# 8th Grade Science

## Link Community Charter School

| UNITS (8/8 SELECTED) | SUGGESTED DURATION |
| --- | --- |
| Unit 1: Introduction to Matter | *20 lessons* |
| Unit 2: Solids, Liquids, and Gasses | *18 lessons* |
| Unit 3: Energy | *18 lessons* |
| Unit 4: Atoms and the Periodic Table | *20 lessons* |
| Unit 5: Chemical Reactions | *18 lessons* |
| Unit 6: Forces and Motion | *20 lessons* |
| Unit 7: Mini lessons to review Earth and Life Science Concepts | *15 lessons* |
| Unit 8: Waves and Electromagnetic Radiation | *20 lessons* |

# Unit 1: Introduction to Matter

**8th Grade Science** - *Last Updated on August 26, 2021*

## STANDARDS ADDRESSED

| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
| --- |
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| MS-PS1-2 |
| Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
| 1 |
| Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. |
| **Next Generation Science (NGSS) - Middle School - Science and Engineering Practices** |
| 1. |
| Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. |
| 1.1.a |
| Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. |
| 1.1.b |
| Ask questions to identify and/or clarify evidence and/or the premise(s) of an argument. |
| 1.1.c |
| Ask questions to determine relationships between independent and dependent variables and relationships in models. |
| 1.1.d |
| Ask questions to clarify and/or refine a model, an explanation, or an engineering problem. |

# Unit 1: Introduction to Matter

**8th Grade Science** - *Last Updated on August 26, 2021*

## DESIRED RESULTS

**Established Goals**

**In this unit, students will be able to independently use their learning to classify matter based on its physical properties, measurable properties, and matter's abilities to change state or change form. Students learn that all of these concepts apply when identifying matter. They are important to know so that proper materials are combined (or not combined). They also lead to advancements in technology such as superconductivity and new products.**

**Transfer**

Students will be able to independently use their learning to describe and classify matter.

**Meaning**

| Big Ideas & Understandings | Essential Questions |
|---|---|
| Students will understand that...<br>• Anything that has mass and takes up space is matter<br>• The chemical and physical properties of matter are unique<br>• Different types of matter have different properties<br>• Homogeneous and heterogeneous mixtures have a unique set of properties | Students will keep considering...<br>• What matter is made of?<br>• What properties describe matter?<br>• How can different types of matter be classified? |
| • Matter can be measured<br>• Mass and weight are two different concepts<br>• Data can be used to identify and calculate properties of matter<br>• Data can be used to identify and calculate density as a function of mass and volume | • How can matter be measured?<br>• How properties of matter can be determined through measurement? |
| • Ratio reasoning and data can be used to determine how matter is conserved during a physical and chemical change<br>• Ratio reasoning and data can be used to determine how thermal energy is transformed during a chemical change | • How are changes in matter related to changes in energy?<br>• What is the difference between a physical change and a chemical change? |

| Meaning | |
|---|---|
| • There is a difference between a physical and chemical change<br>• Changes in matter are related to change in energy | |

| Acquisition | |
|---|---|
| **Knowledge** | **Skills** |
| Students will know...<br>• What makes up matter.<br>• The properties of matter<br>• Examples of chemical and physical properties of matter<br>• Different types of matter<br>• The classification of homogeneous and heterogeneous mixtures<br>• The basic concepts and definitions of the following words: matter, substance, physical property, chemical property, atom, element, molecule, compound, and mixture<br>• Mass can be measured<br>• Mass can be compared to weight<br>• Properties of matter can be determined through measurement<br>• Density is a function of mass and volume<br>• The basic concept and definition of the following vocabulary words: mass, volume, weight, density, and convert.<br>• Matter is conserved during a physical and chemical change<br>• Thermal energy is transformed during a chemical change | Students will be skilled at...<br>• Constructing and using models to explain and describe what makes up matter<br>• Using visual examples to describe the properties of matter and examples of chemical and physical properties of matter<br>• Citing evidence to classify different types of matter and different types of homogeneous and heterogeneous mixtures<br>• Explain orally or in written form that a pure substance has characteristics physical and chemical properties that can be used to identify it.<br>• Explain orally or in written form that when chemical change takes place, the atoms of the original substances are regrouped to form different molecules. |

| Acquisition | |
|---|---|
| • The difference between a physical and chemical change<br>• That changes in matter are related to changes in energy<br>• The meaning of the terms: physical change, chemical change, and conservation | |

