Quinton Township School District

Science Curriculum Guide

7th Grade

Curriculum MAP **Key: Careers Technology Interdisciplinary Studies**

Marking Period	**1**	**Unit Title**	**Structure, Properties and Changes in Matter**	**Pacing**	**30 days**

Unit Summary: Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level accounts to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, and the influence of science, engineering and technology on society and the natural world provide a framework for understanding the disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas.

Knowledge - By the end of this unit, students will know:

- Everything in the universe is made of matter.
- Elements are composed of atoms which are simple substances that can't be broken down into other substances.
- How the Periodic Table is arranged.
- Molecules are combinations of various elements that result in brand new substances.

Skills - By the end of this unit, students will be able to:

- Describe the basic structures of atoms and molecules
- Demonstrate how both mass and volume are measured and then use this information to calculate for density.
- Distinguish between weight and mass.
- Describe the difference between physical and chemical properties and give examples of each.

Essential Questions:

1. What is matter and how do we measure it?
2. What is an atom and how is it structured?
3. How is the Periodic Table of Elements arranged and what does an element's placement tell you about the substance?
4. What is the difference between a physical and a chemical property and what are some examples of each?

5. What are the states of matter and what role does thermal energy play in changing matter's state?

NGSS Standards:

- **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
- **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

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (MS-PS1-3) **RST.6-8.1**
- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). *(MS-PS1-4)* **RST.6-8.7**
- Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-PS1-3) **WHST.6-8.8**
- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.(MS-PS1-2) **RST.6-8.1**
- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS- PS1-1),(MS-PS1-2) **RST.6-8.7**

Mathematics

- Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-PS1-4) **6.NS.C.5**
- Reason abstractly and quantitatively. (MS-PS1-1),(MS-PS1-2) MP.2 Model with mathematics. (MS-PS1-1) MP.4
- Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS1- 1),(MS-PS1-2) **6.RP.A.3**
- Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. (MS-PS1-1) **8.EE.A.3**
- Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (MS-PS1-2) **6.SP.B.4**
- Summarize numerical data sets in relation to their context. (MS-PS1-2) **6.SP.B.5**

21st Century Themes and Skills

Computer Science and Design Thinking

- **8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.**
- **8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.**

- **8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.**
- **8.2.8.ITH.2: Compare how technologies have influenced society over time.**

Career Readiness, Life Literacies, and Key Skills

- 9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.
- 9.4.8.DC.1: Analyze the resource citations in online materials for proper use.
- 9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping
- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
1. **Matter and Its Properties Classwork/Homework** 2. **Lab 1: Measuring Matter** 3. **Lab 2: Build an Atom Lab** 4. **Lab 3: Build a Molecule** 5. **Lab 4: Determining Density**	1. **Matter and Its Properties Classwork/Homework Answers Guide** 2. **Matter and Its Properties SMART Notebook Notes** 3. **NJCTL.com** 4. **Legends of Learning** 5. **Edpuzzle** 6. **Matter and Its Properties Pacing Guide**	1. **Matter and Its Properties SMART Notebook Notes** 2. **Matter and Its Properties Classwork/Homework** 3. **Labs**	1. **SMARTboard Applications** 2. **Google Applications** 3. **Legends of Learning** 4. **Edpuzzle**

Formative Assessment Plan	Summative Assessment Plan
Formative assessment informs instruction and is on going through a unit to determine how students are progressing with the high expectations of standards. **Suggested activities to assess student progress:** Daily Science Starters Daily/Weekly Classwork & Homework Completion Kahoot! Rubric-for projects Self-reflection	Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. **Final Assessments:** Quiz 1 - Matter and Periodic Table Quiz 2 - Physical Properties of Matter Quiz 3 - Density Quiz 4 - States of Matter Test - Matter and Its Properties Test

Differentiation			
Special Education	**ELL**	**At Risk**	**Gifted and Talented**
• Teacher's aide will read to the students as needed • Students can type or speech to text notes. • The students will be given study guides for tests • Students will be given notes for quizzes • Projects will be modified for students who need it to be. • Homework is also modified for those students who need it. • Students will be given extra time to complete all assignments. • All quizzes and tests have been modified for the students to meet their needs. • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g.	• Provide ELL students with multiple literacy strategies. • Rosetta Stone • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Translate printed communications for parents in native language • Hold conferences with translator present • Review Special Education listing for additional recommendations	• Teacher's aide will read to the students as needed • Students can type or speech to text notes. • Students will be given extra time to complete all assignments. • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Make modifications to instructional plans based on I and RS Plan.	• Allow students to provide additional support for students struggling (peer teaching) • Expanded learning projects to further student understanding • Student teaching lessons • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena. • Promote self-initiated and self-directed learning and growth. • Enable students to explore continually changing

multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.			knowledge and information and develop the attitude that knowledge is worth pursuing in an open world.

Marking Period	**1-2**	**Unit Title**	**Chemical Reactions**	**Pacing**	**30 days**

Unit Summary: Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Students also apply their understanding of optimization design and process in engineering to chemical reaction systems. The crosscutting concept of *energy and matter* provides a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in *developing and using models, analyzing and interpreting data, designing solutions*, and *obtaining, evaluating, and communicating information*. Students are also expected to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Knowledge - By the end of this unit, students will know:

- How to determine if a chemical reaction has occurred.

- How atoms can rearrange and combine to form new substances.
- Key, easily observable properties of chemical substances
- That properties of substances may change during a chemical reaction.
- That total mass in a reaction must be conserved
- That some reactions can absorb energy
- That some reactions can release energy
- That heat is transferred from an object at higher temperature to an object at lower temperature.
- That heat transfer stops when the objects reach the same temperature.

Skills - By the end of this unit, students will be able to:

- Describe observable cues that a chemical reaction has occurred.
- Distinguish between chemical substances based on observable properties.
- Develop an atomic level model to explain how atoms rearrange to form new substances during a chemical reaction.
- Distinguish between reactions that absorb energy and reactions that release energy
- Explain when heat will transfer between two objects and in which direction the heat will flow.

Essential Questions:

1. What happens when substances react chemically?
2. What happens to atoms of the original substances when a reaction occurs?
3. Will the properties of the substance that is produced as part of a reaction be the same as those of the original substances?
4. What happens to the total mass of all atoms as a reaction takes place?
5. How does the amount of stored energy change during a chemical reaction?
6. How does the everyday definition of "heat" differ from the scientific definition?
7. When does heat transfer between two objects?
8. How are temperature and energy related?

NGSS Standards:

- **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.
- **MS-PS1-6 -** Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Cite specific textual evidence to support analysis of science and technical texts. (MS-ETS1-3) **RST.6-8.1**
- Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS1-6) **RST.6-8.3**

- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-PS1-5) **RST.6-8.7**
- Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ETS1-3) **RST.6-8.9**
- Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS1-6) (MS-ETS1-3) **WHST.6-8.7**
- Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS1-5) **6.RP.A.3**

Mathematics

- Reason abstractly and quantitatively. (MS-PS1-5) (MS-ETS1-3) **MP.2**
- Model with mathematics. (MS-PS1-5) **MP.4**
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. (MS-ETS1-3) **7.EE.3**

21st Century Themes and Skills

Computer Science and Design Thinking

- 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.
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Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
1. Chemical Reactions Classwork/Homework 2. Lab 1: Classifying Reactions 3. Lab 2: Atomic Rearrangement 4. Lab 3: Temperature and Thermal Energy 5. Lab 4: Energy Transfer	1. Chemical Reactions Classwork/Homework Answers Guide 2. Chemical Reactions SMART Notebook Notes 3. NJCTL.com 4. Legends of Learning 5. Edpuzzle 6. Chemical Reactions Pacing Guide	1. Chemical Reactions SMART Notebook Notes 2. Chemical Reactions Classwork/Homework 3. Labs	1. SMARTboard Applications 2. Google Applications 3. Legends of Learning 4. Edpuzzle

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Differentiation			
Special Education	**ELL**	**At Risk**	**Gifted and Talented**
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Marking Period	**2**	**Unit Title**	**Structure, Function, and Information Processing & Body**	**Pacing**	**30 days**

			Systems		

Unit Summary: Students demonstrate age appropriate abilities to plan and carry out investigations to develop *evidence* that living organisms are made of cells. Students gather information to support explanations of the relationship between structure and function in cells. They are able to communicate an understanding of cell theory and understand that all organisms are made of cells. Students understand that special structures are responsible for particular functions in organisms. They then are able to use their understanding of cell theory to develop and use physical and conceptual models of cells. The crosscutting concepts of *scale, proportion, and quantity* and *structure and function* provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in *planning and carrying out investigations*, *analyzing and interpreting data*, and *developing and using models*, Students are also expected to use these to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.
Students develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple-interaction subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. The cross cutting concepts of *systems and system models* and *cause and effect* provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in *engaging in argument from evidence* and *obtaining, evaluating, and communicating information*. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Knowledge - By the end of this unit, students will know:

- All living things are made up of cells, which is the smallest unit that can be said to be alive.
- An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.
- Cells form tissues, which form organs, which form systems
- Sensory receptors send messages to our brain

Skills - By the end of this unit, students will be able to:

- Determine whether something is living or non-living
- Explain how cells are the building blocks of life
- Build models of both a plant and animal cell and be able to demonstrate key characteristics that define both
- Describe how multicellular subsystems interact and work together to form tissue and organs that are specialized to particular body functions.
- Explain the similarities and differences between a chicken wing and a human arm
- Explain how our brain receives messages

Essential Questions:

1. What are the building blocks of life?
2. How does each part of a cell function?
3. How is the body a system of interacting subsystems composed of groups of cells?

4. What are fundamental differences between animal and plant cells pertaining to cell reproduction?
5. How do our sensory receptors send information to our brain?

NGSS Standards:

- **MS-LS1-1 -** Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different types of cells.
- **MS-LS1-2 -** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute of the function.
- **MS-LS1-3 -** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- **MS-LS1-8 -** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-LS1-1) **WHST.6-8.7**
- Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS1-2) **SL.8.5**
- Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3) **RST.6-8.1**
- Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.(MS-LS1-3) **RI.6.8**
- Write arguments focused on discipline content. (MS-LS1-3) **WHST.6-8.1**
- Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.(MS-LS1-8) **WHST.6-8.8**

Mathematics

- Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-1),(MS-LS1-2) **6.EE.C.9**

21st Century Themes and Skills

Computer Science and Design Thinking

- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
- 8.2.8.ITH.2: Compare how technologies have influenced society over time.

Career Readiness, Life Literacies, and Key Skills

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Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
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Formative Assessment Plan	Summative Assessment Plan
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Differentiation			
Special Education	**ELL**	**At Risk**	**Gifted and Talented**

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Marking Period	**3**	**Unit Title**	**Organization for Matter and Energy Flow in Organisms**	**Pacing**	**30 days**

Unit Summary: Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. They construct scientific explanations for the cycling of matter in organisms and the interactions of organisms to obtain matter and energy from an ecosystem to survive and grow. They understand that sustaining life requires substantial energy and matter inputs, and that the structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy. The crosscutting concepts of *matter and energy* and *structure and function* provide a framework for understanding of the cycling of matter and energy flow into and out of organisms. Students are also expected to demonstrate proficiency in *developing and using models*. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Knowledge - By the end of this unit, students will know:

- Photosynthesis uses carbon dioxide and water to store the energy of water in plants. It creates glucose and releases oxygen as a waste product.
- Photosynthesis gets its energy from the sun and occurs in the chloroplast of plants.
- Cellular respiration is the opposite of Photosynthesis. It releases the energy stored in glucose by combining it with oxygen to give off energy and releases carbon dioxide and water as waste products. This occurs in the mitochondria.
- These two cycles are a system that helps keep many organisms on Earth alive.

Skills - By the end of this unit, students will be able to:

- Model the processes of Photosynthesis and Cellular Respiration

- Explain that the energy to power photosynthesis comes from the sun.
- Construct a scientific explanation based on evidence for the role of photosynthesis in cycling matter and flow of energy in organisms.
- Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

Essential Questions:

1. What is photosynthesis?
2. Why is photosynthesis important to all living things?
3. Where is the energy needed to perform photosynthesis created?
4. In what organisms does photosynthesis occur? In what cell structures does photosynthesis occur?
5. What is cellular respiration?
6. What materials are needed to perform photosynthesis? Cellular Respiration?
7. What materials are produced by photosynthesis? Cellular Respiration?
8. In what organisms does respiration occur? In what cell structures does respiration occur?
9. What is the relationship between Photosynthesis and Cellular Respiration?

NGSS Standards:

- **MS-LS1-6 -** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- **MS-LS1-7 -** Develop a model to describe how food is rearranged through chemical reactions to forming new molecules that support growth and/or release energy as this matter moves through an organism**.**

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-6) **RST.6-8.1**
- Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-6) **RST.6-8.2**
- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-6) **WHST.6-8.2**
- Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-6) **WHST.6-8.9**

Mathematics

- Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-6) **6.EE.C.9**

21st Century Themes and Skills

Computer Science and Design Thinking

- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

Career Readiness, Life Literacies, and Key Skills

- 9.4.8.DC.1: Analyze the resource citations in online materials for proper use.

Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
1. **Organization for Matter and Energy Flow in Organisms Classwork/Homework** 2. **Lab 1: Investigating Photosynthesis Lab** 3. **Lab 2: Set Sail for the Island of Photosynthesis** 4. **Lab 3: Cellular Respiration Molecular Model** 5. **Photosynthesis and Cellular Respiration Project**	1. **Organization for Matter and Energy Flow in Organisms Classwork/Homework Answers Guide** 2. **Organization for Matter and Energy Flow in Organisms SMART Notebook Notes** 3. **NJCTL.com** 4. **Legends of Learning** 5. **Edpuzzle** 6. **Organization for Matter and Energy Flow in Organisms Pacing Guide**	1. **Organization for Matter and Energy Flow in Organisms SMART Notebook Notes** 2. **Organization for Matter and Energy Flow in Organisms Classwork/Homework** 3. **Labs**	1. **SMARTboard Applications** 2. **Google Applications** 3. **Legends of Learning** 4. **Edpuzzle**

Formative Assessment Plan	Summative Assessment Plan
Formative assessment informs instruction and is on going through a unit to determine how students are progressing with the high expectations of standards. **Suggested activities to assess student progress:** Daily Science Starters Daily/Weekly Classwork & Homework Completion Kahoot! Rubric-for projects Self-reflection	Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. **Final Assessments:** Quiz 1 - Photosynthesis Quiz 2 - Cellular Respiration Test - Organization for Matter and Energy Flow in Organisms Test

Differentiation

Special Education	ELL	At Risk	Gifted and Talented
● Teacher's aide will read to the students as needed ● Students can type or speech to text notes. ● The students will be given study guides for tests ● Students will be given notes for quizzes ● Projects will be modified for students who need it to be. ● Homework is also modified for those students who need it. ● Students will be given extra time to complete all assignments. ● All quizzes and tests have been modified for the students to meet their needs. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).	● Provide ELL students with multiple literacy strategies. ● Rosetta Stone ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Translate printed communications for parents in native language ● Hold conferences with translator present ● Review Special Education listing for additional recommendations	● Teacher's aide will read to the students as needed ● Students can type or speech to text notes. ● Students will be given extra time to complete all assignments. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Make modifications to instructional plans based on I and RS Plan.	● Allow students to provide additional support for students struggling (peer teaching) ● Expanded learning projects to further student understanding ● Student teaching lessons ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Promote self-initiated and self-directed learning and growth. ● Enable students to explore continually changing knowledge and information and develop the attitude that

• Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena. • Structure the learning around explaining or solving a social or community-based issue. • Collaborate with after-school programs or clubs to extend learning opportunities.			knowledge is worth pursuing in an open world.

Marking Period	**3-4**	**Unit Title**	**Growth and Development of Organisms**	**Pacing**	**30 days**

Unit Summary: Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism. They connect this idea to the role of animal behaviors in animal reproduction and to the dependence of some plants on animal behaviors for their reproduction. Students provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. The crosscutting concepts of *cause and effect* and *structure and function* provide a framework for understanding the disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *analyzing and interpreting data*, *using models*, *conducting investigations*, and *communicating information*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Knowledge - By the end of this unit, students will know:

- The stages of mitosis
- Simple meiosis
- Land and aquatic fertilization strategies
- Asexual and sexual reproduction
- How behavior effects survival and reproduction
- Animal parenting methods
- Flower structure
- How the environment effects growth and reproduction

- Reproductive success is measured in the number of offspring which survive to reproduce

Skills - By the end of this unit, students will be able to:

- Show the order of mitosis given pictures, name the function of mitotic structures
- Differentiate between animal types and reproductive strategies
- Identify extreme structures for attracting mates
- Identify behaviors which enhance reproductive success
- Differentiate between aquatic and land fertilization and development of young
- Compare parenting styles of animals
- Compare pollination types

Essential Questions:

1. How do organisms reproduce?
2. What is the difference between sexual and asexual reproduction?
3. How can an organism's behavior increase its chance of survival and reproduction?
4. What structures or mechanisms aid in plant reproduction?
5. How does the environment contribute to successful reproduction or growth?
6. How do genetic factors influence the growth of organisms?
7. How do natural differences in organisms increase survival and reproduction?

