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CHAPTER 4 READING GUIDE | BIOCHEMISTRY

1. What is the difference between a ground state and excited state electron?

2. What is an isomer? Give an example of an isomer that we discussed in class.

3. The half-life of Carbon-14 is approximately 5700 years. If you were an animal that went extinct approximately 17,100 years ago, and at the time if your death, the total mass of C-14 in your bones was 8 grams. How many grams of C-14 would we find in your fossil?

4. Which of the following are isotopes? *Select **all** that apply.*

A. Carbon-12, Nitrogen-14
B. Carbon-12, Carbon-14
C. Nitrogen-14, Nitrogen 15
D. Oxygen-16, Nitrogen-15
E. Carbon-14, Oxygen-14

5. Determine whether the following **BONDS** are ionic, polar covalent, or nonpolar covalent.

A. H_2O
B. $AgNO_3$
C. CH_4
D. $C_6H_{12}O_6$
E. $CaCO_3$
F. CO_2
G. O_2
H. NaCl
I. CH_3Cl
J. H_3PO_4

6. True or false. Dispersion or van der Waals forces are stronger than hydrogen bonding.

7. Which of the following is NOT a characteristic of water. *Select **all** that apply*.

A. Universal solvent
B. Solid is denser than liquid.
C. High specific heat.
D. Adhesion and cohesion
E. Nonpolar covalent molecule

8. Adding HCl to water (increases/decreases/stabilizes) the pH.

9. Adding HCO3- to water (increase/decreases/stabilizes) pH.

10. Adding NaOH to water (increase/decreases/stabilizes) the pH.

11. What is the pH of water normally?

A. 2 B. 5 C. 7 D. 9 E. 12

12. Match the following.

A. Glycogen
B. Starch
C. Cellulose
D. Chitin

i. Structural molecule in fungi cell walls _____
ii. Energy storage molecule in animals _____
iii. Energy storage molecule in plants _____
iv. Structure molecule in plant cell walls _____

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13. Fill out the following chart.

Macromolecule	Monomer(s)	Bond	Functions
1.	Nucleotides		
2.	Monosaccharides like glucose and fructose.	Dehydration synthesis creates glycosidic bond	
3.			1. Energy storage 2. Structural 3. Hormones
4. Protein			

14. A hemoglobin molecule is an example of which type of protein structure?

A. Primary
B. Secondary
C. Tertiary
D. Quaternary
E. Enzyme

15. Tertiary structure is described as…*Select all that apply*

A. Hydrogen bond interactions between the amine and carboxyl groups of the amino acids.=
B. Hydrogen bond interactions between the R groups on the amino acids
C. Creating the 3D structure of a protein
D. The conglomeration of two or more peptide chains
E. The alpha helices and beta pleated sheets

Enzyme True or False.

16. Enzymes are consumed during reactions. (T/F)
17. All proteins are enzymes. (T/F)
18. Enzymes decrease the activation energy for reactions. (T/F)
19. Enzymes only break substances down. (T/F)
20. All enzymes require cofactors and coenzymes. (T/F).
21. DNA polymerase is an enzyme. (T/F)
22. Enzymes have optimal temperatures and pH. (T/F)
23. Prions are enzymes that aid in transport. (T/F)
24. Enzymes are substrate specific. (T/F)
25. Another name for the active site is the allosteric site. (T/F)

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CHAPTER 5 READING GUIDE | THE CELL

For questions 1-10, select from the following. Some answers may be used once, more than once, or not at all.

A. Eukaryote – Plantae B. Eukaryote – Animalia C. Eukaryote – Fungi
D. Eukaryote – Protista E. Prokaryote

1. Multicellular, autotroph
2. Multicellular, cell walls made of chitin
3. Unicellular, nucleoid, no organelles
4. Multicellular, cell walls made of cellulose
5. Unicellular, anaerobic respiration
6. Unicellular, membrane bound organelles
7. Multicellular, heterotroph, no cell walls
8. Unicellular, plasmids present
9. Unicellular, 1-10 micrometers
10. Multicellular, heterotroph, cell walls present

11. The shape of a cell is largely determined by its
    A. Position
    B. Surrounding cells
    C. Function
    D. Enzymes
    E. Ribosomes

12. This organelle is a prominent region inside a nucleus of a non-mitotic cell
    A. Ribosome
    B. Lysosome
    C. Peroxisome
    D. Nucleolus
    E. Endoplasmic Reticulum

13. The function of the smooth endoplasmic reticulum includes _____ and the function of the rough endoplasmic reticulum includes _____.

A. Protein Synthesis	Membrane Synthesis
B. Detoxification	Membrane Synthesis
C. Producing Ribosomes	Protein Synthesis
D. Detoxification	Protein Synthesis
E. Producing Ribosomes	Detoxification

14. Programmed cell death is also referred to as _____ and is performed by _____.

A. Apoptosis	Macrophages
B. Apoptosis	Lysosomes
C. Intracellular Digestion	Macrophages
D. Intracellular Digestion	Lysosomes
E. Lysergic Cycle	Lysosomes

15. Which of the following is NOT found in animal cells?

A. Chloroplasts B. Ribosomes C. Mitochondria D. Lysosomes E. Golgi Apparatus

16. Which of the following is NOT found in plant cells?

A. Vacuoles B. Chloroplasts C. Endoplasmic Reticulum D. Mitochondria E. Glycogen

17. Match the following plastids to their functions.

i. Chloroplasts	A. Store red-orange-yellow color pigment called carotenoid
ii. Leucoplasts	B. Store starch, abundant in potatoes
iii. Chromoplasts	C. Site of photosynthesis

18. Cytoskeletons are made of

A. Microtubules of actin and microfilaments of tubulin
B. Myosin of actin and microfilaments of microtubules
C. Microtubules of tubulin and microfilaments of actin
D. Microtubules of tubulin and microfilaments of myosin
E. Myosin of microfilaments and microtubules of actin

19. Explain the difference between centrioles, centrosomes, and flagella.

True or false.

20. Plants have centrioles and centrosomes. (T/F)
21. Animals have vacuoles. (T/F)
22. The phospholipid bilayer separates the cytosol and the cytoplasm. (T/F)
23. Cholesterol in the membrane contributes to membrane fluidity. (T/F)
24. The Na+-K+ pump is an example of passive transport. (T/F)
25. Solutes naturally move from areas to high concentration to low concentration. (T/F)
26. A virus is considered living because it has DNA. (T/F)
27. Exocytosis via a vesicle is a form of active transport. (T/F)
28. Prokaryotes have cell walls made of glycoproteins. (T/F)
29. Prokaryotes have circular DNA while eukaryotes have stranded DNA. (T/F)
30. The phospholipid bilayer is permeable by small nonpolar molecules. (T/F)

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CHAPTER 6 READING GUIDE | MITOSIS & MEIOSIS

Name _____

1. The centromere is a region in which
A) chromatids remain attached to one another until anaphase.
B) metaphase chromosomes become aligned at the metaphase plate.
C) chromosomes are grouped during telophase.
D) the nucleus is located prior to mitosis.
E) new spindle microtubules form at either end.

2. If there are 20 chromatids in a cell, how many centromeres are there?
A) 10
B) 20
C) 30
D) 40
E) 80

3. At which phase are centrioles beginning to move apart in animal cells?
A) telophase
B) anaphase
C) prometaphase
D) metaphase
E) prophase

4. If cells in the process of dividing are subjected to colchicine, a drug that interferes with the formation of the spindle apparatus, at which stage will mitosis be arrested?
A) anaphase
B) prophase
C) telophase
D) metaphase
E) interphase

5. If there are 20 centromeres in a cell at anaphase, how many chromosomes are there in each daughter cell following cytokinesis?
A) 10
B) 20
C) 30
D) 40
E) 80

6. Where do the microtubules of the spindle originate during mitosis in both plant and animal cells?
A) centromere
B) centrosome
C) centriole
D) chromatid
E) kinetochore

*7. During which phase of mitosis does **chromatin** become chromosomes?*
A) telophase
B) anaphase
C) prophase
D) metaphase
E) cytokinesis

*8. During which phase of mitosis do the **chromatids** become chromosomes?*
A) telophase
B) anaphase
C) prophase
D) metaphase
E) cytokinesis

9. What is a cleavage furrow?
A) a ring of vesicles forming a cell plate
B) the separation of divided prokaryotes
C) a groove in the plasma membrane between daughter nuclei
D) the metaphase plate where chromosomes attach to the spindle
E) the space that is created between two chromatids during anaphase

10. If a cell has 46 chromosomes at the beginning of mitosis the at anaphase there would be a total of
A) 23 chromatids
B) 23 chromosomes
C) 46 chromosomes
D) 46 chromatids
E) 92 chromosomes

11. Crossing over of tetrads occurs during
A) Prophase
B) Prophase II
C) Prophase I
D) Metaphase I
E) Metaphase II

12. If a cell has 46 chromosomes at the beginning of mitosis the at anaphase I there would be a total of
A) 23 chromatids
B) 23 chromosomes
C) 46 chromosomes
D) 46 chromatids
E) 92 chromosomes

13. DNA replication occurs during this phase of the cell cycle
A. G1
B. G2
C. Prophase
D. S
E. G3

14. The majority of a cell's life is spent in
A. Prophase
B. G1
C. Telophase
D. Cytokinesis
E. Interphase

15. Female meiosis produces

I. Four haploid cells II. One oocyte (egg) III. Two haploid cells IV. Three polar bodies

A. I & II
B. I & IV
C. III & IV
D. I, II, & III
E. I, II, & IV

16. During which type of division do chromosomes line up <u>single file</u> at the metaphase plate?

A. Metaphase & Metaphase II
B. Metaphase & Metaphase I
C. Metaphase I & Metaphase II
D. Metaphase I
E. Metaphase II

17. The shortest phase of mitosis is

A) telophase
B) anaphase
C) prophase
D) metaphase
E) cytokinesis

18. Cytokinesis in plants is characterized by

A. The formation of a cleavage furrow and middle lamella
B. The formation of a cell plate and a cleavage furrow
C. The formation of a middle lamella and plate
D. Daughter cells not fully separating from one another
E. More than one answer is correct

19. Synapsis is another name for

A. The cleavage furrow
B. Linked genes
C. The metaphase plate
D. The connection between spindle fibers and kinetochores
E. The crossing over of chromosomes

20. Reduction division refers to

A. Meiosis I
B. Meiosis
C. Meiosis II
D. Anaphase I
E. Anaphase II

21. Meiosis I is characterized by

A. Separation of chromatids
B. Crossing over
C. Independent assortment
D. Separation of tetrads
E. Production of gametes

22. Meiosis II is characterized by

A. Separation of chromatids B. Crossing over C. Independent assortment
D. Separation of tetrads E. Production of gametes

For questions 23-26, refer to the following. Answers may be used once, more than once, or not at all.

A. Anaphase B. Telophase C. Metaphase D. Prophase E. Interphase

23. Cytokinesis begins
24. Chromosomes migrate to opposite poles
25. MTOCs migrate to opposite poles
26. Chromosomes replicate

True or false.

27. At the end of reductive division, each gamete is genetically identical.
28. Genes on homologous chromosomes are more likely to cross over if they are close together.
29. Mitosis occurs for the production of haploid cells.
30. Telophase is the opposite of prophase.
31. In prophase the number of chromatids is double the number of chromosomes.
32. In anaphase, the number of chromosomes is double that of metaphase.
33. Chromatids exist independently.
34. Chromosomes are counted by centromeres.
35. In metaphase I, chromosomes line up double file.
36. In metaphase I, homologous pairs line up at metaphase plate.
37. If a person is homozygous for every single genes, their gametes would be genetically identical.
38. The nucleolus is only visible during interphase.
39. DNA exists in the nucleus mainly as chromosomes.
40. When chromatids split, they become individual chromosomes.
41. Nondisjunction events occur during anaphase.
42. Nondisjunction can occur during anaphase I.
43. Nondisjunction can occurs during anaphase II.
44. Most gametes that are the result of nondisjunction that are fertilizes are aborted.
45. Fertilized gametes that are the result of nondisjunction have aneuploidies.
45. The only viable monosomy is Turner's syndrome.

For 46-50, refer to the following.

A. Trisomy 21 B. Klinefelter Syndrome C. Turner Female D. Color Blindness

46. Syndrome the result of an autosomal aneuploidy.
47. Sex-linked trait.
48. Will always be a male.
49. The only viable monosomy.
50. A sex chromosome trisomy.

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CHAPTER 7 & 8 READING GUIDE | CELL RESPIRATION

1. The molecule that stores energy for immediate use in cellular activity is

A. Glucose
B. Glucose-3-Phosphate
C. Adenosine Diphosphate
D. Adenosine Triphosphate
E. Glycogen

2. Molecules like to be at **(HIGHER/LOWER)** *energy states; therefore, ATP is at a* **(HIGHER/LOWER)** *energy state than ADP.*

3. The two phases of cellular respiration in ORDER are

A. Aerobic and Anaerobic
B. Anaerobic and Aerobic
C. Pyruvate Decarboxylation and Krebs Cycle
D. Citric Acid Cycle and Oxidative Phosphorylation
E. Anaerobic and Oxidative Phosphorylation

4. Arrange the following processes in the correct order

I. Oxidative Phosphorylation II. Glycolysis III. Krebs Cycle IV. Pyruvate → Acetyl-CoA

A. I → II → III → IV
B. II → III → I → IV
C. IV → III → I → II
D. II → IV → III → I
D. II → IV → I → III

5. NADH and FADH2 are both molecules are function as

A. Electron transport chain proteins
B. Proton carriers
C. Ions
D. Final electron acceptors
E. ATP enzymes

6. The products of glycolysis are

A. 4 Total ATP, 2 Pyruvates, 1 NADH
B. 2 Net ATP, 2 Pyruvates, 2 NADH
C. 4 Net ATP, 1 Pyruvate, 2 NADH
D. 4 Total ATP, 2 Pyruvates, 2 NADH
E. More than one of the answers is correct

7. This process produces the CO2 that is exhaled

A. Glycolysis
B. Alcoholic Fermentation
C. Chemiosmosis
D. Krebs Cycle
E. None

8. Fermentation is an ----- process to -----.

A. Aerobic process, produce ATP
B. Anaerobic process, produce ATP
C. Aerobic process, replenish cellular ethanol
D. Anaerobic process, replenish NAD+
E. Anaerobic process, replenish FADH+

9. Alcoholic fermentation occurs in ----- and lactic acid fermentation occurs in -----.

A. Animals, Plants
B. Animals, Yeast
C. Plants, Bacteria
D. Plants, Yeast
E. Yeast, Animals

10. Which molecule has the MOST energy potential?

A. Glucose
B. Lactose
C. Pyruvate
D. FADH2
E. NADH

11. Which molecule has the LEAST energy potential?

A. Glucose
B. Lactose
C. Pyruvate
D. FADH2
E. NADH

12. Which of the following NOT the correct process-location pairing?

A. Fermentation – Cytoplasm
B. Glycolysis – Cytoplasm
C. Krebs Cycle – Mitochondrial Matrix
D. Oxidative Phosphorylation – Outer Mitochondrial Membrane
E. Pyruvate Decarboxylation – Cytoplasm

13. NAD+ and FAD+ is **(REDUCED/OXIDIZED)** *to NADH and FADH2.*

14. All of the following about chemiosmosis are true EXCEPT

A. It depends on the hydrogen proton gradient in the intermembrane space of mitochondria
B. It produces the majority of the ATP in cellular respiration
C. The hydrogen proton gradient is produced by the movement of electrons in the ETC
D. It utilizes the hydrogen protons from FADH2 and NADH
E. It can occur without the presence of oxygen

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15. The molecule that combines ADP + Pi in the inner mitochondrial membrane is called

A. ATP Synthase
B. ADP-Pi Synthase
C. Cytochrome C Oxidase
D. Photosystem I
E. Cristae Membrane

16. Reduction is the **(GAIN/LOSS)** *of electrons, while oxidation is the* **(GAIN/LOSS)** *of electrons.*

17. What are two waste products produced by cellular respiration?

A. CO_2 and H_2O
B. CO_2 and ATP
C. CO_2 and Pyruvate
D. H_2O and Pyruvate
E. H_2O and ATP

18. How many times does one glucose undergo each of the following processes?

a) Glycolysis _____
b) Pyruvate Decarboxylation _____ (conversion of pyruvate into Acetyl-CoA)
c) Citric Acid Cycle _____
d) Oxidative Phosphorylation _____

19. What is the net ATP production of aerobic and anaerobic cellular respiration? _____

20. Prokaryotes cannot respire aerobically **(TRUE/FALSE)**

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CHAPTER 7 & 8 READING GUIDE | PHOTOSYNTHESIS

1. Write the balanced chemical equation for photosynthesis

2. Rank from largest structure to smallest

I. Plant Cell II. Thylakoid III. Grana IV. Chloroplast

A. I → IV → II → III
B. I → IV → III → II
C. I → II → IV → III
D. I → III → II → IV
E. I → II → III → IV

3. Photosynthesis is an overall **(REDUCTION/OXIDATION)** *reaction.*

For 4-5 refer to the following:

A. Carotenoids B. Chlorophyll C. Phycobilins D. Hemocyanin E. Carrots

4. The pigment responsible for the green color in plants is called _____
5. The pigment responsible for the red, orange, and yellow color in plants is called _____

For 6-15, match the following. Answers can be used more than once or not at all. Write letter next to number.

6. Granum	(A) Also known the Calvin Cycle
7. Thylakoid Membrane	(B) Pigment in plants that absorbs light energy
8. Light Dependent Reaction	(C) Carbohydrate that results from Calvin Cycle
9. Light Independent Reaction	(D) Reactants in photosynthesis
10. Chloroplast	(E) Contains photosystems and electron transport chain
11. NADPH	(F) Stack of thylakoid
12. G3P	(G) Produces O2 as waste
13. Alcohol	(H) Carrier molecule that transfers high energy electrons
14. Water and CO2	(I) Organelle found in plant cells
15. Chlorophyll	(J) Product of Fermentation

16. The primary function of the light dependent reaction is to

A. Produce ATP and protons for the Calvin Cycle
B. Produce glucose and ATP
C. Produce PGAL
D. Fix carbon for the light independent reactions
E. Fix nitrogen for the Calvin Cycle

17. The primary function of the light independent reaction is to

A. Produce ATP and protons for the Calvin Cycle
B. Produce glucose and ATP
C. Produce PGAL
D. Fix carbon for the light independent reactions
E. Fix nitrogen for the Calvin Cycle

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For 18-25, match where each takes place.

18. Light Dependent Reaction	A. Cytoplasm
19. Light Independent Reaction	B. Stroma
20. Hydrogen Proton Gradient	C. Thylakoid Membrane
21. Electron Transport Chain	D. Thylakoid Lumen
22. Electron Excitation	E. Photosystems

23. Each of the following is true about photolysis EXCEPT

A. It replenishes the electrons lost in noncyclic phosphorylation in light dependent reactions
B. It produces the protons to pass through ATP synthase
C. It released O2 as byproduct
D. It occurs in the stroma
E. It produces protons that create a proton gradient in the thylakoid space

24. The most important enzyme in the Calvin Cycle is _____

25. The three carbon sugar produces during the Calvin Cycle is called _____

26. Most of the G3P produced during the Calvin Cycle is used to produce _____

True or false.

27. The majority of photosynthesis occurs in the cuticle layer (cutin) of a leaf. (TRUE/FALSE)
28. The palisade layer contains tightly packed cells that contain chloroplasts. (TRUE/FALSE)
29. The spongy mesophyll layer contains even more chloroplasts than the palisade layer. (TRUE/FALSE)
30. The palisade cells have airspaces for the exchange or gases. (TRUE/FALSE)
31. The epidermis layer is waterproof and minimizes water loss. (TRUE/FALSE)
32. Guard cells of stomata control gas exchange and rate of photosynthesis. (TRUE/FALSE)
33. C4 photosynthesis is more prevalent in plants in more humid environments. (TRUE/FALSE)
34. C4 photosynthesis is modified to prevent excessive water loss. (TRUE/FALSE)
35. The products of C4 photosynthesis and C3 photosynthesis are the same. (TRUE/FALSE)

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CHAPTER 9 READING GUIDE | CLASSICAL GENETICS

Name _____

1. Define the law of dominance.

2. Define the law of segregation.

3. Define the law of independent assortment.

For questions 4-9, please refer to the following answer choices.

A. FF x FF B. FF x ff C. Ff x Ff D. FfGg x FfGg E. FFgg x ffGG

4. This cross produces offspring with a 9:3:3:1 phenotypic ratio. _____
5. These TWO crosses produce only hybrid offspring. _____ _____
6. These THREE crosses produce offspring with only dominant traits. _____ _____ _____
7. This cross produces offspring with a 1:2:1 genotypic ratio. _____
8. This cross is referred to as a dihybrid cross. _____
9. This cross is referred to as a testcross or backcross. _____

10. Incomplete dominance is best characterized by which of the following?
A. A black bear and a white bear have offspring that are spotted.
B. A long pear and a round pear have offspring that are long.
C. An AB+ parent and an O- parent have offspring that are A+.
D. A red flower and a white flower have offspring with pink flowers.
E. Human blood antigens have alleles A, B, and i.

11. Codominance is best characterized by which of the following?
A. A black bear and a white bear have offspring that are spotted.
B. A long pear and a round pear have offspring that are long.
C. An AB+ parent and an O- parent have offspring that are A+.
D. A red flower and a white flower have offspring with pink flowers.
E. Human blood antigens have alleles A, B, and i.

12. Multiple alleles is best characterized by which of the following?
A. A black bear and a white bear have offspring that are spotted.
B. A long pear and a round pear have offspring that are long.
C. An AB+ parent and an O- parent have offspring that are A+.
D. A red flower and a white flower have offspring with pink flowers.
E. Human blood antigens have alleles A, B, and i.

13. What kind of traits are considered along a "spectrum?"
A. Co-dominant traits
B. Height and skin color
C. Polygenetic traits
D. A & B are correct
E. B & C are correct

14. Which of the following are recessive sex-linked traits?

I. Colorblindness II. Hemophilia III. Trisomy 21

A. I only
B. I & II only
C. II & III only
D. I & II only
E. All are sex-linked traits

15. Men are more affected by recessive X-linked disorders because

A. There are no carriers for X-linked disorders in males
B. Females need two copies of a recessive X-linked disorder to express it
C. Males pass traits only to their daughters
D. Two of the above are true
E. Three of the above are true

16. What is karyotype?

A. An individual phenotype
B. An individual genotype
C. A combination of chromosomes found in a gamete
D. The number of chromosomes in a diploid cell
E. A method of organizing homologous chromosomes

17. A dark colored square in a pedigree can indicate

A. A female with a dominant phenotype
B. A male with a dominant phenotype
C. A male with homozygous dominant or heterozygous genotype
D. A male with exhibiting a trait
E. A female exhibiting a trait

18. A frameshift mutation could result from

A. a base insertion only.
B. a base deletion only.
C. a base substitution only.
D. deletion of three consecutive bases.
E. either an insertion or a deletion of a base.

19. Gabrielle and Eric are respectively blood type O and AB. What MUST their parents' blood types be?

A. AB x ii
B. Ai x Bi
C. Ai x BB
D. AA x Bi
E. AB x ii

For questions 20-25, refer to the following.

A. Trisomy 21 B. Huntington's C. Cystic Fibrosis D. Klinefelter's E. Hemophilia

20. A chromosomal disorder characterized by autosomal aneuploidy
21. A chromosomal disorder characterized by a nondisjunction in sex chromosomes
22. An X-linked genetic disorder
23. A dominant genetic disorder that only manifests later on in life
24. A recessive autosomal genetic disorder
25. A disorder characterized by a sterile male

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CHAPTER 10 READING GUIDE | MOLECULAR GENETICS

Name _____

1) In his transformation experiments, what did Griffith observe?

A) Mutant mice were resistant to bacterial infections.
B) Mixing a heat-killed pathogenic strain of bacteria with a living nonpathogenic strain can convert some of the living cells into the pathogenic form.
C) Mixing a heat-killed nonpathogenic strain of bacteria with a living pathogenic strain makes the pathogenic strain nonpathogenic.
D) Infecting mice with nonpathogenic strains of bacteria makes them resistant to pathogenic strains.
E) Mice infected with a pathogenic strain of bacteria can spread the infection to other mice.

2) How do we describe transformation in bacteria?

A) The creation of a strand of DNA from an RNA molecule
B) The creation of a strand of RNA from a DNA molecule
C) The infection of cells by a phage DNA molecule
D) The type of semiconservative replication shown by DNA
E) Assimilation of external DNA into a cell

3) In trying to determine whether DNA or protein is the genetic material, Hershey and Chase made use of which of the following facts?

A) DNA contains sulfur, whereas protein does not.
B) DNA contains phosphorus, whereas protein does not.
C) DNA contains nitrogen, whereas protein does not.
D) DNA contains purines, whereas protein includes pyrimidines.
E) RNA includes ribose, whereas DNA includes deoxyribose sugars.

4) Cytosine makes up 42% of the nucleotides in a sample of DNA from an organism. Approximately what percentage of the nucleotides in this sample will be thymine?
A) 8%
B) 16%
C) 31%
D) 42%
E) It cannot be determined from the information provided.

5) The Hersey-Chase experiment proved that
A) The molecule transferred in Griffith's experiment was DNA
B) DNA replicates in a semiconservative fashion
C) DNA was the molecule of inheritance, not protein
D) Bacteriophages are responsible for the spread of viral disease
E) DNA has a double-helical shape

6) The Meselson-Stahl experiment proved that
A) The molecule transferred in Griffith's experiment was DNA
B) DNA replicates in a semiconservative fashion
C) DNA was the molecule of inheritance, not protein
D) Bacteriophages are responsible for the spread of viral disease
E) DNA has a double-helical shape

7) Watson, Crick, and Franklin's experiments proved that
A) The molecule transferred in Griffith's experiment was DNA
B) DNA replicates in a semiconservative fashion
C) DNA was the molecule of inheritance, not protein
D) Bacteriophages are responsible for the spread of viral disease
E) DNA has a double-helical shape

8) The Avery-Chase experiment proved that
A) The molecule transferred in Griffith's experiment was DNA
B) DNA replicates in a semiconservative fashion
C) DNA was the molecule of inheritance, not protein
D) Bacteriophages are responsible for the spread of viral disease
E) DNA has a double-helical shape

9) The elongation of the leading strand during DNA synthesis

A) progresses away from the replication fork.
B) occurs in the 3' → 5' direction.
C) produces Okazaki fragments.
D) depends on the action of DNA polymerase.
E) does not require a template strand.

10) The protective ends of DNA are called

A) Telomeres
B) Centromeres
C) Poly-A Tail
D) Introns
E) Exons

11) If we transform an E. coli cell with a plasmid containing a glowing protein. We would have utilized ----- to create a genetically engineered bacteria known as a -----.
A) Polymerase Chain Reaction…Genetically Modified Organism
B) Genetic Modification…Methicillin Resistant Staphylococcus
C) Recombinant DNA…Genetically Modified Organism
D) Transformation…Methicillin Resistant Staphylococcus
E) Recombinant DNA… Methicillin Resistant Staphylococcus

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12. Match the following.

Term	*Matching Letter*	*Choices*
1. Translation		A. A series of three nucleotides on an mRNA strand corresponding to specific amino acids
2. Transcription		B. Charged with amino acids in the nucleus
3. Ribosome		C. Includes the 5' cap and poly-A tail
4. Codon		D. Protein monomer
5. Anticodon		E. Where ribosomes are assembled
6. mRNA		F. The process by which proteins are enzymatically synthesized via dehydration synthesis
7. tRNA		G. A structural portion of ribosomes
8. rRNA		H. Enzyme complex that catalyzes protein synthesis
9. RNA Processing		I. Where ribosomes attach to mRNA
10. Post-Transcriptional Modification		J. Variations in the combination of exons from the same gene that enable the creation of multiple proteins
11. Nucleus		K. Template for sequencing amino acids
12. Cytoplasm		L. The means by which introns are removed from RNA
13. Start Codon		M. The process by which RNA polymerase synthesizes RNA from DNA
14. Amino Acid		N. AUG
15. Alternative Splicing		O. Sequence of three nucleic acids that complement mRNA on tRNA

13. The end products of translation are

A. polypeptides
B. amino acids
C. lipids
D. RNA
E. DNA

14. All of the following are enzymes involved in DNA replication except:

A. helicase
B. DNA ligase
C. DNA polymerases
D. RNA polymerases
E. primase

15. Protein synthesis consists of all the following steps except:

A. Replication B. Transcription C. Translation D. Processing E. Mitosis

16A. What is the correct ordering of the following processes?

I. Transcription II. Processing III. Translation IV. Post-Transcriptional Modification

A. I → II → III → IV
B. II → I → IV → III
C. I → III → IV → II
D. I → II → IV → III
E. IV → III → IV → I

16B. Which of the following is NOT considered a post-transcriptional modification?

A. 5' cap
B. Ribosomal Translation
C. Poly-A tail
D. Alternative splicing
E. RNA processing

17. The portion on a bacterial operon that recruits RNA polymerase is called

A. TATA Box B. Enhancer Region C. Promoter D. Operator E. cAMP

18. Which of the following is true about translation?

A. Initiation begins at the 3' end of the mRNA
B. Termination ends with the synthesizes of the stop codon amino acid
C. Elongation of the amino acid chain starts with the amino acid glutamine
D. Both A and B are true
E. None of the above are true

19. One possible result of chromosomal breakage is for a fragment to join a nonhomologous chromosome. What is this alteration called?