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>*Some of the possible choices:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Investigate Lab: Developing models of atoms and molecules<br>• Interactivity: Investigate the particle theory of matter<br>• Hands-On Lab: Modeling atoms and Molecules<br>• Interactivity: Develop models of extended structures including molecules<br>• Lesson 1 Check<br>• Quest Check-in: The Science of Special Effects<br>• Lesson 1 Quiz<br>• Careers: Saving The Art World<br>• U Investigate: Explore the physical properties of mass, volume, and density<br>• Hands-On Lab: Which has more mass?<br>• Interactivity: Investigate density using various materials<br>• Hands-on Lab: Observing Physical Properties<br>• Lesson 2 Check<br>• Lesson 2 Quiz<br>• Case Study: An Epic Disaster<br>• U Investigate: Explore physical and chemical changes<br>• Hands-On Lab: Is A New Substance Formed?<br>• Interactivity: Investigate different properties of matter<br>• Hands-On Lab: Physical and Chemical Changes<br>• Lesson 3 Check<br>• Quest Check-In: Mysterious Movie Fog<br>• U Engineer IT!: Design Challenge<br>• Lesson 3 Quiz<br>• Topic 1 Review and Assess |

| | |
|---|---|
| | • Topic 1 Test<br>• Quest Findings: Reflect on Your Movie Scene<br>• U Demonstrate Lab: Help Out The Wildlife |
| | Other Evidence:<br>• Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Introduction to Matter

- Matter
- Components of Matter
- Types of Matter

Lesson 2: Measuring Matter

- Expressing Weight, Mass, and Volume
- Determining Density
- Using Density

Lesson 3: Changes in Matter

- Physical Changes in Matter
- Chemical Changes in Matter
- Energy and Matter Are Related

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

# Unit 2: Solids, Liquids, and Gasses

**8th Grade Science** - *Last Updated on July 6, 2021*

## STANDARDS ADDRESSED

| **Next Generation Science (NGSS) - Middle School - Physical Sciences - Disciplinary Core Ideas** |
|---|
| PS1.A.3 |
| Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4) |
| PS1.A.4 |
| In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4) |
| PS1.A.6 |
| The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4) |
| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
| 2.2 |
| Cause and effect relationships may be used to predict phenomena in natural or designed systems. |
| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
| MS-PS1-4 |
| Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. |
| **Next Generation Science (NGSS) - Middle School - Science and Engineering Practices** |
| 2. |
| Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. |
| 3. |
| Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. |
| 7. |
| Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and |

designed world(s).

# Unit 2: Solids, Liquids, and Gasses

**8th Grade Science** - *Last Updated on July 6, 2021*

## DESIRED RESULTS

| Established Goals |
| --- |
| In this topic, students examine solids, liquids, and gasses based on their properties. This includes their reactions to temperature changes and their relationship to pressure and volume at the particle level |

| Transfer |
| --- |
| Students will be able to independently use their learning to examine solids. liquids, and gasses. |

| Meaning | |
| --- | --- |
| **Big Ideas & Understandings** | **Essential Questions** |
| Students will understand that...<br>• Particle arrangement and behavior define each of the three states of matter<br>• Scientific reasoning is used to determine the effects of thermal energy and pressure on matter at the particle level<br>• There is a relationship between temperature, pressure, and volume as they apply to particle behavior of gases | Students will keep considering...<br>• **What are the similarities and differences between solids, liquids, and gasses?**<br>• **What is the relationship between particle motion and state of matter?**<br>• **How does thermal energy play a role in particle motion and change of state?**<br>• **What happens to particles during changes of state between solids, liquids, and gasses?**<br>• How does pressure affect the change of state from solid to liquid?<br>• **How do changes in particle motion of a gas affect physical properties?**<br>• **How are the temperature, pressure, and volume of a gas related?** |

| Acquisition | |
| --- | --- |
| **Knowledge** | **Skills** |
| Students will know... | Students will be skilled at... |

| Acquisition | |
|---|---|
| • **Solids have a definite shape and volume**<br>• **Liquids have a definite volume but no definite shape**<br>• **Surface Tension is an inward pull among the molecules of a liquid that brings the molecules on the surface closer together**<br>• **Viscosity is resistance to flowing**<br>• **Gasses have neither a definite shape or volume**<br>• **Thermal energy is the total kinetic and potential energy of all the particles in an object or substance**<br>• **Temperature is a measure of the average kinetic energy of the particles in an object**<br>• **Melting Point is the temperature at which a substance changes from a solid to a liquid**<br>• **Freezing Point is the temperature at which a liquid freezes**<br>• **Vaporization is the change of state from a liquid to a gas**<br>• **Boiling Point is the temperature at which a liquid boils**<br>• **Evaporation is the process by which molecules at the surface of a liquid absorb enough energy to change into a gas**<br>• **Pressure = Force / Area**<br>• **Condensation is the change in state from a gas to a liquid**<br>• **Sublimation occurs when the surface particles of a solid gain enough energy that they form a gas**<br>• **Pressure is the force pushing on a surface divided by the area of that surface**<br>• **Boyle's Law is the relationship between the pressure and volume of a gas at a constant temperature**<br>• **Charles Law is the relationship between the temperature and volume of a gas at a constant temperature** | • developing models to describe phenomena.<br>• conducting an investigation that will yield data needed to support goals.<br>• constructing a scientific explanation based on valid and reliable evidence.<br>• applying their knowledge of atoms to explain the differences among solids, liquids, and gasses.<br>• Use cause and effect to explain and predict changes in natural systems<br>• making and use models to represent systems and their interactions<br>• realizing that changes in one part of a system may cause changes in another part of the system |

