



RADNOR TOWNSHIP SCHOOL DISTRICT
Course Overview



6th Grade Science
Course #

General Information

Credits: N/A
Weighted: N/A
Prerequisite: N/A

Length: Full Year
Format: Meets Daily
Grade: 6

Course Description

6th Grade Science is a hands-on, inquiry-based learning experience in earth science. This course will explore weather, geology, and astronomy. In the Weather Unit, students will learn about the composition and structure of the atmosphere and how energy is transferred in the atmosphere. In addition, they will examine the water cycle, how to measure weather conditions, how to interpret weather information, and make predictions.

In the Geology unit, students will learn about minerals and gems and how to identify them. Students will learn how rocks form, the three different rock groups-igneous, sedimentary and metamorphic and the cycle that describes how rocks change from one type to another. They'll also learn how much society depends upon minerals. They will learn about the fossil, climate, and rock clues that indicate that Earth's continents have drifted over time. In addition, students will learn about types of earthquakes, predicting earthquakes, earthquake magnitude and seismic-safe structures. Types of volcanoes and how they form, how volcanoes affect humans and the surrounding environment and the rock features they leave behind will also be studied.

In Astronomy, students will learn how space is explored with rockets, probes, satellites, and space shuttles. Students will learn why the lengths of day and night change and why seasons occur. They'll also learn why the Moon's appearance changes throughout the month. Students will learn about the solar system's planets and how they are being explored.

Course Objectives:

- Students will engage intellectually to develop conceptual understanding.
- They will generate their own ideas, questions, and propositions.
- Students will interact collegially with one another to solve problems.
- They will also employ appropriate resources for inquiry-based learning.
- Students will learn to apply the scientific method.
- Students will construct a data appropriate graph or table.
- They will perform calculations from data obtained and analyze results in the context of the lab.
- Students will write science lab reports that follow the RTSD guidelines.
- They will identify, utilize, and gain experience in using scientific tools and instruments appropriately.
- Students will utilize appropriate earth science vocabulary to explain various phenomena.

Common Assessments:

NMSI Assessments

- Minerals and Rocks
- Geologic Time and Plate Tectonics
- Weather
- Climate and Seasons
- Atmosphere
- Space Science I: Earth, Moon, Solar System

Major Units of Study:

- Introduction to the Science Classroom
- Geologic Cycles and Processes
- Weather, Climate, and Atmosphere
- Space Science

Materials & Texts

CK-12 Foundation: Online Flexbook (2013)

Earth Materials and Processes, Glencoe (2002)

The Air Around You, Glencoe (2002)

Astronomy, Glencoe (2002)

National Math and Science Initiative: National Math and Science Initiative (2012)



RADNOR TOWNSHIP SCHOOL DISTRICT Course Curriculum



First Marking Period

Unit I: Introduction to the Science Classroom – 4 weeks

Common Core Standards and PA Academic Standards

Common Core

(LITERACY) RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

(LITERACY) RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

(LITERACY) RST.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or

performing technical tasks.

(LITERACY) RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

(LITERACY) RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

(LITERACY) RST.6-8.9

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

(LITERACY) W.6.1

Write arguments to support claims with clear reasons and relevant evidence.

(LITERACY) W.6.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

(MATH) Content.6.SP.A.1

Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

(MATH) Content.6.SP.A.4

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

(MATH) Content.6.SP.A.5

Summarize numerical data sets in relation to their context

(MATH) Content.6.NS.B.2

Fluently divide multi-digit numbers using the standard algorithm.

(MATH) Content.6.NS.B.3

Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

(MATH) Content.6.EE.A.2

Write, read, and evaluate expressions in which letters stand for numbers.

(MATH) Content.6.EE.A.3

Apply the properties of operations to generate equivalent expressions.

(MATH) Content.6.EE.A.4

Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

(MATH) Content.6.EE.A.5

Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

(MATH) Content.6.EE.A.6

Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

(MATH) Content.6.EE.A.7

Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

(MATH) Content.6.EE.A.8

Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

(MATH) Content.6.EE.A.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Keystone Connections:

This course is an Earth Science course, and does not directly converge with the Keystone BIOLOGY exam that will be administered. It is, however, aligned with the 8th grade science PSSA exam.

