

## Photo Description



In this image, a white bird called a cattle egret stands on a rusty fence rail while a brown cow grazes in a pasture below. The egret and cow are in the same space, with green fields and trees in the background. This photograph shows two different animals living and working together in the same habitat.

## Scientific Phenomena

**Anchoring Phenomenon:** This image captures mutualistic symbiosis—a relationship where two different species benefit from living or working together.

**Why This Happens:** The cattle egret eats insects (like ticks and parasites) from the cow's body and surrounding area. The cow gets "cleaned" and feels relief from pesky bugs. The egret gets a meal. Both animals benefit! This is a natural partnership that has evolved over time because it helps both species survive better. The egret even follows grazing cattle to catch insects stirred up in the grass. This is not accidental—it's an adaptation that helps both animals thrive.

## Core Science Concepts

1. **Symbiosis and Mutualism:** Two different organisms can have relationships where both benefit. The egret gets food, and the cow gets parasite removal.
2. **Animal Adaptations and Behaviors:** The egret's behavior (following cattle) and physical features (long beak, thin legs for wading) are adaptations that help it survive in this relationship.
3. **Habitat and Community:** Multiple species live together in the same environment (pasture ecosystem) and interact with each other in ways that support survival.
4. **Interdependence:** Animals depend on each other and their environment to meet their needs for food, shelter, and safety.

### Pedagogical Tip:

When teaching symbiosis to Third Graders, use the analogy of "helping friends." Ask: "Do you help your friends? Do they help you? That's like the egret and cow!" This concrete connection makes abstract concepts memorable and relatable. Avoid overly technical language like "parasitic symbiosis" at this grade level.

### UDL Suggestions:

**Representation:** Show multiple images of the cattle egret relationship (bird on different livestock, bird in grass near cattle). Some students are visual learners and benefit from seeing the relationship from different angles.

**Engagement:** Invite students to role-play as the cow and egret. One student can be itchy (cow) and one can be hungry (egret), then act out how they help each other. This kinesthetic activity supports diverse learners.

**Expression:** Allow students to draw the relationship, write a simple story, or create a poster showing how the two animals help each other. Multiple modalities let all students demonstrate understanding.

## Zoom In / Zoom Out

### ### Zoom In: Cellular & Microscopic Level

Parasites and Pathogens: Invisible to the naked eye, ticks and other parasites live on the cow's skin and drink its blood. They can carry diseases. The egret's digestive system breaks down these insects at a cellular level, removing them from the cow's body. Inside the egret's stomach, enzymes work to digest the protein-rich insects, providing the energy the bird needs.

### ### Zoom Out: Ecosystem & Environmental Level

Pasture Ecosystem: The cattle egret, cow, grasses, insects, soil, and trees form an interconnected pasture ecosystem. If the grass disappears, cattle have no food, so they don't graze, and egrets lose the insects stirred up by grazing. If parasites become too numerous, the cow gets sick and may not produce milk or calves. The health of one species affects the whole system. Beyond the pasture, this ecosystem connects to water sources, weather patterns, and even human farmers who manage the land.

## Discussion Questions

1. "Why does the cow let the egret stand on the fence nearby while it eats grass?" (Bloom's: Understand | DOK: 1)
  - Expected response: The cow knows the egret eats the bugs that bother it.
2. "What would happen to the egret if there were no cattle or other large animals in the pasture?" (Bloom's: Analyze | DOK: 2)
  - Expected response: The egret would have fewer insects to eat because large animals stir up bugs as they move. It would need to find food another way or move to a different place.
3. "How do you think this relationship helps each animal survive better?" (Bloom's: Evaluate | DOK: 3)
  - Expected response: The cow stays healthier without parasites, and the egret has an easy food source. Both animals are stronger and healthier.
4. "Are there any 'helpers' in your life or home that work with you the way the egret works with the cow? How?" (Bloom's: Apply | DOK: 2)
  - Expected response: A dog protects our house; a bee helps flowers grow; a plant gives us oxygen while we give it carbon dioxide.

## Potential Student Misconceptions

1. Misconception: "The egret is bothering the cow or hurting it."
  - Clarification: The egret actually helps the cow by removing parasites and insects that itch or could make the cow sick. The cow allows the egret to land on it because it feels good, like when someone scratches an itch for you. Both animals want this relationship.
2. Misconception: "The cow and egret are friends just like people are friends."
  - Clarification: While we can use "friendship" as a helpful comparison, animals don't think or plan friendships like we do. Instead, their bodies and behaviors are shaped by nature (evolution) to work well together. They benefit from being near each other, even though they don't choose it the way friends choose each other.
3. Misconception: "The egret eats the cow."
  - Clarification: The egret is too small and the cow is too large. The egret only eats tiny insects like ticks and flies, not the cow itself. It's like if you picked food crumbs off a table—you're not eating the table, just the crumbs on it.

