

Topic: Astronomy

Days: 44

Subject(s): Science

Grade(s): 8th

Key Learning:

Astronomy is the study of the origins of the universe, motions of the objects in the universe, and the characteristics of celestial bodies.



Unit Essential Question(s):

How do scientists describe the formation of the universe and what are the characteristics of the objects in our universe?



Concept:

Our Solar System 14

S11.C.3.1.4, S8.D.3.1.1, S8.D.3.1.2, S8.D.3.1.3

Concept:

Moon 9

S8.D.3.1.3

Concept:

Sun 3

S11.D.3.1.2



Lesson Essential Question(s):

How have our concepts of the Solar System changed over time? (ET)

How does the Nebular Theory describe the formation of our solar system? (A)

What are the patterns of motion in the solar system? (seasons) (A)

What are the distinct features of the planets and moons in our solar system? (A)

How do you differentiate among comets, asteroids, and meteoroids? (A)

Lesson Essential Question(s):

What effect does the moon's rotation and revolution have on Earth? (A)

What causes the phases of the moon? (A)

What causes solar and lunar eclipses? (A)

What are other characteristics of the moon? (A)

How are Earth's oceans influenced by the moon? (ET)

Lesson Essential Question(s):

How would you describe the layers of the sun? (A)

How does solar activity influence Earth? (ET)

What occurs during nuclear fusion? (A)



Vocabulary:

axis, rotation, revolution, astronomical unit, comet, seasons, equinox, solstice, solar system, inner planet, outer planet, meteoroid, asteroid, meteor, meteorite

Vocabulary:

moon phases, solar eclipse, lunar eclipse, Maria, crater, tide

Vocabulary:

core, radiative zone, convective zone, photosphere, chromosphere, corona, sunspots, Prominences, solar flare, solar wind

Topic: Astronomy

Days: 44

Subject(s): Science

Grade(s): 8th

Concept:

Stars 153.4.7.D, S11.D.3.1.2, S11.C.2.1.1

Concept:

Celestial Origins 3S11.D.3.1.3**Lesson Essential Question(s):**

What forms of radiation are emitted by stars? (A)

What is the relationship between light intensity and distance? (ET)

What relationship exists between a star's color and temperature? (ET)

How can you describe the evolution of large and small stars? (A)

What occurs during nuclear fusion? (A)

Lesson Essential Question(s):

How does the Big Bang Theory depict the beginning of the universe? (A)

How does the Doppler Effect support the Big Bang Theory? (ET)

How does our galaxy compare to others in the universe? (ET)

How are galaxies classified? (A)

**Vocabulary:**

electromagnetic spectrum, absolute magnitude, apparent magnitude, light year, binary system, main sequence, Nuclear fusion, nebula, giant, white dwarf, neutron star, black hole, pulsar, supernova

Vocabulary:

galaxy, Big Bang Theory, red shift, blue shift, Doppler shift

Additional Information:

A common assessment will be given during the Our Solar System concept: Seasons on Neptune article and compare/contrast question

Attached Document(s):

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

Concept:

Our Solar System 14

axis -

imaginary line through the center of the Earth upon which it rotates

rotation -

spinning of an object on its object

revolution -

time it takes for an object to orbit another object

astronomical unit -

average distance between the Earth and the Sun

comet -

object of frozen gases and rock particles that orbits the sun

seasons -

short-term variations in climate due to the tilt of Earth's object

equinox -

period of time when neither axis is tilted toward the sun

solstice -

period of time when one of the axes is tilted toward the sun and the other is tilted away from the sun

solar system -

group of planets and other objects that orbit a central star

inner planet -

those closest to the sun and are small, rocky, and have few moons

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

outer planet -

those farthest from the sun and are large, gaseous, and have many moons

meteoroid -

small rock debris in the solar system

asteroid -

large rock fragment orbiting the sun

meteor -

small piece of rock that is completely destroyed as it passes through the atmosphere

meteorite -

small piece of rock that survives its journey through the atmosphere and hits the Earth or another planet

