

Wilson Area School District Planned Course Guide

Title of planned course: Science Grade 6

Subject Area: Science

Grade Level: 6

Course Description: This course is designed to provide students with an introductory exploration into Earth and Space and Physical Science. Students will delve into understanding the physical world around them. The Earth and Space unit will center on water, climate dynamics, and space exploration. By employing scientific inquiry, data analysis, and case studies, students will develop a holistic understanding of the intricate mechanisms underlying water dynamics and climate phenomena. In the Physical Science unit, the focus will be on comprehending waves and matter, encouraging students to engage in research and experimentation to deepen their understanding. Scientific process skills, integral to each unit, will be seamlessly integrated and practiced throughout the course.

Time/Credit for this Course: One full academic year

Curriculum Writing Committee: Amy Hertzog and Diana Partridge

Curriculum Map

August/September: Earth and Space

- Unit 1 - Exploring Space: The Sun-Earth-Moon System (3 weeks)
- Unit 1 - Exploring Space: Exploring the Universe (1 week)

October: Earth and Space

- Unit 1 - Exploring Space: Exploring the Universe (2 weeks)
- Unit 2 - Water and Climate: The Water Cycle (2 weeks)

November: Earth and Space

- Unit 2 - Water and Climate: The Water Cycle (1 week)
- Unit 2 - Water and Climate: Weather and Climate (2.5 weeks)

December: Earth and Space

- Unit 2 - Water and Climate: Weather and Climate (2.5 weeks)

January: Physical Science

- Unit 3 - Understanding Waves: Introduction to Waves (3 weeks)

February: Physical Science

- Unit 3 - Understanding Waves: Light (4 weeks)

March: Physical Science

- Unit 3 - Understanding Waves: Light (1 week)
- Unit 3 - Understanding Waves: Information Technologies (2 weeks)

April: Physical Science

- Unit 4 - Understanding Matter: Energy and Matter (3.5 weeks)

May/June: Physical Science

- Unit 4 - Understanding Matter: Energy and Matter (1 week)
- Unit 4 - Understanding Matter: Classification and States of Matter (3.5 weeks)

Wilson Area School District Planned Course Materials

Course Title: Science Grade 6

Textbook:

Inspire Science

McGraw Hill

2020

mheducation.com/prek-12

Teacher Resources:

Inspire Science

McGraw Hill

2020

Unit 1

Earth and Space

Exploring Space

mheducation.com/prek-12

Inspire Science

McGraw Hill

2020

Unit 2

Earth and Space

Water and Climate

mheducation.com/prek-12

Inspire Science

McGraw Hill

2020

Unit 2

Physical Science

Understanding Waves

mheducation.com/prek-12

Inspire Science

McGraw Hill

2020

Unit 3

Physical Science

Understanding Matter

mheducation.com/prek-12

[Study Island](#)

[CK12 Physical Science](#)

[CK12 Earth Science](#)

[Phet](#)

Curriculum Scope & Sequence

Planned Course: Science Grade 6

Unit 1: Earth and Space: Exploring Space

Time frame: 6 weeks

State Standards

- 3.3.6-8.A. A Develop and use a model of the Earth Sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- 3.3.6-8.B. Develop and use a model to describe the role of gravity in the motion within galaxies and the solar system.
- 3.3.6-8.C. Analyze and interpret data to determine scale properties of objects in the solar system.

Anchor(s) or adopted anchor:

- 3.3.6-8.A. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.3.1.1
- 3.3.6-8.B. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.3.1.1
- 3.3.6-8.C. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.3.1.1-3

Essential content/objectives: At end of the unit, students will be able to:

- Students will explore Earth's motion and the seasons. They will develop and use models to explain how Earth's rotation, revolution, and tilted axis cause the patterns of the seasons, day and night, and the apparent motions of the Sun, Moon, and stars in the sky.
- Students will explore the phases of the Moon. They will develop and use models to explain how the Moon's revolution relates to the pattern of lunar phases.
- Students will explore eclipses of the Sun and Moon. They will develop and use models to explain how the motions of Earth and the Moon relate to the pattern of solar and lunar eclipses.
- Students will develop and use models to describe the role of gravity in the formation of stars and the solar system. They also develop and use models to describe how gravity affects the motions of objects in the solar system, and they learn how galaxies are classified.
- Students will learn about the different types of objects in the solar system. They will analyze and interpret data to explore the technology scientists used to study the solar system. They will develop and use models to determine the scale properties of objects in the solar system.

