

Englewood on the Palisades Charter School

Science Curriculum

Grade Four

Aligned With the 2026 New Jersey Student Learning Standards

The Vision for Science Education in New Jersey

2026 New Jersey Student Learning Standards for Science

The New Jersey Student Learning Standards for Science (NJSLS-S) describe the expectations for what students should know and be able to do as well as promote three-dimensional science instruction across the three science domains (i.e., physical sciences, life science, Earth and space sciences). From the earliest grades, the expectation is that students will engage in learning experiences that enable them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments (in appropriate ways relative to their grade level).

The foundation of the NJSLS-S reflects three dimensions — science and engineering practices, disciplinary core ideas, and crosscutting concepts. The performance expectations are derived from the interplay of these three dimensions. It is essential that these three components are integrated into all learning experiences. Within each standard document, the three dimensions are intentionally presented as integrated components to foster sensemaking and designing solutions to problems. Because the NJSLS-S is built on the notions of coherence and contextuality, each of the science and engineering practices and crosscutting concepts appear multiple times across topics and at every grade level. Additionally, the three dimensions should be an integral part of every curriculum unit and should not be taught in isolation.

Mission

All students will possess an understanding of scientific concepts and processes required for personal decision-making, participation in civic life, and preparation for careers in STEM fields (for those that chose).

Vision

Prepare students to become scientifically literate individuals who can effectively:

- Apply scientific thinking, skills, and understanding to real-world phenomena and problems;

- Engage in systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned;
- Conduct investigations, solve problems, and engage in discussions;
- Discuss open-ended questions that focus on the strength of the evidence used to generate claims;
- Read and evaluate multiple sources, including science-related magazine and journal articles and web-based resources to gain knowledge about current and past science problems and solutions and develop well-reasoned claims; and
- Communicate ideas through journal articles, reports, posters, and media presentations that explain and argue.

(NJ DOE, 2022)

New Jersey Legislative Statutes and Administrative Code

Science

Amistad Law: *N.J.S.A. 18A 52:164-88*

[African Americans in Science](#)
[8 Amazing Black Scientists and How They Changed History](#)
[African American Scientists and Inventors](#)

Holocaust Law: *N.J.S.A. 18A:35-28*

[Georg Bredig: Scientist, Humanist, and Holocaust Survivor](#)

LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*

<https://prideinstem.org/>
[LGBTQA+ Scientists Through History](#)
[Celebrating Scientists With Disabilities](#)

Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*

Ada Twist, Scientist by Andrea Beaty [Ada Twist, Scientist Activities](#)

How Many Stars in the Sky by Lenny Hort [How Many Stars in the Sky? | RIF.org](#)

Mae Among the Stars by Roda Amhed [Mae Among the Stars STEM Activity](#)

The Outdoor Scientist by Temple Grandin

4th Grade Science Curriculum

A 4th-grade science curriculum aligns with the New Jersey Student Learning Standards (NJSLS) and provides young learners with a solid foundation in scientific inquiry skills and early understanding of key science concepts. Throughout the year, the curriculum should incorporate hands-on activities, observations, and exploration to engage 4th-grade students and make learning science interactive and fun. Formative assessments, observations, and ongoing progress monitoring should be used to ensure that students are meeting the learning objectives. The curriculum should be flexible and adaptable to meet the individual needs and learning styles of the students.

Grade Four Units and Pacing	
Unit 1: Energy Transfer (Collisions)	9 weeks
Unit 2: Energy Transfer (Electricity)	9 weeks
Unit 3: Earth Processes	9 weeks
Unit 4: Structure and Function	9 weeks

Total Number of Weeks:	36 weeks
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Unit 1 - Energy and Motion

Unit Goals:

Students will understand that the energy and speed of an object are related. The more energy the object has, the more speed it can also have. Students will perform various investigations throughout the lesson that allow them to collect evidence to explain the relationship between the speed and the energy of an object. Changes in energy occur when objects collide. Students will be able to understand that predictions about energy change in collisions can be tested and that collisions result in a transfer of energy.

Duration: 9 weeks

Essential Questions:

- How are energy and speed related?
- What happens when objects collide?
- Where do we get the energy we need for modern life?

