

Topic: Astronomy

Subject(s): Science

Days: 30

Grade(s): 11th, 12th

**Key Learning:**  
Astronomy helps us expand our knowledge beyond the planet Earth.



Unit Essential Question(s):

**What is the origin and history of the components of our solar system?**



Concept:

**Studying the Universe**

S11.A.3.1.3, S11.A.3.1.2, S11.A.3.2.3, S11.A.3.3.3, S11.A.3.3.1, S11.D.3.1.2, S11.D.3.1.3, S11.D.3.1.1, 3.4.10.D, S11.A.1.1.1, S11.A.1.1.2, S11.A.1.1.4, S11.A.1.1.5, S8.A.2.1.1

Concept:

**Stars and Galaxies**

S11.A.3.1.3, S11.A.3.1.2, S11.A.3.2.3, S11.A.3.3.3, S11.A.3.3.1, S11.D.3.1.2, S11.D.3.1.3, S11.D.3.1.1, 3.4.10.D, S11.A.1.1.1, S11.A.1.1.2, S11.A.1.1.4, S11.A.1.1.5, S8.A.2.1.1

Concept:

**The Sun and the Solar System**

S8.A.2.1.1, S11.A.1.1.5, S11.A.1.1.4, S11.A.1.1.2, S11.A.1.1.1, 3.4.10.D, S11.D.3.1.1, S11.D.3.1.3, S11.D.3.1.2, S11.A.3.3.1, S11.A.3.3.3, S11.A.3.2.3, S11.A.3.1.2



Lesson Essential Question(s):

How do scientists explore space? (A)

What are different types of energy beyond visible light? (A)

What is visible light and how does it relate to Astronomy? (ET)

Lesson Essential Question(s):

What are the stars and what is their distance from us? (A)

How are stars born? (A)

What galaxy is the Milky Way and where is it located? (A)

Lesson Essential Question(s):

How would you describe the environment on the sun? (ET)

What is the Sun's role in the solar system? (ET)

How does the solar system move relative to the sun? (ET)



Vocabulary:

electromagnetic spectrum, reflecting telescope, refracting telescope

Vocabulary:

astronomical unit, absolute magnitude, apparent magnitude

Vocabulary:

fission, fusion, black

Topic: Astronomy

Days: 30

Subject(s): Science

Grade(s): 11th, 12th

<p><b>Concept:</b> <b>The Planets and the Solar System</b>  <a href="#">S11.A.3.1.2</a>, <a href="#">S11.A.3.2.3</a>, <a href="#">S11.A.3.3.3</a>, <a href="#">S11.A.3.3.1</a>, <a href="#">3.4.10.D</a>,  <a href="#">S11.A.1.1.1</a>, <a href="#">S11.A.1.1.2</a>, <a href="#">S11.A.1.1.4</a>, <a href="#">S11.A.1.1.5</a>, <a href="#">S8.A.2.1.1</a></p>	<p><b>Concept:</b> <b>Earth's Moon</b>  <a href="#">S11.A.3.2.3</a>, <a href="#">S11.A.3.3.3</a>, <a href="#">S11.A.3.3.1</a>, <a href="#">3.4.10.D</a>, <a href="#">S11.A.1.1.1</a></p>	<p><b>Concept:</b> <b>Earth's Motions</b>  <a href="#">S11.A.3.3.3</a>, <a href="#">S11.D.3.1.1</a></p>
<p><b>Lesson Essential Question(s):</b>                  How is the Earth similar and different to the Inner planets? (ET)                   Is Pluto a planet or not? (ET)                   What are the primary moons of each planet? (A)                   Where are the comets, asteroids, and meteoroids located in the solar system? (A)                   How do scientists study the planets? (A)</p>	<p><b>Lesson Essential Question(s):</b>                  How have astronauts studied the moon in the past, present, and future? (ET)                   How is the composition of the moon different from the Earth's composition? (ET)                   What is it like to walk on the surface of the moon? (ET)                   Why does the moon look different every night? (ET)                   How does the moon affect the tides? (A)</p>	<p><b>Lesson Essential Question(s):</b>                  How and why does the Earth rotate on its axis? (A)                   How is time related to the rotation of the Earth? (ET)                   How do we know that the Earth rotates around the sun in the solar system? (ET)                   Why does the Earth have different seasons? (ET)</p>
<p><b>Vocabulary:</b> terrestrial planet, gas giant planet</p>	<p><b>Vocabulary:</b> albedo, regolith, mare</p>	<p><b>Vocabulary:</b> apogee, perigee</p>