Student Objectives:

Scientists use scientific methods to structure their experiments and investigations.

KNOWLEDGE

Students will know...

- Why precise communication is crucial in science
- The steps of the scientific method
- The names of scientific equipment and instruments
- Experiments include a dependent and independent variable
- Graphs, tables, and charts are three common ways to communicate data from an experiment
- The difference between mass and weight
- The difference between area and volume
- A scientific model is an accurate representation of an idea or theory
- Scientific theories and laws are sometimes discovered accidentally

SKILLS

Students will be able to...

- Choose appropriate equipment and technology
- Properly use lab equipment and technology
- Work collaboratively to collect and analyze data
- Utilize correct measurement techniques
- Correctly determine the significant digits
- Design a chart or data table as appropriate
- Create graphical representations of data
- Analyze error
- Graph and analyze data (plot points, label and scale axes, title graph, construct line of best fit)
- Measure and record data in SI units
- Determine the variables to be measured
- Estimate and approximate quantities
- Solve mathematical equations using data

Assessments:

FORMATIVE

- Visual assessment of measuring techniques used within the lesson
- Interactive Lab Notebook

SUMMATIVE

- NMSI Short Lesson Assessment: Numbers in Science
- NMSI Assessment: Introduction to the Science Classroom

COMMON

- NMSI Lab: The Scientific Method: Exploring Experimental Design ~ *Come Fly With Us*
- NMSI Scientific Method Practice (I)

Activities and Assignments

ACTIVITIES

NMSI Foundation Lesson I: The Scientific Method
NMSI Foundation Lesson II: Numbers in Science
NMSI Foundation Lesson IV: Graphing Skills

Activities from Discovery Education: How Scientists Work Series ~What is the Scientific Method?

ASSIGNMENTS

Conclusion questions from each lab
Document-Based Questions

Terminology

Scientific method, hypothesis, independent variable, dependent variable, hidden variable, control, SI, mass, weight, area, volume, density, significant digit, interval, interpolation, extrapolation, line of best fit, scientific model, scientific theory, scientific law

Materials & Texts

ESSENTIAL

CK-12 Foundation(2013)
National Math and Science Initiative; Foundation Lessons (2013)

ADDITIONAL

Blackline Masters from Discovery Education: How Scientists Work Series ~What is the Scientific Method?
Earth Science: Geology, the Environment, and the Universe (2013)

Media, Technology, Web Resources

Discovery Education: How Scientists Work Series ~What is the Scientific Method? (streamed video)
CK-12 Foundation: Online Flexbook

Unit II: Geologic Cycles and Processes - 14 weeks

Standards

Common Core

(LITERACY) RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

(LITERACY) RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

(LITERACY) RST.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

(LITERACY) RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

(LITERACY) RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

(LITERACY) RST.6-8.9

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

(LITERACY) WHST.6-8.1

Write arguments focused on discipline-specific content.

(LITERACY) WHST.6-8.2

Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

(LITERACY) WHST.6-8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

(LITERACY) WHST.6-8.5

Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

(LITERACY) WHST.6-8.6

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

(LITERACY) WHST.6-8.7

Conduct short research projects to answer a question (including a self-generated question), drawing on

several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

(LITERACY) WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

(LITERACY) WHST.6-8.9

Draw evidence from informational texts to support analysis, reflection, and research.

(LITERACY) WHST.6-8.10

Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Keystone Connections:

This course is an Earth Science course, and does not directly converge with the Keystone BIOLOGY exam that will be administered. It is, however, aligned with the 8th grade science PSSA exam.

Student Objectives:

Minerals are an integral part of daily life.

Most rocks are formed from preexisting rocks through external and internal geologic processes.

Most geologic activity occurs at the boundaries between plates.

KNOWLEDGE

Students will know...

