518 Botany/Range Science

Unit	Objective	CAERT Lesson Plan Library	Unit	Problem Area	Lesson
A. Our Natural Resources Then and Now	1. Match terms associated with natural resources with their definitions	Environmental Resources	A	1	1
	2. Define and discuss the concept of natural resources	Environmental Resources	A	1	1
	3. List and describe the major categories of natured resources in America	Environmental Resources	A	1	1
	4. Explain what makes something a natural resource	Environmental Resources	A	1	1
	5. Explain why nature's resources once seemed limitless, and why this is no longer true	Environmental Resources	A	1	3
	6. Describe how the usefulness of a natural resource change over time, and what factors most effect their usefulness	Environmental Resources	A	1	3
	7. Identify the land area of the United States, indicating how much is suitable for farming, and how much is suitable for crop production	Environmental Resources	A	2	2
	8. Explain why there is a water shortage problem in this country	Environmental Resources	A	1	3
	9. Indicate how many species of wild animals, birds, and fish have become extinct in this country since colonial times	Environmental Resources	C	1	2
	10.Diagram the forested area of this country 300 years ago compared to today, and explain how our smaller forest area produces more wood today				
	11. Explain what the direct or indirect source of most of our energy resources is	Environmental Resources	A	1	1
	12. List our key mineral resources and what their known reserves are				
B. A History of Conservation in the United States	1.Define terms associated with conservation of our natural resources	Environmental Resources	A	1	4
	2. Compare exploitation, conservation, and preservation as they related to natural resources management	Environmental Resources	A	1	4
	3. Outline the history of conservation in the United States	Environmental Resources	C	1	1
	4. Describe the role of the federal government in conservation	Environmental Resources	C	1	1
	5. Explain why Americans have had such wasteful practices in using our natural resources in the past	Environmental Resources	C	1	1
	6. Discuss what would have happened to our fish and game animal populations if sport hunters and fisherman had not fought market hunters				
	7. Indicate who pays for wildlife conservation in this country	Environmental Resources	C	1	1
	8. Explain what the Weeks Law of 1911 was, and why it was important				

	9. Explain the concept of a soil and water conservation district, and how it works				
	10. Explain how the federal government helped local farmers and other landowners work to solve their soil and water conservation problems				
	11. Explain why soil and water conservation is a federal concern	Environmental Resources	A	3	1-7
	12. List the three needs that early water management efforts in America centered around	Environmental Resources	A	1	4
C. Principles of Ecology-Ecosystem Structure	1. Define ecology and explain its subdivision structure	Environmental Resources	B	6	3
	2. List the characteristics of all living organisms, describe the term irritability and give examples of irritability				
	3. Describe the process of evolution including the concepts of natural selection and adaptation	Environmental Resources	A	1	2
	4. Explain how genetic change could result in the major changes that occur in evolution and what role the environment plays in evolution	Environmental Resources	C	5	4
	5. Define the term biosphere and explain why the biosphere is considered a closed system naming some closed systems	Biological Science	A	3	2
	6. Define the term biome and explain what determines the type of vegetation in a biome	Environmental Resources	A	1	2
	7. Define the term ecosystem and explain some common features of all ecosystems	Environmental Resources	B	6	3
	8. Describe the abiotic components of the ecosystem and how these factors affect plant and animal life	Environmental Resources	A	1	2
	9. Discuss the concept "range of tolerance"				
	10. Explain a limiting factor and tell what the limiting factor is in most terrestrial ecosystems	Environmental Resources	C	4	5
	11. Discuss the terms niche and habitat	Environmental Resources	A	1	2
	12. Discuss the statement: no two organisms can occupy the same niche in the same habitat	Environmental Resources	A	1	2
	13. Explain an ecological equivalent and give an example				
D. Principles of Ecology-Ecosystem Function	1. Explain a food chain, discussing the two major types of food chain, how they are different and how they are similar	Environmental Resources	C	5	4
	2. Sketch several simple food chains and indicate all producers and consumers	Environmental Resources	A	1	2
	3. Explain microconsumers and why they are important				
	4. Explain biomass and how it is measured	Environmental Resources	C	3	2
	5. Discuss why biomass decreases as we ascend the food chain	Biological Science	A	3	2