Core Activities: Students will complete/participate in the following:

- Module 1: The Sun-Earth-Moon System (student workbook pg 3-69)
 - Lesson 1: Earth's Motion Around the Sun (student workbook pg 5-22)
 - Investigations:
 - Night and Day
 - Ahead of the Curve
 - Lesson 2: Lunar Phases (student workbook pg 25-38)
 - Writing piece: If water would be available on the moon, should humans live there?
 - Investigations:
 - Foil Moon
 - The Motion the the Moon
 - Lab: Moon Phases
 - Lesson 3: Eclipses (student workbook pg 41-58)

- Labs:
 - Beyond a Shadow of a Doubt
 - Casting Shadows
 - Investigation: Eclipse Essentials
 - STEM: Science Challenge: Patterns in the Sky
- Module 2: Exploring the Universe (student workbook pg 71-119)
 - Lesson 1: Gravity and the Universe (student workbook pg 73-89)
 - Investigations:
 - What Goes Up Must Come Down
 - Classification of Galaxies
 - Labs:
 - Changing Shape
 - Elliptical Orbits
 - Lesson 2: The Solar System (student workbook pg 91-110)
 - Investigations:
 - Compare the View
 - Graphing Characteristics
 - Digging Deeper
 - Moons of the Outer Planets
 - Labs:
 - Model the Inner Planets
 - Scale Down
 - STEM: Science Challenge: Wanted: Space Investigator

Extensions:

- Integrate technology for further exploration of scientific concepts
 - [Study Island](#) Grade 8 Science: Earth and Space Sciences
 - The Universe
 - The Solar System
 - The Earth, Sun & Moon
 - [CK12 Earth Science](#)
 - Chapter 3: Planet Earth
 - Chapter 22: The Solar System
 - Chapter 23: Beyond the Solar System
 - Phet
 - [My Solar System](#)
 - [Kepler's Laws](#)
 - [Gravity and Orbits](#)
- Project: Students will apply their understanding of health to research how seasonal cycles affect the human body.
- Research: Investigate the relationship between the theory of relativity and solar eclipses
- Research project: Kepler's laws of planetary motion
- Math connection: Design a scale model that compares sizes of inner planets and the distance from the Sun
- Teacher generated digital practice for Exploring Space skills (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, Quizizz)

Remediation:

- Differentiated small group instruction
 - Students use themselves as props to demonstrate why Sun appears to rise and set
 - Draw Earth's orbital path

- Draw and label parts of a shadow
- Remediation on forces and gravity
- Complete Reading Essentials from textbook on each lesson
- Differentiated materials, assignments, and assessments
- Additional online practice
 - Textbook Interactive: What is the role of gravity in the formation of the solar system
 - Textbook Interactive: How are galaxies classified?

Instructional Methods:

- Direct instruction
- Note-taking strategies
- Labs and Investigations
- C.E.R. (Claim/Evidence/Reasoning)
- Centers/stations
- Modeling
- Small and large-group direct instruction
- Small and large-group discussion
- Differentiated instruction
- Practice with online programs (i.e. Online textbook, [Phet](#), Study Island, [CK12 Earth Science](#))

Materials & Resources:

- Inspire Science
McGraw Hill
2020
Unit 1
Earth and Space
Exploring Space
mheducation.com/prek-12
- Teacher-generated guided note sheets
- Practice book and masters
- Calculators
- Digital practice (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, [Study Island](#), [CK12 Earth Science](#), [Phet](#))
- Lab/Investigation materials

Assessments:

- Diagnostic:
 - Questioning
 - Small and large group discussion
 - Quick Checks
 - Student observation
 - Online resources
- Formative:
 - Warm ups
 - Quizzes
 - Worksheets and activities
 - Labs and Investigations
 - Online resources
- Summative:
 - End-of-unit assessment and/or projects
 - Labs and Investigations