Concept:

Moon 9

moon phases -

changing appearance of the moon as seen on Earth due to the reflect of sunlight off of its surface

solar eclipse -

rare occurrence when the moon comes between the Sun and earth and casts a shadow on part of the earth

lunar eclipse -

more regular occurrence when the earth comes between the Sun and the moon and casts a shadow on the moon

Maria -

dark areas on the moon that are the result of ancient lava flows

crater -

circular depression on moon's surface formed from meteorite impacts

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

tide -

daily rising and falling of sea level due to the moon's gravitational pull

Concept:

Sun 3

core -

center of a star where nuclear fusion occurs

radiative zone -

layer above the core that transfers energy by radiation

convective zone -

layer above the radiative zone that transfers energy by convection

photosphere -

visible surface of the sun from which light and heat are given off

chromosphere -

layer above the photosphere

corona -

outer layer of the sun visible during a solar eclipse

sunspots -

dark, cooler areas on the surface of the Sun

Prominences -

arches of gas that erupt out of sunspots

solar flare -

violent eruption of charged gas from the sun

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

solar wind -

charged particles that leave the sun

Concept:

Stars 15

electromagnetic spectrum -

classification of energy in our universe based on wavelength

absolute magnitude -

the actual amount of light released by a star

apparent magnitude -

the amount of starlight visible on earth

light year -

distance light travels in one year

binary system -

two stars orbiting one another

main sequence -

time period in a star's life where it is fusing hydrogen to helium

Nuclear fusion -

energy producing process in the core of a star when smaller atoms are fused together to form larger atoms

nebula -

large cloud of dust and gas in space

giant -

star that is fusing helium into carbon

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

white dwarf -

star is no longer undergoing fusion and is slowly cooling

neutron star -

remaining neutrons after a supernova explosion

black hole -

final stage of a large star's life where the mass of the core causes it to collapse to a point that its gravity is so strong that nothing can escape it

pulsar -

neutron star that is orbiting and sends out a radio signal in the process

supernova -

explosion of a large star that creates heavy elements

Concept:

Celestial Origins 3

galaxy -

large group of stars held together by gravity

Big Bang Theory -

scientific theory for the formation of the universe; states that the universe began as a small area, rapidly expanded, and has been rapidly expanding ever since

red shift -

indicates that an object is moving away from the earth

blue shift -

indicates that an object is moving toward the earth

Doppler shift -

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 44

Grade(s): 8th

shift in wavelength due to movement

Topic: Geology

Days: 92

Subject(s): Science

Grade(s): 8th

Key Learning:

Geology is the study of geologic processes, Earth's resources, and Earth's history.

Unit Essential Question(s):

What processes, present and past, have changed Earth? How do humans utilize Earth's materials?



Concept:

Rocks 10

S11.D.1.1.1, S11.D.1.2.1, S11.D.1.2.2, 3.5.7.A, S8.D.1.1.1,
S8.D.1.2.1, S8.D.1.1.4

Concept:

Minerals 8

S11.D.1.1.1, S11.D.1.2.1, S11.D.1.2.2, 3.5.7.A, S8.D.1.2.1

Concept:

Earth History 21

S8.D.1.1.2, S8.D.1.1.4



Lesson Essential Question(s):

How do rocks form and change? (A)

How are rocks classified as igneous, sedimentary, and metamorphic? (A)

How are igneous rocks classified? (A)

How are metamorphic rocks classified? (A)

How are sedimentary rocks classified? (A)

How are rocks used? (ET)

Lesson Essential Question(s):

What characteristics do all minerals share? (A)

How are minerals formed? (A)

How are minerals identified? (A)

How are minerals used? (A)

Lesson Essential Question(s):

How are fossils formed? (A)

How are index fossils used to date rocks? (A)

How are relative ages of rocks determined? (A)

How are rock layers correlated? (A)

How is radioactive decay used to date rocks? (A)

