Introduction

There is no doubt that science—and, therefore, science education—is central to the lives of all Americans. Never before has our world been so complex and science knowledge so critical to making sense of it all. When comprehending current events, choosing and using technology, or making informed decisions about one's healthcare, science understanding is key. Science is also at the heart of the United States' ability to continue to innovate, lead, and create the jobs of the future.

Through a collaborative, state-led process, new K–12 science standards have been developed that are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education. The Next Generation Science Standards are based on the Framework for K–12 Science Education developed by the National Research Council.

Every NGSS standard has three dimensions: disciplinary core ideas (content), scientific and engineering practices, and crosscutting concepts.

The NGSS focus on a smaller set of Disciplinary Core Ideas (DCI) that students should know by the time they graduate from high school, focusing on deeper understanding and application of content. ← Science and engineering are integrated into science education by raising engineering design to the same level as scientific inquiry in science classroom instruction at all levels, and by emphasizing the core ideas of engineering design and technology applications

The NGSS content is focused on preparing students for college and careers. The NGSS are aligned, by grade level and cognitive demand with the English Language Arts and Mathematics Common Core State Standards. This allows an opportunity both for science to be a part of a child's comprehensive education as well as ensuring an aligned sequence of learning in all content areas. The three sets of standards overlap and are reinforcing in meaningful and substantive ways.

Coupling practice with content gives the learning context, whereas practices alone are activities and content alone is memorization. It is through integration that science begins to make sense and allows students to apply the material.

Gifted & Talented

The Saddle River School District extends learning opportunities to all high achieving students. It supports the philosophy that every student has special talents and gifts. The Saddle River School District's enrichment and gifted & talented programs offer a unique approach to servicing all students while maintaining a focus on those who are identified as needing pull out services through the district's screening/criteria process. The Saddle River School District's enrichment program focuses on bringing out the special talents in all learners as enrichment instruction is delivered to all students in grades kindergarten through fifth grade. The program follows the Joseph Renzulli schoolwide enrichment model that concentrates on "schools being a place for talent development," (Renzulli, 1994). The program follows a wide-range of enriching/developing activities based upon student strengths and interests. Additionally, the program focuses on enriching activities across the curriculum in providing complementary and developing features/standards for all subject areas. The enrichment program builds upon existing student learning standards in all content areas in coordination with instruction and student needs.

The Saddle River School District Gifted & Talented program offers pull-out instruction for those students meeting the multiple measures and specific criteria set forth and approved by the board of education. The identification process may/can begin as early as kindergarten. The gifted and talented program follows the central theme that all appropriate curriculum standards are followed and that those standards are the

foundation for developing student learning opportunities and standards across the curriculum. The gifted and talented program will provide the following in coordination with each content area when and where appropriate:

- Develop students' abilities and engage critical thinking skills
- Expand students' creative thought process and responses
- Advance students' research skills needed to become independent learners
- Develop students' abilities to self-evaluate their own learning process
- Enrich students' abilities in seeking and expanding their own knowledge in subject content areas and individual talents
- Develop students' ability to interact effectively in small-group and large-group setting
- Heighten students' ability in expanding on student learning standards to strengthen appropriate skills necessary for 21st century learning

English Language Learners (ELL)

The Saddle River School District recognizes the importance of increasing language proficiency while gaining confidence and strength so that academic goals and New Jersey state learning standards can be met. English Language Learners in the Saddle River School District are identified through a multitude of measures. These measure include, but are not limited to: a home language survey, parental conferencing, and daily teacher observations. Based on the information/data collected, the Saddle River School District will determine if a formal approved language assessment is necessary. The World-Class Instructional Design and Assessment (WIDA) is the assessment tool for those students recommended for ELL testing.

The Saddle River School District will provide the following accommodations for ELL students:

- Basic skills with a focus a the specific language skills
- Use of a translation dictionary (ipad, google translator, bilingual word to word dictionary)
- Preferential seating
- Extended time and/or modified classroom assignments
- Print out of teacher notes/lessons for additional review
- Extended time and/or modified assessments
- Extended time/accommodation for standardized testing in coordination with state regulations

Special Education Students

The Saddle River School District special education department offers a full continuum of services for students who are eligible for special education services. In order to meet the specific requirements for each learner, programs are developed so that that social, emotional and educational needs are met within the least restrictive environment. The specific program for each learner is based on individual needs where goals and objectives are set and followed accordingly. These individual educational plans follow a specific plan that is aligned to the student learning standards and may include, but is/are not limited to:

- Individual education plan
- Pull-out support
- Replacement content instruction
- In-class support
- Instructional aide(s)
- Support services (i.e.; speech, physical therapy, occupational therapy)
- Presentation accommodations (i.e.; notes, outlines, instructions, lists, organization)
- Response accommodations (i.e.; dictations, audio, dictionaries, calculation devices, scribes)
- Setting accommodations (i.e.; lighting, acoustics, seat placement, testing, sensory tools)

- Timing accommodations (i.e.; completing tasks, frequent breaks, processing directions)
- Scheduling accommodations (i.e.; spacing out projects/assignments, order of schedule)
- Organizational accommodations (i.e.; highlighter, time management, planning)
- Assignment modifications (i.e.; fewer tasks, alternate questions)
- Technology support (i.e; ipad, word processing, specific programs/apps)
- Testing accommodations (i.e.; extended time, placement, seating, time)

Students who require additional services outside of the district's resource program, may require an out-of-district placement. In this event, the Child Study Team will coordinate accordingly to ensure that all necessary learning standards are being met.

Students in Danger of Failing

For those students in danger of failing, the Saddle River School District has a specific referral process to ensure that student needs are being met. The Intervention & Referral Services (I&RS) is an interdisciplinary team of professional within the school that addresses a full range of student/staff needs and concerns. This process is designed to maximize student success and establish goals and benchmarks to promote outcomes that positively reflect academics, health, behavior, self-esteem, work habits and strong character. The I&RS team is comprised of a chairperson, child study team member, teachers and other school professionals so that a continuous system of support can be provided. The team provides a plan so that short and long term goals can be established and strategies can be implemented and designed specifically for each student. In trying to achieve success, the team works collaboratively in making growth for each student a top priority and adhere to a plan that is achievable but rigorous. This plan, as set by New Jersey I&RS Team Process, may contain, but is not limited to the following;

- Request for assistance
- Information collection
- Parent Notification
- Problem solving within the I&RS team
- Developing an I&RS action plan
- Supporting, evaluating and continuing the process

In evaluating and monitoring students, the I&RS team closely calculates a plan so that curriculum needs can be met. In order to achieve and demonstrate success, the Saddle River School District provides modifications and support so that consideration is given to, but not limited to, the following:

- Student strengths/weaknesses
- Classroom and standardized assessments
- Academic records
- Social and behavioral patterns
- Previous history or concern
- Participation in class (and interaction with peers)
- Health related concerns
- Family concerns
- Retention of information/instruction
- Student interests
- Independent & group work habits
- Emotional status
- Study habits (at home/school)
- Present level of functioning
- Expectations (academic, social, behavioral, etc.)
- Following classroom rules/directions/procedures

As the I&RS team formulates a plan, many ongoing concerns are addressed within the team and may

include parental notification/input. The problem solving objectives as set forth by New Jersey I&RS Team Process will:

- Describe the problem
- Identify the priority
- Develop objectives
- Review previous interventions
- Create new strategies
- Analyze and evaluate solutions

The Saddle River School District continues to inform and update staff of the I&RS procedures. The procedures are as follows:

- Teacher recognizes a problem(s) with a particular student in class and refers the student to the I&RS committee by filling out the appropriate paperwork. An I&RS meeting is scheduled to and the committee and appropriate staff members gather to discuss and begin the proactive process of assistance.
- Information from the teacher(s), administrator(s), and other school personnel is collected.
- Parent notification where/when appropriate
- The I&RS team begins the problem solving process by offering ideas and suggestions pertaining to the problems while prioritizing the most important issues.
- The I&RS team develops an action plan with specific strategies that can be implemented to achieve both short term and long term goals.
- The I&RS team meets regularly to evaluate and support the action plan (and to adjust accordingly when/where appropriate). Parents are notified on an ongoing basis to continue communication in the support of implementing the strategies set forth in the action plan.

Basic Skills Instruction is also a valuable resource that the Saddle River School District uses to meet the needs of struggling students. Students who require additional academic support will be offered that assistance in all subject areas. This system allows the students to receive in-class or pull-out support when and where appropriate so that grade level curriculum and student learning goals can be met. This program is an intervention system used to create a positive and constructive learning environment so that students can achieve success.

After the I&RS action plan has been in place the team may continue with the current strategies, offer/discuss new strategies or decide that the student should be referred to the district's child study team. In the instance of referring a student to the child study team, it can be concluded that many of the strategies from the action plan were not benefitting the student as intended. The child study team them would follow the guidelines for the referral process and notify the parents/guardians of the potential special education recommendation.

Unit A Overview

Content Area: Science

Unit Title: Unit A Science, Engineering, and Technology

Target Course/Grade Level: 4

Unit Background

Science education requires students to develop their ability to engage in scientific thinking. Students will have many opportunities to practice skills that support scientific inquiry, including the following science process, critical thinking, and communication skills.

1. Observing – using one or more of the five senses to gather information about the world and keeping accurate, detailed records of observation.
2. Inferring – the ability to interpret observations and form logical conclusions from them.
3. Predicting – making an inference about a future event based on current evidence or past experience.
4. Classifying – organizing items that are alike in some way using specific criteria.
5. Making models – creating a picture, diagram, structure, computer image, or another representation to better understand, describe, or explain something.
6. Communicating – the process of sharing ideas and information with other people.

Scientific Measurement

Scientists us the standard system of measurement know as the International System of Units (SI). SI units are based on multiples of 10 and each unit is ten times larger than the next smallest unit and one-tenth the size of the next largest unit. The most common scientific measurements are length/distance, liquid volume, mass, and temperature.

- Length is measured in meters (m), but long distances, such as the distance between two cities, is measured in kilometers (km). Small lengths are measured in centimeters (cm) and millimeters (mm).
- Liquid volume is the amount of space a liquid takes up in a container and is measured in liters (L) and milliliters (mL). A graduated cylinder is the most common container used by scientists.
- Mass is measured in grams (g) using a balance (scale); one gram is approximately the mass of a paperclip. Larger masses are measured in kilograms (kg).
- The temperature of a substance is measured in degrees Celsius (ºC) using a thermometer. On the Celsius scale, water freezes at 0ºC and boils at 100ºC.

Scientific Attitudes

Successful scientists possess important scientific attitudes:

- curiosity – leads scientists to learn more about the topics they study
- honesty – report observations and results truthfully
- acceptance – of new and different ideas
- analytical – careful review of new and different ideas
- creativity – finding inventive ways to solve problems

Science and Technology

Scientific discoveries occur when people learn new information or discover new things. These discoveries lead to new technologies as this new knowledge is used in a practical way to solve problems. Technology may be

complex, or as simple as a paperclip.