NGSS Standards:

- **MS-LS1-4 -** Use an argument based on empirical evidence and scientific reasoning to support am explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants
- **MS-LS1-5 -** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms
- **MS-LS3-2 -** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-4),(MS-LS1-5) **RST.6-8.1**
- Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-5) **RST.6-8.2**
- Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (MS-LS1-4) **RI.6.8**
- Write arguments focused on discipline content. (MS-LS1-4) **WHST.6-8.1**

- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-5) **WHST.6-8.2**
- Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-5) **WHST.6-8.9**

Mathematics

- Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-4),(MS-LS1-5) **6.SP.A.2**
- Summarize numerical data sets in relation to their context. (MS-LS1-4),(MS-LS1-5) **6.SP.B.4**

21st Century Themes and Skills

Computer Science and Design Thinking

- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
- 8.2.8.ITH.2: Compare how technologies have influenced society over time.

Career Readiness, Life Literacies, and Key Skills

- 9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping
- 9.4.8.IML.14: Analyze the role of media in delivering cultural, political, and other societal messages.

Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
1. **Growth and Development of Organisms Classwork/Homework** 2. **Lab 1: Yeast Budding** 3. **Lab 2: Vegetative Propagation** 4. **Lab 3: Pollen Observation** 5. **Lab 4: Flower Dissection**	1. **Growth and Development of Organisms Classwork/Homework Answers Guide** 2. **Growth and Development of Organisms SMART Notebook Notes** 3. **NJCTL.com** 4. **Legends of Learning** 5. **Edpuzzle** 6. **Growth and Development of Organisms Pacing Guide**	1. **Growth and Development of Organisms SMART Notebook Notes** 2. **Growth and Development of Organisms Classwork/Homework** 3. **Labs**	1. **SMARTboard Applications** 2. **Google Applications** 3. **Legends of Learning** 4. **Edpuzzle**

Formative Assessment Plan	Summative Assessment Plan

Formative assessment informs instruction and is on going through a unit to determine how students are progressing with the high expectations of standards. **Suggested activities to assess student progress:** Daily Science Starters Daily/Weekly Classwork & Homework Completion Kahoot! Rubric-for projects Self-reflection	Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. **Final Assessments:** Quiz 1 - Cell Division Quiz 2 - Reproduction Quiz 3 - Animal Behavior and Reproduction Quiz 4 - Plant Reproduction Test - Growth and Development of Organisms Test

Differentiation			
Special Education	**ELL**	**At Risk**	**Gifted and Talented**
● Teacher's aide will read to the students as needed ● Students can type or speech to text notes. ● The students will be given study guides for tests ● Students will be given notes for quizzes ● Projects will be modified for students who need it to be. ● Homework is also modified for those students who need it. ● Students will be given extra time to complete all assignments. ● All quizzes and tests have been modified for the students to meet their needs. ● Structure lessons around questions that are authentic, relate to students' interests,	● Provide ELL students with multiple literacy strategies. ● Rosetta Stone ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to	● Teacher's aide will read to the students as needed ● Students can type or speech to text notes. ● Students will be given extra time to complete all assignments. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple	● Allow students to provide additional support for students struggling (peer teaching) ● Expanded learning projects to further student understanding ● Student teaching lessons ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and

social/family background and knowledge of their community. ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.	demonstrate their understandings. ● Translate printed communications for parents in native language ● Hold conferences with translator present ● Review Special Education listing for additional recommendations	ways to demonstrate their understandings. ● Make modifications to instructional plans based on I and RS Plan.	Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Promote self-initiated and self-directed learning and growth. ● Enable students to explore continually changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world.

Marking Period	**4**	**Unit Title**	**Inheritance and Variation of Traits**	**Pacing**	**30 days**

Unit Summary: Students develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. Students understand how genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic implications of sexual and

asexual reproduction. The crosscutting concepts of *cause and effect* and *structure and function* provide a framework for understanding how gene structure determines differences in the functioning of organisms. Students are expected to demonstrate proficiency in *developing and using models*. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Knowledge - By the end of this unit, students will know:

- How to properly use a Punnett Square
- Your traits are determined by the dominant and recessive alleles passed to you from your parents
- The difference between genotype and phenotype and how phenotype depends on genotype
- How to perform a test cross to determine the unknown genotype of an organism
- Why a person may end up being born with a birth defect or disease

