Branches of Science

Biology

- The study of life.
- Biology is concerned with the characteristics, classification, and behaviors of organisms, how species come into existence, and the interactions they have with each other and with the natural environment.

Paleontology

- **Paleontology** or **palaeontology** is the study of the history and development of life on Earth, including that of ancient plants and animals, based on the fossil record. This includes the study of body fossils, tracks, burrows, cast-off parts, fossilized feces and chemical residues.

Paleontology

Ecology

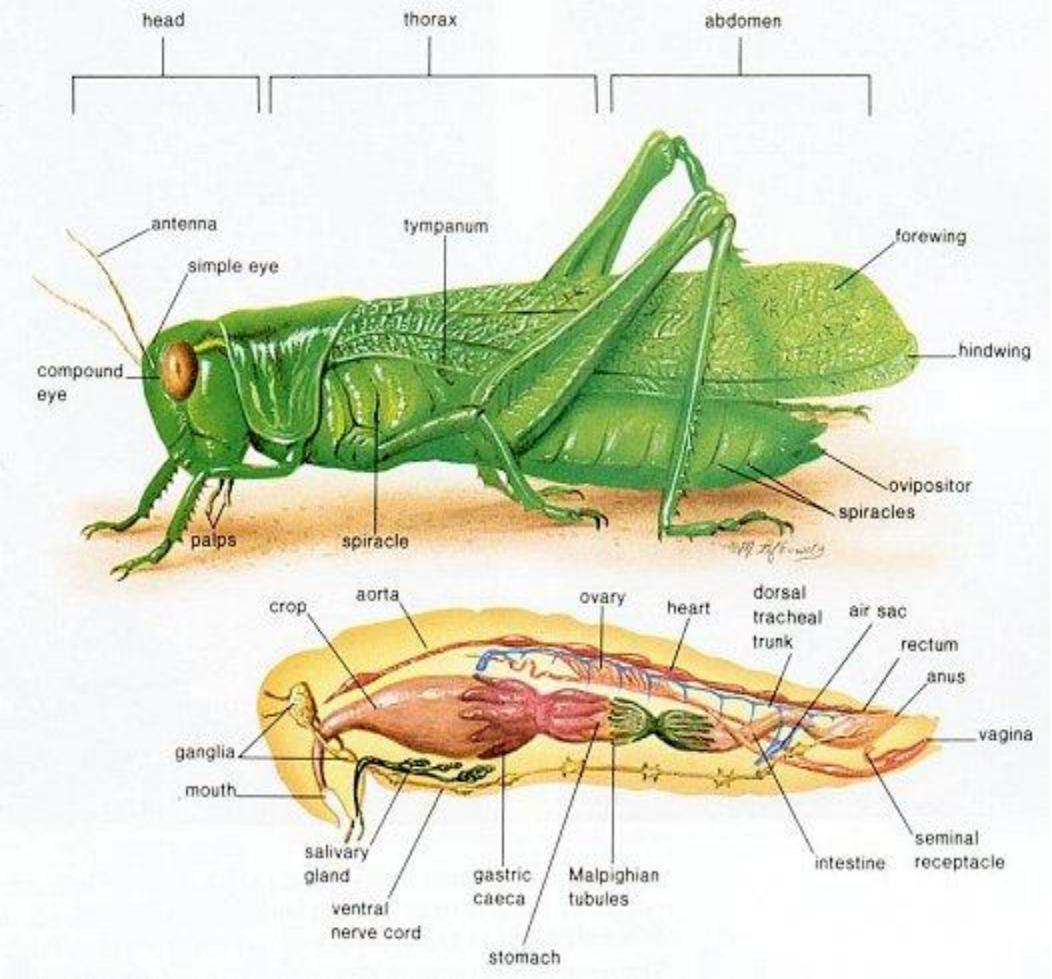
- **Ecology**, is the scientific study of the distribution and abundance of living organisms and how the distribution and abundance are affected by interactions between the organisms and their environment. The environment of an organism includes physical properties like sunlight, climate, and geology, as well as the other organisms that share its habitat.

Ecology: The study of the household of nature

Entomology

- **Entomology** is the scientific study of insects. Insects have many kinds of interactions with humans and other forms of life on earth, so it is an important specialty within biology.

Entomology

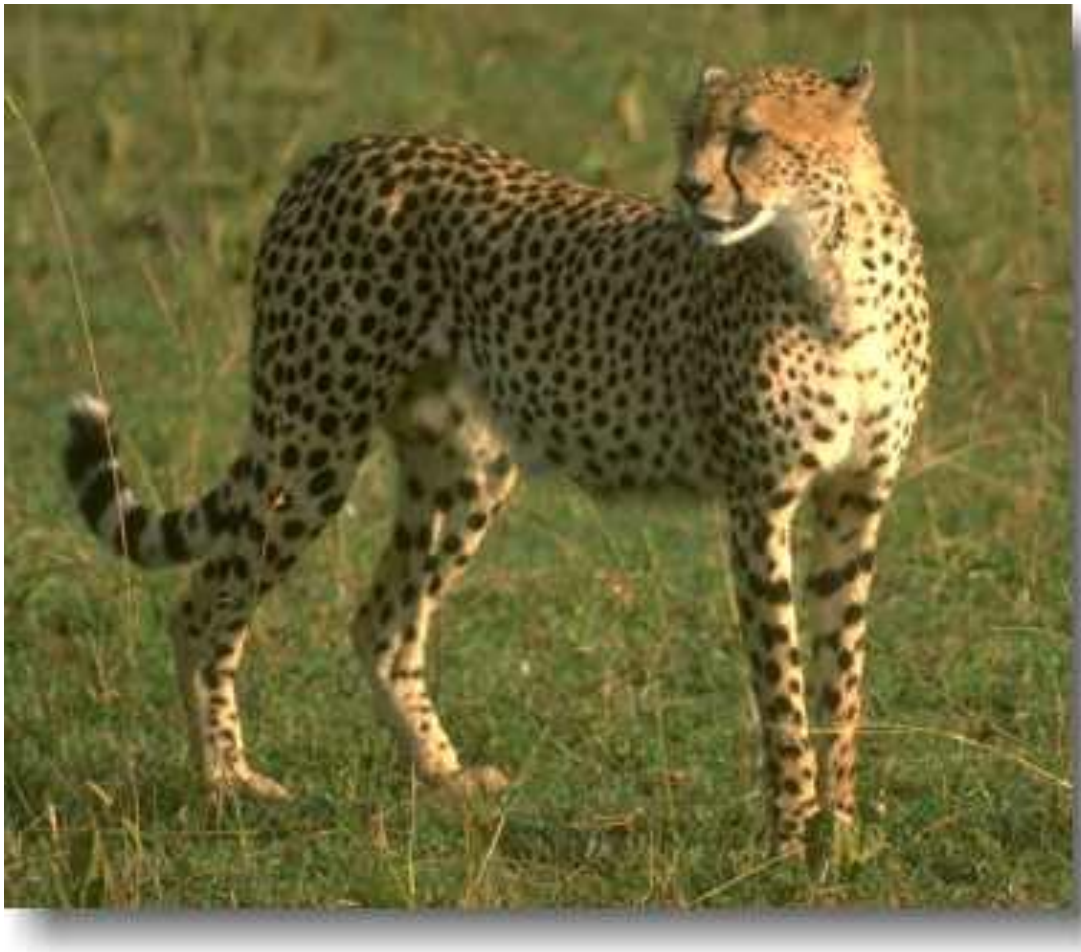

head
thorax
abdomen
antenna
simple eye
compound eye
tympanum
forewing
hindwing
ovipositor
spiracles
palps
spiracle
crop
aorta
ovary
heart
dorsal tracheal trunk
air sac
rectum
anus
vagina
ganglia
mouth
salivary gland
ventral nerve cord
gastric caeca
stomach
Malpighian tubules
intestine
seminal receptacle

Mammalogy

- The study of mammals

Zoology

- **Zoology** is the biological discipline which involves the study of non-human animals.