Primary interdisciplinary connections: Reading, Math, Social Studies, Language Arts, Writing,

21st century themes:

- **Creativity and Innovation**
  - Think Creatively
  - Work Creatively with Others
  - Implement Innovations
- **Critical Thinking and Problem Solving**
  - Reason Effectively
  - Use Systems Thinking
  - Make Judgments and Decisions
  - Solve Problems
- **Communication and Collaboration**
  - Communicate Clearly
  - Collaborate with Others

Standard(s)

- **3-5-ETS1 Engineering Design**
-

Performance Expectations

- **3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**
- **3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**
- **3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

Science and Engineering Practices

- **Asking Questions and Defining Problems**
  - Asking questions and defining problems in 3-5 builds on grades K-2 experiences and progresses to specifying qualitative relationships.
- **Planning and Carrying Out Investigations**
  - Planning and carrying out investigations to answer questions or test solutions to problems I 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- **Constructing Explanations and Designing Solutions**
  - Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

Disciplinary Core Ideas

- **ETS1-A: Defining and Delimiting Engineering Problems**

• **ETS1.B: Developing Possible Solutions** • **ETS1.C: Optimizing the Design Solution**	
Crosscutting Concepts • **Influence of Science, Engineering, and Technology on Society and the Natural World**	
Performance Expectations (PE)	**Supporting Concepts, Practices, and Ideas**
3-5-ETS1-1	Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.
	People's needs and wants change over time, as do their demands for new and improved technologies.
3-5-ETS1-2	Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.
	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.
	At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.
3-5-ETS1-3	Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
	Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
	Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.
Related Common Core ELA Standards	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5 ETS1-2)
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (3-5 ETS1-2)
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (3-5 ETS1-1) (3-5 ETS1-3)
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of

	sources (3-5 ETS1-1) (3-5 ETS1-3)
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5 ETS1-1) (3-5 ETS1-3)
Related Common Core Mathematics Standards	
MP.2	Reason abstractly and quantitatively. (3-5 ETS1-1) (3-5 ETS1-2) (3-5 ETS1-3)
MP.4	Model with mathematics. (3-5 ETS1-1) (3-5 ETS1-2) (3-5 ETS1-3)
MP.5	Use appropriate tools strategically. (3-5 ETS1-1) (3-5 ETS1-2) (3-5 ETS1-3)
3-5.OA	Operations and Algebraic Thinking (3-5 ETS1-1) (3-5 ETS1-2)

Unit Essential Questions

- ***What questions do scientists ask?***
- ***How do scientists use tools?***
- ***How do scientists answer questions?***
- ***How do scientists draw conclusions?***
- ***What is technology?***
- ***What is the design process?***

Unit Enduring Understandings

- **Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying explanations.**
- **Safety first!**
- **Mathematics is a tool used to model objects, events, and relationships in the natural and designed world.**
- **The development of technology and advances in science are mutually supportive in driving innovation in both fields.**
- **Physical constraints and social values play a role in limiting the use of technology to solve problems.**
- **Thinking systematically means looking for the relationships between parts.**

Unit Learning Targets

Students will be Able To:

- describe questions scientists ask
- explain how scientists find answers to their questions
- identify tools that scientists use
- explain how to properly and safely use these tools
- describe different scientific methods scientists use to answer questions
- explain how scientists keep records to share conclusions with other scientists
- understand how technology solves problems and makes work easier
- use the design process

Unit Vocabulary:

- **Chapter 1:** ***evidence, hypothesis, inference, inquiry, investigation, procedure, scientific methods, three-dimensional, tool, two-dimensional***
- **Chapter 2:** ***design process, prototype, technology***

Evidence of Learning

4th Grade Wandell School Science Curricula

Aligned to the Next Generation Science Standards (NGSS)

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Summative Assessments at the end of each chapter.

Equipment needed: See teacher's edition

Teacher Resources: Pearson Interactive Science
https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true&ticket=ST-1368125-E9Ki92wc0g5CVII9xxk5-b3-rumba-prod-01-01

Formative Assessments

- teacher observation
- student responses to questions
- student participation in inquiry activities
- student interactive science journal
-
-

Lesson Plans

Chapter 1: The Nature of Science	Timeframe
Lesson 1 *What Questions Do Scientists Ask?*	**3-4 class periods**
Lesson 2 *How Do Scientists Use Tools?*	**3-4 class periods**
Lesson 3 *How Do Scientists Answer Questions?*	**3-4 class periods**
Lesson 4 *How Do Scientists Draw Conclusions?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***What affects how many times a pendulum swings?***
- ***How does weight affect how many times a pendulum swings?***
- **Lightning Lab: *Testing Observations***
- ***How can tools help you observe?***
- **Lightning Lab: *Compare Measurements***
- ***What helps scientists answer questions?***
- **At-Home Lab: *Trial Testing***
- ***How can data help you draw a conclusion?***
- **Lightning Lab: *Observations and Inferences***

Chapter 2: Technology and Design	Timeframe
Lesson 1 *What is Technology?*	**3-4 class periods**
Lesson 2 *What is the design process?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***How can you design a hovercraft?***
- ***Which boat design will hold more cargo?***
- **At-Home Lab: *Kitchen Technology***
- ***How can the design of a model help you learn about the real thing?***
- **Go Green: *Pollution***

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

• ***What design will carry cargo best?***
Teacher Notes:
Curriculum Development Resources Click the links below to access additional resources used to design this unit: • **Next Generation Science Standards (NGSS) http://www.nextgenscience.org/** • **21st Century Skills http://www.p21.org/our-work/p21-framework** • **New Jersey Standards Clarification Project http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf**

The Nature of Science: Lesson 1							
Content Area: Science							
Lesson Title: *What Questions Do Scientists Ask?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: • describe questions scientists ask • explain how scientists find answers to their questions	**Lesson Sequence** 1. **Engage:** a. Students discuss what questions scientists might ask about a natural formation. b. Introduce lesson vocabulary.

	2. **Explore: My Planet Diary *Science Stats*** 3. **Explain**: a. Review the lesson question. b. Students read *Questions* and *Investigations* then answer questions using reading skills. 4. **Lightning Lab: *Testing Observations*** a. Students explore the properties of different rocks. 5. **Elaborate**: a. **Science Notebook**. Students write the reference information about a scientific journal article, including its title, author, page, name of the journal, and date of publication. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

The Nature of Science: Lesson 2							
Content Area: Science							
Lesson Title: *How Do Scientists Use Tools?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

***Interdisciplinary Connections: see unit overview**

***Integration of Technology: Pearson Interactive Science Program**

***Equipment needed: see teacher's edition**

***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● identify tools that scientists use ● explain how to properly and safely use these tools	**Lesson Sequence** 1. **Engage:** a. Students circle tools that help them see very small things. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can tools help you observe?*** 3. **Explain**: a. Review the lesson question. b. Students read *Tools*, *More Tools*, *Compare Observations*, and *Safety* then answer questions using reading skills. 4. **Lightning Lab:** ***Compare Measurements*** a. Students use a metric ruler to measure the length of their pencil in centimeters and compare results, then repeat with a US standard ruler. 5. **Elaborate**: a. **Science Notebook**. Students write a poem or jingle about one or two safety rules. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation:

Embedded in the program are

● strategies for English Language Learners

● leveled readers

● resources to address multiple intelligences

Resources Provided: *Pearson Interactive Science*

The Nature of Science: Lesson 3							
Content Area: Science							
Lesson Title: *How Do Scientists Answer Questions?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe different scientific methods scientists use to answer questions	**Lesson Sequence** 1. **Engage:** a. Students tell what questions they have about starfish and how they could find an answer. b. Introduce lesson vocabulary. 2. **Explore It!** ***What helps scientists answer questions?*** 3. **Explain**: a. Review the lesson question. b. Students read *Scientific Methods, A Bouncing Ball Experiment, Creativity, Observation and Evidence, Models,* and *Explanations* then answer questions using reading skills.

	4. **At-Home Lab:** ***Trial Testing*** a. Students test how high a table-tennis ball will bounce on concrete. 5. **Elaborate**: a. **Science Notebook**. Students draw pictures of the way they expect the ball to bounce on each surface. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

The Nature of Science: Lesson 4							
Content Area: Science							
Lesson Title: *How Do Scientists Draw Conclusions?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how scientists keep records in order to share conclusions with other scientists	**Lesson Sequence** 1. **Engage:** a. Students explain what they think the scientist is writing down. b. Introduce lesson vocabulary. 2. **Explore It! *How can you record data?*** 3. **Explain**: a. Review the lesson question. b. Students read *Record Procedures*, *Keep Records, Organize Your Data, Presenting Data, Evidence and Inferences, Reasonable Answers, Compare Results* and *Go Further* then answer questions using reading skills. 4. **Lightning Lab: *Observations and Inferences*** a. Students examine coins and make inferences. 5. **Math Connection: *Interpret Data*** a. Students interpret data about bouncing a table-tennis ball. 6. **Elaborate**: a. **Science Notebook**. Students make inferences about trees, and write these inferences in their Science Notebook. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	

Resources Provided: *Pearson Interactive Science*

Technology and Design: Lesson 1							
Content Area: Science							
Lesson Title: *What is Technology?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● understand how technology solves problems and makes work easier	**Lesson Sequence** 1. **Engage:** a. Students identify some problems that a communications satellite might help solve. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Connections*** 3. **Explain**: a. Review the lesson question. b. Students read *Scientific Discoveries*,

	Technology and Transportation, and *Everyday Technologies* then answer questions using reading skills. 4. **At-Home Lab: *Kitchen Technology*** a. Students examine a can opener, draw a diagram of a can opener, and write about how a can opener works. 5. **Elaborate**: a. **Science Notebook**. Students write about how new technology in the future might change how they travel to school or work. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Technology and Design: Lesson 2							
Content Area: Science							
Lesson Title: *What is the Design Process?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		

***Interdisciplinary Connections: see unit overview**
***Integration of Technology: Pearson Interactive Science Program**
***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● use the design process	**Lesson Sequence** 1. **Engage:** a. Students consider why aircraft have different designs. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can the design of a model help you learn about the real thing?*** 3. **Explain**: a. Review the lesson question. b. Students read *Design Process* and *Steps of the Design Process* then answer questions using reading skills. 4. **Math Connection:** ***Elapsed Time*** a. Students calculate the elapsed time for different flights. 5. **Go Green:** ***Pollution*** a. Students research pollution and write a plan to reduce pollution. 6. **Elaborate**: a. **Science Notebook**. Students identify a problem they could design a product to solve, and identify the product's user. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation:
Embedded in the program are
● strategies for English Language Learners
● leveled readers
● resources to address multiple intelligences

Resources Provided: *Pearson Interactive Science*

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

Unit B Overview

Content Area: Science

Unit Title: Unit B Life Science

Target Course/Grade Level: 4

Unit Background

Leaves and Stems

The tissues and organs of plants transport materials, provide structural support, and help the plant carry out photosynthesis. The plant's leaf captures sunlight and converts the sun's energy to sugar and oxygen. Xylem tissue carries water absorbed by the roots up into the leaf. Phloem tissue carries the food made during photosynthesis to other parts of the plant.

On the underside of the leaf are small openings called stomata. The stomata open and close, allowing gases to enter and leave the leaf. When the stomata are open, carbon dioxide enters the leaf, and oxygen and water vapor exit.

The stem is another organ in the plant. The xylem and phloem tissues carry substances up from the root to the leaves, and from the leaf throughout the plane via the stem. The stem also supports the plant and holds the leaves up to the sunlight. Some plant's stems also store food.

Plant Roots

The tip of a root is rounded and covered by a structure called the *root cap.* The root cap, which contains dead cells, protects the root from injury from rocks. Behind the root cap are living cells that divide and form new root cells. *Root hairs* grow out of the root's surface. The hairs increase the surface area of the root allowing more water and nutrients to be absorbed into the root.

Animal Learning

Animals learn through practice and experience. The larger the brain of an animal, the more the animal can learn. There are three main ways animals learn: conditioning, trial-and-error, and insight learning.

- Conditioning is learning to connect a stimulus with an event (good or bad).
- Trial-and-error learning occurs when an animal, through repeated practice, learns to perform a behavior more and more skillfully.
- Insight learning is the ability of an animal to solve a problem or learn how to do something new by applying what it already knows, without trial and error. Insight learning is most common in primates.

Genes and Alleles

Genes are factors that control traits. Alleles are forms of a gene that control an organism's traits. An organism inherits its alleles from its parents. Alleles are either dominant or recessive. A dominant allele controls a trait that will always show up if the allele is present. A recessive allele controls a trait that will only show up in the absence of the dominant allele.

Ecosystems

Ecosystems are influenced by biological and physical factors. Biological influences are called *biotic factors* and include all the living things with which an organism might interact – the ecological community. *Abiotic factors* are the nonliving influences, such as climate, wind, nutrient availability, soil type and sunlight.

Energy first enters an ecosystem as sunlight. Some organisms such as plants, algae, and some bacteria, are able to capture the sun's energy and store it as food energy through the process of photosynthesis. These organisms are

called *autotrophs* or producers. Producers are the source of all the food in an ecosystem.

Other members of the ecosystem, known as *heterotrophs* or consumers, cannot make their own food and must feed on producers to get the energy they need. *Herbivores* are consumers that obtain energy by eating only plants; *carnivores* however, get energy from eating other animals. *Omnivores* eat both plants and animals, while *detritivores* feed on plant and animal remains and other dead matter called *detritus. Decomposers* such as some bacteria and fungi, break down organic matter.

Energy flows through ecosystems from the sun to producers to various consumers. A food chain shows one particular path of energy through an ecosystem. Most producers and consumers are part of many food chains. A food web will show how energy flows through the many overlapping food chains in an ecosystem.