Skills - By the end of this unit, students will be able to:

- SWBAT properly complete a Punnett Square and use it to predict the genes of offspring
- SWBAT use an organism's genotype to describe the physical characteristics of the object
- SWBAT properly perform test crosses to determine an unknown genotype
- SWBAT demonstrate appropriate research skills and teach the class about birth defects and genetic mutations

Essential Questions:

1. How do children get traits from their parents?
2. Why do some people look more like their dad and some look more like their mom?
3. What is a Punnett Square and how does it help us predict the traits of offspring?
4. Why do some children show traits that neither of their parents display?
5. Why are some people born with birth defects or diseases?

NGSS Standards:

- **MS-LS3-1 -** Use an argument based on empirical evidence and scientific reasoning to support am explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants
- **MS-LS3-2 -** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation
- **MS-LS4-5** - Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

Interdisciplinary Connections/Including 21st Century Themes and Skills:

English Language Arts/Literacy-

- Cite specific textual evidence to support analysis of science and technical texts. (MS-LS3-1),(MS-LS3-2) **RST.6-8.1**

- 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. (MS-LS3-1),(MS-LS3-2) **RST.6-8.4**
- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1),(MS-LS3-2) **RST.6-8.7**
- Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS3-1),(MS-LS3-2) **SL.8.5**

Mathematics

- Model with mathematics. (MS-LS3-2) **MP.4**
- Summarize numerical data sets in relation to their context. (MS-LS3-2) **6.SP.B.5**

21st Century Themes and Skills

Computer Science and Design Thinking

- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
- 8.2.8.ITH.2: Compare how technologies have influenced society over time.
- 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.

Career Readiness, Life Literacies, and Key Skills

- 9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping
- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally

Overview of Activities	Teacher's Guide/Resources	Core Instructional Materials	Technology Infusion
1. **Inheritance and Variation of Traits Classwork/Homework** 2. **Lab 1: Mendel's Peas** 3. **Lab 2: Dragon Crossing** 4. **Lab 3: Jane and John Activity** 5. **Lab 4: Genetic Mutations**	1. **Inheritance and Variation of Traits Classwork/Homework Answers Guide** 2. **Inheritance and Variation of Traits SMART Notebook Notes** 3. **NJCTL.com** 4. **Legends of Learning** 5. **Edpuzzle** 6. **Inheritance and Variation of Traits Pacing Guide**	1. **Inheritance and Variation of Traits SMART Notebook Notes** 2. **Inheritance and Variation of Traits Classwork/Homework** 3. **Labs**	1. **SMARTboard Applications** 2. **Google Applications** 3. **Legends of Learning** 4. **Edpuzzle**

Formative Assessment Plan	Summative Assessment Plan
Formative assessment informs instruction and is on going through a unit to determine how students are progressing with the high expectations of standards. **Suggested activities to assess student progress:** Daily Science Starters Daily/Weekly Classwork & Homework Completion Kahoot! Rubric-for projects Self-reflection	Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit. **Final Assessments:** Quiz 1 - Mendelian Genetics and Punnett Squares Project - Genetic Mutations Test - Inheritance and Variation of Traits Test

Differentiation			
Special Education	**ELL**	**At Risk**	**Gifted and Talented**
• Teacher's aide will read to the students as needed • Students can type or speech to text notes. • The students will be given study guides for tests • Students will be given notes for quizzes • Projects will be modified for students who need it to be. • Homework is also modified for those students who need it. • Students will be given extra time to complete all assignments. • All quizzes and tests have been modified for the students to meet their needs. • Structure lessons around questions that are authentic,	• Provide ELL students with multiple literacy strategies. • Rosetta Stone • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and	• Teacher's aide will read to the students as needed • Students can type or speech to text notes. • Students will be given extra time to complete all assignments. • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with	• Allow students to provide additional support for students struggling (peer teaching) • Expanded learning projects to further student understanding • Student teaching lessons • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

relate to students' interests, social/family background and knowledge of their community. ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.	multiple ways to demonstrate their understandings. ● Translate printed communications for parents in native language ● Hold conferences with translator present ● Review Special Education listing for additional recommendations	multiple entry points and multiple ways to demonstrate their understandings. ● Make modifications to instructional plans based on I and RS Plan.	● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Promote self-initiated and self-directed learning and growth. ● Enable students to explore continually changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world.