APESreview Ch 5-6: Populations

Top 15 Terms for This Exam

Symbiotic Relationships   Biotic Potential
Survivorship Curves   Age Structure Diagrams
Rule of 70   Ecological Succession
Shannon Diversity Index   Population Cycles
Human Population Size   Replacement Level Fertility Rate
Demographic Transition   K-Strategist
Limiting Factors   r-Strategist
Population Dispersion

The Gimme Question for This Exam

Survivorship curves show
a. fertility rates   b. patterns of natality
c. fecundity rates   d. patterns of mortality

Video Review Links

Symbiosis   Ecological Succession
Human Population Growth   Community Ecology
Predation   7 Billion
Succession

College Board Objectives & Essential Knowledge

ERT-1.A. Explain how the availability of resources influences species interactions.

ERT-1.A.1. In a predator-prey relationship, the predator is an organism that eats another organism (the prey).

ERT-1.A.2. Symbiosis is a close and long-term interaction between two species in an ecosystem. Types of symbiosis include mutualism, commensalism, and parasitism.

ERT-1.A.3. Competition can occur within or between species in an ecosystem where there are limited resources. Resource partitioning—using the resources in different ways, places, or at different times—can reduce the negative impact of competition on survival.

ERT-2.F. Describe ecological tolerance.

ERT-2.F.1. Ecological tolerance refers to the range of conditions, such as temperature, salinity, flow rate, and sunlight that an organism can endure before injury or death results.

ERT-2.F.2. Ecological tolerance can apply to individuals and to species.

ERT-2.G. Explain how natural disruptions, both short and long-term, impact an ecosystem.

ERT-2.G.1. Natural disruptions to ecosystems have environmental consequences that may, for a given occurrence, be as great as, or greater than, many human-made disruptions.

ERT-2.G.2. Earth system processes operate on a range of scales in terms of time. Processes can be periodic, episodic, or random.

ERT-2.G.6. Wildlife engages in both short- and long-term migration for a variety of reasons, including natural disruptions.

ERT-2.I. Describe ecological succession.

ERT-2.I.1 There are two main types of ecological succession: primary and secondary succession.

ERT-2.J. Describe the effect of ecological succession on ecosystems.

ERT-2.J.1. Pioneer members of an early successional species commonly move into unoccupied habitat and over time adapt to its particular conditions, which may result in the origin of new species.

ERT-2.J.2. Succession in a disturbed ecosystem will affect the total biomass, species richness, and net productivity over time.

ERT-3.B. Identify differences between K- and r-selected species.

ERT-3.B.1. K-selected species tend to be large, have few offspring per reproduction event, live in stable environments, expend significant energy for each offspring, mature after many years of extended youth and parental care, have long life spans/life expectancy, and reproduce more than once in their lifetime. Competition for resources in K-selected species' habitats is usually relatively high.

ERT-3.B.2. r-selected species tend to be small, have many offspring, expend or invest minimal energy for each offspring, mature early, have short life spans, and may reproduce only once in their lifetime. Competition for resources in r-selected species' habitats is typically relatively low.

ERT-3.B.3. Biotic potential refers to the maximum reproductive rate of a population in ideal conditions.

ERT-3.B.4. Many species have reproductive strategies that are not uniquely r-selected or K-selected, or they change in different conditions at different times.

ERT-3.B.5. K-selected species are typically more adversely affected by invasive species than r-selected species, which are minimally affected by invasive species. Most invasive species are r-selected species.

ERT-3.C. Explain survivorship curves.

ERT-3.C.1. A survivorship curve is a line that displays the relative survival rates of a cohort—a group of individuals of the same age—in a population, from birth to the maximum age reached by any one cohort member. There are Type I, Type II, and Type III curves.

ERT-3.C.2. Survivorship curves differ for K-selected and r-selected species, with K-selected species typically following a Type I or Type II curve and r-selected species following a Type III curve.

ERT-3.D. Describe carrying capacity.

ERT-3.D.1. When a population exceeds its carrying capacity (carrying capacity can be denoted as K), overshoot occurs. There are environmental impacts of population overshoot, including resource depletion.

ERT-3.E. Describe the impact of carrying capacity on ecosystems.

ERT-3.E.1. A major ecological effect of population overshoot is dieback of the population (often severe to catastrophic) because the lack of available resources leads to famine, disease, and/or conflict.

ERT-3.F. Explain how resource availability affects population growth.

ERT-3.F.1. Population growth is limited by environmental factors, especially by the available resources and space.

ERT-3.F.2. Resource availability and the total resource base are limited and finite over all scales of time.

ERT-3.F.3. When the resources needed by a population for growth are abundant, population growth usually accelerates.

ERT-3.F.5. When the resource base of a population shrinks, the increased potential for unequal distribution of resources will ultimately result in increased mortality, decreased fecundity, or both, resulting in population growth declining to, or below, carrying capacity.

EIN-1.A. Explain age structure diagrams.

EIN-1.A.1. Population growth rates can be interpreted from age structure diagrams by the shape of the structure.

EIN-1.A.2. A rapidly growing population will, as a rule, have a higher proportion of younger people compared to stable or declining populations.

EIN-1.B. Explain factors that affect total fertility rate in human populations.

EIN-1.B.1. Total fertility rate (TFR) is affected by the age at which females have their first child, educational opportunities for females, access to family planning, and government acts and policies.

EIN-1.B.2. If fertility rate is at replacement levels, a population is considered relatively stable.

EIN-1.B.3. Factors associated with infant mortality rates include whether mothers have access to good healthcare and nutrition. Changes in these factors can lead to changes in infant mortality rates over time.

EIN-1.C. Explain how human populations experience growth and decline.

EIN-1.C.1. Birth rates, infant mortality rates, and overall death rates, access to family planning, access to good nutrition, access to education, and postponement of marriage all affect whether a human population is growing or declining.

EIN-1.C.2. Factors limiting global human population include the Earth's carrying capacity and the basic factors that limit human population growth as set forth by Malthusian theory.

EIN-1.C.3. Population growth can be affected by both density-independent factors, such as major storms, fires, heat waves, or droughts, and density-dependent factors, such as access to clean water and air, food availability, disease transmission, or territory size.

EIN-1.C.4. The rule of 70 states that dividing the number 70 by the percentage population growth rate approximates the population's doubling time.

EIN-1.D. Define the demographic transition.

EIN-1.D.1. The demographic transition refers to the transition from high to lower birth and death rates in a country or region as development occurs and that country moves from a preindustrial to an industrialized economic system. This transition is typically demonstrated through a four-stage demographic transition model (DTM).

EIN-1.D.2. Characteristics of developing countries include higher infant mortality rates and more children in the workforce than developed countries.

EIN-4.B.4. Species in a given ecosystem compete for resources like territory, food, mates, and habitat, and this competition may lead to endangerment or extinction.

(ENG=Energy Transfer, ERT=Interactions Between Earth Systems, EIN=Interactions Between Species and the Environment, STB=Sustainability)