A) deletion
B) transversion
C) inversion
D) translocation
E) duplication

20. Which of the following is an appropriate mRNA transcript for the following RNA transcript

Exon 1 – Intron 1 – Exon 2 – Intron 2 – Exon 3 – Intron 3 – Exon 4

A. Exon 2 – Exon 1 – Exon 3
B. Exon 1 – Exon 3 – Exon 4
C. Exon 1 – Exon 2 – Exon 3 – Exon 4
D. Both A & C
E. Both B & C

For 21-25, refer the following:

Donovan is a geneticist at a DNA lab in Cupertino. His friend Adam tells Donovan that Adam's wife has been acting pretty shady lately, and he is not sure whether his new baby is actually his. Donovan collects DNA samples from both Adam and the baby.

21. Donovan first decides to test specific genes, so he needs to cut the DNA using

A. Gel Electrophoresis
B. Polymerase Chain Reaction
C. Restriction Enzymes
D. Restriction Sites
E. Recombinant DNA

22. After the genetic fragments are acquired, Donovan sends them to the lab technician to make copies. To amplify the DNA, the lab technician uses

A. Gel Electrophoresis
B. Polymerase Chain Reaction
C. Restriction Enzymes
D. Restriction Sites
E. Recombinant DNA

23. When the billions of fragments of Adam's and the baby's DNA are sent back, Donovan will analyze the genes via fragment size using

A. Gel Electrophoresis
B. Polymerase Chain Reaction
C. Restriction Enzymes
D. Restriction Sites
E. Recombinant DNA

24. Donovan loads the DNA into the wells, and runs the machine. He goes to In-N-Out where he orders a double-double with animal style fries. When he comes back from lunch, he will see

A. Larger fragments further away from the wells
B. Smaller fragments further away from the wells
C. Larger fragments further from the negative end
D. Smaller fragments closer to the negative end
E. Larger fragments closer to the positive end

25. If Donovan were to fall asleep after his delicious meal, and left the machine on for an indefinite amount of time, which of the following will occur?

A. Smaller DNA fragments will be toward the wells and larger fragments will be toward the ends
B. Larger DNA fragments will be toward the wells and smaller fragments will be toward the ends
C. All fragments will be toward the wells
D. All fragments will be at the ends
E. All fragments are at the center

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CHAPTER 11 READING GUIDE | EVOLUTION

Name _____

1. A population is defined as

A. All biotic and abiotic factors in a given area
B. All the biotic specimen of a given area
C. All the biotic specimen in a biome
D. All the members of a species in a particular area
E. All the members of a species in a biome

2. Which of the following is NOT evidence of evolution?

A. Fossil Record
B. Comparative Anatomy
C. Molecular Biology
D. Comparative Embryology
E. All of the other are evidence of evolution

3. That we have similar plants on the east coast of South America and western coast of Africa confirms the theory of

A. Biogeography
B. Acquired Traits
C. Microbiology
D. Descent with Modification
E. Continental Drift

For questions 4-9, refer to the following:

A. Embryonic Structure B. Homologous Structure C. Analogous Structure
D. Vestigial Structure E. Transitional Fossil

4. A bat wing and a bird wing. _____
5. Most animals gastrulate to form a complete digestive tract during development _____
6. A whale flipper and a human arm. _____
7. Human wisdom teeth and tailbones. _____
8. The wing of a bird and the leg of a dog. _____
9. Archaeopteryx is an extinct organism that displays both bird and reptilian characteristics. _____

10. Match each statement with an idea. In the blank to the left of each statement, write "L" for Lamarckism, "D" for Darwinism, or "B" for both

A. _____ Adaptive traits make an organism better suited for its environment.
B. _____ Traits accumulated over a single lifetime can be passed on to offspring
C. _____ Populations are smaller than can be supported by the environment, traits are passed on genetically
D. _____ An organism can "will" a change to occur.
E. _____ If Vincent Van Gogh had cut his ear off, then had a daughter, the daughter would be born without an ear

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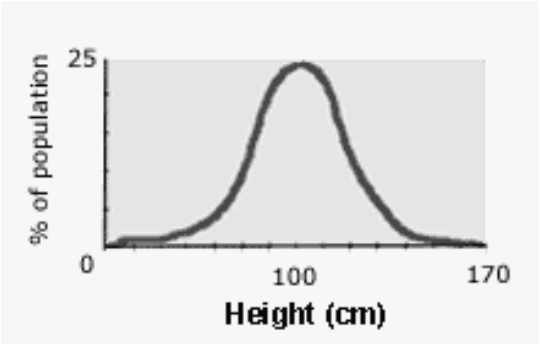
11. Height is a genetic trait that shows a range of phenotypes (from very tall to very short). Heterozygotes are moderate in height. A 2005 study records the heights of individuals across the world. This data, comparing the number of individuals at each height is record in the graph below.



In the year 3005, the world has become overcrowded, and as a result, personal space is at a minimum. Very tall people must always stoop and slouch, which results in poor skeletal health. This reduces their life expectancy to 35 years and means they are less likely to mate often. Short people have no difficulty maintaining great posture, and their use of less resources means they can share extra resources with their mates and families. This means they reproduce more.

A. On the graph, draw how you would expect the population data to look in the year 3005.

B. What type of selection is the world population experiencing with respect to height?

I. Directional II. Stabilizing III. Disruptive

C. Over the course of the next 100 years, it becomes advantageous to be of moderate height (compared to the rest of the population). This would result in which kind of selection?

I. Directional II. Stabilizing III. Disruptive

D. Unfortunately, the genes for moderate height are linked with a pheromone that enables the new alien overlords to find and hunt humans carrying them. This would result in which kind of selection?

I. Directional II. Stabilizing III. Disruptive

12. Match the following mechanisms of evolution to its correct example.

____Bottleneck Effect	A. Organisms move into a population changing the allelic frequencies.
____Founder Effect	B. Certain traits offer a selective advantage over others.
____Mutations	C. Changes in DNA sequence result from mistakes in DNA replication
____Fitness	D. Carriers of the sickle cell anemia gene have resistance to malaria
____Heterozygote Advantage	E. A small number of individuals inhabit an island and begin reproducing.
____Gene Flow	F. A hurricane wipes out a large portion of the population and a few individuals are left

13. You have sampled a population in which you know that the percentage of the homozygous recessive genotype (aa) is 36%. Using that 36%, calculate the following:

A. The frequency of the "aa" genotype. _____
B. The frequency of the "a" allele. _____
C. The frequency of the "A" allele. _____
D. The frequencies of the genotypes "AA" and "Aa." _____
E. The frequencies of the two possible phenotypes if "A" is completely dominant over "a." _____

14. If you were observing a population of turtles NOT *in Hardy-Weinberg equilibrium, which of these would you expect? Circle all that apply.*

A. No mutations B. Random Mating C. Gene flow D. Small population E. No selection

15. If you were observing a population of giant Chinese salamanders in Hardy-Weinberg equilibrium, which of these would you NOT expect? Circle all that apply.

A. Mutations B. No Random Mating C. Gene flow D. Large population E. No natural selection

For questions 16-20, refer to the following.

A. Geographic Isolation B. Habitat Isolation C. Behavioral Isolation
D. Temporal Isolation E. Reproductive Isolation

16. Some female boobies prefer to mate exclusively with males with blue feet.
17. Chipmunks in the same area hibernate during different seasons.
18. A Great Dane and a Maltese cannot physically mate because of their size difference.
19. A population of rabbits is separated by a river: one into a forest and one into a plain.
20. Some amphibious snakes prefer to live in the water while others prefer to live on land.

21. In 4007, an atomic war wipes out most life on the planet. Only a single species of squirrel survives the war. The extensive radiation from the war causes mutation rates to increase. In addition, the squirrels are able to occupy many new niches in the environment. Over a relatively short amount of time, the original species of squirrel develops into many different species of squirrel.

I. This is an example of

A. Adaptive Radiation B. Gradualism C. Natural Selection D. Gene Flow E. None

II. The rate of evolution of the squirrels after the atomic war would provide evidence for which model?

A. PUNCTUATED EQUILIBRIUM B. GRADUALISM

22. Which of the following gases was NOT present in the atmosphere of early Earth?

A. CO_2 B. CH_4 C. NH_3 D. H_2O E. O_2

23. The Urey-Miller experiment recreated the theoretical conditions of early Earth, recreating a highly reductive atmosphere, and collected samples of what?

A. Bacteria B. Viruses C. RNA D. Amino Acids E. Carbohydrates

24. Endosymbiosis proposes that

I. An anaerobic eukaryotic precursor engulfed an aerobic prokaryote
II. Mitochondria is inherited maternally
III. Mitochondria and chloroplasts are remnants of engulfed prokaryotes

A. All answer are correct
B. Only I & II
C. Only I & III
D. Only II & III
E. Only I

25. A hummingbird beak and a long flower is an example of

A. Parallel evolution
B. Convergent evolution
C. Divergent evolution
D. Adaptive radiation
E. Coevolution

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CHAPTER 12 READING GUIDE | TAXONOMY

Name _____

1. Please put in order of most inclusive to least inclusive.

Kingdom _____
Species _____
Order _____
Domain _____
Class _____
Phylum _____
Genus _____
Family _____

2. Classify the following domains.

I. Archaea II. Eukarya III. Prokarya

A. *Domain including unicellular organisms that can be transformed* _____
B. *Domain including multicellular organisms* _____
C. *Domain with extremophiles* _____
D. *Domain with organisms without membrane bound organelles* _____
E. *Domain including Protista* _____
F. *Domain including Bacteria* _____
G. *Domain including Diatoms* _____

3. Classify the following kingdoms.

I. Monera II. Plantae III. Fungi IV. Animalia V. Protista

A. Multicellular, heterotrophic, cell walls made of chitin _____
B. Unicellular, can be photosynthetic, includes algae _____
C. Multicellular, autotrophic, cell walls made of _____
D. Unicellular, no membrane bound organelles _____
E. Multicellular, heterotrophic, no cell walls _____

4. Which of the following is NOT true bacteria?

A. Decomposers of organic matter
B. Many are pathogenic
C. Specimen for genetic engineering
D. Have cell walls of peptidoglycan
E. Have no means of resistance against antibiotics

5. A thermophilic halophile can live in ----- and ----- environments.

A. Hot and salty B. Cold and salty C. Hot and humid D. Hot and dry E. Cold and dry

6. Which of the following is NOT true of fungi?

A. They are heterotrophic eukaryotes
B. Ecological decomposers
C. Excrete extracellular enzymes for to digest food
D. Can only sexually reproduce
E. They are saprophytes, eating decaying or dead organic material

7. Lichen are examples of
A. Pioneer organisms
B. A mutualistic, symbiotic relationship between fungi and algae
C. Tree parasites
D. Both A & B are true
E. Both B & C are true

8. Which of the following is NOT a characteristic of most animals?
A. Autotrophic
B. Multicellular
C. Motile
D. Germ layers
E. Both A & D are not true

For questions 9-12 refer to the following.
A. Tissue B. Cell C. Organ D. Organ System E. Organism

9. Neuron, erythrocyte, macrophage
10. Group of cells performing similar function
11. Flatworm
12. Liver, lung, heart

13. Match the following.
A. Ectoderm B. Mesoderm C. Endoderm D. Mesoglea E. Coelom

I. Bones _____
II. Skin _____
III. Neurons _____
IV. Lining of small intestine and esophagus _____
V. Missing in diploblastic organisms _____
VI. Red blood cells _____
VII. Lungs and thyroid _____
VIII. Heart and kidney _____
IX. Only present in diploblastic organisms _____
X. Fluid filled body cavity surrounded by mesoderm _____

14. Which phylum is the first to develop specialized tissues?
A. Porifera (sponges)
B. Annelida (earthworms)
C. Cnidaria (jellyfish)
D. Anthropoda (insects etc.)
E. Mollusca

15. Which phylum is the first to develop bilateral symmetry?
A. Arthropoda
B. Nematoda (roundworms)
C. Cnidaria
D. Platyhelminthes (flatworms)
E. Echinodermata (starfish)

16. Which phylum is the first to develop segmentation?
A. Arthropoda
B. Annelida
C. Chordata (verterbrates)
D. Platyhelminthes
E. Mollusca

17. Which phylum is NOT a triploblastic coelomate?
A. Arthropoda
B. Annelida
C. Nematoda (round worms)
D. Chordata
E. Mollusca

18. A new species of terrestrial animal is discovered with the following characteristics: exoskeleton; tracheal system for gas exchange; modified segmentation. A knowledgeable zoologist would predict that it probably also would have
A. Eight legs
B. A water vascular system
C. A sessile life style
D. Diploblastic
E. Closed circulatory system

Match the phrases with the choices below. Each choice may be used once, more than once, or not at all.

A. Cnidaria B. Annelida C. Mollusca D. Arthropoda E. Echinodermata

19. Protostomes that have a closed circulatory system and true segmentation.
20. Deuterostomes with tube feet and radial symmetry
21. Includes clams, snails, octopuses
22. Segmentation, open circulatory system, largest phylum
23. Segmented worms
24. Excrete waste using Malpighian tubules
25. Diploblastic, radially symmetric
26. Open circulatory system, soft bodies

27. An arthropod has all the following characteristics EXCEPT
A. Protostome development.
B. Bilateral symmetry.
C. Pseudocoelom.
D. Three embryonic germ layers.
E. True tissues

28. A radially symmetrical animal that has two embryonic germ layers belongs to which phylum?
A. Porifera
B. Cnidaria
C. Platyhelminthes
D. Chordata
E. Echinodermata

29. Which of the following structures are characteristic of vertebrates?
A. open circulatory system
B. pharyngeal slits
C. dorsal hollow nerve cord
D. pharyngeal slits and dorsal hollow nerve cord
E. open circulatory system, pharyngeal slits, and dorsal hollow nerve cord

30. The amniotic egg first evolved in which of the following groups?
A. Fish
B. Birds
C. Reptiles
D. Amphibians
E. Egg-laying mammals (monotremes)

*31. Animals that maintain a constant body temperature are called (*ENDODERMS/ECTODERMS).

