Structure of Knowledge

Science: Grade Seven

2016 \*ELA additions

**Science Inquiry and Application**

All students must form an understanding of the scientific processes and appropriate laboratory safety techniques that will be utilized as they develop knowledge in all science content areas:

- Identify questions that can be answered through scientific investigations

- Design and conduct a scientific investigation

- Use appropriate mathematics, tools and techniques to gather data and information

- Analyze and interpret data

- Develop descriptions, models, explanations and predictions

- Think critically and logically to connect evidence and explanations

- Recognize and analyze alternative explanations and predictions; and

- Communicate scientific procedures and explanations

Vocabulary

Scientific Method

Problem

Hypothesis

Procedures

Independent variable

Dependent variable

Constants

Control group

Experimental group

Controlled experiment

Data

Conclusion

Scientific Theory

Scientific Law

Observing

Inferring

Predicting

Classifying

Making models

Quantitative observation

Qualitative observation

Skepticism

Curiosity

Open-mindedness

Honesty

Creativity

Resources/Instructional Strategies

Prentice Hall Nature of Science and Technology Books

Sciencesaurus Books

Education Video

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that cannot be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Fill-in-the-blank notes

SLAP! Vocabulary practice

Lab Safety poster

Education Video

Hands-on Lab activities

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Formative Assessment:

Lab observations

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Lab Activities

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

First Quarter – 3 Weeks (Scientific Method) and on-going through other units

Structure of Knowledge

Science: Grade Seven

2016

**PHYSICAL SCIENCE TOPIC: Conservation of Mass and Energy**

*This topic focuses on the empirical evidence for the arrangements of atoms on the Periodic Table of Elements, conservation of mass and energy, transformation and transfer of energy.*

Content Statements

The properties of matter are determined by the arrangement of atoms.

Essential Understandings (Evidence of Understanding)

1. Elements can be organized into families, groups, and periods based on their similar properties.

2. When substances interact to form new substances (compound), the properties of the new substances may be very different from those of the old, but the amount of matter does not change.

3. The pH scale has a range of 0-14 and is used to measure the acidity or alkalinity of a compound which impacts to the natural world (water, soil, and air quality).

4. Mixtures are materials composed of two or more substances that retain their separate atomic compositions (water and sugar).

5. In many cases when objects, substances, or materials undergo change, there may be a combination of chemical and physical changes occurring.

6. The idea of reversibility of changes is not a criterion for classifying changes as chemical or physical.

Vocabulary

Matter

Solid, liquid, gas

Melting, freezing, vaporization, condensation, sublimation, deposition

Physical properties: conductivity, ductility, solubility, malleability, boiling point, density, melting point

Chemical properties: flammability, tendency to rust, reactivity to acid or water

Acids, Bases, and Neutral Substances

pH Scale

Physical change

Chemical change

Conservation of Mass and Matter

Open and Closed Systems

Atoms and Molecules

Protons, neutrons, and electrons

The Periodic Table

Families and Periods

Metals, non-metals, and metalloids

Element, Compound, and Mixture

Resources/Instructional Strategies

Sciencesaurus Books

McGraw-Hill/Glencoe Atoms and Elements Books

Schlessinger Education Videos

AIMS Chemistry Matters

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Fill-in-the-blank notes

Vocabulary card sort

Teacher physical/chemical change demonstrations

Hands-on Triple Beam Balance Lab

Powerpoint physical/chemical change review

Ball and Stick Models of Molecules/Manipulatives for Basic Bonding

Picture Periodic Table

Color Code Periodic Table of Elements

Schlessinger Education Videos

Red Cabbage Indicator Lab

Litmus Paper/pH Lab

Alien Sorting Activity

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Formative Assessment:

Lab observations

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Labs

Element Project

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

First Quarter – 3 Weeks (Matter)

First/Second Quarter – 3 Weeks (The Periodic Table)

Structure of Knowledge

Science: Grade Seven

2016

**PHYSICAL SCIENCE TOPIC: Conservation of Mass and Energy**

*This topic focuses on the empirical evidence for the arrangements of atoms on the Periodic Table of Elements, conservation of mass and energy, transformation and transfer of energy.*

Content Statements

Energy can be transferred through a variety of ways.

Energy can be transformed from one form to another or can be transferred from one location to another, but is never lost.

