

What Does An “Umbrella” Have To Do With Sage-grouse?

Created by: Jenifer Haley	Date:
Subject: Biology	Grade Level: 10 th , could be adapted to elementary grades
Time Required: 1 class period for “webquest”, 2 or more hours for project	CCS Standards: Reading: Key Ideas and Details: 1 Writing: Production & Distribution of Writing: 4 & 6 Research to build and present knowledge: 7 & 8.

Overview	Students complete a webquest worksheet to understand what scientists mean when they refer to an “umbrella” species, then use their information to create a brochure on a potential umbrella species of their choosing
Goal(s) & Objective(s)	Understand the terms “indicator species” and “umbrella species”. Analyze and report on the environmental importance of different indicator species. Scan for important information in an academic document.
Materials	<ol style="list-style-type: none"> 1. Computers with internet access per student or student team. 2. Webquest 3. Sage Grouse Project Guideline 4. Sage Grouse Brochure Example 5. Sage Grouse Glossary (for reference)
Teaching Activities: Instructional Approaches/Strategies	<p>Introduction: Choose one or more of the following to lead into the lesson:</p> <ol style="list-style-type: none"> 1. Have students take a guess as to what an “umbrella species” or “indicator species” might be. Try to convince someone next to you that your definition is correct. 2. Have students brainstorm everything they know, or think they know, about threatened or endangered species, or a specific endangered species that is of interest to the class <p>Procedures:</p> <ol style="list-style-type: none"> 1. Discuss what it means when a species is described as “sagebrush obligate” – that it depends on a sagebrush ecosystem to survive, and cannot survive in a different ecosystem. Indicator species are obligated to live in a specific ecosystem, and can be used to show gains or declines in an ecosystem.

	<ol style="list-style-type: none"> 2. Let students know they will be going on a web quest to discover what Biologists mean when they say Sage Grouse are an “indicator species” or “umbrella species”. 3. They will use what they have learned to create a handout or presentation about other possible indicator or umbrella species. If needed, go over the parts of the academic article at the end of the webquest so that students know where to look when the instructions talk about the Abstract and Discussion, for example. 4. Hand out the web quest sheets. Give students time to gather information, then re-gather as a class and discuss what they learned.
Assessment:	<p>Handout and go over the “Sage-grouse – A Snapshot” brochure. Let students know that they will be producing a similar brochure or presentation on a species of their choice. They may use the Sage-grouse brochure as a template. Encourage students to consider some of the species they read about in the academic article during their web quest as their species of choice, if they have difficulties choosing. Go over the requirements and hand out the grading rubric.</p>

Preparation: Preview the websites to be sure they work on your computers. Modify the handouts and rubric to fit your grading guidelines, if necessary. Copy student handouts and reserve computer time if necessary. This lesson has two parts, a web quest, and a project. The web quest will take about one hour, and the project at least two hours

Attachments:

- Umbrella Species Project Guide
- Sage Grouse Glossary
- Sage Grouse Webquest

Other documents:

- Sagegrouse brochure example

Umbrella Species Project Guide

Name _____

Your assignment is to make a presentation or brochure about a species of concern in Idaho, which must include reasons why this species can or cannot be considered an Indicator or Umbrella species. This can be a plant or animal. Fill out this worksheet before making your Presentation or Brochure. Be sure to include your name and references on your finished product.

1. Species name and scientific name:
2. Latin or other origin of scientific name:
3. Identifying characteristics of this species(at least three):
4. Habitat type and requirements
5. Habitat concerns
6. Other concerns about this species' survival
7. Ways to improve this species' habitat.
8. This species _____(is/is not) a good candidate for an umbrella species because it _____(is/is not) a species that lives only in this habitat, and could be used to manage other species living in this habitat. Reasoning:
9. This species _____(is/is not) a good candidate for an indicator species because it _____(is/is not) a species that indicates the type and quality of a specific type of habitat.