<b>Additional Information:</b>
<b>Attached Document(s):</b>

Vocab Report for Topic: Astronomy

Subject(s): Science

Days: 30

Grade(s): 11th, 12th

### **Concept: Studying the Universe**

electromagnetic spectrum -  
reflecting telescope -  
refracting telescope -

### **Concept: Stars and Galaxies**

astronomical unit -  
absolute magnitude -  
apparent magnitude -

### **Concept: The Sun and the Solar System**

fission -  
fusion -  
black -

### **Concept: The Planets and the Solar System**

terrestrial planet -  
gas giant planet -

### **Concept: Earth's Moon**

albedo -  
regolith -  
mare -

### **Concept: Earth's Motions**

apogee -  
perigee -

Topic: Atmospheric Science

Days: 10

Subject(s):

Grade(s):

Key Learning:



Unit Essential Question(s):



Concept:



Lesson Essential Question(s):  
(A)



Vocabulary:

Additional Information:

Attached Document(s):



Topic: Geology

Days: 88

Subject(s): Science

Grade(s): 11th, 12th

**Key Learning:**  
**Geology is the study of the structure of the Earth and its shape, dimensions, and internal heat.**



Unit Essential Question(s):

**What are the major characteristics that make the Earth unique?**

<p><b>Concept:</b>  <b>Earth's Shape, Size, and Structure</b>  <u>S11.A.3.2.3, S11.A.3.2.2, S11.D.1.1.3</u></p>	<p><b>Concept:</b>  <b>Earth's Density and Temperature</b>  <u>S8.A.2.1.1</u></p>	<p><b>Concept:</b>  <b>Minerals</b>  <u>S11.A.3.2.3, S11.A.3.3.1, S11.A.3.3.2, S11.D.1.1.1</u></p>
<p><b>Lesson Essential Question(s):</b>                  Is the Earth Spherical? (ET)                  What is an oblate spheroid? (A)                  How is the Earth's circumference measured? (A)                  What are the Earth's dimensions? (A)                  What is the structure of the Earth? (A)</p>	<p><b>Lesson Essential Question(s):</b>                  What is density? What is the density of the Earth? (A)                  What are the units of measurement used by Earth scientists? (A)                  What are the temperatures below the Earth's surface? (A)                  What makes the Earth's crust hot? (ET)</p>	<p><b>Lesson Essential Question(s):</b>                  What is a mineral? (A)                  How are minerals identified? (A)                  What are rock-forming minerals? (A)                  How are minerals utilized in society? (A)</p>
<p><b>Vocabulary:</b>                  latitude, longitude, cartography, oblate spheroid, global positioning system, cosmic projection, mercator projection</p>	<p><b>Vocabulary:</b></p>	<p><b>Vocabulary:</b>                  rock forming minerals, silicates, tetrahedron, carbonates, oxides</p>

Topic: Geology

Days: 88

Subject(s): Science

Grade(s): 11th, 12th

<p>Concept: <b>Rocks</b> <u>S11.D.1.1.1, S11.A.3.3.1, S11.A.3.3.2</u></p>	<p>Concept: <b>Plate Tectonics</b> <u>S11.A.3.3.1, S11.A.3.3.3, S11.D.1.1.2, S11.A.1.1.4</u></p>	<p>Concept: <b>Volcanoes</b> <u>S11.A.3.3.3, S11.D.1.1.2, S11.A.3.3.1</u></p>
<p><b>Lesson Essential Question(s):</b> What is uniformitarianism? (A)  What are the three groups of rocks and how are they formed? (A)  What is the Rock cycle? (A)  How are rocks classified? (A)</p>	<p><b>Lesson Essential Question(s):</b> What is plate tectonics? (A)  What are some forms of evidence for plate tectonics? (ET)  What are the three types of plate boundaries? (A)  How are convection currents responsible for plate movements? (ET)  What is the Theory of Continental Drift? (A)</p>	<p><b>Lesson Essential Question(s):</b> How does the chemical composition of magma affect a volcanic eruption? (ET)  How do volcanoes release magma? (A)  What are the different types of eruptions? (A)  Where have major volcanic eruptions occurred? (A)  What is plutonic activity? (A)</p>
<p><b>Vocabulary:</b> extrusive rock, intrusive rock, texture, porphyritic texture, cementation, graded bedding, contact metamorphism, regional metamorphism</p>	<p><b>Vocabulary:</b> continental drift, convection currents, pangaea, magnetic reversal, seafloor spreading, divergent boundary, convergent boundary</p>	<p><b>Vocabulary:</b> volcanism, caldera, shield volcano, cinder volcano, hot spots, viscosity, tephra, pyroclastic, pluton</p>