	6. Define the following terms: consumer, producer, trophic level and food web	Environmental Resources	A	1	2
	7. Explain cellular respiration and why carbon dioxide is released during respiration in producers and consumers	Biological Science	B	4	2
	8. Explain the implications of decreasing biomass in the food chain and how affects the number of higher level consumers				
	9. Define the terms gross primary productivity and net primary productivity, explaining the most productive regions of the earth and why or why not these can be tapped for food				
	10. Draw the carbon cycle, and describe what happens during the various parts of the cycle				
	11. Draw the nitrogen cycle and list organisms that fix atmospheric nitrogen and why this is critical to the operation of the nitrogen cycle	Biological Science	A	4	3
	12. Draw and describe the phosphorus cycle				
	13. Define the following terms: predation, commensalism, mutualism, neutralism and competition, comparing them for similarities and differences	Environmental Resources	C	5	5
E. Principles of Ecology Ecosystem Balance and Imbalance	1. Describe ecosystem stability and give examples of stable ecosystems	Environmental Resources	C	2	5
	2. If you were to examine a mature ecosystem over the course of 30 years at the same time each year, discuss why you would expect the number of species in the ecosystem and the population size of each of these species to be the same from year to year or not	Environmental Resources	C	4	5
	3. Define inertia and resilience	Environmental Resources	D	1	1
	4. Explain environmental resistance and the role it plays in population balance and ecosystem balance				
	5. Define the term species diversity and give evidence that species diversity affects ecosystem stability and any evidence contradicting this idea	Environmental Resources	A	1	2
	6. Discuss a mature ecosystem and its major features	Environmental Resources	A	1	2
	7. Describe temporary imbalances caused in ecosystems you are familiar with and how the ecosystem returns to normal	Environmental Resources	C	2	5
	8. Explain succession and why one biotic community eventually is replace by another during succession	Environmental Resources	A	1	2
	9. Discuss a pioneer community				
	10. Discuss why environmental resistance changes during succession as one community is gradually replaced by another and in what ways human populations change environmental resistance and how that affects our population	Environmental Resources	A	1	2

	11. Describe how introducing and removing competitors into an ecosystem can affect ecosystem stability and give examples	Environmental Resources	C	5	5
	12. Discuss why it is necessary for humans to simplify their ecosystem and how it may be avoided and give some examples				
F. Concepts of Natural Resources Management	1. Match the terms and concepts of natural resource management with their definitions	Environmental Resources	A	1	4
	2. Explain the differences between nonexhaustible, renewable, and exhaustible natural resources	Environmental Resources	A	1	1
	3. Discuss the concept of balance in natural ecosystems	Environmental Resources	A	1	2
	4. Discuss the role of food chains in maintaining balanced ecosystems	Environmental Resources	A	1	2
	5. Discuss the role of ecology in human efforts at natural resources management	Environmental Resources	A	1	4
	6. Define an ecosystem	Environmental Resources	A	1	2
	7. Define man's ecosystem				
	8. Discuss some ways that nature is balanced	Environmental Resources	A	1	2
	9. Trace the human population level over the past 8000 years				
	10. Discuss differences between conservation and preservation	Environmental Resources	A	1	4
G. Introduction to Range Scie	1. Define or describe the terms associated with range science				
	2. List and describe the various uses of range lands				
	3. Describe the most common limiting factor associated with rangeland				
	4. List the approximate amounts of rangeland in the world, the United States, and Idaho				
	5. Identify the regions or the states consisting of the most range land				
H. History and Policies of Range Science Before 1934	1. List the opportunities that the western ranges offered early pioneers				
	2. Describe the effects cattle and sheep had on rangelands from 1825 - 1886				
	3. Date and describe the following Acts that relate to range science:				
	a. Homestead Act				
	b. Timber Culture Act				
	c. Desert Land Act				
	d. Enlarged Homestead Act				
	e. Stock Grazing Homestead Act				
	f. Forest Reserve Act				
	g. Soil Erosion Service				
	4. Explain what happened to range management during World War I				

