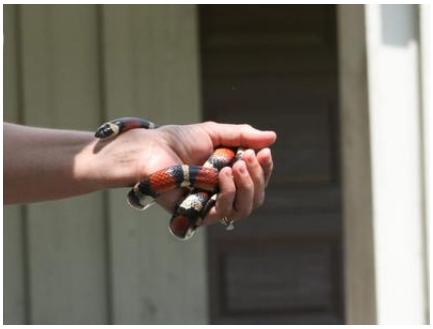
King Snake

Life Science | Lesson Guide

5th Grade

Photo Description



This image shows a coral snake (or coral snake mimic) being safely held in a person's hand. The snake has distinctive red, yellow, and black bands running around its body. The bright coloring is a warning signal that tells predators the snake may be dangerous, which is an important survival adaptation in nature.

Scientific Phenomena

Anchoring Phenomenon: Warning Coloration (Aposematism)

This snake displays bright, contrasting colors in a specific banding pattern. This is happening because the snake (or its mimic) uses color as a defense strategy. Over many generations, snakes with these warning colors survived better because predators learned to avoid them. The predators that ate brightly-colored snakes and got sick or poisoned didn't survive to eat more snakes. This process, called natural selection, shaped both the snake's appearance and predator behavior. The bright colors are like nature's "warning label"—they communicate danger without the snake having to fight or run away.

Core Science Concepts

1. Adaptations for Survival
   - Physical traits (like bright colors) help animals survive in their environment
   - These traits develop over many generations through natural selection

2. Animal Behavior and Communication
   - Animals use visual signals (colors, patterns) to communicate with other animals
   - Warning coloration is a behavior strategy that protects the animal without physical combat

3. Predator-Prey Relationships
   - Predators learn which prey are safe or dangerous to eat
   - Prey animals develop defense strategies to survive predator attacks

4. Mimicry in Nature
   - Some harmless animals copy the appearance of dangerous animals
   - This "false warning" also protects harmless snakes from being eaten

> **Pedagogical Tip:**
>
> Consider starting this lesson by asking students to observe the snake's colors WITHOUT revealing what it is. Ask: "What do these colors tell you about this animal?" This builds observational skills and prediction before introducing the scientific explanation. Students are more engaged when they discover the "why" themselves.

UDL Suggestions:

Representation: Provide both images and videos of snakes with warning coloration, plus diagrams showing predator avoidance. Some students may have ophidiophobia (fear of snakes), so emphasize safety and allow them to engage with digital images rather than live animals.

Action/Expression: Allow students to choose how they demonstrate understanding—creating a colored diagram of warning coloration, writing a predator's "field guide" to dangerous snakes, or recording a short video explanation. This honors multiple learning modalities.

Engagement: Connect to students' real lives by discussing how warning colors appear in everyday items (yellow/black on bees, caution tape, traffic signs). This makes abstract adaptation concepts concrete.

Discussion Questions

1. Why do you think this snake's bright colors might help it survive? (Bloom's: Analyze | DOK: 2)

2. If a predator eats a poisonous snake and gets sick, how might that affect what it hunts in the future? (Bloom's: Evaluate | DOK: 3)

3. Some harmless snakes look almost identical to poisonous snakes. How could this be helpful to the harmless snake? (Bloom's: Apply | DOK: 2)

4. Over thousands of years, why might snakes with brighter warning colors become more common in a population than snakes with dull colors? (Bloom's: Synthesize | DOK: 3)

Extension Activities

1. Design Your Own Warning Coloration
   - Students create their own imaginary animal and design warning colors using markers, colored paper, or digital tools
   - Have them write a "field guide" entry explaining why their colors would scare predators
   - Display as a class gallery with predictions about which designs would work best

2. Predator Learning Simulation
   - Create a game where students are "predators" learning to avoid brightly-colored prey
   - Use colored paper cutouts of "safe" (dull-colored) and "dangerous" (bright-colored) prey
   - Track how long it takes predators to learn which colors mean "don't eat me!"
   - Discuss: How might this help us understand why warning colors evolved?

3. Snake Adaptation Research Project
   - In pairs or small groups, have students research different snake adaptations (camouflage, fangs, speed, mimicry)
   - Create a comparison poster or digital presentation showing how different snakes survive using different strategies
   - Present findings to the class and vote on which adaptation seems most effective

NGSS Connections

Performance Expectation:
- 5-LS1.A: Structure and Function – Students understand how plants and animals have body structures that support growth, survival, and reproduction.

Disciplinary Core Ideas:

- 5-LS2.A – Organisms interact with their environment; some interactions help one organism and harm another (predator-prey)
- 5-LS4.B – Natural selection leads to the predominance of certain traits in a population
- 5-LS4.C – Adaptation by natural selection acting over generations eons produces a range of traits within any species

Crosscutting Concepts:
- Patterns – The bright banding pattern is a predictable signal in nature
- Cause and Effect – Bright colors cause predators to avoid the snake; avoidance causes the snake to survive
- Structure and Function – The color pattern's structure allows it to function as a warning signal

Science Vocabulary

* Adaptation: A body part or behavior that helps an animal survive and thrive in its environment
* Warning Coloration: Bright colors that tell other animals "stay away, I'm dangerous!"
* Natural Selection: When animals best suited to their environment survive and pass their traits to their babies
* Predator: An animal that hunts other animals for food
* Prey: An animal that is hunted by other animals
* Mimicry: When one animal copies the appearance of a different, more dangerous animal

External Resources

Children's Books:
- Snakes by Seymour Simon (explores snake adaptations and behaviors with photographs)
- National Geographic Little Kids First Big Book of Snakes by Jill McDonald (engaging illustrations and age-appropriate facts)
- The Coral Snake: A True Book by Christine Petersen (focuses specifically on warning coloration and coral snakes)

YouTube Videos:
- "Why Do Animals Have Warning Colors? (Aposematism Explained)" – PBS Learning Media
  A short, animated explanation of how bright colors protect animals from predators
  https://www.pbslearningmedia.org/resource/bozeman-aposematism/aposematism-warning-coloration/

- "Snake Adaptations" – National Geographic Kids
  A visually engaging 5-minute video showing how snakes use different strategies to survive, including color, speed, and venom
  https://www.youtube.com/watch?v=UvYFrCQzGu8

Teacher Notes: This lesson connects abstract evolutionary concepts to observable, concrete examples. The bright colors students can see make natural selection tangible and memorable. Consider having images of both coral snakes and kingsnakes (which mimic them) available to deepen understanding of mimicry.