CODES 220 Exam 2 Study Guide

1. Scientific Content

a. Describe the characteristics of each biome. Include the following:

i. Where this biome is located

ii. Amount and type of precipitation

iii. Temperature

iv. Types of animals

v. Types of vegetation

- **Tundra**: Cold Boggy Plains

-Tundra: Cold Boggy Plains

Location: Found in the far north. Permafrost, or permanent ice, exists within a meter of surface

Latitude: Latitudinal range is 75° N to 60° N.

Precipitation: Little rain or snow. ◦ Precipitation totals 15-25 cm (6-10 inches) of rain a year, which includes melted snow

Temperature: Winter temperatures don't reach above -6°C (20°F) and average -28°C to -34°C (-20° to -30°F)

Vegetation: Grasslands that are open, windswept and boggy

Animals: Many large mammals like caribou and reindeer

- **Taiga**: Boreal Conifer Forests

Location: Vast areas of Asia & North America

Latitude: The latitude range is approximately between 50°-60° North latitude.

Precipitation: Average annual rainfall of 30-84 cm (12 -33 inches). ◦ Most of it falls in the summer as rain.

Temperature: Long cold winters ◦ The temperature range is -54 to 21°C (-65°F to 70°F).

Vegetation: Conifers are trees with needle-like leaves that are kept all year long
Animals: Many large mammals: elk, moose, bears

- **Deserts**

Location: North Africa, Southwestern US, Australia

Latitude: Typically around 15° to 35° from equator.

Precipitation: Dry places with less than 25 cm (10 inches) of rain a year

Temperature: Temperatures vary between day (average 38°C (100°F)) and night (average -4°C (25°F)) ◦ typical range is probably 20-25°C (68-77°F)

Vegetation: Vegetation is sparse and often has methods to store water or have deep roots to access water. ◦ E.g, cacti and shrubs.

Animals: Require water conservation and heat regulation method. ◦ Camels can drink large quantities of water and survive long dry periods. ◦ Fennec foxes have large ears for heat regulation

- **Savannas**: Dry Tropical Grasslands

Location: Across the world. Africa, Australia, North Central, and South America. On a global scale, savannas are transitional between tropical rain forest and desert **Latitude**: Typically around 8° to 20° from equator.

Precipitation: Rainfall is seasonal: 75-125 cm (30-49 in) annually ◦ Dry winters and wet summers

Temperature: Temperature can vary between regions, but possible ranges include 8-30°C (45-85°F)

Vegetation: Grasslands with some trees

Animals: Wide variety that can graze or prey on grazers ◦ Lots of endangered animals

- Tropical Rain Forests Location: Close to equator in S. America, Africa, and Asia ◦ Temperate rain forests are a bit cooler in moist coastal regions that do not freeze Latitude: 15-20° N & S of equator Precipitation: Very rainy! Experience more than 250 cm of rain a year (>100 inches) Temperature: Stays warm: 20-25°C (68-77°F) Vegetation: Very diverse! ◦ Rich ecosystem with wide variety of vegetation Animals: Very diverse! ◦ Lots of mammals, amphibians, reptiles, birds, insects

- Temperate Deciduous Forests: Hardwood Forests

Location: North America, Europe, and Asia Latitude: 25° and 50° latitude in both hemispheres Precipitation: The average amount of rainfall in the forest is 76-152 cm (30 to 60 inches) a year. Temperature: Four distinct seasons. ◦ 4-6 frost-free months (early fall, late spring, summer) ◦ Times with mild climate and lots of rain (spring) Vegetation: Deciduous trees drop leaves in winter ◦ Much forest area lost to farms and towns Animals: Variety of mammals (deer, elk, foxes, racoons), birds, and insects

- Temperate Grasslands: Seas of Grass

Location: North America, Europe and Asia. ◦ Temperate regions found halfway between the equator and the poles. Latitude: 25° and 55° latitude in both hemispheres Precipitation: 25-76 cm (10 to 30 in.) rain Temperature: -40 to 21°C (-40°F to 70°F) Vegetation: Very rich agricultural regions. Commonly referred to as a prairie. Lots of grasses and shrubs. Animals: Often populated by herds of grazing mammals (bison!). Bears, wolves, elk here too.

b. List the major causes of extinction and describe how each is related to human activity.