<p>Concept: <b>Earthquakes and Plate Tectonics</b> <u>S11.D.1.1.2, S11.D.1.1.3</u></p>	<p>Concept: <b>Mountains and Plate Tectonics</b> <u>S11.D.1.1.2, S11.D.1.1.3</u></p>
<p><b>Lesson Essential Question(s):</b> Why does stress create an earthquake? (ET)  What is an earthquake and how are they caused? (A)  How is the depth of an earthquake located? (A)  How is an earthquake measured? (A)  What are some examples of major earthquakes that have occurred? (A)  How can society prepare for future earthquakes? (ET)</p>	<p><b>Lesson Essential Question(s):</b> What geological processes form mountains? (A)  What are the different types of mountains that form? (A)  What are the characteristics of an active continental margin? (A)  What are the characteristics of a passive continental margin? (A)  How does stress and strain impact folding and faulting of the Earth? (ET)</p>
<p><b>Vocabulary:</b> stress, strain, elastic deformation, plastic deformation, seismic waves, seismometer, soil liquefaction, tsunami, seismic gap</p>	<p><b>Vocabulary:</b> isostasy, isostatic rebound, orogeny, compressive force, uplifted mountain, fault-block mountain</p>

Topic: **Geology**

Days: 88

Subject(s): Science

Grade(s): 11th, 12th

**Additional Information:**

Eratosthenes Lab and Structure of Earth lab should be included in the first concept.

Density lab should be included in the second concept.

Mineral concept can include a growing crystals lab and the mineral ID and online lab activity.

Rock ID lab and a rock cycle activity should be included with the rock concept.

Plate tectonics can include the convection current lab or demo, structure of Earth activity, and labeled drawings of plate boundaries.

Volcanoes can contain volcanic activity and a subducting/convergent boundary map activity.

Earthquakes can include a seismograph lab and earthquake presentation.

Fault planes can be used in conjunction with the mountain concept.

**Attached Document(s):**



Vocab Report for Topic: Geology

Subject(s): Science

Days: 88

Grade(s): 11th, 12th

### **Concept: Earth's Shape, Size, and Structure**

- latitude -
- longitude -
- cartography -
- oblate spheroid -
- global positioning system -
- cosmic projection -
- mercator projection -

### **Concept: Minerals**

- rock forming minerals -
- silicates -
- tetrahedron -
- carbonates -
- oxides -

### **Concept: Rocks**

- extrusive rock -
- intrusive rock -
- texture -
- porphyritic texture -
- cementation -
- graded bedding -
- contact metamorphism -
- regional metamorphism -

### **Concept: Plate Tectonics**

- continental drift -
- convection currents -
- pangaea -
- magnetic reversal -
- seafloor spreading -
- divergent boundary -
- convergent boundary -

### **Concept: Volcanoes**

- volcanism -
- caldera -
- shield volcano -
- cinder volcano -
- hot spots -
- viscosity -

Vocab Report for Topic: Geology

Days: 88

Subject(s): Science

Grade(s): 11th, 12th

tephra -  
pyroclastic -  
pluton -

### **Concept: Earthquakes and Plate Tectonics**

stress -  
strain -  
elastic deformation -  
plastic deformation -  
seismic waves -  
seismometer -  
soil liquefaction -  
tsunami -  
seismic gap -

### **Concept: Mountains and Plate Tectonics**

isostasy -  
isostatic rebound -  
orogeny -  
compressive force -  
uplifted mountain -  
fault-block mountain -