Reasoning:

10. Find and include at least three pictures of your species or its habitat

References:

1. Encyclopedia/Magazine/Other book or resource:

2. Internet:

Points for 85 possible	5 Each Excellent	4 Ok	0-3 Poor/missing
Content (0-5 points each)	The following are complete and accurate: <input type="checkbox"/> Name <input type="checkbox"/> Scientific name <input type="checkbox"/> Meaning or origin of name <input type="checkbox"/> 3 identifying characteristic <input type="checkbox"/> Habitat type <input type="checkbox"/> Habitat requirements <input type="checkbox"/> Habitat concerns <input type="checkbox"/> Other concerns <input type="checkbox"/> Ways to improve <input type="checkbox"/> Umbrella species <input type="checkbox"/> Indicator species <input type="checkbox"/> References	Information with minor inaccuracy <input type="checkbox"/> Name <input type="checkbox"/> Scientific name <input type="checkbox"/> Meaning or origin of name <input type="checkbox"/> 3 identifying characteristic <input type="checkbox"/> Habitat type <input type="checkbox"/> Habitat requirements <input type="checkbox"/> Habitat concerns <input type="checkbox"/> Other concerns <input type="checkbox"/> Ways to improve <input type="checkbox"/> Umbrella species <input type="checkbox"/> Indicator species <input type="checkbox"/> References	Missing or totally inaccurate <input type="checkbox"/> Name <input type="checkbox"/> Scientific name <input type="checkbox"/> Meaning or origin of name <input type="checkbox"/> 3 identifying characteristic <input type="checkbox"/> Habitat type <input type="checkbox"/> Habitat requirements <input type="checkbox"/> Habitat concerns <input type="checkbox"/> Other concerns <input type="checkbox"/> Ways to improve <input type="checkbox"/> Umbrella species <input type="checkbox"/> Indicator species <input type="checkbox"/> References
Mechanics/ Presentation (0-5 points each)	Project <input type="checkbox"/> Is easy to understand <input type="checkbox"/> Is organized <input type="checkbox"/> Has correct spelling <input type="checkbox"/> Student's own thoughts come through <input type="checkbox"/> Is visually appealing (3 pictures)	Project <input type="checkbox"/> Is a bit unclear <input type="checkbox"/> Is a little disorganized <input type="checkbox"/> 1 or 2 misspelled words <input type="checkbox"/> Paraphrased <input type="checkbox"/> 1 or 2 pictures	Project <input type="checkbox"/> Is very unclear <input type="checkbox"/> Is disorganized <input type="checkbox"/> 3 or more misspellings <input type="checkbox"/> Quoted from sources <input type="checkbox"/> No pictures
Total			

Webquest

What Does An “Umbrella” Have To Do With Sage-grouse?

Name _____

Use the website <http://www.britannica.com/EBchecked/topic/286117/indicator-species> to answer the questions below:

1. Define “indicator species” in your own words based on this definition.
2. What do greasewood plants indicate?
3. What do tubifex worms in water indicate?

Now go to <http://www.wisegeek.com/what-are-umbrella-species.htm> (Be sure to read down past the advertisements as well).

4. What is an umbrella species?
5. Why do scientists designate a species as an umbrella species?
6. What are two synonyms for umbrella species (also known as...)?
7. Do all scientists think using an umbrella species is the correct method for managing an ecosystem?

Now go to <http://northern-ecologic.com/publications/3.pdf>. This is an academic article that probably has some unfamiliar terminology, but scanning for important points will be useful.

Read the first half of the Abstract at the top of this article.

8. What species are scientists considering to use as an umbrella species for conservation purposes in the Sagebrush ecosystem?

Scroll down to page 4 of this article (listed as page 326)

9. How many species of concern did these scientists investigate as possibly affected under the Sage Grouse umbrella?

10. List species that the scientists investigated which are described in the right column as “sagebrush obligate”

Scroll down to the table on page 6 of the article (page 328).

11. Describe what this table is about in your own words.

12. Find Wyoming Ground Squirrels and Pygmy rabbits in the left hand column. In the next column to the right “% overlap”, what numbers are listed for these two species?

