

Biology 300 Midterm Exam ~ **Important Information**

The Biology Midterm is cumulative for the 1st Semester and will cover all of the topics you have addressed in class and lab. The exam will count for 20% of your entire semester grade, so it is important to begin your study and review well before the exam week.

You will not receive additional review materials beyond the vocabulary lists, essential questions, and objectives for each unit included in this packet. Instead you should use this Unit outline as a guide to **review your textbook, class notes, and study materials from the 1st and 2nd Quarters** as you prepare for the exam.

A series of five review quizzes will be administered in the week leading up to the midterm. These are designed to encourage you to study previous topics and identify areas that may require extra review. These quizzes will count towards your 2nd marking period grade. Each quiz will focus on a particular area of biology that you have studied:

Quiz 1: Ecosystems, Scientific Method, and Chemistry

Quiz 2: Cells

Quiz 3: DNA, RNA, and Protein

Quiz 4: Mitosis and Meiosis

Quiz 5: Genetics

You are encouraged to **see your teacher if you need extra help with a particular topic**. In addition, there will be six scheduled review sessions conducted by the Biology 300 teachers during the two weeks prior to exams. You are welcome to attend to **any** of these sessions, even those not being led by your current teacher.

Biology 300 Review Schedule:

Tuesday, 1/5/09	7:00 am	Room C208	Ms. Daniele
Wednesday, 1/6/09	7:00 am	Room C108	Mr. Trifone
Thursday, 1/7/09	2:20 pm	Room C10	Mrs. Scudder
Friday, 1/8/09	2:20 pm	Room C210	Ms. Tsaparakis
Monday, 1/11/09	2:20 pm	Room C106	Ms. Wisniewski
Tuesday, 1/12/09	7:00 am	Room C104	Mr. Otterspoor

UNIT 1: Biology as the Science of Life

Essential Questions:

What are the common characteristics of living organisms?

How are energy and nutrients made available to all members of a community?

You should be able to:

- distinguish between living and non-living things based upon life functions.
- distinguish between producers and consumers and between photosynthesis and cellular respiration.
- demonstrate an understanding of the relationship between photosynthesis and cellular respiration.
- discuss how energy is made available to members of a community.
- discuss how organisms are influenced by the non-living factors of their environment.
- relate various characteristics of Zebra mussels to the problems caused by these organisms.
- explain that the process of evolution has resulted in a great diversity of life forms and describe the meaning of the phrase “unity within diversity.”

VOCABULARY

adaptation
autotroph
biology
cell
cellular respiration
chlorophyll
community
consumer
decomposer
development
ecosystem
energy
evolution
food chain
growth

heterotroph
homeostasis
host
metabolism
organ
organ system
organism
organization
parasite
photosynthesis
population
producer
reproduction
tissue

UNIT 2: Biology as a Science

Essential Questions:

How does technology like the microscope aid biologists in learning about the natural world

What is the scientific method and how is it applied?

You should be able to:

- describe techniques for observing and collecting data.
- relate the various methods used by scientists to learn about the natural world.
- apply your understanding of a controlled experiment to the testing of a hypothesis.
- compare and contrast the appropriate use of the compound light microscope, scanning electron microscope and transmission electron microscope.

VOCABULARY

Compound Light Microscope

control group

controlled experiment

data

dependant variable

experiment

experimental group

hypothesis

independent variable

law

magnification

resolving power

Scanning Electron Microscope

science

technology

theory

Transmission Electron Microscope

UNIT 3: The Chemistry of Life

Essential Questions:

What is the chemical basis of life?

Why is carbon important to life?

You should be able to:

- explain the relationships among atoms, elements and compounds.
- describe the types of chemical bonds
- diagram the structure of the atom with charges of subatomic particles
- relate characteristics and functions of four macromolecules.
- apply your knowledge of the elements to the processes of photosynthesis and cellular respiration.
- differentiate between organic and inorganic compounds.

VOCABULARY

amino acid

atom

atomic mass

atomic number

bond

carbohydrate

carbon

compound

covalent bond

electron

element

fatty acid

glucose

glycerol

hydrogen

inorganic compound

ionic bond

lipids

mass number

matter

monomer

monosaccharide

nucleotide

nucleic acids

neutron

nitrogen

organic compound

oxygen

periodic table

polypeptide

polysaccharide

polymer

protein

proton

UNIT 4: The Cell and its Environment

Essential Questions:

How is the cell the basic unit of life?

How do materials enter and leave cells?

You should be able to:

- describe the discovery of cells and the development of cell theory.
- analyze the various structures and functions of the cell and its membrane
- demonstrate the various ways that substances enter and leave cells.
- compare and contrast the processes of passive and active transport.

VOCABULARY

active transport

cell theory

cell wall

diffusion

dynamic equilibrium

endocytosis

exocytosis

facilitated diffusion

lipid bilayer

osmosis

passive transport

plasma membrane

protein

selectively permeable membrane

vesicle

UNIT 5: Inside the Cell

Essential Questions:

What are the structures and function of the cell?

