Life Cyle

Life Science | Lesson Guide

Kindergarten

Photo Description

This image shows broken eggshells nestled in soil with green plant stems and decomposing mulch nearby. The white shells are cracking open and breaking apart as they sit in the garden environment. This is a natural example of how things break down and change over time in nature.

Scientific Phenomena

Anchoring Phenomenon: Eggshells decomposing and returning nutrients to soil

This image captures the observable process of decomposition—how dead or discarded materials break down into smaller pieces and eventually become part of the soil. Eggshells contain calcium and other nutrients that plants need to grow. As the shells crack, weather them, and interact with soil organisms (microbes, fungi, insects), they gradually break apart into nutrients that enrich the soil. This is a visible example of nutrient cycling in nature: materials from one organism (the egg) support life in another (plants).

Core Science Concepts

* Decomposition: Materials break down into smaller pieces over time, especially when exposed to water, air, and soil organisms. Decomposed materials become nutrients that help new living things grow.

* Life Cycles: Living things grow, change, and eventually return materials to Earth. Eggshells represent the "end" of an egg's function, but the "beginning" of its role in feeding the soil.

* Nutrient Cycling: Everything in nature is recycled. Dead materials don't disappear—they transform and feed new life. Eggshells become food for plants.

* Observation of Change Over Time: Students can watch how objects change when placed in soil and exposed to natural conditions (rain, sun, soil creatures).

Pedagogical Tip:

For Kindergarteners, avoid overwhelm by focusing on ONE clear observation: "Eggshells break into smaller pieces in the garden." Use repetitive language ("break," "change," "grow") and point to visible changes rather than abstract processes. Collect eggshells in class and let students observe them weekly—concrete, hands-on observation is developmentally appropriate and memorable.

UDL Suggestions:

Representation: Provide real eggshells for students to handle and observe (ensure they're clean and safe). Use picture cards showing: whole egg !’ broken eggshell !’ crumbly pieces !’ rich soil. Action & Expression: Allow students to express learning through drawing, sorting shells by size, or acting out the decomposition process. Engagement: Connect to students' experiences: "You eat eggs at breakfast—where do the shells go? Let's help them grow a garden!"

Zoom In / Zoom Out

Zoom In: Microscopic Decomposition
When we look very, very closely at a crumbling eggshell (with a magnifying glass or microscope), we would see tiny living creatures called bacteria and fungi. These are so small we can't see them without special tools, but they are eating the eggshell, breaking it into smaller and smaller pieces. It's like millions of invisible helpers munching on the shell bit by bit. The shell doesn't just break by itself—these teeny tiny living things are doing the work! Over weeks and months, their "eating" turns the hard shell into soft, crumbly powder that mixes into soil.

Zoom Out: The Garden Ecosystem & Nutrient Cycle
When we zoom way, way out, the eggshell in this garden is part of a giant circle of life. A chicken laid the egg !' a person ate the egg !' the leftover shell goes to the garden !' the shell breaks down !' plants eat the nutrients from the broken shell !' the plant grows !' maybe an animal eats the plant !' when that animal dies, it returns to soil too. This circle never ends! Eggshells, fallen leaves, dead insects, and old plants all become food for new plants. The whole Earth is connected through this recycling system—nothing gets wasted in nature, it just changes form and feeds something new.

Discussion Questions

1. "What is happening to the eggshells in this picture? What do you notice?" (Bloom's: Remember | DOK: 1)
   - Encourages observation of visible change and familiar objects.

2. "Why do you think eggshells are breaking into smaller and smaller pieces in the soil?" (Bloom's: Analyze | DOK: 2)
   - Prompts thinking about cause and effect: rain, time, soil creatures, and temperature.

3. "If we bury eggshells in our classroom garden, what do you predict will happen in 4 weeks?" (Bloom's: Create | DOK: 3)
   - Encourages prediction and experimentation mindset.

4. "How do you think broken eggshells help plants grow?" (Bloom's: Understand | DOK: 2)
   - Builds connection between decomposition and plant nutrition; introduces the "food for plants" concept.

Potential Student Misconceptions

Misconception 1: "The eggshell just disappears."
- Why students think this: Kindergarteners may not yet understand that objects can change form without ceasing to exist. They might think the broken pieces are "gone."
- Scientific Clarification: The eggshell doesn't disappear—it breaks into tinier and tinier pieces that mix into the soil. The pieces are still there; they're just so small and mixed in that we can't see them easily. This is like breaking a cracker into crumbs; the cracker is still there, just in a different form. Eventually, those crumbs become part of the soil that helps plants grow.

Misconception 2: "Eggshells are trash and shouldn't be in the garden."
- Why students think this: Young children often categorize things as "trash" or "garbage" without understanding that some "waste" is actually useful to nature.
- Scientific Clarification: Eggshells are not trash—they are a gift to the garden! Eggshells have nutrients (like calcium) that plants need to grow big and strong, just like you need healthy food to grow. When we put eggshells in soil, we are feeding the plants, not littering. It's recycling!

Misconception 3: "Only rain breaks the eggshells apart."

- Why students think this: Kindergarteners may focus on one visible cause (water) and not yet understand that multiple factors work together (time, soil organisms, temperature, weather).
- Scientific Clarification: Rain helps, but it's not the only thing! Tiny bugs and creatures in the soil also munch on the shell. The sun heats it up and cools it down, making it crack. Wind blows it around. All of these things together—water, time, living creatures, and weather—work as a team to break the shell into smaller pieces.