Mass extinctions:

-Species loss on a global scale

-Affect large numbers of species

-Dramatic impact

Probably caused by massive global changes

– Climate fluctuations that changed sea levels

– Continental drift that changed ocean and land forms

– Asteroid impact that caused widespread destruction and climate chang

Extinctions are caused by various events

Causes of extinction

– Loss or degradation of habitat

– Introduction of nonnative species

– Overexploitation of species

– Pollution

-Extinctions due to habitat

Habitat: the place where a particular species lives and obtains food, water, shelter, and space

Habitat degradation is when there is damage and destruction to the habitat **Habitat destruction**: human modification and degradation of natural forests, grasslands, wetlands, and waterways

– Accelerated rates of destruction in 20 th century due to human population growth

– Most serious threat to species around the globe

– Caused by human use and development

Habitat fragmentation: large natural areas subdivided into smaller areas

–More commonly caused by human activity

–Especially threatening to large predators

◦ E.g., grizzly bears and tigers need large hunting areas

Extinctions disrupt food chains

Food chain: linear flow of energy within an ecosystem; energy flows in one direction– Sun → producers → primary consumers → secondary consumers ◦ --Producers: photosynthetic organisms

- Primary consumers: feed on producers

- Secondary consumers: predators that feed on primary consumers

Trophic level: a level of the food chain

c. Explain the principle of the trophic pyramid.

Extinctions disrupt trophic levels

Trophic pyramid: the flow of energy along a food chain

– Most biomass (total weight) at bottom level

– Much energy lost as heat between levels

d. Define predation, mutualism, and competition, and provide examples of each ecological interaction.

-**Mutualism**: interactions between two species that benefit each other

Bees and flowering plants

– Bees collect excess pollen and nectar for food while pollinating flowers to increase seed production.

– Wild bees pollinate 80% of agricultural crops in the United States.

-Commensalism: relationship in which one species benefits and the other is unaffected

– Cattle egrets and domestic cattle

◦ Egrets feed on insects stirred up by cattle.

◦ No benefit or harm appears to affect cattle

-**Predator**: species that survives by eating another species

– Cheetahs

– Eagles

– Killer whales

– Songbirds

Example: Wood warblers voraciously consume insects.

Most insects eaten by warblers prey on plants.

– Reduces insect damage to forest plants

– Increases tree growth

– $230 billion in paper and lumber products in the United State

-**Competition**: occurs when two species require the same resources for life Limits the size of competing populations

Competitive exclusion: introduction of one species to reduce another species that requires the same resources

Hen digestive systems are deliberately infected with harmless bacteria

–Harmless bacteria establish in the intestine.

–Chicks less likely to host S. enteritidis ◦ S. enteritidis infections reduced by 50% in United Kingdom

e. Define food web and ecosystem and explain the role of keystone and non-

Biological community: all of the organisms living together in a particular habitat area

– Ecological niche: the role or “job” of the species

– Humans benefit from the community species.

Food Web: complex linkage among organisms inhabiting different niches in a community

– Disruption in one strand affects other portions of the web.keystone species in both.

Extinctions affect keystone species

Keystone species: plays a dramatic role in determining the composition of a system’s **food web**; may have indirect effects on the community

◦ Like a keystone in an archway ◦ Removal of keystone species may cause web of life to collapse.

Mid-1920s: Gray wolves were exterminated within Yellowstone Park.

◦ Aspen, cottonwood, and willow trees declined due to increased predation by elk.

In the 1990s, wolves were reintroduced.

◦ **Trees rebounded**

.– Beneficial effects on beavers, warblers, insects, and fish that depend on shelter, food, and shade

f. List strategies that will help reduce the number of extinctions going forward.