Topic: Hydrology

Days: 10

Subject(s): Science

Grade(s): 10th, 11th, 12th

**Key Learning:**  
**Hydrology is the study of the effects of water on the Earth's surface and inside the Earth's crust.**



Unit Essential Question(s):

**How does the movement of surface water effect features on the surface of the Earth? How does human activity affect the quality of surface and groundwater?**



**Concept:**  
**Weathering and Erosion**  
 S11.A.3.3.1, S11.D.1.1.2, S11.D.1.1.3, S11.D.1.3.1, S11.D.1.3.2

**Concept:**  
**Surface Water**  
 S11.A.3.3.1, S11.D.1.1.2, S11.D.1.1.3, S11.D.1.3.1, S11.D.1.3.2

**Concept:**  
**Groundwater**  
 S11.D.1.1.1, S11.D.1.1.3, S11.D.1.1.2, S11.A.3.3.3, S11.A.3.3.1



**Lesson Essential Question(s):**  
 What is weathering? (A)  
 Describe mechanical weathering. (A)  
 What are the similarities and differences of mechanical and chemical weathering? (A)  
 What factors effect the rate of weathering? (A)  
 Explain the development of a fertile soil. (ET)

**Lesson Essential Question(s):**  
 What is the water cycle? Explain it. (A)  
 What is meant by a stream system? (A)  
 What are the similarities and differences of stream stage development? (A)  
 How does eutrophication occur? (A)

**Lesson Essential Question(s):**  
 Describe the movement and storage of groundwater. (A)  
 How does groundwater effect the water supply for humans? (ET)  
 How does groundwater cause weathering and erosion? (A)  
 What is Karst Topography? (A)



**Vocabulary:**  
 mechanical weathering, chemical weathering, deposition, soil horizon, abrasion, mass movement

**Vocabulary:**  
 bed load, watershed, rejuvenation, eutrophication, flood plain

**Vocabulary:**  
 infiltration, aquifer, geyser, drawdown, recharge, porosity, permeability, artesian well

**Additional Information:**

**Attached Document(s):**

Vocab Report for Topic: Hydrology

Days: 10

Subject(s): Science

Grade(s): 10th, 11th, 12th

**Concept:**

**Weathering and Erosion**

mechanical weathering -  
chemical weathering -  
deposition -  
soil horizon -  
abrasion -  
mass movement -

**Concept: Surface Water**

bed load -  
watershed -  
rejuvenation -  
eutrophication -  
flood plain -

**Concept: Groundwater**

infiltration -  
aquifer -  
geyser -  
drawdown -  
recharge -  
porosity -  
permeability -  
artesian well -

Topic: Meteorology

Days: 25

Subject(s): Science

Grade(s): 11th, 12th

**Key Learning:**  
 Atmospheric science can help explain the weather that occurs around us.



Unit Essential Question(s):

**Why is it important for us to be able to analyze and understand the atmospheric changes that take place around us every day?**



Concept:

**Weather and the Atmosphere**

3.4.10.B, S11.A.1.3.2, S8.A.2.1.1, S11.A.2.2.1, S11.A.3.1.2

Concept:

**Evaporation and Humidity**

S11.A.3.3.3, S11.A.3.1.2, S11.A.2.2.1, S8.A.2.1.1, S11.A.1.3.2,  
3.4.10.B

Concept:

**Forms of Condensation**

3.4.10.B, S11.A.3.3.3, S11.A.3.1.2, S11.A.2.2.1



Lesson Essential Question(s):

What is the composition and structure of the atmosphere? (A)

How does the heating of the atmosphere affect the Earth? (ET)

How and why does temperature vary? (ET)

How do scientists measure air temperature? (A)

Lesson Essential Question(s):

What are the different states of water? (A)

What is specific humidity and capacity? (A)

What is relative humidity and how do you find it? (A)

Lesson Essential Question(s):

What is condensation and dew point? (A)

What are condensation nuclei? (A)

What is dew and frost from contact? (A)

What is fog from radiation and convection? (A)



Vocabulary:

atmospheric layers, conduction, insolation, radiation, temperature inversion, convection