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists: | Performance Task(s): |
| * Some of the options that may be used include:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | • Hands-On Lab: Distinguish between states of matter by understanding their properties<br>• Quest Kickoff: How can you use solids, liquids, and gasses to lift a car?<br>• U Connect lad: Solids, Liquids, and Gasses<br>• Lesson 1 Check<br>• U Engineer It: From Ink to 3D Printing<br>• Lesson 1 Quiz<br>• Hands-On Lab: Examine how particles move in relation to temperature<br>• Interactivity: States of Matter<br>• Hands-On Lab: Understanding why fog can sometimes form on a mirror<br>• Lesson 2 Check<br>• Quest Check-In: Identify strengths and weaknesses of your quest design<br>• Lesson 2 Quiz<br>• U Investigate: Test Charles Law and Boyle's Law<br>• Hands-On Lab: Discover how bubble wrap can prevent chalk from breaking<br>• Interactivity: Watch to understand a video demonstrating Charles Law and Boyle's Law<br>• Lesson 3 Check<br>• Quest Check-in: Phases of Matter, test design devices<br>• Lesson 3 Quiz<br>• Topic 2 Review and Assess<br>• Topic 2 Test<br>• Case Study: Rising To The Occasion<br><br>Other Evidence: |

| | |
|---|---|
| | • Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Topic 2: Solids, Liquids, and Gasses

Lesson 1: States of Matter

- Solids, Liquids, and Gasses
- Describing Gasses
- Describing Liquids
- Describing Gasses

Lesson 2: Changes of State

- Thermal Energy and Temperature
- Changes of State Between Solids and Liquids
- Changes of State Between Liquid and Gas
- Changing State From Solid to gas

Lesson 3: Gas behavior

- Pressure and Temperature of Gas
- Temperature and Volume
- Pressure and Volume

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

# Unit 3: Energy

**8th Grade Science** - *Last Updated on July 6, 2021*

**STANDARDS ADDRESSED**

| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
|---|
| 2.2 |
| Cause and effect relationships may be used to predict phenomena in natural or designed systems. |
| 5 |
| Energy and Matter: Flows, Cycles, and Conservation: Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. |
| 3 |
| Scale, Proportion, and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. |
| 4 |
| Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. |
| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
| MS-PS3-1 |
| Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. |
| MS-PS3-2 |
| Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. |
| MS-PS3-5 |
| Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. |
| **Next Generation Science (NGSS) - Middle School - Science and Engineering Practices** |
| 6.1 |
| Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena. |

| 6.5 |
| --- |
| Apply scientific reasoning to show why the data or evidence is adequate for the explanation or conclusion. |
| 6.6 |
| Apply scientific ideas or principles to design, construct, and/or test a design of an object, tool, process or system. |

# Unit 3: Energy

**8th Grade Science** - *Last Updated on July 6, 2021*

## DESIRED RESULTS

### Established Goals

In this unit, students will learn about the nature and role of energy in the world and apply concepts related to kinetic and potential energy to demonstrate how energy is transferred and transformed. Students will use this information to trace energy through a system, understand where energy comes from and how and why energy is used, and make informed decisions about the use of energy to accomplish specific tasks.

### Transfer

Students will be able to independently use their learning to determine how energy causes change, is transferred, is classified, and measured.

### Meaning

| Big Ideas & Understandings | Essential Questions |
| --- | --- |
| Students will understand that...<br>• **It takes energy for motion to occur**<br>• **Energy is transferred during work**<br>• **There is a relationship between energy, motion, force, and work**<br>• **There is a relationship between potential and kinetic energy**<br>• **There are many types of energy**<br>• **Energy can be classified, quantified, and measured**<br>• **Energy can change from one form to another.** | Students will keep considering...<br>• **How is energy related to motion and force?**<br>• **What are the relationships among energy, motion, force, and work?**<br>• **What determines an object's kinetic energy?**<br>• **What factors affect potential energy?**<br>• **What is the relationship between potential and kinetic energy?**<br>• **How can different forms of energy be classified, quantified, and measured?**<br>• **How are different forms of energy-related to each other?**<br>• **In what ways can energy change from one form to another?**<br>• **How is energy transferred?**<br>• **How does the Law of Conservation of Energy apply to transformations and transfers?** |

| Acquisition | |
|---|---|
| **Knowledge** | **Skills** |
| Students will know...<br>• **the meaning of the following terms: energy, motion, force, and work**<br>• **that energy is related to motion and force**<br>• **the relationship among energy, motion, force, and work**<br>• **the formula to calculate the amount of work done**<br>• **the formula to calculate the amount of power used**<br>• **the factors related to kinetic energy**<br>• **the factors that affect potential energy**<br>• **the relationship between potential and kinetic energy**<br>• **the linear relationship of gravitational potential energy**<br>• **the nonlinear relationship of kinetic energy**<br>• **use scientific reasoning to classify, quantify, and measure different forms of energy**<br>• **know the relationship among different forms of energy**<br>• that energy changes from one form to another<br>• energy can transfer between objects<br>• energy is conserved in a system | Students will be skilled at...<br>• Using models to describe phenomena<br>• Using models or representations to construct an explanation<br>• Construct arguments supported by evidence to support or refute an explanation.<br>• Identify the energy of motion as kinetic energy, which is proportional to the mass of the moving object<br>• Predicting that when the motion energy of an object changes, there will be some other change in energy at the same time.<br>• Explaining that when two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object<br>• Use cause and effect to predict phenomena<br>• Use models to represent systems and the interactions within and between them<br>• Explain orally or in written form that matter is conserved because atoms are conserved in physical and chemical processes |

