



Springfield Public Schools
Springfield, New Jersey 07081

**Grade 1
Science**

Curriculum Guide

2026

This curriculum may be modified through varying materials, techniques, and strategies as per an individual student's IEP.

*Springfield Board of Education
Approved July 27, 2026*

Springfield Public Schools

Cultivating compassionate and extraordinary learners!

EXTRACT OF THE MINUTES OF A MEETING OF
THE BOARD OF EDUCATION OF
THE TOWNSHIP OF SPRINGFIELD
COUNTY OF UNION, NEW JERSEY
AS RECORDED IN THE OFFICIAL MINUTE BOOK

Resolution: 21

Introduced By: Mrs. Gamarekian

Seconded By: Vice President Rinaldi

Adopted: July 27, 2026

Curriculum Adoption

To approve the following new and revised curriculum and courses for the 2026-2027 school year:

1. High School Courses

- a. AP Cybersecurity (new course)
- b. AP Business with Personal Finance (new course)
- c. AP Biology
- d. AP Chemistry
- e. AP Physics I
- f. PLTW Robotics and Automation
- g. PLTW Introduction to Engineering Design
- h. PLTW Principles of Engineering
- i. Biology
- j. Biology Honors
- k. Chemistry
- l. Chemistry Honors
- m. Conceptual Physics
- n. Physics
- o. Environmental Science
- p. Forensics
- q. Human Anatomy and Physiology
- r. Oceanography
- s. Science 8
- t. Molecular Biology Research Lab (new course)

2. Middle School Courses

- a. Science 6
- b. Science 7

3. Elementary School Courses

- a. Kindergarten Science
- b. Grade 1 Science
- c. Grade 2 Science

Michelle Calas, School Business Administrator/Board Secretary

(continued)

I, Michelle Calas, School Business Administrator/ Board Secretary of the Springfield Board of Education, hereby certify that the extract from the minutes of a meeting of the Board of Education duly called and held on July 27, 2026 has been compared by me with the original minute book of said Board of Education, and is a true, complete and exact copy thereof, as far as the same relates to the subject matter to on said extract.

In WITNESS THEREOF, I have hereunto set my hand and seal of the Springfield Board of Education, this 28th day of July 2026.

SEAL



Michelle Calas
School Business Administrator/ Board Secretary



**Springfield Public Schools
Springfield, New Jersey**

**Rachel Goldberg
Superintendent of Schools**

**Erica Scudero
Assistant Superintendent**

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Unit Overview Template

Content Area: Science

Grade Level: 1

Unit Title: Animal
Superpowers

Unit Summary: In this high-energy, physically interactive science unit, 1st-grade students step into the wilderness as wildlife biologists, bio-mimicry engineers, and conservation experts. Through an immersive series of hands-on behavioral simulations, physical trait-mapping grids, structural testing, and population tracking, students investigate the incredible evolutionary adaptations that rule the natural world: the physical structures and behavioral survival patterns that act as real-life animal superpowers. Students will discover how the specific physical shapes of parent and offspring traits dictate family identification, how genetic inheritance creates unique trait variation patterns among siblings, and how synchronized parent-offspring behavior ensures an animal family secures food while avoiding threats. Going deeper into physical adaptations, students analyze how specialized animal structures function as built-in tools for defense and harvesting resources, and investigate how camouflage provides a vital concealment superpower against environmental hazards. From using manual magnifying lenses to map anatomical geometry to executing split-second silence and hiding drills to escape a simulated predator, students will learn how animals actively interact with their environments to stay alive. The unit culminates in an iterative design cycle where students define real-world wildlife survival problems, map anatomical traits, and evaluate structural adaptations against strict environmental constraints.

Primary Interdisciplinary Connections: ELA and Mathematics

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy
☒ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy

Unit Rationale: For early learners, "survival" can feel like an abstract, distant concept. The best way to make life science real is to anchor it within their immediate, tactile world—the sharp curve of a bird's beak, the texture of protective armor, or the way a creature blends seamlessly into a backyard tree. By exploring real-world engineering inspired by nature, international animal sanctuaries, and local ecosystems, students learn that animal bodies, structural features, and deliberate actions are simply smart, highly optimized solutions to intense environmental challenges. This unit teaches young students that a physical or behavioral mismatch (like an offspring possessing an un-optimized structure for its environment or making too much noise near a hazard) isn't just an error—it is critical data. By actively manipulating variables like trait probability distribution, structural design constraints, and camouflage concealment factors, 1st graders learn to approach biology with the mindset of a scientist: observing carefully, isolating diagnostic traits, and mapping behavioral patterns to understand how organisms use their natural superpowers to perform better in the wild.

Career Readiness (Standard 9):

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
9.4.2.CL.1: Demonstrate openness to new ideas.
9.4.2.CT.3: Use a variety of thinking to solve problems (e.g., inductive, deductive)



Learning Targets

Standards: 1-LS1; 1-LS3

Content Statements: From Molecules to Organisms: Structure and Processes; Heredity: Inheritance and Variation of Traits

CPI#:	Cumulative Progress Indicator (CPI):
1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. C. Ask questions to clear up any confusion about the topics and texts under discussion.
1.M.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
SEL.PK-12.1.2	Recognize the impact of one's feelings and thoughts on one's own behavior.
SEL.PK-12.3.2	Demonstrate awareness of the differences among individuals, groups and others' cultural backgrounds
SEL.PK-12.3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation in collaboration with peers. (1-LS3-1)



Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)
- Make observations (firsthand or from media) to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. (1-LS3-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate evidence.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

- Adult plants and animals can have young. (1-LS1-2)
- In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive (such as signaling behaviors, responding to signals, and providing food or protection). (1-LS1-2)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival—for example, eyes for light, ears for sounds, and skin for temperature or touch. Animals respond to these inputs with behaviors that help them survive (e.g., find food, run from a predator). (1-LS1-1)

LS3.A: Inheritance of Traits

- Young plants and animals are like, but not exactly like, their parents. (1-LS3-1)

LS3.B: Variation of Traits



- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

Crosscutting Concepts

Patterns

- Patterns in the natural and human-designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2), (1-LS3-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-LS3-1)
- Scientists use different ways to study the world. (1-LS3-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world or utilizing structural traits observed in nature to solve practical human problems. (1-LS1-1)

Unit Essential Questions:

- How can you help a lost baby animal find its parents?
- Can you predict what an animal's babies will look like?
- Why do baby ducks follow their mother?
- Why do birds have beaks?
- Why are polar bears white?
- What is a trait, and how do physical characteristics help us match lost baby animals to their correct biological parents?
- How can we predict offspring trait variation patterns, and why do babies look like a mix of their parents without being exactly identical?
- How do the matched behavioral interactions between parents and offspring operate as a coordinated system to help families survive?
- How do specialized external animal structures act as mechanical tools to protect a living thing and gather vital resources?
- How does camouflage function as a survival superpower to hide an animal from predators in plain sight?

Unit Enduring Understandings:

- Traits can be used to connect baby animals to their parents.



- A baby animal's traits can be predicted by analyzing the traits of their parents.
- Behaviors of parents and their offspring help them survive.
- Animals use their external parts to help them survive, grow, and meet their needs.
- A trait is an inherited physical feature or behavioral action passed down from parents that helps a living thing fulfill its basic needs for food, safety, and shelter.
- Inherited characteristics come from both the mother and the father, creating unique offspring trait variation patterns that make every individual sibling one of a kind.
- Parent-offspring behavior is an interconnected system that relies on babies signaling their distress or hunger and parents executing a rapid, protective response.
- Animals possess unique external animal structures, like claws, shells, or specialized beaks, that serve as mechanical solutions to physical survival problems.
- Camouflage is a deceptive structural superpower that uses color and pattern matching to disrupt a predator's visual tracking systems.

Unit Learning Targets:

Students will....

- Observe baby animals and their parents to gather evidence that they look similar because of shared traits
- Identify lost baby birds based on observations of their specific traits
- Gather evidence that animal offspring look like, but not exactly like, their parents
- Model how puppies look similar to their parents, but each puppy can vary in many ways
- Compare and contrast Parent & Offspring Traits across diverse species to prove that young organisms closely resemble their biological parents despite temporary developmental differences.
- Execute a multi-round probability simulation to map Offspring Trait Variation, demonstrating how individual genetic combinations create diversity within a single family population.
- Design and execute a synchronized behavioral trial evaluating Parent & Offspring Behavior to show how animal families use coordinated vocalizations and freezing patterns to protect themselves.
- Analyze specific Animal Structures & Survival mechanics, testing how physical adaptations like armor, claws, and unique beak shapes function as real-world tools.
- Construct and evaluate a physical model of Camouflage & Animal Survival to prove how blending into a matching background protects an organism from being detected by predators.



Evidence of Learning

Summative Assessment: Unit Assessment

Equipment Needed: Mystery Science Kit

Teacher: Mystery Science Online Program

Resources:

Formative Assessments:

- Mystery Science lesson assessments
- Mystery Science activities
- Class discussions
- The Structural Parent-Offspring Evidence Grid: A pictorial recording matrix where students evaluate physical characteristics across multiple organisms, identifying shared familial features versus temporary developmental age markers to match lost babies to their correct parents.
- The Sibling Variation Distribution Map: A visual data layout assessment where students plot inherited coin-flip metrics onto template cards, verifying that independent sorting generates a diverse, non-identical population from the same parents.
- The Sound & Silence Safety Simulation Log: A physical checklist where students demonstrate their ability to pivot instantly from vocal food-signaling to absolute stillness and silence upon a predator cue, verifying an understanding of matched parent-offspring behavioral systems.
- The Structural Mechanical Tool Test: A practical sorting activity where students match specific external animal tools (e.g., tweezers for probing beaks, cups for scooping mouths) to their corresponding environmental survival functions.
- The Camouflage Concealment Matrix: An observation check where students track and record the survival rates of brightly colored vs. perfectly camouflaged insect models hidden across varied classroom backgrounds during timed predator hunts.



Lesson Plans

Lesson	Time Frame
Lesson 1- How can you help a lost baby animal find its parents?	2 days
Lesson 2- Can you predict what an animal's babies will look like?	2 days
Lesson 3- Why are baby birds so loud?	2 days

Teacher Notes:

This unit contains 5 lessons, an anchor phenomenon about animal structures and behaviors, and a performance task.

This unit relies heavily on physical kinetics, manual trait manipulation, tool testing, and acoustic transitions. Ensure your classroom layout features a clear, open "foraging field" where students can hunt for yarn worms, organized desk "nests" where student pairs can execute behavioral roleplays, and a "structural testing lab" with mats where physical tool simulations can be run safely without distracting neighboring teams.

When facilitating these lessons, actively lean into the "Animal Superpowers" framing! Frame drawing, tool testing, and data tracking modifications as real field research—if a student misses a structural trait clue or creates an un-camouflaged model, tell the student team that their research lab needs to re-audit their biological profile. When introducing the core concepts like *Parent & Offspring Behavior* or *Camouflage & Animal Survival*, emphasize the role of spatial positioning, timing, and material matching. Help students explicitly vocalize why a needle-thin beak helps a bird probe for food or why absolute stillness serves as a defensive shield. Remind them daily that every observation of a trait or structure is a step closer to the scientific podium!

Curriculum Development Resources/Technology Resources:

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

<https://mysteryscience.com/animal-superpowers/animal-traits-survival>

<https://explore.org/livecams/bald-eagles/decorah-eagles>

<https://explore.org/livecams/owl-research-institute/great-gray-owl-nest>

<https://explore.org/livecams/warrior-canine-connection/service-puppy-cam-3>

<https://www.audubon.org/news/diy-craft-how-make-cardboard-binoculars-kids>

<https://www.audubon.org/magazine/easy-ways-get-kids-birding>

<https://mysteryscience.com/animal-superpowers/mystery-5/inheritance-variation-of-traits/145>

<https://mysteryscience.com/docs/1065>

<https://mysteryscience.com/mini-lessons/penguin-wings#slide-id-14403>

<https://mysteryscience.com/animal-superpowers/mystery-4/animal-structures-survival/117#slide-id-2433>

<https://kids.nationalgeographic.com/wacky-weekend/article/hidden-animals#ww-camouflage-orchi-d-mantis-reveal.jpg>



Lesson Plan 1 Template

Content Area: Science	Lesson Title: How can you help a lost baby animal find its parents?	Time Frame: 2 days
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Lesson Components

21st Century Themes

- | | |
|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital document camera display to project micro-details of bird anatomy, paired with live audio playback of localized avian parent-offspring identification calls.

Equipment Needed: Handheld magnifying lenses, sorting clipboards, 3 sorting envelopes labeled A, B, and C containing trait comparison matrices per group, colored marking rings, and a life-sized dimensional bird ruler.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will observe and identify structural characteristics (traits) of young animals and their adult parents to describe patterns of similarity and variation. - Students will analyze anatomical clues—including beak shapes, foot structures, and eye patterns—to match lost offspring with their correct biological parents. - Students will explain how specific physical traits	Lesson Sequence - Phenomenon: A tiny, fuzzy gray fledgling bird sitting on a suburban sidewalk looks completely different from the sleek, bright blue adult jays nesting in a nearby maple tree, yet they share a uniquely wedge-shaped beak and specialized foot structures. - Wildlife Sanctuary Field Observation Hook: Students examine close-up images of an Indiana forest floor,	- Students will verbally define a trait as a physical structural clue that helps scientists connect a baby animal to its family. - Students will circle and match three distinct physical traits on an anatomical diagram linking an unclassified chick to its correct parent organism. - Students will use standard non-standard units (linking cubes) to measure and record the leg-length differences



function as diagnostic data used by wildlife conservationists to protect local biodiversity.

- Students will distinguish between developmental age markers (downy feathers, closed eyes) and permanent familial traits (beak curvature) to determine an organism's developmental stage.

- tracking how a camouflage-spotted fawn hides low in the brush while its parent actively single-forages nearby.
3. Anatomical Trait
Definition: The teacher defines the scientific term trait inline (a physical feature or characteristic of how a living thing looks), utilizing explicit side-by-side images of mother and baby foxes to highlight shared ear geometry versus size variations.
 4. Global Rescue System
Cross-Cultural Scan: Students map different regional wildlife centers around the globe—ranging from marine mammal sanctuaries in California to sloth rehabilitation centers in Costa Rica—to analyze how communities care for displaced local fauna.
 5. The Squirrel
Metamorphosis Analysis: The class evaluates a chronological series of photographs tracking a hairless, pink, blind baby squirrel as it grows fur and shifts into a miniature copy of an adult backyard squirrel across a multi-week span.
 6. Bald Eagle Baseline
Contradiction: Students analyze the stark structural differences of a

between a young wading bird and an adult shorebird.

- Students will classify a series of bird photos as either "Too Young to be Out of Nest" or "Old Enough to Practice Flying" based on visible plumage traits.



- baby bald eagle, discovering that while its gray, wispy downy feathers completely alter its appearance, its massive yellow feet and distinct curved beak profile remain genetically consistent from birth.
7. Brenda's Avian Case File Setup: Working in structured partnerships, students assume the role of junior wildlife rehabilitation engineers to assist a local rescue station ("Brenda's Baby Bird Rescue") with three unidentified avian cases.
 8. Case A: Forest Bird Structural Matching: Partners open Envelope A, utilizing manual magnifying glasses to map a young bird's sharply hooked beak profile, fuzzy lower legs, and dark-centered iris to isolate it from flat-beaked forest contenders.
 9. Case B: Wetland Shorebird Proportional Audit: Students open Envelope B, analyzing anatomical traits across multiple variables to match a lake fledgling with its proper parent based on un-webbed toe configurations and specialized mid-length leg metrics.
 10. Case C: Urban Passerine Precision Challenge: Teams open Envelope C



- to tackle the highest difficulty trial, comparing micro-structural traits of three highly similar urban adult birds to align a lost town fledgling with its uniquely elongated, needle-thin probe beak parent.
11. Avian Age Marker
Evaluation: The teacher presents a final comparative diagnostic framework: mapping naked skin and fused eyelids as indicators that a hatchling must be returned to a nest, versus fully opened eyes and emerging flight plumage indicating a brancher learning to navigate flight paths safely.

Differentiation:

- High-contrast raised-line tactile drawings of beak types (curved vs. straight) will be provided for students developing fine-grained visual processing skills.
- Simplified dual-choice visual matrices will limit the field of adult choices to two instead of three for groups requiring scaffolding.
- Custom oversized foam magnifying handles will be available to support tactile grip stability during the structural observation loops.
- Strategic auditory cues—matching the rhythmic chirp frequency of offspring to parent calls—can be introduced to reinforce structural pairing through multi-sensory pathways.
- Advanced students can use a regional field guide to chart three distinct traits that differentiate a local American Robin from a Blue Jay at both the juvenile and adult stages.
- Sentence frames are provided for parent-offspring analysis: "I know Bird Number [blank] is the parent because they both share the trait of [blank]."