Essential Understandings (Evidence of Understanding)

1. When energy is transferred from one system to another, the quantity of energy before the transfer equals the quantity of energy after transfer.

2. A closed system does not interact with its surroundings while an open system allows the flow of matter and energy into and out of the system.

3. If energy appears to be gained or lost, it has just transformed or transferred into a different system.

4. Dissipated energy is energy that is transformed into thermal energy and released into the surroundings.

5. Mechanical energy can be transferred when objects push or pull on each other over a distance.

6. Electromagnetic waves transfer energy when they interact with matter.

7. Thermal energy can be transferred through radiation, convection, and conduction.

8. Electrical energy transfers when an electrical source is connected in a complete electrical circuit to an electrical device.

9. Vibrations cause wave-like disturbances that transfer energy from one place to another.

10. Waves can be described by their speed, wavelength, amplitude, and frequency.

11. Electricity can be measured through current, voltage, and resistance.

12. An electric circuit exists when an energy source is connected to an electrical device in a close circuit.

Vocabulary

Energy

Potential Forms of Energy: chemical, stored mechanical, nuclear, gravitational

Kinetic Forms of Energy: electrical, radiant, thermal, mechanical, sound

Conservation of Energy

Open and Closed Systems (ecosystems, atmosphere, hydrosphere, solar system, human body)

Matter and Energy

Dissipated Energy (looks lost, but where, oh where, does it go? …. thermal energy!)

Conduction, Convection, and Radiation

Wave

Force

Work (energy transfer)

Types of Energy – mechanical, electromagnetic, sound, light, and electrical (circuit)

Types of Waves – mechanical, seismic, oceanic, sound, and light

Properties of Waves – speed, amplitude, frequency, and wavelength

Types of Mechanical Waves – transverse and longitudinal

Vibrations

Medium vs. Vacuum

Law of Electric Charges

Electricity – voltage, resistance, and current

Conservation of Charge

Electrical Circuit (Series and Parallel)

Renewable Energy – wind, geothermal, water, and solar

Resources/Instructional Strategies

Holt Science & Technology Electricity and Magnetism Books

Holt Science & Technology Sound and Light Books

Virtual Labs (quantifiable energy changes)

Schlessinger Education Videos

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Cut and Paste: Kinetic or Potential?

Schlessinger Education Videos

Powerpoint Heat Transfer examples

Pendulum Activity

Critter Car Lab

Design/Construct a Roller Coaster (with marbles)

Design/Construct a Catapult (a simple machine)

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Sparky’s Workshop

Quiz Circuit Boards

Investigate Different Positions of Series and Parallel Circuits

Formative Assessment:

Lab observations

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Labs

Walk-Arounds

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Second Quarter – 2 Weeks (The Energy Unit)

Second Quarter – 3 Weeks (Waves)

Second/Third Quarter – 4 Weeks (Electricity)

Structure of Knowledge

Science: Grade Seven

2016

**EARTH AND SPACE TOPIC: Cycles and Patterns of Earth and the Moon**

*This topic focuses on Earth’s hydrologic cycle, patterns that exist in atmospheric*

*and oceanic currents, the relationship between thermal energy and the currents,*

*and the relative position and movement of the Earth, sun and moon.*

Content Statements

The atmosphere has different properties at different elevations and contains a mixture of gases that cycle through the lithosphere, biosphere, hydrosphere, and atmosphere.

Essential Understandings (Evidence of Understanding)

1. The atmosphere is held to the Earth by the force of gravity.

2. There are defined layers of the atmosphere that have specific properties; natural events and human activities can change these properties.

3. Molecules and elements interact between Earth’s spheres (Nitrogen Cycle, Carbon-Oxygen Cycle, etc.)

4. Properties of air and air quality can be examined using real-time scientific data.

Vocabulary

Atmosphere

Biosphere

Lithosphere

Hydrosphere

Layers of the Atmosphere

Physical Characteristics/Properties – density, temperature, chemical composition

Biogeochemical Cycles – Carbon-Oxygen Cycle, Nitrogen Cycle

Elements /Molecules – Nitrogen, Oxygen, Water Vapor, Carbon Dioxide

Trace Gases

Ozone

Greenhouse Gases

Global Warming

Air Quality

Point-source pollution

Nonpoint-source pollution

Causes and Effects of Pollution

Resources/Instructional Strategies

Prentice Hall Weather and Climate Books

Schlessinger videos

Movie: *An Inconvenient Truth*

Online Resources for Current Scientific Data: Ohi EPA’s Division of Air Pollution Control, NOAA, AirOhio, NCDC

