical wet & dry -dry climates can be arid and semiarid climates -3 kinds of temperate marine climates: marine west coast, humid subtropical, and Mediterranean -temperate continental climates are only found on continents in the Northern Hemisphere and include humid continental & subarctic -polar climate is the coldest climate region & includes the ice cap & tundra climates -temperature falls as altitude increases, so highland regions are colder than regions that surround them 	Graph & interpret data about the best time of year to visit various cities to enjoy particular recreational activities	test	May

<p>Earth, Moon, & Sun</p>	<ul style="list-style-type: none"> -Earth in space -gravity & motion -phases, eclipses, & tides -Earth's moon -traveling into space 	<ul style="list-style-type: none"> -How does Earth move in space? -What causes the cycle of seasons on Earth? -What determines the strength of the force of gravity b/w 2 objects? -What 2 factors combine to keep the moon & Earth in orbit? -What causes the phases of the moon? -What are solar & lunar eclipses? -What causes the tides? -What features are found on the moon's surface? -What are some characteristics of the moon? -How did the moon form? -How does a rocket work? -What is the main advantage of a multistage rocket? -What was the space race, & what were the major events in the human exploration of the moon? -What are the roles of space shuttles, space stations, & space probes? 	<ul style="list-style-type: none"> -Earth moves through space in 2 major ways: rotation & revolution -Earth has seasons b/c its axis is tilted as it revolves around the sun -the strength of the force of gravity b/w 2 objects depends on: the masses of the objects & the distance b/w them -Newton concluded that: inertia & gravity combine to keep Earth & the moon in their orbit -changing relative positions of the moon, Earth, & sun cause the phases of the moon, eclipses, & tides -the phase of moon you see depends on how much of the sunlit side of the moon faces Earth -a solar eclipse occurs when the moon passes directly b/w Earth & the sun -during a lunar eclipse, Earth blocks sunlight from reaching the moon -tides are caused mainly by differences in how much the moon's gravity pulls on different parts of Earth -features on the moon's surface include maria, craters, & highlands -the moon is dry & airless. Compared to Earth, the moon is small & has large variations in its surface temperature -scientists theorize that a planet-sized object collided with Earth to form the moon -a rocket moves forward when gases shooting out the back of the rocket push it in the opposite direction -the main advantage of a multistage rocket is that the total weight of the rocket is greatly reduced as the rocket rises -the rivalry b/w the US and the Soviet Union over the exploration of space was known as the "space race" -the American effort to land astronauts on the moon was named the Apollo program -NASA has used space shuttles to perform many important tasks. These include taking satellites & carrying astronauts & equipment to & from space stations -A space station provides a place where long term observations & experiments can be carried out in space -Space probes gather data about distant parts of the solar system where humans cannot easily travel 		<p>test</p>	<p>May June</p>