Curriculum Scope & Sequence

Planned Course: Science Grade 6

Unit 2: Earth and Space: Water and Climate

Time frame: 8 weeks

State Standards

- 3.3.6-8.E. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- 3.3.6-8.F. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- 3.3.6-8.H. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- 3.3.6-8.I. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
- 3.3.6-8.J. Collect data to provide evidence for how the motion and complex interactions of air masses result in changes in weather conditions.
- 3.3.6-8.O. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
- 3.3.6-8.L. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects

Anchor(s) or adopted anchor:

- 3.3.6-8.E. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.1.1.1-4; S8.D.2.1.2
- 3.3.6-8.F. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.1.1.1-4; S8.D.2.1.2
- 3.3.6-8.H. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.1.3.1-4
- 3.3.6-8.I. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.1.3.1-4
- 3.3.6-8.J. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.2.1.1-3
- 3.3.6-8.O. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.2.1.1-3
- 3.3.6-8.L. Anchors: S8.A.1.1-3; S8.A.2.1-2; S8.A.3.1-3; S8.D.1.1.2

Essential content/objectives: At end of the unit, students will be able to:

- Students will explore how the transfer of thermal energy drives processes of the water cycle, including evaporation, condensation, and crystallization. They will develop and use models to enhance their understanding of these processes.
- Students will continue their exploration of how water cycles among Earth's systems, focusing on precipitation, runoff, and the role of gravity in moving water downhill. They will recognize various water reservoirs and develop and use models about these concepts.
- Students will investigate the transfer of energy from the Sun to Earth and the atmosphere. They will develop and use models to describe the unequal heating of Earth by the Sun and how energy flows through the system of Earth and the atmosphere.
- Students will investigate the transfer of energy from the Sun to Earth and the atmosphere. They will develop and use models to describe the unequal heating of Earth by the Sun and how energy flows through the system of Earth and the atmosphere.
- Students will explore climate and the factors that determine regional climates. They will develop and use models to enhance their understanding of how factors including unequal heating by the Sun, latitude, altitude, and patterns of atmospheric and oceanic circulation determine regional climates.

Core Activities: Students will complete/participate in the following:

- Module 1 The Water Cycle: (student workbook pg 3-43)
 - Lesson 1: Water in the Atmosphere (student workbook pg 5-20)
 - Labs:
 - Into Thin Air
 - Out of Thin Air
 - Lesson 2: Water on Earth's Surface (student workbook pg 23-36)
 - Lab: Make it Rain
 - Investigations:
 - Streaming By
 - Rivers of Ice
 - STEM: Science Challenge: Dinosaurs and Dew
 - Module 2: Weather and Climate (student workbook pg 45-161)
 - Lesson 1: Solar Energy on Earth (student workbook pg 47-69)
 - Labs:
 - Shine On
 - Warm Up and Cool Down
 - Hot Air
 - To Absorb, or Not to Absorb
 - Lesson 2: Atmospheric and Oceanic Circulation (student workbook pg 71-94)
 - Labs:
 - Moving Air
 - Moving Water
 - Toys Ahoy
 - Investigations:
 - It's a Breeze
 - Rise and Fall, then Repeat
 - It's a Blowin'
 - Ahead of the Curve
 - It's on the Surface
 - The Great Ocean Conveyor Belt
 - Lesson 3: Weather Patterns (student workbook pg 97-126)
 - Investigations:
 - Listen Up
 - Describing Weather
 - Characteristics of Air Masses
 - Pressure Changes
 - Highs and Lows
 - Air Mass Collision Course
 - Come Rain or Shine
 - Labs:
 - Feel the Air
 - Predicting Weather
 - Lesson 4: Climates on Earth (student workbook pg 129-152)
 - Investigations:
 - Takin' the Temp of Earth
 - In the Air
 - A Tale of Three Cities
 - Patterns of Precipitation
 - Patterns of Plant Growth

- STEM: Science Challenge: As the Water Churns

Extensions:

- Integrate technology for further exploration of scientific concepts
 - [Study Island](#) Grade 8 Science: Earth and Space Sciences
 - Earth's Water System
 - The Water Cycle
 - Weather and Climate
 - [CK12 Earth Science](#)
 - Chapter 3: Planet Earth
 - Chapter 11: Weather
 - Chapter 12: Climate
 - Phet
 - [Greenhouse Effect](#)
- Engineering Project: Design a device to turn saltwater into freshwater
- Project: Explore how reflection and refraction form solar halos
- Research thermal energy and convection
- Historical Research: Research how jet streams impacted planes in WWII
- Slideshow: Research how climate change affects organisms on Earth
- Teacher generated digital practice for Exploring Space skills (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, Quizizz)

Remediation:

- Differentiated small group instruction
 - Draw models of evaporation
 - Make Venn Diagrams to compare condensation and evaporation
 - Complete Reading Essentials from textbook on each lesson
 - Draw pictures to explain surface currents and gyres
 - Make sequencing diagrams for cold and warm fronts
 - Write a numbered list showing the sequence of events in forming a rain shadow
 - Compare and contrast climates from different regions
- Differentiated materials, assignments, and assessments
- Additional online practice
 - Textbook interactive: Where is water on Earth?
 - Textbook interactive: How can you get water to reappear?
 - Textbook Interactive: Solar Energy on Earth
 - Textbook Interactive: Air Pressure Ideas

Instructional Methods:

- Direct instruction
- Note-taking strategies
- Labs and Investigations
- C.E.R. (Claim/Evidence/Reasoning)
- Centers/stations
- Modeling
- Small and large-group direct instruction
- Small and large-group discussion
- Differentiated instruction
- Practice with online programs (i.e. Online textbook, [Phet](#), Study Island, [CK12 Earth Science](#))

Materials & Resources:

- Inspire Science
McGraw Hill
2020
Unit 2
Earth and Space
Water and Climate
mheducation.com/prek-12
- Teacher-generated guided note sheets
- Practice book and masters
- Calculators
- Digital practice (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, [Study Island](#), [CK12 Earth Science](#), [Phet](#))
- Lab/Investigation materials

Assessments:

- Diagnostic:
 - Questioning
 - Small and large group discussion
 - Quick Checks
 - Student observation
 - Online resources
- Formative:
 - Warm ups
 - Quizzes
 - Worksheets and activities
 - Labs and Investigations
 - Online resources
- Summative:
 - End-of-unit assessment and/or projects
 - Labs and Investigations

Curriculum Scope & Sequence

Planned Course: Science Grade 6

Unit 3: Physical Science: Understanding Waves

Time frame: 10 weeks

State Standards

- 3.2.6-8.Q. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- 3.2.6-8.R. Develop and use a model to describe how waves are reflected, absorbed, or transmitted through various materials.
- 3.2.6-8.S. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals

Anchor(s) or adopted anchor:

- 3.2.6-8.Q. Anchor: S8.A.1.1
- 3.2.6-8.R. Anchor: S8.A.1.1
- 3.2.6-8.S. Anchors: S8.A.1.3 S8.A.2.1 S8.A.2.2

Essential content/objectives: At end of the unit, students will be able to:

- Students will explore mechanical wave properties by modeling mechanical waves using mathematical representations and identifying patterns in data gathered by observing a variety of mechanical waves.
- Students will use structures to investigate how mechanical waves are reflected, absorbed, or transmitted through various materials, and develop models to describe the phenomena they observe.
- Students will develop and use models to describe light's path as straight lines and to describe how objects function to interact with light waves through reflection, absorption, and transmission.
- Students will develop and use models to investigate how light interacts with matter through reflection. They will examine the structure and function of plane, convex, and concave mirrors.
- Students will develop and use models to investigate how light interacts with matter through transmission and refraction. They will trace the path of light where it bends at surfaces between different transparent materials by examining the structure and function of convex and concave lenses.
- Students will explore the function of prisms and raindrops in the frequency dependent bending of light at a surface between media that results in the separation of the colors of light. They will develop and use models to explain how the colors of objects depend on the object's material and the frequency (color) of the light.
- Students will explore different ways that information can be encoded and transmitted, while obtaining, evaluating, and communicating information about the role of science in developing and using information technologies.
- Students will compare digitized signals to analog signals, constructing explanations about how noise can cause an analog signal to degrade over time, whereas a digital signal can be reproduced and transmitted consistently.

