

APES Exam Review – Ecosystems / Food Webs

population	community	ecosystem
domesticated species	biosphere	abiotic factors
biotic factors	range of tolerance	limiting factor
autotrophs / producers	chemosynthesis	
consumers/heterotrophs		
scavengers	detrivores	food webs
biomass	ecological efficiency	primary productivity
ecotone	trophic level	

_____ 1. Non-living factors in an ecosystem, including rocks, soil, water, sunlight, wind, current, etc.

_____ 2. A factor that influences population growth; principle states that too much or too little of any abiotic factor can limit or prevent growth of a population even if all other factors are at or near optimum range of tolerance.

_____ 3. Organisms at the base of the food web that produce their own food by photosynthesis or chemosynthesis; most biomass of a community

_____ 4. Populations of all the different species occupying in a particular place

_____ 5. A community of different species interacting with one another and with their non-living environment

_____ 6. A species that has been plucked from its normal ecological environment to support the needs and wants of humans (ex. cows, grasses, food crops)

_____ 7. Detritus feeders and decomposers that live off detritus – parts of dead organisms and cast-off fragments and wastes of living organisms

_____ 8. Organisms in a community that obtain their energy by feeding on other organisms or their remains; includes herbivores, carnivores, and omnivores

_____ 9. A group of interacting individuals of the same species that occupy a specific area at the same time

_____ 10. All of the earth's ecosystems; the portion of earth in which living organisms exist and interact with one another and their non-living environment

_____ 11. A region containing a mixture of species from adjacent regions (ex. marshland found between water and open land)

_____ 12. Variations in the physical and chemical environment that a particular organism can withstand (ex. temperature of water for fish species)

_____ 13. The process of producing complex nutrient compounds from simple compounds in the environment without sunlight; usually found in specialized bacteria

_____ 14. A level of feeding in a food web

_____ 15. The dry weight of all organic matter contained in the organisms in an ecosystem; may be represented in an ecological pyramid

_____ 16. A complex network of interconnected food chains

_____ 17. The percentage of energy that is transferred from one trophic level to the next; usually about 10%

_____ 18. The rate at which an ecosystem's producers convert solar energy into chemical energy as biomass

_____ 19. Consumers that feed on dead organisms that were killed by other organisms

_____ 20. Living components of an ecosystem (plants, animals, microorganisms)

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Energy flow		
pH/DO		
Thermodynamics		
Field research		

biodiversity	microevolution	selective pressure
coevolution	niche	speciation
background extinction	specialist species	exotic species
indicator species	keystone species	competitive exclusion
resource partitioning	mimicry	parasitism
commensalism	mutualism	succession
pioneer species	facilitation	inhibition
disturbance	climax community	natural selection

- _____ 1. The “end product” of ecological succession; a long-lived community of organisms that can sustain itself indefinitely; varies depending on area
- _____ 2. May be primary (gradual establishment of biological communities) or secondary (reestablishment of a biological community in an area following a disturbance; ex. natural disaster, abandoned farmland, heavy pollution)
- _____ 3. The ability to look or act like another organism that has methods of protection from predators (ex. monarch / viceroy butterfly)
- _____ 4. A species that serves as an early warning of damage in an ecosystem or community (ex. lichen, amphibians)
- _____ 5. The many different types of life found on this planet – bacteria, protist, fungi, plant and animal. The planet’s genetic raw material for future evolution.
- _____ 6. Small genetic changes that occur in a population; works through mutation, natural selection, gene flow, and genetic drift to change the gene pool of a population.
- _____ 7. A factor in a population’s environment that causes natural selection to occur.
- _____ 8. Hardy species that are the first to appear at the beginning of ecological succession (ex. lichen, mosses, grasses)
- _____ 9. A symbiotic association where one species benefits while the other is unaffected; epiphytes on tree branches, plants that grow in shade of trees
- _____ 10. A symbiotic association where one species benefits and the other is harmed; may be ecto- or endo- ; mistletoe in trees, athlete’s foot fungus
- _____ 11. A symbiotic association where both interacting species benefit; mycorrhizal fungi on plant roots, termite and protozoan
- _____ 12. Human-caused or natural; a discrete event in time that disrupts an ecosystem or community; fire, drought, deforestation, plowing
- _____ 13. Occurs when species make an area suitable for species with different niche requirements (ex. lichens and mosses build up soil on rocks)