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Research and Present Finding on Car Emissions Checks (Old vs. New Cars)

Research and Document Everyday Activities – Compare and Present Results to Discuss Amounts of Pollution Emitted

Schlessinger videos

Impact activity

Compare Air Quality of Local Cities, Share Results

Prepare a Presentation for a Biogeochemical Cycle

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Prepare and Present a Debate For or Against Global Warming

Design a Green City

Formative Assessment:

Lab observations

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Labs

Projects

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Third Quarter – 1.5 Weeks (Pollution and Atmosphere)

Structure of Knowledge

Science: Grade Seven

2016

**LIFE SCIENCE TOPIC: Cycles of Matter and Flow of Energy**

*This topic focuses on the impact of matter and energy transfer*

*within the biotic component of ecosystems.*

Content Statements

In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

Essential Understandings (Evidence of Understanding)

1. Biomes are regional ecosystems characterized by distinct types of organisms that have developed under specific soil and climatic conditions.

2. Biomes are defined by abiotic components of the environment – topography, soil types, precipitation, solar radiation, and temperature.

3. Earth’s biomes include aquatic (freshwater, brackish water, and marine water), forest (tropical and temperate), desert (cold and hot), grassland, taiga, and tundra.

4. An ecosystem is composed of linked and constantly changing interactions between biotic and abiotic factors.

5. Population growth is determined by limiting factors (food, space, predation, etc.)

Vocabulary

Biome

Aquatic Biomes – freshwater, brackish water, and marine water

Forest Biomes – tropical and temperate

Desert – cold and hot

Earth Biomes – grassland, taiga, and tundra

Abiotic/Biotic

Biodiversity

Ecosystem

Climate and Climate Zones

Topography

Limiting Factor

Succession

Disruption – deliberate and/or inadvertent

Predator-Prey (review)

Resources/Instructional Strategies

Prentice Hall Environmental Science Books

Online Resources: Missouri Botanical Garden, Freshwater Ecoregions of the World, World Wildlife Organization, The Virtual Nature Trail at Penn State, Project Wild and Project Wild Aquatic

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Cut and Paste: Biotic or Abiotic?

Write/Illustrate a Biomes Book

Limiting Factor Game (using candy)

Stick Bug Survival Activity

Can you hide a butterfly? Activity

Too Many Bears Activity

Research and Present an Endangered Species – Conservation Efforts (Who Would You Save?)

Compose a Letter to the Zoos (Conservation Efforts)

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Formative Assessment:

Lab Activities

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Lab Activities

Projects

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Third/Fourth Quarter – 2 Weeks (World Biomes)

Fourth Quarter – 1.5 Weeks (Populations and Communities)

Structure of Knowledge

Science: Grade Seven

2016

**EARTH AND SPACE TOPIC: Cycles and Patterns of Earth and the Moon**

*This topic focuses on Earth’s hydrologic cycle, patterns that exist in atmospheric*

*and oceanic currents, the relationship between thermal energy and the currents,*

*and the relative position and movement of the Earth, sun and moon.*

Content Statements

Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.

Essential Understandings (Evidence of Understanding)

1. The sun is the major source of energy for wind, air, ocean currents, and the hydrologic cycle.

2. Currents form as thermal energy transfers in the atmosphere and oceans.

3. Ocean currents are influenced by thermal energy, water density, salinity, ocean floor topography, and Earth’s rotation.

4. Atmospheric currents are influenced by thermal energy, density, pressure, composition, and topographic/geographic influences.

5. Large bodies of water can influence weather and climate.

Vocabulary

Sun and the Earth’s Rotation

Thermal Energy

Oceanic Current (The Gulf Stream)

Factors of oceanic currents – water density, mineral content, salinity, ocean floor topography

Causes of oceanic currents – thermal energy, density, pressure, composition, and topographic/geographic influences

Atmospheric Current (The Jet Stream)

Current Oceanic and Atmospheric Patterns

Resources/Instructional Strategies

Online Resources: NOAA Drifter Buoy Program (Adopt a Buoy Data), NCDC

Movie: *The Day After Tomorrow*

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Diagram General Patterns of the Jet Stream and Gulf Stream on a Poster

Design, Build, and Test a Buoy

Heating and Cooling Water Lab (Depth, Salinity, etc.)