Resources Provided:

- Mystery Science digital media suite and avian anatomy time-lapse clips.
- Mystery Pack (3 trait-mapping evidence sheets, color-coded parent profile arrays, and classification folders).
- Precision desk magnifiers, anatomical measuring scales, and student junior ranger badges.



Lesson Plan 2 Template

Content Area: Science	Lesson Title: Offspring Trait Variation- Can you predict what an animal's babies will look like?	Time Frame: 2 days
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Lesson Components

21st Century Themes

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|--|--|
| ☒ Global Awareness | ☒ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Interactive digital database for trait tracking, visual document camera for parent profile displays, and cloud-based spreadsheet entry tools for collective variation mapping.

Equipment Needed: Coin-flip cups, pennies, parent trait worksheets, profile crayons (brown, blue, yellow, black), interactive whiteboard, tablet or computer with classroom data entry sheet, puppy profile template cards, and play-money budget tokens.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will observe and identify physical traits to predict possible trait combinations in offspring. - Students will execute a probability model using a coin-flip system to simulate how random trait inheritance creates variation among siblings. - Students will use ICT tools to log individual data points into a collective classroom database to analyze	Lesson Sequence - Phenomenon: A classroom of students uses the exact same coin-flipping system and the exact same mother and father dog profiles, yet every single student draws a puppy with a completely unique combination of fur colors, ear shapes, and spot patterns. - The Puppy Supply Budget: The teacher introduces a budget constraint before the	- Students will verbally explain how a coin flip simulates the way a baby animal gets a random mix of traits from its mom and dad. - Students will successfully enter five trait data points into the shared digital classroom sheet with zero input errors. - Students will complete a financial ledger showing that their starting tokens minus their supply costs equals zero.



patterns of trait distribution.

- Students will apply basic financial literacy concepts by managing a token budget to purchase essential supplies and assessing the economic value of variation in a puppy adoption simulation.

scientific simulation begins. Each student pair receives ten play-money tokens. The teacher explains that running a business like a veterinary clinic or a rescue station requires managing financial resources. Students must spend their tokens to purchase their required field gear: two coin cups (two tokens), two data worksheets (two tokens), and a shared specialized coloring pack (six tokens). Students fill out a simple paper ledger tracking their starting balance, expenses, and final zero balance to practice balancing a project budget.

3. Ona and Otis Parent Observation: The teacher shares the story of dog parents Ona and Otis, prompting students to realize that while dogs always have puppies, individual traits like ear shape, fur texture, and tail length can look vastly different from dog to dog.
4. Parent Trait Analysis and ICT Base Logging: Students observe the digital profiles of a new set of parent dogs, Archie and Bella, projected on the interactive whiteboard. The teacher explicitly defines the term trait inline (any

- Students will identify at least two unique variations that make their drawn puppy look different from their partner's puppy.



- physical feature or characteristic you can observe about a living thing). Students use their purchased crayons to color Archie's eyes brown and fur yellow, and Bella's eyes blue and fur brown. Pairs launch a simple classroom spreadsheet on a tablet or computer terminal. They click check-boxes to log the baseline data of the parents into the classroom's ICT system, recording Archie's floppy ears, curly tail, and big spots versus Bella's pointy ears, straight tail, and little spots.
5. The Trait Inheritance Coin Simulation: The teacher demonstrates the mechanical operation of the coin-flip simulation. Students place a penny inside their cup, cover the top with one hand, and shake for five seconds. If the coin lands face up (heads), the puppy inherits the father's specific trait variation. If the coin lands face down (tails), the puppy inherits the mother's trait variation. Pairs take turns shaking the cup for five distinct rounds to determine five genetic traits: ears, tail shape, eye color, fur color, and spot size. Students draw each inherited trait directly



- onto their puppy template sheet based on their coin results.
6. Physical Trait Gallery Walk: Students stand up and perform a series of coordinated physical hand gestures as a class—such as mimicking floppy or pointy ears—to visually compare their drawn puppies with their peers' drawings across the room.
 7. ICT Classroom Cloud Compilation: Once drawings are complete and puppies are named, each pair uses their digital terminal to enter their puppy's final combination of traits into the central classroom data sheet. The spreadsheet automatically generates a live, visual bar graph showing how many puppies in the class inherited floppy ears versus pointy ears, or yellow fur versus brown fur. Students evaluate the screen to see how computer tools help scientists instantly collect, sort, and analyze big groups of information from many different places.
 8. The Trait Variation Marketplace: The teacher introduces the concept of variation (the unique differences, big and



- small, that make every living thing one of a kind). The class views the live data graph to confirm that while all puppies share the same parents, no two drawings are identical. The classroom transforms into a puppy adoption agency simulation to explore business literacy. Student pairs display their unique puppy cards on their desks like an interactive business showcase.
9. Entrepreneurial Investment Simulation: The teacher distributes five play-money tokens to each pair to act as an adoption operating budget. Pairs navigate the room to view the puppy variations created by their peers, analyzing which puppies have rare combinations of traits based on the ICT graph data. Pairs use their tokens to simulate an investment, choosing to adopt a puppy whose unique variation adds special value to their imaginary animal rescue business. Students discuss how having a wide variety of unique choices helps a business attract different types of customers in a marketplace.
10. Real-World Extension and Wrap-Up: The class



watches the final video segment revealing Otis and Ona's real-world litter, identifying how puppy Chester inherited pointy ears from Dad but shaggy fur from Mom, while sister Beatrice inherited Dad's short fur. The teacher explains that these variations occur across all living species, from the unique spots on a baby giraffe to the stripes on backyard kittens, ensuring that every individual organism remains completely unique.

Differentiation:

- Visual coin-landing guides featuring oversized graphic icons of heads and tails will be placed at tables to assist with quick icon matching.
- Digital entry portals can use simplified color-coded buttons rather than text-based menus for students developing directional navigation skills.
- Pre-cut physical trait stamps (ears, tails) can replace the manual drawing steps for students refining physical hand coordination.
- Advanced students can use the digital data graph to calculate the exact fraction of the class that inherited yellow fur versus brown fur.
- Sentence frames are provided for peer discussion: Our puppy is unique because it is the only one in our row that has the traits of both a straight tail and big spots.

Resources Provided:

- Interactive classroom digital graphing database and media display files.
- Token ledger worksheets and printable play-money coupon sheets.
- Puppy profile drawing sheets, coin cups, and selected trait reference matrices.
- Mystery Pack



Lesson Plan 3 Template

Content Area: Science Lesson Title: Why are baby birds so loud? Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital whiteboard system for media playback, electronic activity timer display, visual document camera for demonstrating the manual modeling steps, and a soundboard system playing animal danger and feeding calls.

Equipment Needed: Handout worksheets containing the baby bird templates, colored crayons (red, blue, yellow, green), green yarn pieces cut into short strands to act as pretend worms, an interactive whiteboard with an integrated media player, an adjustable kitchen timer, a toy hawk or predator image card, and specialized student "beak" tracking wristbands.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define animal behaviors as specific actions that living things perform to satisfy their basic needs for food and safety. - Students will execute a roleplay simulation to demonstrate how a parent bird's food-gathering actions match a baby bird's vocal signaling behaviors. - Students will model defense behaviors by altering their physical posture and volume level	Lesson Sequence - Phenomenon: A tiny, defenseless baby bird sitting in an exposed nest chirps loudly and frantically when its parent approaches, yet it instantly drops to the bottom of the nest and goes completely silent the moment a hawk or raccoon passes overhead. - The Extra Legs Mystery Hook: Students examine a confusing photograph of a wild water bird that appears to have up to eight extra legs dangling	- Students will verbally define a behavior as an action a living thing does to get food or stay safe. - Students will execute a physical posture shift from loud chirping to total silence within two seconds of a predator prop being revealed. - Students will complete their worksheet, correctly identifying that parent birds provide food and protection to help their families survive.



in response to a simulated environmental predator threat.

- Students will analyze how contrasting communication patterns (loud chirping versus absolute silence) directly increase an organism's chances of survival.

beneath its feathers, sharing initial observations with their table partners.

3. Protective Wing Analysis: The teacher plays the first digital media clip to reveal that the extra legs belong to small baby birds hiding beneath their father's wings to escape a lurking crocodile, introducing how parents protect young.
4. Survival Terminology Introduction: The teacher defines the scientific term survive inline (to stay alive and healthy in an environment), connecting it to the universal needs of all young living things.
5. Elephant Herd Wall Evaluation: The class observes media footage of an adult elephant herd working together to form a tight physical circle around their babies to successfully drive away a charging hyena.
6. Nest Coloring and Supply Setup: Students receive their nest worksheets and use their crayons to shade in the feather patterns of three hungry baby birds while an automated timer tracks their pacing.
7. Classroom Foraging Field Scatter: While students are coloring, the teacher

- Students will verbally describe how a baby bird's loud chirp helps it get food but how its quiet behavior helps it hide from danger.



- | | | |
|--|---|--|
| | <p>distributes thirty pieces of green yarn (acting as pretend worms) across open surfaces around the room, placing them on top of tables and shelves.</p> <p>8. Behavior Concept
 Definition: The teacher defines the scientific term behavior inline (anything a living thing actively does or executes to satisfy a real-world need), prompting the class to practice forming a "beak" by pinching their fingers together.</p> <p>9. Parent Bird Foraging Simulation: Students assume the role of parent birds, following structural constraints: carrying only one yarn worm at a time in their hand-beak, walking slowly to avoid dropping food, and only hunting when they actively hear baby birds chirping.</p> <p>10. Signaling Coordination Loop: The teacher plays an audio clip of chirping nestlings; students stand up to harvest a single green yarn piece, return to their desks to feed one drawn baby bird, and sit down when the audio track pauses, repeating for three complete rounds.</p> <p>11. Matching Puzzle
 Explanation: The class evaluates footage of a mother cat stretching out</p> | |
|--|---|--|



so her kittens can drink milk, analyzing how the baby's signaling behavior (meowing) and the parent's responding behavior go together like a puzzle.

12. Predator Conflict

Transition: The teacher introduces an environmental hazard by displaying a hawk card, prompting students to assume the role of baby birds who cannot fly and must stay seated in their "nest" chairs.

13. Contrasting Behavioral

Game: Student pairs execute two matching survival actions for three minutes: opening their arms wide and chirping loudly when the parent card is raised, and instantly dropping low, tucking their arms in, and maintaining total silence when the teacher circles the room with the hawk predator card.

14. Camouflage Field Review

and Wrap-Up: The class views a final time-lapse clip to locate four camouflaged wild birds crouching perfectly still against a rocky field, concluding that working together through matched behaviors allows families to stay safe as they grow.



Differentiation:

- High-contrast visual cue symbols (a bright sun for feeding time and a dark cloud for danger) will be displayed alongside the teacher cards to support rapid role transitions.
- Plastic counting tweezers can replace the manual hand-pinch gesture for students working on fine-motor hand coordination.
- Quiet alternative actions (raising a flat hand-beak without vocalizing) are provided to accommodate students who are sensitive to elevated classroom noise levels.
- Advanced students can use uniform plastic linking chains laid end-to-end to measure and record the exact length variations of their harvested yarn worms.
- Sentence frames are provided for survival analysis: "When the parent comes near, the baby bird uses the behavior of [blank] to get [blank]."

Resources Provided:

- Mystery Science media suite, parent attraction calls, and predator warning audio tracks.
- Mystery Pack (3 printable baby bird worksheets, predator hawk silhouettes, and color-coded animal behavior cards).
- Handheld simulation cups, pre-cut green yarn worm bundles, and custom tracking wristbands.



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 Strongly 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: Science	Grade Level: 1st	Unit Title: Animal Superpowers
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Created: 2026	Board Approved on: Type Here
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Unit Overview Template

Content Area: Science **Grade Level:** 1 **Unit Title:** Plant Superpowers

Unit Summary: In this high-energy, immersive 1st-grade science unit, students become botanical engineers, biological structural trackers, and biomimicry innovators. Through a series of hands-on investigations, structural stress-tests, and real-world design challenges, students explore how plants use extraordinary physical adaptations to survive, grow, and solve environmental problems. Students will investigate how baby seedlings inherit diagnostic physical traits from their parents, explore how flexible structures like bendy trunks and moving leaves protect plants from harsh weather forces, and analyze how specialized external parts function like a real-world solar panel and plumbing system to gather light and water. The unit culminates in an engineering design suite where students use biomimicry to borrow survival solutions from the plant kingdom to invent new human tools, transforming observations of the natural world into practical everyday designs.

Primary Interdisciplinary Connections: ELA and Mathematics

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy
☒ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy

Unit Rationale: For early learners, plants can often be misperceived as static, inactive objects rather than dynamic, problem-solving living organisms. To shift this perspective, this unit anchors abstract biological concepts into tactile, observable physical structures—the specific geometry of a leaf, the curvature of a stem, the anchoring network of roots, and the flexibility of branches. By framing these structures as "superpowers," students learn that every shape, line, and material in nature serves a critical survival function. Investigating these traits teaches students to approach the natural world with the mindset of an engineer. They discover that a plant's physical response to an environmental challenge—such as a stem bending away from shadows or a branch flexing in a storm—is not random, but an optimized system for survival. By directly connecting these biological adaptations to human engineering problems through the lens of biomimicry, 1st graders build a foundation in structural analysis, cross-system pattern recognition, and iterative testing. This positions them to view nature as an active laboratory of human design solutions.

Career Readiness (Standard 9):

- 9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.
9.4.2.CT.2: Identify possible approaches and resources to execute a plan.
9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

Learning Targets

Standards: 1-LS1; 1-LS3; K-2-ETS1

Content Statements: Heredity: Inheritance and Variation of Traits; From Molecules to Organisms: Structure and Processes; Engineering Design

CPI#: **Cumulative Progress Indicator (CPI):**



1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem
K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
1-LS1-1	Foundational for Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. C. Ask questions to clear up any confusion about the topics and texts under discussion.
1.M.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
SEL.PK-12.1.2	Recognize the impact of one's feelings and thoughts on one's own behavior.
SEL.PK-12.3.2	Demonstrate and awareness of the differences among individuals, groups and others' cultural backgrounds
SEL.PK-12.3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ
8.2.2.ED.1	Communicate the function of a product or device.
8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ED.4	Identify constraints and their role in the engineering design process.



8.2.2.ITH.1	Identify products that are designed to meet human wants or needs. •
8.2.2.ITH.2	Explain the purpose of a product and its value
8.2.2.NT.1	Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together
8.2.2.NT.2	Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

- Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

LS3.B: Variation of Traits



- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

ETS1.A: Defining and Delimiting Engineering Problems

- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2- ETS1-1)
- Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-2- ETS1-1)

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions, such as climate change, to other people. (K-2-ETS1-2)

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1), (K-2-ETS1-2)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

Unit Essential Questions:

- How do the specific physical shapes and parts of a plant act as superpowers to help it get food, stay safe, and survive?
- How can we use the matching visual clues on baby seedlings and adult plant parents to prove they belong to the same family?
- How can human inventors borrow structural ideas from plants to design new tools that solve everyday human problems?



- How do water lilies float and where do they come from?
- What will a baby plant look like when it grows up?
- Does a baby plant look like its parent?
- What are the similarities and differences between parent plants and their offspring?
- How do plant traits help those plants survive?
- Why don't trees blow down in the wind?
- What do sunflowers do when you're not looking?
- What are the tiniest water lily leaves?

Unit Enduring Understandings:

- Plants have unique external parts, called structures, that perform specialized jobs like catching sunlight, drinking water, and keeping the plant anchored in place.
- Young seedlings inherit specific physical traits from their adult parents; they are highly similar to their parents but are not completely identical.
- Biomimicry is the process where human engineers study how plants and animals naturally solve their survival problems and use those exact structural patterns to invent new human technologies.
- Observe similarities and differences between parent plants and their offspring.
- Investigate how plant traits help plants survive.

Unit Learning Targets:

Students will...

- Compare and contrast structural trait variations across diverse plant species to construct an evidence-based account proving that young offspring resemble their adult parents.
- Analyze how specific external plant structures, including roots, stems, and leaves, function together to capture and transport universal survival resources like water and light.
- Evaluate how the physical properties of a structure, such as flexibility versus rigidity, dictate how well an organism withstands mechanical environmental hazards like high winds.
- Design, build, and iterate on a physical prototype that solves a human problem by directly copying a functional structural mechanism observed in the plant world.
- Students identify the pattern that young plants are similar to their parent plants.
- Students observe three seedlings and three adult plants and use their observations to match each seedling to its adult counterpart.