Core Activities: Students will complete/participate in the following:

- Module 1: Introduction to Waves (student workbook pg 3-61)

- Lesson 1: Wave Properties (student workbook pg 5-32)
 - Labs:
 - Making Waves
 - Strike That
 - Don't be Alarmed
 - Ride the Wave
 - Fever Pitch
 - Lesson 2: Mechanical Wave Interactions (student workbook pg 35-52)
 - Labs: Crashing Waves
 - Echo, Echo
 - Breaking Waves
 - Investigation:
 - It's All Material
 - STEM: Engineering Challenge: Don't Make Waves
- Module 2: Light (student workbook pg 63-149)
 - Lesson 1: How Light Travels (student workbook pg 65-82)
 - Labs:
 - Lights Out
 - Light and Matter
 - Investigation:
 - Across the Wavelengths
 - Lesson 2: Reflection and Mirrors (student workbook pg 85-102)
 - Labs:
 - Mirrored View
 - Two Sided
 - The Rough Side
 - Lesson 3: Refraction and Lenses (student workbook pg 105-120)
 - Labs:
 - Bending Light
 - Looking Through the Lens
 - Lesson 4: Color of Light (student workbook pg 123-140)
 - Labs
 - Rainbow Bright
 - Concepts of Color
 - Investigation:
 - Color Differences
 - STEM: Engineering Challenge: Optical Illusions
- Module 3: Information Technologies (student workbook pg 151-199)
 - Lesson 1: Communicating with Signals (student workbook pg 153-166)
 - Investigations:
 - Signal This
 - Passing on Signals
 - Fiber Optics
 - Phone a Friend
 - Lesson 2: Modern Communication with Digital Signals (student workbook pg 169-192)
 - Labs:
 - Continuous Signals
 - Informations Stairs
 - Investigations:
 - Without a Trace
 - The Computer Domino Effect

- Trace Back
- STEM: Science Challenge: Out With the Old, In With the New

Extensions:

- Integrate technology for further exploration of scientific concepts
 - [Study Island](#) Grade 8 Science: Physical Sciences
 - Forms of Energy
 - Energy Transformations
 - [CK12 Physical Science](#)
 - Chapter 16: Waves
 - Chapter 17: Electromagnetic Radiation
 - Phet
 - [Waves Intro](#)
 - [Blackbody Spectrum](#)
 - [Wave on a String](#)
 - [Wave Interference](#)
- Research Earthquakes: mechanical waves in the form of seismic waves
- Research the structure of the human ear and how cochlear implants work
- Research the human eye and how the cornea refracts light
- Draw objects and how they would look through convex and concave lenses
- Explore color subtraction through the mixing of pigments
- Use a binary character table to write their names
- Teacher generated digital practice for Exploring Space skills (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, Quizizz)

Remediation:

- Differentiated small group instruction
 - Illustrate terms from the sections
 - Further investigation on electromagnetic waves (microwaves, gamma rays, radio waves)
 - Categorize objects as transparent, translucent, or opaque
 - Make readable images in a mirror
 - Create Venn Diagrams for convex and concave mirrors
 - Use kaleidoscopes to show reflection
 - Look through magnifying lenses and draw what is seen
 - Draw diagrams of light passing through a prism
 - Complete Reading Essentials from textbook on each lesson
- Differentiated materials, assignments, and assessments
- Additional online practice
 - Textbook Interactive: How does energy affect a wave?
 - Textbook Interactive: Reflection and mirrors.
 - Textbook Interactive: The color of light.