Student Foldables for Naming Currents

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Formative Assessment:

Labs

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Summative Assessment:

Labs

Projects

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Third Quarter – 2 Weeks (World Biomes)

**LIFE SCIENCE TOPIC: Cycles of Matter and Flow of Energy**

*This topic focuses on the impact of matter and energy transfer*

*within the biotic component of ecosystems.*

Content Statements

Matter is transferred continuously between one organism to another and between organisms and their physical environments.

Essential Understandings (Evidence of Understanding)

1. Plants use energy in light to perform photosynthesis (make sugar from carbon dioxide and water).

2. Energy can be used up (respiration), stored, and passed from one living thing to the next.

3. Energy can transform from one form to another but the total amount of energy stays the same.

4. At each stage in the transfer of energy within an ecosystem, some energy is stored and some energy is lost in the environment as heat.

5. The elements that make up the molecules of living things are continuously recycled with the help of decomposers.

Vocabulary

Matter

Photosynthesis

Cellular Respiration

Digestion

Oxidizing/Oxidation

Organism

Consumer, Producer, and Decomposer

Conservation of Matter and Energy

Biodiversity

Chemical Formula

Chemical Reaction

Products and Reactants

Energy Pyramid – energy passed within pyramid and/or released as heat and/or returned to environment

Flow of Energy

Nitrogen fixation

Sugar/Sugar Polymers

Fossil Fuels?

Organelles – chloroplast (review)

Predator-Prey (review)

Resources/Instructional Strategies

Prentice Hall Environmental Science Books

Prentice Hall Cells and Heredity Books

Sciencesaurus Books

Schlessinger Education videos

Microscopes and Slides

Online Resource: Interactive Games to Review Cell Organelles

Diverse Learners

Cell Review Bingo Game (\*chloroplast)

Illustrate/Diagram Photosynthesis and Respiration

Schlessinger Education Videos

Energy Transfer examples

Cycles of Matter Review

Traveling Nitrogen Activity

Create a Chart to Compare Products and Reactants (for photosynthesis and respiration)

Create/Illustrate a Food Pyramid

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Formative Assessment:

Lab Activities

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Labs

Projects

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Fourth Quarter – 3 Weeks (Ecosystems)

Structure of Knowledge

Science: Grade Seven

2016

**EARTH AND SPACE SCIENCE TOPIC: Cycles and Patterns of Earth and the Moon**

*This topic focuses on Earth’s hydrologic cycle, patterns that exist in atmospheric*

*and oceanic currents, the relationship between thermal energy and the currents,*

*and the relative position and movement of the Earth, sun and moon.*

Content Statements

The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere, and atmosphere.

Essential Understandings (Evidence of Understanding)

1. Thermal energy is transferred as water changes state throughout the cycle and this movement of water through the spheres of Earth is known as the hydrologic cycle.

2. Geographic and topographic landforms as well as the porosity and permeability of the rock and soil affect the rate at which the water flows.

3. Ground water and surface water quality are important to the hydrologic cycle, and ground water is easily contaminated.

4. Drainage patterns and watersheds contribute to the cycling of water as it moves through the different spheres.

5. The cycling of water illustrates the relationship between water, energy, and, weather.

Vocabulary

Thermal Energy

Hydrologic Cycle (Changes of State – Water)

Porosity and Permeability of Soil/Rock

Contamination

Ground Water

Pollution

Sources of Pollution

Lithosphere

Biosphere

Hydrosphere

Atmosphere

Erosion and Weathering

Geographic and Topographic Landforms

Topographic and Aerial Maps

Water Shed

Resources/Instructional Strategies

Prentice Hall Weather and Climate Books

Online Resources: Healthy Water-Healthy People, The National Ground Water Association, USGS, The Ohio EPA, Project Wet, ODNR’s Division of Soil and Water Resources, The Monday Creek website , iTunes (Science Quest)