- A mineral is a naturally occurring, inorganic solid with a specific chemical composition and a definite crystalline structure
- A crystal is a solid in which the atoms are arranged in repeating patterns
- Magma and lava are the materials that cool to form igneous rock
- The processes of weathering, erosion, deposition, and lithification form sedimentary rocks
- Metamorphic rocks form when preexisting rocks are exposed to increases in temperature and pressure and to hydrothermal solutions
- The hypothesis of Continental drift
- Age and magnetic clues are support seafloor spreading
- The explosiveness of a volcanic eruption is related to the silica and water vapor content of its magma.
- Three forms of volcanoes

SKILLS

Students will be able to...

- Identify minerals based on physical and chemical properties
- Explain how minerals form

- Explain how minerals are classified
- Differentiate between subjective and objective mineral properties
- Distinguish between a rock and a mineral
- Describe the rock cycle
- Contrast intrusive and extrusive formation
- Contrast granitic and basaltic igneous rock
- Describe the conditions that allow metamorphic rock to form
- Classify metamorphic rock as foliated and nonfoliated
- Explain how sedimentary rocks form
- Classify sedimentary rocks as detrital, chemical, or organic in origin
- Identify evidence supporting Continental Drift
- Explain seafloor spreading
- Compare and contrast different types of plate boundaries
- Explain how heat inside the earth causes plate tectonics
- Recognize features caused by plate tectonics
- Explain how earthquakes result from the buildup of energy in rocks
- Describe how compression, tension, and shear forces make rocks move along faults
- Distinguish among normal, reverse, and strike –slip faults
- Describe how earthquake energy travels through seismic waves
- Distinguish among primary, secondary, and surface waves
- Describe the structure of the Earth’s interior
- Explain where most earthquakes occur
- Describe how scientists measure earthquakes
- List ways to make buildings more earthquake-safe
- Describe how volcanoes can affect people.
- List conditions that cause volcanoes to form
- Identify the relationship between volcanoes and Earth’s moving plates
- Describe intrusive igneous rock features and how they form
- Explain how a caldera forms

Assessments:

FORMATIVE

Visual assessments of student work

Interactive Lab Notebook

SUMMATIVE

NMSI Short Lesson Assessment: They Will Rock You Assessment

NMSI Diagnostic Tests for Minerals and Rocks: from Test 012160, 012162, 012164

NMSI Diagnostic Tests for Geologic Time and Plate tectonics: Tests 012170, 012172, or 012174

COMMON

NMSI Short Lesson Assessment: They Will Rock You Assessment ~ only Question 10

NMSI Diagnostic Tests for Minerals and Rocks: from Test 012160 ~ Open Response Question 1

Activities and Assignments

ACTIVITIES

NMSI Lab: Mineral Mystery ~ Using Dichotomous Keys for Mineral Identification

NMSI Lab: They Will Rock You ~ Observing and Classifying Rocks

NMSI Lab: Rock-N-Roll ~ Investigating the Weathering of Rocks

NMSI Lab: Rockin' Write Up ~ Using Rock and Mineral Identification Labs to Prepare a Formal Lab Report

NMSI Lab: Lights, Camera, Eruption ~ Making Volcanoes 101

NMSI Lab: The Sands of Time

ASSIGNMENTS

NMSI Lesson: Relative Dating ~ Using Cross-Sections to Order Time

NMSI Lesson (Coordinated with the Rockin' Write Up: How to Write a Formal Lab Report

Terminology

Mineral, crystal, magma, silicate, hardness, luster, specific gravity, streak, cleavage, fracture, specific gravity, gem, rock, rock cycle, igneous rock, lava, intrusive, extrusive, basaltic, granitic, metamorphic rock, foliated, non-foliated, sediment, sedimentary rock, compaction, cementation, Continental drift, Pangaea, seafloor spreading, plate tectonics, plate, lithosphere, asthenosphere, convection current, fault, earthquake, normal fault, reverse fault, strike-slip fault, subduction, seismic waves, focus, Primary wave, Secondary wave, surface wave, epicenter, seismograph, magnitude, liquefaction, tsunami, volcano, vent, crater, shield volcano, cinder cone volcano, composite volcano, caldera, tephra, batholith, sill, dike