Saving Species by focusing on Hot Spots

Saving Species with Policies

Taking action to preserve biodiversity

2. Research Article Jigsaws

a. Compare and contrast the significance, methods and results for following papers for the Biome Jigsaw:

i. Conservation of Earth's biodiversity is embedded in Indigenous fire stewardship

ii. Importance of Indigenous Peoples' lands for the conservation of Intact Forest Landscapes

iii. Amazonian vegetation types and indigenous lands threatened by upcoming climate change: Forecast impact for Brazilian biomes

iv. Indigenous knowledge and the shackles of wilderness

b. Compare and contrast the significance, methods and results following papers for the Conservation Jigsaw:

i. Rediscovery of traditional ecological knowledge as adaptive management

ii. Indigenous Knowledge and Biodiversity Conservation and Management in Ghana

iii. Native Perspectives about Coupling Indigenous Traditional Knowledge with Western Science in Geoscience Education from a Focus Group Study

iv. Indigenous knowledge and rangelands' biodiversity conservation in Tanzania: success and failure

3. Braiding Sweetgrass

a. Summarize each of the following chapters in "Braiding Sweetgrass" and identify unifying themes.

i. Footsteps of Nanabozho: Becoming Indigenous to Place [4.1]

They are explaining the new coming of moving to new land and making it your home becoming a part of that land too growing your family through future generations. "Nanabozho " the first man

Be of good to the land

ii. The Sound of Silverbells [4.2]

Kimmerer try's to teach student how nature and indigenous beliefs

iii. Sitting in a Circle [4.3]

Surviving through the land and giving back to the land for what it gives us. Also, tradition and reciprocity

iv. Burning Cascade Head [4.4]

Salmon ceremonies are celebrating, dancing, ritual burn at the top of a cliff and feasting. Kimmerer discusses that people do things for

others but over time as people modernize, they forget to do ceremonies for the earth that give us so many things

v. Putting Down Roots [4.5]

Is about the importance of restoration and letting things die not keeping life in it such as the ecosystem and culture

vi. Umbilicaria: The Belly Button of the World [4.6]

The connection of how lichen fungus and algal will help each other in hard times to survive and through that help other species too. Kimmerer tells us to be like the lichen and algal work together to help our climate change.

- - .

vii. Witness to the Rain [4.8]

Is Kimmerer overlooking the rain and how the way it flows throughout nature. Nature is all around us, it can't be separated but slowly understood and its different sense of time. Natural nature can't be compared to our knowledge it is sources us and is way wiser.

b. Summarize each of the following chapters in "Burning Sweetgrass" and identify unifying themes

i. Windigo Footprints [5.1]

It is a monster that eats humans and has greed, overconsumption.

It is into a loop the more it eats the more it wants leading to its own destruction. Kimmerer relates this to our modern live and obsession in the money economy and our over consumption.

ii. The Sacred and the Superfund [5.2]

The fight to regain the right to the Onondaga lake to restore and take care the lake to how once it was before it becomes a completely polluted lake and forgotten along the way.

iii. People of Corn, People of Light [5.3]

Explain how the people of light where arrogant and the people of corn care for the earth.in context the humans think they are above all forgetting all the other parts they can make us better bring science and spirt of learning from the earth together.

iv. Collateral Damage [5.4]

Is the explanation that the deaths are justifiable. Kimmerer gives us two examples a salamander killed on the road and a Baghdad kill because of oil. Humans have made it look like it's just something that had to happen as part of nature and not that humans did, they didn't have a choice.

v. People of the Seventh Fire" [5.5]

This part explain the fire and how it is seen as both destructive and healing force to the people. The seventh fire is seen as when people go back to their traditions of teaching as healing after their hard time and grief. The eight fire is after all the bad now is transition to peace moving forward and keeping their spirt alive.

vi. Defeating Windigo [5.6],

Is the explanation of overcoming the monster and its overconsumption that we see as the enemy. But there is so much more and rich live what her solution was to make the monster vomit all the bad it had consumed to give it back to the land it took from.