Enduring Understandings:

- Students will explain the relationship between the speed and the energy of an object and the various ways that energy can be transferred between objects.
- When objects collide, energy can be transferred from one object to another,
- thereby changing their motion.

Energy is present whenever there are moving objects, sound, light, or heat.		
Key NJSLS Strands: 4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.		
Science & Engineering Practices	Disciplinary Core Ideas	Cross-cutting Concepts
Asking Questions and Defining Problems - Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) 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. Constructing Explanations and Designing Solutions - Use evidence (e.g., measurements, observations, patterns) to construct an explanation.	PS3.A: Definitions of Energy - The faster a given object is moving, the more energy it possesses. - Energy can be moved from place to place by moving objects or through sound, light, or electric currents. PS3.B: Conservation of Energy and Energy Transfer - 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. PS3.C: Relationship Between Energy and Forces	Energy and Matter - Energy can be transferred in various ways and between objects. Influence of Science, Engineering and Technology on Society and the Natural World - Engineers improve existing technologies or develop new ones. (4-PS3-4) Science is a Human Endeavor - Most scientists and engineers work in teams. (4-PS3-4) - Science affects everyday life. (4- PS3-4)

	• When objects collide, the contact forces transfer energy so as to change the objects' motions. • Light also transfers energy from place to place. (4-PS3-2) • 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. (4- PS3-2), (4-PS3-4) PS3.C: Relationship Between Energy and Forces • When objects collide, the contact forces transfer energy so as to change the objects' motions. (4- PS3-3) PS3.D: Energy in Chemical Processes and Everyday Life • The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) ETS1.A: Defining Engineering Problems	
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	● 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.	
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Interdisciplinary Connections

English Language Arts

- 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.
- 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.
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
- W.4.2 Write informative/explanatory texts to determine a topic and convey ideas and information clearly.
- 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.
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Math

- 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

21st-Century Skills
● 9.4.5.CI.1 Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions. ● 9.4.5.CI.2 Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue. ● 9.4.5.CT.1 Identify and gather relevant data that will aid in the problem-solving process. ● 9.4.5.CT.2 Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem. ● 9.4.5.CT.4 Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global. ● 9.2.5.CAP.1 Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
Career Ready Practices
● CRP 8 Utilize critical thinking to make sense of Mystery Science extension activities and persevere in solving them. ● CRP 11 Use technology to enhance productivity when accessing online resources.
Technology Integration ● 8.2.5.ED.4 Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). ● 8.2.5.ED.5 Describe how specifications and limitations impact the engineering design process. Using the constraints and tradeoffs identified in the design. ● 8.2.5.ETW.1 Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Explain the relationship between the speed and the	Energy and Speed Energy Change in	Formative Assessments: Lesson Quizzes	Materials: Foam Piping	Kinetic energy Potential energy

energy of an object. Describe the various ways the energy can be transferred between objects. Use evidence to construct an explanation relating the speed of an object to the energy of that object. Explain that energy changes when objects collide. This results in a transfer of energy.	Collisions	Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	2 marbles Plastic Cup Cardboard Tube Tape Balloon Rockets Balloons Long String Tape Vocabulary foldables Ramp Stopwatch Balls of different masses Scenario cards (describing different energy transfer scenarios) Props related to energy transfer scenarios (e.g.,	Speed Velocity Mass Momentum Collision Conservation of energy Transfer of energy Friction Elastic collision Inelastic collision Force Work Power Energy transformation Gravitational potential energy Chemical energy Thermal energy
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			food items, batteries, balls) Space for role-playing activities Videos of objects in motion (e.g., cars, athletes, machinery) Computers or tablets for video playback Graph paper or graphing software (optional) Physics simulation software or online interactive simulations Computer or projector for displaying simulations Balls or objects for physical collision demonstrations Measuring tape Activities:	Mechanical energy
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			Design a roller coaster Balloon rockets Speed and Energy Demonstration Energy Transfer Role-Playing Energy Relationship Video Analysis Collision Simulation Links: Sid the Science Kid Videos Generation Genius - Collisions BrainPop Forms of Energy BrainPop Potential Energy BrainPop Kinetic Energy	
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			BrainPop Natural Resources Force and Motion Olympic Snowboarding Physics Olympic Hockey Slapshot Physics Mentor Texts: <i>The Magic School Bus: Inside the Earth</i> by Joanna Cole and Bruce Degen <i>Energy Makes Things Happen</i> by Kimberly Bradley <i>Forces Make Things Move</i> by Kimberly Brubaker Bradley	
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Modifications and Accommodations	
Tier II and III Strategies	Small group instruction (Tier II) ● Explicit instruction ● Schema-based instruction ● Use visuals