13. If the Sagebrush ecosystem was managed for Sage-grouse, does the table indicate that the Wyoming Ground Squirrels and Pygmy rabbits would benefit as well? Why or why not?

14. Find Sage Sparrow and Sagebrush Vole in the left hand column. In the next column to the right “% overlap”, what numbers are listed for these two species?

15. If the Sagebrush ecosystem was managed for Sage-grouse, does the table indicate the Sage Sparrow and Sagebrush Vole would benefit as well? Why or why not?

Scroll down to page 8 (page 330) under “Discussion”.

16. After their investigation, what did these scientists conclude about the benefit to other species if Sage-grouse were used as an umbrella species for conserving and restoring Sagebrush ecosystems?

17. Based on what you have read on these websites, do you think Sage-grouse fit best as an indicator species or an umbrella species? Explain your answer.



Sage Grouse Glossary



1. Annual – A plant that sprouts from seed, reproduces, and dies within the same year
2. Biennial – A plant that sprouts from seed and grows (usually into a round cluster of leaves called a rosette) the first year, then grows to maturity during a second year, produces seed the second year, then dies. Example: many thistles are biennials
3. Brood – As a noun, means a group of baby birds. As a verb, means the act of a bird raising its young.
4. Cheatgrass – a winter annual grass that is invasive on sagebrush grasslands
5. Exotic plant – a plant that is not native to an area, a plant introduced by humans
6. Forb – a non-woody plant with “broad” leaves, netted veins in the leaves, and showy flowers such as wildflowers and many weeds. Examples – a dandelion or a buttercup.
7. Fragmentation (of habitat) – placement of human structures such as roads, buildings, ditches, and agricultural fields so that one part of an animal’s original habitat is separated from another
8. Grass – a plant with hollow, jointed stems, parallel veins, leaves on both sides of the stem. Examples: Idaho fescue, Cheatgrass
9. Habitat – includes the food, water, shelter, and space an organism needs to survive
10. Invasive plant– A plant that spreads and persists over large areas
11. Juniper – a coniferous shrub or small tree with scale-like leaves or small needles
12. Lek – An area where Sage Grouse gather in the spring to breed. From Swedish “lek” – a fun and rule-less competitive game
13. Local Working Group – A group made of any interested citizens and wildlife professionals to provide a forum to complete habitat improvement projects and get involved in discussions
14. Medusahead Wild Rye – a winter annual grass that is invasive on sagebrush grasslands, and unpalatable to both wildlife and livestock during most of its life cycle.
15. Native plant – (indigenous plant) a plant that has been present in an area without obvious human intervention
16. Noxious weed – A plant species that has been designated at the state or federal level as damaging to agriculture, humans, and/or livestock. Government agencies and landowners are legally obligated to control noxious weeds on their land.
17. Obligate – an organism that can only live under specific conditions
18. Perennial – Plants that grow from a seed or cutting to maturity, and then continue to grow back and reproduce for more than two years
19. Predation – the act of eating another animal
20. Predator – an animal that eats other animals. Example: Coyotes are a predator of sage-grouse.
21. Riparian Area – the vegetation on the banks of a stream, river, or lake
22. Sage-grouse Initiative – developed to help landowners voluntarily conserve and improve Sage Grouse habitat on their working land. Provides advice and money to complete projects.
23. Sagebrush steppe – a dry, desert-like biome characterized by sagebrush as the primary cover plant with a perennial grass and forb understory
24. Shrub – a plant with solid, woody stems, flowers, and netted veins in the leaves. Examples: Sagebrush, bitterbrush
25. Summer Annual – An annual plant that sprouts from seed in the spring, matures and produces seed in the summer/fall, then dies. Example: Curlycup gumweed

26. Winter Annual – An annual plant that sprouts from seed during a damp period in the fall, lives through the winter, produces seed in the spring or early summer, then dies. Example: Cheatgrass