Evidence of Learning

Summative Assessment: Unit Assessment

Equipment Needed: Mystery Science Kit

Teacher: Mystery Science Online Program

Resources:

Formative Assessments:

- Lesson activity printouts
- Think/pair/share
- Class discussions
- Teacher observation
- Lesson check-ins
- Exit Slips
- The Seedling Family Identification Check: A pictorial recording matrix where students analyze leaf shapes and stem postures to map ancestral matches between young sprouts and adult profiles.
- The Wind Stress Structural Analysis Task: A physical prototyping trial where student teams test altered paper canopies and flexible straw stems against an electric fan to evaluate aerodynamic stability.
- The Sun-Tracking Movement Log: A sequenced growth layout where students diagram how a sunflower head adjusts its physical placement to capture solar energy across a garden habitat.
- The Biomimicry Tool Design Challenge: An interactive prototyping assessment where students construct a physical model of a human tool inspired by a specific plant structure, pitching their design's functional benefit to a partner.



Lesson Plans

Lesson	Time Frame
Lesson 1 What will a baby plant look like when it grows up?	3 days
Lesson 2 Why don't trees blow down in the wind?	2 days
Lesson 3 What do sunflowers do when you're not looking?	2 days

Teacher Notes: All consumable materials are in your Mystery Science Mystery Pack. This unit contains an Anchor Phenomenon, 3 lessons, and a Performance Task.

This unit balances guided media exploration with active, material-heavy engineering labs. Organize your classroom into dedicated "Invention Stations" early on, keeping materials like pipe cleaners, straws, paper patterns, and modeling clay pre-sorted in shared team bins to streamline transitions between videos and testing phases.

When facilitating these lessons, actively maintain the framing of students as "Professional Inventors" and "Field Biologists." Encourage students to move away from vague observations (like "the plant looks neat") and push for specific structural terminology (such as "the leaf trait has a pointed boundary line" or "the stem demonstrates a flexible curvature property"). When teams encounter structural failures during testing—such as an umbrella prototype tipping over in the wind station—frame it as a milestone in the engineering cycle. Remind them that true inventors use data from a failure to refine their ideas, looking right back at how a tree or a seed utilizes its natural superpowers to improve human designs.

Curriculum Development Resources/Technology Resources:

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

<https://mysteryscience.com/docs/25230>

<https://mysteryscience.com/docs/25286>

<http://mysteryscience.com/docs/25239>



Lesson Plan 1 Template

Content Area: Science Lesson Title: What will a baby plant look like when it grows up? Time Frame: 3 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display macro-details of seedling leaf anatomy and adult plant structures, paired with an automated on-screen countdown timer to manage partner observation intervals.

Equipment Needed: Electronic countdown timer, 3 empty master seed packets (Geranium, Sunflower, Pumpkin), 3 small temporary starter pots (numbered 1, 2, and 3), "Look for Clues" student worksheets, crayons, and uniform plastic linking cubes for linear measurement extension.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define plant traits as specific physical characteristics and structures that a living organism possesses throughout its lifecycle. - Students will observe and document physical variation patterns in leaf geometry and stem posture to differentiate between distinct plant families. - Students will construct an evidence-based matching account to align young seedlings with	Lesson Sequence - Phenomenon: Tiny, non-flowering green seedlings emerging from identical pots of dirt possess distinct structural shapes in their leaves and stems that perfectly match the features of their fully grown adult forms, long before they ever produce bright flowers, tall stalks, or giant fruits. - The Mixed-Up Garden Mystery Hook: Students observe three unmarked starter pots containing tiny green seedlings,	- Students will verbally define a trait as a physical shape or feature that tells us what kind of plant or animal a living thing is. - Students will execute a visual classification task on their worksheet, correctly matching all three seedlings to their adult parents based on leaf shape and stem curvature. - Students will complete their data matrix, writing the correct reference numbers (1, 2, and 3)



their corresponding adult plant parents based on structural similarities. Students will analyze how an adult plant's projected physical growth size dictates its specific localized environmental space constraints.	learning that the teacher accidentally washed off the identification signs during watering and must figure out which is which before they get too big. - Adult Needs Evaluation: The teacher projects images of an adult geranium, an adult sunflower, and a sprawling pumpkin patch, prompting students to share initial observations with their table partners regarding their massive differences in final physical size. - Spatial Footprint Analysis: The class evaluates three prepared garden habitats—a small clay pot, a narrow space by a tall fence, and a wide open garden bed—discussing why a giant sprawling pumpkin vine cannot survive if it is left inside a tiny clay pot. - Seedling Terminology Introduction: The teacher defines the scientific term seedling inline (a young, baby plant that has recently sprouted from a seed), connecting it to how baby humans grow bigger until they become adult humans. - Anatomical Leaf Observation: The teacher introduces the scientific term observe inline (to look very closely at	next to the corresponding adult plant graphics. Students will verbally describe how a young seedling does not look exactly like its adult parent yet, but carries enough matching structural clues to prove who its parents are.
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- something using your senses to gather clues) and projects a macro-photo of a leaf, prompting students to list words describing its boundary lines.
7. Leaf Trait Variety
Categorization: The class charts various leaf structures across the plant kingdom, noting how some are thin spiky needles, some are broad/flat, some are shaped like hearts or circles, and some have zigzag edges versus smooth edges.
 8. Supply Distribution & Pacing Setup: Student pairs receive their "Look for Clues" tracking worksheet and sorting crayons, while the teacher sets the classroom projection system countdown timer to establish pacing boundaries for the lab work.
 9. Isolating the Outlier Leaf: Student pairs conduct a side-by-side inspection of the three mystery seedlings on their worksheet, identifying that Seedling 2 has a completely unique roundish shape with a point at one end compared to the other two.
 10. The Sunflower Alignment Loop: Students compare



- the round, pointed leaf of Seedling 2 against the adult pictures on their seed packets, identifying it as the sunflower. They write a "2" next to the sunflower and color the adult plant to log the data.
11. Secondary Stem-Trait Introduction: The teacher introduces a secondary anatomical structure to help differentiate the remaining two plants, showing how stems (the part of a plant that leaves grow out of) can be straight, bendy, or curly.
 12. Stem Curvature Structural Mapping: Students trace the lines of the remaining stems on their worksheets, discovering that Seedling 1 has a perfectly straight stem with no curls, while Seedling 3 bends dramatically to the side and has curly green tendrils.
 13. Locking In Geranium & Pumpkin Evidence: Teams match Seedling 1's straight stem to the adult geranium packet (writing a "1"). They match Seedling 3's sideways bend and curly tendrils to the adult pumpkin vine (writing a "3") and color both to complete the investigation.
 14. The Final Transformation Wrap-Up: The class views



a time-lapse media clip showing the seedlings growing up in their proper garden beds: the straight seedling growing tall over the fence into a sunflower, the short seedling blooming pink geranium flowers, and the curling vine transforming yellow blossoms into giant orange pumpkins.

Differentiation:

- High-contrast visual shape cards (outlining a perfect circle, triangle, and heart) will be displayed on the digital board to help students identify leaf boundaries.
- Textured structural templates (raised puff-ink lines representing straight lines and curly loops) are provided for students working on tactile-sensory hand coordination.
- Simplified pictorial check-sheets (using color symbols instead of written numbers) are provided to accommodate students who are working on early numeral identification.
- Advanced students can use uniform plastic linking cubes laid end-to-end to measure and record the exact length variations of the different seedling stems on their worksheets.
- Sentence frames are provided for structural matching analysis: "I know that Seedling [blank] is a pumpkin because its stem has the trait of [blank]."

Resources Provided:

- Mystery Science media suite, seedling growth time-lapse clips, and automated classroom interval timer tracks.
- Mystery Pack (3 printable "Look for Clues" seedling worksheets, miniature replica seed packets, and family trait sorting cards).
- Handheld magnifying lenses, colored charting pencils, and plastic tracking units.



Lesson Plan 2 Template

Content Area: Science Lesson Title: Why don't trees blow down in the wind? Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display video media of real beach umbrellas blowing across a windy shore, accompanied by an electric table fan acting as the Big Wind testing station.

Equipment Needed: Plastic drinking straws with bendy necks, pipe cleaners, pre-printed paper circle patterns, small paper cups filled with Play-Doh modeling clay, safety scissors, small stickers, a large cardboard fan or manual hand-fan, and plastic connecting blocks for non-standard length measurements.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define plant structures as the specific physical parts of a living organism that help it perform functional tasks to stay alive and healthy. - Students will compare and contrast the physical properties of natural tree trunks and human-designed umbrella poles to isolate why rigid structures fail in high winds while	Lesson Sequence - Phenomenon: A large beach umbrella sticks straight into the sand but gets blown away by a sudden gust of wind, while nearby coastal trees with thin trunks, wide branches, and thousands of separate leaves bend in the breeze but remain standing securely in the soil. - The Flying Umbrella Mystery Hook: The teacher shares a personal story about a hot day at	- Students will verbally define a structure as a physical part of a plant or animal that does a specific job to help it handle real-world challenges. - Students will execute a physical engineering modification, successfully altering a paper canopy or a straw pole to make it withstand a steady stream of fan wind. - Students will complete their test table trial,



flexible structures survive.

- Students will apply biological principles to design a modified paper umbrella canopy that allows air to pass through or deflects wind energy, mimicking the behavior of tree leaves.
- Students will test and iterate on a structural prototype to demonstrate how borrowing ideas from nature allows engineers to solve real-world human design challenges.

the beach where an umbrella kept blowing away, then projects a real video clip of dozens of beach umbrellas rolling across a windy shoreline while garbage cans and heavy chairs stay put.

3. Natural Comparison Discussion: The teacher prompts students to look out the window or view a digital image of a neighborhood tree, initiating a partner discussion comparing the shape of a tree to the shape of a beach umbrella.
4. Tree Posture Roleplay Simulation: Students stand up in an open classroom space to act out being a tree, planting their legs wide to simulate roots, holding up their arms to act as branches, and wiggling their fingers to represent individual leaves reacting to a simulated breeze.
5. Wind Force Movement Adaptation: The teacher acts as the wind, prompting students to actively bend their trunks and sway their branches sideways to experience how flexibility helps absorb energy without breaking or falling over.
6. Structure Terminology Introduction: The teacher defines the scientific term structure inline (a

tracking whether their umbrella design fell down instantly or bent safely like a living tree.

- Students will verbally describe how bending branches and separated leaves prevent a real tree from getting knocked over by a strong storm.



- specific physical part of a living thing that does a special job), guiding students to sit back down and identify the trunk, branches, leaves, and roots of a tree.
7. Internal Root View
Analysis: The class examines a cross-section photograph of soil to observe how a tree's root system spreads deep and wide underground to anchor the plant, noting that beach umbrellas lack this hidden structural advantage.
 8. Aerodynamic Leaf Flow
Demonstration: The teacher explains how a tree has thousands of tiny moving leaves that let wind pass through one by one, contrasting this with a massive, solid umbrella fabric canopy that traps all the wind at once.
 9. Component Material
Gathering: Students transition into inventor pairs and gather their engineering supplies, including a paper circle template, a flexible straw, a pipe cleaner, a pair of scissors, and a cup of clay acting as a heavy umbrella stand.
 10. Umbrella Framework
Construction: Students cut out the paper circle, slide a twisted pipe cleaner loop through the center boundary line, and



- fold the edge over a gray indicator triangle, securing the cone shape with small stickers.
11. Stand Engineering and Baseline Testing: Teams slide the bendy straw over the pipe cleaner core and press the base firmly into the cup of Play-Doh, placing their standard umbrellas on the test table to see them immediately blow over when the teacher waves the Big Wind fan.
 12. Biomimicry Brainstorming Session: The teacher introduces the concept of copying nature to solve problems, prompting student pairs to modify their paper canopy by cutting slits like palm leaves or poking small holes so the wind can pass through safely.
 13. Structural Iteration and Stem Re-engineering: Students alter the straw pole to mimic bendy tree trunks, testing how a flexible handle allows the paper canopy to tilt and flutter in the wind current instead of tipping the entire clay base over.
 14. Prototype Evaluation and Wrap-Up: The class runs a final wind test on their improved designs, observing how tree-inspired features keep the umbrellas



upright before viewing a closing media clip that highlights how other organisms, like acorns and lizards, inspire human inventions.

Differentiation:

- High-contrast dotted guidelines are pre-drawn on the paper canopy patterns to show students exactly where to cut feather-like slits for wind passage.
- Pre-wrapped pipe cleaner loops are provided to student pairs working on fine-motor hand movements to make assembly easier.
- Visual symbol cards depicting a rigid line and a wavy line are displayed on the board to guide students during the structure selection step.
- Advanced students can use uniform plastic connecting blocks laid end-to-end to measure the height of their umbrella poles, recording the total unit length on a chart.
- Sentence frames are provided for design analysis: "I made my umbrella more like a tree by adding the trait of [blank] so that the wind could [blank]."

Resources Provided:

- Mystery Science exploration video media, wind velocity demonstration reels, and nature-inspired engineering clip collections.
- Printable paper canopy layout grids, custom sticker sets, and pre-sorted pipe cleaner bundles.
- Classroom testing tables, electric distribution fans, and non-standard measurement units.
- Mystery Science First Grade Mystery Pack



Lesson Plan 3 Template

Content Area: Science Lesson Title: Plant Movement & Survival Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display a time-lapse media suite of sunflower heads tracking the path of the sun, paired with an interactive e-book reader for the whole-class read-along story.

Equipment Needed: Large chart paper, sunflower growth sequencing cards, pre-printed garden tracking sheets, crayons, water misting bottles, and uniform plastic links for stem height measurements.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define a seed as a tiny, protected plant part that contains stored food and can grow into a completely new living organism under the right conditions. - Students will observe and document how plant structures like leaves and roots actively gather necessary resources from the surrounding soil and air. - Students will execute a scientific experiment inline (a fair test that	Lesson Sequence - Phenomenon: A row of young sunflowers planted along a garden wall slowly tilts, stretches, and curves their stems toward the open lawn during the morning hours, turning their green leaves directly toward the bright sky even when no one is moving them. - The Window Garden Brainstorm: The teacher introduces a boy named Jin who wants to plant giant sunflowers right outside his bedroom	- Students will draw two distinct things on their worksheet that a flowering plant absolutely needs from its environment to stay alive and grow healthy. - Students will execute a written or dictated description of two different plant structures, such as roots or leaves, explaining exactly how those parts help the sunflower capture its basic survival needs. - Students will complete their sequencing task,



scientists perform to find the answer to a real-world question) to determine how light placement alters the growth direction of a stem.

- Students will analyze text and media clues to construct an evidence-based claim detailing the primary universal survival requirements of all flowering plants.

window, prompting students to share initial ideas with their table partners about whether the plants will grow successfully there.

3. Digital Story Read-Along: The teacher projects the interactive e-book on the digital classroom display, guiding the class as they follow along with Jin's garden journey, tracking the words with their fingers on their desks.
4. Seed Concept Discovery: The teacher defines the scientific term seed inline (a small plant part that carries a baby plant inside it), passing around real sunflower seeds so students can feel the hard protective outer shell.
5. Resource Needs Mapping: The class halts at a critical page in Jin's story to discuss why plants cannot survive inside a dark closet, mapping out the basic things that plants need to live that are similar to what humans need.
6. Experiment Step Modeling: The teacher models how Jin sets up a fair test in his yard, showing how changing one single item at a time helps a scientist isolate exactly what makes a living thing happy or sad.
7. Leaf Light-Catcher Evaluation: The teacher

arranging the life cycle cards in order from a single dormant seed to a fully grown adult blossom.

- Students will verbally describe how a young sunflower adjusts its posture over time to chase the position of the sun during the day.



- projects a close-up image of a wide sunflower leaf, explaining how the flat green surface works like a solar panel to trap rays of sunshine from the sky.
8. Tracking Sheet
Distribution: Students receive their garden tracking worksheets and use their crayons to draw Jin's bedroom window alongside a tiny sprouted seedling emerging from the soil line.
9. Directional Growth
Tracking: The class views a time-lapse video clip of real seedlings growing inside a room with only one side window, observing how every single stem bends at a dramatic angle toward the glass pane.
10. Root System Spreading
Log: The teacher illustrates how hidden roots underground absorb moisture from rain, prompting students to add wavy lines beneath their drawn soil to represent water-gathering networks.
11. Classroom Sun-Tracking Simulation: Students stand up at their seats and act out being Jin's sunflowers, starting the morning facing toward the classroom door and slowly rotating their heads and arms toward



- the windows as the teacher moves a golden light prop across the ceiling.
12. Plant Reaction Synthesis:
The class returns to the digital book to read the conclusion of Jin's test, discovering that plants actively move their parts to face the sun when humans are not looking.
13. Final Diagram Completion and Wrap-Up: Students add final color details to their garden sheets, completing a multi-part growth drawing that shows a fully grown sunflower standing tall against a bright sunny sky to summarize their learning.