	● Use manipulatives ● Use a multi-sensory approach ● Guided notes and/or scaffold outline for written assignments ● Introduce key vocabulary before lesson ● Lesson taught again using a differentiated approach Small group or Individual instruction (Tier III) ● Intensive instruction ● Practice fact retrieval ● Lesson taught again using a differentiated approach ● Allow answers to be given orally or dictated ● Use visuals / Anchor Charts
Students with IEPs and 504 Plans	● Follow all the IEP/504 plan modifications ● Allow extra time to complete assignments or tests ● Guided notes and/or scaffold outline for written assignments ● Work in a small group ● Solidify and refine concepts through repetition ● Allow answers to be given orally or dictated ● Use multi-sensory teaching approaches ● Utilize assistive technology and materials ● Use large print books, Braille, or books on CD (digital text) ● Text to speech/audio recorded selections ● Amplification system as needed ● Leveled texts according to ability ● Fine motor skill stations embedded in rotation as needed ● Modified or constrained spelling word lists ● Provide anchor charts with high frequency words and phonemic patterns ● Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with

	their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. ● Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. ● Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	● Work toward longer passages as skills in English increase ● Use visuals ● Introduce/highlight key vocabulary before lesson ● Teacher models reading aloud daily ● Provide peer tutoring ● Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers ● Guided notes and/or scaffold outline for written assignments ● Provide students with English Learner leveled readers ● Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts ● As students share ideas, include a drawing or annotation to illustrate connections. ● Invite students to use gestures as they count.
Accelerating Students	● Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) ● Provide options, alternatives and choices to differentiate and broaden the curriculum ● Organize and offer flexible small group learning activities ● Provide whole group enrichment explorations ● Teach cognitive and methodological skills ● Use center, stations, or contracts ● Organize integrated problem-solving simulations

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| | <ul style="list-style-type: none"> • Propose interest-based extension activities • Expose students to beyond level texts. |
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Unit 2 - Energy Transfer

Unit Goals:

In this unit, students will plan and carry out investigations and construct explanations and design solutions that demonstrate and use energy transfer. Students will also develop and use models of waves and construct and compare solutions for using waves to send information. Students will engage in scientific experiences to answer questions such as: How is energy transferred? How do electric currents transfer energy? How does light transfer energy? What kinds of problems can be solved by understanding energy transfer? How do waves travel? And How do we use patterns and waves to transmit information?

Duration: 9 weeks

Essential Questions:

- How is energy transferred?
- What kinds of problems can be solved by understanding energy transfer?
- How do electric currents transfer energy?
- How do we use patterns and waves to transmit information?
- How do waves travel?
- How does sound travel through each of the three states of matter?
- How do we use patterns and waves to transmit information?
- How do waves travel?
- How does sound travel through each of the three states of matter?

Enduring Understandings:

- Energy can be transferred in various ways and between objects.
- Energy can be moved from place to place through sound, light, or electric currents
- Energy can be transferred from place to place by electric currents; the currents may have been produced to begin with by transforming the energy of motion into electrical energy.

Key NJSLS Strands:

- 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-PS3-4: 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.
- 4-PS4-3: Generate and compare multiple solutions that use patterns to transfer information.
- 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 3-ESS3-1: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
- 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.