Materials & Texts

ESSENTIAL

CK-12 Foundation: Online textbook/flexbook (2013)

Earth Materials and Processes, Glencoe (2002)

National Math and Science Initiative (2012)

ADDITIONAL

Earth Science: Geology, the Environment, and the Universe (2013)

Basher Science: Rocks and Minerals ~ A Gem of a Book (Kingfisher, 2010)

Media, Technology, Web Resources

Bill Nye: Earth's Crust (DVD, RMS)

Bill Nye: Earthquakes (DVD, RMS)

Discovery Education: Continents Adrift ~ An Introduction to Continental Drift and Plate Tectonics

The Day the Earth Shook (DVD, RMS)

Plates On the Move (interactive website)

Unit II: Weather, Climate, and Atmosphere - 10 weeks

Standards

Common Core

(LITERACY) RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

(LITERACY) RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

(LITERACY) RST.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

(LITERACY) RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

(LITERACY) RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

(LITERACY) RST.6-8.9

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

(LITERACY) WHST.6-8.1

Write arguments focused on discipline-specific content.

(LITERACY) WHST.6-8.2

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

(LITERACY) WHST.6-8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

(LITERACY) WHST.6-8.5

Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

(LITERACY) WHST.6-8.6

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

(LITERACY) WHST.6-8.7

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

(LITERACY) WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

(LITERACY) WHST.6-8.9

Draw evidence from informational texts to support analysis reflection, and research.

(LITERACY) WHST.6-8.10

Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

(LITERACY) RI.6.1

Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

(LITERACY) RI.6.2

Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

(LITERACY) RI.6.3

Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

(LITERACY) RI.6.7

Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

(LITERACY) RI.6.8

Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

(LITERACY) SL.8.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

(LITERACY) SL.8.4

Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

(LITERACY) SL.8.5

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

(MATH) Content.6.NS.C.5

Understand that positive and negative numbers are used together to describe quantities having opposite directions or values

(MATH) Content.6.EE.B7

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Keystone Connections:

This course is an Earth Science course, and does not directly converge with the Keystone BIOLOGY exam that will be administered. It is, however, aligned with the 8th grade science PSSA exam.

Student Objectives:

The composition, structure, and properties of Earth's atmosphere form the basis of Earth's weather. Weather patterns can be observed, analyzed, and predicted.

The different climates on earth are influenced by natural factors as well as human activities.

Increased gas levels have been cited as being responsible for trapping additional heat in the earth's atmosphere.

KNOWLEDGE

Students will know...

- The composition of the atmosphere makes life on Earth possible
- There are different gases in the Earth's atmosphere
- The Kyoto Protocol was established to regulate greenhouse gas emissions
- The Sun provides energy to Earth's atmosphere, allowing life to exist
- Wind streams determine major weather patterns on Earth
- Air masses, pressure systems, and fronts cause weather to change
- Changing climates could affect sea level and life on Earth
- How clouds form and how they are classified
- The symbols used in a weather station model
- Possible causes of climatic change

SKILLS

Students will be able to...

- Explain how solar heating and water vapor in the atmosphere affect weather
- Describe how rain, hail, sleet, and snow develop
- Describe how weather is associated with fronts and high and low pressure areas
- Explain how tornadoes develop from thunderstorms
- Discuss the dangers of severe weather
- Explain how data are collected for weather maps and forecasts
- Describe the structures of the Earth's atmosphere
- Explain what causes air pressure
- Describe what happens to the energy Earth receives from the sun
- Compare and contrast radiation, conduction, and convection
- Explain the water cycle
- Explain why different latitudes on Earth receive different amounts of solar energy
- Describe the Coriolis effect
- Locate doldrums, trade winds, prevailing westerlies, polar easterlies, and jet streams
- Describe what determines climate
- Explain how latitude and other factors affect the climate of a region
- Explain how greenhouse gases affect earth's climate
- Describe how CO₂, NO₂, and SO₂ gases cause acid rain
- Calculate the change in pH caused by CO₂, NO₂, and SO₂
- Calculate their yearly CO₂ emissions
- Describe the problems associated with society's impact on increased production of certain greenhouse gases
- Identify things one could do to reduce emissions

