Amazing Animals: Owls

Unit Information

- **Unit #:** ASHCT-00035870
- **Grade Level:** 1
- **Subject:** Science
- **Interdisciplinary Focus:** STEAM
- **Author:** Carly Levine

Unit Overview

In this unit, students explore the world of owls as a lens for understanding animal behavior, structure, and survival. Through observation, discussion, and hands-on investigation, students learn how owls use their physical features and behaviors to meet their needs.

Instruction is supported with multimedia resources, including investigations and videos from Mystery Science, to help students visualize concepts such as animal adaptations, food chains, and survival strategies.

Standards Alignment

Next Generation Science Standards (NGSS)

- **LS1.A: Structure and Function** – Animals use body parts in different ways to survive.
- **LS1.B: Growth and Development of Organisms** – Parents and offspring engage in behaviors that support survival.
- **LS1.D: Information Processing** – Animals receive and respond to information from their environment.
- **LS3.A: Inheritance of Traits** – Young organisms resemble, but are not identical to, their parents.
- **LS3.B: Variation of Traits** – Individuals of the same species show similarities and differences.

Crosscutting Concepts

- **Patterns:** Students observe and identify patterns in animal behavior and traits.
- **Structure and Function:** Students examine how physical features relate to survival.

Connections to Engineering, Technology, and Society

Students explore how humans design solutions inspired by nature, including how animal structures can inform problem-solving.

Common Core Connections

ELA/Literacy

- RI.1.1, RI.1.2, RI.1.10
- W.1.7, W.1.8

Mathematics

- MP.2, MP.5
- 1.NBT.B.3, 1.NBT.C.4–6
- 1.MD.A.1

Stage 1: Desired Results

Enduring Understandings

Students will understand that:

- Animals have specialized body parts that help them survive.
- Animal behaviors, especially between parents and offspring, support survival.
- Young animals are similar to, but not identical to, their parents.

Essential Questions

- Why do birds have beaks?
- Why do baby owls resemble their parents?

- How do owls survive in their environment?
- How do scientists study and learn about owls?

Knowledge

Students will know:

- Animals use external structures for survival (e.g., hunting, sensing, protection).
- Owl adaptations (such as talons, beaks, and silent flight) support survival.
- Parent and offspring behaviors are critical for survival.
- Traits are inherited but vary among individuals.

Skills

Students will be able to:

- Observe and describe patterns in animal traits and behaviors.
- Use evidence from texts, media, and investigations to explain scientific ideas.
- Compare similarities and differences between parent and offspring organisms.
- Apply knowledge of animal structures to design solutions to problems.

Stage 2: Assessment Evidence

Performance Task 1 (1-LS1-1): Design Solution

Students design a solution to a human problem by mimicking animal or plant structures.

Students will:

- Describe the problem clearly
- Use scientific knowledge about animal structures
- Design a device inspired by how animals survive
- Explain how their design solves the problem

Performance Task 2 (1-LS1-2): Patterns of Behavior

Students gather and evaluate information about how parents and offspring behave to survive.

Students will:

- Use texts and media (including Mystery Science videos) to gather information
- Identify patterns in behaviors
- Explain how these behaviors support survival

Performance Task 3 (1-LS3-1): Inheritance and Variation

Students construct an evidence-based explanation about similarities and differences between parents and offspring.

Students will:

- Observe and describe traits
- Identify patterns of similarity and variation
- Use evidence to explain their thinking

Stage 3: Learning Plan

Learning Activity: Owl Adaptations Investigation

Students explore owl adaptations through hands-on and virtual experiences.

Activities include:

- Investigating owl pellets to identify diet and feeding behavior
- Observing owl structures (beaks, talons, feathers) and discussing function
- Viewing videos and interactive lessons from Mystery Science to deepen understanding of animal adaptations and food chains
- Discussing how owl traits support survival

Resources

- Virtual Owl Pellet Dissection
- Owl pellet and behavior videos
- Supplemental multimedia from Mystery Science

Notes / Comments

This unit integrates literacy, science, and inquiry-based learning to support student understanding of animal life systems. Instruction emphasizes observation, questioning, and evidence-based reasoning.

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Bang! A Sound Unit

Unit Information

- **Unit #:** ASHCT-00035874
- **Grade Level:** 1
- **Subject:** Science
- **Interdisciplinary Focus:** STEAM
- **Author:** Carly Levine
- **Duration:**
- **Dates:**

Unit Overview

In this unit, students explore the science of sound through hands-on investigations and collaborative inquiry. Students examine how sound is created, how it travels, and how it can be used to communicate.