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Connect Lab: How does an object's energy relate to work<br>• Quest: How can you build a complicated machine to do something simple?<br>• Interactivity: How do first-class levers make it easier to do work?<br>• Interactivity: How is energy related to motion and force?<br>• Lesson 1 Check<br>• Quest Check-in: Reflect on the use of force as a means to transfer potential energy to kinetic energy<br>• Lesson 1 Quiz<br>• Hands-On Lab: Use a skateboard to model changes in kinetic energy<br>• Interactivity: Interpret graphs<br>• Hands-On Lab: Mass. Velocity, and Kinetic Energy<br>• Hands-On Lab: Living Mysteries<br>• Lesson 2 Check<br>• Quest Check-in: Finalize design and analyze the moving parts to identify different types of kinetic energy<br>• Lesson Quiz<br>• Hands-On Lab: Investigate energy with a flashlight<br>• Interactivity: Investigate energy<br>• Interactivity: Investigate roller coaster<br>• Hands-On Lab: Investigate with a flashlight<br>• Lesson 3 Check<br>• Quest Check-in: Test design, evaluate results<br>• Lesson 3 Quiz<br>• Interactivity: Explore energy changes in the everyday world |

| | |
|---|---|
| | • Hands-On Lab: Explore kinetic energy in a bouncing ball<br>• Hands-On Lab: Apply the law of Energy of conservation to a bouncing ball<br>• Interactivity: Explore the role that energy plays in extreme sports<br>• Lesson 4 Check<br>• Quest Check-in: Redesign and test chain reaction<br>• Lesson 4 Quiz<br>• Topic 1 Review and Assess<br>• Topic 1 Test<br>• Quest Findings: Determine the best way to demonstrate a chain reaction |
| | • Other Evidence:<br>◦ Reading Checks<br>◦ Checking for Understanding Figures<br>◦ Model It!<br>◦ Math Toolbox<br>◦ Connect It!<br>◦ Plan it! |

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists: | Performance Task(s): |
| | Other Evidence: |

# Unit 3: Energy

**8th Grade Science** - *Last Updated on July 6, 2021*

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Energy, Motion, Force, and Work

- Energy in Motion and Force
- Force and Work
- Work-Related to Energy and Power

Lesson 2: Kinetic Energy and Potential Energy

- Kinetic Energy
- Potential Energy

Lesson 3: Other Forms of Energy

- Determining Mechanical Energy
- More Forms of Energy

Lesson 4: Energy Changes and Conservation

- Energy Changes Form
- Energy Changes and the Law of Conservation

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

# Unit 4: Atoms and the Periodic Table

**8th Grade Science** - *Last Updated on July 6, 2021*

## STANDARDS ADDRESSED

| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
|---|
| 3 |
| Scale, Proportion, and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. |
| 4 |
| Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. |
| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| MS-PS1-2 |
| Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| **Next Generation Science (NGSS) - Middle School - Physical Sciences - Disciplinary Core Ideas** |
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| PS1.A.1 |
| Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) |

# Unit 4: Atoms and the Periodic Table

**8th Grade Science** - *Last Updated on July 6, 2021*

## DESIRED RESULTS

| Established Goals |
| --- |
| In this topic, students will explore the structure of atoms and the periodic table to help understand the properties of elements. Students will make important connections between chemistry and the real world. |

| Transfer |
| --- |
| Students will be able to independently use their learning to explain Atoms and the Periodic Table. |

| Meaning | |
| --- | --- |
| **Big Ideas & Understandings** | **Essential Questions** |
| Students will understand ...<br>• **the atomic theory as well as the components of the atom**<br>• **that the Periodic Table can be used to describe important properties of elements**<br>• **that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all living and nonliving things**<br>• **that there are various types of compounds that can form and discover how they differ in their composition**<br>• **the properties of acids and bases** | Students will keep considering...<br>• **What are the parts that make up an atom?**<br>• **What is the Atomic Theory?**<br>• **What evidence supports the modern model of the atom?**<br>• **Why do elements need to be organized?**<br>• **How was the Periodic Table developed?**<br>• **What information about elements is provided by the periodic table?**<br>• **What causes atoms to bond together?**<br>• **How do valence electrons and bonding affect the properties of elements?**<br>• How are electrons involved in bond formation?<br>• What type of bonds form between atoms?<br>• How do bonds determine certain properties of compounds?<br>• What properties describe acids and bases?<br>• What happens when acids and bases interact? |