Differentiation:

- High-contrast visual symbol placards (a bright sun emblem and a blue water droplet emblem) are placed on the board to remind students of the core plant requirements.
- Pre-cut paper leaf shapes are provided to student pairs working on fine-motor manipulation so they can stick them onto their diagrams without manual scissor work.
- Simplified sentence frames with picture boxes are utilized to support students who are developing early written communication skills.
- Advanced students can use uniform plastic links laid end-to-end to measure the length of the root lines on their worksheets, recording the total unit count on their paper.
- Sentence frames are provided for analysis: "The sunflower uses its green leaves to catch [blank] and its underground roots to drink [blank]."

Resources Provided:

- Mystery Science digital story suite, solar tracking time-lapse media reels, and electronic text files.
- Mystery Pack (3 printable sunflower tracking matrices, life cycle sequencing cards, and miniature seed packets for exploration).
- Handheld water sprayers, uniform counting units, and assorted coloring utensils.



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 Strongly 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: Science	Grade Level: 1st Grade	Unit Title: Plant Superpowers
Created: 2026	Board Approved on:	Type Here



Unit Overview Template

Content Area: Science **Grade Level:** 1 **Unit Title:** Sun & Shadows

Unit Summary: In this first-grade earth science and engineering unit, students become sky detectives to investigate the predictable, repeating patterns of the sun and the behavior of shadows on Earth. Through a series of hand-on observations, interactive narratives, and physical modeling, students explore how the sun appears to move across the sky in a consistent path every day, rising on the east side of the horizon and setting on the west side. Students discover that this celestial movement directly controls the shapes, lengths, and positions of the shadows cast by objects on the ground. By experimenting with flashlights, paper gnomes, and real-time tracking, students gather evidence to prove that even when an object stays completely still, its shadow will move, change, or disappear depending on the position of the light source and the presence of blocking structures. The unit culminates in a deep understanding of seasonal light patterns, allowing students to use the sun and stars to observe, describe, and predict the natural patterns of our planet.

Primary Interdisciplinary Connections: ELA and Mathematics

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy
☒ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy

Unit Rationale: First-grade students learn best when abstract concepts are grounded in everyday observations. The sun and shadows are universal, tangible phenomena that every child experiences, yet few understand as a systemic, repeating pattern. By transitioning students from simply noticing their shadows to actively predicting their movements using spatial orientation, this unit builds foundational skills in data collection and pattern recognition. Isolating the relationship between a light source and a blocking object teaches students to think like scientists. They learn to manipulate variables, observe cause-and-effect relationships, and use physical models to simulate macroscopic changes in the sky. Understanding these celestial patterns is not just an academic exercise; it helps students develop spatial awareness, navigation skills, and a deeper connection to the natural world. By directly interacting with the patterns of daylight across different times of the year, students build the necessary scaffolding to eventually understand Earth's place in the solar system, reinforcing the idea that natural events can be observed, measured, and predicted.

Career Readiness (Standard 9):

- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan.
- 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
- 9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.

Learning Targets

Standards: 1-ESS1; K-2-ETS1

Content Statements: Earth's Place in the Universe; Engineering Design

CPI#: Cumulative Progress Indicator (CPI):



1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.
1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. C. Ask questions to clear up any confusion about the topics and texts under discussion.
1.M.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
SEL.PK-12.1.2	Recognize the impact of one's feelings and thoughts on one's own behavior.
SEL.PK-12.3.2	Demonstrate awareness of the differences among individuals, groups and others' cultural backgrounds
SEL.PK-12.3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ
8.2.2.ED.1	Communicate the function of a product or device.
8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ED.4	Identify constraints and their role in the engineering design process.
8.2.2.ITH.1	Identify products that are designed to meet human wants or needs. •
8.2.2.ITH.2	Explain the purpose of a product and its value
8.2.2.NT.1	Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together
8.2.2.NT.2	Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Science and Engineering Practices

Planning and Carrying out Investigations



Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

Disciplinary Core Ideas

ESS1.A: The Universe and its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

Crosscutting Concepts

Patterns

Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

Unit Essential Questions:

- How does the sun's position in the sky change from morning to evening, and how can we use that movement to find our way?
- What causes a shadow to form, move, or disappear even when the object casting it stays completely still?
- How can observing the patterns of the sun and stars help us understand and predict changes in daylight throughout the year?
- Could a statue's shadow move?
- What does your shadow do when you're not looking?
- How can the Sun help you if you're lost?
- Why do you have to go to bed early in the summer?



Unit Enduring Understandings:

- The sun appears to move across the sky in a repeating, predictable path each day, rising in the east and setting in the west.
- Shadows are created when an object blocks a path of light, and a shadow's position and size change in direct response to the movement of the light source.
- Natural patterns, such as the amount of daylight at different times of the year or the position of objects in the sky, can be observed, described, and predicted through careful tracking.
- Observing the Sun can help people determine direction and time of day.

Unit Learning Targets:

Students will...

- Use observations of the sun's path to identify the directional orientations of east and west.
- Construct and manipulate a physical model to demonstrate how a moving light source changes the position of a stationary object's shadow.
- Analyze data from real-time tracings and time-lapse media to explain how shadows move throughout the day.
- Describe the repeating pattern of daylight hours to show that the amount of sunlight changes predictably across different seasons.
- Observe and describe how shadows change throughout the day.
- Investigate how the position of a light source affects shadows.
- Develop models to show the Sun's path across the sky.
- Use observations of the Sun to explain predictable daytime patterns.
- Compare the amount of daylight during different seasons.
- Explore how the Sun can help people find direction.



Evidence of Learning

Summative Assessment: Unit Assessment

Equipment Needed: Mystery Science Kit

Teacher: Mystery Science Online Program

Resources:

Formative Assessments:

- Lesson activity printouts
- Think/pair/share
- Class discussions
- Teacher observation
- Lesson check-ins
- Exit Slips
- The Sun Finder Check: A modeling task where students rotate a paper sun strip to show the correct positions of sunrise in the east and sunset in the west.
- The Flashlight Shadow Target Lab: A physical performance assessment where students manipulate a light source to cast a gnome's shadow onto specific numbered zones in a sequence.
- Jada's Beach Question Log: A text-based analysis worksheet where students identify the direct cause of a shadow disappearing under a blocking canopy.
- The Horizon Directional Match: A verbal and visual check where students describe how the afternoon sun can guide a lost person back home based on daily paths.



Lesson Plans

Lesson	Time Frame
Lesson 1 Could a statue's shadow move?	2 days
Lesson 2 What does your shadow do when you're not looking?	2 days
Lesson 3 How can the Sun help you if you're lost?	1 day

Teacher Notes:

All consumable materials are in your Mystery Science Mystery Pack. This unit contains an Anchor Phenomenon, 4 lessons, and a Performance Task.

This unit requires managing light levels within the classroom. Ensure you have a reliable way to dim or turn off the main lights for the flashlight stations, and keep window shades accessible for real-time sun tracking activities.

When facilitating these lessons, guide students to focus on the relative positions of the sun, the object, and the shadow. Avoid introducing complex planetary rotation mechanics too early; focus instead on what students can directly observe from their perspective on Earth. Use consistent directional language (east and west) throughout the unit to help students build a robust mental map of the horizon. Encourage partner discussions during data collection to allow students to articulate their predictions and observations in real time.

Curriculum Development Resources/Technology Resources:

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

<https://mysteryscience.com/sun-shadows/mystery-1/sun-shadows-daily-patterns/82#slide-id-1979>

<https://mysteryscience.com/sun-shadows/mystery-1/sun-shadows-daily-patterns/82#slide-id-1981>

<https://mysteryscience.com/docs/509>

<https://mysteryscience.com/docs/234>

<https://mysteryscience.com/mini-lessons/daylight-saving-time#slide-id-17772>



Lesson Plan 1 Template

Content Area: Science Lesson Title: Could a statue's shadow move? Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display a high-contrast, time-lapse video showing 20 minutes of real gnome shadow movement compressed into 20 seconds, paired with automated station timing cues.

Equipment Needed: Handheld LED flashlights, clear tape, pre-printed shadow pattern pages with numbered target zones, printable paper gnomes (Willy), crayons, and uniform plastic connecting blocks for measuring shadow length variations.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define a shadow as a dark shape cast on a surface when an object blocks a source of light. - Students will demonstrate how moving a light source alters the position, angle, and size of a shadow while the blocking object remains stationary. - Students will simulate the sun's daily sky path by manipulating a flashlight in a chronological, numbered sequence around a fixed model.	Lesson Sequence - Phenomenon: A stone statue stands completely still and motionless in the middle of a park all day long, yet its dark shadow on the ground continuously stretches, turns, and crawls across the grass from morning until afternoon. - The Scary Shadow Discovery Hook: Students observe video clips of a toddler and a dog noticing their own dark shadows for the first time, sharing initial observations with their table partners about how	- Students will verbally define a shadow as a dark shape made on a surface when a solid object blocks a path of light. - Students will execute a physical path match, moving their flashlight to cast a shadow directly onto a designated target on their pattern page. - Students will complete their observation check, correctly noting on their worksheet that the window shadow moved while the gnome stayed still. - Students will verbally describe how the sun's



- Students will analyze evidence from time-lapse data to explain how the apparent movement of the sun causes stationary outdoor objects to cast moving shadows.

- shadows follow living things.
3. Stationary Object Challenge: The teacher introduces Willy the gnome, posing a riddle to the class: can the shadow of an object that is not alive, like a fence, a building, or a statue, move if the object itself stays perfectly still?
 4. Willy's Real-Time Shadow Tracing: The teacher sets Willy the gnome in a sunlit window frame and traces his initial shadow outline on a sheet of paper, leaving the model in place to collect data over the course of the hour.
 5. Classroom Station Preparation Loop: The teacher turns off the main classroom lights to make the environment dark, directing student groups to move to their assigned exploration stations.
 6. Model Anchor Setup: Students use tape to secure their shadow pattern worksheets flat to the desk surfaces, then tape their paper Willy gnome right in the center so he is acting as a stationary park statue.
 7. Flashlight Alignment Execution: One student holds the flashlight while partners watch the paper; they discover that the

path across the sky causes the shadows of buildings and trees to change shape during the day.



- only way to make Willy's shadow move without touching him is to actively change the position of the light source.
8. Numbered Target
Tracking: Student pairs collaborate to move the flashlight through space so that Willy's shadow precisely covers target position one, target position two, and target position three in exact numerical order.
 9. Station Rotation and Peer Observation: Students alternate roles at the station, taking turns manipulating the angle and height of the flashlight to practice creating predictable shadow changes.
 10. Window Progress
Check-In: The class gathers back around the window spot to view Willy's real shadow, discovering that the dark shape has moved away from the original pencil lines drawn at the start of class.
 11. Time-Lapse Evidence
Analysis: The teacher projects a sped-up video clip of Willy's window trial where 20 minutes of movement passes in 20 seconds, proving that the outdoor shadow crawls very slowly across the paper.



- | | | |
|--|--|--|
| | <p>12. Natural Shadow
Extension Media: The class evaluates additional time-lapse footage showing tree shadows sweeping across a yard and sunlight patches sliding across the floor of a room throughout the day.</p> <p>13. The Moving Light Source
Conclusion: The class connects their flashlight lab to the real sun, realizing that since Willy did not move, the sun must be changing its place in the sky from morning to evening.</p> <p>14. Apparent Solar
Movement Synthesis: The teacher introduces the scientific concept that the earth is actually spinning, but because humans stand on the ground, it appears as though the sun is traveling across the sky, causing every statue shadow to move.</p> | |
|--|--|--|

Differentiation:

- High-contrast yellow dots are printed on the boundary edge of the pattern sheets to show exactly where to hold the flashlight for each target.
- Pre-cut cardboard stands are provided to student pairs working on physical hand-coordination to keep the paper gnome upright without manual balancing.
- Low-intensity flashlights or soft ambient lamps are available to accommodate students who are sensitive to sudden classroom light transitions.
- Advanced students can use uniform plastic connecting blocks laid end-to-end to measure and record the exact length variations of Willy's shadow at different flashlight heights.
- Sentence frames are provided for shadow tracking analysis: "When I move the flashlight higher in the sky, Willy's shadow gets [blank] and moves toward number [blank]."

Resources Provided:



SPRINGFIELD PUBLIC SCHOOLS

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

- Mystery Science shadow tracking media suite, compressed time-lapse clips, and digital station instruction slides.
- Mystery Pack (3 printable numbered shadow tracking charts, cardstock Willy gnome cutouts, and station tracking markers).
- Handheld directional light pens, uniform measuring units, and rolls of removable binding tape.



Lesson Plan 2 Template

Content Area: Science Lesson Title: What does your shadow do when you're not looking? Time Frame: 2 days

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display interactive read-along text panels from the web application, accompanied by ambient audio clips of ocean waves to ground the story setting.

Equipment Needed: Shared print or digital copies of the read-along big book tracking Jada's beach trip, handheld pocket flashlights, opaque plastic cups, small plastic toys to act as shadow-blocking objects, and uniform plastic links to measure shadow lengths.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define the environmental conditions necessary to create a shadow, focusing on a clear light source and an open pathway. - Students will analyze evidence from a structured narrative to explain why shadows disappear when light paths are completely blocked or diffused. - Students will model characters' movements from a text to investigate how changing the	Lesson Sequence - Phenomenon: A child walking along a wide open beach can easily see a sharp, dark shadow mimicking their movements on the sand, but when they turn around or step under a large fabric umbrella, their shadow suddenly vanishes from the ground. - The Vanishing Shadow Hook: The teacher introduces Jada's beach story, setting up the mystery of how a clear	- Students will verbally define a light path as the straight route light travels from a source to a surface before it gets blocked. - Students will execute a narrative modeling task, correctly matching their physical flashlight setup to the umbrella scene in Jada's story book. - Students will complete their story question log, circling the illustration that correctly shows where Jada's shadow



position of an object relative to a light source affects visibility.

- Students will collaborate with peers to solve text-based challenges, using physical evidence to explain real-world shadow behavior.

shadow can be right in front of you one minute and completely gone the next, prompting students to share initial ideas with their partners.

3. Digital Read-Along Orientation: The teacher activates the classroom projection system to display the book introduction, establishing the collaborative read-along routine where students listen to the text and watch for visual context clues.
4. Text Section One Shared Reading: The class reads the opening pages together, tracking Jada as she plays on the open sand and explores how her dark shadow copies her running, jumping, and sand-castle building movements.
5. Physical Action Modeling: The teacher pauses the reading and prompts students to stand up in place to recreate Jada's poses, observing how their own body shapes alter light paths in the room just like the character in the book.
6. The Hidden Shadow Turning Point: The class reads the next story segment where Jada turns around and realizes her shadow is no longer visible on the sand ahead

goes when the sun is behind her.

- Students will verbally describe why stepping under a shady structure makes a personal body shadow disappear.



- of her, initiating a partner discussion to locate where the shadow went.
7. Light Source Position
Check: The teacher guides students to look at the illustrations to determine where the sun is located relative to Jada's body, helping them trace how a shadow can be cast behind a person out of their direct line of sight.
 8. The Fabric Umbrella
Transition: The class reads about Jada walking under a giant beach umbrella to get a drink of water, noticing that her clear, distinct shadow disappears entirely the moment she steps beneath the fabric canopy.
 9. Flashlight Blockade
Simulation: Students move back to their workspaces in pairs to test this scenario using a pocket flashlight, a small plastic toy figure, and an opaque plastic cup acting as the beach umbrella.
 10. Baseline Shadow
Verification: One student shines the flashlight on the toy figure to cast a sharp shadow on the desk, verifying that a strong, unobstructed light path is required to make the dark shape appear.



11. Umbrella Shield
Execution: The second student places the plastic cup directly over the toy figure, blocking the light beam and observing that the shadow on the desk surface instantly vanishes when the light cannot reach the object.
12. Text Boundary Clue
Hunting: The class returns to the digital book pages to search for illustrations that match their lab findings, identifying the specific objects that block or shade the sun's rays on the beach.
13. Narrative Conclusion
Wrap-Up: The class reads the final pages of the story to see how Jada uses her understanding of the sun to find her shadow again, completing the read-along sequence as a unified group.
14. Shadow Principles
Synthesis: The teacher closes the lesson by summarizing that a shadow doesn't run away when you aren't looking; it is always directly opposite the light source, and it only disappears if something else blocks the light first.

Differentiation:

- High-contrast yellow highlights are added to the digital read-along text to help students track key vocabulary words like sun, light, and shadow.



- Pre-spaced seating arrangements are used during the physical modeling steps to give students with spatial tracking a safe area to mimic story movements.
- Tactile textured book markers are provided to student pairs to help them quickly locate and flip to the active question pages during the reading session.
- Advanced students can use uniform plastic links laid end-to-end to measure the length of shadows cast by different story toys, comparing lengths when the light source shifts.
- Sentence frames are provided for narrative analysis: "When Jada walks under the big umbrella, the umbrella blocks the [blank] so her shadow [blank]."