Under favorable conditions a population in an ecosystem will increase, but increases cannot be maintained indefinitely. Eventually, some environmental factor will limit a population's growth. Food, space, and weather conditions are limiting factors for population growth. Organisms in an ecosystem must compete for resources, sometimes changing the habitat in order to obtain the necessary resources for survival.

Primary interdisciplinary connections: Reading, Math, Social Studies, Language Arts, Writing,

21st century themes:

- **Creativity and Innovation**
  - Think Creatively
  - Work Creatively with Others
  - Implement Innovations
- **Critical Thinking and Problem Solving**
  - Reason Effectively
  - Use Systems Thinking
  - Make Judgments and Decisions
  - Solve Problems
- **Communication and Collaboration**
  - Communicate Clearly
  - Collaborate with Others

Standard(s)

- **3-LS3 Heredity: Inheritance and Variation of Traits**
- **3-LS4 Biological Evolution: Unity and Diversity**
- **4-LS1 From Molecules to Organisms: Structures and Processes**
- **5-LS1 From Molecules to Organisms: Structures and Processes**
- **5-LS2 Ecosystems: Interactions, Energy, and Dynamics**

Performance Expectations

- **3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.**
- **3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.**
- **3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.**
- **3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among**

individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

- **3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.**
- **3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.**
- **4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.**
- **5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.**
- **5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.**

Science and Engineering Practices

- **Developing and Using Models**
  - Modeling in 3-5 builds on K-2 models and progresses to building and revising simple models and using models to represent events and design solutions.
- **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena**
- **Engaging in Argument from Evidence**
  - Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
- **Analyzing and Interpreting Data**
  - Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- **Constructing Explanations and Designing Solutions**
  - Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

Disciplinary Core Ideas

- **LS1.C: Organization for Matter and Energy Flow in Organisms**
- **LS2.A: Interdependent Relationships in Ecosystems**
- **LS2.C: Ecosystem Dynamics, Functioning, and Resilience**
- **LS3.A: Inheritance of Traits**
- **LS3.B: Variation of Traits**
- **LS4.A: Evidence of Common Ancestry and Diversity**
- **LS4.B: Natural Selection**
- **LS4.C: Adaptation**
- **LS4.D: Biodiversity and Humans**
- **PS3.D: Energy in Chemical Processes and Everyday Life**

Crosscutting Concepts

- **Systems and System Models**
- **Patterns**
- **Cause and Effect**

- **Scale, Proportion, and Quantity**
- **Interdependence of Engineering, Technology, and Science on Society and the Natural World**
- **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**
- **Energy and Matter**

Performance Expectations (PE)	**Supporting Concepts, Practices, and Ideas**
5-LS1-1	Support an argument with evidence, data, or a model.
	Plants acquire their material for growth chiefly from air and water.
	Matter is transported into, out of, and within systems.
5-LS2-1	Develop a model to describe phenomena.
	Science explanations describe the mechanisms for natural events.
	The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat the plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.
5-PS3-1	Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
	Use models to describe phenomena.
	The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).
	Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.
	Energy can be transferred in various ways and between objects.
4-LS1-1	Construct an argument with evidence, data, and/or a model.
	Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
	A system can be described in terms of its components and their interactions.
3-LS3-1	Analyze and interpret data to make sense of phenomena using logical reasoning.
	Many characteristics of organisms are inherited from their parents.
	Different organisms vary in how they look and function because they have different inherited information.
	Similarities and differences in patterns can be used to sort and classify natural phenomena.
3-LS3-2	Use evidence (e.g., observations, patterns) to support and explanation.
	Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both

	inheritance and environment.
	The environment also affects the traits that an organism develops.
	Cause and effect relationships are routinely identified and used to explain change.
3-LS4-1	Analyze and interpret data to make sense of phenomena using logical reasoning.
	Some kinds of plants and animals that once lived on Earth are no longer found anywhere.
	Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.
	Observable phenomena exist from very short to very long time periods.
	Science assumes consistent patterns in natural systems.
3-LS4-2	Use evidence (e.g., observations, patterns) to support and explanation.
	Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.
	Cause and effect relationships are routinely identified and used to explain change.
3-LS4-3	Construct an argument with evidence, data, and/or a model.
	For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.
	Cause and effect relationships are routinely identified and used to explain change.
3-LS4-4	Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.
	When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.
	Populations live in a variety of habitats, and change in those habitats affects the organisms living there.
	A system can be described in terms of its components and their interactions.
	Knowledge of relevant scientific concepts and research findings is important in engineering.
Related Common Core ELA Standards	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
RI.4.2	Determine the main idea of a text and explain how it is supported by key details; summarize the text. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and

	information. (4-LS1-1) (3-LS4-1) (3-LS4-3) (3-LS4-4)
W.4.2	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources (3-LS4-1)
SL.4.4	Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. (3-LS3-1) (3-LS3-2) (3-LS4-2) (3-LS4-3) (3-LS4-4)
SL4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-1)
Related Common Core Mathematics Standards	
MP.2	Reason abstractly and quantitatively. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
MP.4	Model with mathematics. (3-LS3-1) (3-LS3-2) (3-LS4-1) (3-LS4-2) (3-LS4-3) (3-LS4-4)
MP.5	Use appropriate tools strategically. (3-LS4-1)
3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. (3-LS4-2) (3-LS4-3)
3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters. (3-LS4-1)

Unit Essential Questions

- ***How are plants and animals classified?***
- ***How do plants reproduce?***
- ***How do plants make food?***
- ***What are adaptations?***
- ***What plant and animal characteristics are inherited?***
- ***How do animals respond to the environment?***
- ***What are ecosystems?***
- ***How do living things get energy?***
- ***What are food chains and food webs?***
- ***How do living things affect the environment?***
- ***What are fossils?***
- ***What can fossils tell us?***

Unit Enduring Understandings

- **Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying explanations.**
- **Safety first!**
- **Mathematics is a tool used to model objects, events, and relationships in the natural and designed world.**
- **Thinking systematically means looking for the relationships between parts.**
- **All organisms transfer matter and convert energy from one form to another.**
- **Both matter and energy are necessary to build and maintain structures within the organism.**
- **Organisms are grouped in taxonomy based upon**

	similarity. ● **The structural and functional characteristics of an organism determine their continued survival over time under changing environmental conditions.** ● **Organisms and their environments are interconnected. *f*** ● **Changes in one part of the system will affect other parts of the system.** ● **Humans can alter the living and non-living factors within an ecosystem, thereby creating changes in the overall system.** ●

Unit Learning Targets
Students will:

- describe how to classify plants and animals
- demonstrate an understanding of structures that help plants survive and reproduce
- explain the roles of roots, leaves, and stems in making food
- explain how physical features and behaviors help organisms interact with their environments
- explain that plants and animals inherit characteristics that may help them survive and reproduce
- demonstrate an understanding of how animals respond to their environments and get what they need
- describe the parts of ecosystems and some examples of ecosystems
- explain that animals get energy from the plants and animals they eat
- describe the possible consequences of the removal of one component in a balanced ecosystem
- explain how energy flows in a food chain and a food web
- know how some organisms compete for resources
- describe the effect of a sudden change of one group of organisms on another group
- explain that fossils are the remains or marks of living things
- demonstrate an understanding of the ways a fossil can form
- describe how scientists use fossils to learn about the past

Unit Vocabulary:

- **Chapter 3:** ***adaptation, advantage, characteristics, chlorophyll, classify, fertilization, germinate, inherit, instinct, invertebrates, photosynthesis, pistil, pollination, sepal, stamen, stimulus, vertebrates***
- **Chapter 4:** ***carnivore, competition, consumer, decomposer, ecosystem, extinct, food chain, food web, fossil, habitat, herbivore, omnivore, paleontologist, population, producer***

Evidence of Learning

Summative Assessments at the end of each chapter.

Equipment needed: See teacher's edition

Teacher Resources: Pearson Interactive Science
https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true&ticket=ST-

1368125-E9Ki92wc0g5CVII9xxk5-b3-rumba-prod-01-01

Formative Assessments

- teacher observation
- student responses to questions
- student participation in inquiry activities
- student interactive science journal
-
-

Lesson Plans

Chapter 3: Plants and Animals	Timeframe
Lesson 1 *How Are Plants and Animals Classified?*	**3-4 class periods**
Lesson 2 *How Do Plants Reproduce?*	**3-4 class periods**
Lesson 3 *How Do Plants Make Food?*	**3-4 class periods**
Lesson 4 *What Are Adaptations?*	**3-4 class periods**
Lesson 5 *What Plant and Animal Characteristics Are Inherited?*	**3-4 class periods**
Lesson 6 *How Do Animals Respond to the Environment?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***How can flower parts be classified?***
- ***What is inside an owl pellet?***
- ***What prey does an owl eat?***
- ***How can owl pellets help you further explore ecosystems?***
- ***What are some ways you can classify animals?***
- **Go Green: *Investigate Plants***
- **Lightning Lab: *Designer Seeds***
- ***How can plants react to light?***
- **At-Home Lab: *Cactus-Stem Model***
- ***How can some characteristics be affected by the environment?***
- **Lightning Lab: *Dimpled Cheeks***
- **At-Home Lab: *Migrating Animals***

Chapter 4: Ecosystems	Timeframe
Lesson 1 *What Are Ecosystems?*	**3-4 class periods**
Lesson 2 *How Do Living Things Get Energy?*	**3-4 class periods**
Lesson 3 *What Are Food Chains and Food Webs?*	**3-4 class periods**

Lesson 4 *How Do Living Things Affect the Environment*	**3-4 class periods**
Lesson 5 *What Are Fossils?*	**3-4 class periods**
Lesson 6 *What Can Fossils Tell Us?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***How can you estimate how many animals live in an ecosystem?***
- ***How do earthworms meet their needs in a model of an ecosystem?***
- ***How might light affect the earthworms in a model ecosystem?***
- **At-Home Lab: *Picture This!***
- ***What do yeast use for energy?***
- **At-Home Lab: *For the Birds!***
- ***How do food webs show connections?***
- **At-Home Lab: *Decomposers Delight***
- ***What happens when one part of an ecosystem is removed?***
- **Go Green: *The Recycling Bin***
- **Lightning Lab: *Tell-Tale Footprints***
- **Go Green: *Fossil Fuel Use***

Teacher Notes:

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

- **Next Generation Science Standards (NGSS) http://www.nextgenscience.org/**
- **21st Century Skills http://www.p21.org/our-work/p21-framework**
- **New Jersey Standards Clarification Project http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf**

Plants and Animals: Lesson 1							
Content Area: Science							
Lesson Title: *How are plants and animals classified?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							

x	Creativity and Innovation	X	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how to classify plants and animals	**Lesson Sequence** 1. **Engage:** a. Students identify differences between a plant and an animal. b. Introduce lesson vocabulary. 2. **Explore It!** ***What are some ways you can classify animals?*** 3. **Explain**: a. Review the lesson question. b. Students read *Classifying Organisms*, *Classifying Plants*, and *Classifying Animals* then answer questions using reading skills. 4. **Go Green:** ***Investigate Plants*** a. Students observe and classify plants near their homes. 5. **Elaborate**: a. **Science Notebook**. Students write the meaning of *vascular* and some related words. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers	

● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

Plants and Animals: Lesson 2							
Content Area: Science							
Lesson Title: *How do plants reproduce?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of structures that help plants reproduce and survive	**Lesson Sequence** 1. **Engage:** a. Students think about what will happen when some seeds blow away. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question.

	b. Students read *Plants That Make Seeds*, *Parts of a Flower*, *Pollen on the Move*, *After Pollination*, *Seeds on the Move*, and *Life Cycle of a Plant* then answer questions using reading skills. 4. **Lightning Lab: *Designer Seeds*** a. Students make a seed with craft materials. 5. **Elaborate**: a. Students research imperfect flowers and draw a diagram of the imperfect flowers they research, showing either male or female parts. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Plants and Animals: Lesson 3							
Content Area: Science							
Lesson Title: *How do plants make food?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							

***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain the roles of roots, leaves, and stems in making food	**Lesson Sequence** 1. **Engage:** a. Students identify various plant parts. b. Introduce lesson vocabulary. 2. **Explore It! *How can plants react to light?*** 3. **Explain**: a. Review the lesson question. b. Students read *Needs of Plants; How Plants Make Food; Leaves, Stems, and Roots;* and *Plants Without Roots* then answer questions using reading skills. 4. **Lightning Lab: *Leaves and Light*** a. Students cover a green leaf with foil and leave it by a sunny window for one week. Students compare the leaf to other leaves and describe how it changed. 5. **Elaborate**: a. Students discuss how the sharp, thin needles of a cactus help it to survive in the desert. 6. **Evaluate**: a. Review lesson vocabulary. c. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	

Resources Provided: *Pearson Interactive Science*

Plants and Animals: Lesson 4							
Content Area: Science							
Lesson Title: *What are adaptations?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how physical features and behaviors help organisms interact with their environments	**Lesson Sequence** 1. **Engage:** a. Students identify how each bird's feet help it survive. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can some fish float?*** 3. **Explain**: a. Review the lesson question. b. Students read *Adaptations, Animal Adaptations,* and *Plant Adaptations* then answer questions using reading skills. 4. **At-Home Lab:** ***Cactus-Stem Model*** a. Students model a waxy cactus stem by coloring a piece of paper with crayons and placing the paper in a bowl of water. 5. **Elaborate**:

	a. **Science Notebook**. Students analyze pictures of leaves, stems, and seeds, and write a caption about how each is an adaptation that helps the plant survive. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Plants and Animals: Lesson 5							
Content Area: Science							
Lesson Title: *What plant and animal characteristics are inherited?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain that plants and animals inherit characteristics that may help them survive and reproduce	**Lesson Sequence** 1. **Engage:** a. Students explain why peacocks have inherited showy tails. b. Introduce lesson vocabulary. 2. **Explore It! *How can characteristics be affected by the environment?*** 3. **Explain**: a. Review the lesson question. b. Students read *Characteristics of Living Things; Inherited Characteristics;* and *Parents, Offspring, and Advantages* then answer questions using reading skills. 4. **Lightning Lab: *Dimpled Cheeks*** a. Students survey classmates about the presence of dimples and make a chart to show the data. 5. **Elaborate**: a. Students learn how the peacock flounder's eyes came to be on the same side of its head. b. Students discuss how the peacock flounder's behavior of burying itself in sand helps it catch food. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Plants and Animals: Lesson 6	
Content Area: Science	
Lesson Title: *How do animals respond to the environment?*	**Timeframe:** 3-4 class periods

Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of how animals respond to their environments and get what they need	**Lesson Sequence** 1. **Engage:** a. Students infer how monkeys respond to their environment. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Misconception*** 3. **Explain**: a. Review the lesson question. b. Students read *Animal Behaviors*, *Animal Instincts*, and *Learned Behavior* then answer questions using reading skills. 4. **Math Connection: *Division*** a. Students use division to calculate how long it takes birds to travel great distances. 5. **At-Home Lab: *Migrating Animals*** a. Students identify a local migratory animal and describe the animal's path of migration. 6. **Elaborate**: a. **Science Notebook**. Students learn about an instinctive behavior of toads that helps them protect themselves, then draw a cause-and-effect diagram that shows how a cat might learn to not eat a toad.

	7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 1							
Content Area: Science							
Lesson Title: *What are ecosystems?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe the parts of ecosystems and some examples of ecosystems	**Lesson Sequence** 1. **Engage:** a. Students discuss how organisms interact.

	b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Let's Blog!*** 3. **Explain**: a. Review the lesson question. b. Students read *Parts of an Ecosystem, Kinds of Ecosystems,* and *Living Things Within Their Ecosystems* then answer questions using reading skills. 4. **At-Home Lab: *Picture This!*** a. Students pick an ecosystem, cut out pictures of habitats and communities, and then describe the ecosystem. 5. **Elaborate**: a. **Science Notebook**. Students write about what might happen to an ecosystem if there were changes to the ecosystem's soil. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 2							
Content Area: Science							
Lesson Title: *How do living things get energy?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain that animals get energy from the plants and animals they eat ● describe the possible consequences of the removal of one component in a balanced ecosystem	**Lesson Sequence** 1. **Engage:** a. Students draw what a chipmunk gets energy from, and gives energy to. b. Introduce lesson vocabulary. 2. **Explore It! *What do yeast use for energy?*** 3. **Explain**: a. Review the lesson question. b. Students read *Producers, Consumers, Decomposers,* and *Removal of One Component* then answer questions using reading skills. 4. **At-Home Lab: *For the Birds!*** a. Students make a bird feeder and then record the number as well as types of birds they see. 5. **Math Connection:** a. Students read a graph that identifies the change in a rabbit population over a 10-year period. 6. **Elaborate**: a. **Science Notebook**. Students learn that other words that use the root *vore* include *voracious* and *devour*. b. Students look up the meaning of these words and use each one in a sentence. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 3							
Content Area: Science							
Lesson Title: *What are food chains and food webs?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how energy flows in a food chain and a food web ● know how some organisms compete for some resources	**Lesson Sequence** 1. **Engage:** a. Students draw plants and animals near their school. b. Introduce lesson vocabulary.

	2. **Explore It!** ***How do food webs show connections?*** 3. **Explain**: a. Review the lesson question. b. Students read *Energy Pyramids*, *Food Chains*, *Food Webs*, and *Balance in Ecosystems* then answer questions using reading skills. 4. **At-Home Lab:** ***Decomposers Delight*** a. Students sprinkle yeast on a banana slice in a resealable bag and observe it everyday for one week. 5. **Elaborate**: **Science Notebook**. a. Students list other phrases that use the word *chain*, such as "chain of events" or "restaurant chain." b. Students write a sentence for each phrase they list, explaining what *chain* means. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 4							
Content Area: Science							
Lesson Title: *How do living things affect the environment?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe the effect of a sudden change of one group of organisms on another group	**Lesson Sequence** 1. **Engage:** a. Students discuss the way humans have affected a deer's environment. b. Introduce lesson vocabulary. 2. **Explore It!** ***What happens when one part of an ecosystem is removed?*** 3. **Explain**: a. Review the lesson question. b. Students read *Changes to the Environment, Plants Cause Change, Animals Cause Change,* and *Humans Cause Sudden Change* then answer questions using reading skills. 4. **Go Green:** ***The Recycling Plan*** a. Students organize a recycling plan for the classroom. 5. **Elaborate**: a. **Science Notebook**. Students find out about other species that are invasive to the United States, and write about one of the species. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 5							
Content Area: Science							
Lesson Title: *What are fossils?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To:	**Lesson Sequence**

● explain that fossils are the remains or marks of living things and demonstrate an understanding of the ways a fossil can form	1. **Engage:** a. Students compare the tracks of different animals and discuss what they can learn by studying them. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Discovery*** 3. **Explain**: a. Review the lesson question. b. Students read *Fossil Clues, How Fossils Form,* and *Other Types of Fossils* then answer questions using reading skills. 4. **Lightning Lab: *Tell-Tale Footprints*** a. Students compare their footprints and explain what scientists can learn by studying different fossil footprints. 5. **Elaborate**: a. Students learn that ammonites were sea animals b. Students discuss why so many ammonites became fossils. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Ecosystems: Lesson 6							
Content Area: Science							
Lesson Title: *What can fossils tell us?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how scientists use fossils to learn about the past	**Lesson Sequence** 1. **Engage:** a. Students describe what they can learn about a dinosaur by examining its fossil. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Misconception*** 3. **Explain**: a. Review the lesson question. b. Students read *Windows to the Past, Fossils and Living Organisms*, *Fossils and the Environment,* and *Fossil Age* then answer questions using reading skills. 4. **Go Green Lab: *Fossil Fuel Use*** a. Students generate and share a list of ways they can conserve fossil fuels.

	5. **Elaborate**: a. **Science Notebook**. Students learn that hadrosaurs were herbivores that had specialized teeth, then students write about why scientists study what hadrosaurs ate. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Unit C Overview

Content Area: Science

Unit Title: Unit C Earth Science : *Earth's Resources* and *Earth and Space*

Target Course/Grade Level: 4

Unit Background

Fossils

Fossils form when living plants, animals, and other organisms die and are buried by sediments. Over time, the sediments harden into rock, preserving the hard parts (bones, shells, teeth, seeds, and woody stems) or shapes of the dead organisms.

Several types of fossils can be found in sedimentary rock. The most common types are molds and casts. Molds form when an organism buried in sediment dissolves, leaving a hollow area. A cast forms when minerals seep into the mold and make a copy of the organism's shape. Other types of fossils include petrified fossils, carbon films, and trace fossils. Petrified fossils are formed when minerals replace all or part of an organism. When the remains of an organism leave a then coating of carbon behind on a rock, it is a carbon film fossil. Fossils that show evidence of an organism's existence rather than the organism itself are called trace fossils (footprints and burrows).

Minerals

Minerals form through crystallization of melted materials and crystallization of materials dissolved in water. Minerals form inside Earth as magma cools or on Earth's surface as lava hardens. Magma cools very slowly, resulting in minerals with large crystals whereas magma located closer to the Earth's surface cools quicker, yielding smaller crystals. Sometime elements are dissolved in hot water, and as the water cools the elements leave the solution and crystallize as minerals.

Constellations

According to the International Astronomical Union (IAU), there are 88 constellations. Which constellations can be seen at any given time depends on the viewer's location on Earth. Northern Hemisphere constellations are Ursa Major ("Big Bear"), Ursa Minor ("Little Bear"), Cassiopeia, and Draco. These constellations appear to circle the North Pole and are known as circumpolar constellations and are always visible in the sky. Polaris is a circumpolar star that is located in the sky directly over the North Pole, and is known as the North Star.

Earth's Movement

Earth moves through space in several ways:

- rotates on its axis – one rotation takes 24 hours (one day)
- revolves around the sun – one revolution takes 365 days (one year)
- moves with the solar system as the solar system revolves around the center of the Milky Way Galaxy – one revolution takes 220 million years

Earth's rotation causes people to experience day and night; its revolution around the sun and its tilt on its axis causes the seasons.

Primary interdisciplinary connections: Reading, Math, Social Studies, Language Arts, Writing,

21st century themes:

- **Creativity and Innovation**

- Think Creatively
- Work Creatively with Others
- Implement Innovations

- **Critical Thinking and Problem Solving**
  - Reason Effectively
  - Use Systems Thinking
  - Make Judgments and Decisions
  - Solve Problems
- **Communication and Collaboration**
  - Communicate Clearly
  - Collaborate with Others

Standard(s)

- **4-ESS1 Earth's Place in the Universe**
- **4-ESS2 Earth's Systems**
- **5-ESS1 Earth's Place in the Universe**
- **5-ESS2 Earth's Systems**
-

Performance Expectations

- **4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.**
- **4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.**
- **4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.**
- **5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some start in the night sky.**
- **5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.**

Science and Engineering Practices

- **Analyzing and Interpreting Data**
  - Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- **Constructing Explanations and Designing Solutions**
  - Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
- **Planning and Carrying Out Investigations**
  - Planning and carrying out investigations to answer questions or test solutions to problems in 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- **Using Mathematics and Computational Thinking**
  - Mathematical and computational thinking in 3-5 builds on K-2 experiences and progresses to

	extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.
Disciplinary Core Ideas • **ESS1.B: Earth and the Solar System** • **ESS1.C: The History of Planet Earth** • **ESS2.A: Earth Materials and Systems** • **ESS2.B: Plate Tectonics and Large-Scale System Interactions** • **ESS2.C: The Roles of Water in Earth's Surface Processes** • **ESS2.E: Biogeology** •	
Crosscutting Concepts • **Patterns** • **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • **Cause and Effect** • **Scale, Proportion, and Quantity**	
Performance Expectations (PE)	**Supporting Concepts, Practices, and Ideas**
4-ESS1-1	Identify the evidence that supports particular points in an explanation.
	Local, regional, and global patterns or rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.
	Patterns can be used as evidence to support an explanation.
	Science assumes consistent patterns in natural systems.
4-ESS2-1	Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
	Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.
	Living things affect the physical characteristics of their regions.
	Cause and effect relationships are routinely identified, tested, and used to explain change.
4-ESS2-2	Analyze and interpret data to make sense of phenomena using logical reasoning.
	The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features area of Earth.
	Patterns can be used as evidence to support an explanation.
5-ESS1-2	Represent data in graphical displays (bar graphs, pictographs, and /or pie charts) to reveal patterns that indicate relationships.
	The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable

	patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.
	Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.
5-ESS2-2	Describe and graph quantities such as area and volume to address scientific questions.
	Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.
	Standard units are used to measure and describe physical quantities such as weight and volume.
Related Common Core ELA Standards	
RI.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS2-2) (5-ESS2-2)
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1) (4-ESS2-2)
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources (4-ESS1-1) (4-ESS2-1) (5-ESS2-2)
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)
SL4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2) (5-ESS2-2)
Related Common Core Mathematics Standards	
MP.2	Reason abstractly and quantitatively. (4-ESS1-1) (4-ESS2-1) (5-ESS1-2) (5-ESS2-2)
MP.4	Model with mathematics. (4-ESS1-1) (4-ESS2-1) (5-ESS1-2) (5-ESS2-2)
MP.5	Use appropriate tools strategically. (4-ESS2-1)
4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb; oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS1-1) (4-ESS2-1)
4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1) (4-ESS2-2)
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2) (5-ESS2-2)