| Acquisition | |
|---|---|
| **Knowledge** | **Skills** |
| Students will know...<br>• **how to identify and describe the properties of electrons, protons, and neutrons**<br>• **how to describe the development of atomic theory, including the historical atomic models of Dalton, Thomson, Rutherford, and Bohr**<br>• **how the data from experiments caused the Atomic theory to change**<br>• **the basics of the modern atomic theory**<br>• **to identify and describe the organization used to create the periodic table**<br>• **how the periodic table was developed**<br>• **how to describe elements**<br>• **the role of valence electrons in the bonding of atoms**<br>• **the properties of atoms and how atoms are affected when bonded**<br>• **the properties of metal and nonmetals**<br>• **the properties of atoms**<br>• **the role of valence electrons in the structure and function of atoms**<br>• **that a finite number of elements exist**<br>• **that atoms combine to produce compounds that make up all living and nonliving things**<br>• **the basic examples of atoms**<br>• **properties of various compounds, including acids, bases, and salts**<br>• **The properties of acids**<br>• **the properties of bases**<br>• **what happens when acids and bases interact** | Students will be skilled at...<br>• developing models to predict and/or describe phenomena<br>• using graphs and tables to identify temporal and spatial relationships<br>• gathering, interpreting, and synthesizing information from multiple sources, such as the periodic table<br>• applying an understanding of atoms and molecules to explain the properties of substances and the diversity of materials<br>• understanding and explaining the pattern of elements in the periodic table<br>• describing how proportional relationships can influence the interactions among molecules<br>• developing and using models to show how the functions of an atom or a molecule depend upon its structure |

| Established Goals |
|---|

| Transfer |
| --- |
| Students will be able to independently use their learning to... |

| Meaning | |
| --- | --- |
| **Big Ideas & Understandings** | **Essential Questions** |
| Students will understand that...<br>• **Big Idea #1**<br>• **Big Idea #2**<br>• **Big Idea #3** | Students will keep considering...<br>• **Essential Question #1**<br>  ◦ **Instructional Question #1**<br>  ◦ **Instructional Question #2**<br>  ◦ **Instructional Question #3**<br>• **Essential Question #2**<br>  ◦ **Instructional Question #1**<br>  ◦ **Instructional Question #2**<br>  ◦ **Instructional Question #3**<br>• **Essential Question #3**<br>  ◦ **Instructional Question #1**<br>  ◦ **Instructional Question #2**<br>  ◦ **Instructional Question #3** |

| Acquisition | |
| --- | --- |
| **Knowledge** | **Skills** |
| Students will know...<br>• **Acquired Knowledge #1**<br>• **Acquired Knowledge #2**<br>• **Acquired Knowledge #3**<br>• **...** | Students will be skilled at...<br>• **Acquired Skill #1**<br>• **Acquired Skill #2**<br>• **Acquired Skill #3**<br>• **...** |

# Unit 4: Atoms and the Periodic Table

**8th Grade Science** - *Last Updated on July 6, 2021*

| Acquisition | |
|---|---|
| • Acquired Knowledge #1<br>• Acquired Knowledge #2<br>• Acquired Knowledge #3<br>• ... | • Acquired Skill #1<br>• Acquired Skill #2<br>• Acquired Skill #3<br>• ... |
| • Acquired Knowledge #1<br>• Acquired Knowledge #2<br>• Acquired Knowledge #3<br>• ... | • Acquired Skill #1<br>• Acquired Skill #2<br>• Acquired Skill #3<br>• ... |

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

# Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Connect Labs<br>• Quest Challenges<br>• Interactivity<br>• Hands-On Labs<br>• Lesson Check-Ins<br>• Lesson Quizzes<br>• Topic Review and Assess<br>• Lesson Tests |
| | Other Evidence:<br>• Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

# Unit 4: Atoms and the Periodic Table

**8th Grade Science** - *Last Updated on July 6, 2021*

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Atomic Theory

- Development of Atomic Theory
- A Modern Model of the Atom

Lesson 2: The Periodic Table

- Organizing the Elements
- Using the Periodic Table
- Periods in the Periodic Table
- Groups in the Periodic Table

Lesson 3: Bonding and the Periodic Table

- Elements and the Periodic Table
- Bonding
- Bonding and Periodic Properties

Lesson 4: Types of Bonds

- Bonding and Compounds
- Ionic Bonding Covalent Bonding
- Properties of Compounds

Lesson 5: Acids and Bases

- Acids
- Properties of Acids
- Properties of Bases
- Neutralization of Acids and Bases

**Summary of Key Learning Events and Instruction:**

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

# Unit 5: Chemical Reactions

**8th Grade Science** - *Last Updated on July 29, 2021*

**STANDARDS ADDRESSED**

| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
|---|
| 1 |
| Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. |
| **Next Generation Science (NGSS) - Middle School - Science and Engineering Practices** |
| 4.1 |
| Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships. |
| 4.2 |
| Use graphical displays (e.g., maps, charts, graphs, and/or tables) of large data sets to identify temporal and spatial relationships. |
| 4.3 |
| Distinguish between causal and correlational relationships in data. |
| 4.4 |
| Analyze and interpret data to provide evidence for phenomena. |
| 4.5 |
| Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. |
| 4.6 |
| Consider limitations of data analysis (e.g., measurement error), and/or seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). |
| 4.7 |
| Analyze and interpret data to determine similarities and differences in findings. |
| 4.8 |
| Analyze data to define an optimal operational range for a proposed object, tool, process or system that best meets criteria for success. |

| Next Generation Science (NGSS) - Middle School - Physical Sciences - Disciplinary Core Ideas |
| --- |
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| MS-PS1-2 |
| Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| MS-PS1-3 |
| Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. |
| MS-PS1-4 |
| Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. |
| MS-PS1-5 |
| 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. |

