DATES Themes & Topics Readings

ECOLOGY - THE STUDY OF THE RELATIONSHIP BETWEEN ORGANISMS AND THEIR ENVIRONMENT Chap. 1

Jan. 8, 10 What is ecology? Levels of ecological organization The process of ecological investigation Case Study: amphibian decline & UV-B Major ecological lessons Articles 1-4

ECOSYSTEMS HAVE MANY SHAPES AND SIZES

What is an ecosystem? Approaches to investigating ecosystems

ENVIRONMENTAL CONDITIONS AFFECT ALL LIVING THINGS

Jan. 12, 17 Earth as an Ecosystem The physical & chemical environment of Earth Energy The planetary energy budget Atmospheric circulation Ocean structure & circulation

Jan. 19, 22 The effects of atmospheric & oceanic circulation Applications: Human alteration of the global environment Rising CO₂

Jan. 24, 26, 29 Global climate change Stratospheric ozone depletion Changing tropospheric chemistry Articles 6 & 7 Ozone Depletion FAQs Article 8

SIMILAR ENVIRONMENTS CAN SUPPORT SIMILAR ECOSYSTEMS Chaps. 4-5 Chaps. 23-25

Jan. 31 Biomes Controlling factors Tundra, boreal forests, & temperate forests Article 9

Feb. 2 Tropical forests & savanna

Feb. 5 Grasslands & Deserts

Feb. 7 The ocean Applications: Estimating global plant productivity

NATURAL SYSTEMS RECYCLE ESSENTIAL NUTRIENTS Chap. 22

Feb. 9 Global Biogeochemical Cycles The hydrologic & carbon cycles Pgs. 65-68

Feb. 12, 14 The nitrogen & phosphorus cycle

Feb. 16 Local Nutrient Cycles Inputs, internal transformations, & outputs Applications: overfertilization of land & water Article 10

NATURAL SYSTEMS ARE MAINTAINED AND CONSTRAINED BY PROCESSING ENERGY Chap. 20

Feb. 19, 21 Energy flow, trophic levels & trophic structure Productivity Applications: Biological magnification of toxins
**INTERACTING POPULATIONS FORM ECOLOGICAL COMMUNITIES**  
Chap. 26

Feb. 23, 26 Types and patterns of species diversity  
*Island biogeography*  
Article 11  
Pgs. 408-410

**COMMUNITIES RECOVER FROM DISTURBANCE BUT NOT ALWAYS**  
Chap. 18

Feb. 28 Primary & Secondary Succession  
Mar. 2 Communities can exist in several stable configurations  
*Applications: Climates change, communities change*

**POPULATIONS ARE INDIVIDUALS OF A SPECIES LIVING IN THE SAME PLACE AT THE SAME TIME**

Mar. 5 Populations defined  
*Population structure*  
*Density, distribution and dispersion*  
*Applications: Finding rare species*

**ALL POPULATIONS CAN GROW EXPONENTIALLY**

Mar. 7 Simple exponential growth  
Mar. 9 Exponential growth and age structure  
Exponential growth and stage structure  
Sensitivity analysis  
*Applications: Human population growth*

**NO POPULATION GROWS WITHOUT LIMITS**

Mar. 12, 14 Density-Dependence (within species)  
Mar. 16 Competition (between species)  
Mar. 19 *Applications: Evolution of life histories and niches*

Mar. 21 Predator-prey dynamics  
Mar. 23 *Applications: Volterra Principle*

Apr. 2 Herbivory  
Parasitism  
Mutualism  
*Applications: The value of mutualisms*

**THE EVOLUTIONARY PLAY OCCURS IN AN ECOLOGICAL THEATER**

Apr. 4 The process of evolution  
The Hardy-Weinberg Law  
Apr. 9, 11 Mutation  
Apr. 11 Drift  
Natural selection  
*Model of allele frequency change*

Apr. 13, 16 Selection in the ‘real’ world on ‘real’ traits  
Apr. 18 Speciation  
Apr. 20 Speciation  
Readings to be assigned
NOTHING IN BIOLOGY MAKES SENSE EXCEPT IN THE LIGHT OF EVOLUTION

Apr. 23  The evolution of sex and sexual selection
        The evolution of behavior

        Applications: Memes; the cultural equivalent of genes

TO KEEP EVERY COG AND WHEEL IS THE FIRST PRECAUTION OF INTELLIGENT TINKERING

Apr. 25  The growing science of conservation biology
        The value of biological diversity
        Extinction: Causes & Prevention

Apr. 27  Emerging concepts in conservation biology

Chap. 28