Student Questions for Burrowing Owl

Exploring Ecosystems Through Bloom's Taxonomy

This document provides example questions that middle and high school students might ask a owl living on a Southern Plains Land Trust (SPLT) preserve in Colorado. Questions are organized by Bloom's taxonomy levels and aligned with NGSS standards for understanding interdependent relationships in ecosystems, ecosystem interactions and dynamics, and biodiversity and ecosystem services.

Integration Notes for Educators

- **Scaffolding:** Build from Level 1 (Remember) to Level 6 (Create) across a unit or allow students to choose their own question level based on readiness. Modify or remove scaffolds as students gain confidence in asking and reasoning about ecosystem questions.
- **Celebrate critical thinking:** Encourage Evaluate and Create questions—these show deepest engagement with NGSS standards.
- **NGSS Alignment:** All questions connect to three core standards: Interdependent Relationships in Ecosystems, Ecosystem Interactions & Dynamics, and Biodiversity & Ecosystem Services.
- **Pair with Data:** Have students gather observational or research evidence to support their answers, strengthening NGSS science practices.
- **Real-World Connection:** Frame these as conversations with an actual owl on the SPLT preserve to increase engagement and relevance.
- **Fact-Checking:** All factual claims should be verified against SPLT materials and the provided sources in the SPLT document.

Level 1: Remember - Recall & Define

Questions students might ask:

1. What do you eat during the day and at night?
2. How many times do you hunt in a week?
3. Where do you build your burrow, and what do you use to make it?
4. How long have you lived on this preserve?
5. What other animals live near you in the grassland?
6. How fast can you fly?
7. When did you move to the Southern Plains preserve?

NGSS Tie-In: *Interdependent Relationships in Ecosystems* — Students identify organisms and

basic habitat features within the owl's community.
Scaffolding Tip: Provide a simple habitat diagram (burrow, prairie, nearby plants/animals) so students anchor their recall questions to visible ecosystem elements.

Level 2: Understand - Explain & Interpret

Questions students might ask:

1. Why do you hunt at night instead of during the day?
2. Can you explain how you use your feathers to fly so quietly?
3. Why is the grassland important for owls like you?
4. What would happen to you if all the prairie dogs and ground squirrels disappeared?
5. How do you know where to find food even in complete darkness?
6. Why do you choose to live in a burrow instead of building a nest in a tree?
7. How does being small help you survive on the prairie?

NGSS Tie-In: *Ecosystem Interactions and Dynamics* — Students explain the relationships between the owl's traits and its survival in the prairie ecosystem.
Scaffolding Tip: Ask students to predict why before asking the follow-up "why" question to deepen comprehension.

Level 3: Apply - Use Information in New Contexts

Questions students might ask:

1. If a wildfire burned down part of the prairie, how would you find a new burrow?
2. How would your hunting strategy change if you had to hunt during the day?
3. What skills from hunting mice could you use to catch a bird if mice weren't available?
4. If a farmer used pesticides and killed all the insects, how would that affect your survival?
5. How would climate change (hotter, drier prairie) change where you hunt for food?
6. If a road was built near the preserve, how would you cross it safely?
7. How could the Southern Plains Land Trust help you if your habitat started disappearing?

NGSS Tie-In: *Ecosystem Interactions and Dynamics; Biodiversity and Ecosystem Services Solutions* — Students apply their understanding of ecological relationships to predict outcomes of environmental change.
Scaffolding Tip: Present a "scenario card" (drought, fire, habitat loss) and ask students to formulate questions about how the owl would adapt or respond.

Level 4: Analyze - Break Down & Examine Relationships

Questions students might ask:

1. Compare your hunting strategy to a different raptor—how do your methods differ, and why?
2. How do your adaptations (silent flight, excellent hearing, small size) work together to make you a successful predator?
3. What is your relationship to the prairie dogs in the burrows—are you always enemies, or does it ever benefit them?
4. How do you fit into the food web of the grassland? Who are your predators, and who do you hunt?
5. Why is biodiversity (lots of different species) on the preserve important to your survival?
6. How does the presence of the Southern Plains Land Trust change the prairie ecosystem compared to areas without protected land?
7. Analyze how your role as a predator keeps other animal populations balanced—what happens if owls disappear?