Instructional Methods:

- Direct instruction
- Note-taking strategies
- Labs and Investigations
- C.E.R. (Claim/Evidence/Reasoning)
- Centers/stations
- Modeling
- Small and large-group direct instruction
- Small and large-group discussion

- Differentiated instruction
- Practice with online programs (i.e. Online textbook, [Phet](#), Study Island, [CK12 Physical Science](#))

Materials & Resources:

- Inspire Science
McGraw Hill
2020
Unit 2
Physical Science
Understanding Waves
mheducation.com/prek-12
- Teacher-generated guided note sheets
- Practice book and masters
- Calculators
- Digital practice (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, [Study Island](#), [CK12 Physical Science](#), [Phet](#))
- Lab/Investigation materials

Assessments:

- Diagnostic:
 - Questioning
 - Small and large group discussion
 - Quick Checks
 - Student observation
 - Online resources
- Formative:
 - Warm ups
 - Quizzes
 - Worksheets and activities
 - Labs and Investigations
 - Online resources
- Summative:
 - End-of-unit assessment and/or projects
 - Labs and Investigations

Curriculum Scope & Sequence

Planned Course: Science Grade 6

Unit 4: Physical Science: Understanding Matter

Time frame: 10 weeks

State Standards:

- 3.2.6-8.A. Develop models to describe the atomic composition of simple molecules and extended structures.
- 3.2.6-8.B. Develop a model that predicts and describes changes in the particle motion, temperature and state of a pure substance when thermal energy is added or removed
- 3.2.6-8.E. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- 3.2.6-8.F. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
- 3.2.6-8.M. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
- 3.2.6-8.N. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

Anchor(s) or adopted anchor:

- 3.2.6-8.A. Anchors: S8.C.1.1.1 S8.C.1.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2
- 3.2.6-8.B. Anchors: S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.C.1.1.2
- 3.2.6-8.E. Anchors: S8.C.1.1.3 S8.A.1.3 S8.A.2.1 S8.A.2.2
- 3.2.6-8.F. Anchors: S8.C.1.1.1 S8.C.1.1.3 S8.A.1.3 S8.A.2.1 S8.A.2.2
- 3.2.6-8.M. Anchors: S8.A.3.2 S8.C.2.1.2
- 3.2.6-8.N. Anchors: S8.A.2.1 S8.A.2.2 S8.C.2.1.3

Essential content/objectives: At end of the unit, students will be able to:

- Students will carry out investigations to determine the relationships among the energy transferred, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. They will develop and use models to enhance their understanding of these relationships.
- Students will carry out investigations to determine the relationships among the energy transferred, the type of matter and its mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. They will construct explanations of these relationships for a variety of substances.
- Students will explore how energy moves when objects are at different temperatures. They will develop and use models to enhance their understanding of this process.
- Students will plan and carry out investigations to understand factors, such as the nature of the matter and the size of the sample, affect the amount of energy transfer needed to change the temperature of a sample of matter.
- Students will explore the structure and properties of matter in the gas, liquid, and solid states and compare the energy of the particles in each of the states. They will develop and use models and work with scale, proportion, and quantity to enhance their understanding of matter.
- Students will explore how changes in temperature affects the structure and properties of matter in the gas, liquid, and solid states and compare the energy of particles as matter

changes from one state to another. They will develop and use models and work with scale, proportion, and quantity to enhance their understanding of matter.

- Students will explore the structure and properties of matter in the gas, liquid, and solid states in relation to pressure. They will develop and use models and analyze cause and effect relationships to enhance their understanding of how changes in pressure affect matter.
- Students will explore how to classify elements and compounds. They will investigate the structure and properties of elements, covalent compounds, and ionic compounds. They will develop and use models, considering scale, proportion, and quantity, to enhance their understanding of these concepts.

Core Activities: Students will complete/participate in the following:

- Module 1: Energy and Matter (student workbook pg 3-99)
 - Lesson 1: Particles in Motion (student workbook pg 5-26)
 - Labs:
 - Wait for It
 - In Hot Water
 - Investigations:
 - Ready, Set, Collide
 - On the Rise
 - It's a Gas
 - Still Solid
 - Lesson 2: States of Matter (student workbook pg 29-50)
 - Lab:
 - Phase Changes
 - Investigations:
 - Next Phase
 - Changing Energy
 - Turn Up the Heat
 - Energy Factors
 - Lesson 3: Thermal Energy Transfers (student workbook pg 53-68)
 - Labs:
 - Transferring Temperature
 - Transferring Temperature Over Time
 - Lights On
 - Investigation: Rising Liquids
 - Lesson 4: Thermal Energy Conductivity (student workbook pg 71-99)
 - Labs:
 - Massing Around
 - Melt Down
 - Tall, Thin, or Tough
 - Investigation: Heat of Water
 - STEM: Engineering Challenge: Cookin' with the Sun
- Module 2: Classification and States of Matter (student workbook pg 101-203)
 - Lesson 1: Energy and States of Matter (student workbook pg 103-124)
 - Lab: Matter IDs
 - Investigations:
 - Particles in States of Matter
 - Temperature and States of Matter
 - Breaking Down Water
 - Compound Ratios
 - Element Symbols