_____ 14. Occurs when early species hinder the establishment and growth of other species

_____ 15. Introduced species that may thrive and crowd out native species (ex. zebra mussel, cane toad, kudzu, Africanized bees)

_____ 16. Species whose roles in an ecosystem are much more important than abundance would indicate (ex. sea otters keep sea urchins from depleting kelp beds, dung beetles remove, bury, and recycle animal wastes)

_____ 17. A species with a narrow niche; may be able to live in only one type of habitat, have a narrow range of tolerance for certain environmental conditions, or use only certain types of food (ex. giant panda, northern spotted owl)

_____ 18. The role a species plays in an ecosystem, its total way of life; includes “fundamental” aspect (full potential range of conditions and resources) and “realized” aspect (that actually utilized)

_____ 19. When some individuals have genetically based traits that cause them to better survive and produce offspring; must start with variation in a population, and lead to differential reproduction

_____ 20. When two species arise from one; usually starts with geographic isolation, followed by reproductive isolation

_____ 21. Disappearance of species at a low rate, as local conditions change

_____ 22. Occurs when species interact over a long period of time so that changes in the gene pool of one can lead to changes in the gene pool of the other (ex. plants and pollinators, predators and their prey)

_____ 23. Two species requiring the same resource cannot coexist indefinitely in an ecosystem; “one niche, one species”; one species will displace the other

_____ 24. Dividing up of scarce resources so that species with similar requirements use them at different times, in different ways, or in different places (ex. lions/leopards, hawks/owls, birds using different parts of trees)

Connections: Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Role of fire		
Endangered Species		
Tropical Rain Forest		

APES Exam Review – Nutrient Cycles and Soils

hydrologic cycle	transpiration	infiltration
percolation	condensation nuclei	carbon cycle
nitrogen cycle	nitrogen fixation	phosphorus cycle
sulfur cycle	rock cycle	soil horizons
soil profile	humus	leaching
soil texture	loams	soil porosity
soil permeability	weathering	

- _____ 1. Cycle that is driven by photosynthesis and cellular respiration, and is also influenced by burning of fossil fuels
- _____ 2. A measure of the volume of pores or spaces per volume of soil and of the average distances between those spaces
- _____ 3. Soils with roughly equal measures of sand, silt and clay
- _____ 4. Cycle which collects, purifies, and distributes water ; includes precipitation, evaporation, transpiration, condensation, infiltration, percolation, and runoff
- _____ 5. A global gaseous cycle that begins with atmospheric nitrogen, and through a series of steps carried out by various species of bacteria, converts it to a usable form before returning it to the atmosphere
- _____ 6. The rate at which water and air move from upper to lower soil layers
- _____ 7. Zones of soils, each with a distinct texture and composition that varies with type of soil; named O, A, B, and C
- _____ 8. Cycle that includes input from natural sources such as volcanoes and human sources such as industries; most of this nutrient is tied up in underground rocks and deep ocean sediments
- _____ 9. Specialized bacteria living in the root nodules of legumes convert gaseous nitrogen to ammonia
- _____ 10. Movement of water into soil
- _____ 11. Downward flow of water through soil and permeable rock formations to groundwater storage areas
- _____ 12. Evaporation from the leaves of water extracted from soil by roots and transported throughout the plant
- _____ 13. Partially decomposed organic matter

_____ 14. The interaction of processes that change rock from one form to another over time (rock types – igneous, sedimentary, metamorphic)

_____ 15. Mechanical or chemical process that breaks apart or decomposes rock

_____ 16. Relative amounts of the different types of soil particles (sand, silt and clay)

_____ 17. As water seeps down through the soil, it dissolves various soil components in upper layers and carries them to lower layers

_____ 18. A cross-sectional view of the horizons in soil

_____ 19. Cycle in which nutrient moves slowly from deposits on land and in ocean sediments to living organisms, and then more slowly back to the land and ocean

