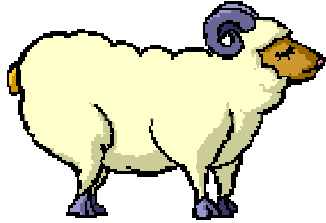


CHAPTER 1
WHAT IS LIFE ANYWAY?

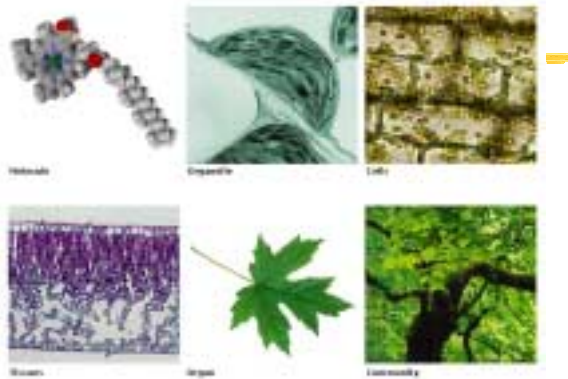


LIFE IS ORGANIZED AT
MANY DIFFERENT
LEVELS

ATOMS, ORGANELLES, CELLS,
TISSUES, ORGANS, ORGAN
SYSTEMS, ORGANISMS, SPECIES
POPULATION, COMMUNITIES,
ECOSYSTEMS, BIOME, BIOSPHERE

THE HEIARCHY OF LIFE

Figure 1.2 The hierarchy of biological organization



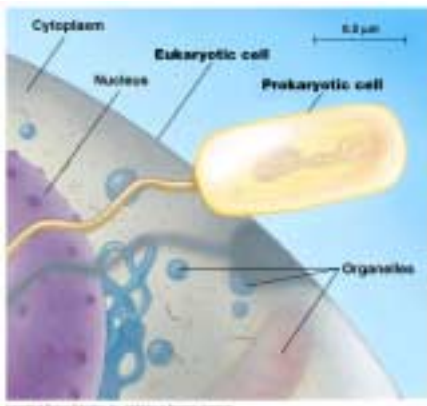
EMERGENT PROPERTIES OF BIO ORGANIZATION

- ORDER
- REPRODUCTION
- GROWTH AND DEVELOPMENT
- ENERGY UTILIZATION
- RESPONSE TO THE ENVIRONMENT
- HOMEOSTASIS
- EVOLUTIONARY ADAPTATION

CELLS AS THE BASIC UNITS OF STRUCTURE

- CELL THEORY OF HOOKE, SCHLEIDEN, SCHWANN AND LEEWENHOEK
- COMPOUND AND ELECTRON MICROSCOPES
- PRO AND EUKARYOTIC CELLS
- WHERE DO VIRUSES FIT IN?

Figure 1.4 Structural organization of eukaryotic and prokaryotic cells

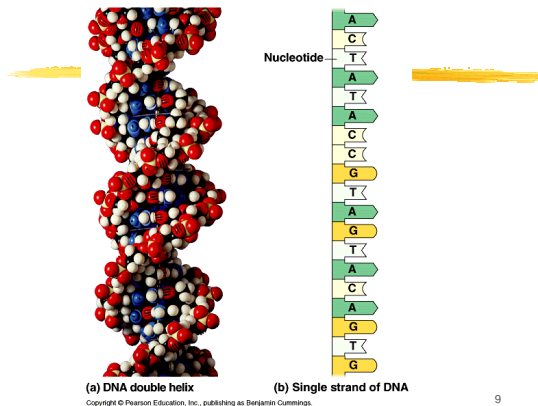




CONTINUITY OF LIFE/DNA

- WHAT IS DNA AND HOW DOES IT WORK?
- WHEN IS DNA TOLD TO WORK?
- HOW DOES M-RNA COPY FROM DNA?
- WHERE DOES ALL OF THIS TAKE PLACE IN THE CELL?
- WHAT IS THE END PRODUCT?

Figure 1.5 The genetic material: DNA



INTERACTING ENVIRONMENTS

- OCCURS WITH ALL ORGANISMS
- THERE ARE LIVING AND NON-LIVING PARTS OF ALL ENVIRONMENTS
- BIOTIC IS THE LIVING PART
- ABIOTIC IS THE NON-LIVING PART SUCH AS WATER, LIGHT, HUMIDITY

UNITY AND LIFE DIVERSITY

- THREE DOMAINS/BACTERIA/ARCHAEA AND EUKARYA
- 5 KINGDOMS: MONERA, PROTISTA, FUNGI, PLANTAE, ANIMALIA
- BACTERIA AND ARCHAEA ARE PROKARYOTES
- EUKARYA ARE EUKARYOTES