Botany

- **Botany** is the scientific study of plantlife. Botany covers a wide range of scientific disciplines that study the structure, growth, reproduction, metabolism, development and diseases of plants. The study of plants and botany began with tribal lore, used to identify edible, medicinal and poisonous plants, making botany one of the oldest sciences.

Botany

Ichthyology

- **Ichthyology** is the branch of zoology devoted to the study of fish. This includes skeletal fish (Osteichthyes), cartilaginous fish (Chondrichthyes), and jawless fish (Agnatha). An estimated 25,000 fish species exist, comprising a majority of vertebrates. While a majority of species have probably been discovered and described, approximately 250 new species are officially described by science each year.

Ornithology

- **Ornithology** is the branch of zoology concerned with the scientific study of birds. Several aspects of the study of ornithology differ from closely related disciplines, perhaps because of the high visibility and the aesthetic appeal of birds. Most marked among these is the extent of field studies undertaken by amateur volunteers working within the parameters of strict scientific methodology.

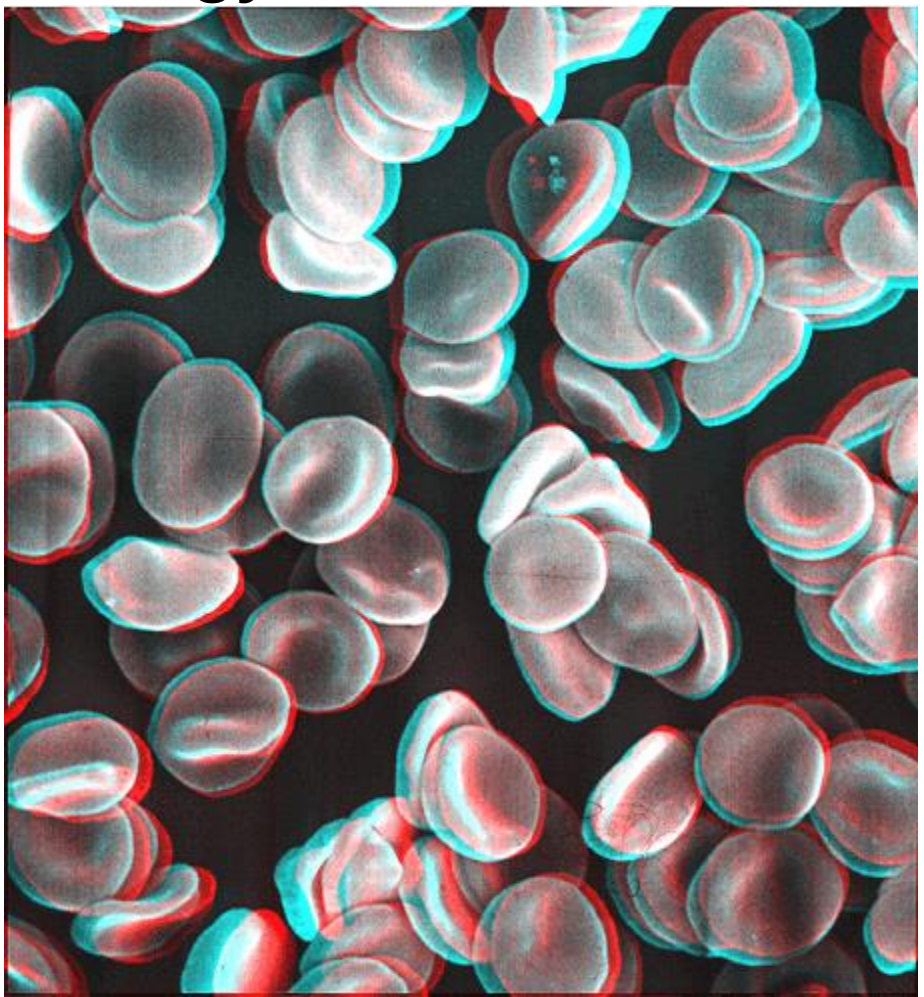
Ornithology

Herpetology

- The study of reptiles and amphibians

Cytology

- Includes both cell biology and cytopathology.