- Lesson 2: Changes in Temperature (student workbook pg 127-150)
 - Labs:
 - Growing Air
 - Energy on the Move
 - Don't Spill
 - Under Pressure
- Lesson 3: Changes in Pressure (student workbook pg 153-168)
 - Labs:
 - Pile on the Pressure
 - Reload the Pressure
 - Investigation: Phase Out, Phase In
- Lesson 4: Molecular Structure (student workbook pg 171-192)
 - Labs:
 - Examining Elements
 - Comparing Compounds
 - Investigations:
 - Organize the Elements
 - Organize the Compounds
 - Comparing Extended Structures
 - Comparing Molecules
- STEM: Science Challenge: Cycling Across the States

Extensions:

- Integrate technology for further exploration of scientific concepts
 - [Study Island](#) Grade 8 Science: Physical Sciences
 - Elements, Compounds, and Mixtures
 - Heat Transfer
 - [CK12 Physical Science](#)
 - Chapter 2: Matter and Change
 - Chapter 15: Thermal Energy and Heat
 - Phet
 - [States of Matter: Basic](#)
 - [Molecule Shapes: Basic](#)
 - [Build an Atom](#)
- Engineering: Research criteria and constraints for expansion joints in new bridges
- Create posters for how thermal energy is transferred
- Research portable showers
- Research the properties of plasma, the fourth state of matter
- Connect Boyle's Law to real world applications
- Write a newscast about fullerenes
- Teacher generated digital practice for Exploring Space skills (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, Quizizz)

Remediation:

- Differentiated small group instruction
 - Draw models of groups of particles using different numbers of motion lines
 - Create a concept map for the states of matter
 - Draw out the "cooling curve" as liquids turn to solids
 - Contrast temperature vs thermal energy
 - Create Venn Diagrams for open and closed systems
 - Act out the movement of particles in the various states of matter

- Use props to compare the structure of molecules
- Complete Reading Essentials from textbook on each lesson
- Differentiated materials, assignments, and assessments
- Additional online practice
 - Textbook Interactive: What factors determine the total energy of a substance?
 - Textbook Interactive: Feeling pressured
 - Textbook Interactive: Hot Soup
 - Textbook Interactive: Thermal energy conductivity
 - Textbook Interactive: The size of an atom

Instructional Methods:

- Direct instruction
- Note-taking strategies
- Labs and Investigations
- C.E.R. (Claim/Evidence/Reasoning)
- Centers/stations
- Modeling
- Small and large-group direct instruction
- Small and large-group discussion
- Differentiated instruction
- Practice with online programs (i.e. Online textbook, [Phet](#), Study Island, [CK12 Physical Science](#))

Materials & Resources:

- Inspire Science
McGraw Hill
2020
Unit 3
Physical Science
Understanding Matter
mheducation.com/prek-12
- Teacher-generated guided note sheets
- Practice book and masters
- Calculators
- Digital practice (i.e. Google Docs, Google Slides, Nearpod, Classkick, Edpuzzle, Google Sheets, [Study Island](#), [CK12 Physical Science](#), [Phet](#))
- Lab/Investigation materials

Assessments:

- Diagnostic:
 - Questioning
 - Small and large group discussion
 - Quick Checks
 - Student observation
 - Online resources
- Formative:
 - Warm ups
 - Quizzes
 - Worksheets and activities
 - Labs and Investigations
 - Online resources

- Summative:
 - End-of-unit assessment and/or projects
 - Labs and Investigations