

## Photo Description



This image shows a young American alligator being carefully held in a person's hand. You can clearly see the bumpy scales covering the alligator's head, body, and tail. The scales have a tan and dark brown pattern, and the alligator's eye and snout are visible as it looks to the side.

## Scientific Phenomena

Anchoring Phenomenon: Why do reptiles have scales instead of skin like mammals?

Reptiles evolved scales as a protective feature that helps them survive in their environments. Scales are made of a tough material called keratin (the same substance in your fingernails) and overlap like roof shingles. This structure protects reptiles from injury, helps prevent water loss from their bodies, and allows them to move more efficiently through water and across rough ground. Unlike human skin, reptile scales are not living tissue on the outside—they're a specially adapted covering that reptiles shed and regrow as they grow larger.

## Core Science Concepts

- \* Adaptation and Survival: Scales are a structural adaptation that helps reptiles survive in their specific habitats by providing protection and water retention.
- \* Classification and Structure: Reptiles are a class of animals with distinctive features including scales, cold-bloodedness (ectothermy), and the ability to lay eggs on land.
- \* Variation Within Species: While all reptiles have scales, the shape, size, texture, and pattern of scales vary greatly among different reptile species.
- \* Material Properties: Keratin, the protein that makes up scales, is strong, flexible, and waterproof—making it ideal for protecting an animal's body.

### Pedagogical Tip:

When teaching about reptile adaptations, encourage students to feel different textures (smooth vs. rough scales on models or safe reptile specimens) to engage their tactile learners. This multisensory approach deepens understanding of why scales have particular structures—the texture directly connects to function.

### UDL Suggestions:

Provide multiple means of representation by offering images, videos, and tactile models of scales from different reptile species. Allow students to choose their preferred way to explore (observation, drawing, describing verbally, or handling safe materials). Consider pairing visual learners with kinesthetic demonstrations and providing written labels for those who benefit from text-based information.

## Discussion Questions

1. Why do you think an alligator's scales are bumpy and tough instead of smooth and soft like human skin? (Bloom's: Analyze | DOK: 2)
2. If you were designing a suit of armor to protect a soldier, what could you learn from looking at how reptile scales are arranged? (Bloom's: Evaluate | DOK: 3)
3. How might a reptile's scales help it survive in a dry desert compared to a reptile living in a wet swamp? (Bloom's: Analyze | DOK: 2)
4. What would happen to an alligator if its scales fell off and didn't grow back? (Bloom's: Evaluate | DOK: 3)

## Extension Activities

1. Scale Pattern Investigation: Provide students with images of different reptile species (snakes, lizards, crocodiles, turtles). Have them sketch and compare scale patterns, colors, and arrangements. Challenge them to hypothesize why different species have different scale patterns and whether those patterns help them blend into their habitats.
2. Model Reptile Armor: Give students craft materials (cardboard, paper plates, markers) and challenge them to design and build protective "armor" inspired by reptile scales. Students should test their models by dropping them with an egg inside to see if the overlapping scale design protects the egg from breaking—connecting structure to protective function.
3. Reptile Adaptations Field Guide: Have students research one reptile species and create a "field guide page" that includes: a drawing of the reptile, a description of its scales (size, color, texture), the habitat where it lives, and an explanation of how its scales help it survive in that environment. Display completed guides in a classroom "Reptile Museum."

## NGSS Connections

Performance Expectation: 5-LS1-1: Support an explanation that plants get the materials they need for growth chiefly from air and water. (Note: While this PE focuses on plants, the image connects to broader life structure standards.)

Relevant PE for this content: 3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Disciplinary Core Ideas:

- 3-LS1.B: Growth and Development of Organisms
- 4-LS1.A: Structure and Function (body parts and their functions)
- 5-LS1.A: Supporting the evidence that organisms need food, water, and air

Crosscutting Concepts:

- Structure and Function: The scales' overlapping structure allows them to protect the animal while still permitting movement.
- Patterns: All reptiles follow a pattern of having scales, but the pattern and arrangement vary by species.
- Cause and Effect: The presence of scales causes reptiles to have advantages in their specific environments.

## Science Vocabulary

- \* Scales: Tough, flat plates that cover a reptile's skin and protect it from harm and dryness.
- \* Adaptation: A special body part or behavior that helps an animal survive in its home environment.
- \* Keratin: A strong, flexible material that makes up scales, claws, and fingernails.

- \* Reptile: A cold-blooded animal with scales that lays eggs and includes snakes, lizards, alligators, and turtles.
- \* Overlap: To lie on top of something else, the way scales on a reptile are arranged like shingles on a roof.
- \* Ectothermic: An animal whose body temperature changes with its environment (also called cold-blooded).

### External Resources

Children's Books:

- Snakes by Gail Gibbons (National Geographic Little Kids First Big Book of Reptiles includes scale information with engaging illustrations)
- National Geographic Little Kids First Big Book of Reptiles by National Geographic Kids (comprehensive, visually rich exploration of reptile features including scales)
- Reptiles by Mary Ling (DK Eyewitness; includes detailed close-up photography of scales and other reptile structures)

YouTube Videos:

- "Reptile Scales: How They Work" by Crash Course Kids — Explains why reptiles have scales and how they function as protection. (<https://www.youtube.com/watch?v=qJIHNfkOro>)
- "All About Reptiles" by National Geographic Kids — A comprehensive overview of reptile adaptations including scales, perfect for fifth-grade engagement. (<https://www.youtube.com/watch?v=9zzKtD3xmNs>)