How is geologic time divided? What are the major events of each time period? (A)



Vocabulary:

intrusive, extrusive, metamorphic, foliated, nonfoliated, compaction, cementation, organic, rock cycle, igneous, lava

Vocabulary:

hardness, luster, streak, cleavage, fracture, inorganic, mineral, crystal, magma, ore

Vocabulary:

era, period, epoch, eon, unconformity, absolute age, half-life, geologic time scale, fossil, index fossil, superposition, radioactive decay

Topic: Geology

Days: 92

Subject(s): Science

Grade(s): 8th

Concept: Plate Tectonics 18 <u>S11.D.1.1.3</u> , <u>3.5.7.A</u> , <u>S11.D.1.1.2</u> , <u>S8.D.1.1.2</u>	Concept: Earthquakes 7 <u>3.5.7.A</u> , <u>S8.D.1.1.2</u> , <u>S11.D.1.1.2</u> , <u>S11.D.1.1.3</u>	Concept: Volcanoes 7 <u>3.5.7.A</u> , <u>S8.D.1.1.2</u> , <u>S11.D.1.1.3</u> , <u>S11.D.1.1.2</u>
Lesson Essential Question(s): What evidence exists for continental drift? (A) What causes seafloor-spreading? (A) What evidence supports seafloor-spreading? (ET) How does the Theory of Plate Tectonics merge continental drift and seafloor-spreading? (ET) How does convection explain plate movement? (ET) What features result from plate boundaries? (A)	Lesson Essential Question(s): How does faulting produce earthquakes? (A) What are the characteristics of the three types of seismic waves? (A) How have seismic waves aided in mapping Earth's surface? (A) How is earthquake location determined? (A) What are the properties of Earth's layers? (A) How is a seismograph used to measure Earthquakes? (A)	Lesson Essential Question(s): What conditions are necessary for volcanic formation and eruption? (A) Where are volcanoes likely to occur? (A) What determines the explosiveness of a volcano? (A) What are the three forms of volcanoes? (A) What features result from underground magma movement? (A)
Vocabulary: continental drift, seafloor-spreading, plate tectonics, plate, lithosphere, asthenosphere, divergent, convergent, transform, mid-ocean ridge, trench, rift valley	Vocabulary: fault, earthquake, seismic wave, focus, epicenter, inner core, primary wave, secondary wave, surface wave, outer core, mantle, crust, seismograph, magnitude, moho	Vocabulary: volcano, vent, crater, hotspot, tephra, shield cone, cinder cone, composite cone

Concept: Environmental Concerns 21 <u>S11.C.2.2.2</u> , <u>S11.C.2.2.1</u> , <u>S11.C.2.2.3</u>
Lesson Essential Question(s): How do humans impact the environment? (ET) What are some environmental problems created by land use? (A) How does recycling benefit the Earth? (A) What types of energy are used by humans? What are the pros and cons of the different types of energy? (A)
Vocabulary: landfill, sanitary landfill, hazardous waste, conservation, composting, acid rain, pH scale, fossil fuel, pollution, ozone, ultraviolet radiation, CFC

Topic: **Geology**

Subject(s): Science

Days: 92

Grade(s): 8th

Additional Information:

A common assessment will be given during the Plate Tectonics concept: Continental Drift article and open ended response

A common assessment will be given during the Earth History concept: Radioactive Decay Lab

Common assessments: Rock Identification lab
and Mineral Identification lab

Attached Document(s):

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

Concept:

Rocks 10

intrusive -

an igneous rock with large crystals that formed from magma deep in Earth's crust

extrusive -

an igneous rock with small crystals that formed from lava on or near Earth's surface

metamorphic -

any rock changed by heat and pressure

foliated -

a metamorphic rock whose mineral crystals are arranged in parallel bands

nonfoliated -

a metamorphic rock whose mineral crystals have no arrangement

compaction -

compressing of sediment

cementation -

bonding of sediment to form a rock

organic -

any substance made from living things

rock cycle -

diagram outlining how rocks form and change

igneous -

rock formed by the cooling of magma or lava

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

lava -

melted rock on Earth's surface

Concept:

Minerals 8

hardness -

a material's ability to resist scratching

luster -

description of how a material reflects light, either metallic or nonmetallic

streak -

Color of a mineral's powder when rubbed on an unglazed ceramic tile

cleavage -

Pattern of breaking along geometric planes

fracture -

Random pattern of breaking

inorganic -

any substance made from non-living material

mineral -

An inorganic, naturally solid with a specific chemical composition and crystal structure

crystal -

a solid with an orderly, repeating pattern of atoms

magma -

Melted rock deep inside the earth

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

ore -

substance that can be mined for profit

Concept:

Earth History 21

era -

subdivision of an eon based on major differences in fossils and geologic events

period -

subdivision of an era based on differences in species

epoch -

subdivision of a period based on differences in species and climate

eon -

largest division of geologic time

unconformity -

gaps in rock sequences due to erosion or removal of rock

absolute age -

age in years of a rock using the properties of radioactive atoms to date rocks

half-life -

time it takes for half of the parent material to decompose to the daughter material

geologic time scale -

outline of the events that have occurred in Earth's history

fossil -

any evidence of past organic life

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

index fossil -

fossil that is abundant in the rock record for a short period of time that is used to date rocks

superposition -

states that in an undisturbed rock layer, the oldest layers are on the bottom and the youngest rocks are on the top

radioactive decay -

process by which radioactive elements change into a non-radioactive element

Concept:

Plate Tectonics 18

continental drift -

theory that states the continents moved horizontally to their current positions and will continue to move

seafloor-spreading -

theory that explains plate movement; magma rises to the surface at mid-ocean ridges and forces the plates on either side to move apart

plate tectonics -

combines continental drift and seafloor spreading into a unified theory

plate -

solid piece of lithosphere

lithosphere -

Rigid layer comprised of Earth's crust and upper mantle that floats on the asthenosphere

asthenosphere -

Plastic-like layer under the lithosphere

divergent -

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

boundary formed where two plates are moving apart

convergent -

boundary formed where two plates are coming together

transform -

boundary formed where two plates are coming together

mid-ocean ridge -

divergent plate boundary; place where new plate material is being created

trench -

convergent plate boundary; place where old plate material is being destroyed

rift valley -

point at the mid-ocean ridge where plates have separated and new plate material is coming out of the mantle

Concept:

Earthquakes 7

fault -

a break in rock where movement occurs

earthquake -

vibrations caused by the energy released when rocks break

seismic wave -

any generated by an earthquake

focus -

point deep in the earth where rocks break and earthquake energy is released

epicenter -

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

point on earth's surface directly above the focus

inner core -

solid, iron & nickel; Earth's innermost layer

primary wave -

rock particles move in the same direction as the earthquake energy; fastest moving

secondary wave -

rock particles move perpendicularly to the earthquake energy

surface wave -

earthquake waves that travel outward from the epicenter and cause all earthquake damage

outer core -

liquid iron & nickel; above the inner core

mantle -

plastic-like layer above the outer core

crust -

earth's outermost layer

seismograph -

instrument used to detect earth's vibrations and locate earthquake epicenters

magnitude -

measurement of earthquake intensity

moho -

boundary between the mantle and the crust

Concept:

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

Volcanoes 7

volcano -

mountain formed when magma in the mantle comes to the surface

vent -

opening of a volcano where magma is released

crater -

depression in earth's surface formed when a cinder cone volcano explodes

hotspot -

weak area, not at a plate boundary, in Earth's crust where magma is released

tephra -

solid particles released during a volcanic eruption

shield cone -

broad, flat volcano made of lava, formed during quiet eruptions

cinder cone -

tall, narrow volcano made of tephra, formed during explosive eruptions

composite cone -

volcano that alternates between quiet and explosive eruptions

Concept:

Environmental Concerns 21

landfill -

place to store trash

sanitary landfill -

facility to store trash; procedures are put in place to prevent pollution

Vocab Report for Topic: Geology

Subject(s): Science

Days: 92

Grade(s): 8th

hazardous waste -

wastes that are poisonous, can cause cancer, or can catch fire

conservation -

preserving natural resources

composting -

piling yard and other organic wastes where they can decompose gradually

acid rain -

acidic moisture that falls to earth as rain or snow

pH scale -

scale used to measure how acidic or basic something is

fossil fuel -

any energy source obtained from once-living, organic substances; nonrenewable

pollution -

any harmful substance added to the environment

ozone -

oxygen compound found in our atmosphere that absorbs ultraviolet (UV) radiation

ultraviolet radiation -

harmful energy from our sun that causes skin cancer; blocked by the ozone layer

CFC -

chlorofluorocarbon; chemicals found in everyday objects that when released into the atmosphere destroy ozone molecules

Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

Key Learning:

Meteorology is the study of components of the weather, energy transfer within the atmosphere, analysis of weather data, and climate changes.



Unit Essential Question(s):

How does the sun and human interaction influence Earth's weather?
How is weather forecasted?



Concept:

Energy 10

3.4.7.B, [S11.D.2.1.2](#), [S8.C.2.2.1](#), [S8.D.1.3.1](#), [S8.D.2.1.2](#), [S8.C.2.1.2](#)



Lesson Essential Question(s):

What is the role of the sun in heating the Earth? (A)

How do the processes of conduction, convection, and radiation heat all parts of Earth? (A)

What are the components of the Water Cycle? (A)

What is the impact of Earth's uneven heating? (ET)

How does the heating of earth cause the layers in the atmosphere? (ET)



Vocabulary:

radiation, conduction, convection, Coriolis Effect, evaporation, condensation, precipitation, runoff, groundwater, transpiration, jet streams, land breeze, sea breeze

Concept:

Climate Change 4

[S8.D.2.1.2](#)

Lesson Essential Question(s):

How can you differentiate between the Greenhouse Effect and Global Warming? (A)

What are the consequences of global warming? (ET)

Vocabulary:

climate, Greenhouse Effect, Global Warming, deforestation, reforestation

Concept:

Weather 11

[S11.D.2.1.3](#), [S8.C.2.1.2](#), [S8.D.2.1.1](#), [S8.D.2.1.2](#)

Lesson Essential Question(s):

How are clouds formed and classified? (A)

How do the types of precipitation form? (A)

How does the interaction between air masses create fronts? (ET)

What types of weather are associated with fronts? (A)

Vocabulary:

weather, humidity, relative humidity, air mass, front, dewpoint, cloud, saturated

Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

Concept:

Severe Weather 3S8.C.2.1.2, S8.D.2.1.3, S8.D.2.1.1, S11.D.2.1.3

Concept:

Weather Forecasting 2S11.D.2.1.4

Lesson Essential Question(s):

How are thunderstorms produced? (A)

How is thunder related to lightning? (A)

Why do some thunderstorms produce
tornadoes? (A)

How are hurricanes formed? (A)

Lesson Essential Question(s):

What types of symbols are used on weather
maps? (A)How do meteorologists forecast the weather?
(A)What is the difference between a weather watch
and a weather warning? (A)

Vocabulary:

thunder, lightning, tornado, hurricane, blizzard

Vocabulary:

weather watch, weather warning

Additional Information:

A common assessment will be given during the Climate Change concept: Earth's Poles in Peril article and open-ended response

Attached Document(s):

Vocab Report for Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

Concept:

Energy 10

radiation -

transfer of energy by electromagnetic waves through empty space

conduction -

transfer of energy when two objects are touching

convection -

transfer of energy by the flow of moving material in gases and liquids

Coriolis Effect -

Deflection of fluids on Earth due to Earth's rotation

evaporation -

liquid to gas

condensation -

gas to liquid

precipitation -

moisture falling to Earth from clouds

runoff -

water flowing across Earth's surface

groundwater -

water stored below Earth's surface

transpiration -

Giving off of water through green leaves

Vocab Report for Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

jet streams -

Fast-moving channels of high-altitude air that can greatly impact weather

land breeze -

cool breeze moving from land to water in the evening

sea breeze -

cool breeze moving from water to land in the daytime

Concept: Climate Change 4

climate -

average weather pattern for an area over a long period of time

Greenhouse Effect -

natural process where energy is trapped inside the atmosphere to keep Earth warm

Global Warming -

environmental problem caused by the trapping of too much heat in Earth's atmosphere

deforestation -

removal of trees

reforestation -

planting new trees

Concept:

Weather 11

weather -

the current state of the atmosphere

humidity -

Vocab Report for Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

amount of moisture in the air

relative humidity -

measure of the amount of moisture in the air

air mass -

body of air that has the same properties as the land below it

front -

boundary between two air masses where weather occurs

dewpoint -

temperature at which condensation occurs

cloud -

condensed moisture in the atmosphere

saturated -

air is holding the maximum amount of moisture

Concept:

Severe Weather 3

thunder -

sound wave produced when lightning is released and rapidly heats the air

lightning -

discharge of static electricity

tornado -

whirling low pressure system over land produced by severe thunderstorms

hurricane -

Vocab Report for Topic: Meteorology

Subject(s): Science

Days: 30

Grade(s): 8th

huge low pressure system that forms over tropical oceans

blizzard -

severe winter storm with very low visibility and intense snowfall

Concept: Weather Forecasting 2

weather watch -

conditions are favorable for severe weather, but the event has not been witnessed

weather warning -

severe weather exists in the warning area and residents should take immediate action

Topic: Nature of Science

Subject(s): Science

Days: 12

Grade(s): 8th

Key Learning:

The Scientific Method is used by all scientists to conduct experiments and investigations.



Unit Essential Question(s):

**What are the essential steps to the Scientific Method? How do they
aide scientists in conducting experiments?**



Concept:

The Scientific Method 2

S8.A.1.1.2, S8.A.1.1.3, S8.A.1.1.4, S8.A.1.1.1, S8.A.1.2.1, 3.2.7.A, 3.2.7.B, 3.2.7.C, 3.2.7.D,
S8.A.1.3.2



Concept:

Measurement 10

3.2.7.A, 3.2.7.B, 3.2.7.D, S8.A.1.3.1



Lesson Essential Question(s):

What are the steps of the Scientific Method? (A)

How can we distinguish between hypotheses, theories, and laws? (A)



Lesson Essential Question(s):

What is the SI unit of measurement? (A)

How are length, mass, weight, area, volume, density, and temperature measured in the SI system? (A)

How can you convert between SI units of measurement? (A)



Vocabulary:

Scientific Method, Hypothesis, Variable, Control, Theory, Law

Vocabulary:

Mass, Volume, Weight, Gravity, Density

Additional Information:

Incorporate graphing activity

Graphing lab to be done as a common assessment

Attached Document(s):

Vocab Report for Topic: Nature of Science

Subject(s): Science

Days: 12

Grade(s): 8th

Concept:

The Scientific Method 2

Scientific Method -

a series of planned steps used by scientists to solve problems

Hypothesis -

an educated guess

Variable -

changeable factor in an experiment

Control -

the standard for comparison in an experiment

Theory -

an explanation of things or events based on knowledge gained from many observations and investigations

Law -

a well-tested statement about what happens in nature

Concept:

Measurement 10

Mass -

measurement of the amount of the amount of matter in an object

Volume -

measurement of the amount of space taken up by an object

Weight -

the force of gravity on an object

Vocab Report for Topic: Nature of Science

Subject(s): Science

Days: 12

Grade(s): 8th

Gravity -

the force of attraction that between any two objects that have mass

Density -

mass per unit volume of an object