Science & Engineering Practices	Disciplinary Core Ideas	Cross-cutting Concepts
Planning and Carrying Out Investigations ● Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. Constructing Explanations and Designing Solutions ● Apply scientific ideas to solve design problems. Developing and Using Models ● Develop a model using an analogy, example, or abstract representation to describe a scientific principle.	PS3.A: Definitions of Energy ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. PS3.B: Conservation of Energy and Energy Transfer ● 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.	Patterns ● Similarities and differences in patterns can be used to sort and classify natural phenomena. ● Similarities and differences in patterns can be used to sort and classify designed products. Scientific Knowledge is Based on Empirical Evidence ● Science findings are based on recognizing patterns. Interdependence of Science, Engineering, and Technology

Constructing Explanations and Designing Solutions ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.	● 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 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. PS3.D: Energy in Chemical Processes and Everyday Life ● The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. PS4.A: Wave Properties ● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves	● Knowledge of relevant scientific concepts and research findings is important in engineering. Energy and Matter ● Energy can be transferred in various ways and between objects. Influence of Science, Engineering and Technology on Society and the Natural World ● Engineers improve existing technologies or develop new ones. Science is a Human Endeavor ● Most scientists and engineers work in teams. ● Science affects everyday life.
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	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 (height of the wave) and wavelength (spacing between wave peaks). PS4.C: Information Technologies and Instrumentation • Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. ETS1.A: Defining Engineering Problems • 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	
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	how well each one meets the specified criteria for success or how well each takes the constraints into account.	
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Interdisciplinary Connections	
English Language Arts ● 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. ● 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. ● RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. ● W.4.2 Write informative/explanatory texts to determine a topic and convey ideas and information clearly. ● 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. ● W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. Math ● 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	
21st-Century Skills	
● 9.4.5.CI.1 Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions. ● 9.4.5.CI.2 Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse	

perspectives to improve upon current actions designed to address the issue.

- 9.4.5.CT.1 Identify and gather relevant data that will aid in the problem-solving process
- 9.4.5.CT.2 Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem
- 9.4.5.CT.4 Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global
- 9.2.5.CAP.1 Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.

Career Ready Practices

- CRP 8: Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP 11: Use technology to enhance productivity.

Technology Integration

- 8.2.5.ED.4 Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
- 8.2.5.ED.5 Describe how specifications and limitations impact the engineering design process. Using the constraints and tradeoffs identified in the design.
- 8.2.5.ETW.1 Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Design a device that shows several ways in which energy can be transferred.	Types of Energy Transfer	Formative Assessments: Lesson Quizzes	Materials: Cardboard	Energy
	Transfer of Energy by Electricity	Lesson Self-assessment	Small solar panel	Transfer
Make observations to provide evidence that	Transfer of Energy by Light	Teacher Observations	Small motor	Electricity
				Circuit