Resources Provided:

- Mystery Science digital read-along book application, embedded audio tracking assets, and illustrative context slides.
- Mystery Pack (3 print versions of Jada's beach adventure book, individual character tracking cards, and text discussion tokens).
- Classroom desks, directional pocket lights, blocking cups, and non-standard measurement counters.



Lesson Plan 3 Template

Content Area: Science Lesson Title: How can the Sun help you if you're lost? Time Frame: 1 day

Lesson Components

21st Century Themes

- ☒ Global Awareness ☐ Financial, Economic, Business and Entrepreneurial Literacy
☒ Civic Literacy ☒ Health Literacy

21st Century Skills

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

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display a high-contrast, time-lapse video tracking the continuous arc of the sun from early morning dawn until late evening sunset.

Equipment Needed: Metal paper fasteners, safety scissors, pre-printed forest maps, printable paper sun tracking strips, crayons, and uniform plastic links for measuring the length of the sun's travel arc.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define the sun's apparent daily movement as a repeating, predictable pattern that shifts across the sky from east to west over time. - Students will construct a mechanical Sun Finder model to simulate the changing positions of sunrise, midday peak, and sunset. - Students will analyze how spatial orientation coordinates change relative to an observer's	Lesson Sequence - Phenomenon: A person can use the bright sun in the sky as a steady, reliable trail guide to navigate through a dense, trackless forest in the morning, yet following that exact same sun later in the afternoon leads them back home in the completely opposite direction. - The Lost in the Woods Hook: The teacher shares Doug's adventure story about getting almost lost in a thick forest without	- Students will verbally define east as the side of the sky where the sun rises and west as the side of the sky where the sun sets. - Students will execute a physical modeling task, turning their Sun Finder wheel to the exact afternoon position to match Doug's return journey. - Students will complete their directional tracing, successfully identifying which neighborhood



location between morning hours and afternoon hours.

- Students will use observations of celestial positioning to solve a real-world navigational problem and guide a lost person safely out of a forest.

any paths where all the trees look identical, prompting students to share initial survival ideas with their table partners.

3. Morning Navigation Logic Review: The class evaluates how Doug originally reached his friend's house in the morning by keeping his body walking directly toward the early morning sun, knowing his friend lived on the sunrise side.
4. The Afternoon Return Problem: The teacher poses the central riddle: after playing past lunchtime, Doug enters the forest in the afternoon to go home, but gets turned around by fallen trees and a creek, losing his straight-line path.
5. Solar Path Media Observation: The class views a sped-up video clip of the daytime sky, observing how the sun does not just go straight up and down in one spot, but actively curves across the entire horizon over the course of the day.
6. Directional Terminology Introduction: The teacher defines the scientific term east inline (the specific side of the sky where the sun rises every morning) and the scientific term west inline (the specific

house aligns with the east and west horizons.

- Students will verbally describe why following the sun in the afternoon takes you in a completely different direction than following the sun in the morning.



- opposite side of the sky where the sun sets every evening).
7. Component Supply
Distribution: Students gather their engineering materials, including the pre-printed forest landscape page, the moveable paper sun strip, safety scissors, and a metal paper fastener.
 8. Model Sub-Assembly
Cutting: Students follow the thick black guidelines to separate their handouts into two functional parts: a large baseline card showing the two neighborhood houses and a smaller tracking strip carrying the sun graphic.
 9. Fastener Pivot
Installation: Students push the sharp prongs of the metal paper fastener through the alignment holes on both sheets, flattening the metal legs on the backside so the sun strip can rotate smoothly across the horizon line.
 10. Mapping Label Tracing:
Students use their crayons to trace over the words east on the sunrise side near the friend's white house and west on the sunset side near Doug's gray house to lock in their coordinates.
 11. Simulated Solar Arc
Practice: Teams rotate



- their paper strips to practice aligning the sun with the white house to show early morning, and then sweep it across the top arc to set the sun behind the gray house to show late afternoon.
12. Navigational Partner
Discussion: Students turn to their neighbors to evaluate whether Doug should walk directly toward the afternoon sun or turn his back to it if he wants to reach his own gray house before dinner time.
13. The Westward Epiphany
Analysis: The teacher uses the models to show that because the sun traveled all the way to the west while Doug was playing, the afternoon sun is now sitting directly over Doug's home.
14. Predictable Pattern
Synthesis: The class concludes the lesson by tracking the final sun placement on their models, verifying that the repeating movement of the sun allows humans to use it as a permanent compass whenever they are lost.

Differentiation:

- High-contrast color-coded boundary lines (yellow for the morning east zone and orange for the afternoon west zone) are displayed on the board to guide model alignment.
- Pre-punched starter holes are provided on the paper sheets for student pairs working on fine-motor coordination to prevent tearing during fastener assembly.



- Large tactile arrows indicating left-to-right movement are added to the classroom chart to support students with tracking spatial transitions.
- Advanced students can use uniform plastic links laid end-to-end to measure and compare the total unit length of the morning sun arc versus the afternoon sun arc on their maps.
- Sentence frames are provided for navigational analysis: "In the afternoon, the sun moves to the [blank] side of the sky, which helps Doug find his way back to the [blank] house."

Resources Provided:

- Mystery Science navigation media reels, celestial time-lapse loops, and digital alignment guides.
- Mystery Pack (3 printable forest landscape grids, moveable sun tracking strips, and multi-colored alignment fasteners).
- Handheld safety scissors, uniform non-standard measuring units, and coloring markers.



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 Strongly 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: Science	Grade Level: 1st	Unit Title: Sun & Shadows
Created: 2026	Board Approved on: Type Here	



Unit Overview Template

Content Area: Science **Grade Level:** 1 **Unit Title:** Moon & Stars

Unit Summary: In this first-grade earth science unit, students become night sky detectives to investigate the predictable, repeating patterns that occur after the sun sets. Through hands-on modeling, time-lapse analysis, and interactive storytelling, students explore the changing appearance of the moon and the behavior of stars in the night sky. Students will discover that the moon appears to change its shape in a dependable, repeating cycle that lasts about four weeks, moving from a bright, full circle down to complete darkness before growing back again. They will also investigate the stars, learning that these distant points of light are always present in space but are temporarily outshone by the intense brightness of the sun during the day. Finally, students discover how the night sky can serve as a natural map, focusing on the unique behavior of the North Star, which remains locked in a fixed position while the rest of the sky drifts. By the end of this unit, students will be able to use these celestial patterns to describe, track, and predict changes in the world around them.

Primary Interdisciplinary Connections: ELA and Mathematics

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy

☒ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy

Unit Rationale: The night sky holds a natural sense of wonder for young children, making it an ideal platform for teaching foundational tracking and pattern-recognition skills. First graders easily notice that the moon changes shape and that stars appear at night, but they often believe these objects disappear or change randomly. This unit grounds those observations into predictable, scientific cycles. By constructing physical models and logging data, students learn that these vast, macroscopic events follow strict rules of order and consistency. Understanding that the moon's phase can predict the brightness of a night hike, or that a single unmoving star can guide a lost traveler through a dark forest, demonstrates the practical power of earth science. This structural scaffolding prepares young minds to think systematically about spatial relationships, relative motion, and the solar system, reinforcing the core idea that nature operates in beautiful, repeating patterns that can be observed and predicted.

Career Readiness (Standard 9):

9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.

9.4.2.CL.1: Demonstrate openness to new ideas.

9.4.2.CT.2: Identify possible approaches and resources to execute a plan.

9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Learning Targets

Standards: 1.ESS1

Content Statements: Earth's Place in the Universe

CPI#: **Cumulative Progress Indicator (CPI):**

1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.



1.ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.
SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. C. Ask questions to clear up any confusion about the topics and texts under discussion.
1.M.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
SEL.PK-12. 5.2	Utilize positive communication and social skills to interact effectively with others.
SEL.PK-12. 1.2	Recognize the impact of one's feelings and thoughts on one's own behavior.
SEL.PK-12. 3.2	Demonstrate awareness of the differences among individuals, groups and others' cultural backgrounds
SEL.PK-12. 3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ

Science and Engineering Practices

Planning and Carrying out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

Disciplinary Core Ideas

ESS1.A: The Universe and its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)



ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

Crosscutting Concepts

Patterns

Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

Unit Essential Questions:

- How does the moon change its shape over time, and how can we use that pattern to predict what it will look like next week?
- Where do the stars go during the daytime, and why do we see more of them when we are away from city lights?
- How can looking at a steady star in the night sky help someone find their way home when they are lost?
- When can you see the full moon?
- Why do the stars come out at night?
- How can stars help you if you get lost?
- When can you see the sun, moon, and stars?

Unit Enduring Understandings:

- The appearance of the moon changes in a predictable, repeating cycle that takes a little more than four weeks to complete.
- Stars are always present in the sky, but the intense brightness of the sun (and artificial city lights) outshines them during the day.
- While most stars appear to drift across the sky in a slow circle due to the earth's movement, the North Star remains in a fixed position, serving as a reliable cosmic compass.
- Moon phases follow a predictable, repeating pattern.
- Stars are visible at night since the sky is dark. During the daytime, the stars are still in the sky, but they are not visible.
- Constellations are patterns of stars in the sky which can be used to help you if you get lost.
- When the sky is darker, more stars can be seen in the nighttime sky.
- Different constellations can be seen during different months of the year.
- The Moon is very bright. That is why we can see it in the sky during both the day and the night.

Unit Learning Targets:

Students will....

- Sequence and describe the four-week cycle of the moon's shifting phases from full, to dark, and back to full.



- Construct a functional model to demonstrate how a dominant light source can outshine fainter points of light.
- Analyze visual evidence to explain why stars are visible in the country but hidden in bright urban centers.
- Formulate a navigation solution using clues from an interactive text to show how a stationary star indicates direction.
- Explore all of the different shapes of the Moon that can appear on different nights.
- Students observe photos of the Moon taken over the course of four weeks and draw pictures of the Moon's phases in their book.
- Use these observations to discover patterns in how the Moon's shape changes and predict when the next full moon will appear.
- Create a model of the Big Dipper and discover that it can be seen at night, but not during the day.
- Use a model to investigate why the stars are visible at night but disappear when the Sun comes out during the day.
- Use paper cups to project stars onto a sky picture, and observe what happens to these stars when a flashlight acts as a model of the Sun.
- Participate in an exercise where they imagine what they might see looking through a telescope.



Evidence of Learning

Summative Assessment: Unit Assessment

Equipment Needed: Mystery Science Kit

Teacher: Mystery Science Online Program

Resources:

Formative Assessments:

- Lesson activity printouts
- Think/pair/share
- Class discussions
- Teacher observation
- Lesson check-ins
- Exit Slips
- The Moon Phase Calendar Match: A drawing and sorting task where students sequence missing moon shapes within a weekly observation template.
- The Starmaker Sunrise Experiment: A performance check where students use a bright flashlight to outshine a projected constellation on a target board.
- The Night Sky Comparison Log: A visual assessment where students circle and explain why a countryside sky displays more visible stars than a city block.
- Ryan's Wilderness Map Escape: A scenario-based tracking activity where students draw a navigation arrow using the unmoving position of the North Star.



Lesson Plans

Lesson	Time Frame
Lesson 1 Moon Phases & Patterns- When can you see the full moon?	3 days
Lesson 2 Stars & Daily Patterns- Why do stars come out at night?	3 days
Lesson 3 Stars & Seasonal Patterns- Read Along Mystery: How Can stars help you if you get lost?	2 day

Teacher Notes:

All consumable materials are in your Mystery Science Mystery Pack.

This unit contains an Anchor Phenomenon, 3 lessons, and a Performance Task.

Preparing the classroom environment is critical for this unit. You will need a completely dark space for the Starmaker activity—ensure your window blinds block ambient light effectively, or coordinate with a dark interior space like a cafeteria or large closet if needed.

When teaching these lessons, focus strictly on observational patterns rather than deep planetary mechanics. First-grade students do not need to master the physics of tidal locking or the axial tilt of the Earth; they need to understand what can be seen and how it repeats. Keep phase vocabulary simple: "crescent moon," "half moon," and "full moon." When discussing stars, reinforce the concept that they do not travel away during the morning—they are simply masked by the sun's overwhelming glow.

Curriculum Development Resources/Technology Resources:

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

<https://mysteryscience.com/moon-stars/mystery-1/moon-phases-patterns/812#slide-id-12875>

https://www.moonconnection.com/moon_phases_calendar.phtml

<https://mysteryscience.com/docs/24864>

https://www-tc.pbs.org/seeinginthedark/pdfs/big_dipper_star_clock.pdf

<https://mysteryscience.com/moon-stars/mystery-2/stars-daily-patterns/128>

<https://mysteryscience.com/moon-stars/mystery-3/stars-seasonal-patterns/156>



Lesson Plan 1 Template

Content Area: Science	Lesson Title: Moon Phases & Patterns- When can you see the full moon?	Time Frame: 3 days
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Lesson Components

21st Century Themes

- | | |
|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display high-resolution, chronological space photographs of the moon's shifting illumination across a four-week span, paired with an automated pacing display for the step-by-step book assembly.

Equipment Needed: Safety scissors, pre-printed Moon Book layout pages, soft yarn or flexible pipe cleaners, graphite drawing pencils, multi-colored crayons, and uniform plastic connecting links to measure page dimensions.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define a cycle as a predictable series of natural events that repeats over and over again in the exact same order on a dependable schedule. - Students will construct a sequenced observation log to document how the visible, sunlit portion of the moon grows and shrinks over a four-week period. - Students will compare and contrast varying	Lesson Sequence - Phenomenon: People living thousands of miles apart in Florida, Texas, and Australia can all look up into the night sky on the exact same date and observe a perfectly round, glowing full moon, but over the next two weeks, that bright shape slowly shrinks until it vanishes completely from everyone's view before growing back into a circle. - The Global Moon Call Hook: The teacher shares	- Students will verbally define a cycle as a natural pattern that repeats over and over again in the exact same order on a regular schedule. - Students will execute a data drawing task, correctly shading the dark and bright portions of a crescent moon to match a target photograph. - Students will complete their tracking booklet, successfully sequencing the phases of the moon



moon shapes, including crescent, half, and full appearances, by analyzing pairs of lunar photographs.

- Students will use observed patterns of celestial change to predict future lunar phases and determine the optimal timing for an illuminated night hike.

Jay's story about calling family members in distant states and countries on the same night to discover they all see the exact same bright full moon shape, prompting students to discuss this shared view with their table partners.

3. Cultural Celebration
Overview: The class examines digital images of the Mid-Autumn Moon Festival, exploring how paper lanterns and sweet mooncakes are used by millions of people to celebrate the arrival of the round full moon.
4. Physical Arm Shape Simulation: Students stand up at their seats to act out the varying shapes of the moon using their arms, practicing wide round circles for a full moon, curved letters for a crescent moon, and hidden postures for a completely dark moon.
5. Predictable Schedule
Brainstorm: The teacher initiates a class discussion about events that follow a fixed schedule, prompting students to identify repeating routines like the days of the week, school years starting in fall, and annual birthdays.
6. Cycle Terminology
Introduction: The teacher

from full circle to complete darkness and back.

- Students will verbally describe how a completed Moon Book allows a scientist to predict what shape will appear in the sky next Saturday.



- defines the scientific term cycle inline (a pattern that repeats over and over again in the same order), pointing out how the sun's daily rise-and-set sequence is a perfect everyday example.
7. Component Sheet
Distribution: Students gather their bookmaking supplies, receiving the pre-printed layout pages, safety scissors, and a flexible pipe cleaner spine binding.
 8. Equal Half Book
Division: Students use their safety scissors to cut along the solid black center guideline, splitting their main handout into two equal paper halves containing different page sections.
 9. Precision Crease
Alignment: Partners work together to fold their paper sheets face-out, carefully lining up the outer boundary corners and smoothing down the folds to create crisp, durable page spines.
 10. Spine Interlocking and Stitching: Students place the star sheet directly on top of the triangle sheet, folding them like a traditional booklet before sliding a bent pipe cleaner loop through the



- center alignment holes to bind the pages together.
11. Baseline Full Moon
Outline: The teacher projects the first chronological photo showing a complete, bright circle, prompting students to write their names on the cover and trace the outer boundary line of the full moon on page one.
 12. Shaded Shadow
Progression Mapping: Students advance page by page through the digital photo set, using their pencils to outline the remaining bright crescent or half shapes and shading in the dark areas where sunlight is blocked.
 13. Opposing Crescent
Direction Comparison: The teacher pauses the class at page six to compare a new sliver moon to the earlier drawing on page four, guiding students to discover that the bright zone is now growing from the opposite side.
 14. Lunar Cycle Prediction
Synthesis: The class tracks the final photo on page eight, discovering that the moon has returned to a full, complete circle exactly four weeks later, allowing them to use their books



to forecast future moon shapes.