Vocabulary:

specific humidity, relative humidity, latent heat, coalescence

Vocabulary:

condensation level, condensation nuclei, orographic lifting

Topic: Meteorology

Days: 25

Subject(s): Science

Grade(s): 11th, 12th

<p>Concept: <b>Air Pressure and Winds</b> <a href="#">S11.A.3.3.3</a>, <a href="#">S11.A.3.1.2</a>, <a href="#">S11.A.2.2.1</a>, <a href="#">S8.A.2.1.1</a>, <a href="#">S11.A.1.3.2</a></p>	<p>Concept: <b>Air Masses and Fronts</b> <a href="#">S11.A.1.3.2</a>, <a href="#">S8.A.2.1.1</a>, <a href="#">S11.A.2.2.1</a>, <a href="#">S11.A.3.1.2</a></p>	<p>Concept: <b>Storms and Weather Forecasts</b> <a href="#">S11.A.1.3.2</a>, <a href="#">S8.A.2.1.1</a>, <a href="#">S11.A.2.2.1</a>, <a href="#">S11.A.3.1.2</a></p>
<p><b>Lesson Essential Question(s):</b> What is air pressure and how do scientists measure it? (A)  Why does air pressure change? (ET)  What makes the wind blow? (A)  What is the Coriolis Effect and how does it effect the wind? (A)  What is the origin of the world wind belts? (ET)</p>	<p><b>Lesson Essential Question(s):</b> What are the kinds, sources, and paths of air masses? (A)  What are the weather and skies like in an air mass? (A)  What are fronts and formations of lows? (A)  What type of weather is associated with lows, fronts, and highs? (A)</p>	<p><b>Lesson Essential Question(s):</b> How do thunderstorms and tornadoes behave? (A)  What are the characteristics of cyclonic storms? (A)  How do meteorologists forecast and use weather maps? (ET)</p>
<p><b>Vocabulary:</b> Coriolis Effect, barometer, hygrometer, anemometer, isobar</p>	<p><b>Vocabulary:</b> air mass, stable air, unstable air, warm front, cold front, cyclone</p>	<p><b>Vocabulary:</b> analog forecast, digital forecast, frontal thunderstorm</p>

Concept:  
**Climate**  
[S8.A.2.1.1](#), [S11.A.3.1.2](#), [S11.A.3.3.3](#)

**Lesson Essential Question(s):**  
What are the main factors that control climate? (A)  
  
What are microclimates? (A)  
  
How are climates classified? (A)  
  
What are several examples of adaptations to biodiversity of climate regions? (A)  
  
What are the causes of climate change? (ET)

**Vocabulary:**  
climatology, heat island, Koppen Classification System, microclimates, Global Warming, El Nino

<b>Additional Information:</b>
<b>Attached Document(s):</b>

Vocab Report for Topic: Meteorology

Subject(s): Science

Days: 25

Grade(s): 11th, 12th

### **Concept: Weather and the Atmosphere**

- atmospheric layers -
- conduction -
- insolation -
- radiation -
- temperation inversion -
- convection -

### **Concept: Evaporation and Humidity**

- specific humidity -
- relative humidity -
- latent heat -
- coalescence -

### **Concept: Forms of Condensation**

- condensation level -
- condensation nuclei -
- orographic lifting -

### **Concept: Air Pressure and Winds**

- Coriolis Effect -
- barometer -
- hygrometer -
- anemometer -
- isobar -

### **Concept: Air Masses and Fronts**

- air mass -
- stable air -
- unstable air -
- warm front -
- cold front -
- cyclone -

### **Concept: Storms and Weather Forecasts**

- analog forecast -
- digital forecast -
- frontal thunderstorm -

Vocab Report for Topic: Meteorology

Days: 25

Subject(s): Science

Grade(s): 11th, 12th

**Concept: Climate**

climatology -

heat island -

Koppen Classification System -

microclimates -

Global Warming -

El Nino -



Topic: Nature of Science

Days: 10

Subject(s): Science

Grade(s): 11th, 12th

**Key Learning:**  
The nature of science can be used to explore Earth Science.



Unit Essential Question(s):

**What is Earth Science? How do Earth scientists study the world around them?**



Concept:

**Introduction to Earth Science**

[3.2.10.C](#), [S11.A.1.1.2](#), [S8.A.2.1.2](#), [S11.A.3.2.3](#), [S11.A.3.3.1](#)