32. Which of these developed LAST?
A. Amniotic Eggs
B. Cartilage skeletons
C. Legs
D. Bones
E. Jaws

33. Segmentation is an important development in animals because it allowed for
A. Less energy consumption
B. Development of nerve nets
C. Sponges to realize their niches
D. Better fitness in marine environments
E. Greater specialization

34. Which of the following is true about porifera?
A. They have true tissues
B. They are motile
C. They are autotrophic
D. They are basal animals
E. They are diploblastic

35. Which of the following is NOT a characteristic of mammals?
A. Hair and fur
B. Mammary glands for milk
C. Endothermic
D. Protostomes
E. Triploblastic

36. In general primates are
A. Mammals that give placental birth
B. Bipedal with opposable thumbs
C. Care for their young the most of any animals
D. B & C are true
E. All are true

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CHAPTER 13 READING GUIDE | PLANTS PT I

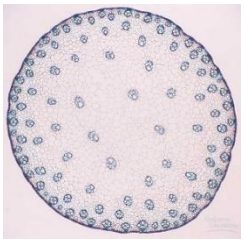
Name _____

1. Which of the following is NOT true of bryophytes?
A. Mosses are a type of bryophyte
B. Subdivisions include gymnosperms and angiosperms
C. They have no vascular tissues for xylem and phloem
D. They must live in moist environments
E. Reproduce by spores rather than flowers or seeds

2. Which of the following is NOT true of tracheophytes?
A. They have vascular tissues
B. Subdivisions include monocot and dicot
C. Can reproduce via spores, but also flowers and seeds
D. Include redwoods, pines, and spruces
E. Include roses, orange trees, and grape vines

3. Which of the follow is true about gymnosperms?
A. They are flowering plants
B. They do not exhibit secondary growth
C. They are cone-bearing plants
D. They can't survive in dry conditions
E. Include redwoods, cedars, and sequoias

4. The picture to the right is an example of…
A. Monocot root
B. Monocot stem
C. Dicot root
D. Dicot stem
E. Vascular bundle



5. *The picture of the left is an example of*
A. Monocot leaf
B. Bryophyte leaf
C. Conifer leaf
D. Dicot leaf
E. Fern leaf

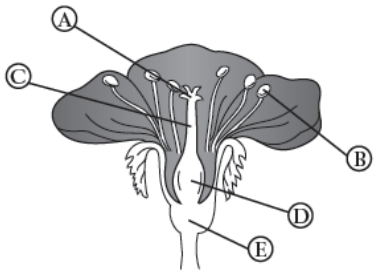
6. The roots of monocots differ from roots of dicots in that

A. Monocots have a main root with small hairs growing out of it B. Dicots have mesophyll cells in their roots
C. Vascular bundles in roots are in a ring D. Vascular bundles are scattered E. Dicots have a taproot

7. Which of the following is NOT an evolutionary development of terrestrial plants?

A. Photosynthesis for the production of food
B. Stomata to regulate gas exchange
C. Cutin in palisade layer of leaf to prevent excessive water loss
D. Gametangia protect gametes and zygotes from drying out
E. Cell walls of cellulose for structural support

Questions 8–10 refer to the following diagram of floral structures.



8. The site of fertilization

9. The site of pollen production

10. The site of pollen tube development

11. Which of the following is NOT matched correctly?
A. Apical Meristem – Primary Growth
B. Root Hair – Zone of Specialization
C. Secondary Growth – Lateral Growth
D. Root Epidermis – Absorption of water and nutrients from environment
E. Cortex – contain parenchyma cells with plastids for storage of cellulose

12. The ----- in the root is a vascular cylinder that is surrounded by endoderm. Endodermis is surrounded by a waxy layer called -----.
A. Stele…Parenchyma
B. Stele…Casparian Strip
C. Xylem…Stele
D. Phloem…Xylem
E. Casparian Strip…Xylem

13. Which of the following is NOT matched correctly?
A. Rhizobium – symbiotic nitrogen fixing bacterium
B. Mycorrhizae – symbiotic structure of plant root and fungi filament
C. Symplast – continuous system of cytoplasm connected by plasmodesmata
D. Apoplast – network of cell walls and intercellular spaces for water movement
E. Taproot – a network of fibrous roots in dicots for absorption

14. Vascular tissue runs the length of each stem in strands called -----. _____

15. Dicot stems have an outer ----- of ground tissue and an inner ----- of parenchymal storage cells. _____
_____

16. Vascular bundles in dicots consist of the ---- toward the outside and the ---- toward the inside. _____
_____

17. Which of the following is correctly matched?
A. Palisade Mesophyll – Gas Exchange
B. Spongy Mesophyll – Controls Stomata
C. Epidermis – Photosynthesis
D. Vein – Transport of Water
E. Guard Cells – Protection

18. Guard cells become ----- to prevent water loss in leaves called -----.

A. Turgid – Dehydration
B. Turgid – Transpiration
C. Flaccid – Evaporation
D. Flaccid – Transpiration
E. Turgid – Evaporation

19. Match the following to its function. Answer with ROMAN NUMERALS next to the letters.

A. Tracheids & Vessel Elements	I. Parts of the phloem for nutrient transport
B. Dermal Tissue	II. Ground tissue found in almost all parts of the plant
C. Sieve Tube Elements & Companion Cells	III. Ground tissue whose primary function is support
D. Parenchyma	IV. Protective outer covering on plants
E. Lignin	V. Unevenly thickened ground tissue
F. Collenchyma	VI. Polymer is secondary cell walls of plants, aids in H2O transport
G. Sclerenchyma	VII. Parts of the xylem for water transport

20. When would you expect the greatest water loss in a plant?

A. Hot humid day
B. Hot dry day
C. Dry cloudy day
D. Hot cloudy day
E. Cloudy humid day

21. Translocation is an ----- process that -----.

A. Active – Transports Water
B. Active – Transports Gases
C. Active – Transports Sugars
D. Passive – Transports Water
E. Passive – Transports Sugars

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CHAPTER 13 READING GUIDE | PLANTS PT. II

Match the following. Answer with LETTERS in the blanks.

1. Asexual reproduction in plants is also known as this term.	A. Petals	_____
2. Part of a flowering plant where male gametes are formed.	B. Sepals	_____
3. Sticky top of the style where pollen lands and germinates.	C. Ovary	_____
4. Develops into a fruit in a flowering plant.	D. Stigma	_____
5. Structure within a plant where female gametes are formed.	E. Anther	_____
6. Circle of leaves that protect flower buds.	F. Ovule	_____
7. Brightly colored leaves that attract animals.	G. Vegetative Propagation	_____

8. A pollen grain contains three haploid nuclei. What are their individual functions?

A.
B.
C.

9. The double fertilization event in plant sexual reproduction gives rise to two structures. What are they?

A.
B.

10. Seeds consist of all of the following EXCEPT

A. Gametophytes
B. Protective coat
C. Embryo
D. Cotyledon
E. Endosperm

For questions 11-15, refer to the following.

A. Endosperm B. Cotyledon C. Epicotyl D. Hypocotyl E. Radicle

11. Food source in monocot seeds.
12. Food source in dicot seeds.
13. The first organ to emerge from a germinating seed.
14. Develops into the lower part of the stem.
15. Develops into the upper part of the stem.

16. Alternation of generations is defined as

A. Gametophytes producing gametes my mitosis which fuse to form a sporophyte that produces a gametophyte
B. Plants going between haploid and diploid stages each generation
C. Plants changing between male and female sexes each generation
D. Two of the above are true.
E. A, B, and C are true.

Match the following. Answer with LETTERS.

17. Haploid generation that produces gametes by mitosis	_____	A. Anther
18. Diploid generation that produces gametes by meiosis	_____	B. Megaspore
19. Responsible for the production of male gametes.	_____	C. Microspore
20. Large female cones that develop into female gametophytes	_____	D. Gametophyte
21. Small male cones that develop into male gametophytes	_____	E. Sporophyte
22. Where haploid spores are formed on sporophytes	_____	F. Sporangia

23. In mosses and bryophytes this generation is dominant

A. Sporophyte B. Gametophyte C. Diploid D. Haploid E. Two are true

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24. In ferns gametophytes are **(DEPENDENT on/INDEPENDENT from)** *the sporophytes, but in angiosperms gametophytes are* **(DEPENDENT on/INDEPENDENT from)** *the sporophyte.*

25. Match the following with LETTERS in the blanks.

A. Auxin	I. Responsible for phototropism	_____
B. Cytokinins	II. Inhibits growth; counteracts breaking of dormancy	_____
C. Gibberellins	III. A gas that ripens fruit	_____
D. Abscisic Acid	IV. Stimulates cell division, delay aging	_____
E. Ethylene	V. Promotes stem and leaf elongation	_____

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CHAPTER 14 READING GUIDE | ANIMAL PHYSIOLOGY

Name _____

Match the following with LETTERS in the blanks.

1. All heterotrophs acquire energy via	_____	A. Exoskeleton
2. This term refers to animals that have no locomotion	_____	B. Ligament
3. Refers to the chitin outer covering on arthropods that must be shed	_____	C. Endoskeleton
4. Refers to a closed body compartment filled with fluid	_____	D. Hydrostatic Skeleton
5. An example of this is the human skeleton	_____	E. Tendon
6. Connects bone to bone	_____	F. Sessile
7. Connects bone to muscles	_____	G. Ingestion

8. On a particularly hot day, a jackrabbit will…

A. Close its ears to prevent heat from getting in
B. Open its ears to let heat out
C. Close its ears to let heat out
D. Open its ears to prevent heat from getting in
E. Lay in the sun to tan its ears

For questions 9-15, refer to the following answers.

A. Urea B. Uric Acid C. Ammonia

9. A fish would mostly excrete this nitrogenous waste	_____
10. Most likely found in amniotic eggs	_____
11. Humans utilize nephrons to put this into urine	_____
12. Most likely excreted by animals in hot, dry climates	_____
13.The most energy expensive to produce	_____
14. Platyhelminthes utilize flame cells to excrete this most toxic waste	_____
15. Insects utilize Malpighian tubules to excrete this	_____

Organism	Nutrition	Nervous System	Reproduction	Special System Notes
Hydra		*Nerve Net*		*Cnidocytes with nematocysts for stinging*
Earthworm	*Crop for storage* *Gizzard for mechanical digestion*			
Grasshopper		*Ventral Nerve Cord*		*Malpighian Tubules for excretion*

Name _____

1. Humans have an (OPEN/CLOSED) *circulatory system.*

2. Rank the following vessels from highest pressure to lowest pressure.
I. Capillaries II. Arteries III. Veins
A. II → III → I
B. I → II → III
C. III → II → I
D. II → I → III
E. I → III → II

3. Rank the following from thickest wall structure to thinnest wall structure
I. Capillaries II. Arteries III. Veins
A. II → III → I
B. I → II → III
C. III → II → I
D. II → I → III
E. I → III → II

4. Veins and arteries are so named because they respectively
A. Carry oxygenated and deoxygenated blood
B. Carry deoxygenated and oxygenated blood
C. Have thinner walls and thicker walls
D. The direction of flow to the heart
E. Delivery nutrients and oxygen

5. All of the following are matched correctly EXCEPT
A. Erythrocytes – carry oxygen
B. White blood cells – leukocytes
C. Thrombocytes – red blood cells
D. Plasma – liquid matrix solution containing gases, nutrients, and wastes
E. Platelets – cell fragments responsible for blood clotting

6. All of the following represent correctly activation pathways for clot formation EXCEPT
A. Damaged tissue and platelets release thromboplastin
B. Platelets release clotting factors to stimulate clotting
C. Thrombin stimulates Fibrinogen → Fibrin
D. Thrombin stimulates Fibrin → Fibrinogen
E. Thromboplastin + Ca^{2+} stimulates Prothrombin → Thrombin

7. Which of the following is NOT necessary for blood clot formation?
A. Erythrocytes
B. Calcium Ions
C. Platelets
D. Fibrin
E. Thrombin

8. Which of the following is incorrectly matched?
A. Capillary – walls one cell thick
B. Capillary – smallest vessel
C. Vein – lowest pressure
D. Capillary – functions in exchange of gases and nutrients
E. Artery – carry oxygenated blood

9. Which of the following is true about capillaries?
I. Have very thin walls for exchange of gases and nutrients
II. Walls under enormous pressure
III. Active transport for exchange with tissues

A. I only
B. I & II only
C. I & III only
D. II & III only
E. III only

10. All of the following is true about arteries EXCEPT
A. Thick muscles to withstand tremendous pressure
B. Walls of elastic to expand and contract
C. Carry blood away from the heart
D. System of valves prevents backflow
E. The largest is the aorta

11. Which of the following is NOT a component of blood?
A. Wastes B. Gases C. Veins D. Plasma E. Platelets

12. If someone were deficient in calcium, and received a paper cut, what could you predict?
A. They would clot quickly
B. They would be unable to clot
C. They would clot slowly
D. They would have very thin blood
E. They would have particularly viscous blood

CHAPTER 15 READING GUIDE | THE HEART & BLOOD FLOW

Match the following with the LETTER in the blank.

1. Sinoatrial Node	_____	A. Pumps deoxygenated blood toward the lungs
2. Right Ventricle	_____	B. The perfusion of blood through the body
3. Left Ventricle	_____	C. Separates the left atrium and ventricle
4. Right Atrium	_____	D. Vein delivering deoxygenated blood from the abdomen and lungs to the heart
5. Left Atrium	_____	E. Pumps oxygenated blood to the body
6. Tricuspid Valve	_____	F. Vein delivering deoxygenated blood from the head and trunk to the heart
7. Bicuspid Valve	_____	G. Provides oxygenated blood to the heart muscles
8. Septum	_____	H. Separates the left and right sides of the heart
9. Aorta	_____	I. Vessels delivering deoxygenated blood to the lungs
10. Pulmonary Vein	_____	J. Receives oxygenated blood from the lungs
11. Pulmonary Arteries	_____	K. Sends electrical signals throughout the heart to contract
12. Inferior Vena Cava	_____	L. The largest artery in the body
13 Superior Vena Cava	_____	M. Separates the right atrium and ventricle
14. Systemic Circuit	_____	N. Vessels delivering oxygenated blood to the left atrium
15. Coronary Circuit	_____	O. Receives deoxygenated blood from the body

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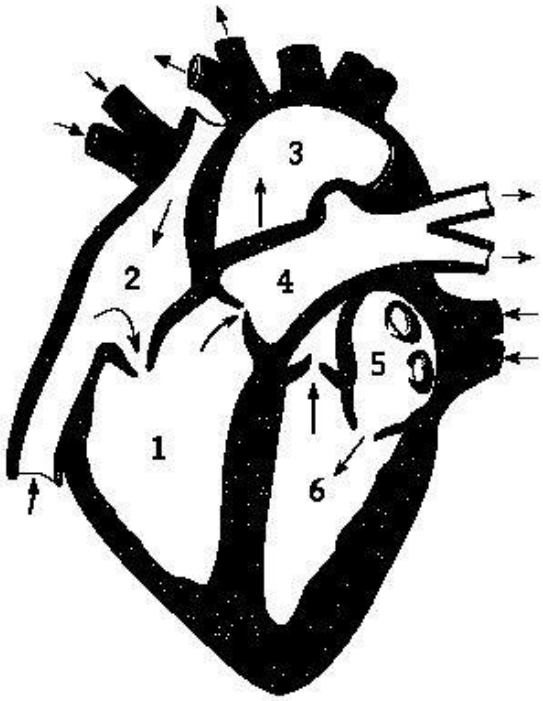

Label the parts on the diagram. Put "O" for oxygenated or "D" for deoxygenated.