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

Investigate an Ohio Location that Exhibits a Unique Water Contamination Problem

Build a Model to Represent a Cross-Section of Earth’s Surface

Investigate and Use Tools to Measure Water Flow for Different Cross-Sections (ant farm)

Design a Poster That Identifies Changes in Thermal Energy in the Hydrologic Cycle

Analyze Topographic Maps (Locate Watersheds, Drainage Patterns)

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Formative Assessment:

Lab Activities

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

(Labs)

Projects

Cumulative Paper and/ Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Fourth Quarter – 3 Weeks (Pollution/The Hydrologic Cycle)

Structure of Knowledge

Science: Grade Seven

2016

**EARTH AND SPACE TOPIC: Cycles and Patterns of Earth and the Moon**

*This topic focuses on Earth’s hydrologic cycle, patterns that exist in atmospheric*

*and oceanic currents, the relationship between thermal energy and the currents,*

*and the relative position and movement of the Earth, sun and moon.*

Content Statements

The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.

Essential Understandings (Evidence of Understanding)

1. Gravity and inertia keep the planets in orbit around the sun.

2. Movement of the Earth, moon, and sun cause predictable and cyclical patterns.

3. The changing positions of the Earth and moon cause lunar/solar eclipses, daily tides, neap and spring tides, and phases of the moon.

Vocabulary

Earth, Sun, and Moon

Cyclical

Predictable

Orbit

Relative Position

Solar Eclipse

Shadow

Lunar Eclipse

Gravitational Force

Daily Oceanic Tides

Spring and Neap Tides

Moon Phases

Align

Perpendicular

Solar System

Galaxy (Milky Way)

Universe

Resources/Instructional Strategies

Prentice Hall Astronomy Books

Online Resources: NASA website, Griffith Observatory, How It Works, Real-World Data for Tides, BrainPop Videos

Nonfiction Reading: Current News Articles

Relevant Science Movies

ELA Reading Standards

RST 7.1 Cite specific textual evidence to support analysis of science and technical texts.

RST 7.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST 7.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Writing Standards

WS7.1 Write arguments focused on discipline-specific content.

A. Introduce claim about a topic or issue acknowledge and distinguish the claim from alternate or opposing claims and organize the reason and evidence logically.

B. Support claims with logical reason in and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

C. Use words, phrases, and clauses to create cohesion and clarify the relationship among claim (s). counterclaims, reasons, and evidence.

E. Provide a concluding statement or section that follows from and supports the argument presented.

WS7.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

A. Introduce a topic clearly, previewing that is to follow: organize ideas, concepts and information into broader categories as appropriate to achieving purpose: include formatting (e.g,headings,) graphics (e.g charts a, tables,) and multimedia when useful to aiding comprehension.

B. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

C. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

D. Use precise language and domain-specific vocabulary to inform about or explain the topic.

E. Establish and maintain a formal style and objective tone

F. Provide a concluding statement or section that follows from and supports the information or explanation presented.

WS7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

WS7.7 Conduct short research projects to answer a question (including a self-generated questions,) drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WS7.9 Daw evidence from informational texts to support analysis reflection, and research.

ELA Activities/Writing Prompts

Lab Reports with emphasis on writing conventions and literacy standards

non-fiction article or textbook section (text-dependent questions or extended response)

“picture walk” if applicable

Vocabulary WORD Wall (words that can not be misspelled throughout the unit)

possible informative/argumentative essays that could cross over to English class for editing

Diverse Learners

3-D Models of Solar/Lunar Eclipses, Phases of the Moon

Research/Observe and Chart the Moon Phases

Relative Size of the Solar System Class Project

Simulations of Eclipses, Tides, and Phases

Moon Phaser Activity

Graphic Organizer for Vocabulary Words

Class Word Wall for High-Frequency Words

Create a Poem, Rap, or Song to Explain Eclipses

Formative Assessment:

Lab Activities

K-W-L Charting

Think-Pair-Share

Toss the Ball Review

Entry/Exit Slips (Bellringers)

Homework Checks

Quizzes

Teacher Questioning

Teacher Observations

Zap! Review

Summative Assessment:

Labs

Projects

Cumulative Paper and Pencil Test

Quarter Taught and Length of Unit (Unit and Time Frame)

Fourth Quarter – 2.5 Weeks (Patterns of the Earth, Moon, and Sun)