

Lesson Plan: Hatching a Plan - Comparing Egg Adaptations for Survival

Grade/Level	Grade Level: 5th grade (Could be adapted for other grades)
Time Allotment	60 minutes
Content Area(s)	Science (with potential integration into Language Arts & Art)

Curricular Connections

Learning Standard: 5-LS4-1 Structure and Function. Conduct an investigation to determine how the structures and functions of various plants and animals enable them to survive and reproduce in different environments.

Lesson Overview

Students will compare the eggs of birds, snakes, and frogs, exploring how their characteristics reflect adaptations for survival and reproduction in different environments.

Instructional Materials

- Pictures of eggs, egg hatching, and adult animals.
 - Quick facts included in this lesson.
 - Reference books or online resources about birds, snakes, and frogs for student research.
 - Materials for selected activity: chart paper, markers, construction paper, glue, materials to create simple models of each egg type (playdough, clay, papier-mâché).
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Introduction

Engage: Present pictures of baby animals (eagle chick, snakelet, tadpole). Ask students how these animals might have started their lives. Briefly introduce the concept of eggs and their role in reproduction.

Explore: Introduce the learning standard, explaining that today we will compare the eggs of three different animals - bald eagles, snakes, and frogs - to understand how their egg characteristics are adapted for survival and reproduction in their specific environments.

Activate Prior Knowledge: Ask students:

- Can you think of other animals that lay eggs? What do you know about them?
 - Do you think all eggs look the same? Why or why not?
 - How do you think the environment an animal lives in might affect its eggs?
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Presentation

Quick Facts

Incubation

- Bald Eagles incubate their eggs by sitting on them to apply heat.
- Snakes and frogs do not incubate their eggs.

Outer Shell

- Bald Eagle eggs and snake eggs have a shell that encloses the egg's contents.
 - Bald Eagle eggs have a hard, rigid shell.
 - Snake eggs have a soft, flexible, parchment-like shell.
- Frog eggs do not have an outer shell.

Growth

- Snake eggs and frog eggs expand as the embryo grows.
- Eagle eggs do not expand as the embryo grows.

Number of Eggs

- Bald Eagles lay one to four eggs.
- Snakes lay 10-40 eggs.
- Frogs lay hundreds to thousands of eggs.

Egg Timing

- In the upper Midwest and Great Lakes States, Bald Eagles usually lay eggs in January and February. Snakes and frogs do not.

Laying

- Frogs lay eggs in water.
- Bald Eagles lay eggs in stick nests in trees.
- Snakes lay eggs in underground burrows, leaf litter, hollow logs, and stumps.

Parental Care

- Bald Eagles provide parental care for eggs and young.
- Most snakes and frogs do not.

In Common

- The eggs of all three enclose and protect embryos.
- The eggs of all three allow gas exchange.
- Bald Eagle, snake, and frog embryos must all remain moist.
 - Shells help Bald Eagle and snake eggs retain water. Frogs lay their unshelled eggs in water or very humid environments.
- The eggs of all three serve as a calcium reserve for the skeletons of the developing embryos.

How might parental care, egg timing, egg growth, and incubation relate to egg shape and structure? What do the similarities between Bald Eagle, snake, and frog eggs tell us?

Eggstraordinary Features: Present pictures of each egg type and discuss their key characteristics:

- Bald Eagle eggs: Bald Eagles lay their white, oval, hard-shelled eggs in a carefully prepared nest. Both parents incubate eggs almost continuously from the time they are laid to the time they hatch. Bald eagles usually lay a clutch of one to four eggs.
- Snake eggs: Snakes lay their leathery, elongated, soft-shelled eggs in carefully selected burrows, hollow logs, rotting stumps, or under leaf litter and rocks. Their embryos develop without parental care. Depending on the species, snakes generally lay between 10 and 40 eggs.
- Frog eggs: Frogs lay their buoyant eggs in a jelly-like floating mass or ‘glue’ them to grass, sticks, and leaves. Buoyancy helps ensure that eggs laid in bodies of water, including ponds, lakes, and streams, are oxygenated and exposed to sunlight, and the gelatinous coating keeps them hydrated while providing protection from damage, predators, and the environment. Still, many animals eat frog eggs and frogs can lay thousands of eggs at a time. The embryos develop without parental care.

Adaptation Station: Divide students into groups and assign each group an egg type. Have them research and discuss how the specific characteristics of their assigned egg adaptation help the developing offspring survive and reproduce:

- Birds: A bird’s hard outer eggshell provides support for incubation while protecting the developing embryo from damage and pathogens. *Birds incubate eggs to maintain optimal temperature and humidity levels for embryonic development. They also turn their eggs to help prevent the embryo from sticking to the shell and assure gas exchange. Bird incubation is a labor-intensive process. Without incubation, the embryo will die.*
- Snakes: A snake’s leathery, flexible outer eggshell allows eggs to expand as the embryo grows and provides protection from damage and pathogens. *Snakes do not incubate their eggs, but they bury them in places that provide optimal conditions for underground incubation. Temperature, humidity, and protection from predators all play a role in site choice. Once a snake has selected her site and laid her eggs, her work is done.*
- Frog: A frog lays soft, unshelled eggs embedded in a jelly-like mass that might contain hundreds or thousands of eggs. Most of the eggs will be eaten or die, but some will survive to create the next generation. *Since frog eggs lack a protective shell, they must be laid in an aquatic environment. Frogs don’t care for their young. Their low-investment strategy costs little in terms of time or resources: a good thing, since frogs face many challenges and very few of their eggs survive to adulthood.*

Activity and Assessment

Choose one of the suggested activities below.

- **Chart it Out:** Create a chart with columns for each egg type and rows for its associated characteristics (e.g., shell material, location, parental care). Have students fill in the chart based on their research and discussions.
- **Egg Model Mania:** Provide materials for students to create simple models of each egg type, highlighting their key features. Encourage them to explain their design choices and how they connect to the specific adaptations discussed.
- **Survival Scramble:** Write scenarios on cards related to potential threats or challenges faced by developing offspring (e.g., drought, predator attack, blizzards). Divide students into groups

and challenge them to match each scenario with the egg type they believe is best adapted to survive it, explaining their reasoning.

- **Egg-cellent Story:** Have students write their own creative story from the perspective of an egg, describing its challenges and adaptations for survival until hatching.

Choose the assessment tool(s) that work with your activity:

- Observe students' participation in discussions and activities, noting their understanding of egg adaptations and how they relate to environment and survival.
- Evaluate student work in the chart or egg model activity, assessing their ability to identify and explain key adaptation features.
- Review student stories to assess their understanding of specific egg adaptations and their role in the chosen animal's life cycle.

Differentiation

- Provide support to struggling students by offering visuals, guiding questions, or pre-selected information about each egg type.
- Challenge advanced students to research the resources and habitats that Bald Eagles, snakes, and frogs need to lay eggs. What is different? What is the same?
- Integrate language arts by having students write poems or songs about different eggs and their unique characteristics.

Extension

- Watch a live bald eagle cam online to see how eagles care for their eggs:
<https://www.raptorresource.org/classroom/>.
- Visit a local farm or hatchery to see different types of eggs and discuss their adaptations.
- Play a matching game where students match pictures of baby animals to pictures of their eggs.