Differentiation:

- High-contrast shaded templates are lightly pre-printed in the booklets to assist students with physical drawing boundaries during shading steps.
- Pre-cut and pre-bent pipe cleaner fasteners are provided to student pairs working on fine-motor coordination to ensure successful book binding.
- Visual symbol cards displaying a white circle, a half circle, and a dark circle are placed on the front board to anchor phase vocabulary terms.
- Advanced students can use uniform plastic connecting blocks laid end-to-end to measure the length of the bright crescent shapes across different pages, recording the totals.
- Sentence frames are provided for phase analysis: "After the moon goes completely dark on page five, the bright part begins to get [blank] each day until it looks like a [blank] circle again."

Resources Provided:

- Mystery Science lunar photography bank, digital cycle demonstration modules, and automated pacing timers.
- Mystery Pack (3 printable Moon Book layout templates, flexible binding loops, and lunar festival culture cards).
- Classroom desks, graphite drawing pencils, safety scissors, and non-standard measuring units.



Lesson Plan 2 Template

Content Area: Science	Lesson Title: Stars & Daily Patterns- Why do stars come out at night?	Time Frame: 3 days
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Lesson Components

21st Century Themes

- | | |
|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display high-contrast photographic comparisons of urban city glows versus rural dark skies, alongside simulated solar eclipse media loops showing daytime stars.

Equipment Needed: Heavy-duty paper cups, pre-printed Big Dipper constellation templates, sharp metal pushpins, handheld LED flashlights, removable circular stickers, safety scissors, matte black backdrop paper sheets, and uniform plastic links for measuring projection beam widths.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define outshine as a scientific process where a dominant, nearby light source prevents an observer from seeing fainter, distant light points. - Students will construct a functional Starmaker cup model to project a patterned arrangement of light points mimicking a real sky constellation. - Students will simulate atmospheric lighting	Lesson Sequence - Phenomenon: Thousands of tiny, glittering stars are easily visible across the dark countryside at night, but they seem to completely vanish from the sky the moment the sun rises in the morning, even though they never actually left their spots in outer space. - The Dark Sky Astronomy Hook: The teacher shares Doug's collegiate astronomy story about driving out to the	- Students will verbally define outshine as what happens when an extremely bright light keeps you from seeing a softer, dimmer light nearby. - Students will execute a physical simulation task, moving their flashlight to make a projected constellation disappear and reappear on command. - Students will complete their star tracking chart,



transitions by combining dual light beams to replicate morning dawn and evening twilight.

- Students will analyze evidence from simulated models and real-world event data to prove that stars remain present in the sky during daytime hours.

pitch-black countryside to reveal thousands of hidden stars to his city-raised friend, prompting student pairs to discuss how many stars they can typically see from their own neighborhoods.

3. Constellation Pattern Recognition: The class reviews digital star maps to practice connecting the dots, identifying how ancient people group star arrangements into recognizable shapes like Orion the Hunter or the spoon-shaped Big Dipper.
4. The Daytime Disappearance Riddle: The teacher poses the central lesson challenge: if the stars are giant burning balls of fire in deep space, where do they go when we are eating lunch at recess?
5. Planetarium Modeling Introduction: The teacher introduces the concept of a scientific model inline (a pretend copy of a real thing used to run tests), explaining how planetarium museums project light onto ceilings to teach people about outer space.
6. Material Gathering Protocol: Students walk to the distribution counter to collect their engineering supplies,

correctly identifying whether stars are present or absent during daytime hours based on lab observations.

- Students will verbally describe why a city with bright streetlights displays fewer stars at night than an open field in the countryside.



- including a paper cup, a Big Dipper template page, a pushpin, safety scissors, and a circular alignment sticker.
7. Constellation Boundary Trimming: Students use their safety scissors to carefully cut around the circular dotted boundary lines of the Big Dipper graphic, practicing rotating the paper sheet instead of twisting the scissor blades.
 8. Template Cup Mounting: Students place a circular sticker onto the bottom base of their inverted paper cup, smoothing down the edges of the star graphic to ensure it is centered securely.
 9. Perforation Point Poking: Students place their cups flat against a protective foam block and use a pushpin to carefully poke individual light holes directly through each labeled star point on the Big Dipper template.
 10. Star Cup Calibration Trial: The classroom window shades are drawn closed and the main lights are turned off to make the room dark; students insert a flashlight into their star cup to project the Big Dipper onto their desk surfaces.
 11. Partner Role Assignments: Students



- form lab duos, assigning one teammate to act as the Starmaker (managing the constant star cup projection) and the other teammate to act as the Sunshine (operating a secondary bare flashlight).
12. Sunrise Outshining Simulation: The Starmaker projects the constellation steadily onto a printed sky scene sheet while the Sunshine partner slowly raises their bare flashlight up from the bottom edge to simulate the rising sun.
13. The Disappearing Spot Discovery: Partners observe that as the bright white sunshine beam passes directly over the projected Big Dipper points, the faint star spots instantly become invisible, proving that bright light outshines dim light.
14. Sunset Retrieval Evaluation: The Sunshine partner lowers their flashlight beam back down past the paper houses to simulate evening sunset, allowing the Starmaker's projected constellation to clearly reappear against the paper sky.
15. Role Reversal and Verification Loop: Teammates swap instruments, repeating



- the solar path trials to verify that the projected stars never stopped shining through the cup holes during the entire experiment.
16. Solar Eclipse Evidence Wrap-Up: The teacher displays a video of a total solar eclipse, showing how the sky turns completely dark at midday when the moon blocks the sun, revealing that the real stars are actually there all day long.

Differentiation:

- High-contrast bolded guide rings are printed around each target star point on the layout sheet to assist students with pushpin alignment accuracy.
- Thick-walled foam handles are wrapped around the pushpins to provide a secure, comfortable grip for students working on fine-motor hand coordination.
- Adjustable low-lumen pocket lights are available for student pairs who experience sensory sensitivity during the dark-room phases of the lab.
- Advanced students can use uniform plastic links laid end-to-end to measure the precise distance at which the sunshine beam begins to outshine the star spots.
- Sentence frames are provided for environmental lighting analysis: "The stars are in the sky during the day, but the sun is too [blank], which causes the stars to be [blank]."

Resources Provided:

- Mystery Science constellation mapping software, dark-sky projection videos, and total solar eclipse media clips.
- Mystery Pack (3 printable sky scene backdrops, Big Dipper template stamps, and specialized mounting rings).
- Handheld LED focus lights, safety piercing pins, structural paper cups, and non-standard measuring blocks.



Lesson Plan 3 Template

Content Area: Science	Lesson Title: Stars & Seasonal Patterns- Read Along Mystery: How Can stars help you if you get lost?	Time Frame: 2 days
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Lesson Components

21st Century Themes

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|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display the interactive read-along text modules from the online portal, synched with rotating digital sky charts that simulate the evening's celestial movement.

Equipment Needed: Shared print or digital copies of Ryan's camping adventure read-along book, handheld focus flashlights, large sticky notes, glow-in-the-dark star stickers, a classroom globe or spinning pivot stool, and uniform plastic links to measure star chart boundaries.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define the North Star (Polaris) as a unique celestial body that appears to remain stationary in the night sky while other stars change positions. - Students will analyze text-based clues and illustrations to explain how a permanent sky fixture can be used for	Lesson Sequence Phenomenon: A family sitting around a crackling campfire notices that as the night goes on, the moon shifts across the treetops and most constellations slowly drift sideways through the dark sky, yet one single, steady star stays perfectly locked in the exact same spot above the horizon all night long.	- Students will verbally define the North Star as the one special star in the sky that stays in the same place all night long. - Students will execute a narrative tracking task, pointing directly to the unchanging central star on an interactive digital sky chart. - Students will complete their story map log, drawing a straight arrow



directional navigation at night. • Students will model the earth's rotation relative to a fixed point to investigate why most stars appear to move while one remains in place. • Students will collaborate in teams to solve a situational narrative problem, using evidence from a text to guide characters out of a dark environment.	2. The Backyard Telescope Hook: The teacher introduces Ryan's camping story, setting up the mystery of a special star discovered by Ryan and his dad that doesn't seem to play by the same movement rules as the rest of the sky, prompting students to share initial thoughts with their table partners. 3. Digital Read-Along Integration: The teacher launches the digital projector system to display the book's title page, outlining the interactive reading protocol where students look closely at background illustrations for navigational clues. 4. Text Section One Shared Reading: The class reads the opening pages together, following Ryan as he packs his camping gear, drives out to a dark campsite with his dad, and sets up a telescope away from bright city lights. 5. Campfire Sky Pattern Tracking: The class reads about Ryan pointing his telescope upward at dusk, noting down how the general fields of stars look like giant patterns of dots spread out across the dark forest canopy. 6. Physical Pivot Simulation: The teacher	from the lost characters directly toward the northern star marker. • Students will verbally describe how an unchanging point in the sky can act as a permanent compass for someone walking through a forest at night.
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stops the reading and has students stand up in an open space, instructing them to find a single spot on the ceiling to represent the North Star while they slowly spin their bodies in a circle to experience how the rest of the room appears to rotate around that fixed point.

7. Text Section Two
Evidence Hunting: The class reads the middle segment of the book where Ryan's dad explains that while the spinning of the earth makes most stars look like they are drifting in a big circle, one star sits directly above the earth's top axis point.
8. Directional Coordinate Labeling: The teacher defines the scientific term North Star inline (the steady star in the northern sky that stays in the same place all night and points the way north), guiding students to locate it on their reading panels.
9. The Wilderness
Disorientation Turning Point: The class reads about Ryan and his dad walking down a dark trail away from their tent to look for nocturnal animals, eventually losing track of the main path as the woods grow dark.



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|--|---|--|
| | <p>10. Flashlight Constellation Mapping: Students return to their design spaces in pairs to simulate Ryan's view using a pocket flashlight and a paper star map page taped to the wall carrying a hidden North Star marker.</p> <p>11. Fixed Position Verification: One student shines their flashlight on the map and slowly tilts the page in a slow circle to mimic general star drift, while their partner uses a finger to track the single central star hole that stays completely still during the movement.</p> <p>12. Navigational Trail Matching: The class returns to the digital book illustrations to find out how Ryan uses the steady position of the North Star to determine which way is north, allowing him and his dad to match their compass direction back to their campsite map.</p> <p>13. Narrative Resolution Read-Through: The class reads the final pages of the text to see Ryan and his dad follow the steady star directly back to their lit campfire, successfully completing the story journey as a group.</p> <p>14. Celestial Compass Synthesis: The teacher closes the lesson by</p> | |
|--|---|--|



summarizing that just like the sun helps humans find east and west during the day, the unchanging position of the North Star allows lost travelers to find their way home throughout the night.

Differentiation:

- High-contrast blue arrows are added to the digital book panels to help students identify the North Star within busy constellation drawings.
- Pre-printed tactile raised dots are added to the student map pages to assist pairs working on physical tracking needs to locate the center rotation point easily.
- Large directional wall posters (North, South, East, West) are displayed around the room to anchor student movements during the physical pivot exercises.
- Advanced students can use uniform plastic links laid end-to-end to measure the distance between the Big Dipper pointer stars and the North Star on their chart layouts.
- Sentence frames are provided for narrative navigation analysis: "While the other stars looked like they moved in a circle, the [blank] Star stayed still, which helped Ryan find the direction of [blank]."

Resources Provided:

- Mystery Science story navigation software, automated digital sky charts, and wilderness path illustrations.
- Mystery Pack (3 print copies of Ryan's camping book, constellation tracking sheets, and reflective orientation tokens).
- Classroom space, pocket focus lights, removable mounting tape, and non-standard measuring tools.



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 Strongly 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: Science	Grade Level: 1st	Unit Title: Moon & Stars
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Created: 2026	Board Approved on: Type Here
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Unit Overview Template

Content Area: Science **Grade Level:** 1 **Unit Title:** Lights & Sounds

Unit Summary: In this first-grade physical science and engineering design unit, students become dynamic foley artists and communications engineers to explore the fundamental principles of light and sound waves. Students begin by pulling back the curtain on the entertainment industry, discovering that sounds are caused by rapid back-and-forth movements called vibrations. By plucking rulers and manipulating bodily percussion, they learn how to control these vibrations to sync custom audio effects with silent animations. Students then transition to investigating light, diving into how it travels and interacts with the world around them. Through the creation of sunlit stained-glass window designs, they categorize everyday materials as transparent, translucent, or opaque based on how much light passes through them. The unit culminates in an engineering design challenge where students synthesize their knowledge to solve a real-world problem: how to transmit secret messages across a distance without using sound. By building, testing, and refining a custom, color-coded optical signaling system, students prove that both light and sound can be systematically manipulated to share information.

Primary Interdisciplinary Connections: Mathematics and ELA

21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy
☒ Information Literacy ☒ Life and Career Skills ☒ Communication and Collaboration ☒ Media Literacy

Unit Rationale: Light and sound are invisible forms of energy that first-grade students interact with constantly, yet they rarely analyze them as measurable phenomena. This unit bridges that gap by anchoring abstract physics and engineering concepts into highly relatable, concrete experiences like cartoons, windows, and traffic signals. Understanding how vibrations function shifts students from passive consumers of media to active, scientific investigators who can trace a clear cause-and-effect loop from mechanical motion to auditory perception. Similarly, classifying materials by their light-transmission properties provides a tactile foundation for understanding how light behaves when it hits a boundary. By concluding with an explicit engineering design task, this unit demonstrates the practical, human application of science. Students learn that technology is not magic; it is the purposeful organization of materials and physical patterns designed to solve human problems, such as communicating across distances.

Career Readiness (Standard 9):

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
9.4.2.CI.1: Demonstrate openness to new ideas.
9.4.2.CT.3: Use a variety of thinking to solve problems (e.g., inductive, deductive)

Learning Targets

Standards: 1-PS4; K-2-ETS1

Content Statements: Waves and their Applications in Technologies for Information Transfer; Engineering Design

CPI#: **Cumulative Progress Indicator (CPI):**



1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
1-PS2-1	Make observations to construct an evidence-based account that objects can be seen only when illuminated.
1-PS4-3	Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
1-PS4-4	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. A. Follow agreed-upon norms for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. C. Ask questions to clear up any confusion about the topics and texts under discussion.
1.M.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.
SEL.PK-12.1.2	Recognize the impact of one's feelings and thoughts on one's own behavior.
SEL.PK-12.3.2	Demonstrate awareness of the differences among individuals, groups and others' cultural backgrounds
SEL.PK-12.3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1), (1-PS4-3)

Constructing Explanations and Designing Solutions



Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Disciplinary Core Ideas

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3)

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions, such as climate change, to other people. (K-2-ETS1-2)

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1), (1-PS4-2), (1-PS4-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science, on Society and the Natural World

- People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)



Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Unit Essential Questions:

- What is a vibration, and how can we change an object's physical shape or position to alter the sound it makes?
- What happens to a beam of light when it encounters transparent, translucent, or opaque materials?
- How can we use light or sound patterns to build a functional communication tool that sends a message far away?
- How do they make silly sounds in cartoons?
- What if there were no windows?

Unit Enduring Understandings:

- Sounds are produced exclusively by vibrating materials, and changing how a material vibrates alters the sound we hear.
- Objects can only be seen when they are illuminated by light, and different materials block, scatter, or allow that light to pass through completely.
- Humans intentionally design and build devices that utilize light and sound patterns to communicate across distances and coordinate human activity.
- Vibrating materials make sound and sound can make materials vibrate.
- Objects can be seen only when they are illuminated.
- Sound or light are used to communicate over a distance.

Unit Learning Targets:

Students will....

- Plan and conduct investigations demonstrating that plucking or striking an object creates a vibration that produces sound.
- Classify diverse everyday materials into transparent, translucent, and opaque categories based on visual light transmission.
- Construct a physical model to observe how layering translucent materials alters light intensity and creates new color mixtures.
- Design, build, and test a device that uses a color-coded light code to communicate specific instructions to a receiver across a room.
- Investigate vibrations as a source of sound effects for movies.
- Classify objects as opaque, transparent or translucent.
- Practice using light to communicate information.



Evidence of Learning

Summative Assessment: Unit Assessment

Equipment Needed: Mystery Science Kit

Teacher: Mystery Science Online Program

Resources:

Formative Assessments:

- Lesson activity printouts
- Think/pair/share
- Class discussions
- Teacher observation
- Lesson check-ins
- Exit Slips
- The Cartoon Sound Foley Check: A performance-based calibration where students pluck a ruler at specified lengths to match the visual rhythm and changing intensity of an on-screen bouncing ball.
- The Eye-Line Visibility Sorting Board: A material-classification task where students peer through unknown samples to sort them into transparent, translucent, and opaque stations.
- The Overlapping Light Transmission Grid: An artistic analysis where students evaluate how stacking sheets of colored tissue paper restricts passing light and shifts primary colors into secondary colors.
- The Secret Code Light Signal Test: An engineering design assessment where student pairs use handheld lights and custom paper filters to transmit and execute silent behavioral commands across a distance.