_____ 20. Tiny particles on which droplets of water vapor can collect; needed in order for precipitation to occur

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Acid deposition		
Global warming		
Water withdrawal		
Soil fertility / agriculture		

front	ENSO	microclimate
deciduous	taiga	epiphytes
succulent	grassland	permafrost
estuary	plankton	eutrophic
benthos	euphotic	thermal stratification
intertidal zone	barrier island	river system
overtum	mitigation banking	

_____ 1. Long, thin, low offshore islands of sediment that generally run parallel to the shore; help protect the mainland by dispersing energy of storm waves.

_____ 2. Plants that attach themselves to the trunks and branches of canopy trees and obtain nutrients from bits of organic matter falling from the canopy.

_____ 3. Persist because of grazing animals, seasonal drought, and periodic fire; types include savanna, prairies, pampas, veldt, steppes, and polar (tundra).

_____ 4. Plants with the ability to store water in their tissues, typical of desert biomes (ex. cacti, aloe).

_____ 5. Boundary between 2 air masses with different temperatures and densities (cold or warm); produces dramatic changes in weather.

_____ 6. The separation of lakes into different temperature layers; upper layer – epilimnion (warm water), lower layer – hypolimnion (cold water), separated by a “thermocline”.

_____ 7. The mixing of lake waters in spring and fall when water temperatures at all depths are equalized; mixes nutrients and oxygen.

_____ 8. Highly productive areas, important as breeding grounds and in water purification, where fresh water and salt water mix; temperature and salinity vary with tidal change.

_____ 9. El Nino-Southern Oscillation, occurs in Pacific Ocean; prevailing westerly winds weaken or cease, surface waters become warmer, normal upwelling is suppressed; can trigger extreme weather changes.

_____ 10. Weakly swimming or free-floating organisms; phyto-plantlike, zoo- animallike

_____ 11. Policy that allows destruction of existing wetlands as long as an equal area of the same type of wetland is created or restored.

_____ 12. Area of shoreline between low and high tide; organisms that inhabit must be able to cope with changing levels of water and salinity.

_____ 13. Local climatic conditions created by topographic features that differ from the general climate of a region; mountains, forests, or cities.

_____ 14. A perennially frozen layer of soil that prevents liquid water from seeping into the ground during summer months, leading to waterlogged soil at the surface.

_____ 15. Aquatic bottom-dwelling creatures such as barnacles, oysters, worms, and lobsters.

_____ 16. A series of different ecosystems; source zone – headwaters (clear, turbulent), transition zone – wider, deeper (warmer, more nutrients), flood plain zone – meander across broad valleys (slow moving)

_____ 17. Well nourished lakes that are typically shallow with turbid water and have high primary productivity.

_____ 18. Upper layer of water where photosynthesis occurs.

_____ 19. Subarctic forest predominated by large evergreen trees; winters are long, dry, and extremely cold.

_____ 20. Plants that survive cold winters by shedding their leaves and becoming dormant.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Primary productivity		
Biodiversity		
Erosion		
Adaptations		
Symbiosis		

population density	population dispersion	ZPG
carrying capacity	exponential growth (J -curve)	r-strategists
population cycles	density-independent controls	K-strategists
survivorship curve	density-dependent controls	birth/death
rate		
habitat fragmentation	doubling time	TFR
replacement level fertility	infant mortality rate	baby boom
age-structure diagrams	demographic transition	family planning

_____ 1. Total Fertility Rate; estimate of the average number of children a woman will have during her child-bearing years. The most useful measure of fertility for projecting future population change.

_____ 2. Number per 1000 people in a population in a given year.

_____ 3. Shows the number of survivors of each age group for a particular species; 3 types – late loss, early loss, constant loss.

_____ 4. The spatial pattern in which the members of a population are found in their particular habitat – clumped, uniform, or random.

_____ 5. Zero Population Growth; number of individuals added through birth or immigration equals the number being lost by death or emigration.

_____ 6. The process by which human activities breaks natural ecosystems into smaller and smaller pieces of land, and land between is unable to support population of wild species. May be connected by “corridors”.