Through experimentation and observation, students develop an understanding of vibrations, sound waves, and the role of light in seeing objects. Instruction is enhanced through multimedia resources and interactive investigations, including lessons from Mystery Science, which support student engagement and conceptual understanding.

Standards Alignment

Next Generation Science Standards (NGSS)

- **PS4.A: Wave Properties** – Sound is caused by vibrating materials, and sound can cause materials to vibrate.
- **PS4.B: Electromagnetic Radiation** – Objects can be seen only when illuminated or when they emit light.
- **PS4.C: Information Technologies and Instrumentation** – People use devices that rely on light and sound to communicate.

Crosscutting Concepts

- **Cause and Effect:** Students investigate how vibrations produce sound and how sound can cause vibrations.

Connections to Engineering, Technology, and Society

Students explore how people use sound and light technologies to communicate over distances and solve problems. They design and build devices that apply scientific understanding in practical ways.

Common Core Connections

ELA/Literacy

- W.1.2, W.1.7, W.1.8
- SL.1.1

Mathematics

- MP.5
- 1.MD.A.1, 1.MD.A.2

Stage 1: Desired Results

Enduring Understandings

Students will understand that:

- Sound is produced by vibrations and can cause materials to vibrate.
- Light is necessary for seeing objects.
- Sound and light can be used as tools for communication.

Essential Questions

- Where do sounds come from?
- How are sounds created and changed?
- How do we see objects?
- How can sound and light be used to communicate?

Knowledge

Students will know:

- Vibrations produce sound.
- Sound can cause objects to vibrate.
- Light allows objects to be seen.
- Different materials interact with light in different ways.
- Sound and light can be used to send information.

Skills

Students will be able to:

- Plan and conduct simple investigations about sound and light.
- Make observations and use evidence to explain scientific phenomena.
- Describe cause-and-effect relationships.
- Design and build a device to solve a communication problem.

Stage 2: Assessment Evidence

Performance Task 1: Investigating Sound and Vibration (1-PS4-1)

Students investigate the relationship between sound and vibration.

Students will:

- Identify the purpose of an investigation about sound and vibration
- Plan and conduct investigations collaboratively
- Observe how vibrations create sound and how sound causes vibrations
- Record and describe observations as evidence

Performance Task 2: Light and Visibility (1-PS4-2)

Students construct explanations about how light allows objects to be seen.

Students will:

- Observe objects in light and dark environments
- Compare visibility under different lighting conditions
- Use evidence to explain how light affects visibility
- Construct an evidence-based explanation

Performance Task 3: Communication Device Design (1-PS4-4)

Students design and build a device that uses sound or light to communicate over a distance.

Students will:

- Define a problem related to communication
- Design and build a device using provided materials
- Explain how their device uses sound or light
- Evaluate how well the design solves the problem

Stage 3: Learning Plan

Learning Activities

Sound Wave Investigation (Ruben's Tube Demonstration)

- Students observe a demonstration of sound waves using a Ruben's Tube in collaboration with engineering partners.
- Students discuss how vibrations create visible patterns.

Cup and String Telephone

- Students construct a simple communication device using cups and string.
- Students explore how sound travels through different materials.

Exploring Sound Through Inquiry

- Students investigate engaging questions such as how sound effects are created in cartoons.
- Students use videos and interactive lessons from Mystery Science to deepen understanding of sound, vibration, and communication.

Sample Lesson Structure (Optional)

- **Objective:** Understand how vibrations create sound
- **Activity:** Hands-on investigation with materials
- **Discussion:** What caused the sound? What changed it?
- **Assessment:** Student explanation using evidence

Resources

- Ruben's Tube demonstration (with engineering partners)
- Materials for cup-and-string telephone
- Multimedia resources and videos from Mystery Science

Differentiation / Support (Optional)

- Provide guided investigation templates for support
- Offer extension challenges (e.g., improving communication device design)
- Use visuals and hands-on models to support understanding

Notes / Comments

This unit emphasizes inquiry-based learning and hands-on exploration to build foundational understanding of sound and light. Students engage in collaborative investigations and apply their learning through engineering design challenges.

Bright Scientists: Light

Unit Information

- **Unit #:** ASHCT-00035872
- **Grade Level:** 1
- **Subject:** Science
- **Interdisciplinary Focus:** STEAM
- **Author:** Carly Levine
- **Duration:**
- **Dates:**

Unit Overview

In this unit, students explore the properties of light and how it interacts with objects. Through hands-on investigations and inquiry-based learning, students examine how light allows us to see, how shadows are formed, and how different materials affect the passage of light.