Unit Essential Questions	**Unit Enduring Understandings**
• ***How are minerals classified?*** • ***How are rocks classified?*** • ***What are weathering and erosion?*** • ***How can Earth's surface change rapidly?*** • ***Where is Earth's water?*** • ***What is the water cycle?*** • ***How does Earth move?*** • ***How do start patterns change?*** • ***What are the phases of the moon?*** • ***What is the solar system?***	• **Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying explanations.** • **Safety first!** • **Mathematics is a tool used to model objects, events, and relationships in the natural and designed world.** • **Thinking systematically means looking for the relationships between parts.** • **Earth systems can be broken down into individual components that have observable measurable properties.** • **Earth's components form systems. These systems continually interact at different rates of time affecting the Earth regionally and globally.** • **Technology enables us to better understand Earth's systems and the impact of Earth's systems on human activity.** • **Observable, predictable patterns of movement in the Sun, Earth, and Moon system occur because of gravitational interaction and energy from the Sun.** • **Physical characteristics of planets depend on their distance from the Sun and their size.** • **The Sun is a star.**

Unit Learning Targets

Students will:

- identify different properties of minerals
- understand how minerals make up rocks
- describe the three categories of rocks
- know how rocks are formed
- explain how weathering, erosion, and deposition can change Earth's surface
- describe how rapid processes change Earth's surface
- explain where water collects on Earth
- demonstrate an understanding of the water cycle
- describe how Earth revolves around the sun and rotates on its axis
- describe how Earth's rotation is related to the apparent movement of the sun, moon, and stars
- understand that patterns in the sky stay the same but appear to change nightly and throughout the year
- describe the phases of the moon
- demonstrate an understanding that the sun, the planets, and their moons, and other objects are part of the solar system

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

4th Grade Wandell School Science Curricula

Aligned to the Next Generation Science Standards (NGSS)

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Unit Vocabulary:

- **Chapter 5:** ***cleavage, erosion, fault, groundwater, hardness, igneous, landform, luster, metamorphic, mineral, precipitation, sedimentary, streak, water cycle, weathering***
- **Chapter 6:** ***asteroid, comet, constellation, eclipse, ellipse, lunar eclipse, planet, orbit, revolution, rotation, solar eclipse, solar system***

Evidence of Learning

Summative Assessments at the end of each chapter.

Equipment needed: See teacher's edition

Teacher Resources: Pearson Interactive Science
https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true&ticket=ST-1368125-E9Ki92wc0g5CVII9xxk5-b3-rumba-prod-01-01

Formative Assessments

- teacher observation
- student responses to questions
- student participation in inquiry activities
- student interactive science journal
-
-

Lesson Plans

Chapter 5:	Timeframe
Lesson 1 *How Are Minerals Classified?*	**3-4 class periods**
Lesson 2 *How Are Rocks Classified?*	**3-4 class periods**
Lesson 3 *What Are Weathering and Erosion?*	**3-4 class periods**
Lesson 4 *How Can Earth's Surface Change Rapidly?*	**3-4 class periods**
Lesson 5 *Where is Earth's Water?*	**3-4 class periods**
Lesson 6 *What is the Water Cycle?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***How can rocks and minerals be classified?***
- ***How does the steepness of a stream affect how fast it flows?***
- ***How does the width of a stream affect how fast it flows?***
- **Lightning Lab:** ***Texture and Effervescence***
- ***What can you learn from rock layers?***
- **Lightning Lab:** ***Rock Model***
- ***How does a rock wear away?***
- **At-Home Lab:** ***Soil in Motion***
- **Lightning Lab:** ***Earthquake Model***
- ***Where is Earth's water?***

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

- **Go Green:** ***Saving Water***
- ***How can water move in the water cycle?***
- **Lightning Lab:** ***Water Droplets***

Chapter 6: ***Earth and Space***	**Timeframe**
Lesson 1 *How Does Earth Move?*	**3-4 class periods**
Lesson 2 *How Do Star Patterns Change?*	**3-4 class periods**
Lesson 3 *What Are the Phases of the Moon?*	**3-4 class periods**
Lesson 4 *What is the Solar System?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***What is one cause for the seasons?***
- ***What is the shape of a planet's path?***
- ***What shapes do the orbits of planets make?***
- ***Do all planets have orbits with the same elliptical shape?***
- **Lightning Lab:** ***Make a Sundial***
- ***What star patterns can you see?***
- **At-Home Lab:** ***Pictures in the Sky***
- ***Why is the new moon hard to see?***
- **At-Home Lab:** ***Moon Phases***
- **Go Green:** ***Solar Power***

Teacher Notes:

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

- **Next Generation Science Standards (NGSS) http://www.nextgenscience.org/**
- **21st Century Skills http://www.p21.org/our-work/p21-framework**
- **New Jersey Standards Clarification Project http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf**

Earth's Resources: Lesson 1	
Content Area: Science	
Lesson Title: *How Are Minerals Classified?*	**Timeframe:** 3-4 class periods
Lesson Components	
***21st Century Themes**	

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● identify different properties of minerals and understand how minerals make up rocks	**Lesson Sequence** 1. **Engage:** a. Students compare gold and "fool's" gold. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Misconception*** 3. **Explain**: a. Review the lesson question. b. Students read *Mineral Crystals, Properties of Minerals,* and *Other Mineral Properties* then answer questions using reading skills. 4. **Lightning Lab: *Texture and Effervescence*** a. Students scratch and dip rocks in vinegar to determine their properties. 5. **Elaborate**: a. **Science Notebook**. Students describe mineral samples in terms of hardness. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers	

● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

Earth's Resources: Lesson 2							
Content Area: Science							
Lesson Title: *How Are Rocks Classified?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe the three categories of rocks and know how they are formed	**Lesson Sequence** 1. **Engage:** a. Students discuss what they think will happen when lava and water interact. b. Introduce lesson vocabulary. 2. **Explore It!** ***What can you learn from rock layers?*** 3. **Explain**: a. Review the lesson question. b. Students read *Classifying Rocks, Igneous*

	Rocks, *Sedimentary Rocks*, *Metamorphic Rocks*, and *The Rock Cycle* then answer questions using reading skills. 4. **Lightning Lab: *Rock Model*** a. Students model a type of rock using clay and then describe the type of rock they made. 5. **Elaborate**: a. Students learn about two types of lava and infer which type cools more slowly. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth's Resources: Lesson 3							
Content Area: Science							
Lesson Title: *What Are Weathering and Erosion?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							

***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how weathering, erosion, and deposition can change Earth's surface	**Lesson Sequence** 1. **Engage:** a. Students describe what shapes a beach. b. Introduce lesson vocabulary. 2. **Explore It!** ***How does a rock wear away?*** 3. **Explain**: a. Review the lesson question. b. Students read *Earth's Surface, Weathering, Erosion,* and *Deposition* then answer questions using reading skills. 4. **At-Home Lab:** ***Soil in Motion*** a. Students think about how water flow affects erosion. 5. **Elaborate**: a. Students explain how the materials in a rock and the conditions around a rock can affect the rate at which physical weathering occurs. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth's Resources: Lesson 4							
Content Area: Science							
Lesson Title: *How Can Earth's Surface Change Rapidly?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how rapid processes change Earth's surface	**Lesson Sequence** 1. **Engage:** a. Students describe how the land is changing. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Science Stats?*** 3. **Explain**: a. Review the lesson question. b. Students read *Earth's Moving Plates, Volcanoes, Earthquakes, Landslides and Floods*, and *Drought* then answer questions using reading skills. 4. **Lightning Lab: *Earthquake Model*** a. Students shake a pan of soil to demonstrate how earthquakes affect landforms. 5. **Math Connection** a. Students read a graph to identify changes in the depth of the Missouri River 6. **Elaborate**: a. Students use a pencil to press a hole through a

	sheet of modeling clay to demonstrate how magma breaks through Earth's surface. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth's Resources: Lesson 5							
Content Area: Science							
Lesson Title: *Where is Earth's Water?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies

Students Will Be Able To:	**Lesson Sequence**
● explain where water collects on Earth	1. **Engage:** a. Students describe where water and steam come from at a geyser. b. Introduce lesson vocabulary. 2. **Explore It!** ***Where is Earth's Water?*** 3. **Explain**: a. Review the lesson question. b. Students read *Water on Earth, Surface Water, Groundwater,* and *Clean Drinking Water* then answer questions using reading skills. 4. **Go Green Lab:** ***Saving Water*** a. Students list and share ways they can use less water in school. 5. **Elaborate**: a. Students learn that scientists use satellites to take measurements of the ocean. Students think about the advantages of using satellites to study Earth's ocean. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth's Resources: Lesson 6							
Content Area: Science							
Lesson Title: *What is the Water Cycle?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of the water cycle	**Lesson Sequence** 1. **Engage:** a. Students identify what happens to water when it is warmed. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can water move in the water cycle?*** 3. **Explain**: a. Review the lesson question. b. Students read *Recycled Water*, *The Water Cycle*, *Water Cycle and Weather*, and *Water Cycle and Climate* then answer questions using reading skills. 4. **Lightning Lab:** ***Water Droplets*** a. Students explain why there are droplets of water on a mirror after a hot shower. 5. **Elaborate**: a. Students make a list of places that they have seen condensation in their Science Notebook. 6. **Evaluate**:

	a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth and Space: Lesson 1							
Content Area: Science							
Lesson Title: *How Does Earth Move?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies

Students Will Be Able To:	**Lesson Sequence**
● describe how Earth revolves around the sun and rotates on its axis ● describe how Earth's rotation is related to the apparent movement of the sun, moon, and stars	1. **Engage:** a. Students recognize photos of the sun moving during 24 hours. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Connections*** 3. **Explain**: a. Review the lesson question. b. Students read *Earth Moves, Earth's Rotation, Shadows Change, Earth's Revolution,* and *Earth's Seasons* then answer questions using reading skills. 4. **Lightning Lab: *Make a Sundial*** a. Students make a sundial with a poster board. 5. **Math Connection** a. Students identify patterns and averages of daylight hours in the Northern and Southern Hemispheres. 6. **Elaborate**: a. Students explain the name that describes areas near each pole that receive sunlight for 24 hours. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation:
Embedded in the program are
● strategies for English Language Learners
● leveled readers
● resources to address multiple intelligences

Resources Provided: *Pearson Interactive Science*

Earth and Space: Lesson 2	
Content Area: Science	
Lesson Title: *How Do Star Patterns Change?*	**Timeframe:** 3-4 class periods

Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● understand that patterns in the sky stay the same but appear to change nightly and throughout the year	**Lesson Sequence** 1. **Engage:** a. Students connect the stars to show a pattern in the sky. b. Introduce lesson vocabulary. 2. **Explore It!** ***What star patterns can you see?*** 3. **Explain**: a. Review the lesson question. b. Students read *Stars*, *Star Patterns*, and *The North Star* then answer questions using reading skills. 4. **At-Home Lab:** ***Pictures in the Sky*** a. Students use a star finder to locate star patterns. 5. **Elaborate**: a. Students draw their own constellations in their Science Notebook. 6. **Evaluate**: a. Review lesson vocabulary. c. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

Earth and Space: Lesson 3							
Content Area: Science							
Lesson Title: *What Are the Phases of the Moon?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe the phases of the moon	**Lesson Sequence** 1. **Engage:** a. Students color the moon in its different phases. b. Introduce lesson vocabulary. 2. **Explore It!** ***Why is the new moon hard to see?*** 3. **Explain**: a. Review the lesson question. b. Students read *Sun, Moon, and Earth; Phases of*

	the Moon; and *Eclipses* then answer questions using reading skills. 4. **At-Home Lab: *Moon Phases*** a. Students draw the moon and label its phase. 5. **Elaborate**: a. Students draw a picture of each moon phase on the day it occurs. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Earth and Space: Lesson 4							
Content Area: Science							
Lesson Title: *What is the Solar System?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							

***Integration of Technology: Pearson Interactive Science Program**
***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding that the sun, the planets and their moons, and other objects are part of the solar system	**Lesson Sequence** 1. **Engage:** a. Students explain why the planet Mercury likely does not support life. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question. b. Students read *Our Solar System, Objects in the Solar System, Planets and Moons, Inner Planets, and Outer Planets* then answer questions using reading skills. 4. **Go Green: *Solar Power*** a. Students generate a list of ways that people can use solar energy. 5. **Elaborate**: a. Students learn that Saturn's rings are divided into small, thin rings. Students tell why they think the rings keep orbiting around Saturn. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Unit D Overview

Content Area: Science

Unit Title: Unit D Physical Science: *Matter, Energy and Heat, Electricity and Magnetism*, and *Motion*

Target Course/Grade Level: 4

Unit Background

Elements and Compounds

There are two types of matter: pure substances and mixtures. Pure substances are mad of only one kind of matter and have definite properties. Elements are one group of pure substances; they cannot be broken down into any other substance by any physical or chemical means. There are 116 elements, including silver, gold, oxygen, hydrogen, and carbon. Elements can combine with other elements to form another group of pure substances known as compounds. The properties of compounds are always different from the properties of the elements that formed them. In a mixture, two or more substances are in the same place but they are not chemically combined. Each substance maintains its separate properties.