_____ 7. The number of children a couple must have in order to replace themselves.

_____ 8. Represented by a bulge in an age-structure diagram; occurs when there is an unusually high fertility rate for a given period of time.

_____ 9. Provides educational and clinical services that help couples choose how many children to have and when to have them.

_____ 10. Histograms that convey the proportion of a population of each gender at each age level. Divided into pre-reproductive, reproductive, and post-reproductive categories.

_____ 11. The number of individuals of a population in a certain space at a given time. $D=m/v$

_____ 12. Growth that starts out slowly, then proceeds faster and faster as the population increases.

_____ 13. The number of babies out of every 1000 born each year that die within a year of birth; one of the best indicators of the overall health of a country.

_____ 14. A change in the structure of a population of a country as it becomes more industrialized; 4 stages – pre-industrial, transitional, industrial, postindustrial.

_____ 15. Species that tend to reproduce late and have few offspring with long generation times (few-but-large-young strategy).

_____ 16. Species that have many offspring each time they reproduce, reach reproductive age rapidly, and have short generation times (small-and-unprotected-young strategy).

_____ 17. A measure of how long it takes to double population size using the rule of 70. $DT = 70 / \% \text{ growth rate}$

_____ 18. The number of a given species that can be sustained indefinitely in a given space or area.

_____ 19. Controls that affect a population's size regardless of its density – floods, hurricanes, earthquakes, fire, drought, habitat destruction.

_____ 20. Limiting factors that have a greater effect as the population density increases – food, disease, parasitism.

_____ 21. 3 types – stable, irruptive, and cyclic.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Island biogeography		
China		
Conservation		
Empowering women		
Economic influence		

industrialized agriculture	subsistence agriculture	monoculture
agroforestry	malnutrition	aquaculture
watershed	aquifers	dams/reservoirs
desalination	irrigation	floodplain
plate tectonics	erosion	ore
reserves	surface mining	smelting
desertification	contour farming	compost

- _____ 1. Plowing and planting crops in rows across, rather than up and down the sloped contour of the land; helps to reduce run-off and erosion.
- _____ 2. Theory explaining the movements of the earth's plates and the interactions (subduction, transform faults) that occur at boundaries.
- _____ 3. A method of interplanting where crops and trees are planted together (ex. legumes and orchard trees) to reduce the chances of losing a year's crop.
- _____ 4. Method of farming that produces only enough crops or livestock for a farm family's survival.
- _____ 5. Created to control water flow of a river to maximize its benefits to humans; used in production of electricity, water diversion projects, or to provide recreational areas.
- _____ 6. The removal of dissolved salts from ocean water or brackish water in order to increase fresh water supplies.
- _____ 7. The area adjacent to a river or stream that may be covered with water if the stream overflows its normal channel. Land is very fertile and has been traditionally settled upon.
- _____ 8. Use of mechanized equipment to strip away overburden of soil and rock and remove profitable deposits of minerals. Includes open-pit mining, strip mining, and dredging.
- _____ 9. Uses large amounts of fossil fuel energy, water, commercial fertilizers, and pesticides to produce huge quantities of single crops.
- _____ 10. A single crop grown on an area of land; usually selectively bred or genetically engineered high-yield varieties of key crops.
- _____ 11. Porous, water-saturated layers of sand, gravel or bedrock through which groundwater flows; supply ~50% of U.S. drinking water and ~40% of U.S. irrigation water.
- _____ 12. A rich, natural fertilizer and soil conditioner that aerates soil, improves water-holding capacity, and prevents erosion. Produced by the decomposition of nitrogen-rich organic material.

_____ 13. A drainage basin, or region of land, from which water drains into a nearby body of surface water.

_____ 14. Distribution of water to the world's croplands; the largest use of water world-wide.

_____ 15. A process by which the productive potential of arid land falls by 10% or more, resulting mostly from human activities such as overgrazing, deforestation, surface mining, increased erosion, or soil compaction.

_____ 16. Raising fish or shellfish for food, includes fish farming (cultivating fish in a controlled setting) or fish ranching (holding anadromous species in captivity, then releasing them, and finally harvesting the adults).