Lesson Plans

Lesson	Time Frame
Lesson 1 Sounds & Vibrations - How do they make silly sounds in cartoons?	1 day
Lesson 2 Light, Materials, Transparent & Opaque - What if there were no windows?	2 days
Lesson 3 Light, Communication, & Engineering - How could you send a secret message to someone far away?	1 day

Teacher Notes:

Most lesson resources can be found in the Mystery Pack. For lesson 1, wooden rulers are needed. For lesson 2, the teacher must find examples of opaque, transparent and translucent materials.

This unit relies heavily on alternating ambient room light. Ensure your classroom is equipped with easily managed window shades or have a designated "dark lab" zone ready for the light transmission and signaling labs.

When conducting the sound experiments, expect a high-energy, noisy classroom environment. Embrace the noise by establishing clear visual cues—such as holding up a physical stop sign—to instantly signal students to damp their vibrating instruments and return to a silent, listening posture. Emphasize the connection between form and function during the engineering phase; push students to explain why a direct, flush flashlight placement yields a cleaner signal than an angled, distant beam.

Curriculum Development Resources/Technology Resources:

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

<https://mysteryscience.com/light/mystery-5/light-communication-engineering/131>

<https://mysteryscience.com/light/mystery-3/light-materials-transparent-opaque/106#slide-id-0>

<https://mysteryscience.com/light/mystery-1/sounds-vibrations/105>



Lesson Plan 1 Template

Content Area: Science	Lesson Title: Sounds & Vibrations - How do they make silly sounds in cartoons?	Time Frame: 1 day
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Lesson Components

21st Century Themes

- | | |
|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display silent cartoon clips of a bouncing ball and stormy weather, paired with on-screen visual prompt icons to guide student sound effect synchronization.

Equipment Needed: Rigid plastic or wooden rulers, sturdy flat tables, pre-printed storm sequence visual charts, safety stop signs on sticks, and uniform plastic connecting links to measure how far rulers overhang the table edge.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define a vibration as a rapid, back-and-forth movement of an object that creates a sound. - Students will construct a physical sound effects simulation to replicate the changing intensity of a natural rainstorm using bodily percussion. - Students will manipulate the overhang length of a rigid ruler to investigate how changing a vibrating object's physical	Lesson Sequence - Phenomenon: When a heavy rubber ball bounces up and down in a cartoon, it doesn't make a standard thudding noise on the ground, but instead lets out a hilarious, vibrating "boing" sound that matches its movement perfectly. - The Silly Sound Discovery Hook: The teacher demonstrates how everyday objects can make unexpected noises,	- Students will verbally define a vibration as a quick back-and-forth motion that produces a sound. - Students will execute a rhythmic sound-match task, plucking their rulers in perfect coordination with an on-screen cartoon ball bounce. - Students will complete their storm checklist, successfully transitioning their physical body



dimensions alters its sound.

- Students will collaborate with a partner to synchronize custom audio effects with a moving visual animation in real time.

sharing video clips of professional sound effect artists using a loose metal Slinky to create spaceship laser beams and a vibrating metal sheet to make thunder.

3. Behind-the-Scenes Audio Orientation: The teacher explains that artists create every single voice and noise heard in cartoons, showing an overlay clip of an actor recording character dialogue to introduce the concept of sound design.
4. The Back-and-Forth Movement Riddle: The teacher poses a challenge: how can a flat ruler make the funny "boing" sound of a cartoon bouncing ball?
5. Vibration Vocabulary Introduction: The teacher defines the scientific term vibration inline (a rapid back-and-forth movement that creates sound), illustrating how a door spring shakes when plucked.
6. The Rainstorm Soundscape Briefing: The teacher instructs students to close their eyes and listen to an audio recording of a real storm, tracking how it transitions from gentle wind to heavy downpours and loud thunder before clearing up.

sounds to match a moving weather timeline.

- Students will verbally describe how changing the length of a ruler sticking off a table changes the type of sound it makes.



7. Bodily Percussion
Practice Loop: Students stand at their desks to practice physical rain storm sounds following the teacher: rubbing hands for wind, tapping two fingers for light rain, clapping hands for heavy rain, and stomping feet for a pouring storm.
8. Animated Storm
Synchronization: The teacher projects a silent video of a gathering storm; students act as a unified sound effects team, changing their physical movements in real time as the on-screen weather alters.
9. Ruler Soundboard Setup:
Students return to their tables and receive a rigid ruler, learning how to press one end flat against the table surface while leaving the opposite end hanging off into mid-air.
10. The "Boing"
Experimentation Trial:
One student holds the table base secure while their partner plucks the free end of the ruler, observing how it shakes rapidly back and forth to create a cartoon bouncing noise.
11. Overhang Measurement
Calibration: Students use uniform plastic links laid end-to-end to measure and alter how much of the ruler sticks off the



- table, testing how a long overhang makes a deep sound while a short overhang makes a high sound.
12. **Cartoon Bounce**
Match-Up: The teacher loops a silent clip of a bouncing ball; students track the visual rhythm, plucking their calibrated rulers every single time the ball hits the digital floor.
13. **The Stop Sign Control**
Test: The teacher introduces a visual stop sign cue at the end of the video loop, requiring students to instantly damp their vibrating rulers with their hands to make the audio stop exactly when the ball finishes moving.
14. **Sound Effects Synthesis**
Wrap-Up: The class reflects on their trials, concluding that sounds are caused by items vibrating back and forth, and that humans can alter those vibrations to create a huge variety of custom noises.

Differentiation:

- High-contrast colored tape lines are placed on the activity tables to show exactly where to align the base of the ruler for a successful trial.
- Thick foam grip blocks are provided to place over the table-bound end of the ruler, helping students with limited hand grip strength hold it steady.
- Noise-dampening headphones are available for students who experience sensory discomfort during the loud, collective foot-stomping phases of the storm simulation.
- Advanced students can use uniform plastic links to measure and record the exact lengths that create the highest and lowest pitches, graphing the results.



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- Sentence frames are provided for vibration analysis: "When I pluck the ruler, it moves quickly [blank] and [blank], which creates a cartoon [blank] sound."

Resources Provided:

- Mystery Science cartoon soundboard software, silent animation loops, and professional foley artist demonstration reels.
- Mystery Pack (3 sets of weather sequence prompt cards, miniature handheld cue signs, and custom alignment stickers).
- Classroom work tables, rigid tracking rulers, and non-standard plastic measurement links.



Lesson Plan 2 Template

Content Area: Science	Lesson Title: Light, Materials, Transparent & Opaque - What if there were no windows?	Time Frame: 2 days
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Lesson Components

21st Century Themes

- | | |
|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display a video demonstration of raw sand melting in an ultra-hot oven into liquid glass, paired with electronic sorting mats for material categorization.

Equipment Needed: Clear plastic transparency sheets, squares of colored tissue paper, thick cardboard pieces, pre-printed flower frame templates, clear contact sticky paper, and uniform plastic links to measure the dimensions of the artwork frames.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define the three scientific categories of light transmission: transparent (completely see-through), translucent (kind of see-through), and opaque (not see-through). - Students will categorize a variety of everyday objects and materials based on their ability to let light pass through them.	Lesson Sequence: - Phenomenon: Sunlight streams easily through a clear glass windowpane to illuminate a classroom, but when the same light hits a solid wooden door, it blocks the beam entirely and casts a dark shadow, while passing through a sheet of colored tissue paper creates a soft, blurry glow. - The Missing Glass Hook: The teacher prompts	- Students will verbally define translucent as a description for a material that lets some light through but makes objects look blurry. - Students will execute a sorting task, correctly placing a plastic sheet, a piece of cardboard, and a piece of tissue paper into three distinct light-behavior categories. - Students will complete their window flower



• Students will construct a model stained-glass window using translucent materials to investigate how light behaves when passing through layered barriers. • Students will analyze visual changes in light brightness and color blending when multiple translucent sheets overlap in a sunlit path.	students to imagine waking up in a world with no windows or car windshields where everything is dark and drivers must stick their heads out into the wind, inviting partners to discuss how daily life would change. 3. Historical Window Timeline: The class tracks how ancient houses lacked glass, moving from dark stone walls to the discovery of flaky mica rocks that served as the very first blurry windows before modern glass making was invented. 4. The Sand-to-Glass Revelation: The teacher projects video footage showing sand melting into glowing liquid lava in a super-heated oven, revealing how it cools into hard, completely see-through windowpanes. 5. Vocabulary Definition Loop: The teacher introduces three scientific terms inline: transparent (completely see-through, letting light pass perfectly), translucent (kind of see-through, making shapes look blurry), and opaque (not see-through, blocking light entirely). 6. Material Sorting Challenge: Student	project, successfully demonstrating how translucent sheets interact with real sunlight. • Students will verbally describe what happens to light when it hits an overlapping section of two tissue paper squares.
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- groups receive a collection tray of unknown items (cardboard, clear plastic, tissue paper, wood splints) and three sorting mats labeled with the new vocabulary terms.
7. The Eye-Line Visibility Test: Students hold each material up to their eyes to look at a partner, determining if they can see their teammate clearly (transparent), blurrily (translucent), or not at all (opaque), then placing the object on the matching mat.
 8. Artistic Medium Briefing: The teacher introduces the stained-glass window project, explaining that while modern buildings use transparent glass, artists use translucent colored segments to control and beautify indoor light paths.
 9. Canvas Framework Setup: Students return to their design spaces and place a pre-printed cardstock flower outline flat on the desk, matching it to a sheet of clear contact paper laid sticky-side-up over the template.
 10. Translucent Mosaic Application: Students select varied squares of colored tissue paper, pressing them firmly onto the sticky contact



- paper surface to fill the interior zones of their flower design.
11. Layer Layering
Observation: The teacher prompts students to intentionally overlap two different colors of tissue paper in specific zones, encouraging them to observe what happens to the visibility in those thick intersections.
 12. Window Presentation
Mount: The teacher helps students peel their completed sticky artworks from the guide sheets and presses them directly against a sunlit classroom windowpane.
 13. Sunlight Transmission
Synthesis: The class evaluates the glowing gallery, discovering that the single tissue layers let bright colored light through, while the double-layered overlapping zones block more light and blend into brand new secondary colors.

Differentiation:

- High-contrast bold outlines are printed on the flower templates to assist students with visual tracking needs as they position their paper pieces.
- Pre-peeled corners on the contact paper backings are provided to student pairs working on fine-motor manipulation challenges to ensure easy assembly.
- Large-print tactile classification labels are affixed to the sorting mats, using textured surfaces to reinforce the terms transparent, translucent, and opaque.
- Advanced students can use uniform plastic links laid end-to-end to measure the length and width of their stained-glass art panels, recording the surface area covered.
- Sentence frames are provided for material analysis: "The tissue paper is [blank] because it lets some light through, but the cardboard is [blank] because it blocks the light."



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Resources Provided:

- Mystery Science molten sand video clips, light behavior interactive slides, and historical architecture portfolios.
- Mystery Pack (3 pre-cut flower frame templates, transparent sorting sheets, and multi-colored translucent paper bundles).
- Classroom window space, transparent contact rolls, safety scissors, and non-standard sorting units.



Lesson Plan 3 Template

Content Area: Science	Lesson Title: Light, Communication, & Engineering - How could you send a secret message to someone far away?	Time Frame: 1 day
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Lesson Components

21st Century Themes

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|--|---|
| ☒ Global Awareness | ☐ Financial, Economic, Business and Entrepreneurial Literacy |
| ☒ Civic Literacy | ☒ Health Literacy |

21st Century Skills

- | | | |
|---|---|--|
| ☒ Creativity and Innovation | ☒ Critical Thinking and Problem Solving | ☒ Information Literacy |
| ☒ Life and Career Skills | ☒ Communication and Collaboration | ☒ Media Literacy ☐ ICT Literacy |

Interdisciplinary Connections: ELA and Mathematics

Integration of Technology: Digital classroom projection system to display interactive traffic signal prompt cards and dynamic color-changing timers, paired with ambient street-crossing audio sounds to simulate an active roadway environment.

Equipment Needed: Heavyweight paper code sheets containing pre-printed guide circles, thick dual-tip markers (red, green, blue), handheld focus flashlights, black privacy cardboard dividers, and uniform plastic links to measure flashlight signaling distances.

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - Students will identify and define communication as a scientific process where a sender uses light or sound signals to transmit a specific message to a receiver across a distance. - Students will construct a custom three-part color code key by pairing individual colored light filters with unique physical motor actions.	Lesson Sequence - Phenomenon: A driver sitting inside a quiet car can look through the front windshield and immediately know whether to press the gas pedal or stomp on the brakes simply by observing a distant, silent glass lens change from a glowing green color to a bright red color. - The Long-Distance Chat Hook: The teacher	- Students will verbally define communication as using signals like light or sound to send a message to someone far away. - Students will execute an optical decoding task, performing the correct physical action that matches a partner's projected color beam. - Students will complete their secret code worksheet, successfully



- Students will manipulate a handheld flashlight's distance from a translucent paper sheet to determine the optimal position for casting a clear, recognizable color beam.
- Students will collaborate with a partner to decode and execute physical actions in real time using long-distance optical signals.

- introduces the history of communication, showing images of giant 1980s brick cell phones and contrast-mapping how early generations had to wait days for paper letters to arrive, prompting partners to discuss how they talk to far-away relatives today.
3. The Silent Signal Challenge: The teacher poses a design problem: how can you tell a friend a secret message across a busy, noisy street at night without knocking on doors or waking up a sleeping baby?
 4. Traffic Light Message Analysis: The class reviews real-world optical codes, analyzing how a green light communicates "go," a red light communicates "stop," and a yellow light communicates "slow down and prepare to stop" to drivers.
 5. The Vroom-Engine Movement Simulation: Students stand up in open spaces to play a reaction game, holding imaginary steering wheels and making quiet engine noises while executing physical responses (running in place, slowing down, freezing) to changing on-screen color blocks.

- linking three distinct colors to three distinct, repeatable movement rules.
- Students will verbally describe how a sender can create more than three messages using only three colors by adding a flashing or alternating sequence pattern.



6. Code Key Handout
Distribution: Students return to their collaborative lab spaces to receive their paper coding sheets, marking trays, and independent focus lights.
7. Circle Filter Saturation:
Students select red, green, and blue markers to completely color in the three blank circles on their code sheet, pressing firmly to heavily saturate the paper fibers so the sheets act as custom translucent light filters.
8. Secret Message
Assignment: Partners deliberate to invent custom meanings for each color block, writing their selected action instructions (e.g., hop on one leg, bark like a dog, wave hands) directly next to the matching color circle.
9. Beam Calibration Trials:
Students activate their flashlights and practice shining the light beams through the back of their colored circles, adjusting the flashlight closer and farther away to discover that pressing the light directly against the paper projects the brightest colored signal.
10. Long-Distance Station
Setup: The classroom windows are covered and the main lights are



- turned off; partners split up and march to designated markers on opposite sides of the room, taking their code sheets and flashlights with them.
11. The Sender Transmission Phase: One student takes the role of the Sender, placing their flashlight behind a chosen colored circle to project a glowing red, green, or blue signal beam across the dark room toward their teammate.
 12. The Watcher Decoding Execution: The second student acts as the Watcher, observing the colored light glow from across the room, checking their matching code sheet, and instantly performing the correct secret movement.
 13. Role Reversal Verification: Teammates swap signaling duties, executing three distinct color transmission trials each to verify that custom light signals can reliably transfer instructions without using sound.
 14. Sky Projector Symbol Synthesis: The teacher closes the lesson by sharing the historical story of the cloud-shining sky projector invention and the fictional Batman bat-signal, illustrating how humans use shaped



stencils over giant lights
to communicate
messages to an entire
city.

Differentiation:

- Pre-darkened high-contrast boundary circles are provided on the worksheets to help students with spatial orientation tracking keep their markers inside the boundaries.
- Easy-click push-button flashlights are distributed to student pairs working through fine-motor finger joint challenges to ensure stress-free beam activation.
- Large, color-coded reference posters are hung on the side walls to give students a quick visual reminder of their partner's matching action codes during the dark-room trial.
- Advanced students can use uniform plastic links laid end-to-end to measure how far their colored light beam can travel before the color becomes too faint to decode, recording the distance.
- Sentence frames are provided for code analysis: "When my partner shines the flashlight through the blue circle, the light looks [blank] and communicates that I should [blank]."