Students also explore how light can be used as a tool for communication and problem-solving. Instruction is supported with interactive media and investigations, including lessons from Mystery Science, to deepen understanding and engagement.

Standards Alignment

Next Generation Science Standards (NGSS)

- **PS4.B: Electromagnetic Radiation** – Objects can be seen when illuminated or when they emit light.
- **PS4.B:** Different materials transmit, reflect, or block light, creating shadows.
- **PS4.C: Information Technologies and Instrumentation** – Light can be used as a tool for communication.

Crosscutting Concepts

- **Cause and Effect:** Students investigate how light interacts with materials to produce observable effects such as shadows and reflections.

Connections to Engineering, Technology, and Society

Students explore how light is used in technologies and communication systems. They apply their understanding by designing solutions that use light to solve problems.

Common Core Connections

ELA/Literacy

- W.1.2, W.1.7, W.1.8
- SL.1.1

Mathematics

- MP.5
- 1.MD.A.1, 1.MD.A.2

Stage 1: Desired Results

Enduring Understandings

Students will understand that:

- Light is necessary for seeing objects.
- Light interacts with materials in different ways (passes through, reflects, or is blocked).
- Light can be used as a tool for communication.

Essential Questions

- Can you see in the dark?
- What happens when light hits different materials?
- How are shadows created?
- How can light be used to send messages?

Knowledge

Students will know:

- Objects are visible only when light is present.
- Some materials allow light to pass through, while others block it.
- Shadows are created when light is blocked.
- Mirrors can redirect light.
- Light can be used to communicate over distances.

Skills

Students will be able to:

- Plan and conduct investigations about light and shadows.
- Make observations and use evidence to explain scientific phenomena.
- Identify cause-and-effect relationships.
- Design and build a device that uses light to communicate.

Stage 2: Assessment Evidence

Performance Task 1: Investigating Light and Sound (1-PS4-1)

Students explore how vibrations and sound are connected.

Students will:

- Identify the purpose of an investigation
- Plan and conduct investigations collaboratively
- Observe relationships between vibration and sound
- Record and describe findings

Performance Task 2: Light and Visibility (1-PS4-2)

Students construct explanations about how light allows objects to be seen.

Students will:

- Observe objects in light and dark environments
- Compare visibility under different conditions
- Use evidence to explain how light affects visibility
- Construct an evidence-based explanation

Performance Task 3: Communication with Light (1-PS4-4)

Students design and build a device that uses light to communicate.

Students will:

- Define a communication problem
- Design and build a solution using light
- Explain how their device works
- Evaluate the effectiveness of their design

Performance Task 4: Patterns in the Sky (1-ESS1-1)

Students observe and analyze patterns in the sun, moon, and stars.

Students will:

- Record observations of objects in the sky
- Identify patterns in day/night cycles
- Use patterns to make predictions
- Explain how observations support their conclusions

Stage 3: Learning Plan

Learning Activities

Exploring Light and Refraction

- Students observe how light bends by placing a drop of nail polish in water to create rainbow effects.
- Students connect observations to how light interacts with materials.

Shadows and Light Sources

- Students create shadow puppets using flashlights.
- Students explore how light can be blocked and how shadows are formed.

Light Pathways and Reflection

- Students build mazes using materials such as blocks or Legos and use mirrors and light sources to guide light through the maze.
- Students explore how light travels and can be redirected.

Inquiry Through Exploration

- Students investigate questions about light, such as how rainbows form or how light is used in everyday technology.
- Students engage with videos and interactive lessons from Mystery Science to deepen understanding.

Sample Lesson Structure (Optional)

- **Objective:** Understand how light interacts with materials
- **Activity:** Hands-on investigation
- **Discussion:** What happened to the light? Why?
- **Assessment:** Student explanation using evidence

Resources

- Flashlights and shadow materials
- Mirrors and building materials (e.g., Legos)
- Rainbow and light demonstration materials
- Multimedia resources from Mystery Science

Differentiation / Support (Optional)

- Provide structured investigation guides

- Offer extension challenges (e.g., more complex light pathways)
- Use visuals and demonstrations to support understanding

Notes / Comments

This unit emphasizes hands-on exploration and inquiry to build foundational understanding of light and its properties. Students engage in scientific practices including observation, questioning, and design.

Out in the Greenhouse

Unit Information

- **Unit #:** ASHCT-00035871
- **Grade Level:** 1
- **Subject:** Science
- **Interdisciplinary Focus:** STEAM
- **Author:** Carly Levine
- **Duration:**
- **Dates:**

Unit Overview

In this unit, students use the greenhouse as a living laboratory to explore plant structures, growth, and survival. Through hands-on experiences, students investigate how plants meet their needs, how their parts function, and how traits are passed from parent plants to offspring.