# Unit 5: Chemical Reactions

**8th Grade Science** - *Last Updated on July 29, 2021*

## DESIRED RESULTS

| Established Goals |
| --- |
| In this topic, students will analyze evidence collected in changes of matter to determine if a physical or chemical reaction has occurred. |

| Transfer |
| --- |
| Students will be able to independently use their learning to identify chemical reactions, mixtures, and solutions and how they are used in everyday circumstances. |

**Meaning**

| Big Ideas & Understandings | Essential Questions |
| --- | --- |
| Students will understand that...<br>• **substances retain their properties in a mixture and use properties to propose methods to separate mixtures, such as sand, seawater, and dirty or freshwater into their components substances**<br>• **the properties involved in identifying a chemical reaction and the factors that affect the rate of chemical reactions.**<br>• **there is a relationship between the Law of Conservation of Mass and chemical reactions**<br>• **Scientists produce new substances and materials from natural resources.** | Students will keep considering...<br>• **How can the properties of mixtures and solutions be used to classify them?**<br>• **What do the visible properties mixtures reveal about their molecular and atomic properties?**<br>• **How can the different parts of a mixture be identified and separated?**<br>• **How can data about the characteristic physical and chemical properties of a substance be used to identify whether a physical or chemical change has occurred?**<br>• **What factors affect the rate at which a chemical change has occurred.**<br>• **How can a model be used to identify the components of a chemical reaction?**<br>• **How can a chemical equation be used to model the conservation of mass?**<br>• **How are synthetic materials made from natural resources?**<br>• **How do the production and use of synthetic materials affect society?** |

| Acquisition | |
|---|---|
| **Knowledge** | **Skills** |
| Students will know...<br>• **Mixtures of substances can be categorizes**<br>• **Substances retain their properties in a mixture**<br>• **properties can be used to separate mixtures into their component substances**<br>• **Chemical reactions and a change in property can be used to identify chemical reactions**<br>• **the factors that affect the rate of chemical change**<br>• **Chemical reactions can happen at the atomic level**<br>• **The Law of Conservation of Mass can be applied to chemical reactions in closed and open systems**<br>• **scientist produce new substances and materials from natural resources** | Students will be skilled at...<br>• **interpreting data to determine similarities and differences in findings**<br>• **applying scientific evidence to construct an explanation for real-world chemical phenomena**<br>• **recognizing that a pure substance has characteristics physical and chemical properties**<br>• **recognizing that a new substance will have different properties from those of the reactant**<br>• **using a model to show how patterns of atomic-level structure can explain a substance's external structure**<br>• **interpreting a model to show that all the atoms that are present at the beginning of a chemical reaction are present at the end**<br>• **visualizing how the function of a substance is dependent upon the structure of the atoms and molecules within it** |

**ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)**

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Connect Labs<br>• Quest Challenges<br>• Interactivity<br>• Hands-On Labs<br>• Lesson Check-Ins<br>• Lesson Quizzes<br>• Topic Review and Assess<br>• Lesson Tests |
| | Other Evidence:<br>• Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

# Unit 5: Chemical Reactions

**8th Grade Science** - *Last Updated on July 29, 2021*

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Mixtures and Solutions

- Types of Mixtures
- Separating Mixtures
- Classifying Mixtures
- Concentrations
- Solubility

Lesson 2: Chemical Change

- Changing matter
- Building and breaking chemical bonds
- Evidence of Chemical Reactions
- Changes in Energy
- Energy Graphs for Chemical Reactions
- Affecting Rates of Reactions

Lesson 3: Modeling Chemical Reactions

- Chemical Equations
- Law of Conservation of Mass
- Types of Chemical Reactions

Lesson 4: Producing Useful Materials

- Synthetic Materials

**Summary of Key Learning Events and Instruction:**

**Click here to view all possible modifications**

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

# Unit 6: Forces and Motion

**8th Grade Science** - *Last Updated on August 23, 2022*

**STANDARDS ADDRESSED**

| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
|---|
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| MS-PS1-2 |
| Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| MS-PS2-4 |
| Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. |
| MS-PS3-2 |
| Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. |
| MS-PS2-1 |
| Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. |
| MS-PS2-2 |
| Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. |
| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
| 7 |
| Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. |
| 4 |
| Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. |
| **Next Generation Science (NGSS) - Middle School - Science and Engineering Practices** |
| 3. |

| |
|---|
| Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. |
| 2.6 |
| Develop a model to describe unobservable mechanisms. |
| 7. |
| Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). |
| **New Jersey (NJSLS) - Grades 6-8 - Computer Science and Design Thinking (2020)** |
| 8.2.8.ETW.1: |
| Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs. |
| 8.2.8.ED.7: |
| Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). |
| 8.1.8.AP.3: |
| Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. |
| 8.2.8.ED.3: |
| Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch). |