Concept:

**Scientific Method/ Measurements**

[3.2.10.C](#), [S11.A.1.1.1](#), [S8.A.2.1.1](#), [S8.A.2.1.2](#), [S11.A.2.2.1](#)

Concept:

**Earth's Chemistry**

[3.2.10.C](#), [S11.A.3.2.3](#)



Lesson Essential Question(s):

What are the four major components of Earth Science? (A)

What is the origin of Earth science? (ET)

Lesson Essential Question(s):

What are the steps of the scientific method? (A)

How does the scientific method apply to Earth science? (A)

How do Earth scientists analyze different types of data? (ET)

Why is it important to obtain accurate data from observations? (ET)

Lesson Essential Question(s):

What are the three basic parts of the atom? (A)

How does the structure of the atom change to form an ion or isotope? (A)

What is a mixture? (A)

What is a compound? (A)

What are the different types of chemical bonds? (A)



Vocabulary:

geology, astronomy, oceanography, meteorography

Vocabulary:

observation, variable, hypothesis, theory, independent, dependent, conclusion, procedure, law, quantitative data, qualitative data

Vocabulary:

atomic number, atomic mass number, isotope, ion, covalent bond, ionic bond

Additional Information:

Scientific method lab should be included in the instruction of the second concept.

Attached Document(s):

Vocab Report for Topic: Nature of Science

Subject(s): Science

Days: 10

Grade(s): 11th, 12th

### **Concept: Introduction to Earth Science**

- geology -
- astronomy -
- oceanography -
- meteorography -

### **Concept: Scientific Method/ Measurements**

- observation -
- variable -
- hypothesis -
- theory -
- independent -
- dependent -
- conclusion -
- procedure -
- law -
- quantitative data -
- qualitative data -

### **Concept: Earth's Chemistry**

- atomic number -
- atomic mass number -
- isotope -
- ion -
- covalent bond -
- ionic bond -

Topic: Oceanography

Days: 8

Subject(s): Science

Grade(s): 11th, 12th

**Key Learning:**  
**Oceanography is the study of the ocean's properties.**



Unit Essential Question(s):

**What are the properties of ocean water? What kind of world exists on the ocean floor?**



Concept:

**Ocean Properties**

3.2.10.A, S11.D.1.1.3, S11.D.1.1.2, S11.A.3.2.3, S11.A.3.1.2

Concept:

**Ocean Floor and Sediments**

S11.A.3.1.2, S11.A.3.2.3, S11.D.1.1.2, S11.D.1.1.3, 3.2.10.A

Concept:

**Ocean Currents**

3.2.10.A, S11.A.3.1.2, S11.A.3.2.3, S11.D.1.1.2, S11.D.1.1.3



Lesson Essential Question(s):

What lies in the Earth's ocean? (A)

What is the composition of ocean water? (A)

What factors affect the temperature of ocean water? (ET)

What is life in the ocean like? (ET)

Lesson Essential Question(s):

How do scientists study the ocean floor? (A)

How could you describe the ocean floor? (ET)

What are some main components of the ocean basin? (A)

What are some examples of the ocean floor sediments? (A)

Lesson Essential Question(s):

How do surface currents affect the Earth? (ET)

How do deep currents affect the Earth? (A)



Vocabulary:

salinity, sea level, temperature profile, thermocline, estuary

Vocabulary:

continental margin, abyssal plain, deep-sea trench, guyot, mid-ocean ridge, seamount

Vocabulary:

density current, surface current, upwelling, neap tide, spring tide, longshore currents, rip current, turbidity current

Additional Information:

Attached Document(s):

Vocab Report for Topic: Oceanography

Subject(s): Science

Days: 8

Grade(s): 11th, 12th

### **Concept: Ocean Properties**

- salinity -
- sea level -
- temperature profile -
- thermocline -
- estuary -

### **Concept: Ocean Floor and Sediments**

- continental margin -
- abyssal plain -
- deep-sea trench -
- guyot -
- mid-ocean ridge -
- seamount -

### **Concept: Ocean Currents**

- density current -
- surface current -
- upwelling -
- neap tide -
- spring tide -
- longshore currents -
- rip current -
- turbidity current -