16. _____ _____

17. _____ _____

18. _____ _____

19. _____ _____

20. _____ _____

21. _____ _____

22. *What structure brings blood to* PART 2? _____

23. Which are the components of the circulatory system?
A. Heart and lungs
B. Blood vessels, heart, and lungs
C. Blood, blood vessels, and heart
D. Heart and blood
E. Heart, blood, blood vessels, and lungs

24. Which is the correct direction of blood flow?
A. Right Atrium → Right Ventricle → Pulmonary Artery
B. Right Atrium → Left Atrium → Pulmonary Artery
C. Left Ventricle → Pulmonary Artery → Aorta
D. Left Ventricle → Left Atrium → Aorta
E. Left Ventricle → Aorta → Pulmonary Artery

25. In the heart, the mixing of oxygen rich and oxygen poor blood is prevented by
A. Mitral Valve
B. Tricuspid Valve
C. Bicuspid Valve
D. Septum
E. Ductus Arteriosus

26. Compared with walls of arteries, the walls of capillaries are
A. Thicker
B. Thinner
C. Lack valves
D. Have more resistance
E. More muscular

27. Through which pathway does blood typically flow through the circulatory system?
A. Arteries → Capillaries → Veins
B. Veins → Capillaries → Arteries
C. Arteries → Veins → Capillaries
D. Capillaries → Veins → Arteries
E. Capillaries → Arteries → Veins

For 28-33, refer to the following. Answers may be used once, more than once, or not at all.

A. Pulmonary Veins B. Pulmonary Artery C. Aorta D. Vena Cava

28. Which vessel carries deoxygenated blood away from the heart?

29. Which vessel carries oxygenated blood away from the heart?

30. Which vessel carries deoxygenated blood to the lungs?

31. Which vessel carries oxygenated blood to the lungs?

32. Which vessel carries oxygenated blood to the heart?

33. Which vessel carries deoxygenated blood to the heart?

34. Which systemic circuit carries blood to the kidneys?
A. Renal circulation
B. Coronary circulation
C. Hepatic circulation
D. Bronchial circulation
E. Pulmonary circulation

35. Which systemic circuit carries blood to the liver?
A. Renal circulation
B. Coronary circulation
C. Hepatic circulation
D. Bronchial circulation
E. Pulmonary circulation

36. Which systemic circuit carries blood to the heart?
A. Renal circulation
B. Coronary circulation
C. Hepatic circulation
D. Bronchial circulation
E. Pulmonary circulation

37. Systole refers to…Diastole refers to
A. Ventricular relaxation…Atrial relaxation
B. Ventricular contraction…Atrial relaxation
C. Atrial relaxation…Atrial contraction
D. Atrial relaxation…Ventricular contraction
E. Ventricular contraction…Ventricular relaxation

38. The SA node is affected by all of the following EXCEPT
A. Neuromuscular junction
B. Adrenaline
C. Body temperature
D. Nervous system
E. Exercise

40. Which of the following structures would you expect heart muscle cells to have more of?
A. Golgi apparatus
B. Nucleoli
C. Lysosomes
D. Mitochondria
E. Smooth Endoplasmic Reticulum

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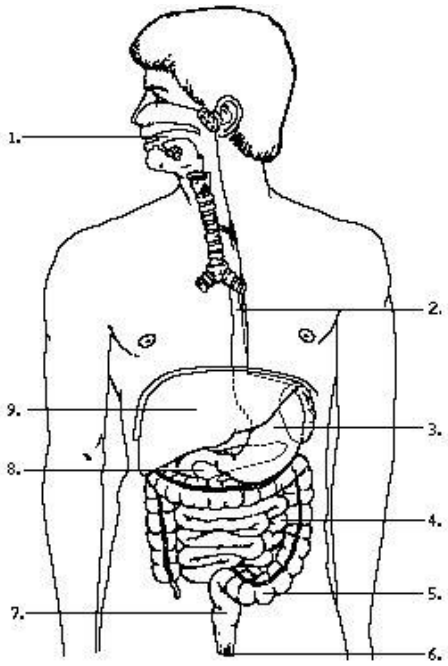
CHAPTER 15 READING GUIDE | DIGESTION

Name _____

1. Which of the following is NOT a function of the digestive system?
A. Breakdown of macromolecules
B. Catabolism
C. Absorption of nutrients
D. Mechanical digestion
E. Anabolism

2. What controls the digestive system?
A. Peripheral nervous system
B. Central nervous system
C. Motor Units
D. Neuromuscular Junction
E. Autonomic nervous system

3. You test a sample of digestive juice with litmus paper and find that it has a pH of 2. It most likely came from the
A. Mouth B. Small intestine C. Pancreas D. Stomach E. Esophagus



4. Bicarbonate that neutralizes the acidity of chyme is produced by…
A. 3 B. 7 C. 8 D. 6 E. 5

5. Chemical digestion begins…
A. 1 B. 3 C. 4 D. 5 E. 8

6. Produces vitamin K and B12…
A. 4 B. 5 C. 6 D. 8 E. 9

7. Accessory gland producing insulin and glucagon…
A. 3 B. 4 C. 8 D. 9 E. 1

8. Most enzymatic hydrolysis of the macromolecules in food occurs in the…
A. small intestine B. large intestine C. stomach
D. liver E. mouth

.

9. Absorption of water occurs in this structure
A. 4 B. 5 C. 6 D. 8 E. 9

10. Which of the following enzymes are responsible for the digestion of protein?
I. Amylase II. Lipase III. Pepsin IV. Trypsin
A. I and II
B. I and III
C. II and III
D. II and IV
E. III and IV

11. Which of the following is not matched up correctly?
A. Mouth – Amylose
B. Stomach – Hydrochloric Acid
C. Stomach - Pepsin
D. Small Intestine – Lipase
E. Pancreas – Sodium Bicarbonate

12. Which of the following does not perform chemical digestion?
I. Pepsin II. Bile III. Amylase IV. Trypsin
A. I & II B. II & IV C. II only D. IV only E. None of the above

The (13) ---- blocks the bolus from entering the (14) ---- and directs it toward the (15) ----.
A. Pharynx B. Larynx C. Epiglottis D. Esophagus E. Oral cavity

16. The human body regulates the concentration of glucose in the bloodstream so that it remains within a narrow range. In response to an increase in blood glucose above this range, the pancreas
A. releases insulin, signaling muscle cells to release glucose
B. releases glucagon, signaling muscle cells to take up glucose
C. releases glucagon, signaling adipose cells to take up glucose
D. releases insulin, signaling the liver to convert glucose to glycogen
E. releases glucagon, signaling the liver to convert glucose to glycogen

17. Which of the following are true of mechanical and chemical digestion?
I. Bile – Mechanical II. Teeth – Mechanical III. Bile – Chemical IV. Amylase – Chemical

A. All are true
B. Only I
C. I & II
D. I, II, and IV
E. II, III, and IV

18. Protein digestion begins in that
A. Stomach
B. Mouth
C. Esophagus
D. Small Intestine
E. Large Intestine

19. The process by which smooth muscles move food through the alimentary canal is called
A. Digestion B. Ingestion C. Absorption D. Peristalsis E. Milking

For questions 20-25, refer to the following.
A. Cardiac Sphincter B. Pyloric Sphincter C. Pepsinogen D. Ulcers E. Stomach Muscles

20. The following structure prevents gastric juices from returning to the esophagus.
21. The following structure prevents too much acidic chyme from entering the small intestine.
22. Inactive enzyme that is activated by pH levels.
23. This structure participates in mechanical digestion in the stomach.
24. Acidophile H. pylori causes this "hole" in the stomach wall.
25. The following condition is only curable by means of antibiotics.

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True or false. Mark T for true and F for false in the blanks.

_____ *25. The small intestine is basic.*
_____ *26. All digestion is completed in the duodenum.*
_____ *27. Pepsin is found in the small intestine.*
_____ *28. Microvilli are minute projections in the lumen of the small intestine that increase the surface area.*
_____ *29. Fats and proteins begin to be digested in the small intestine.*
_____ *30. Amylase breaks down sugars in the small intestine.*
_____ *31. Chymotripsin breaks down nucleic acids.*
_____ *32. Each villus contains capillaries for the absorption of fatty acids.*
_____ *33. Every macromolecule undergoes chemical digestion in the small intestine.*
_____ *34. Lacteals are found outside of epithelial cells and absorb fats for the lymphatic system.*
_____ 35. The body cannot function without a gallbladder.

36. Which of the following is an accessory organ in the digestive system?
A. Esophagus B. Liver C. Small Intestine D. Stomach E. Large Intestine

37. Which of the following is NOT part of the alimentary canal?
A. Esophagus B. Liver C. Small Intestine D. Stomach E. Large Intestine

38. All of the following are accessory organs EXCEPT:
A. Salivary Glands B. Pancreas C. Gallbladder D. Liver E. Esophagus

39. ----- produces the bile that is stored in the -----
A. Liver…Gallbladder
B. Gallbladder…Liver
C. Liver…Pancreas
D. Pancreas…Gallbladder
E. Pancreas…Liver

40. Which of the following is NOT a function of the large intestine?
A. Reabsorption of water B. Egestion, removal of undigested waste C. Production of vitamins and folic acid
D. Digestion of lactose E. Storehouse for the body's natural flora

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CHAPTER 15 READING GUIDE | ENDOCRINE

Name _____

1. Which of the following are NOT regulatory systems that release chemicals? Select all that apply.
A. Nervous System B. Immune System C. Endocrine System D. Circulatory System E. Digestive System

2. Unlike the nervous system which works -----, the effects of the endocrine system are -----.
A. Slowly…immediate
B. Quickly…long lasting
C. Slowly….short lasting
D. Quickly…immediate
E. Slowly…short lasting

3. In the nervous system, signals travel -----, while they travel ----- in the endocrine system.
A. Long distances, by hormones
B. Short distances, by neurotransmitters
C. Electrically, by neurotransmitters
D. Short distances, by hormones
E. More than one answer is correct

4. Hormones are endocrine chemicals that travel through the ----- to reach target cells.
A. Bloodstream
B. Lymphatic System
C. Digestive System
D. Circulatory System
E. More than one answer is correct.

For questions 5-14, refer to the following.

A. Tropic Hormones B. Pheromones C. Hypothalamus D. Growth Hormone E. Testosterone

5. Regulates body temperature, hunger, and thirst.
6. A mutation in this could result in abnormal development of bones.
7. A type of hormone that stimulates hormone release in other endocrine glands.
8. Responsible for secondary sex characteristics is males.
9. Located between the endocrine and nervous systems.
10. A type of hormone that is detected by other animals.
11. Follicle stimulating hormone or FSH is a type of this hormone.
12. Animals release this to signal they are ready to mate.
13. A steroid hormone, often found in anabolic steroids.
14. A mutation in this would most likely result in a boy with a high voice.

15. Which of the following hormones is NOT secreted by the anterior pituitary gland?
A. Luteinizing Hormone
B. Thyroid Stimulating Hormone
C. Antidiuretic Hormone
D. Follicle Stimulating Hormone
E. Growth Hormone

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Match the hormones with where they are produced. Answers may be used once more than once, or not at all.

16. Antidiuretic Hormone	_____	A. Posterior pituitary
17. Thyroxin	_____	B. Anterior pituitary
18. Calcitonin	_____	C. Thyroid
19. Glucagon	_____	D. Pancreas
20. Melatonin	_____	E. Ovaries
21. Epinephrine	_____	F. Testes
22. Thymosin	_____	G. Thymus
23. Estrogen	_____	H. Adrenal Medulla
24. Progesterone	_____	I. Adrenal Cortex
25. Androgens	_____	J. Pineal

Match the following hormones with their functions.

26. Antidiuretic hormone	_____	A. Lowers blood glucose levels
27. Epinephrine	_____	B. Promotes uterine lining growth. Produced by the corpus luteum.
26. Insulin	_____	C. Stimulates ovaries and testes starting at puberty.
28. Thyroxin	_____	D. Pancreatic hormone that increases blood glucose levels
29. Oxytocin	_____	E. Important in the immunity.
30. FSH	_____	F. Stimulates spermatogenesis and oogenesis.
31. Thymosin	_____	G. Adrenal hormone that increase blood glucose levels
32. Glucagon	_____	H. Promotes water retention by kidneys
33. Estrogen	_____	I. Stimulates contraction of uterus during childbirth
34. LH	_____	J. Those with too little of this hormone tend to be overweight.
35. Progesterone	_____	K. Responsible for secondary sex characteristics in women.

39. The two type of hormones are:
A. Polypeptide and non-steroid
B. Pheromones and polypeptides
C. Steroid and polypeptide
D. Pheromones and tropical hormones
E. Tropical hormones and steroids

40. Of the two types of hormones, this one is able to diffuse directly through the plasma membrane
A. Polypeptide B. Pheromone C. Tropical Hormone D. Steroid E. Non-steroid

41. Of the two types of hormones, this one must bind to a receptor on the cell membrane and utilize secondary messengers to trigger a response
A. Polypeptide B. Pheromone C. Tropical Hormone D. Steroid E. Non-steroid

42. This is an important secondary messenger:
A. Melatonin B. Tryptophan C. Cyclic AMP D. DNA polymerase D. Beta Lactamase

43. All of the following statements about hormones are correct EXCEPT
A. They are produced by endocrine glands.
B. They travel to different areas of the body.
C. They are carried by the circulatory system.
D. They are used to communicate between different individuals.
E. They elicit specific biological responses from target cells.

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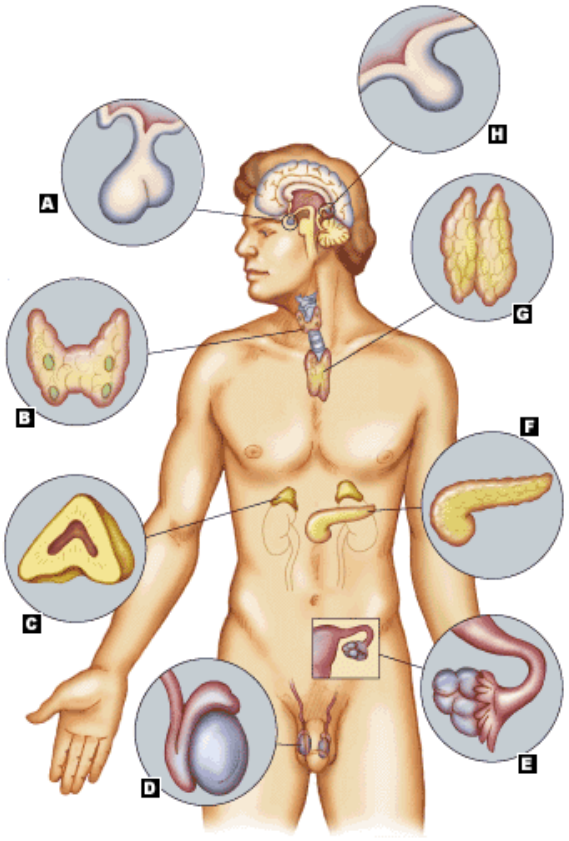
44. Match the following. Answers can be used more than once or not at all.