Resources Provided:

- Mystery Science traffic simulator software, historic sky-projector design logs, and optical signaling video prompts.
- Mystery Pack (3 print versions of the secret action layout sheets, non-bleeding marker sets, and station boundary stickers).
- Classroom space, focus beam flashlights, and non-standard measurement counters.



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 Strongly 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: Science

Grade Level: 1st

Unit Title: Lights & Sounds

Created: 2026

Board Approved on: Type Here



SPRINGFIELD PUBLIC SCHOOLS

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

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR EARLY CHILDHOOD AND ELEMENTARY SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
Review of directions
Use of mnemonics
Have student restate information
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Use of a study carrel
Assistance in maintaining uncluttered space
Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Use of manipulatives
No penalty for spelling errors or sloppy handwriting
Follow a routine/schedule
Alternate quiet and active time
Teach time management skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Adjusted assignment timelines
Visual daily schedule



SPRINGFIELD PUBLIC SCHOOLS

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

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Untimed tests
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book tests
Read test and directions to student
Provide study outline prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator and/or number line for math tests
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS MODIFICATIONS:



SPRINGFIELD PUBLIC SCHOOLS

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

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Have parent sign behavior chart
Set and post class rules
Chart progress and maintain data



SPRINGFIELD PUBLIC SCHOOLS

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

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR MIDDLE AND HIGH SCHOOL STUDENTS:

- Large print textbooks
- Textbooks for at-home use
- Additional time for assignments
- A locker with adapted lock
- Review of directions
- Review sessions
- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Adaptive writing utensils
- Support auditory presentations with visuals
- Weekly or bi-weekly home-school communication
- Space for movement or breaks
- Study sheets and teacher outlines
- Extra visual and verbal cues and prompts
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of tape recorder for lectures
- Use of Interactive notebook
- Use of a scribe
- Use of computers and calculators
- Books on tape
- Graphic organizers
- Quiet corner or room to calm down and relax when anxious
- Preferential seating
- Alteration of the classroom arrangement
- Reduction of distractions
- Answers to be dictated
- Hands-on activities
- Ability to type all assignments
- Follow a routine/schedule
- Teach time management and organizational skills
- Rest breaks
- Verbal and visual cues regarding directions and staying on task
- Agenda book and checklists
- Daily check-in with case manager or special education teacher
- Adjusted assignment timelines
- Visual daily schedule



SPRINGFIELD PUBLIC SCHOOLS

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

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book or open-note tests
Read test and directions to student
Provide study guides prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Pace long-term projects
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Allow outlining, instead of writing for an essay or major project
Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator for math tests
Film or video supplements in place of reading text
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands



SPRINGFIELD PUBLIC SCHOOLS

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

Pass/no pass option
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS FOR STUDENTS:

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Set and post class rules
Chart progress and maintain data



Accommodations and Modifications for ESL Students

- Give tests orally
- Give instructions/directions in writing and orally
- Assign a peer tutor, same language or English speaking
- Allow use of bilingual/translation dictionary
- Provide summaries of text or study guides of particular chapters
- Allow errors in speaking
- Allow errors in writing
- Accept writing in first language
- Highlight key vocabulary
- Reduce amount of work required
- Assess comprehension through demonstration or other alternative means (gestures, drawings)
- Rephrase questions, directions, and explanations
- Reduce multiple choices on assessments
- Provide study guides and/ or outlines
- Shorten reading assignments
- Allow extended time for test/project completion
- Use of audio books
- Use of graphic organizers
- Use reduced text, so that print is not dense
- Use visuals/pictures throughout lesson/unit/assignment
- Adapt homework to reflect language proficiency/home support
- Adapt homework to reflect home support
- Provide hands-on activities and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Use of translation dictionaries to locate words in the native language
- Use anecdotal records and portfolio of work as forms of assessment
- Use story retellings to assess comprehension

What Does the Gifted and Talented Experience Look Like?

Springfield Public Schools

Mission Statement

The Gifted and Talented Program of the Springfield Public Schools aims to provide a meaningful and rigorous education that instills the value of lifelong learning and empowers all students to reach their full potential and become self-fulfilled creative leaders in accordance with the comprehensive standards of our state. We accomplish this by offering challenging, real-world experiences in a student-centered environment.

We recognize that students come from diverse socioeconomic, cultural, and ethnic backgrounds, and the mission of the gifted and talented program is to provide opportunities for students to explore their intellectual, creative, and artistic gifts and talents within the classroom and with beyond-the-classroom experiences. It is essential to provide diverse, appropriate, and ongoing learning experiences and environments that incorporate students' academic, psychological, and social needs. Our responsibility is to provide students with educational alternatives that teach, challenge, and expand their knowledge, while simultaneously stressing the development of independent and self-directed learners who continuously generate questions, analyze, synthesize, and evaluate information and ideas.

New Jersey Administrative Code 6A:8-3.1 defines students who are gifted and talented as those students who possess or demonstrate high levels of ability in one or more content areas when compared to their chronological peers in the local district and who require modification of their educational program if they are to achieve in accordance with their capabilities.

Goals:

To support our mission, we have established the following goals to guide our work:

- To infuse into the general education program a broad range of activities for high-level learning that will challenge all students to perform at advanced levels, and provide extended opportunities, resources, and support in particular areas where student interest or talent is demonstrated.
- To provide a continuum of gifted education services that will strengthen the total school program, offer enriching and challenging learning opportunities for all students, and provide specialized learning experiences
- To promote achievement of students' best potentials and increased ability.

Through a productive and collaborative relationship among the building principals, classroom teachers, and the Gifted and Talented teacher, our schools can create programming that will enhance the learning experience for every student and serve the unique and specialized needs of students currently demonstrating gifted behaviors.

Elements of the Schoolwide Enrichment Model, W.I.N (What I Need), differentiated instruction, advanced classes, or individual programs into a student's regular instruction program are integral to this overarching framework for gifted education in the Springfield School District.

Reference Board Policy and Regulation 2464 – Gifted and Talented Pupils (M)

Early Childhood Center **Edward V. Walton**

Schoolwide Virtual Enrichment

All first and second grade students have access to the [Gifted and Talented Virtual Classroom](#). This virtual classroom is a space for students to complete various challenges and enrichment opportunities at their own pace. Students can receive feedback and additional adaptable resources to meet their individual learning needs. The virtual classroom design expands accessibility to enrichment resources and allows students to choose learning activities according to their unique interests and abilities. The purpose of the activities is to encourage problem-solving, develop critical thinking

skills, and expand curiosity and imagination. Activities are aligned to the New Jersey Student Learning Standards.

Gifted and Talented Teacher as a Resource

The Gifted and Talented teacher serves as a resource to all teachers within Edward V. Walton School. Teachers seeking resources for their high-ability learners will receive additional support from the Gifted and Talented teacher in various ways. This support may include additional units of study, challenging resources, and student projects.

Elementary Schools

James Caldwell

Thelma L. Sandmeier

The goal is to engage small groups of students in intensive learning experiences through standards-based, rigorous, and relevant units of study that supplement, not supplant, the grade-level curriculum and support students' unique learning needs.

Enrichment Experience Grade 3

Beginning in third grade, the G&T teacher will cycle through all classrooms to work on problem-solving and enrichment tasks with students. Driven by assessment data, academic performance, student interest, and teacher observation, small groups of students will meet with the G&T teacher during W.I.N. (What I Need) periods throughout the week that the teacher is assigned to their classroom teacher. Groupings will be flexible and monitored to best meet each student's needs throughout the school year. Activities will include brain teasers, puzzles, strategic thinking, problem-solving, and STEM challenges.

Targeted Gifted and Talented Programing Grades 4-5

Students may become identified as Gifted and Talented in fourth grade. Students that are identified may receive support from the G&T Teacher for up to five periods (200 minutes) a week during W.I.N. (What I Need) periods. Identified students will meet to explore grade-level content while incorporating depth and complexity in a student-centered, problem-based environment. The Gifted and Talented Program aims to provide students with various advanced and challenging learning experiences across content areas to promote independent thinking skills, refine critical thinking and communication skills, cultivate joy in learning, and expand student interests through problem-solving. The instruction that students receive incorporates 21st Century Skills and advanced content that is challenging, hands-on, and relevant to the real world.

Strategies and Practices that Support Gifted and Talented Students

- Adjusted Pace of Lessons
- Inquiry-Based Instruction
- Higher-Order Thinking Activities
- Interest-Based Content
- Real World Problem Solving/Problem Based Learning
- Independent Study/Passion Projects
- Units of Study with Like-Minded Peers

Schoolwide Virtual Enrichment

All JCS and TLS students have access to grade level-specific [Gifted and Talented Virtual Classrooms](#). These virtual classrooms are a space for students to complete various challenges and enrichment opportunities at their own pace. Students are able to receive feedback and additional opportunities based on their needs. The virtual classrooms have expanded the accessibility of enrichment resources directly to the students and allows for students to choose opportunities according to their interests and abilities. The purpose of the activities is to encourage problem solving, develop critical thinking skills, and expand curiosity and imagination in conjunction with the New Jersey Student Learning Standards.

Gifted and Talented Teacher as a Resource

In addition to classroom support, the Gifted and Talented teacher also serves as a resource to all teachers in the building. Teachers that are seeking resources for their high ability learners will receive additional support from the Gifted and Talented teacher in various ways. This may include additional units of study, challenging resources, student projects, and meeting with the G&T teacher as needed.

Additional Enrichment Opportunities

Across all grade levels 3-5, as recommended by the classroom teacher, students exhibiting a need for additional enrichment may have the opportunity to meet with the G&T teacher as the schedule allows. Groupings will be flexible and monitored to best meet the students' needs throughout the school year. Activities will include, brain teasers, puzzles, strategic thinking activities, problem-solving challenges, and STEM challenges. Students engage in an extended process of asking questions, using resources, and developing answers that lead to thinking about what and how they are learning. Students are held accountable for how they work and use their time by demonstrating their learning through products or presentations.

Students self-select to participate in individual and/or group projects based on interest and commitment. The classroom teacher and/or the enrichment teacher will help guide and monitor student exploration of chosen topics, facilitating their learning with resources and teaching of needed skills.

Secondary Schools
Florence M. Gaudineer Middle School
Jonathan Dayton High School

Grades 6-12: Access to specific content programs with higher levels of academic challenges (i.e. Pre-Algebra, Accelerated Communication Arts, and Advanced Placement Classes)

Dual Credit Courses provide students the opportunity to obtain high school credit, and college credit, simultaneously through partnerships with several institutions.

Project Lead the Way (PLTW) students become builders of technology by engaging in real world activities. Students are empowered as design thinkers collaborating on real world projects.

Gifted and Talented Identification Criteria

The Springfield Schools Gifted and Talented Program recognizes that students require differentiated learning experiences beyond the core curriculum being taught because of their advanced abilities in one or more content areas. These students may also have other cognitive qualities such as curiosity, creativity, motivation, leadership, and passion that require modifications to their academic experience.

Multiple Measures of Eligibility

Kindergarten through grade twelve identification process for gifted and talented students includes multiple measures. Multiple measures may include but are not limited to: achievement test scores; grades; student performance or products; intelligence testing; parent, student, and/or teacher recommendation; and other appropriate measures. The identification methodology is developmentally appropriate, non-discriminatory, and related to the programs and services offered by the Springfield School District. The identification procedures are reviewed annually.

According to N.J.A.C. 6A:8-3.1, all public school districts must have a board-approved gifted and talented identification process and provide services for identified students enrolled in the grades of that school district. The regulations require that identification and services be made available to students in grades K-12.

When students are recommended for the Gifted and Talented Program there are multiple measures that are considered to determine if services are necessary and appropriate. The assessments used are as follows:

- Cognitive Abilities Test (CogAT)
- Classroom Performance/Student Portfolios
- DRA2 Level
- iReady Diagnostic Scores
- Gifted Indicators Checklist
- Start Strong/NJSLA Assessment Data

The N.J.A.C. requires that students be compared to their chronological peers in the local school district. The New Jersey Department of Education has not established state-level criteria for identifying students who are gifted, such as mandated tests or assessments, grade point averages, or IQ scores. Local school districts must use multiple measures to identify students.

Procedures

<https://www.straussesmay.com/seportal/Public/DistrictPolicy.aspx?policyid=2464&id=b8a33a9f505e4998a6db3fb8e1de778b>

Gifted and Talented Program Identification Matrix

Minimum Score Required for Consideration: 14 Points

1 Point	2 Points	3 Points
Cogat Assessment Overall Stanine Score of a 7	Cogat Assessment Overall Stanine Score of an 8	Cogat Assessment Overall Stanine Score of a 9
iReady Math Assessment Just Below Current Grade Level	iReady Math Assessment On Grade Level	iReady Math Assessment ½ Year + Above Current Level
iReady ELA On Grade Level	iReady ELA ½ Year Above Current Level	iReady ELA One Full Grade Level + Above Current Level
NJSLA Math Approaching Expectations	NJSLA Math Met Expectations	NJSLA Math Exceed Expectations
NJSLA ELA Approaching Expectations	NJSLA ELA Met Expectations	NJSLA ELA Exceed Expectations
HOPE Teacher Rating Scale Raw Score: 11 - 29	HOPE Teacher Rating Scale Raw Score: 30 - 49	HOPE Teacher Rating Scale Raw Score: 50-66

Team meetings present the opportunity to review data and assess the educational needs of all students. Teacher provides examples of student work exhibiting above and beyond grade level expectations, creativity, leadership, critical and abstract thinking. Programs for gifted and talented students will be periodically evaluated for their continuing efficacy and adjusted accordingly. The parent of any student identified as gifted or talented shall be consulted regarding any program designed to address the student's particular needs.

Resource Links

https://riversideinsights.com/cognitive_abilities_test

<https://www.curriculumassociates.com/programs/i-ready-learning>

<https://www.nj.gov/education/assessment/resources/>

<https://www.routledge.com/HOPE-Teacher-Rating-Scale-Involving-Teachers-in-Equitable-Identification/Gentry-Pereira-Peters-McIntosh-Fugate/p/book/9781618214522#:~:text=The%20HOPE%20Teacher%20Rating%20Scale,making%20it%20easy%20to%20use.>

Gifted and talented student: The "[*Strengthening Gifted and Talented Education Act*](#)" defines a gifted and talented student as a "student who possesses or demonstrates a high level of ability in one or more content areas when compared to their chronological peers in the school district and who require modifications of their educational program if they are to achieve in accordance with their capabilities."

Twice-exceptional (2E) students: A twice-exceptional (2E) student is defined as "a student who is both gifted and a student with a disability. These students may also be referred to as having dual exceptionalities or as being gifted with learning disabilities (GT/LD). This also applies to students who are gifted with ADHD or gifted with autism" (New Jersey Association for Gifted Children, www.nagc.org).

Instructional adaptation: An adjustment or modification to instruction enabling a student who is gifted and talented to participate in, benefit from, and demonstrate knowledge and application of the New Jersey Student Learning Standards in one or more content areas at the instructional level of the student, not just the student's grade level.

Identifying gifted and talented students: The focus of identification is to provide programming and services in which students' specific learning needs and potential are appropriately addressed and met. In every New Jersey school district, there are students who require modifications to the general education curriculum if they are to achieve in accordance with their abilities. By identifying a student's general intellectual ability, creativity, or specific academic area aptitudes, we are acknowledging that they need programming and services outside of the general education/grade level curriculum to advance their learning.

NJDOE Fast Facts

<https://www.nj.gov/education/standards/gifted/>

<https://www.nj.gov/education/standards/gifted/legislation.shtml>

Supplemental Resources/Programming for Gifted Students

Edward V. Walton

- PETS Program – Primary Education Thinking Skills
- Group Solutions/Group Solutions 2 – Cooperative Logic Activities
- Lollipop Logic
- Beginning Thinking Skills
- AIMS Education Programming

James Caldwell and Thelma L. Sandmeier

Math/ELA

- Project M3: Mentoring Mathematical Minds
- Junior Great Books
- AIMS Education Programming
- Borenson Hands on Equations
- BizWorld
- Perplexors
- Advanced Math Explorations grade 3-5
- Challenging Units for Gifted Learners (ELA and Math)
- Creative Curriculum Extenders
- Differentiated Lessons & Projects
- Challenge Math Grades 4+
- Differentiating Instruction with Menus (All Content Areas)
- Jacob's Ladder
- Genius Hour/Passion Project
- Spatial Reasoning
- Logic Puzzles, Brain Games, Analogies

STEM

- Engineering is Elementary
- Engineer Throughout the Year
- PBS Design Squad
- DefinedSTEM
- Project Lead the Way (PLTW)

Enrichment Events

Experience for all students to be enriched through events related to the curricular or extracurricular activities. Examples include after school clubs, PTA-sponsored events, leadership opportunities, visual and performing arts, and community service opportunities.