energy can be transferred from place to place by sound, light, heat, and electric currents. Make observations and use data to provide evidence that electric currents transfer energy. Make observations and use data to provide evidence that light transfers energy. Design a device that applies the scientific idea that energy can be transferred from one object to another. Generate and compare multiple solutions to transmit information using patterns of waves. Generate and compare multiple possible solutions to a problem based on	Design Energy Solutions How Waves Move How Waves Transmit	Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	LED bulb Wires Battery pack Speaker Thermometer Heat lamp Tuning fork Light bulbs Heater Mirrors Solar cells Switches Multimeter Small gears Wheels Axles Small weights Springs	Current Light Sound Heat Solar Motor Battery Switch Thermometer Solar Panel Kinetic Potential Mechanical Convert Observe Evidence Transmit Information Pattern
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how well each is likely to meet the criteria and constraints of the problem. 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.			Rubber bands Light sources (sunlight, lamps) Vocabulary foldables String Paper cups Flashlights Drums Batteries Wires Light bulbs Mirrors Morse code charts Binary code sheets Various construction materials (e.g., cardboard, plastic, metal) Water Sand	Wave Morse code Binary code Signal Prototype Criteria Constraints Solution Variable Control Fair test Model Failure point Improve Efficiency Insulation
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			Gravel Filter paper Tape Scissors Rulers Measuring cups Seeds Soil Thermometers Different insulating materials (e.g., foam, fabric, rubber) Paper Tape measures Small electric motors Toy car kits Activities: Energy Transfer Model	
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			Energy Transfer Stations Simple Circuit Experiment Solar Power Investigation Energy Transfer Toy Design and test a string telephone Create and compare Morse code transmitters Build and evaluate light signal communication devices Design a drum communication system Develop and test paper cup telephones Create a binary code transmission using flashlights	
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			Compare different material constructions for soundproof boxes Design a prototype for a water filtration system Test various materials for their insulation properties Evaluate the efficiency of different designs of wind turbines Compare multiple catapult designs for distance and accuracy Plan and carry out tests on model car speed with different wheel designs Making a Sound Game Making a Wave with a Plunger Game Links: Sid the Science Kid Videos	
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			Amazing Water & Sound Experiment Sound BrainPop Waves BrainPop Light Brainpop: Sound Dolphin Sound Echoes Bill Nye the Science Guy on Light Mentor Texts: <i>Oscar and the Bird: A Book About Electricity</i> by Geoff Waring <i>What Is Energy?</i> by Lisa Trumbauer <i>Switch On, Switch Off</i> by Melvin Berger <i>Light: Shadows, Mirrors, and Rainbows</i> by Natalie M. Rosinsky <i>Forces Make Things Move</i> by Kimberly Brubaker Bradley	
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			<i>The Shocking Truth about Energy</i> by Loreen Leedy	
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Modifications and Accommodations	
Tier II and III Strategies	Small group instruction (Tier II) ● Explicit instruction ● Schema-based instruction ● Use visuals ● Use manipulatives ● Use a multi-sensory approach ● Guided notes and/or scaffold outline for written assignments ● Introduce key vocabulary before lesson ● Lesson taught again using a differentiated approach Small group or Individual instruction (Tier III) ● Intensive instruction ● Practice fact retrieval ● Lesson taught again using a differentiated approach ● Allow answers to be given orally or dictated ● Use visuals / Anchor Charts
Students with IEPs and 504 Plans	● Follow all the IEP/504 plan modifications ● Allow extra time to complete assignments or tests ● Guided notes and/or scaffold outline for written assignments ● Work in a small group ● Solidify and refine concepts through repetition ● Allow answers to be given orally or dictated ● Use multi-sensory teaching approaches

	● Utilize assistive technology and materials ● Use large print books, Braille, or books on CD (digital text) ● Text to speech/audio recorded selections ● Amplification system as needed ● Leveled texts according to ability ● Fine motor skill stations embedded in rotation as needed ● Modified or constrained spelling word lists ● Provide anchor charts with high frequency words and phonemic patterns ● Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. ● Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. ● Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	● Work toward longer passages as skills in English increase ● Use visuals ● Introduce/highlight key vocabulary before lesson ● Teacher models reading aloud daily ● Provide peer tutoring ● Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers ● Guided notes and/or scaffold outline for written assignments ● Provide students with English Learner leveled readers ● Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts ● As students share ideas, include a drawing or annotation to illustrate connections. ● Invite students to use gestures as they count.

Accelerating Students	● Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) ● Provide options, alternatives and choices to differentiate and broaden the curriculum ● Organize and offer flexible small group learning activities ● Provide whole group enrichment explorations ● Teach cognitive and methodological skills ● Use center, stations, or contracts ● Organize integrated problem-solving simulations ● Propose interest-based extension activities ● Expose students to beyond level texts.
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Unit 3 - Earth Processes

Unit Goals: In this unit, students will conduct investigations, analyze and interpret data, and construct explanations for changes in Earth's surface. Students will investigate natural hazards and design and compare solutions for reducing the impact of a variety of natural hazards, and they will obtain, evaluate, and communicate information about energy from Earth's nonrenewable and renewable resources.
Duration: 9 weeks
Essential Questions: ● What are Earth's features? ● How do living and nonliving things change Earth's surface? ● What can rock formations tell us about Earth's history? ● How are people affected by earthquakes and volcanoes? ● How can people prepare for floods? ● How do scientists forecast the likelihood of an Earthquake?

- What are renewable resources?
- How are renewable resources used as energy?
- How can our decisions today impact the resources available for the future?