_____ 17. Identified resources that can be extracted economically at current prices using current mining technology.

_____ 18. Process that separates the metal from other elements in the ore mineral; may emit huge quantities of air pollutants.

_____ 19. Movement of soil components from one place to another, usually by water or wind.

_____ 20. Deficiencies of protein and key micronutrients (ie. vitamins); examples are marasmus and kwashiorkor

_____ 21. A metal-yielding material that can be economically extracted at a given time.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Biodiversity loss		
Government subsidies		
Deforestation		
Water Pollution		
Pesticides		

APES Exam Review – Energy Resources

net energy	fossil fuel	refinery
cogeneration	non-renewable resources	nuclear fission
fluidized-bed combustion	radioactive waste	OPEC
energy efficiency	renewable resources	solar power
photovoltaic cells	hydropower	biomass
geothermal energy	wind power	

- _____ 1. Organic material (wood, manure, etc.) that can be burned to produce energy; renewable if rate of loss does not exceed rate of replenishment. Often used in developing countries.
- _____ 2. May be passive (capturing sunlight directly within a structure) or active (using specially designed collectors to capture the sun's energy).
- _____ 3. Solar cells used to convert solar energy directly into electricity.
- _____ 4. Low-level or high-level waste given off during each part of the nuclear fuel cycle; gives off varying amounts of ionizing radiation.
- _____ 5. The usable amount of high-quality energy available from a given quantity of an energy resource: total useful energy minus amount of energy used, automatically wasted, and unnecessarily wasted in finding, processing, and transporting it to users.
- _____ 6. Resource that exists in a fixed amount in the earth's crust; includes coal, oil, natural gas.
- _____ 7. Products of decomposition of plants and animals when exposed to heat and pressure; includes coal, crude oil, natural gas.
- _____ 8. The production of two useful forms of energy (ex. steam and electricity) from the same fuel source.
- _____ 9. The percentage of total energy input that does useful work in an energy conversion system. Models may cost more initially but have a lower life-cycle cost.
- _____ 10. Use of water to generate electricity through large-scale projects (dams and reservoirs), small-scale projects (low dams, no reservoir), or pumped-storage systems.
- _____ 11. Use of wind turbines to generate electricity; often utilizes large-scale wind farms.

_____ 12. Heat contained in underground rocks and fluids that, in accessible sites, may be used to heat space or water, and to generate electricity.

_____ 13. An essentially inexhaustible resource on a human time scale; includes solar, wind, geothermal, and hydropower.

_____ 14. Organization of Petroleum Exporting Countries: 13 countries which control ~67% of the world's oil reserves.

_____ 15. Method of removing SO₂ and NO_x from coal in order to burn it more cleanly and efficiently.

_____ 16. Method of generating power by splitting atoms of fuels such as Uranium-235 and Plutonium-239.

_____ 17. Where crude oil is heated and distilled to separate it into different components (depending on boiling points) such as asphalt, diesel oil, heating oil, and gasoline.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Criteria pollutants (air)		
Surface mining		
Thermodynamics		
Sustainability		
Water diversion		

bioaccumulation	biomagnification	LD ₅₀
emerging disease	mutagen	teratogen
carcinogen	pathogen	WHO
pandemic	epidemiological transition	synergy
broad-spectrum agents	pesticide treadmill	Bt toxin
pheromone	IPM	

_____ 1. Biopesticide from the bacterium Bacillus thuringensis that may be used in powder form, or added to crops by genetic engineering, to disrupt the digestive systems of pests.

_____ 2. Occurs as a developing country goes through a period of high death rate, followed by a drop in death rate due to improvements in medicine and sanitation, and then finally reaches a period where deaths are caused by non-transmissible diseases.

_____ 3. Chemicals, such as the drug thalidomide, as well as other factors that may cause birth defects.

_____ 4. Agents such as UV radiation that cause changes in the DNA molecules found in cells.

_____ 5. Agents that cause or promote the growth of malignant tumors (cancer).

_____ 6. Occurs as pests develop genetic resistance to pesticides, causing farmers to have to increase applications of pesticides as they become less and less effective.