Figure 1.11 Three domains of life



EVOLUTION: THE CORE THEME OF BIOLOGY

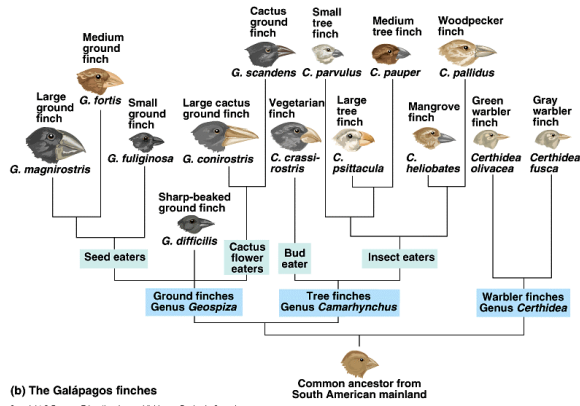
- CHANGE OVER TIME
- CHARLES DARWIN, LATE 1800'S
- INDIVIDUAL VARIATION
- STRUGGLE TO SURVIVE
- ADAPTATION: EDITING PROCESS WITH HERITABLE VARIATION
- DESCENT WITH MODIFICATION

Figure 1.14 Charles Darwin (1809–1882)



17

Figure 1.17b Diversification of finches on the Galápagos Islands

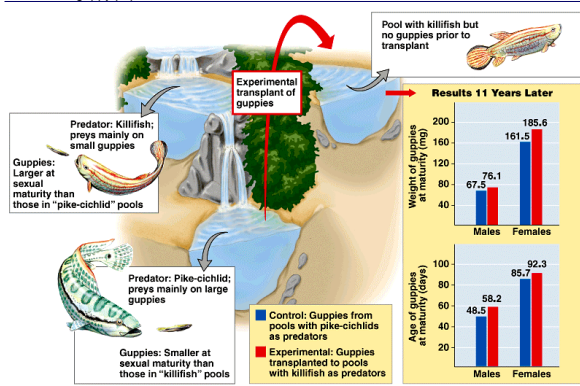


(b) The Galápagos finches
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THE SCIENTIFIC METHOD

- HYPOTHESIS
- EXPERIMENTATION
- PREDICTABLE RESULTS
- DISCUSSION OF DATA
- CONCLUSION
- PROOF OR DISPROOF
- CONTROL/NULL HYPOTHESIS

Figure 1.21 Controlled experiments to test the hypothesis that selective predation affects the evolution of guppy populations



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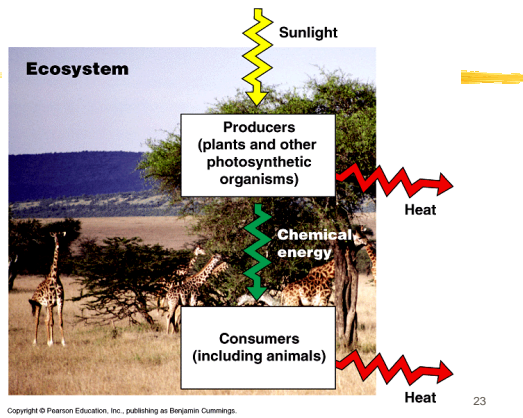
SOME CHARACTERISTICS OF LIFE

- DNA/WHAT IS IT?
- GOAL OF DNA/PROTEIN SYNTHESIS
- TRANSCRIPTION WITH M-RNA IN THE NUCLEUS
- A CODON FROM DNA IS THEN TRANSLATED IN THE RIBOSOMES
- ASSEMBLES AMINO ACIDS INTO PROTEINS

PROTEIN TYPES

- STRUCTURAL/HEMOGLOBIN
- ENZYMATIC/SALIVARY AMYLASE
- IMMUNOGLOBULIN/ANTIBODIES
- HORMONE/INSULIN
- IONIC/CARRIER PROTEIN
- CELL MEMBRANE RECEPTOR PROTEIN:
 - GLYCOPROTEIN, LIPOPROTEIN.
- TRANSCRIPTION/TRANSLATION HAS GIVEN US GENES

Figure 1.7 An introduction to energy flow and energy transformation in an ecosystem



BIOMES

- DESERT/DRY,HOT WITH CACTI
- PRAIRIE/FLAT/RICH SOIL WITH GRASS
- TROPICAL RAINFORESTS/PLANT AND ANIMAL DIVERSITY
- TUNDRA/PERMAFROST/LICHENS
- DECIDUOUS FORESTS/TREES
- VERTICAL STRATIFICATION

HOMEOSTASIS

- BALANCE WITH EXTERNAL AND INTERNAL ENVIRONMENT
 - NERVOUS SYSTEM (STIMULI AND RESPONSE)
 - HORMONES/ENDOCRINE SYSTEM AND NEGATIVE FEEDBACK
 - KIDNEY/EXCRETORY SYSTEM WITH WATER BALANCE
-

REPRODUCTION

- SHARED CHARACTERISTICS
- PERPETUATION OF THE SPECIES
- ALLOWS FOR DIVERSITY
- MUTATIONS/CHANGE IN THE GENE
- GAMETES/EGG/SPERM
- ZYGOTE/EMBRYO/FETUS

LIFE'S LITTLE PROBLEMS