Enduring Understandings:

- Earth's physical features undergo changes due to factors such as erosion and weathering. Fossils and patterns in rock layers show these changes.
- Weathering and erosion change Earth's surface over time.
- Fossils and patterns in rock layers can provide evidence of the historical changes in Earth's surface.
- Humans can develop strategies and solutions that will lessen the impact of natural hazards.
- Scientists use historical data and current measurements to forecast the likelihood of an earthquake within an extended range of time.
- Humans use Earth's natural resources for energy, and these energy sources can be either renewable or nonrenewable.
- Renewable resources are resources that can be replenished such as solar energy and wind.
- Human use of resources impacts the availability of resources for the future.

Key NJSLS Strands:

- 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.
- 4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- 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 & Engineering Practices	Disciplinary Core Ideas	Cross-cutting Concepts
Constructing Explanations and Designing Solutions • Identify the evidence that supports particular points in an explanation.	ESS1.C: The History of Planet Earth • Local, regional, and global patterns of rock formations reveal changes over time	Patterns • Patterns can be used as evidence to support an explanation.

● Planning and Carrying Out Investigations ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Analyzing and Interpreting Data ● Analyze and interpret data to make sense of phenomena using logical reasoning.	due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. ESS2.A: Earth Materials and Systems ● 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. ESS2.E: Biogeology ● Living things affect the physical characteristics of their regions. ESS2.B: Plate Tectonics and Large-Scale System Interactions ● 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 areas of Earth.	Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems ● Science assumes consistent patterns in natural systems. Cause and Effect ● Cause and effect relationships are routinely identified, tested, and used to explain change.
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Interdisciplinary Connections

English Language Arts

- W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1), (4-ESS2-1)
- 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)
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)
- 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. (4-ESS3-2)
- RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)

Math

- MP.2 Reason abstractly and quantitatively. (4-ESS1-1), (4-ESS2-1), (4-ESS3-2)
- MP.4 Model with mathematics. (4-ESS1-1), (4-ESS2-1), (4-ESS3-2)
- 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)
- 4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-2)

21st-Century Skills
9.4.5.CT.1 Identify and gather relevant data that will aid in the problem-solving process. 9.4.5.CT.: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Career Ready Practices
- CRP 6 Demonstrate creativity and innovation while working on projects and labs. - CRP 8 Utilize critical thinking to make sense of Mystery Science problems and persevere in solving them.
Technology Integration
8.1.5.DA.1 Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.5 Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Analyze and interpret data from models to describe patterns in Earth's features.	Earth's Landforms and Features	Formative Assessments: Lesson Quizzes	Materials: Clay	Landform
Identify the various landforms on Earth	Effects of Erosion	Lesson Self-assessment	Sand	Volcano
Explain how the various landforms on Earth were formed.	History of Earth's Surface	Teacher Observations	Water	Earthquake
Explain the difference between weathering,	Earthquakes and Volcanoes	Class Discussions	Stream table	Erosion
	Tsunamis and Floods	Classwork/ Homework	Rock samples	Weathering
	Energy and Nonrenewable Resources	Exit Slips/Google Form	Fossil replicas	Deposition
	Energy from Renewable		Shake table	Fossil
				Sedimentary rock