Cell Biology

- **Cell biology** is an academic discipline that studies cells. This includes their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division and death. Cell biology research extends to both the great diversity of single-celled organisms like bacteria and the many specialized cells in multicellular organisms like humans.

Cytopathology

- **Cytopathology** is a branch of pathology that studies and diagnoses diseases on the cellular level. The most common use of cytopathology is the Pap smear, used to detect cervical cancer at an early treatable stage.

Genetics

- Genetics is the science of genes, heredity, and the variation of organisms.
- Within organisms, genetic information generally is carried in chromosomes, where it is represented in the chemical structure of particular DNA (deoxyribonucleic acid) molecules.

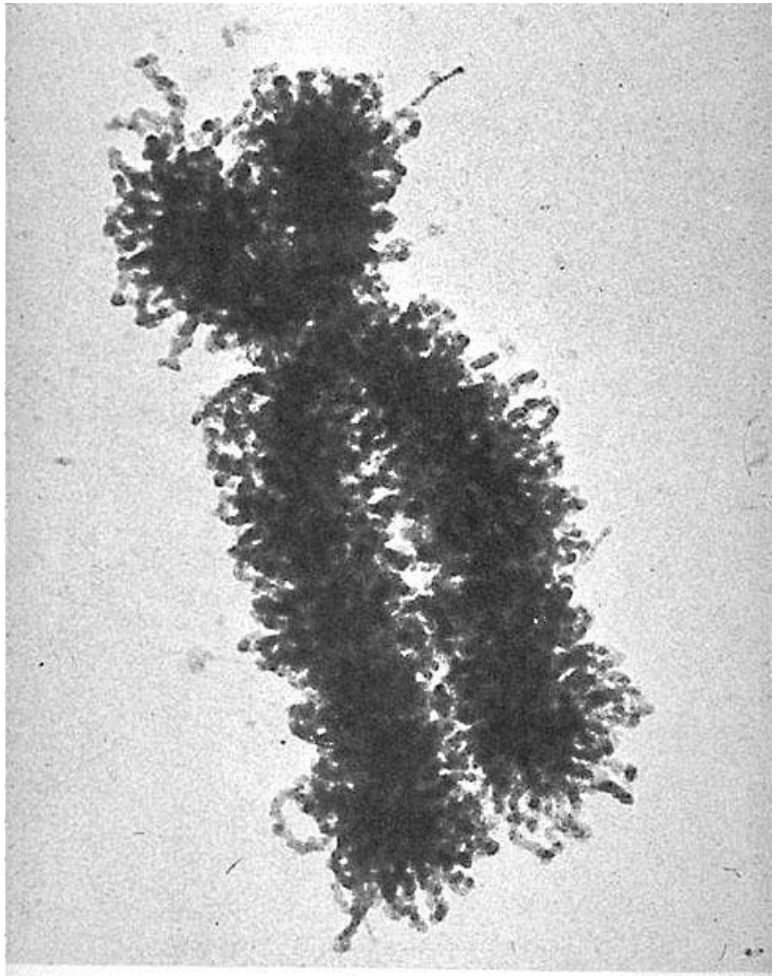


FIGURE 1-14
An electron micrograph of a human chromosome. Chromosome XII from a HeLa cell culture. (Courtesy of Dr. E. Du Praw.)

Histology

- **Histology** is the study of tissue sectioned as a thin slice. It can be described as microscopic anatomy.
- Used to diagnose cancer and other diseases.

Histology (Picture – muscle tissue)

Chemistry

- **Chemistry** is the science of matter at the atomic to molecular scale, dealing primarily with collections of atoms, such as gases, molecules, crystals, and metals.