1. Endocrine glands that sit atop kidneys	_____	(A) Thyroid
2. Gland found in the neck consisting of two connected lobes	_____	(B) Pituitary Gland
3. Produces thyroid-stimulating hormone	_____	(C) Thymus
4. Pea-shaped gland in the brain	_____	(D) Hypothalamus
5. Gland that produces metabolism stimulating hormones	_____	(E) Adrenal Glands
6. Specialized organ of the immune system where T-cells mature	_____	
7. Brain structure that links the nervous system to the endocrine system	_____	



45. Diabetes Type I is an autoimmune disease in this gland. _____
46. This gland produces growth hormone. _____
47. This gland produces ADH. _____
48. This gland regulates metabolism. _____
49. This gland diminishes in size as you age. _____
50. This gland requires iodine to function. _____
51. This gland is a protrusion off the hypothalamus. _____
52. This gland produces hormones important to immunity _____
53. This gland produces epinephrine _____
54. Bridge between the nervous and endocrine systems _____

For 55-60, identify whether the example is a positive or negative feedback mechanism. P for positive, N for negative.

55. In cold temperatures, a person shivers.
56. TSH is released in response to low levels of thyroxin.
57. Activated clotting platelet activates more clotting platelets.
58. Eating a chocolate donut stimulates release of insulin.
59. The opening of the birth canal stimulates release of oxytocin.
60. When dehydrated, ADH is released to concentrate urine.

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CHAPTER 15 READING GUIDE | EXCRETION

Name _____

1. Which of the following is not an example of a metabolic waste?

A. Sweat B. Glycogen C. Urine D. CO2 E. O2

2. Which of the following is NOT an example of an excretory organ in humans?

A. Skin B. Rectum C. Lungs D. Liver E. Kidney

3. Match the following metabolic waste with its organ. Answers may be used once, more than once or not at all.

I. O2	_____	A. Kidneys
II. Salt	_____	B. Liver
III. Nitrogenous Waste	_____	C. Skin
IV. Sweat	_____	D. Lungs
V. CO2	_____	E. Stomata

4. Kidney are supplied with nutrients and blood via the

A. Renal artery
B. Renal vein
C. Renal venules
D. Hepatic artery
E. Hepatic vein

5. This hormone is released by this structure to increase the number of aquaporins in the collecting ducts of the kidneys for water conservation.

A. Antidiuretic Hormone…Anterior Pituitary
B. Antidiuretic Hormone…Hypothalamus
C. Thyroxin…Anterior Pituitary
D. Thyroxin…Posterior Pituitary
E. Antidiuretic Hormone…Posterior Pituitary

For questions 6-10, refer to the following. Answers may be used once, more than once, or not at all.

A. Glomerulus B. Nephron C. Bowman's Capsule D. Loop of Henle E. Tubule

6. One human kidney contains about 1 million of these
7. Capillary bed from renal arterioles
8. Main site of reabsorption
9. Site of urine concentration
10. Structural and functional unit of the kidney
11. Would most likely be longer in animals that live far from water
12. Site of filtrate collection

13. What is the name of the structure carrying fluid from the kidney to the bladder?

A. Pelvis B. Collecting duct C. Urethra D. Ureter E. Nephron

14. Which of the following substances would you NOT find in filtrate?

A. Sodium Ions B. Water C. Glucose D. Erythrocytes E. Urea

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15. Which is the correct order of waste movement through the kidney?

I. Renal Vein II. Glomerulus III. Loop of Henle IV. Renal Artery V. Urethra

A. I → II → III → IV
B. I → II → V → IV → III
C. II → IV → III → V → I
D. IV → II → III → I → V
E. IV → II → III → V

16. Which is the correct order of waste movement through the kidney?

I. Loop of Henle II. Bowman's Capsule III. Collecting Duct IV. Glomerulus V. Renal Artery

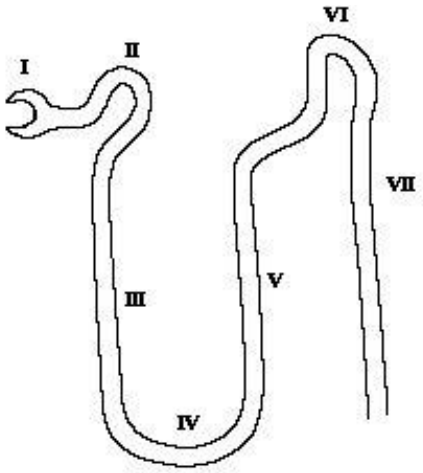
A. V → IV → II → I → III
B. V → IV → III → II → I
C. V → IV → I → III → II
D. IV → III → V → II → I
E. IV → II → III → I → V

17. Which of the following are active processes? Select all that apply.

A. Filtration B. Reabsorption C. Secretion D. Excretion E. Diffusion

18. ----- is the process by which most water and wanted products are transported back into the capillaries

A. Filtration B. Reabsorption C. Secretion D. Excretion E. Diffusion



19. Filtration occurs in what region?

A. I B. III C. IV D. V E. VI

20. Reabsorption begins in which region?

A. I B. II C. III D. IV E. V

21. This region becomes more permeable to water in the presence of ADH

A. III B. IV C. V D. VII E. none of the above

22. Inside this structure is the glomerulus

A. I B. II C. III D. IV E. none of the above

23. The cleanest blood in the body is located in the…

A. Aorta B. Renal Veins C. Renal Arteries D. Collecting Duct E. Inferior Vena Cava

24. Excretion includes which of the following processes?

A. exhaling water vapor and carbon dioxide B. sweating excess water and salts C. eliminating solid wastes D. urinating nitrogenous compounds E. all of the above

For questions 25-30 refer to the following. Answers may be used once, more than once, or as a ball.

a. Urea b. Uric Acid c. Ammonia d. Loop of Henle e. Glomerulus

25. The most water-soluble nitrogenous waste.
26. The least water-soluble nitrogenous waste.
27. Excreted by fish.
28. Concentrates Urine.
29. Excreted by humans.
30. Consists of numerous capillaries

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Match the following with letters next to the number.

31. Ureter	(A) Capillary bed that marks the start of nephron
32. Nephron	(B) Structure that concentrates urine by means of a concentration gradient
33. Glomerulus	(C) Homeostatic regulation of solute concentration
34. Bowman's Capsule	(D) Process by which solutes and water are removed from renal tubes back into the blood
35. Loop of Henle	(E) Structure that captures water, glucose, nitrogenous wastes, and salts
36. Renal Filtration	(F) Process by which body recaptures
37. Osmoregulation	(G) Structural and functional unit of the kidney
38. Excretion	(H) Semi-selective process by which the body creates a plasma-like fluid by separation
39. Reabsorption	(I) Pituitary gland hormone that controls water permeability in the collecting duct
40. ADH	(J) Structure that carries urine to the bladder

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CHAPTER 15 READING GUIDE | GAS EXCHANGE

Name _____

1. Which of the following is NOT an organ of the respiratory system?
A. Alveoli
B. Bronchioles
C. Trachea
D. Nasal Cavity
E. Esophagus

2. Which of the following is NOT an organ of the respiratory system?
A. Bronchus
B. Larynx
C. Mouth
D. Left Lung
E. Diaphragm

3. Which of the following is NOT an organ of the respiratory system?
A. Capillaries
B. Alveoli
C. Right Lung
D. Trachea
E. Left Lung

4. Which of the follow represents the correct passage of air to the lungs?
I. Nose II. Larynx III. Alveoli IV. Bronchioles V. Bronchus

A. I → II → IV → V → III
B. I → IV → III → II → V
C. I → II → V → IV → III
D. II → I → V → IV → III
E. I → IV → III → II → III

5. Which of the following represents the correct passage of oxygen to the tissues?
I. Trachea II. Bronchioles III. Alveoli IV. Capillaries V. Nasal Cavity

A. V → I → II → III → IV
B. V → II → III → IV → I
C. V → III → II → I → IV
D. V → IV → III → I → II
E. II → IV → V → III → I

Match the following respiratory organs with its function.

10. Nasal Cavity	_____	A. Is called the voice box because it contains vocal folds
11. Alveoli	_____	B. Small passageway for air leading to air sacks in lungs
12. Larynx	_____	C. Structure covered in cartilage and lined with mucosa
13. Trachea	_____	D. Entryway that filters, warms, and moistens air
14. Diaphragm	_____	E. Muscle underneath the lungs used for ventilation
15. Bronchioles	_____	F. Gas exchange occurs across the surface of these high surface area bulbs

16. Oxygen is carried through the blood:
A. In red blood cells
B. Bound to hemoglobin
C. Dissolved in plasma
D. As part of leukocytes
E. More than one answer is correct

17. Air is drawn into the body when
A. Diaphragm contracts, and bronchial pressure is higher than atmospheric pressure
B. Diaphragm contracts, and bronchial pressure is lower than atmospheric pressure
C. Diaphragm contracts, and bronchial pressure is equal to atmospheric pressure
D. Diaphragm relaxes, and bronchial pressure is lower than atmospheric pressure
E. Diaphragm relaxes, and bronchial pressure is higher than atmospheric pressure

18. Air leaves the body when
A. Diaphragm contracts, and bronchial pressure is higher than atmospheric pressure
B. Diaphragm contracts, and bronchial pressure is lower than atmospheric pressure
C. Diaphragm contracts, and bronchial pressure is equal to atmospheric pressure
D. Diaphragm relaxes, and bronchial pressure is lower than atmospheric pressure
E. Diaphragm relaxes, and bronchial pressure is higher than atmospheric pressure

19. This portion of the brain is responsible for breathing rhythms by monitoring CO2 levels
A. Medulla
B. Cerebrum
C. Cerebellum
D. Frontal Lobe
E. Occipital Lobe

20. Most of the CO2 in the body is carried through the blood:
A. Dissolved in plasma
B. As bicarbonate ions in plasma
C. Bound to hemoglobin
D. As carbonic acid
E. Bound as carbaminohemoglobin

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CHAPTER 15 READING GUIDE | MUSCLES & SKELETAL SYSTEM

Name _____

THIS READING GUIDE REQUIRES YOU LOOK SOME INFORMATION UP ONLINE TO COMPLETE.

For 1-7, refer to the following.

A. Smooth Muscle B. Skeletal Muscle C. Cardiac Muscle

1. Controlled by the sinoatrial node.
2. Involuntary muscle in digestive tract.
3. Voluntary muscle.
4. Involuntary muscles in heart.
5. Striated and multinucleated.
6. Striated with a single nucleus.
7. Under the control of the autonomic nervous system
8. A bicep is an example of this muscle
9. Action potentials are independently generated.
10. Work in pairs (agonist and antagonist).

11. Thin filaments are made of (ACTIN/MYOSIN) and thick filaments are made of (ACTIN/MYOSIN).

12. The following neurotransmitter is important in skeletal muscle contraction.
A. Acetylcholinesterase B. Acetylcholine C. GABA D. Epinephrine E. Dopamine

13. Muscles contract when…
A. Thick and thin filaments slide over each other
B. Acetylcholine is released into the neuromuscular junction
C. Electrical signals generate an action potential
D. Both A & B are correct
E. A, B, & C are correct

True oder falsch.

14. Your heart will continue to beat even outside the body because it is not controlled by your nervous system. (T/F)
15. A skeletal muscle cell is a long, multinucleated cell called a myofibril. (T/F)
16. Smooth muscle is not striated because it lacks microfilaments. (T/F)
17. A lack of acetylcholinesterase at the neuromuscular junction would result in relaxation. (T/F)
18. Cardiac muscles have intercalated discs to work in functional syncytium. (T/F)
19. Botulinum toxin is a neurotoxin that blocks the release of ACh at the neuromuscular junction. (T/F)
20. Peristalsis the result of skeletal muscle contractions. (T/F)

Types of bones and joints. Find two examples of each.

1. Long bone

2. Short bone

3. Ball and socket joint

4. Flat bone

5. Hinge joint

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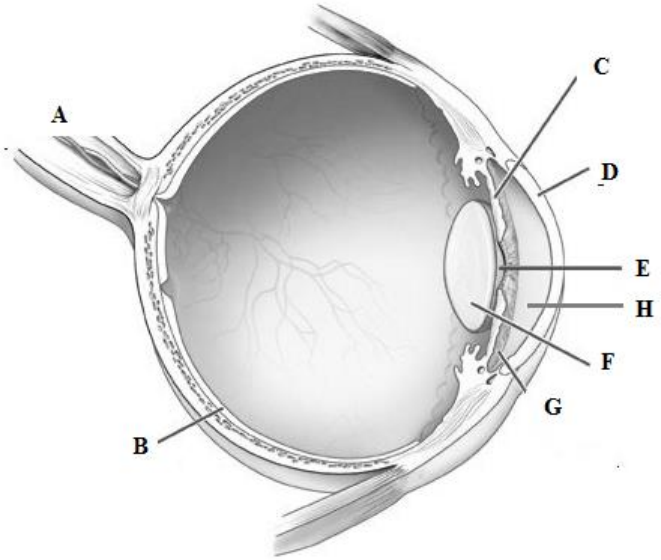
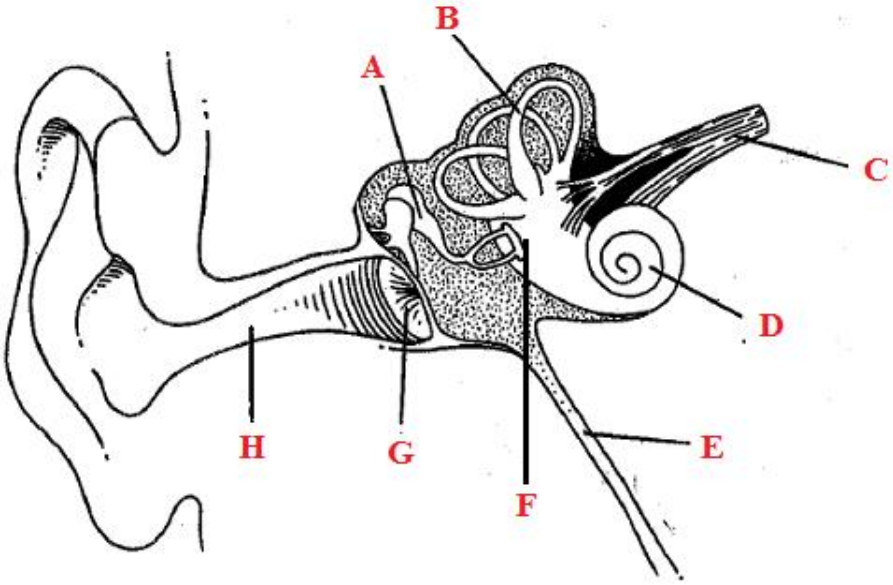
CHAPTER 15 READING GUIDE | THE EYE & THE EAR

For questions 1-15, refer the following diagram. Answers maybe used once, more than once, or not at the mall.



1. Maintains shape of eye.
2. Lens
3. Pupil
4. Converts light signals to electric signals.
5. Cornea
6. Colored portion of the eye controlled light.
7. Retina
8. Connection
9. Small opening in the middle of the iris.
10. Opens and closes in response to light levels.
11. Carries nerve impulses to CNS.
12. Contains cones and rods, photoreceptors.
13. Focuses light into the retina.
14. Aqueous humor.
15. Optic nerve.

For questions 16-30, refer to the following diagram. Answers may be used once, more than once, or to make call.