Students observe patterns in plant growth and variation, while also exploring how humans can learn from plant structures to solve problems. Instruction is supported with interactive lessons and investigations, including resources from Mystery Science to deepen understanding.

Standards Alignment

Next Generation Science Standards (NGSS)

- **LS1.A: Structure and Function** – Plants and animals have external parts that help them survive and grow.
- **LS1.B: Growth and Development of Organisms** – Plants and animals grow and produce offspring.
- **LS3.A: Inheritance of Traits** – Offspring are similar to, but not identical to, their parents.
- **LS3.B: Variation of Traits** – Individuals of the same species vary in observable ways.

Crosscutting Concepts

- **Patterns:** Students observe and use patterns in plant traits and growth.
- **Structure and Function:** Students explore how plant parts help plants survive.

Connections to Engineering, Technology, and Society

Students explore how humans design solutions by mimicking structures found in nature, particularly plant adaptations.

Common Core Connections

ELA/Literacy

- RI.1.1, RI.1.2, RI.1.10
- W.1.7, W.1.8

Mathematics

- MP.2, MP.5
- 1.NBT.B.3, 1.NBT.C.4, 1.NBT.C.5, 1.NBT.C.6
- 1.MD.A.1

Stage 1: Desired Results

Enduring Understandings

Students will understand that:

- Plants have structures that help them survive and grow.
- Plants produce offspring that are similar but not identical.
- Patterns can be observed in plant traits and growth.
- Humans can use knowledge of plant structures to solve problems.

Essential Questions

- Why don’t trees fall over in the wind?

- How do plant parts help plants survive?
- How are young plants similar to and different from parent plants?
- How does a greenhouse help plants grow?

Knowledge

Students will know:

- Plants have parts (roots, stems, leaves, flowers, fruits) that serve specific functions.
- Plants grow and produce offspring.
- Offspring resemble their parents but show variation.
- Plants respond to environmental conditions.

Skills

Students will be able to:

- Observe and describe plant structures and functions.
- Identify patterns in plant traits and growth.
- Gather and use information from texts and observations.
- Construct explanations using evidence.
- Design solutions inspired by plant structures.

Stage 2: Assessment Evidence

Performance Task 1: Biomimicry Design (1-LS1-1)

Students design a solution to a human problem inspired by plant or animal structures.

Students will:

- Define a problem
- Use knowledge of plant/animal structures
- Design and build a solution
- Explain how their design mimics nature

Performance Task 2: Parent and Offspring Behavior (1-LS1-2)

Students gather and evaluate information about how organisms help offspring survive.

Students will:

- Read and analyze informational texts
- Identify patterns in behaviors
- Explain how behaviors support survival

Performance Task 3: Inheritance and Variation (1-LS3-1)

Students construct explanations about similarities and differences between parents and offspring.

Students will:

- Observe plant traits
- Compare parent plants and offspring
- Identify patterns of similarity and variation
- Use evidence to explain observations

Performance Task 4: Daylight Patterns (1-ESS1-2)

Students investigate patterns in daylight over time.

Students will:

- Observe and record daylight patterns
- Identify relationships between time of year and daylight
- Use patterns to make predictions

Stage 3: Learning Plan

Learning Activities

Greenhouse Investigations

- Students grow plants in the greenhouse and observe what plants need to survive.
- Students track plant growth and identify patterns over time.

Plant Structures and Functions

- Students examine plant parts (roots, stems, leaves, flowers).
- Students discuss how each part helps the plant survive.

Farm-to-Table Connection

- Students harvest plants and create a “plant parts” salad.
- Students connect plant structures to real-world uses.

Plant Life Cycles and Offspring

- Students collect seeds and grow new plants.
- Students compare parent plants and offspring to identify similarities and differences.

Inquiry and Exploration

- Students investigate questions about plant growth and greenhouse environments.
- Students engage with multimedia resources from Mystery Science to support understanding.

Sample Lesson Structure (Optional)

- **Objective:** Understand plant structures and their functions
- **Activity:** Greenhouse observation or planting
- **Discussion:** How do these parts help the plant?
- **Assessment:** Student explanation using evidence

Resources

- Greenhouse plants and tools
- Seeds and planting materials
- Observation journals
- Informational texts and videos

- Multimedia lessons from Mystery Science

Differentiation / Support (Optional)

- Provide guided observation sheets
- Use visuals and real plant samples
- Offer extension opportunities (e.g., designing improved growing systems)

Notes / Comments

This unit emphasizes experiential learning through direct interaction with plants. The greenhouse setting allows students to observe real-world applications of scientific concepts and develop a deeper understanding of plant life systems.