Chemistry

Marine Biology

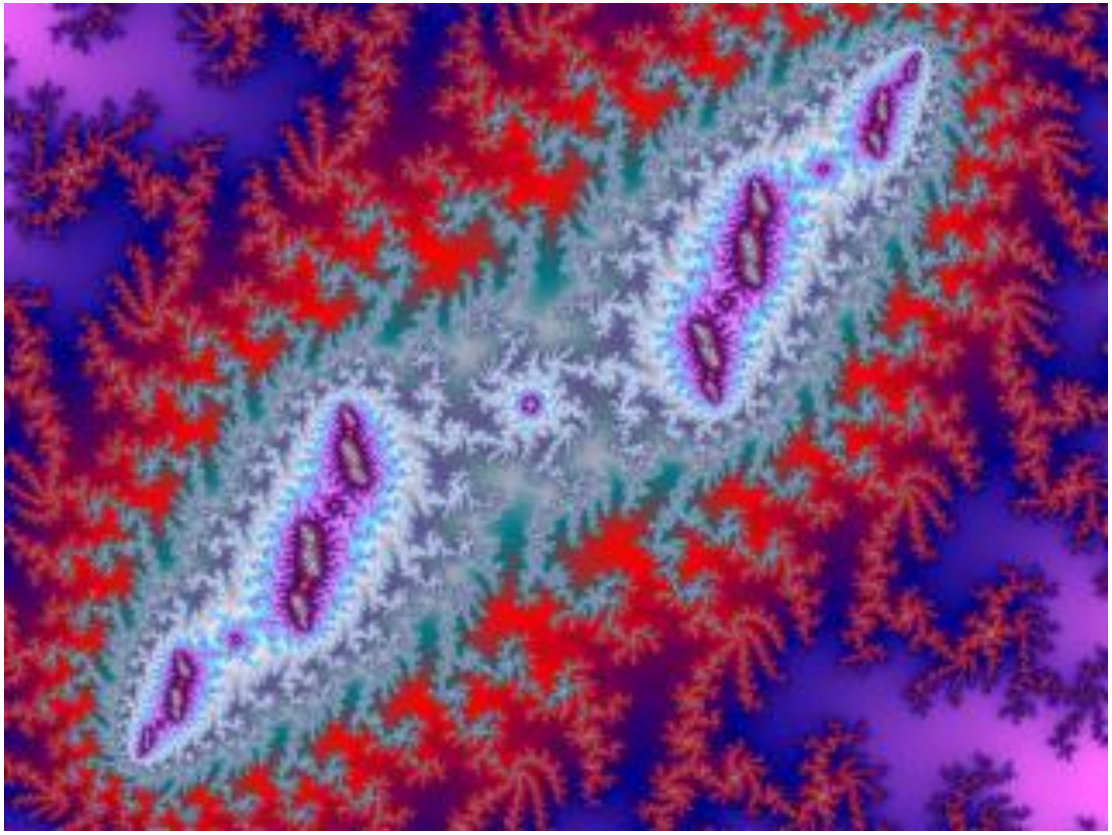
- **Marine biology** is the scientific study of the plants, animals and other organisms that live in the ocean.
- Marine life represents a vast resource, providing food, medicine, and raw materials, in addition to helping to support recreation and tourism all over the world. At a fundamental level, marine life helps determine the very nature of our planet. Marine organisms produce much of the oxygen we breathe and probably help regulate the earth's climate. Shorelines are in part shaped and protected by marine life, and some marine organisms even help create new land.

Marine Biology

Microbiology

- **Microbiology** is the study of *microorganisms*, which are unicellular or cell-cluster microscopic organisms. This includes eukaryotes such as fungi and protists, and prokaryotes such as bacteria and certain algaes. Viruses, though not strictly classed as living organisms, are also studied.

