

Focus Questions and Key Terms
Chapters 4-8
Cell Structure and Function
Honors Biology

Focus Questions

Chapter 4

- As a cell gets bigger, what problems does it face? What surface area to volume ratio is better? (4.2)
- Describe the major components of a prokaryotic cell. What types of organisms are made from these types of cells? (4.3)
- Describe how prokaryotic cells and eukaryotic cells are similar and different. (4.3)
- What is the importance of internal membranes in eukaryotic cells? (4.4)
- What are the components of a cellular membrane? Explain the function of each part. (4.5)
- Explain how mitochondria and chloroplasts evolved through endosymbiosis. (4.16)
- What are the functions of the extracellular matrix? (4.20)

Chapter 5

- Explain how molecules move across a membrane passively. (5.3)
- Explain why water balance is so crucial to cells. (5.5)
- What types of cells are aquaporins found? Why are they not present in all cells? (5.7)
- Describe the different ways large molecules are transported into and out of the cell. (5.9)
- Explain the difference between exergonic and endergonic reactions. You may use pictures if you choose. Also, provide examples of each type of reaction. (5.12)
- Describe how ATP complete cellular work. (5.13)
- Describe what enzymes do and how they work. (5.14-5.15)
- Explain how enzymes can be regulated. (5.16)

Chapter 6

- Explain the relationship between photosynthesis and cellular respiration. (6.1)
- Briefly describe the three stages of cellular respiration. (6.6)
- List all of the reactants and products in glycolysis including ATP and electron carriers. (6.7)
- List all the reactants and products in the citric acid cycle including ATP and electron carriers. (6.9)
- Describe the process of oxidative phosphorylation. How much ATP is produced in this step per glucose? (6.10)
- Describe how poisons can interrupt cellular respiration and what effect this would have on an organism. (6.11)
- What organisms use fermentation? Describe both lactic acid fermentation and alcohol fermentation. (6.13)
- Aside from the sugars you eat, how are the other organic molecules you consume used in cellular respiration? (6.15-6.16)

Chapter 7

- Describe the structure of a chloroplast. (7.2)
- Explain how we know that the oxygen plants release comes from the water they intake and not carbon dioxide. (7.3)
- Briefly describe the two parts of photosynthesis. (7.5)
- Briefly describe how photosynthesis captures solar energy. (7.7)
- Explain how electrons are passed through the two photosystems. (7.8)
- Compare the process of ATP production in photosynthesis with the one in cellular respiration discussed last chapter. (7.9)
- List all the reactants and products in the Calvin Cycle including ATP and electron carriers. (7.10)
- Describe how C₄ and CAM plants have adapted to their climates. (7.12)
- How does photosynthesis moderate climate change? (7.13)

Chapter 8

- Compare and contrast asexual and sexual reproduction. (8.1)
- Explain Virchow's principle. (8.2)
- Describe the process of binary fission and which organisms use this system. (8.3)
- Describe each stage of the cell cycle in eukaryotic cells. (8.5)
- Briefly describe the stages of mitosis. (8.6)
- Explain how cytokinesis is different in animal cells and plant cells. (8.7)
- Explain how the cell cycle is regulated. (8.9)
- Briefly explain how cancer develops. (8.10)
- Explain how the chromosomes behave differently in meiosis than they do in mitosis. (8.12)
- Why is it crucial that gametes only have one set of chromosomes? (8.13)
- Briefly describe the stages of meiosis. (8.14)
- Compare and contrast mitosis and meiosis. (8.15)
- Explain how independent assortment and random fertilization lead to greater genetic diversity in offspring. (8.16)
- Explain the process of crossing over and how it increases genetic diversity. (8.18)
- Describe the causes and symptoms of Down syndrome. (8.20)
- What problems can occur in meiosis and what consequences can this have? (8.21-8.24)

Key Terms

Chapter 4

cell theory
prokaryotic cells
eukaryotic cells
plasma membrane
chromosomes
ribosomes
cytoplasm
nucleoid
flagella
organelles
nucleus
chromatin

nuclear envelope
nucleolus
endomembrane system
vesicles
smooth endoplasmic reticulum
rough endoplasmic reticulum
Golgi apparatus
lysosome
vacuoles
mitochondria
chloroplasts
endosymbiosis

cytoskeleton
microfilaments
intermediate filaments
microtubules
centrioles
cilia
extracellular matrix
tight junctions
anchoring junctions
gap junctions
cell wall
plasmodesmata

Chapter 5

fluid mosaic
selective permeability
diffusion
concentration gradient
passive transport
osmosis
tonicity
isotonic
hypotonic
hypertonic
osmoregulation
facilitated diffusion
aquaporins
active transport

exocytosis
endocytosis
phagocytosis
pinocytosis
energy
kinetic energy
heat
potential energy
chemical energy
thermodynamics
first law of thermodynamics
second law of thermodynamics
entropy
exergonic reaction

endergonic reactions
metabolism
ATP
phosphorylation
energy of activation (EA)
enzymes
substrate
active site
induced fit
cofactors
coenzyme
competitive inhibitor
noncompetitive inhibitor
feedback inhibition

Chapter 6

cellular respiration
kilocalories (kcal)
oxidation
reduction
electron carrier
electron transport chain

glycolysis
citric acid cycle
oxidative phosphorylation
chemiosmosis
ATP synthesis
substrate-level phosphorylation

acetyl CoA
lactic acid fermentation
alcohol fermentation
obligate anaerobes

Chapter 7

photosynthesis
autotrophs
producers
photoautotrophs
chlorophyll
mesophyll
stomata

stroma
thylakoids
grana
light reactions
Calvin cycle
electromagnetic spectrum
wavelength

photon
photosystem
photophosphorylation
C3 plants
C4 plants
CAM plants
greenhouse effect

Chapter 8

anchorage dependence
asexual reproduction
autosome
benign tumor
binary fission
cell cycle
cell division
cell plate
centromere
chiasma
chromatin
chromosome
cleavage
cleavage furrow

crossing over
cytokinesis
density-dependent inhibition
diploid cell
Down syndrome
fertilization
gamete
genetic recombination
genome
haploid cell
homologous chromosomes
interphase
karyotype
locus
malignant tumor

meiosis
metastasis
mitotic phase (M phase)
mitotic spindle
mitosis
nondisjunction
sex chromosome
sexual reproduction
sister chromatid
somatic cell
tumor
zygote