Assessments:

FORMATIVE

Visual assessments of student work
Interactive Lab Notebook

SUMMATIVE/COMMON

NMSI Diagnostic Tests for Weather (Air Movement, Water Cycle): Tests 012110, 012112, or 012114

NMSI Diagnostic Tests for Atmosphere: Tests 012130, 012132, or 012134

NMSI Short Lesson Assessment: Are You Meeting the Kyoto Protocol?

NMSI Project: Emission Possible Research Paper (Includes rubrics for individual and group papers, self/peer/teacher critique)

Activities and Assignments

ACTIVITIES

NMSI Lab: Blowing in the wind ~ Mapping Air Currents

NMSI Lab: Relative Humidity ~ Measuring the Amount of Water Vapor in the Air versus the Total Amount the Air Can Hold

NMSI Lab: Are You Meeting the Kyoto Protocol ~ Calculating Your Carbon Dioxide Footprint

NMSI Lab: Greenhouse Effect ~ Investigating Global Warming

NMSI Lab: Acid Raindrops Keep Falling on My Head ~ Investigating Acid Rain

ASSIGNMENTS

NMSI Project: Emission Possible Research Paper (group and individual research papers)

Investigating Climates

Reading a weather map

Mapping atmospheric pressure

Terminology

Atmosphere, troposphere, stratosphere, mesosphere, thermosphere, ionosphere, exosphere, ozone layer, ultraviolet radiation, chlorofluorocarbon, radiation, conduction, convection, hydrosphere, condensation, Coriolis effect, jet stream, sea breeze, land breeze, weather, humidity, relative humidity, dew point, fog, precipitation, air mass, front, tornado, hurricane, blizzard, meteorologist, station model, isotherm, isobar, climate, tropics, polar zone, temperate zone, carbon dioxide, methane, nitrogen, oxygen, global warming, greenhouse gases, greenhouse effect, pH, acid rain, Kyoto Protocol

Materials & Texts

ESSENTIAL

CK-12 Foundation: Online Flexbook (2013)

Earth Science: Geology, the Environment, and the Universe (2013)

The Air Around You, Glencoe (2002)

Kids Discover ~ Weather

Kids Discover ~ Climate

ADDITIONAL

Investigating Climates

Various Newspaper and Magazine Articles, Graphs, and Charts
Basher Science: Weather: Whipping up a storm! (Kingfisher, 2012)

Media, Technology, Web Resources

Bill Nye the Science Guy: Atmosphere (DVD, RMS)
Bill Nye the Science Guy: Storms (DVD, RMS)
Meteorology (DVD, RMS)
Rain and Snow (DVD, RMS)
Discovery Education ~ Understanding: Weather (streamed video)

Resources for Emission Possible:

www.epa.gov

World Book Online and other RMS library online resources

Noodle Tools

Unit IV: Space Science - 4 Weeks

Standards

Common Core

(LITERACY) RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

(LITERACY) RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

(LITERACY) RST.6-8.3

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

(LITERACY) RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

(LITERACY) RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

(LITERACY) RST.6-8.9

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

(LITERACY) WHST.6-8.1

Write arguments focused on discipline-specific content.

(LITERACY) WHST.6-8.2

Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

(LITERACY) WHST.6-8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

(LITERACY) WHST.6-8.5

Use technology, including the Internet, to produce and publish writing and present the relationships

between information and ideas clearly and efficiently.

(LITERACY) WHST.6-8.6

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

(LITERACY) WHST.6-8.7

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

(LITERACY) WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

(LITERACY) WHST.6-8.9

Draw evidence from informational texts to support analysis, reflection, and research.