# Unit 6: Forces and Motion

**8th Grade Science** - *Last Updated on August 23, 2022*

## DESIRED RESULTS

| Established Goals |
| --- |
| In this topic, students will explore concepts such as friction, gravity, balanced and unbalanced forces. They will learn about motion and Newton's three Laws of motion within the context of everyday (and not-so-everyday) experiences. |

| Transfer |
| --- |
| Students will be able to independently use their learning to see, experience, and explain a variety of forces and motion in their everyday world. |

| Meaning | |
| --- | --- |
| **Big Ideas & Understandings** | **Essential Questions** |
| Students will understand<br>• **the meaning of motion and be able to identify and describe forces in motion**<br>• **that they can use mathematical and computational thinking to apply formulas for determining and graphing speed and acceleration**<br>• **that models can be used to demonstrate each of Newton's three laws of motion**<br>• **that thy can use evidence to construct explanations related to contact and non-contact forces** | Students will keep considering...<br>• **When is an object in Motion?**<br>• **How do different types of forces affect motion?**<br>• **How do you determine speed from calculations and distance-verses-time graphs?**<br>• **How is velocity related to speed and acceleration?**<br>• **How can you interpret graphs to determine acceleration?**<br>• **How do Newton's Laws of motion describe when and how an object moves?**<br>• **How do an object's mass and the forces acting upon an object affect its motion?**<br>• **What are action and reaction forces, and how do they impact an object's motion?**<br>• What factors affect the different types of friction?<br>• What factors affect gravity?<br>• How are gravity and friction related to motion and energy? |

# Unit 6: Forces and Motion

**8th Grade Science** - *Last Updated on August 23, 2022*

| Acquisition | |
|---|---|
| **Knowledge** | **Skills** |
| Students will know...<br>• **that motion is a change in position relative to a reference point**<br>• **how balanced and unbalanced forces affect the motion of an object**<br>• **to calculate the average speed of an object**<br>• **how to use text evidence to compare velocity, speed, and acceleration**<br>• **how to interpret graphs to determine the acceleration**<br>• **that an object's motion changes if forces on it are unbalanced or balanced**<br>• **how factors affect an object's motion to predict the relationship between force, mass, and acceleration**<br>• **that surface texture and the amount of force used to push surfaces together affect the amount of friction**<br>• **how the mass and distance between two objects affect the gravitational force they exert on each other**<br>• **the relationship between gravitational potential energy and kinetic energy** | Students will be skilled at...<br>• conducting an investigation and evaluating the accuracy of different methods for collecting data<br>• Constructing a scientific explanation based on valid and reliable data<br>• making an oral or written argument based on evidence and scientific reasoning<br>• understanding that the mass of an object will have an effect on the extent of motion when a force is applied to the object<br>• understanding that energy may be in the form of kinetic energy or potential energy<br>• understanding that when objects collide, each one exerts a force on the other<br>• using models to show the flow of energy and matter within and between systems<br>• realizing that changes in one part of a system might cause large changes in another part |

**ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)**

# Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Connect Labs<br>• Quest Challenges<br>• Interactivity<br>• Hands-On Labs<br>• Lesson Check-Ins<br>• Lesson Quizzes<br>• Topic Review and Assess<br>• Lesson Tests |
| | Other Evidence:<br>• Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

# Unit 6: Forces and Motion

**8th Grade Science** - *Last Updated on August 23, 2022*

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Describing Motion and Force

- An Object in Motion
- How Forces Affect Motion

Lesson 2: Speed, Velocity, and Acceleration

- Calculating Speed
- Describing Velocity
- Determining Acceleration

Lesson 3: Newton's Laws of Motion

- Newton's First Law of Motion
- Newton's Second Law of Motion
- Newton's Third Law of Motion

Lesson 4: Friction and Gravitational Intersections

- Factors that Affect Friction
- Factors that Affect Gravity
- Energy, Forces, and Motion

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

# Unit 7: Mini lessons to review Earth and Life Science Concepts

**8th Grade Science** - *Last Updated on July 6, 2021*

## STANDARDS ADDRESSED

## DESIRED RESULTS

## ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

## LEARNING PLAN

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

# Unit 8: Waves and Electromagnetic Radiation

**8th Grade Science** - *Last Updated on July 6, 2021*

**STANDARDS ADDRESSED**

| **New Jersey (NJSLS) - Grades 6-8 - Science (2020)** |
|---|
| MS-PS4-1 |
| 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. |
| MS-PS4-2 |
| Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. |
| **Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts** |
| 1.4 |
| Graphs, charts, and images can be used to identify patterns in data. |
| 6.2 |
| Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. |
| **Next Generation Science (NGSS) - Middle School - Physical Sciences - Disciplinary Core Ideas** |
| MS-PS1-1 |
| Develop models to describe the atomic composition of simple molecules and extended structures. |
| MS-PS2-3 |
| Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. |
| MS-PS2-4 |
| Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. |
| PS2.B.1 |
| Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (MS-PS2-3) |
| PS2.B.2 |
| Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very |

| |
|---|
| small except when one or both of the objects have large mass—e.g., Earth and the sun. (MS-PS2-4) |
| PS2.B.3 |
| Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively). (MS-PS2-5) |
| MS-PS3-1 |
| Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. |
| MS-PS3-5 |
| Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. |