erosion, and deposition. Make observations and measurements that provide evidence to show that erosion and weathering change the Earth's surface. Explain how both living and nonliving things change Earth's surface. Identify patterns from fossils and rock layers to explain changes in Earth's surface over time. Explain how volcanoes and earthquakes occur. Describe how these natural hazards impact people. Explain how people can protect themselves and their property from these	Resources	Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Maps Construction paper Craft supplies Internet access for research Presentation materials Diorama supplies Virtual simulation software Water tank Small objects to simulate buildings Plant samples Animal model figures Renewable energy source kits (solar panels, wind turbines, etc.) Measuring tools (rulers, scales, etc.) Vocabulary foldables Activities:	Renewable resource Natural hazard Tsunami Flood Stream table Rock layer Pattern Model Data interpretation Impact Protection strategies Renewable energy Nonrenewable energy Community Simulation Landscape Weathering agent Living thing Non Living thing
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natural events such as tsunamis and floods.. Describe the advantages and disadvantages of using Earth's different renewable resources as energy sources.			Create and interpret a model of Earth's landforms using clay Build a volcano model and simulate an eruption Conduct an erosion experiment with sand, water, and wind Use a stream table to demonstrate river formation and erosion Examine rock samples to identify weathering and erosion Create a fossil dig simulation and analyze findings Model the process of sedimentary rock formation with layers of sand and clay Simulate an earthquake using a shake table and observe the effects on different structures Map out areas prone to natural hazards and	
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			discuss protection strategies Research and present on the impact of volcanoes and earthquakes on communities Investigate different types of renewable energy sources and their pros and cons Create a diorama showing the effects of weathering, erosion, and deposition on a landscape Use a virtual simulation to track and predict earthquake activity Construct a simple tsunami wave tank to observe wave formation and impact Explore how plants and animals contribute to changes in the Earth's surface through weathering and erosion	
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			Links: Sid the Science Kid Videos Earth's Landscapes Natural Disasters Weathering & Erosion Interactions of Earth's Spheres (climate change) BrainPop: Natural Disasters BrainPop Fossils BrainPop Rock Cycle BrainPop Erosion BrainPop Glaciers Grand Canyon: Evidence of Earth's Past Weather and Erosion 1 Weather and Erosion 2	
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			Erosion Video Inside Earthquakes What is Topography? Mentor Texts: <i>The Magic School Bus Inside the Earth</i> by Joanna Cole <i>Rocks: Hard, Soft, Smooth, and Rough</i> by Natalie M. Rosinsky <i>Erosion: Changing Earth's Surface</i> by Robin Koontz <i>Volcanoes!</i> by Anne Schreiber <i>Earthquakes</i> by Seymour Simon <i>Fossils Tell of Long Ago</i> by Alik <i>The Big Rock</i> by Bruce Hiscock <i>How Mountains Are Made</i> by Kathleen Weidner Zoehfeld <i>The Drop in My Drink: The Story of Water on</i>	
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			<i>Our Planet</i> by Meredith Hooper <i>Let's Read and Find Out Science: What Makes a Tornado Twist?</i> by Mary Kay Carson	
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Modifications and Accommodations	
Tier II and III Strategies	Small group instruction (Tier II) ● Explicit instruction ● Schema-based instruction ● Use visuals ● Use manipulatives ● Use a multi-sensory approach ● Guided notes and/or scaffold outline for written assignments ● Introduce key vocabulary before lesson ● Lesson taught again using a differentiated approach Small group or Individual instruction (Tier III) ● Intensive instruction ● Practice fact retrieval ● Lesson taught again using a differentiated approach ● Allow answers to be given orally or dictated ● Use visuals / Anchor Charts
Students with IEPs and 504 Plans	● Follow all the IEP/504 plan modifications ● Allow extra time to complete assignments or tests

	● Guided notes and/or scaffold outline for written assignments ● Work in a small group ● Solidify and refine concepts through repetition ● Allow answers to be given orally or dictated ● Use multi-sensory teaching approaches ● Utilize assistive technology and materials ● Use large print books, Braille, or books on CD (digital text) ● Text to speech/audio recorded selections ● Amplification system as needed ● Leveled texts according to ability ● Fine motor skill stations embedded in rotation as needed ● Modified or constrained spelling word lists ● Provide anchor charts with high frequency words and phonemic patterns ● Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. ● Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. ● Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	● Work toward longer passages as skills in English increase ● Use visuals ● Introduce/highlight key vocabulary before lesson ● Teacher models reading aloud daily ● Provide peer tutoring ● Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers ● Guided notes and/or scaffold outline for written assignments

	● Provide students with English Learner leveled readers ● Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts ● As students share ideas, include a drawing or annotation to illustrate connections. ● Invite students to use gestures as they count.
Accelerating Students	● Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) ● Provide options, alternatives and choices to differentiate and broaden the curriculum ● Organize and offer flexible small group learning activities ● Provide whole group enrichment explorations ● Teach cognitive and methodological skills ● Use center, stations, or contracts ● Organize integrated problem-solving simulations ● Propose interest-based extension activities ● Expose students to beyond level texts.