NGSS Tie-In: *Interdependent Relationships in Ecosystems; Ecosystem Interactions and Dynamics* — Students examine the complex, interconnected roles organisms play and how energy and matter move through the system.

Scaffolding Tip: Provide a partially completed food web or energy pyramid; ask students to fill it in and then ask questions that require them to trace the connections.

Level 5: Evaluate - Justify & Assess

Questions students might ask:

1. Is it more important for the prairie to protect owls like you, or to help the farmers who live nearby? How would you defend your answer?
2. The preserve is limited in size—do you think it's large enough to maintain a healthy owl population long-term? What evidence would you need?
3. Should conservationists prioritize saving your species (Burrowing Owls) or other endangered prairie species? Why?
4. If humans had to choose between expanding a town or protecting more prairie habitat for you, what would be the best decision? Explain your reasoning.
5. How do you evaluate whether the grassland ecosystem is healthy or in danger?
6. Is the Southern Plains Land Trust's approach to conservation (protecting the whole ecosystem, not just owls) better than protecting only your species? Why or why not?
7. What is the most important role you play in the prairie ecosystem, and how do you know?

NGSS Tie-In: *Biodiversity and Ecosystem Services Solutions* — Students judge the value of biodiversity and evaluate conservation strategies based on ecological evidence and human needs.

Scaffolding Tip: Introduce a local controversy (e.g., "Should we allow cattle grazing on the

preserve?") and ask students to craft questions that help them gather evidence to form a judgment.

Level 6: Create - Designing Solutions & Proposing New Ideas

Questions students might ask:

1. If you could redesign the preserve to be the perfect habitat for Burrowing Owls, what would you change, and why?
2. Imagine you could teach a lesson to the community about why grasslands matter—what would you say, and how would you convince them?
3. Create a new conservation strategy for the Southern Plains Land Trust that combines protecting owls, prairie dogs, and the plants they all depend on. How would it work?
4. If you could design a way to help Burrowing Owls survive climate change, what would it be?
5. How would you explain the food web of the prairie to someone who has never been there? Create an analogy or comparison that helps them understand.
6. What if we introduced a new species to the prairie to help you survive—what would be the perfect partner species, and what might go wrong?
7. Design a program that helps local farmers and the preserve coexist—how would it work for both?

NGSS Tie-In: *Biodiversity and Ecosystem Services Solutions; Ecosystem Interactions and Dynamics* — Students synthesize their understanding of ecosystem relationships and design solutions that consider interconnected factors (conservation, community needs, biodiversity).
Scaffolding Tip: Have students work in small groups to brainstorm, sketch, or outline their ideas before framing them as questions. Encourage them to back up their creations with evidence from what they've learned about the ecosystem.

Quick Reference: Bloom's Levels and Ecological Thinking

Bloom's Level	Focus	Ecosystem Application
Remember	Facts about organisms & habitat	Species traits, food sources, location
Understand	Why things happen in nature	Cause & effect in predator-prey, adaptation
Apply	Real-world scenarios	Responses to environmental change
Analyze	Relationships & systems	Food webs, energy flow, roles

Bloom's Level	Focus	Ecosystem Application
		in community
Evaluate	Judgments about conservation	Priorities, effectiveness, trade-offs
Create	New solutions & designs	Novel conservation strategies, ecosystem redesign

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Classroom Implementation Tips

For a Warm-Up Discussion Select 2–3 questions from different Bloom's levels before students interview the animal. Discuss what type of thinking each level demands and why scientists ask questions at all levels.

For Guided Inquiry Have students progress through levels in order:

- **Remember/Understand:** Gather baseline facts about the animal's life and basic ecosystem relationships.
- **Apply/Analyze:** Deepen understanding of dependencies and cause-effect chains.
- **Evaluate/Create:** Synthesize learning and propose evidence-based solutions.

For Differentiation

- **Middle school students:** Focus on Remember through Analyze questions.
- **High school students:** Emphasize Analyze through Create questions.
- **Advanced learners:** Combine questions from multiple levels into a single, complex inquiry.

For Assessment Use Evaluate and Create level responses to assess whether students can:

- Defend claims about interdependent relationships with specific evidence.
- Explain ecosystem dynamics and feedback loops.
- Propose conservation solutions that balance competing needs and services.