

Focus Questions
Chapters 16-21
AP Biology

Chapter 16

- Explain how we know that DNA (and RNA) are the source of heritable information. (16.1)
- What is Chargaff's rule and what does it allow us to do? (16.1)
- What are the three models of DNA replication? Which one is correct? How do we know? (16.2)
- How does DNA replication differ in prokaryotes and eukaryotes? (16.2)
- How are mistakes in DNA replication repaired? (16.2)
- What is unique about replication at the ends of the DNA molecule how is the problem solved? (16.2)
- How is chromatin packed to form a eukaryotic chromosome? (16.3)

Chapter 17

- How are genes expressed? (17.1)
- Why is it significant about the universality of the genetic code? (17.1)
- Briefly describe the process of transcription. (17.2)
- Explain the significance of the 5' cap and poly-A tail. (17.3)
- How is RNA spliced and for what purpose is it spliced? (17.3)
- Briefly describe the process of translation. (17.4)
- What types of mutations can happen and how would it impact the structure of the protein? (17.5)
- After reading this chapter, how has your conception of a gene changed? What is your conception of a gene? (17.6)

Chapter 18

- In general terms, explain how genes are regulated. (18.1)
- How does an operon work and how can it be regulated? (18.1)
- What is positive gene regulation? (18.1)
- What is epigenetic inheritance, and what are examples? (18.2)
- How can transcription be regulated? (18.2)
- How is regulation accomplished post-transcription? (18.2)
- How can non-coding segments of RNA be used by a cell? (18.3)
- What are some ways different cell types are achieved in multicellular organisms? (18.4)
- What are the generalized steps of cancer development? (18.5)

Chapter 19

- What is the basic structure of a virus? (19.1)
- Explain the tobacco mosaic disease experiment and what was learned from it. (19.1)
- Briefly explain viral replication including discussion of the lytic and lysogenic phases. (19.2)
- Explain replication of a retrovirus and provide an example. (19.2)

Chapter 20

- Briefly explain how genes are cloned using restriction enzymes. (20.1)
- Explain what a genomic library is and how it can be used. (20.1)
- How does the polymerase chain reaction work and how is it used? (20.1)
- Explain the process of gel electrophoresis and applications for its use. (20.2)
- Explain a microarray assay and potential uses. (20.2)

Chapter 21

- What is bioinformatics and what resources are available for analyzing genomes? (21.2)
- What are transposable elements and what impact can they have on a genome? (20.4 & 21.5)
- Briefly explain several ways genomes can evolve. (21.5)

Chapter 16

antiparallel
DNA ligase
DNA polymerase
DNA replication
double helix
helicase
lagging strand
leading strand

mismatch repair
nuclease
nucleotide excision repair
Okazaki fragment
origin of replication
phage
primase
primer

replication fork
semiconservative model
single-strand binding protein
telomerase
telomere
topoisomerase
transformation
virus

Chapter 17

5' cap
alternative RNA splicing
anticodon
codon
deletion
exon
frameshift mutation
gene expression
insertion
intron

messenger RNA (mRNA)
missense mutation
mutagen
mutation
nonsense mutation
nucleotide-pair substitution
point mutation
poly-A tail
promoter
ribosomal RNA (rRNA)

RNA polymerase
RNA splicing
silent mutation
TATA box
terminator
transcription
transcription factor
transfer RNA (tRNA)
translation

Chapter 18

activator
alternative RNA splicing
corepressor
cyclic AMP (cAMP)
determination
differentiation
DNA methylation
embryonic lethals
enhancer

epigenetic inheritance
histone acetylation
homeotic genes
inducer
induction
maternal effect gene
microRNAs
morphogenesis
oncogene

operator
operon
p53 gene
positional information
proto-oncogene
ras gene
regulatory gene
repressor

Chapter 19

AIDS
bacteriophages
capsid
epidemic
HIV
lysogenic cycle

lytic cycle
pandemic
phages
prions
prophages
retroviruses

restriction enzyme
reverse transcriptase
vaccine
viral envelope
viroids
virus

Chapter 20

biotechnology
cDNA library
complementary DNA (cDNA)
DNA microarray assay
gel electrophoresis
gene cloning
gene therapy
genetic engineering

genetically modified organism
genomic library
in situ
in vitro
Northern blotting
pluripotent
polymerase chain reaction (PCR)
plasmid

recombinant DNA
restriction enzyme
Southern blotting
stem cell
sticky end
totipotent
transgenic

Chapter 21

bioinformatics
genomics
Human Genome Project

linkage map
repetitive DNA
transposable elements

transposons