How are the characteristics of life manifested by the cell?

You should be able to:

- recognize general differences between the cells of unicellular and multicellular organisms.
- discuss how cell organelles contribute to the efficiency of cellular functions.
- discuss how the function of the ribosomes, endoplasmic reticulum and Golgi bodies are interrelated.
- compare the structure and function of cell organelles.
- describe how cells are arranged into increasingly complex levels of organization.
- demonstrate the manifestation of life functions in the cell's organelles.
- compare and contrast the structure and function of prokaryotic and eukaryotic cells.

VOCABULARY

centriole
chloroplast
chromatin
chromosome
cilia
cytoplasm
cytoskeleton
endoplasmic reticulum (ER)
 smooth (SER) and rough (RER)
eukaryote
flagella
golgi body (golgi apparatus)
lysosome

metabolism
microfilament
microtubule
mitochondria
nucleolus
nucleus
organ
prokaryote
ribosome
symbiosis
system
tissue
vacuole

UNIT 6: DNA and Protein Synthesis

Essential Questions:

What is the chemical basis of life?

How do genes code for proteins?

You should be able to:

- sequence the experimental evidence that led to the conclusion that DNA is the chemical of which genes are composed.
- diagram the double helix model of DNA.
- demonstrate the replication of DNA.
- discuss the evidence for the fact that DNA codes for proteins.
- demonstrate the events of transcription and translation.
- explain the connection between the proteins produced by translation and the traits possessed by the individual organism.
- distinguish between DNA and RNA.

VOCABULARY

adenine

allele

amino acid

anticodon

bacteriophage

base pairing rule

codon

chromosome

cytosine

DNA

DNA polymerase

double helix

exons

gene

genotype

guanine

helicase

introns

mRNA

mutagen

mutation

a. point mutation

b. base deletion

c. base insertion

nitrogen base pair

nucleotide

phenotype

polymer

polypeptide

protein

thymine

replication

RNA

RNA polymerase

start codon

stop codon

tRNA

transcription

translation

trait

uracil

variation

UNIT 7: Cellular Reproduction

Essential Questions:

What is the evidence for the biotic origin of life?

What are the stages of the cell cycle?

What is the role of the cell cycle in organisms?

You should be able to:

- describe the debate surrounding spontaneous generation and how Redi's and Pasteur's experiments ended that debate.
- analyze the ways in which the events of the cell cycle are controlled.
- analyze the significance of meiosis with respect to adaptation and evolution.
- sequence the events of the cell cycle in which new body cells are produced.
- sequence the series of events by which reproductive cells are produced in complex plants and animals.

VOCABULARY

anaphase

binary fission

cell cycle

cell plate

centrioles

centromere

chromatid (sister chromatid)

cytokinesis

diploid

fertilization

gamete

genetic recombination

haploid

homologous chromosomes

homologue

interphase

meiosis

metaphase

microtubules

mitosis

oogenesis

prophase

sexual reproduction

spermatogenesis

spindle

spontaneous generation

spore

telophase

zygote

UNIT 8: Genetics and Heredity

Essential Questions:

How are traits passed from one generation to the next?

How does genotype affect phenotype?

You should be able to:

- discuss Mendel's experiments and his results.
- discuss the development of the chromosome theory of heredity.
- explain the three principles of genetics Mendel obtained through his experiments.
- explain how the expression of a pair of genes may be influenced by other genes as well as by the environment.
- solve genetic problems using Punnett squares.
- apply the rules of probability to solve genetic problems.
- demonstrate the inheritance of traits resulting from incomplete dominance, codominance and multiple alleles.
- apply the laws of probability to solve genetics problems involving sex linked traits.
- defend the role of genetics in creating variation in a species.

VOCABULARY

allele	karyotype
autosome	loci
chromosomal mutation	nondisjunction
codominance	phenotype
dominant gene	probability
gamete	punnett square
gene mutation	recessive gene
gene segregation	recombinant DNA
genotype	sex chromosome
heterozygous	sex linked trait
homologous chromosomes	somatic cell
homozygous	trisomy
incomplete dominance	trait
independent assortment	

UNIT 9: Human Genetic Disorders

Essential Questions:

How is a particular human disorder related to genotype?

How can society accommodate human differences based upon biological knowledge?

VOCABULARY

allele

amniocentesis

autosome

chromosomal mutation

codominance

color blindness

cystic fibrosis

dominant gene

down syndrome

gamete

gene mutation

gene segregation

genotype

hemophilia

heterozygous

homologous chromosomes

homozygous

Huntington's disease

incomplete dominance

independent assortment

karyotype

Klinefelters syndrome

loci

nondisjunction

phenotype

PKU

probability

Punnett square

recessive gene

recombinant DNA

sex chromosome

sex linked trait

sickle cell anemia

somatic cell

Tay sachs

trait

trisomy