_____ 7. Pesticides that are toxic to many species, not only the intended or "target" species.

_____ 8. Any living organisms (bacterium, animal, protozoan, fungus, etc.) that may cause disease.

_____ 9. Chemical sex attractants released by many insect species that may be useful in controlling insect pests.

_____ 10. An integrated pest management program that includes a mix of cultivation, biological, and chemical methods applied in proper sequence and with the proper timing

_____ 11. The amount of a chemical received in one dose that kills 50% of the animals in a test population.

_____ 12. An increase in the concentration of certain chemicals in specific organs or tissues of the body.

_____ 13. An increase in the levels of certain toxins, such as DDT, as they pass through food webs in the environment.

_____ 14. UN organization created to promote world-wide health.

_____ 15. Chemical interactions that increase the harmful effects of one or both chemicals.

_____ 16. Diseases, such as HIV and ebola, that have been rising for at least 2 decades and are likely to continue to increase in the near future due to new pathways of infection.

_____ 17. Massive epidemics that occur as a result of major viral genetic shifts.

CONNECTIONS:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Endangered Species		
El Nino (ENSO)		
Natural selection		
Demographic transition		
Genetic engineering		

APES Exam Review – Air Quality

primary pollutants	secondary pollutants	photochemical smog
thermal inversion	acid precipitation	acid deposition
sick building syndrome	radon gas	particulates
scrubbers	greenhouse effect	global warming
greenhouse gases	ozone depletion	freons

- _____ 1. The earth's ability to trap heat in the atmosphere due to a combination of gases.
- _____ 2. Include carbon dioxide, methane, nitrous oxides, and CFCs.
- _____ 3. Synthetic chemicals that are stable, odorless, and non-toxic, created to use as coolants in refrigerators and air conditioners. Include CFCs.
- _____ 4. Occurs when wet and dry acidic particles descend to the earth's surface.
- _____ 5. Formed when pollutants such as sulfur dioxides and nitrous oxides react with water vapor in the atmosphere.
- _____ 6. Caused by the increased accumulation of greenhouse gases in the atmosphere, particularly carbon dioxide.
- _____ 7. Chemicals that are dispersed into the atmosphere either by natural or human-caused sources.
- _____ 8. Formed by a mixture of primary and secondary pollutants, including ozone, and the addition of sunlight.
- _____ 9. When a layer of cool air is trapped beneath a layer of warmer air, preventing ascending air currents from developing.
- _____ 10. New pollutants formed by a mixture of chemicals and basic components of air.
- _____ 11. Symptoms such as coughing, sneezing, nausea, and burning eyes, suffered by 20% of the occupants of a particular building.
- _____ 12. A colorless, odorless, tasteless gas that may be drawn into buildings from the soil or rock that they are built on.
- _____ 13. Seasonal thinning or loss of ozone in the upper stratosphere above Antarctica.

_____ 14. One of the methods used to remove particulate emissions from factory smokestacks. Other methods include electrostatic precipitators and baghouse filters.

_____ 15. Tiny suspended particles that are emitted by incinerators, motor vehicles, wind erosion and power plants. May lodge in respiratory tract and harm human health.

CONNECTIONS:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Synergy		
Water pollution		
Indicator Species		
Tolerance limits		
Fossil fuels		
Emerging diseases		

coliform bacteria	BOD	inorganic chemicals
cultural eutrophication	turbidity	thermal pollution
non-point sources	point sources	macroinvertebrates
organic chemicals	oxygen sag	sewage treatment

_____ 1. Sources of pollution that cannot be traced to any single site of discharge, such as run-off from watershed areas or acid deposition.

_____ 2. One of the best biological indicators of drinking water quality; WHO recommends 0 colonies per 100 ml. Found in water contaminated by human or animal sewage.

_____ 3. A measure of the clarity of water. High numbers can indicate sediment pollution that may endanger aquatic gill breathing organisms or impair photosynthesis.

_____ 4. A rise in the temperature of water which decreases dissolved oxygen content.

_____ 5. Caused by an increased amount of nutrients added to lake ecosystems; usually by fertilizer run-off or sewage treatment effluent. Leads to algal blooms, then subsequent decomposition followed by a fall in DO.

_____ 6. Specific locations that discharge pollutants into the water (e.g. pipes, sewers, ditches).

_____ 7. Includes primary (mechanical), secondary (biological), and advanced (chemical / physical) processes to purify water.

_____ 8. Biological Oxygen Demand; measures the amount of oxygen-demanding wastes in the water, such as sewage or other organic matter.

_____ 9. A decrease in DO in an area of a stream following bacterial decomposition of organic material. Depth and width of curve depends of on stream's volume, flow rate, temperature, pH level, and volume of waste.

_____ 10. Includes oil, gasoline, plastics, pesticides, cleaning solvents, and detergents; threatens human health and harms fish and other aquatic life.

_____ 11. Biological indicators; presence or absence of specific species may indicate good or poor water quality. (Ex. mayfly larvae = good water quality).

_____ 12. Acids, salts, and compounds of toxic metals such as mercury and lead.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Air quality		
Biomagnification/ DDT		
Groundwater resources		
Wetlands / estuaries		
Hazardous waste disposal		

municipal solid waste reuse materials-recovery facility bioremediation deep-well disposal	hazardous waste recycle source separation mass-burn incinerators leachate	reduce compost post-consumer waste sanitary landfill anaerobic decomposition
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_____ 1. Lined with clay and plastic, solid wastes spread out in thin layers and covered daily with dirt or foam.

_____ 2. Separating trash into recyclable and reusable categories before it is picked up; saves energy, reduces litter, and has low start-up and operating costs

_____ 3. Solid waste produced by homes and businesses; only about 1.5% of the waste produced in the US.

_____ 4. Waste reduction; extends resource supplies, and reduces energy use and pollution (ex. refillable beverage containers, canvas grocery bags)

_____ 5. Locations where machines shred and automatically separate mixed waste to recover glass, iron, aluminum, and other valuable materials – remaining wastes are recycled or burned.

_____ 6. Liquid hazardous wastes are pumped under pressure through a pipe into rock formations below aquifers.

_____ 7. Legally defined as waste that (1) contains toxic, carcinogenic, mutagenic, or teratogenic compounds, (2) catches fire easily, (3) is reactive or unstable, or (4) is corrosive; omits many types of hazardous waste!

_____ 8. Low-waste approach / decreasing consumption; saves energy, saves virgin resources, reduces environmental impact, improves worker health and safety, saves money.

_____ 9. Produced when microorganisms in soil break down organic matter such as leaves, food scraps, paper and wood.

_____ 10. Waste intercepted on its way from consumer to landfill; only recycled products made from this type of waste are effective in reducing solid waste.

_____ 11. Rainwater contaminated as it percolates through the solid waste in a landfill; collected from the bottom of sanitary landfills and sent to waste treatment facilities.

_____ 12. Burn mixed trash without separating out hazardous materials or non-combustible materials; costly to build, operate, and create few long-term jobs.

_____ 13. Closed-loop (post-consumer waste used to create new products of the same type), or open-loop (waste materials converted into different products).

_____ 14. Produces methane (a greenhouse gas) in landfills, which may be collected and burned in small power plants.

_____ 15. Biological treatment of hazardous waste; bacteria destroy hazardous or toxic materials or convert them to harmless forms.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Tragedy of the Commons		
Mining/Resource extraction		
Environmental Justice		
Global warming		
Groundwater contamination		

Principle of sustainable yield	Principle of multiple use	National forests
National Parks	Rangeland	Overgrazing
Riparian zones	Wilderness	Old-growth forests
Habitat corridors	Even-aged management	Selective cutting
Prescribed burning	Debt-for-Nature swap	

_____ 1. Uncut forests and regenerated forests that have not been seriously disturbed for several hundred or thousands of years. (Ex. Pacific Northwest temperate rain forests, tropical rain forests)

_____ 2. Land that supports forage or vegetation for grazing and browsing animals that is not extensively managed.

_____ 3. States that potentially renewable resources (such as trees) should not be harvested or used faster than they are replenished.

_____ 4. States that the same land should be managed simultaneously for a variety of uses, such as sustainable timber harvesting, grazing, recreation, and wildlife conservation.

_____ 5. Areas “where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain”.

_____ 6. Setting controlled ground fires to prevent buildup of flammable material.

_____ 7. Participating countries act as custodians for protected forest reserves in return for foreign aid or debt relief.

_____ 8. Land managed by the principles of sustainable yield and multiple use; used for logging, mining, livestock grazing, farming, oil and gas extraction, recreation, sport hunting, sport and commercial fishing, and conservation of resources.

_____ 9. Restricted-use lands that may be used only for camping, hiking, sport fishing and boating.

_____ 10. Trees in a given stand (usually monoculture) are maintained at about the same age and size; forests viewed primarily as lumber and fiber factories.

_____ 11. Harvesting technique where intermediate-aged or mature trees in an uneven-aged forest are cut singly or in small groups, creating small gaps that reduce crowding and encourages growth of younger trees.

_____ 12. Thin strips of lush vegetation along streams that help prevent floods, provide habitat, and provide food; may be easily trampled and destroyed by grazing cattle.

_____ 13. Occurs when too many animals graze for too long and exceed the carrying capacity of a grassland area; lowers productivity and changes the number and types of plants in an area.

_____ 14. Long areas of land that connect habitat that would otherwise become fragmented; permit movement of migratory animals and ensure a diverse gene pool by permitting some interbreeding between different populations of the same species.

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
Habitat fragmentation		
Desertification		
Biodiversity		
Endangered Species/ Extinction		
Tropical deforestation		

Intrinsic value	background extinction	mass extinction
Precautionary principle	ecological extinction	endangered species
Threatened species	habitat fragmentation	habitat islands
Poaching	overfishing	bioinformatics
CITES	Endangered Species Act	Lacey Act
Gene banks	flyways	IWC

_____ 1. Occurs when there are so few members left of a species, that it can no longer play its ecological roles (ex. American chestnut)

_____ 2. National parks, tropical rain forests, lakes, and nature reserves that provide habitat within an inhospitable sea of development.

_____ 3. Illegal hunting of endangered or threatened plant and animal species.

_____ 4. An organism's right to exist, regardless of its value to humans.

_____ 5. A species with so few individual survivors that it could soon become extinct over most or all of its natural range.

_____ 6. Harvesting fish using methods such as purse-seine fishing, longlining, or drift-net fishing, faster than the fish can replace themselves.

_____ 7. The applied science of managing, analyzing, and communicating biological information; involves use of computer databases, programming, and Internet use for communication

_____ 8. The Convention for International Trade on Endangered Species; treaty that lists species that cannot be traded as live specimens or wildlife products

_____ 9. A species that is still abundant in its natural range, but is declining in numbers and is likely to become endangered

_____ 10. A small number of species that become extinct each year naturally and at a low rate

_____ 11. An abrupt rise in extinction rates over the background level; may be caused by a natural event or human-caused events

_____ 12. Breaking up of habitat causing (1) increased "edge" effect, (2) habitat that is too small to support breeding populations, and (3) barriers that don't allow migration to new areas

_____ 13. The idea that, because of the risk of unknown effects, we should be cautious when interfering with nature and its processes

_____ 14. Federal legislation that makes it illegal for Americans to import or trade in any product made from a threatened or endangered species, unless it is used for an approved scientific purpose or to enhance survival of the species

_____ 15. Prohibits transporting live or dead wild animals or their parts across state borders without a federal permit

_____ 16. International Whaling Commission; regulates whaling industry and sets quotas to prevent overharvesting and commercial extinction

_____ 17. Major routes along which bird migration takes place

_____ 18. Storing seeds (and thus genetic information) in refrigerated, low-humidity environments

Connections:

Relate each of the following concepts to one of the above ideas.

Concept	Connecting Term	How connected
"You can't do just one thing"		
K- strategist		
Specialized niche		
Exotic species		
Captive breeding		