I. History and Policies of Range Science After 1933	1. Date and describe why the Taylor Grazing Act was established				
	2. List the three goals of the Taylor Grazing Acts Administration				
	3. Date and describe why range inventories were taken				
	4. Explain what the BLM did to prevent over/grazing				
	5. Describe and explain commensurate and priority property				
	6. Explain why grazing permits were allocated				
	7. Define carrying capacity				
	8. Date and describe the major legislation that stimulated range restoration and management				
	9. Date and describe Land Adjustment and Utilization projects				
	10. Date and describe the Halogeton Control Act				
J. Range Classification	1. Summarize each type of physical range classification				
	2. Describe the range vegetation in Idaho as described by the Forest Service after 1911				
	3. List 10 of the 18 forage types that were designated to cover the western range region, by the Interagency Range Survey Committee				
	4. List the vegetation units occurring in Idaho, as described by Kuckler				
	5. Describe the best basis for obtaining uniformity in classification				
	6. Define or describe the terns associated with range classification				
	7. Summarize the vegetative features of each vegetative zone in Idaho				
K. Grazing Systems	1. List and describe the four principles of a grazing system				
	2. List and describe the six objectives of a grazing system				
	3. Define the terms associated with grazing systems				
	4. Describe the five requirements of a successful grazing system				
	5. List and describe the advantages and disadvantages of the grazing systems presented				
L. Rangeland Ecology and Physiology	1. List and describe the three climatic factors				
	2. Define soil, soil texture, and soil structure	Animal, Plant, & Soil Science	C	6	4
	3. List the five soil forming factors	Animal, Plant, & Soil Science	C	6	2
	4. List and describe the two types of range soils				
	5. List and describe the four topographic factors and how they affect an ecosystem	Animal, Plant, & Soil Science	A	2	4

	6. Describe the three types of fire climax communities				
	7. List the entropic factors and describe their effects on the ecosystem				
	8. Indicate the best measure of sight capacity				
	9. List the four factors involved in the physical description of an ecosystem				
	10. Describe the two interactions within a plant community				
	11. Describe the three primary concerns in the management of an ecosystem or plant community				
	12. Define terms associated with range ecology				
	13. Describe the regression of plant cover				
	14. Describe physiological disturbance and composition change				
M. Range Inventories	1. List and describe the four types of range inventories				
	2. Explain what is meant by primary and secondary site degradation				
	3. Explain what is meant by the terms range condition, and trend and how they are related				
	4. Describe a multiple use survey and its uses				
	5. Explain what a range appraisal is				
	6. List the five types of information provided by a range inventory				
	7. Explain the primary purpose of a range inventory				
	8. Describe the term sampling error and explain how it occurs and how it may be reduced				
	9. List and describe the factors that are included in a vegetational inventory				
	10. Describe plant dominance, its attributes, and how it is measured				
N. Carrying Capacity	1. Explain what is meant by the term carrying capacity				
	2. List the factors that are used to determine the carrying capacity of a particular area				
	3. Explain the term proper use factor				
	4. Describe how an animal unit and animal unit month are measured				
	5. List the animal equivalents for common range wildlife				
	6. Describe limited stocking rate and how it is used				
	7. Explain range condition and trend assessment and how they are related				
	8. Explain condition classifications and how index ratings are used to assess them				

	9. Describe the difference between apparent trend estimates and true trends				
	10.Explain a climax condition is determined in a range community				
O. Range Improvement	1. Explain the two types of range improvements, indirect and direct				
	2. Explain the relationship between range management and range improvement				
	3. List the two ecological principles that range improvements must be based on				
	4. List and describe the seven reasons for range improvement				
	5. Identify those plants that are undesirable in a typical range community and explain the accepted measures used to control them				