The Day and Night Sky

Unit Information

- **Unit #:** ASHCT-00035869
- **Grade Level:** 1
- **Subject:** Science
- **Interdisciplinary Focus:** STEAM
- **Author:** Carly Levine
- **Duration:**
- **Dates:**

Unit Overview

In this unit, students explore patterns in the day and night sky by observing the sun, moon, and stars. Through hands-on investigations and data collection, students learn that these patterns can be described and predicted.

Students examine how shadows change throughout the day and how daylight varies across seasons. They also explore how people use observations of the sky to solve problems and understand the natural world. Instruction is supported with interactive lessons and investigations, including resources from Mystery Science.

Standards Alignment

Next Generation Science Standards (NGSS)

- **ESS1.A: The Universe and Its Stars** – Patterns of the sun, moon, and stars can be observed and predicted.
- **ESS1.B: Earth and the Solar System** – Seasonal patterns of sunrise and sunset can be observed and described.

Crosscutting Concepts

- **Patterns:** Students observe and use patterns in the sky to describe and predict natural phenomena.

Connections to Nature of Science

Students understand that natural events follow consistent patterns that can be observed and used to make predictions.

Common Core Connections

ELA/Literacy

- W.1.7, W.1.8

Mathematics

- MP.2, MP.4, MP.5
- 1.OA.A.1
- 1.MD.C.4

Stage 1: Desired Results

Enduring Understandings

Students will understand that:

- The sun, moon, and stars follow observable patterns.
- These patterns can be used to describe and predict natural events.
- The amount of daylight changes throughout the year.

Essential Questions

- Can a shadow move?
- How can the sun help you if you're lost?
- Why do stars appear at night?
- How does daylight change throughout the year?

Knowledge

Students will know:

- The sun appears to move across the sky during the day.
- Shadows change position and length throughout the day.
- The moon and stars are visible at different times.
- Daylight varies depending on the time of year.

Skills

Students will be able to:

- Observe and record patterns in the sky.
- Collect and organize data.
- Identify and describe patterns over time.
- Use observations to make predictions.

Stage 2: Assessment Evidence

Performance Task 1: Light and Visibility (1-PS4-2)

Students explain how light allows objects to be seen.

Students will:

- Observe objects in light and dark
- Compare visibility
- Use evidence to construct explanations

Performance Task 2: Light and Materials Investigation (1-PS4-3)

Students investigate how different materials affect light.

Students will:

- Plan and conduct investigations

- Test materials (transparent, translucent, opaque, reflective)
- Record and analyze observations
- Use evidence to explain results

Performance Task 3: Daylight Patterns (1-ESS1-2)

Students investigate how daylight changes over time.

Students will:

- Observe daylight at different times
- Record and compare data
- Identify patterns
- Use patterns to make predictions

Stage 3: Learning Plan

Pre-Assessment

- Use formative assessments from BrainPOP and Mystery Science to gauge prior knowledge and understanding of key concepts.

Learning Activities

Shadow Tracking Investigation

- Students trace and record shadows at different times of the day using chalk.
- Students analyze how shadow position and length change over time.

Sky Patterns and Movement

- Students use virtual simulations to observe the movement of the sun and Earth.
- Students connect observations to real-world patterns.

Daylight and Seasonal Patterns

- Students track daylight (morning, midday, evening) over time.
- Students identify patterns related to seasons.

Women in Science Connection

- Students learn about Dorrit Hoffleit and her work measuring the brightness of stars.
- Students simulate measuring light intensity using classroom materials.

Inquiry and Exploration

- Students explore questions about the sky through observation and discussion.
- Students engage with multimedia resources from Mystery Science to deepen understanding.

Sample Lesson Structure (Optional)

- **Objective:** Identify patterns in the movement of the sun
- **Activity:** Shadow tracing investigation
- **Discussion:** What patterns do you notice?
- **Assessment:** Student explanation using evidence

Resources

- Chalk and outdoor space for shadow tracking
- Digital simulations and videos
- Observation journals
- Multimedia resources from Mystery Science and BrainPOP

Differentiation / Support (Optional)

- Provide structured data collection sheets
- Use visuals and repeated observations
- Offer extension opportunities (e.g., predicting seasonal changes)

Notes / Comments

This unit emphasizes observation and pattern recognition. Students build foundational understanding of Earth’s place in space through repeated observations and data collection.