Extension Activities

1. "Eggshell Decomposition Observation Station"
   - Collect clean eggshells and place them in a clear plastic container with soil and water. Have students observe and draw weekly changes over 4–6 weeks. Create a picture graph showing eggshell size: whole !’ cracked !’ small pieces !’ barely visible. Discuss: "What made them break?"

2. "Plant a Seed in an Eggshell"
   - Fill cleaned eggshell halves with potting soil, plant fast-growing seeds (radish, bean), and water gently. As the plant grows and the eggshell naturally decomposes, students see the connection: old eggshell = new plant food. Plant the entire eggshell in the garden when seedlings are ready.

3. "Sorting & Sensory Exploration"
   - Provide sorted containers of eggshells (whole, cracked, crushed, powder) and let students feel, sort by size, and arrange in order from biggest to smallest. Ask: "What happened to make them different?" Connect to gardening: "Crushed eggshells mix with soil faster!"

Cross-Curricular Ideas

Math: Sorting & Measuring Eggshell Sizes
Collect eggshells in various stages of decomposition (whole, cracked, small pieces, powder) and have students sort them by size. Create a picture graph on a large poster: "How many whole shells? How many cracked? How many tiny pieces?" Students can count, compare quantities ("Are there more big pieces or small pieces?"), and order shells from largest to smallest. This builds number sense, classification, and data representation while reinforcing the decomposition concept.

ELA: Sequencing Story & Descriptive Language
Read The Tiny Seed or Compost Stew together, then have students sequence picture cards showing eggshell decomposition: whole egg !’ broken shell !’ crumbly pieces !’ soil with plant. Students can dictate or draw their own story: "First, the eggshell was hard. Then it cracked. Next, it got smaller and smaller. Finally, it turned into soil." This builds sequencing, narrative language, and vocabulary around change over time.

Art: Observational Drawing & Texture Collage
Provide real eggshells (clean and safe) for students to observe closely and draw. Encourage them to notice cracks, colors, and textures. Then create a texture collage by gluing crushed eggshell pieces onto paper to make a garden picture. Students can paint or color around the shells, label plants and soil, and physically feel the rough texture of decomposing shells. This integrates fine motor skills, visual observation, and tactile learning.

Social Studies: Recycling & Community Care
Connect eggshell decomposition to the broader idea of taking care of Earth. Discuss: "Where do eggshells go after breakfast? How can we help them become food for plants instead of trash?" Start a classroom or school eggshell collection program. Have students take turns bringing clean shells from home, creating a shared responsibility for recycling. This builds environmental awareness, community contribution, and stewardship while reinforcing that everyone's actions matter.

STEM Career Connection

1. Soil Scientist (or Pedologist)
A soil scientist studies dirt! They ask questions like: "What makes healthy soil? What nutrients do plants need? How do eggshells and compost help gardens grow?" These scientists visit gardens and farms, collect soil samples, and test them to see what they're made of. They help farmers and gardeners know exactly what to add to soil to grow the best vegetables and flowers. It's like being a soil doctor!
- Average Annual Salary: $65,000–$75,000 USD

2. Composting or Waste Management Engineer
These engineers design systems to turn trash into treasure! They figure out how to take food scraps, eggshells, leaves, and other waste and turn them into rich compost that helps plants grow. They work for cities, farms, or recycling centers and design big compost piles or machines that speed up decomposition. They're helping Earth stay clean while feeding plants at the same time.
- Average Annual Salary: $70,000–$85,000 USD

3. Botanist or Plant Biologist
A botanist studies plants and how they grow. They want to know: "What do plants need? How do nutrients from soil help plants get bigger and stronger? What's the best way to grow food?" Botanists work in gardens, greenhouses, research labs, and farms. Some even create new types of plants that are healthier or grow better. Understanding decomposition and nutrient cycles is a big part of their job!
- Average Annual Salary: $62,000–$80,000 USD

NGSS Connections

Relevant Performance Expectation:
- K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.

Disciplinary Core Ideas:
- K-LS1.A - All organisms have basic needs. Plants need nutrients from soil.
- K-LS1.C - Death and decomposition are natural processes that return nutrients to soil, supporting new life.

Crosscutting Concepts:
- Patterns - Patterns of decomposition and regrowth repeat in nature.
- Systems and System Models - A garden is a system where dead materials cycle back to feed living plants.

Science Vocabulary

* Eggshell: The hard, white or brown covering that protects the baby bird or egg inside.
* Decompose (or "break down"): When something gets smaller and crumbles into pieces over time, usually in soil.
* Nutrients: Special food that plants need from soil to grow strong and healthy.
* Soil: The dark, crumbly material in gardens where plants grow their roots and get their food.
* Garden: A place where we grow plants, often by digging in soil and adding water and sunlight.

External Resources

Children's Books:
- The Tiny Seed by Eric Carle – Shows seed growth and life cycles with beautiful illustrations.
- From Seed to Plant by Gail Gibbons – Clear, simple diagrams of how plants grow and what they need.

- Compost Stew by Mary McKenna Siddals – A rhythmic story about decomposition and soil creation.

Notes for Implementation:

This lesson is ideal for spring planting units or recycling/sustainability themes. Kindergarteners learn best through direct sensory experience, so handling real eggshells and observing changes over weeks will embed these concepts far better than pictures alone. Connect to home: encourage families to save eggshells and discuss where they go!