16. Ear bones
17. Where sound enters
18. Sound vibrates this drum
19. Cochlea
20. Fluid filled portion of inner ear
21. Eustachian tube
22. Sends pressure waves to cochlea
23. Auditory Canal
24. Oval window
25. Equalizes pressure
26. Semicircular canals
27. Cochlear nerve
28. Sends nerve impulses to CNS
29. Facilitates in balance
30. Tympanum

True or false.

31. Both the ear and the eyes are sensory organs. (TRUE/FALSE)
32. Auditory and visual signals are processed in the same area of the brain. (TRUE/FALSE)
33. Cones are highly sensitive but cannot distinguish between colors. (TRUE/FALSE)
34. Rods are more likely to be utilized in the dark than cones. (TRUE/FALSE)
35. The ear bones consist of the hammer, anvil, and the axe. (TRUE/FALSE)

Name _____

1. The central nervous system consists of
A. Brain and Spinal Cord
B. Neurons and Glial Cells
C. Sympathetic and Parasympathetic Systems
D. Somatic and Autonomic Systems
E. Afferent and Efferent Nerves

2. The peripheral nervous system consists of
A. Brain and Spinal Cord
B. Neurons and Glial Cells
C. Sympathetic and Parasympathetic Systems
D. Somatic and Autonomic Systems
E. Afferent and Efferent Nerves

3. The peripheral nervous system is divided into
A. Brain and Spinal Cord
B. Sensory and Motor Nervous Systems
C. Sympathetic and Parasympathetic Systems
D. Somatic and Autonomic Systems
E. Afferent and Efferent Nerves

4. The processing center of the body is the
A. Central Nervous System
B. Autonomic Nervous System
C. Peripheral Nervous System
D. Parasympathetic Nervous System
E. Sympathetic Nervous System

5. The motor nervous system is divided into
A. Brain and Spinal Cord
B. Neurons and Glial Cells
C. Sympathetic and Parasympathetic Systems
D. Somatic and Autonomic Systems
E. Afferent and Efferent Nerves

6. Activity in the adrenal glands most likely will stimulate this nervous system MOST directly
A. Central B. Peripheral C. Motor D. Sympathetic E. Parasympathetic

For questions 7-16, refer to the following. Answers may be used once, more than once, or bathroom stall.

A. Sensory Nervous System B. Somatic Nervous System C. Autonomic Nervous System
D. Sympathetic Nervous System E. Parasympathetic Nervous System

7. Allows you to "rest-and-digest."
8. Conveys temperature, heat, and pressure information from skin to central nervous system
9. Most likely activated if you were a panicked thief being chased by the dragon Smaug at Erebor.
10. Signals the liver to convert glycogen to glucose.
11. Controls all smooth muscles in the body.
12. Controls voluntary movements like running, jumping, dancing.
13. Most likely involves the optic and cochlear nerves.
14. Controls breathing, digesting, and homeostasis.
15. Most likely takes over during sleep.

16. Dilates your bronchi to increase gas exchange.

17. Which of the following is the basic functional unit of the nervous system?

A. Nephron B. Neuron C. Axon D. Dendrite E. Myelin Sheaths

For 18-25, refer to the following. Answers may be used once, more than once, or Niagra Falls.

A. Axon B. Dendrite C. Axon Terminal D. Myelin Sheaths E. Cell Body

18. Contains neurotransmitter receptors.
19. Releases neurotransmitters at the synaptic cleft.
20. Transmit impulses from the cell body to another cell. Neurons only have one of these.
21. Structure that facilitates in protecting and speeds up impulses.
22. Contains the nucleus.
23. Hundreds of these may protrude off a cell body.
24. Sensory portion of neuron.
25. Actions potentials are propagated down this structure.

26. The knee jerk reflex is most likely activated in the following order:

I. Interneuron II. Muscle III. Motor Neuron IV. Sensory Neuron

A. IV → I → II → III
B. IV → III → I → II
C. III → I → IV → II
D. IV → III → II → I
E. More than one answer is correct

26. The cytoplasm is ----- charged because there is more sodium ----- the cell.

A. Negative…Inside B. Positive…Inside C. Positive…Outside D. Negative…Outside E. Two are correct

27. The extracellular matrix is ----- because there is more sodium ----- the cell.

A. Negative…Inside B. Positive…Inside C. Positive…Outside D. Negative…Outside E. Two are correct

28. The cytoplasm is ----- charged because there is more potassium ----- the cell.

A. Negative…Inside B. Positive…Inside C. Positive…Outside D. Negative…Outside E. Two are correct

29. The extracellular matrix is ----- charged because there is more potassium ----- the cell.

A. Negative…Inside B. Positive…Inside C. Positive…Outside D. Negative…Outside E. Two are correct

30. Which precedes an action potential traveling down the axon of a neuron?

A. Neurotransmitters bind to receptors on the dendrite of the neuron.
B. Neurotransmitters are released from the axon terminals of the neuron.
C. The action potential travels through the synapse from a nearby neuron.
D. Vesicles in the axon terminal release their contents at the synapse.
E. The cell body releases neurotransmitters down the length of the axon.

For questions 31 – 38, refer to the following diagram.

	A		B	C	D	E
31. Resting potential	(A)	(B)	(C)	(D)	(E) none of the above	
32. Sodium channels open	(A)	(B)	(C)	(D)	(E)	
33. Threshold potential	(A)	(B)	(C)	(D)	(E)	
34. Sodium channels close	(A)	(B)	(C)	(D)	(E)	
35. Potassium channels open	(A)	(B)	(C)	(D)	(E)	

36. Represents an action potential

(A) A – B (B) B – D (C) B – E (D) A – D (E) A – E

37. Resting potential appears to be

(A) – 70 mV (B) –50 mV (C) 40mV (D) -90 mV (E) none of the above

38. Represents rapid depolarization

(A) A – B (B) B – C (C) C – D (D) A – C (E) D – E

39. Represents the refractory period during which the neuron cannot response to another stimulus

(A) A – B (B) B – C (C) C – D (D) A – C (E) D – E

40. ----- is constantly coming back into the cell through leak channels, but is pumped outward again by active processes.

A. Ca2+ B. Na C. K D. Na+ E. K+

41. Synaptic vesicles discharge their contents by exocytosis at the

A. dendrite.
B. axon hillock.
C. nodes of Ranvier.
D. postsynaptic membrane.
E. presynaptic membrane.

42. Depolarization is associated most closely with

A. Na+ rushing into the membrane
B. K+ rushing into the membrane
C. Na+ rushing out into the cytoplasm
D. K+ rushing out into the cytoplasm
E. Ca2+ entering the axon terminal and trigger exocytosis

True or false.

43. An action potential will occur with the stimulus increasing potential to -60mV. (TRUE/FALSE)
44. The body distinguishes between weak and strong stimuli by the frequency of action potentials. (TRUE/FALSE)
45. By inducing a more negative resting potential, one could theoretically inhibit an action potential. (TRUE/FALSE)
46. Impulses travel across a synapse electrically. (TRUE/FALSE)
47. Ca2+ rushing into the axon terminal triggers neurotransmitter exocytosis. (TRUE/FALSE)
48. If not enough NT is released to the post-synaptic cell, the signal will terminate. (TRUE/FALSE)
49. Presynaptic cell axon terminals are physically joined with dendrites on the postsynaptic cell. (TRUE/FALSE)

50. Match the following with LETTERS next to number. Look up anything not included in the reading.

1. Acetylcholine	(A) Structure that enables one neuron to pass electrochemical signals to another
2. Dendrites	(B) Myelinated nerve fiber that conducts electrical impulses away from the cell body
3. Axon	(C) Regulates mood, appetite, and sleep
4. Axon Terminal	(D) Primary excitatory neurotransmitter
5. Synapse	(E) Primary neurotransmitter at the neuromuscular junction
6. GABA	(F) Regulates the “rest-and-digest” activities
7. Serotonin	(G) Mobilizes the body into the “fight-or-flight” response
8. Glutamate	(H) Receives neurotransmitters via protein receptors
9. Sympathetic NS	(I) Presynaptic neuron that transmits neurotransmitter via exocytosis across synaptic cleft
10. Parasympathetic NS	(J) Primary inhibitory neurotransmitter

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CHAPTER 16 READING GUIDE | REPRODUCTION & DEVELOPMENT

Name _____

1. Animals reproduce:

A. Sexually B. Asexually C. Alternate between Sexual & Asexual Reproduction D. A &B are true E. All

2. Parthenogenesis refers to the process in which:
A. Meiosis produces only one viable oocyte while disposing of three polar bodies
B. Random inactivation of an X chromosome in females leading to mosaic phenotypes
C. Some eggs develops without fertilization, resulting in haploid adults
D. Hermaphroditic animals have the ability to mate with any animal of their species
E. The evolution of animals from hermaphroditic to dioecious

3. An animal that carries would external fertilization would most likely…
A. Release many eggs because the likely hood of fertilization is lower
B. Release many eggs because offspring have little to no parental nurturing
C. Release many eggs because the rate of predation is high for zygotes
D. A & B are true
E. A & C are true

4. Which of the following animals does NOT fertilize internally?
A. Komodo Dragon
B. Red Panda
C. Sockeye Salmon
D. Blue Macaw
E. King Cobra

5. All of the following are benefits of asexual reproduction EXCEPT:
A. It is favorite in environments that shift in evolutionary pressures
B. Can produce numerous offspring quickly
C. It enables animals to reproduce without a mate
D. Produces clones that do well in stable environments
E. There is no expenditure of energy in maintaining elaborate reproductive systems or hormonal cycles

For questions 6-10, refer to the following. Answers may be used once, more than once, or not at all.

A. Fission B. Budding C. Fragmentation D. Parthenogenesis E. Alternation of Generations

6. The process by which an oocyte develops into an adult without fertilization.
7. The process by which bacteria reproduce and mitochondria replicate.
8. The process by which a parent breaks off parts of itself that grow into new individuals.
9. The process by which a plant produces a gametophyte.
10. The process by which new hydra are produced by splitting off an existing hydra.

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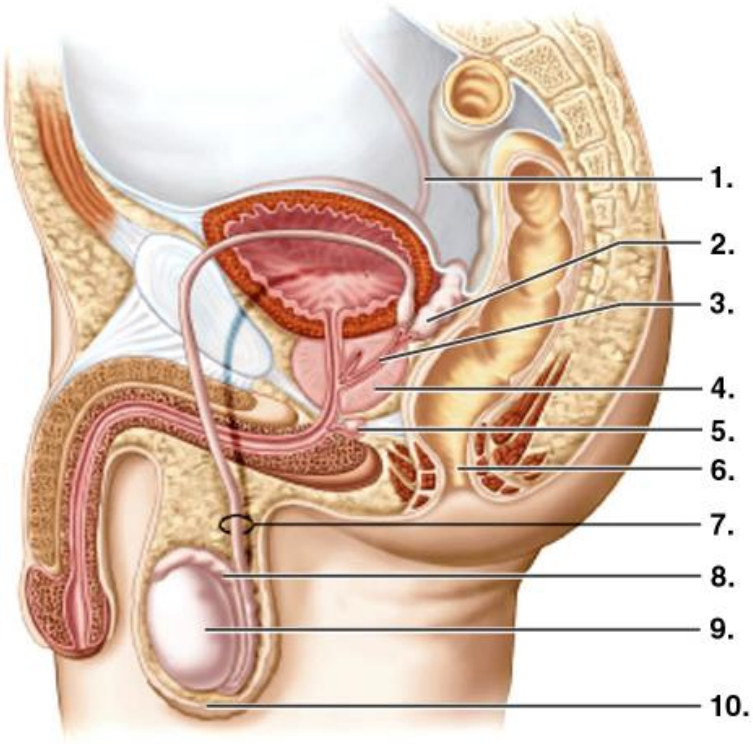
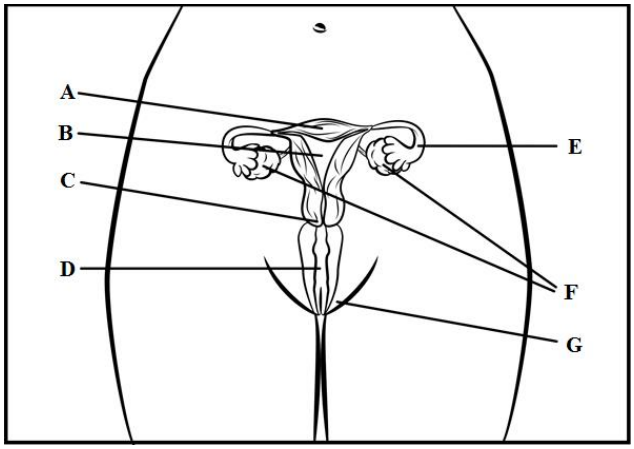


For questions 11-20, refer to the following image. Answers may be used once, more than once, or not at all.

11. Which structure is responsible for the storage and maturation of sperm? _____
12. This structure is responsible for thermoregulation of male gonads. _____
13. This structure transports sperm from the epididymis to the ejaculatory ducts. _____
14. Site of spermatogenesis _____
15. Vas deferens _____
16. This gland secretes semen into the urethra _____
17. The structure carries urine from the kidneys to the urinary bladder _____
18. Scrotum _____
19. Testis _____
20. The SRY gene on the Y chromosome codes for this structure _____

For questions 21-30, refer to the following image. Answers may be used once, more than once, or not at all.



21. Site of fertilization, and where the egg moves through to reach uterus _____
22. The birth canal _____
23. Site of female gamete formation _____
24. Fallopian tube _____
25. Where a zygote implants itself _____
26. Ovaries _____
27. Cervix, the mouth of the uterus _____
28. This structure is lined with endometrium during the luteal phase and sheds if no fertilization occurs _____
29. Uterus _____
30. The urethra is behind this structure _____

For questions 31-34, refer to the following:

A. Follicular Stage B. Ovulation C. Luteal Phase D. Menstruation

31. Corpus luteum forms from the follicle left behind by the oocyte, secreting estrogen and progesterone that thicken the lining of the uterus.
32. The oocyte ruptures from the follicle in response to LH from the anterior pituitary gland.
33. The anterior pituitary gland secretes FSH, inciting follicular development and estrogen secretion.
34. If no embryonic implantation occurs, the corpus luteum disintegrates and the endometrium is shed, discharging tissues and blood.