# Unit 8: Waves and Electromagnetic Radiation

**8th Grade Science** - *Last Updated on July 6, 2021*

## DESIRED RESULTS

| Established Goals |
| --- |
| In this topic, students will explore and examine the different properties of waves and the way that waves interact with matter and with each other. They will also learn the ways in which electromagnetic waves are particularly relevant to our lives and to the technologies that we use every day. |

| Transfer |
| --- |
| Students will be able to independently use their learning of different wave types to understand energy and matter. They also learn how different waves characteristics and behaviors are important to Earth's systems |

| Meaning | |
| --- | --- |
| **Big Ideas & Understandings** | **Essential Questions** |
| Students will understand that...<br>• **Waves have unique properties. Different types of waves transfer energy**<br>• **Waves can react when they strike materials and can cause an interaction between waves**<br>• **Sound waves interact with matter through reflection, absorption, transmission, and diffraction**<br>• **Properties of materials affect the speed of sound**<br>• **The properties and characteristics of electromagnetic waves**<br>• **Transparent, translucent, opaque, and colored materials reflect and absorb light**<br>• Light interacts with concave and convex lenses | Students will keep considering...<br>• **How can you use a simple model to describe a wave and its features?**<br>• **How can you observe the properties of waves?**<br>• **What kinds of patterns can you predict based on wave properties?**<br>• **How do waves interact with different materials?**<br>• **How do waves interact with each other?**<br>• **How are sound waves reflected, transmitted, or absorbed by materials?**<br>• **What factors affect the speed of waves?**<br>• **What makes up an electromagnetic wave?**<br>• **How can you model electromagnetic wave behavior?**<br>• **What kinds of waves make up the electromagnetic spectrum?** |

| Acquisition | |
| --- | --- |
| **Knowledge** | **Skills** |

# Unit 8: Waves and Electromagnetic Radiation

**8th Grade Science** - *Last Updated on July 6, 2021*

| Acquisition | |
|---|---|
| Students will know...<br>• **that different types of waves transmit energy in different ways**<br>• **waves share common properties that influence the waves' behavior**<br>• **frequency, wavelength, and speed are related**<br>• **waves can travel from one medium to another**<br>• **the meaning of the terms diffraction, refraction, and reflection**<br>• **the ways that waves interact, including constructive and destructive interference**<br>• **waves change direction**<br>• **waves can interact with other waves**<br>• **Sound waves interact with matter by processes of reflection, absorption, transmittal, and diffraction**<br>• **stiffness, density, and temperature of materials affect the speed of sound**<br>• **the characteristics of electromagnetic waves**<br>• **how to model electromagnetic wave behavior**<br>• **the waves that make up the electromagnetic spectrum**<br>• **the way that frequency and amplitude are related in waves** | Students will be skilled at...<br>• **developing and/or revising models to show the relationship among variables**<br>• **using mathematical representations to describe or support scientific conclusions**<br>• **recognizing that a simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude**<br>• **realizing that light striking an object is reflected, absorbed, or transmitted**<br>• **using graphs and charts to identify patterns in data**<br>• **recognizing that the properties of a material influence how that material can be shaped and used** |

**ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)**

## Assessments

| Evaluation Criteria | Assessment Evidence |
|---|---|
| Rubrics/Checklists:<br>• Plan an Investigation Rubric<br>• Construct Explanations Rubric<br>• Evaluate Claims Rubric<br>• Use Scientific Reasoning Rubric<br>• Developing Models Rubric<br>• Apply Scientific Reasoning Rubric<br>• Analyze Systems Rubric | Performance Task(s):<br>• U Connect Labs<br>• Quest Challenges<br>• Interactivity<br>• Hands-On Labs<br>• Lesson Check-Ins<br>• Lesson Quizzes<br>• Topic Review and Assess<br>• Lesson Tests |
| | Other Evidence:<br>• Reading Checks<br>• Checking for Understanding Figures<br>• Model It!<br>• Math Toolbox<br>• Connect It!<br>• Plan it! |

# Unit 8: Waves and Electromagnetic Radiation

**8th Grade Science** - *Last Updated on July 6, 2021*

## LEARNING PLAN

**Summary of Key Learning Events and Instruction:**

Lesson 1: Wave Properties

- Types of Waves
- Properties of Waves
- Wave Energy

Lesson 2: Wave Interaction

- Reflection, Refraction, and Absorption
- Wave Interference

Lesson 3: Sound Waves

- The Behavior of Sound
- Factors Affecting the Speed of Sound
- Loudness and Pitch

Lesson 4: Electromagnetic Waves

- Characteristics of Electromagnetic Waves
- Models of Electronic Wave Behavior
- Wavelength and Frequency
- The Electromagnetic Spectrum

## SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications