APES -VS- EVERYBODY

APES Unit 5 Study Guide

Ultimate Review Packet (5.10 - 5.12)

5.10 - Urbanization

a. **Explain** why a person living in a city generally has a lower environmental impact than someone living in a suburban or rural community (assuming similar affluence/resource use) living in cities enables people to drive shorter distances/walk more, enables more efficient delivery of goods/energy for consumption than less dense suburban or rural communities, compact building design means less habitat space is taken up by housing

b. Define the term impervious/impermeable surface, provide an example, and **explain** how the prevalence of these surfaces in urban areas impacts the local water cycle surfaces such as parking lots, pavement, building roofs that do not allow water to penetrate. This reduces ground water infiltration in the area and increases evaporation and runoff

c. **Describe** TWO ways in which urbanization alters the carbon cycle increased combustion of fossil fuels in vehicles/power plants adds more CO_2 to the atmosphere, decrease vegetation means less photosynthesis and less carbon sequestration, the production of cement releases carbon dioxide into the atmosphere, the production and landfilling of waste releases CO_2 and CH_4

d. **Identify** TWO causes for urban sprawl cheaper land than urban areas, desire for more space to raise a family, fear of crime in urban areas, urban blight, declining city tax revenue/services

e. **Describe** an environmental consequence of urban sprawl longer commutes leading to increased FF combustion & CO_2 release, increased habitat loss/fragmentation as land is cleared for housing developments/roads, increased impervious ground cover leading to decreased groundwater recharge/increased urban stormwater runoff contaminating surface waters

5.11 - Ecological Footprint

a. **Explain** the difference between an ecological footprint and carbon footprint ecological footprint refers to the measure of an individual or group's resource consumption measure in space/hectares, while carbon footprint measures the carbon released into the atmosphere by the activities of an individual/group in a given year, expressed in tons of CO_2

5.12 - Sustainability

a. Define sustainability in APES terms using a resource at a rate near or below its rate of natural replenishment, using a resource in a way that preserves it for future generations

b. Choose an agricultural, logging, mining practice from unit 5 pt.1 and **make a claim** about its sustainability. **Justify** your answer monocropping is unsustainable because it depletes soil nutrients **faster than they can replenish naturally**, Ogallala aquifer use is unsustainable because it is being d**rawn from faster than it recharges**, tilling is unsustainable because it causes topsoil **erosion faster than rate of soil formation**

c. Choose a global sustainability indicator and **explain** how it can be used to assess sustainability global biodiversity indicates whether species are going extinct at a rate faster than background extinction, atm. CO_2 and temperature data indicate whether climate is changing at a rate faster than in the past

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APES Unit 5 Ultimate Review Packet (5.13 - 5.15)

5.13 - Reducing Urban Runoff

a. **Describe** how storm drain systems deliver pollutants to surface waters storm drains carry urban stormwater runoff into nearby surface waters to prevent flooding, but the runoff they carry into surface water contains pollutants like oil, road salt, sediments, trash, fertilizer, pet waste
b. **Describe** a method to reduce the volume of stormwater runoff from streets or sidewalks permeable pavement can enable stormwater to infiltrate the ground beneath rather than runoff into storm drains, rain gardens absorb stormwater runoff and recharge groundwater
c. **Describe** a method that can reduce the pollutants in stormwater runoff that does enter storm drains increased public transit/bike lanes/carpooling lanes reduces motor oil on the roads/reduces road/parking lot needs
d. **Describe** an architectural method that can reduce the volume of stormwater runoff building up/compact building design can minimize the total amount of impervious space that buildings require, green roofs can catch rain falling on building roofs and enable infiltration, rain gardens/bioswales can be built near downspouts which enables runoff to infiltrate soil