(LITERACY) WHST.6-8.10

Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

(MATH) Content.6.SP.A.1

Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

(MATH) Content.6.SP.A.5

Summarize numerical data sets in relation to their context

(MATH) Content.6.NS.B.2

Fluently divide multi-digit numbers using the standard algorithm.

(MATH) Content.6.NS.B.3

Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

(MATH) Content.6.EE.A.2

Write, read, and evaluate expressions in which letters stand for numbers.

(MATH) Content.6.EE.A.3

Apply the properties of operations to generate equivalent expressions.

(MATH) Content.6.EE.A.4

Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Keystone Connections:

This course is an Earth Science course, and does not directly converge with the Keystone BIOLOGY exam that will be administered. It is, however, aligned with the 8th grade science PSSA exam.

Student Objectives:

Earth's movements cause night and day and changing of the seasons.

Learning about the Moon can teach you about Earth.

The solar system is composed of many objects of different sizes and structures.

KNOWLEDGE

Students will know...

- Earth's physical characteristics
- What causes seasons to change
- Facts about the Moon that might influence future space travel
- Current models of the formation of the solar system
- The inner planets in their relative order from the Sun
- Important characteristics of each inner planet
- Major characteristics of Jupiter, Saturn, Uranus, and Neptune
- Positions of constellations change throughout the year

SKILLS

Students will be able to...

- Differentiate between rotation and revolution
- Identify phases of the Moon and their cause
- Explain why solar and lunar eclipses occur
- Infer what the Moon's surface features may reveal about its history
- Compare the Sun-centered and Earth-centered models of the solar system.
- Compare and contrast Venus and Earth
- Explain how Pluto differs from the other outer planets
- Describe where comets come from and how a comet develops as it approaches the Sun
- Distinguish among comets, meteoroids, and asteroids
- Distinguish between absolute magnitude and apparent magnitude
- Describe how parallax is used to determine distance

Assessments:

FORMATIVE

Visual assessments of student work

Interactive Lab Notebook

Visual assessment of rocket and launch

SUMMATIVE

NMSI Short Lesson Assessment: Moon Watch

NMSI Short Lesson Assessment: Not So Lost in Space

NMSI Diagnostic Tests for Earth-Moon-Solar System: Tests 012180, 012182, or 012184

Rocket Quiz

COMMON

NMSI Short Lesson Assessment: Moon Watch

NMSI Short Lesson Assessment: Not So Lost in Space

Activities and Assignments

ACTIVITIES

NMSI Lab: Not So Lost in Space ~ Building a Model of the Solar System

NMSI Lab: Moon Watch ~ Observing the Lunar Phases with a Model

Building and launching a rocket

ASSIGNMENTS

NMSI Writing Extension: Moon Watch ~ Tides of War

Terminology

Rocket, satellite, orbit, space probe, Project Mercury, Project Gemini, Project Apollo, space shuttle, space station, sphere, axis, rotation, revolution, ellipse, solstice, equinox, moon phase, waxing, waning, gibbous, full moon, new moon, crescent, gibbous, first quarter, third quarter, umbra, penumbra, solar eclipse, lunar eclipse, solar system, Mercury, Venus, Earth, Mars, Jupiter, Great Red Spot, Saturn, Uranus, Neptune, Pluto, comet, meteor, meteorite, asteroid, constellations, absolute magnitude, apparent magnitude, parallax

Materials & Texts

CK 12 (Online textbook/flexbook)

Earth Science: Geology, the Environment, and the Universe (2013)

Astronomy, Glencoe (2002)

National Math and Science Initiative, National Math and Science Initiative (2012)

(The Lost Moon)

Basher Science: Astronomy ~ Out of this World (Basher, 2010)

Basher Science: Planet Earth ~ What planet are you on? (Basher, 2010)

Media, Technology, Web Resources

Bill Nye: The Solar System (RMS, DVD)

Bill Nye: The Moon (RMS, DVD)

Bill Nye: The Seasons (RMS DVD)

October Sky (DVD, RMS)

Apollo 13 (DVD, RMS) – note rating PG