Unit 4 - Structure and Function

Unit Goals: Students will construct arguments based on evidence and develop and use models to describe animal and plant structures and their functions. Students will engage in scientific experiences to answer questions such as: How do plant structures help them survive and reproduce? How do animal structures help them survive? How do animals sense and respond to information? How do animals see?
Duration: 9 weeks
Essential Questions: ● How do the internal and external parts of plants and animals support their survival, growth, behavior, and reproduction? ● How do animals use their perceptions and memories to make decisions?

• How do animals sense and respond to information?		
Enduring Understandings: • Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. • Animals are able to use their perceptions and memories to guide their actions. . • Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain.		
Key NJSLS Strands: • 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. • 4-LS1-2: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. • 4-PS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.		
Science & Engineering Practices	Disciplinary Core Ideas	Cross-cutting Concepts
Engaging in Argument from Evidence • Construct an argument with evidence, data, and/or a model. Developing and Using Models • Use a model to test interactions concerning the functioning of a natural system. Developing and Using Models • Develop a model to describe phenomena.	LS1.A: Structure and Function • Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. LS1.D: Information Processing • Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. PS4.B: Electromagnetic Radiation	Systems and System Models • A system can be described in terms of its components and their interactions. Cause and Effect • Cause and effect relationships are routinely identified.

	• An object can be seen when light reflected from its surface enters the eyes.	
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Interdisciplinary Connections		
English Language Arts Standards • W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. • SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.		
Math • MP.4 Model with mathematics. • 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.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.		
21st-Century Skills		
• 9.4.5.CI.1 Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions. • 9.4.5CT.1 Identify and gather relevant data that will aid in the problem-solving process • 9.4.5.CT.2 Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem • 9.4.5.CT.4 Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global ones.		
Career Ready Practices		
• CRP 6 Demonstrate creativity and innovation when working on projects and labs.		

- CRP 8 Utilize critical thinking to make sense of Mystery Science problems and persevere in solving them.
- CRP 11 Use technology to enhance productivity while accessing online resources.

Technology Integration

- 8.1.5.IC.1 Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
- 8.1.5.IC.2 Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Construct an argument that plants have internal and external structures that help the plant survive, grow, react to stimuli, and reproduce. Construct an argument that animals have internal and external structures that function to support survival and growth. Develop and use models to describe	Structures and Functions in Plants Structures and Functions of Animals Information Processing in Animals The Role of Animals' Eyes	Formative Assessments: Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments	Materials: Magnifying glasses Mirrors Flashlights Clay or paper for modeling Plant and animal diagrams Drawing and coloring materials	Structure Survive Grow Stimuli Reproduce Internal External Function Sense receptors Information

			Conduct experiments with light and reflection using mirrors and flashlights Role-play different animal responses to stimuli Use a magnifying glass to examine plant and animal parts Draw and label diagrams of sense receptors in animals Create a model to show how the brain processes information Discuss examples of plant and animal adaptations in groups Demonstrate how light helps us see objects with a shadow experiment Virtual Lab: How are Birds Adapted to Their Habitat?	
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			Animal Senses Game Animal Adaptations Interactive Games Links: Sid the Science Kid Videos Bill Nye the Science Guy on The Eye Structures of a Plant Parts of a Cell Human Body Parts - Brain Stimulus and Responses Brainpop - Human Body Systems: Brain Brainpop -Human Body Systems - Eyes Mentor Texts: <i>The Magic School Bus</i> <i>Plants Seeds: A Book About How Living</i>	
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			<i>Things Grow</i> - Joanna Cole <i>What Do You Do with a Tail Like This?</i> - Steve Jenkins and Robin Page <i>From Seed to Plant</i> - Gail Gibbons <i>Owl Moon</i> - Jane Yolen <i>The Human Body: A Shine-a-Light Book</i> - Carron Brown <i>How Do Animals Use Their Senses?</i> - Lynn Stone <i>The Listening Walk</i> - Paul Showers <i>The Science of Light: Things That Shine, Flash, and Glow</i> - Margaret Peot <i>Parts</i> - Louise Spilsbury <i>Me...Jane</i> - Patrick McDonnell	
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	● Modified or constrained spelling word lists ● Provide anchor charts with high frequency words and phonemic patterns ● Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. ● Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. ● Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
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Prepared by Julie Lang, MA

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