5.14 - Integrated Pest Management (IPM)

a. **Explain** the concept of integrated pest management (IPM) the use of various different pest control methods, such as biocontrols or physical controls, in an effort to reduce pesticide use and its ecological consequences
b. **Describe** a biocontrol that could be used to limit pesticide application introduction of a natural predator such as lady bugs to eat aphids, planting of species known to attract pest predators,
c. **Describe** a physical control that could be used to limit pesticide application tilling to disrupt pest eggs in the soil/weeds from establishing, physically pulling plant pests out of the soil, covering soil with plastic/mulch to prevent weeds, crop rotation to prevent pest from continual access to preferred food source, intercropping especially with plants that may repel insect pests or attract them away from crops, physical traps to catch insect/animal pests
d. **Describe** an environmental and human health benefit to IPM Env- reduced death of non-target species like pollinators/amphibians who contact pesticides in runoff/wind/other plants, reduced fossil fuel combustion for pesticide production resulting in fewer GHGs released. Human health - reduced exposure to carcinogenic pesticides by workers applying them, reduced exposure to carcinogenic pesticides on unwashed produce for consumers

5.15 - Sustainable Agriculture

a. **Identify** the two key goals of sustainable agriculture preventing the erosion of soil and the nutrient depletion of soil
b. **Describe** how each of the following practices prevents soil erosion

Contour plowing: plowing parallel to the natural contours of the land prevents down slope erosion, creates plow furrows that slow erosion	Windbreaks: plants like trees or shrubs along the perimeter of fields blocks and slows wind speeds, preventing wind erosion	Perennial crops: stabilizing roots remain in soil after harvest and plant regrows naturally, reducing need to till and re-plant	Terracing: cuts flat ledges into sloped soil which slows erosion and catches soil washing off from level above
No-till agriculture: reduces the destruction of roots after harvest and leaves soil intact rather than loosening and making it prone to erosion		Stripcropping/intercropping: tight crop rows prevent soil from being eroded by runoff or wind, can also replenish soil nutrients if legumes are used (N fixing bacteria in root nodules)	

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APES Unit 5 Ultimate Review Packet (5.15 - 5.17)

5.15 - Sustainable Agriculture

a. Define soil fertility the ability for soil to support plant growth

b. **Describe** how each of the following practices improves soil fertility

Crop rotation: reduces soil nutrient depletion due to differing nutrient demands of different crops, can also replace nutrients if legumes are used due to nitrogen fixing bacteria in their root nodules	Green manure: cover crops can be planted in between planting commodity crop and then mulched/mowed down to create green manure which returns nutrients to the soi while also stabilizing it in between planting	Crushed limestone: acts a base to neutralize acidic soil that can leach positively charged plant nutrients from soil, also replenishes soil calcium levels (key plant nutrient)

c. **Describe** how rotational grazing can prevent soil erosion when livestock are rotated between pastures they don't overgraze on grass or compact soil with hooves. This preserves grass root health/depth, which stabilizes soil

5.16 - Aquaculture

a. **Describe** TWO environmental advantages of aquaculture compared to other meat production methods does not require the habitat loss/land use of CAFOs on land, does not deplete wild populations of fish which preserves ocean biodiversity, reduces damaging fishing practices like bottom-trawling, reduces FF consumption and GHG release from fishing boats, does not require large amounts of water that CAFOs require to produce grain for livestock

b. **Describe** TWO environmental consequences of aquaculture high concentration of fish leads to high concentration of waste which can lead to eutrophication/ e. Coli contamination, antibiotic use can result in water contamination, GMO fish can escape and breed with wild populations, diseases/pathogens resulting from dense living conditions can be transferred to wild populations, destruction of mangrove swamps for shrimp aquaculture occurs in some regions

5.17 - Sustainable Forestry

a. **Identify** the TWO goals of sustainable forestry harvesting wood in a way that doesn't deplete its availability for future use and that minimizes ecological damage

b. **Describe** TWO methods that can reduce deforestation selective cutting which involves harvesting only the oldest or sickest trees from a forest to enable continued future use of the forest for timber and preservation of habitat/soil, reusing wood or purchasing recycled wood decreases the demand for harvesting timber, purchasing wood from ecologically sustainable forestry companies that engage in selective cutting/replanting of forests with native/diverse tree populations

c. **Describe** TWO methods that forest managers can use to sustainably manage forests cutting down diseased trees to prevent the spread of disease, IPM to control insect pests that may damage or kill trees, prescribed burns that reduce dead biomass/ladder/forest floor fuel which prevents larger/more damaging/crown fires in the future

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