Microbiology



Mycology

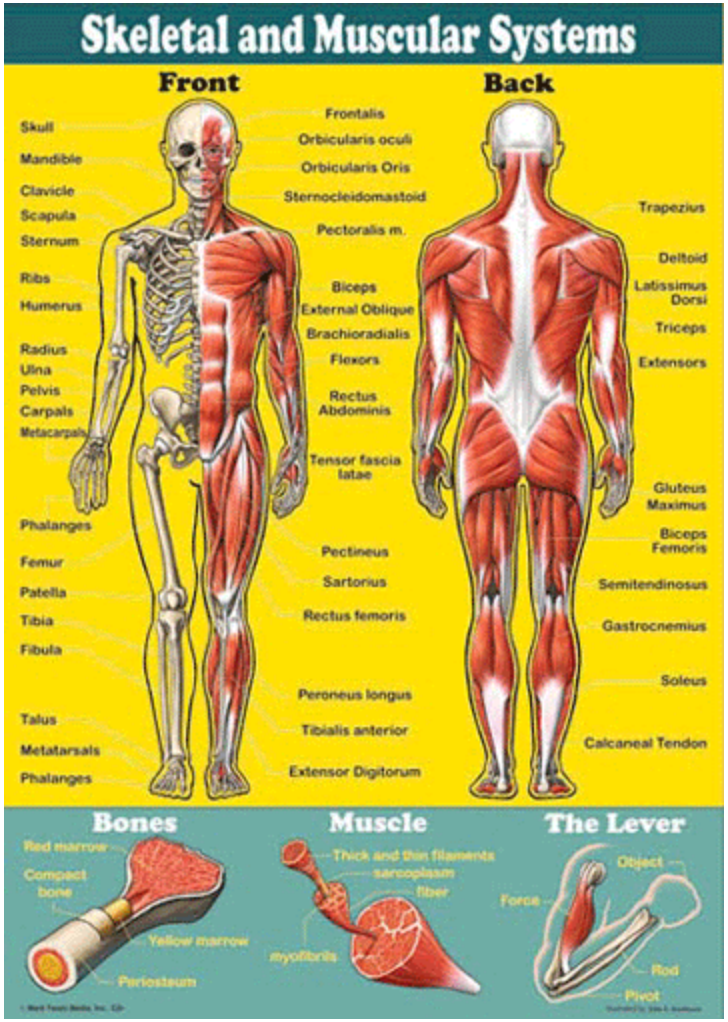
- **Mycology** is the study of fungi, their genetic and biochemical properties, their taxonomy, and their use to humans as a source for medicinals (see penicillin) and food (beer, wine, cheese, edible mushrooms), as well as their dangers, such as poisoning or infection.

Mycology

Anatomy

- **Anatomy** is the branch of biology that deals with the structure and organization of living things.

Anatomy


Skeletal and Muscular Systems
Front
Back
Skull
Mandible
Clavicle
Scapula
Sternum
Ribs
Humerus
Radius
Ulna
Pelvis
Carpals
Metacarpals
Phalanges
Femur
Patella
Tibia
Fibula
Talus
Metatarsals
Phalanges
Frontalis
Orbicularis oculi
Orbicularis Oris
Sternocleidomastoid
Pectoralis m.
Biceps
External Oblique
Brachioradialis
Flexors
Rectus Abdominis
Tensor fascia latae
Pectineus
Sartorius
Rectus femoris
Peroneus longus
Tibialis anterior
Extensor Digitorum
Trapezius
Deltoid
Latissimus Dorsi
Triceps
Extensors
Gluteus Maximus
Biceps Femoris
Semitendinosus
Gastrocnemius
Soleus
Calcaneal Tendon
Bones
Red marrow
Compact bone
Yellow marrow
Periosteum
Muscle
Thick and thin filaments
sarcoplasm
fiber
myofibrils
The Lever
Object
Force
Rod
Pivot

Physiology

- **Physiology** is the study of the mechanical, physical, and biochemical functions of living organisms.

Pathology

- Study of disease