Solids

Solids have a definite volume and shape. However, the particles within them can be arranged in two different ways. Crystalline solids have particles that form a regular, repeating pattern and have a distinct temperature at which it melts. The particles in amorphous solids are not arranged in a regular pattern and do not have a distinct melting point. When these solids are heated, they become softer and softer until they melt.

More Ways Matter Changes

Vaporization is the change from a liquid to a gas, and occurs when a liquid reaches its boiling point. Evaporation takes place on the surface of a liquid. Condensation is the opposite of vaporization and happens when gas particles lose enough thermal energy to become a liquid. The process by which substances go from solid to gas without passing through the liquid state is called sublimation.

Magnets

A material can be a strong magnet if it forms magnetic domains with its atoms having their magnetic fields all aligned in the same way. Non-magnetized material has its domains point in random directions. Magnetic material can become unmagnetized when their domains become randomly organized. Hard impacts or heating can destroy an object's magnetism.

Energy Transformations

Most forms of energy can be converted into other forms of energy; this process is known as energy transformations and takes place frequently throughout the day. Some energy changes involve single transformations such as a flashlight transforming the chemical energy stored in batteries to light energy, and a toaster turning electrical energy into thermal energy when it toasts a slice of bread.

Sometimes multiple transformations are needed to complete a task such as the numerous transformations taking place in your car from the electrical energy produced by turning on the car and firing the spark plugs which release thermal energy that releases chemical energy in the fuel, which then converts to thermal energy and then into the mechanical energy necessary to move the vehicle.

Even with numerous transformations, no energy is ever created or destroyed during the process, the amount of energy always stays the same. This is known as the *law of conservation of energy.*

The Speed of Sound

The speed of sound depends on the medium through which it travels, as well as the elasticity, density, and temperature of the medium. Generally, sound travels fastest through solids because solids have more elasticity than liquids or gases. Elasticity is the ability of particles in a material to bounce back after being disturbed. Since particles in solids don't move very far when a sound wave travels through them, the move back to their original positions quickly. Liquids are not very elastic; neither are gases, which is why air is one of the poorest transmitters of sound.

The density of a material also impacts the speed of sound going through it. The denser the substance, the slower sound travels through it. Sound also travels more slowly at lower temperatures than higher ones.

Forces of Nature as Sources of Energy

Wind power provides a small amount of the world's electricity, but its use is limited to places where the wind blow steadily enough to be reliable. Hydroelectric power from flowing water is very reliable, however, in the United States, most rivers well-suited to dams already have them. Therefore, scientists are looking at ocean tides as an energy resource.

Specific Heat

Heating an object causes its temperature to rise, but not all materials increase their temperature at the same rate. The amount of heat required to raise the temperature depends on the chemical makeup of the object's material. Scientists have defined a quantity to measure the relationship between heat and temperature change. The amount of energy required to raise 1 kilogram of a material's temperature by 1 kelvin is called *specific heat.* The unit of measure for specific heat is *joules per kilogram-kelvin*. The higher the specific heat, the more energy is needed to raise the material's temperature.

Electrical Charges and Interactions

All matter contains particles call electrons and protons, both of which have electrical charges. Electrons carry a negative charge (-), while protons carry a positive charge (+). Electrical charges that are the same repel each other, while opposite charges will attract each other. Charges can build up in objects and produce static electricity by being transferred from one object to another. This happens in one of three ways. Electrons can be transferred by rubbing (friction), direct contact (conduction), or by the electric field of another object (induction).

Circuit Breakers and Safety

To prevent electrical circuits from overheating and possibly causing a fire, a safety device called a circuit breaker is added to a circuit. A circuit breaker uses an electromagnet to shut off the circuit when the current gets too high. Circuit breakers can be reset by a person after remedying the condition that caused the circuit to overheat.

Circuit breakers, which look like horizontal light switches, are housed in a metal cabinet usually located in a building's basement or maintenance area. Anytime people work with electrical appliances or fixtures in their homes, the circuit breaker should be placed in the off position so that electricity does not flow through that circuit.

Transformers

The most efficient way to transmit electric current from a power plant to homes is to maintain very high voltage (11,000 – 765,00 volts), however, electricity is used at much lower voltages in the United States, usually 120 volts. The function of a transformer is to increase or decrease voltage. Electric companies use transformers to increase the voltage before it is sent out over the wires, and then again to decrease the voltage before the electric current arrives in peoples' homes. The transformer itself consists of two separate coils of insulated wire wrapped around an iron core. One coil, the primary coil, is connected to a circuit in which alternating currents flow. The other coil, the secondary coil, is connected to a separate circuit that does not contain a voltage source.

Superconductors and Semiconductors

A superconductor is a material that has no electrical resistance; current flows through without any loss of energy. Using superconducting wires would reduce wasted electrical energy and make electrical devices more efficient. However, since superconductors require very low temperatures to work efficiently, their use has been limited.

Semiconductors are materials that conduct electricity better than insulators, but not as well as conductors. A semiconductor needs just the "right" conditions to conduct an electrical current. The way to produce the "right" conditions is to add atoms from other elements to the semiconductor in specific ways.

Newton's Laws:

The Law of Inertia

Inertia is the tendency of an object to resist change in its motion (or lack of motion). Sir Isaac Newton discovered the three laws of motion, the first of which states that an object at rest will stay at rest, and an object that is moving at a constant velocity will continue moving at a constant velocity unless acted upon by an unbalanced force. The unbalanced forces that act upon moving objects are gravity and friction.

The strength of frictional forces depends on two factors: how hard the surfaces push together and the types of surfaces involved. Smooth surfaces produce less friction than rough surfaces. There are four types of friction.

Static friction acts on objects that are not moving, such as a heavy box, that need extra force to begin moving. Once the object is moving, the friction becomes sliding friction that occurs when two solid surfaces slide over each other. Rolling friction occurs when an object rolls across a surface. Fluid friction occurs when a solid object moves through a fluid.

Newton's Second Law

Acceleration depends on an object's mass and the net force acting on the object. In science, acceleration is the rate at which the velocity of an object changes. Acceleration can mean speeding up, slowing down, or changing direction.

Newton's Third Law

For every action there is an equal but opposite reaction.

Free Fall

On Earth, gravity is a downward force that affects all objects. When the only force acting on a falling object is gravity, the object is said to be in free fall. An object in free fall is accelerating because gravity is the unbalanced force that is acting on the object.

All objects in free fall accelerate at the same rate regardless of their masses. The reason why two objects don't necessarily land at the same time has to do with air resistance (a type of fluid friction). Objects with greater surface area experience more air resistance than objects with less surface area. In addition, air resistance increases with velocity.

Primary interdisciplinary connections: Reading, Math, Social Studies, Language Arts, Writing,

21st century themes:

- **Creativity and Innovation**
  - Think Creatively
  - Work Creatively with Others
  - Implement Innovations
- **Critical Thinking and Problem Solving**
  - Reason Effectively
  - Use Systems Thinking
  - Make Judgments and Decisions
  - Solve Problems
- **Communication and Collaboration**
  - Communicate Clearly
  - Collaborate with Others

Standard(s)

- **3-PS2 Motion and Stability: Forces and Interactions**
- **4-PS3 Energy**
- **4-PS4 Waves and Their Applications in Technologies for Information Transfer**
- **5-PS1 Matter and Its Interactions**
- **5-PS2 Motion and Stability: Forces and Interactions**
-

Performance Expectations

- **3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.**
- **3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.**
- **3-PS2-3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.**
- **3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.**
- **4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.**
- **4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.**

- **4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.**
- **4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.**
- **4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.**
- **5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.**
- **5-PS1-2 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.**
- **5-PS1-3 Make observations and measurements to identify materials based on their properties.**
- **5-PS2-1 Support an argument that the gravitational force exerted by Earth on objects is directed down.**

Science and Engineering Practices

Asking Questions and Defining Problems

- Asking questions and defining problems in grades 3-5 builds on grades K-2 experiences and progresses to specifying qualitative relationships.

Planning and Carrying Out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

Science Knowledge is Based on Empirical Evidence

Scientific Investigations Use a Variety of Methods

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

Developing and Using Models

- Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Using Mathematics and Computational Thinking

- Mathematical and computational thinking in 3-5 builds on K-2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

Engaging in Argument from Evidence

- Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

Disciplinary Core Ideas

- **PS1.A: Structure and Properties of Matter**
- **PS1.B: Chemical Reactions**
- **PS2.A: Forces and Motion**
- **PS2.B: Types of Interactions**

- **PS3.A: Definitions of Energy**
- **PS3.B: Conservation of Energy and Energy Transfer**
- **PS3.C: Relationship Between Energy and Forces**
- **PS3.D: Energy in Chemical Processes and Everyday Life**
- **PS4.A: Wave Properties**
-

Crosscutting Concepts

- **Patterns**
- **Cause and Effect**
- **Interdependence of Science, Engineering, and Technology**
- **Energy and Matter**
- **Influence of Engineering, Technology, and Science on Society and the Natural World**
- **Science is a Human Endeavor**
- **Scale, Proportion, and Quantity**
- **Scientific Knowledge Assumes and Order and Consistency in Natural Systems.**

Performance Expectations (PE)	**Supporting Concepts, Practices, and Ideas**
3-PS2-1	Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
	Science investigations use a variety of methods, tools, and techniques.
	Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.)
	Objects in contact exert forces on each other (friction, elastic pushes and pulls).
	Cause and effect relationships are routinely identified.
3-PS2-2	Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
	Science findings are based on recognizing patterns.
	The patterns of an object's motion in various situations can be observed and measured; when past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.)
	Patterns of change can be used to make predictions.
3-PS2-3	Ask questions that can be investigated based on patterns such as cause and effect relationships.
	Electric, magnetic, and gravitational forces between a pair of objects do not require that the objects be in contact—for example, magnets push or pull at a distance. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

	Cause and effect relationships are routinely identified, tested, and used to explain change.
3-PS2-4	Define a simple problem that can be solved through the development of a new or improved object or tool.
	Electric, magnetic, and gravitational forces between a pair of objects do not require that the objects be in contact—for example, magnets push or pull at a distance. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.
	Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.
4-PS3-1	Use evidence (e.g., measurements, observations, patterns) to construct an explanation.
	The faster a given object is moving, the more energy it possesses.
	Energy can be transferred in various ways and between objects.
4-PS3-2	Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
	Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
	Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced.
	Light also transfers energy from place to place.
	Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.
	Energy can be transferred in various ways and between objects.
4-PS3-3	Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
	Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
	Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced.
	When objects collide, the contact forces transfer energy so as to change the objects' motions.
	Energy can be transferred in various ways and between objects.
4-PS3-4	Apply scientific ideas to solve design problems.

	Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.
	The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.
	Energy can be transferred in various ways and between objects.
	Engineers improve existing technologies or develop new ones.
	Most scientists and engineers work in teams.
	Science affects everyday life.
4-PS4-1	Develop a model using an analogy, example, or abstract representation to describe a scientific principle.
	Science findings are based on recognizing patterns.
	Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach.
	Waves of the same type can differ in amplitude and wavelength.
	Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.
5-PS1-1	Use models to describe phenomena.
	Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon; the effects of air on larger particles or objects.
	Natural objects exist from the very small to the immensely large.
5-PS1-2	Measure and graph quantities such as weight to address scientific and engineering questions and problems.
	The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
	No matter what reaction or change in properties occurs, the total weight of the substances does not change.
	Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.
	Science assumes consistent patterns in natural systems.
5-PS1-3	Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
	Measurements of a variety of properties can be used to identify materials.
	Standard units are used to measure and describe physical quantities such as weight,

	time, temperature, and volume.
5-PS1-4	Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
	When two or more different substances are mixed, a new substance with different properties may be formed.
	Cause and effect relationships are routinely identified and used to explain change.
5-PS2-1	Support an argument with evidence, data, or a model.
	The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.
	Cause and effect relationships are routinely identified and used to explain change.
Related Common Core ELA Standards	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (3-PS2-1) (3-PS2-3) (4-PS3-1) (5-PS2-1)
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (3-PS2-3) (4-PS3-1)
RI.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (5-PS1-1)
RI.4.8	Explain how an author uses reasons and evidence to support particular points in a text. (3-PS2-3)
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1) (5-PS2-1)
W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1)
W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (3-PS2-1) (3-PS2-2) (4-PS3-2) (4-PS3-3) (4-PS3-4) (5-PS1-2) (5-PS1-3) (5-PS1-4)
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources (3-PS2-1) (3-PS2-2) (4-PS3-1) (4-PS3-2) (4-PS3-3) (4-PS3-4) (5-PS1-2) (5-PS1-3) (5-PS1-4)
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1) (5-PS1-2) (5-PS1-3) (5-PS1-4)
SL.4.3	Identify the reasons and evidence a speaker provides to support particular points. (3-PS2-3)
SL4.5	Add audio recordings and visual displays to presentations when appropriate to

	enhance the development of main ideas or themes. (4-PS4-1)
Related Common Core Mathematics Standards	
MP.2	Reason abstractly and quantitatively. (3-PS2-1) (5-PS1-1) (5-PS1-2) (5-PS1-3)
MP.4	Model with mathematics. (4-PS4-1) (5-PS1-1) (5-PS1-2) (5-PS1-3)
MP.5	Use appropriate tools strategically. (3-PS2-1) (5-PS1-2) (5-PS1-3)
4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (5-PS1-2)
4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1)
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (3-PS2-1)

Unit Essential Questions

- ***What are properties of matter?***
- ***How is matter measured?***
- ***What are phases of matter?***
- ***What are mixtures?***
- ***How does matter change?***
- ***What are forms of energy?***
- ***What is sound energy?***
- ***What is light energy?***
- ***What is heat?***
- ***What is static electricity?***
- ***How do electric charges flow in a circuit?***
- ***How does electricity transfer energy?***
- ***What is magnetism?***
- ***How are electricity and magnetism transformed?***
- ***What is motion?***
- ***What is speed?***

Unit Enduring Understandings

- **Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying explanations.**
- **Safety first!**
- **Mathematics is a tool used to model objects, events, and relationships in the natural and designed world.**
- **Thinking systematically means looking for the relationships between parts.**
- **The atomic structures of materials determine their properties.**
- **There are several ways in which elements and compounds react to form new substances and each reaction involves the flow of energy.**
- **The same basic rules govern the motion of all bodies, from planets and stars to birds and billiard balls.**
- **Energy takes many forms.**
-

Unit Learning Targets
Students will:

- compare objects based on their physical properties
- know that magnets attract and repel objects
- demonstrate an understanding of how matter is measured
- understand that heating and cooling affects the motion of particles
- explain how to separate mixtures
- demonstrate an understanding of how matter changes into materials with different characteristics
- define energy
- know what forms energy can take
- understand what energy can do
- describe sound energy
- explain how sound energy is produced
- describe how light bends when it passes through different materials
- recognize that heat flows from hot objects to cold ones
- give examples of good and bad conductors of heat
- explain what static electricity is and how charged objects behave
- describe how electricity is transferred in a circuit
- explain how energy changes form and how electricity is transformed into light and gives off heat
- describe how magnets can attract magnetic materials and attract and repel other magnets
- demonstrate an understanding of how electricity and magnetism can be changed
- understand how an object's mass affects the amount of force needed to move it and how Earth's gravity affects objects
- find, describe, and graph the speed of an object

Unit Vocabulary:

- **Chapter 7:** ***boiling point, chemical change, condensation, density, evaporation, filtration, mass, melting point, mixture, phase of matter, property, volume***
- **Chapter 8:** ***absorption, amplitude, conduction, convection, energy, frequency, kinetic energy, pitch, potential energy, radiation, reflection, refraction, sound, volume, wavelength***
- **Chapter 9:** ***conductor, electric current, electromagnet, filament, generator, insulator, magnetism, parallel circuit, series circuit, static electricity***
- **Chapter 10:** ***force, gravity, motion, reference point, speed, velocity***

Evidence of Learning

Summative Assessments at the end of each chapter.

Equipment needed: See teacher's edition

Teacher Resources: Pearson Interactive Science
https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true&ticket=ST-1368125-E9Ki92wc0g5CVII9xxk5-b3-rumba-prod-01-01

Formative Assessments

- teacher observation
- student responses to questions
- student participation in inquiry activities
- student interactive science journal
-
-

Lesson Plans	
Chapter 7: *Matter*	**Timeframe**
Lesson 1 *What Are Properties of Matter?*	**3-4 class periods**
Lesson 2 *How is Matter Measured?*	**3-4 class periods**
Lesson 3 *What Are Phases of Matter?*	**3-4 class periods**
Lesson 4 *What Are Mixtures?*	**3-4 class periods**
Lesson 5 *How Does Matter Change?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***What properties can be used to classify matter?***
- ***Does steel wool rust faster in water or vinegar?***
- ***How does the temperature of steel wool change as it rusts?***
- **Lightning Lab: *Magnetic Properties***
- ***How does dividing clay affect its mass?***
- **At-Home Lab: *Measure Up Matter***
- ***How does freezing affect the volume of water?***
- **At-Home Lab: *Faster Evaporation***
- **Lightning Lab: *Step by Step***
- ***How can you tell if a change has occurred?***
- **At-Home Lab: *Shiny Pennies***

Chapter 8: *Energy and Heat*	**Timeframe**
Lesson 1 *What Are Forms of Energy?*	**3-4 class periods**
Lesson 2 *What is Sound Energy?*	**3-4 class periods**
Lesson 3 *What is Light Energy?*	**3-4 class periods**
Lesson 4 *What is Heat?*	**3-4 class periods**

Inquiry Questions and Labs:

- ***What are some forms of energy?***
- ***Which material is the better heat conductor?***
- ***Which material is the best insulator?***
- **Go Green: *Energy Savers***
- **Lightning Lab: *Water Music***
- ***What are some colors in white light?***
- **At-Home Lab: *Rainbows in Light***
- ***How does heat move?***

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

• **At-Home Lab:** ***Heat on the Move***	
Chapter 9:*Electricity and Magnetism*	**Timeframe**
Lesson 1 *What Is Static Electricity?*	**3-4 class periods**
Lesson 2 *How Do Electric Charges Flow in a Circuit?*	**3-4 class periods**
Lesson 3 *How Does Electricity Transfer Energy?*	**3-4 class periods**
Lesson 4 *What is Magnetism?*	**3-4 class periods**
Lesson 5 *How Are Electricity and Magnetism Transferred?*	**3-4 class periods**
Inquiry Questions and Labs: • ***What can electricity flow through?*** • ***What is an electromagnet?*** • ***How does an electromagnet interact with a magnet?*** • ***What is one effect of static electricity?*** • **At-Home Lab:** ***Strength of Force*** • ***How can a switch make a complete circuit?*** • **Lightning Lab:** ***Classify Conductors and Insulators*** • **At-Home Lab:** ***Motion and Heat*** • ***How can you make a magnet?*** • **Lightning Lab:** ***Make a Compass*** • ***How can energy be transformed and transferred?*** • **Go Green:** ***Electromagnets in Recycling***	
Chapter 10: ***Motion***	**Timeframe**
Lesson 1 *What Is Motion?*	**3-4 class periods**
Lesson 2 *What is Speed?*	**3-4 class periods**
Inquiry Questions and Labs: • ***How can you measure motion?*** • ***How does friction affect motion?*** • ***How could you change the friction between objects and a ramp?*** • **Lightning Lab:** ***The Wrecking Ball*** • ***What can change a marble's speed?*** • **At-Home Lab:** ***On a Roll***	
Teacher Notes:	

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

- **Next Generation Science Standards (NGSS) http://www.nextgenscience.org/**
- **21st Century Skills http://www.p21.org/our-work/p21-framework**
- **New Jersey Standards Clarification Project http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf**

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

Matter: Lesson 1							
Content Area: Science							
Lesson Title: *What Are Properties of Matter?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● compare objects base on their physical properties and know that magnets attract and repel objects	**Lesson Sequence** 1. **Engage:** a. Students think about how they can use their senses to find something at the grocery store. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question. b. Students read *Properties of Matter* and *More Properties of Matter* then answer questions using reading skills. 4. **Lightning Lab: *Magnetic Properties*** a. Students observe how magnets affect each other. 5. **Elaborate**: a. **Science Notebook**: Students explain why a scale sinks when you stand on it. 6. **Evaluate**: a. Review lesson vocabulary.

	b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Matter: Lesson 2							
Content Area: Science							
Lesson Title: *How is Matter Measured?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of how matter is measured	**Lesson Sequence** 1. **Engage:** a. Students describe how two groups of blocks that are arranged differently have similar masses.

	b. Introduce lesson vocabulary. 2. **Explore It!** ***How does dividing clay affect its mass?*** 3. **Explain**: a. Review the lesson question. b. Students read *Mass, Law of Conservation of Mass, Measure and Compare Mass, Volume, Volume of Liquids and Solids, U.S. System of Measurement*, and *Compare Measurements* then answer questions using reading skills. 4. **At-Home Lab:** ***Measure Up Matter*** a. Students demonstrate the law of conservation of mass. 5. **Math Connection:** ***Measuring Volume*** a. Students compare the volumes of boxes that are different dimensions 6. **Elaborate**: a. Students describe the volume of a 15-mL object in cubic centimeters. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Matter: Lesson 3	
Content Area: Science	
Lesson Title: *What Are Phases of Matter?*	**Timeframe:** 3-4 class periods
Lesson Components	
***21st Century Themes**	

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● understand that heating and cooling affects the motion of particles	**Lesson Sequence** 1. **Engage:** a. Students think about why the person can climb up the waterfall. b. Introduce lesson vocabulary. 2. **Explore It!** ***How does freezing affect the volume of water?*** 3. **Explain**: a. Review the lesson question. b. Students read *Phases of Matter, Solids, Liquids, Gases, Phase Changes,* and *Melting and Boiling Points* then answer questions using reading skills. 4. **At-Home Lab:** ***Faster Evaporation*** a. Students make inferences about evaporation by comparing the drying times of two pieces of paper in different conditions. 5. **Elaborate**: a. Students determine whether the boiling point of a substance is higher or lower at the top of a mountain than at sea level. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.

Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Matter: Lesson 4							
Content Area: Science							
Lesson Title: *What Are Mixtures?*				**Timeframe:** 3-4 class periods			
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how to separate mixtures	**Lesson Sequence** 1. **Engage:** a. Students identify what parts they see mixed together. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question. b. Students read *Mixtures, Separating Mixtures,*

	Solutions, and *Solubility* then answer questions using reading skills. 4. **Lightning Lab: *Step by Step*** a. Students write a numbered set of instructions for separating a mixture of paper clips, wood chips, gravel, and sugar. 5. **Elaborate**: a. **Science Notebook:** Students describe how condensation occurs when they take a hot shower. 6. **Evaluate**: a. Review lesson vocabulary. c. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Matter: Lesson 5							
Content Area: Science							
Lesson Title: *How Does Matter Change?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							

***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of how matter changes into materials with different characteristics	**Lesson Sequence** 1. **Engage:** a. Students discuss how matter changes. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can you tell if a change has occurred?*** 3. **Explain**: a. Review the lesson question. b. Students read *Matter Changes*, *Physical Changes*, and *Chemical Changes* then answer questions using reading skills. 4. **At-Home Lab:** ***Shiny Pennies*** a. Students drop a penny into a solution of water, vinegar and salt and observe any changes. 5. **Elaborate**: a. **Science Notebook:** Students write examples of how they could make physical changes to materials in the classroom. 6. **Evaluate**: a. Review lesson vocabulary. d. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Energy and Heat: Lesson 1							
Content Area: Science							
Lesson Title: *What Are Forms of Energy?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● define energy, know what forms it can take, and understand what it can do	**Lesson Sequence** 1. **Engage:** a. Students think about the sounds and movements a plane might make. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question. b. Students read *Energy*, *Forms of Energy*, *Energy and Motion*, and *Forms of Potential Energy* then answer questions using reading skills. 4. **Go Green: *Energy Savers***

	a. Students look around the classroom and write a list of ways the classroom could be more energy efficient. 5. **Elaborate**: a. **Science Notebook:** Students choose a type of energy presented in the lesson and list other examples of it. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Energy and Heat: Lesson 2							
Content Area: Science							
Lesson Title: *What is Sound Energy?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe sound energy and explain how it is produced	**Lesson Sequence** 1. **Engage:** a. Students identify instruments that make high sounds and low sounds. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Fun Fact*** 3. **Explain**: a. Review the lesson question. b. Students read *Sound Energy*, *How Sound Travels*, *Frequency and Wavelength*, *Pitch*, and *Volume* then answer questions using reading skills. 4. **Math Connection:** a. Students read a graph on how fast sound travels through different types of mediums. 5. **Lightning Lab: *Water Music*** a. Students blow across the top of bottles with different amounts of water and explain the relationship between the amount of water and the sound produced. 6. **Elaborate**: a. **Science Notebook:** Students draw a wave, label it, and define each part. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

4th Grade Wandell School Science Curricula

Aligned to the Next Generation Science Standards (NGSS)

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Content Area: Science							
Lesson Title: *What is Light Energy?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how light bends when it passes through different materials	**Lesson Sequence** 1. **Engage:** a. Students describe how bending light can change the way a frog partly in water looks. b. Introduce lesson vocabulary. 2. **Explore It!** ***What are some colors in white light?*** 3. **Explain**: a. Review the lesson question. b. Students read *Sources of Light*, *Light Waves We See*, *Prisms*, and *Light and Matter* then answer questions using reading skills. 4. **At-Home Lab:** ***Rainbows in Light*** a. Students tell how the back of a compact disc acts like a prism. 5. **Elaborate**: a. **Science Notebook:** Students write the meaning of *visible light spectrum* in their Science Notebook. 6. **Evaluate**: a. Review lesson vocabulary.

	b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Energy and Heat: Lesson 4							
Content Area: Science							
Lesson Title: *What is Heat?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● recognize that heat flows from hot objects to cold ones and give examples of good and bad conductors of heat	**Lesson Sequence** 1. **Engage:** a. Students identify warm temperature areas in a thermogram. b. Introduce lesson vocabulary.

	2. **Explore It!** ***How does heat move?*** 3. **Explain**: a. Review the lesson question. b. Students read *Conduction, A Conduction Example, Convection, Radiation,* and *Changes of Other Energy* then answer questions using reading skills. 4. **At-Home Lab:** ***Heat on the Move*** a. Students take temperature readings in various places around their homes. 5. **Elaborate**: a. **Science Notebook**: Students list things that circulate, then draw a diagram of a convection oven and label it to show how the oven cooks food. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Electricity and Magnetism: Lesson 1	
Content Area: Science	
Lesson Title: *What is Static Electricity?*	**Timeframe:** 3-4 class periods
Lesson Components	
***21st Century Themes**	

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain what static electricity is and how charged objects behave	**Lesson Sequence** 1. **Engage:** a. Students explain what causes a flash of light between two electrical wires. b. Introduce lesson vocabulary. 2. **Explore It!** ***What is one effect of static electricity?*** 3. **Explain**: a. Review the lesson question. b. Students read *Static Electricity*, *How Charged Objects Behave*, *Electric Force*, and *Effects of Static Electricity* then answer questions using reading skills. 4. **At-Home Lab:** ***Strength of Force*** a. Students rub a balloon against their heir, hold it near lightweight objects, and use their results to draw a conclusion about the strength of the balloon's electric force. 5. **Elaborate**: a. Students learn that negative particles may move to water vapor in the air on a humid day and predict how humidity will affect the attraction of a negatively charged balloon to a wall. 6. **Evaluate**: a. Review lesson vocabulary. e. Students complete the Lesson Check blackline

	master to determine whether they need additional help with the lesson content.

Differentiation:
Embedded in the program are
- strategies for English Language Learners
- leveled readers
- resources to address multiple intelligences

Resources Provided: *Pearson Interactive Science*

Electricity and Magnetism: Lesson 2							
Content Area: Science							
Lesson Title: *How Do Electric Charges Flow in a Circuit?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how electricity is transferred in a circuit.	**Lesson Sequence** 1. **Engage:** a. Students discuss why all the bulbs light up when they plug a string of light bulbs into an

	electric outlet. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can a switch make a complete circuit?*** 3. **Explain**: a. Review the lesson question. b. Students read *Electric Currents*, *How Electric Charges Flow*, and *Types of Circuits* then answer questions using reading skills. 4. **Lightning Lab:** ***Classify Conductors and Insulators*** a. Students generate a list of classroom objects that are conductors and insulators. 5. **Elaborate**: a. Students use a water pipe analogy to explain whether a thick wire or a thin wire has more resistance. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Electricity and Magnetism: Lesson 3							
Content Area: Science							
Lesson Title: *How Does Electricity Transfer Energy?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and	x	Critical Thinking and	x	Communication		Information

	Innovation		Problem Solving		and Collaboration		Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● explain how energy changes form and how electricity is transformed into light and gives off heat	**Lesson Sequence** 1. **Engage:** a. Students discuss how electricity is important to some plants. b. Introduce lesson vocabulary. 2. **Explore: My Planet Diary *Voices from History*** 3. **Explain**: a. Review the lesson question. b. Students read *Energy Changing Form*, *Light from Electricity*, and *Heat from Electricity* then answer questions using reading skills. 4. **Math Connection:** a. Students answer questions about electrical energy. 5. **At-Home Lab: *Motion and Heat*** a. Students rub an eraser across a table several times and describe how it feels to the touch. 6. **Elaborate**: a. Students learn how tungsten-halogen bulbs compare to incandescent bulbs and infer why incandescent bulbs are often used in homes rather than tungsten-halogen bulbs. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners	

● leveled readers ● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

Electricity and Magnetism: Lesson 4							
Content Area: Science							
Lesson Title: *What is Magnetism?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● describe how magnets can attract magnetic materials and attract and repel other magnets	**Lesson Sequence** 1. **Engage:** a. Students think about how a maglev train moves. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can you make a magnet?*** 3. **Explain**:

	a. Review the lesson question. b. Students read *Magnetism, Magnetic Fields, Magnetic Poles,* and *Magnetic Compasses* then answer questions using reading skills. 4. **Lightning Lab: *Make a Compass*** a. Students make a compass using water, a paper cup, a paperclip, and a magnet and observe the results. 5. **Elaborate**: a. **Science Notebook:** Students explain how to determine the north and south poles on a magnet. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Electricity and Magnetism: Lesson 5							
Content Area: Science							
Lesson Title: *How Are Electricity and Magnetism Transformed?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							

***Integration of Technology: Pearson Interactive Science Program**
***Equipment needed: see teacher's edition**
***Vocabulary: see unit overview for all vocabulary associated with this unit**

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● demonstrate an understanding of how electricity and magnetism can be changed	**Lesson Sequence** 1. **Engage:** a. Students explain how magnetism attracts paper clips to a bolt. b. Introduce lesson vocabulary. 2. **Explore It!** ***How can energy be transformed and transferred?*** 3. **Explain**: a. Review the lesson question. b. Students read *Electric Current and Magnetism, Electromagnets, Uses of Electromagnets, Transforming Magnetism into Electricity*, and *Generators* then answer questions using reading skills. 4. **Go Green:** ***Electromagnets in Recycling*** a. Students generate a list of objects that an electromagnet could pick up at a recycling center. 5. **Elaborate**: a. Students learn how a galvanometer measures electric currents and discuss how a galvanometer could help them verify what they have learned in the lesson. 6. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers	

● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

Motion: Lesson 1							
Content Area: Science							
Lesson Title: *What is Motion?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	x	Life and Career Skills		
***Interdisciplinary Connections: see unit overview**							
***Integration of Technology: Pearson Interactive Science Program**							
***Equipment needed: see teacher's edition**							
***Vocabulary: see unit overview for all vocabulary associated with this unit**							

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● understand how an object's mass affect the amount of force needed to move it and how Earth's gravity affects objects	**Lesson Sequence** 1. **Engage:** a. Students draw the path that a bouncing ball takes. b. Introduce lesson vocabulary.

	2. **Explore: My Planet Diary *Misconception*** 3. **Explain**: a. Review the lesson question. b. Students read *Motion, Relative Motion, Frame of Reference, Forces Affect Objects, Force and Motion, Force and Mass,* and *Force of Gravity* then answer questions using reading skills. 4. **Lightning Lab: *The Wrecking Ball*** a. Students roll two balls at one another so the balls collide; note the change of position and direction. 5. **Elaborate**: a. Students tell what they think *relative motion* means. 6. **Evaluate**: a. Review lesson vocabulary. f. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation: Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences	
Resources Provided: *Pearson Interactive Science*	

Motion: Lesson 2							
Content Area: Science							
Lesson Title: *What is Speed?*					**Timeframe:** 3-4 class periods		
Lesson Components							
***21st Century Themes**							
	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
***21st Century Skills**							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy

	Media Literacy		ICT Literacy	x	Life and Career Skills
***Interdisciplinary Connections: see unit overview**					
***Integration of Technology: Pearson Interactive Science Program**					
***Equipment needed: see teacher's edition**					
***Vocabulary: see unit overview for all vocabulary associated with this unit**					

Learning Outcomes	Learning Activities/Instructional Strategies
Students Will Be Able To: ● find, describe, and graph the speed of an object	**Lesson Sequence** 1. **Engage:** a. Students decide which animal would win a 100-meter race. b. Introduce lesson vocabulary. 2. **Explore It!** ***What can change a marble's speed?*** 3. **Explain**: a. Review the lesson question. b. Students read *Speed, Calculate Average Speed,* and *Velocity and Acceleration* then answer questions using reading skills. 4. **At-Home Lab:** ***On a Roll*** a. Students roll a ball two separate times using different forces each time, then compare the results. 5. **Math Connection:** a. Students make a graph of how far a cyclist travels in a certain amount of time. 6. **Elaborate**: a. **Science Notebook:** Students track a marathoner and note his/her finishing time for three or four marathons and calculate the marathoner's average running speed on the different courses. 7. **Evaluate**: a. Review lesson vocabulary. b. Students complete the Lesson Check blackline master to determine whether they need additional help with the lesson content.
Differentiation:	

Embedded in the program are ● strategies for English Language Learners ● leveled readers ● resources to address multiple intelligences
Resources Provided: *Pearson Interactive Science*

LESSON REFLECTION

Reflect on the lesson you have developed and rate the degree to which the lesson ***Strongly, Moderately*** or ***Weakly*** meets the criteria below.

Lesson Activities:	**Strongly**	**Moderately**	**Weakly**
Are challenging and require higher order thinking and problem solving skills			
Allow for student choice			
Provide scaffolding for acquiring targeted knowledge/skills			
Integrate global perspectives			
Integrate 21st century skills			
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills			
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills			
Are varied to address different student learning styles and preferences			
Are differentiated based on student needs			
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process			

Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives			
Provide opportunities for student reflection and self-assessment			
Provide data to inform and adjust instruction to better meet the varying needs of learners			

Curriculum Design Template	
Content Area:	
Course Title:	**Grade Level:**

Unit Plan 1	**Pacing Guide**
Unit Plan 1	**Pacing Guide**
Unit Plan 3	**Pacing Guide**
Unit Plan 4	**Pacing Guide**

4th Grade Wandell School Science Curricula

Aligned to the Next Generation Science Standards (NGSS)

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Unit Plan 5	**Pacing Guide**
Unit Plan 6	**Pacing Guide**

Date Created:	
Board Approved on:	

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.