### Extension Activities

1. "Symbiosis Search" Nature Walk: Take students outside on school grounds or a nearby park. Have them observe animals and plants interacting. Ask: "Do you see any animals helping each other? What are they doing?" Students can sketch or photograph examples (with permission) and share findings. This reinforces that symbiosis happens in real habitats they can observe.
2. Role-Play Relationship Stations: Create three stations representing different animal relationships: (1) Cattle Egret & Cow (mutualism—both benefit), (2) Remora Fish & Shark (commensalism—one benefits, one unharmed), (3) Parasite & Host (parasitism—one benefits, one harmed). Students rotate through, role-playing each animal and discussing who benefits and who doesn't. This kinesthetic approach deepens understanding of symbiosis types.
3. "Thank You" Letter or Comic Strip: Students write a thank-you letter from the egret to the cow (or vice versa) explaining how they help each other. Alternatively, they create a 3-4 panel comic strip showing the relationship. This literacy-integrated activity helps students consolidate learning and explain the relationship in their own words.

### Cross-Curricular Ideas

1. Mathematics: Create a simple data chart showing "How many insects does an egret eat in a day?" versus "How many parasites live on a cow?" Use real or estimated numbers (e.g., 100 ticks, 50 insects). Students can practice counting, graphing, and comparing quantities while learning content.
2. English Language Arts: Read aloud a picture book about animal friendships or partnerships (see book list below). Follow up with a class discussion: "Which animals in the book help each other like the egret and cow?" Students can then write their own simple "How Animals Help Each Other" story.
3. Social Studies: Discuss how farmers care for cattle and how relationships in nature help farmers. Ask: "Why would a farmer be happy to see egrets near the cattle?" Connect to how humans depend on nature and how understanding animal relationships helps us be better stewards of the land.
4. Art: Students create a diorama or 3D model of a pasture ecosystem showing the cattle, egret, grass, insects, and trees. They can label each organism and draw arrows showing which animals interact. This visual project integrates fine motor skills with science content.

### STEM Career Connection

1. Zoologist: A scientist who studies animals and how they live together in nature. Zoologists observe animals like cattle egrets and learn why they behave the way they do. Some zoologists help protect animals and their habitats. Average Annual Salary: \$63,000 USD
2. Veterinarian: A doctor for animals who keeps cows, birds, and other animals healthy. A veterinarian might treat a cow with parasites or help a farmer understand how to keep livestock healthy. Average Annual Salary: \$99,000 USD
3. Ecologist: A scientist who studies how animals, plants, and the environment all work together as one big system. Ecologists might study symbiosis and how relationships like the egret-cow partnership help ecosystems stay healthy. Average Annual Salary: \$65,000 USD

### NGSS Connections

Performance Expectation: 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.

Performance Expectation: 3-LS2-1: Construct and interpret food chains and food webs in which the arrows support the sequencing of energy transfer.

Related Disciplinary Core Ideas:

- 3-LS2.A - Organisms interact in various ways that include hunting, feeding, hiding, helping, and harming. Food webs are models that demonstrate how matter and energy is transferred between organisms.
- 3-LS4.C - Adaptation by natural selection: The environment determines which traits are most useful for an organism to survive and reproduce.

Related Crosscutting Concepts:

- Systems and System Models - The cattle egret and cow form a small system where each part affects the others.
- Energy and Matter - The egret obtains energy (food) by eating insects near the cow; energy flows through this relationship.

### Science Vocabulary

- \* Symbiosis: When two different living things live together and help each other or have a special relationship (pronounced: sim-bee-OH-sis).
- \* Mutualism: A friendship between two different animals where both of them get something good from it, like the cow and egret (pronounced: MYOO-choo-ul-iz-um).
- \* Parasite: A tiny creature (like a tick or flea) that lives on or in another animal and drinks its blood or eats its skin.
- \* Adaptation: A special body part or behavior that helps an animal survive in its habitat (like a bird's long beak or a cow's horns).
- \* Habitat: The place where an animal lives, with all the things it needs like food, water, and shelter (pronounced: HAB-i-tat).
- \* Interdependence: When living things need each other and rely on each other to survive (pronounced: in-ter-dee-PEN-dence).

### External Resources

Children's Books:

The Busy Tree\* by Jennifer Ward – Shows a tree as a community where many animals live and interact, introducing ecosystem concepts.

Who Eats What? Food Chains and Food Webs\* by Patricia Lauber – Explains how animals depend on each other for food in simple, engaging language with illustrations.

Are You My Mother?\* by P.D. Eastman – A classic story about help and relationships (though not specifically about symbiosis, it introduces the concept of depending on others for care).

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Notes for Implementation:

This lesson is designed to be scaffolded across multiple days. Start with the photo and simple observations, move to the discussion questions, then introduce vocabulary and concepts gradually. The extension activities can be spread throughout the week to reinforce learning through multiple modalities. Emphasize observable features and real-world examples to keep Third Graders engaged and grounded in concrete understanding.