35. Place the following stages of female menstruation (as if there were male menstruation) in order.

I. Ovulation II. Menstruation III. Follicular Stage IV. Luteal Stage

A. I → II → III → IV
B. I → III → IV → II
C. II → IV → III → I
D. III → I → IV → II
E. III → II → IV → I

36. Period of the thickest endometrium.
A. Follicular Stage B. Ovulation C. Luteal Phase D. Menstruation E. Spermatogenesis

37. Which of the following hormones is NOT important to female menstruation?
A. Follicle Stimulating Hormone B. Luteinizing Hormone C. Gonadotropic Releasing Hormone
D. Progesterone E. Antidiuretic Hormone

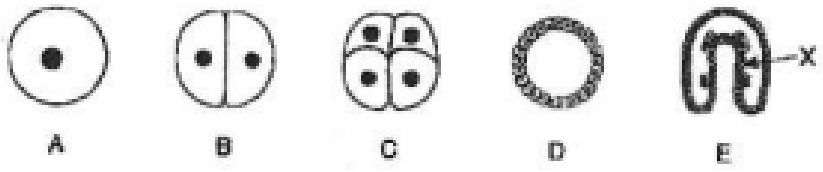
38. Which of the following is true about spermatogenesis but NOT true about the formation of oocytes?
A. Begins and puberty and continues through life
B. Gametes contain only half of parental information
C. Maturation of cells is induced by hormones from the anterior pituitary gland
D. Four haploid cells are formed
E. Combines with a gamete of opposite sex to produce a zygote

39. All of the following are true about spermatogenesis EXCEPT:
A. Spermatogonium cells are 2n cells that divide by mitosis to produce spermatocytes, which undergo meiosis to produce haploid spermatids
B. Male are born with all the sperm they will have for the rest of their life
C. At the end of meiosis, males produce four viable gametes
D. Sperm are significantly smaller than eggs
E. Spermatids mature in the epididymis to become spermatozoa

40. All of the following are true about oogenesis EXCEPT:
A. Oogenesis begins prior to birth
B. Oogenesis produces four viable oocytes via meiosis
C. A female baby is born with all the primary oocyte she will ever have
D. Primary oocytes from oogonium cells are diploid and remain inactive until puberty
E. Puberty stimulates the production of secondary haploid oocytes via meiosis I

41. Meiosis in women...
A. Produce two polar bodies that have very little cytoplasm and will disintegrate
B. Exhibits unequal sequestration of cytoplasm
C. Begins at puberty and ends with birth
D. A & B are true
E. B & C are true

For questions 42-50, refer to the following diagram.



42. This fluid filled ball of cells is the structure that indicates the end of cleavage. _____
43. Represents the first zygotic cleavage, rapid mitotic cell division with no cell growth in between. _____
44. Invagination of the blastula gives rise to three germ layers and the digestive tract. _____
45. The outermost layer of this structure gives rise to skin and nervous system. _____
46. Represents a zygote immediately after fertilization. _____

47. Which stage is NOT shown on the diagram?
A. Gastrula B. Cleavage C. Zygote D. Blastula E. Fetus

48. In picture E, the innermost germ layer is called
A. Gastrula B. Ectoderm C. Endoderm D. Mesoderm E. Blastocoel

49. The picture E, the middle germ layer could give rise to

A. Arm muscle B. Lining of digestive tract C. Skin D. Eye E. Pancreas

50. The three germ layers in picture E are also referred to as

A. The Inner Cell Mass B. Fetus C. Totipotent Stem Cells
D. The Blastocoel E. Pluripotent Stem Cells

For questions 51-60, refer to the following.

A. Ectoderm B. Endoderm C. Mesoderm D. Mesoglea E. Coelom

51. Gives rise to the lining of the gastrointestinal and respiratory tracts.
52. Gives rise to blood and bone.
53. Lost in nematodes (roundworms) and rotifers from mutations.
54. Present in only diploblastic organisms
55. Become the main body cavity in many animals.
56. Is completely lined with mesoderm in adulthood.
57. Gives rise to skin and brain.
58. Gives rise to heart, kidneys, and gonads.
59. Gives rise to spinal cord and sensory epithelia.
60. Gives rise to endocrine glands.

61. Which of the following is NOT paired correctly with its function?

A. Chorion – Gas Exchange B. Yolk Sac – Developing Embryo C. Allantois – Storage for Nitrogenous Waste
D. Amnion – Encloses Embryo in Amniotic Fluid E. All pairings are correct

Name _____

1. A pathogen includes
A. Organism with virulence factors
B. Natural gut bacteria like *E. coli*
C. Viruses like Influenza, Ebola, and HIV
D. All of the above
E. Two of the above

2. Which of the following is NOT a nonspecific defense mechanism against pathogens
A. Physical barriers like skin
B. Antibody producing cells like B-lymphocytes response to antigens
C. Mucous membranes that trap microbes
D. Coughing and sneezing eject pathogens from entryways
E. Ciliated cells force out microbes

3. Which of the following is NOT a nonspecific defense mechanism against pathogens
A. T-lymphocytes fight pathogens in cell-mediate response
B. Low pH of stomach acid kills pathogens
C. Inflammation increases the nutrients, oxygen, and white blood cells at area of infection
D. Histamine triggers vasodilation to concentrate macrophages
E. Phagocytes engulf an lyse invading pathogens

4. Interferons are:
A. A means for cells to communicate to increase immune cell response
B. Chemicals released by the immune system to slow protein synthesis in other cells
C. Signaling proteins that virally infected cells release to warn other cells of impending infection
D. Two answers are true
E. Three answers are true

5. Lymphocytes originate from
A. The Lymphatic System
B. Hepatic Cells
C. Thymus Gland
D. White Blood Cells
E. Bone Marrow

6. Lymphocytes recognize specific bacterium by their
A. Exoenzymes B. DNA C. Ribosomal Units D. Antigens E. Peptidoglycan Cell Walls

7. A humoral response
A. A specific immune response involving T-lymphocyte antibodies
B. A specific immune antibody mediated response involving B-lymphocyte proliferation
C. A specific immune response involving antibody producing T-lymphocytes
D. A specific immune response involving cytokine producing plasma cells
E. A specific immune response involving the activation of antigen specific T-lymphocytes

8. A cell-mediated response is defined as
A. A specific immune response involving B-lymphocyte antibodies
B. A nonspecific immune response involving T-cell phagocytes
C. A specific immune response involving antibody producing T-lymphocytes
D. A specific immune response involving cytokine producing plasma cells
E. A specific immune response involving the activation of antigen specific T-lymphocytes

9. Antibodies...
A. Are antigen specific
B. Do not proliferate until B-lymphocytes are presented with invading antigens
C. Are part of a the third line of nonspecific immune defenses
D. A & B are true
E. All are true

10. Clonal selection refers to
A. The proliferation of lymphocytes in response to an antigen
B. The differentiation of plasma cells into memory cells
C. The antibody-antigen binding specific to proliferated lymphocyte
D. A & B are true
E. A & C are true

For questions 11-20, refer to the following.

A. Plasma Cells B. Memory Cells C. Macrophages D. T-Lymphocytes E. B-Lymphocytes

11. The first cells to respond to a pathogenic invasion.
12. These cells do not live long, but respond faster as part of the primary immune response.
13. Immune cells derived from the thymus gland.
14. Fight pathogens in hand-to-hand combat.
15. These antigen recognition cells remain in circulation even after the infection has subsided.
16. Immune cells derived from bone marrow.
17. Nonspecific white blood cells that destroy invaders via phagocytosis.
18. These cells are part of the secondary immune response, and react quickly if a second infection occurs.
19. Cells also known as leukocytes.
20. These cells are the reason why you will not get certain diseases like chicken pox or a specific flu more than one.

For questions 21-30 refer to the following. Answers may be used once, more than once, or not at all.
A. Passive Immunity B. Active Immunity C. Innate Immunity D. Artificial Immunity

21. Receiving an inoculation for polio virus.
22. Maternally inherited immunity that is borrowed and antibodies do not survive for long.
23. Memory cells are part of this immunity.
24. Inherited immunities that may last a lifetime.
25. Producing antibodies in response to a pathogenic invasion.
26. Includes deliberately coming into contact with a pathogen.
27. A man who had chicken pox once as a child does not get it again.
28. Plasma cells are part of this immunity.
29. Includes non-deliberate contact with disease causing agent.
30. Includes nonspecific immunities like skin, mucous, and inflammation.

31. A girl with the blood genotype ii would be able to donate to another girl with blood displaying the AB antigen for all of the following reasons EXCEPT:
A. She is a universal donor
B. The recipient is the universal recipient
C. No agglutination would occur
D. They are both females
E. The recipient has no antibodies against A or B

32. The same girl would not be able to receive blood from the girl with AB type blood because:
A. She has antibodies for both A and B antigens
B. Agglutination would not occur
C. They are both females
D. She has no antibodies against A or B
E. She is a universal donor

33. AIDS is NEVER result of which of the following
A. HIV
B. A helper T-cell count density under a certain threshold
C. A retrovirus
D. Opportunistic diseases and infections
E. Unprotected sex, sharing needles

34. You should never take antibiotics
A. When you have a fungal infection B. When you have a bacterial infection C. When you have a viral infection
D. As a preventative measure E. More than one answer is correct

35. Vaccines:
A. Cause autism
B. Facilitate in herd immunity by preventing viral infections
C. Are dangerous because some contain mercury
D. A & B are true
E. B & C are true

36. Which of the following would qualify as an autoimmune disease?
A. Antibodies attack pancreatic cells in Type I Diabetes
B. A bee sting triggers the release of histamine
C. Pollen causes sneezing and watery eyes
D. *H. pylori* survives in low pH and causes ulcers in the stomach
E. Atherosclerosis increases blood pressure, inciting a cardiac infarct

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CHAPTER 18 READING GUIDE | ANIMAL BEHAVIOR

Name _____

For questions 1-5, determine whether the behavior is innate or learned.

1. Sharing toys with another child.
2. Crying when you're sad.
3. Salmon leave rivers at after birth and return to mate later in life.
4. Maverick refuses to eat olives ever again after he tries them once.
5. Mammals care for their young.

For questions 5-10, identify the stimulus with an S and the response with an R.

6. Recoiling hand	_____	*Hot stove*	_____
7. Thirst	_____	*Drinking Water*	_____
8. Pupil dilates	_____	*Dim light*	_____
9. Dog dies	_____	*Crying*	_____
10. Addition of new fish	_____	*Aggressive behavior*	_____

11. Von Frisch's study shows that upon returning to its hive, a European honeybee communicates to other worker bees the location of a nearby food source it has discovered by
A. Vibrating its wings at varying frequencies
B. Performing a round dance
C. Performing a waggle dance
D. Visual Cutes
E. All options are correct

12. Tinbergen elucidated on fixed action patterns by
A. Showing that male sickleback fish will attack anything with a red underbelly
B. Showing that male sickleback fish not attack other males without a red underbelly
C. Showing that male sickleback fish will attack females with red underbellies
D. A & B are correct
E. A, B, & C are correct

13. A fixed action pattern is characterized by
A. Imprinting, sign stimuli, and releasers
B. Sign stimuli and releasers
C. Pheromone release
D. Sickleback fish mating habits
E. Two of the above are correct

14. Sign stimuli released amongst members of the same species are called
A. Imprinters
B. Releasers
C. Responders
D. Inhibitors
E. Pheromones

15. All of the following are examples of learning EXCEPT
A. A bear returns to a campsite after it successfully took food from it before
B. A human baby performs a sucking behavior when it is put in the presence of its mother's breast
C. A cat runs into the kitchen in response to the sound of a can opener
D. A rat runs a maze without mistakes to receive a food reward
E. A monkey uses a rock to crack a nut after it watches its father do the same

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16. Which of the following animals would most rely on fixed action patterning rather than learning

A. Goats
B. Whales
C. Turtles
D. Mayfly
E. Chicken

For questions 17-25, refer to the following.

A. Habituation B. Classical Conditioning C. Operant Condition (Trial and Error Learning)
D. Imprinting D. Fixed Action Pattern

17. A species of bird that migrate at night use the night sky as a compass. If juvenile birds are raised under an artificial night sky with no stars or missing stars for several months, they are unable to migrate in the correct direction.
18. Jean's mom pinches her each time she eats chocolate. When she's older Jean flinches each time she walks by Godiva.
19. After living in the house for several months, Geraldine no longer notices the train when it runs by.
20. Mayflies drop their eggs when they encounter a certain light pattern.
21. Monkeys try different ways to separate wheat and sand. One monkey figures out that by throwing wheat into the ocean, the sand would sink and the wheat would float.
22. Young gulls crouch in their nest when any bird flies overhead. Older chicks crouch only for unfamiliar birds.
23. Mark avoids yelling at his sister because she breaks his stuff each time he does.
24. A group of recently hatched ducks believe that a dog they saw at birth is their mother and follows it around.
25. Graylag goose moves it head in an attempt to roll back an egg when it sees an egg missing from its nest. It does this even when there is no egg to move back.

For questions 26-35, refer to the following.

A. Territoriality B. Altruism C. Pecking Order D. Cooperation E. Agnostic Behavior

26. Wolves hunt in packs.
27. Each wolf pack has an alpha male that leads the entire pack
28. Groups of gorillas only one silverback; young males must leave when they reach maturity.
29. A behavior that may reduce an individual's reproductive fitness.
30. Pinnipeds often live in harems with one male and many females.
31. Male elephant seals throw up their heads and show off their size in front of other males.
32. A cat urinates in its litterbox.
33. A frilled-neck lizard flares its bright red and orange frills to makes its head look several times bigger.
34. After a young chimp's mother dies, the aunt takes care of the young chimp as her own.

35. What is the specific type of behavior exhibited in 34?

A. Dominance Hierarchy
B. Kin Selection
C. Adoption
D. Sign Stimuli
E. Love

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CHAPTER 19 READING GUIDE | ECOLOGY

Name _____

1. Rank from most inclusive to least inclusive

A. Community	I.
B. Ecosystem	II.
C. Biosphere	III.
D. Population	IV.
E. Individual	V.

For questions 2-6, refer to the following.

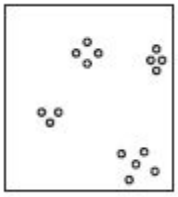
A. Abiotic Factors B. Biotic Factors C. Niche D. Density E. Ecosystem

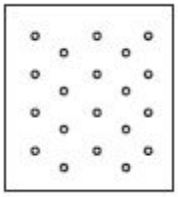
2. Includes plants, predators, and prey
3. Includes what an organism eats and needs to survive
4. Includes all the organisms in a given area and all of the abiotic factors
5. The number of organisms per unit area
6. Includes sunlight, rocks, water, and soil

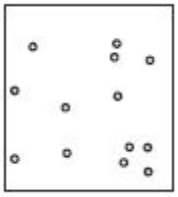
7. The population of deer living near Tony's house at the beginning of 2014 is 1000. During the year, the 200 deer from the Santa Cruz Mountains joined them, and the birth rate was 150 deer. These (stupid) deer love eating the plants at Tony's house, ruining all the gardening. In a rage, Tony kills 37 of them, and scares away 113. 75 more die of less violent causes. What is the size of the deer population at the end of 2014?

Please write out the equation you used to figure out your answer in question 7.

8. Label the types of dispersion shown below, and give an example for each.







_____ _____ _____
_____ _____ _____

9. Which of the following factors would LIMIT biotic potential? Select all that apply.

A. A new predator is introduced to a region
B. A female fruit fly can lay 500 eggs at a time
C. A female fruit fly can only give birth once in a lifetime
D. A certain organism can reproduce only a few day after birth
E. A panda only wants to mate during certain times of its life

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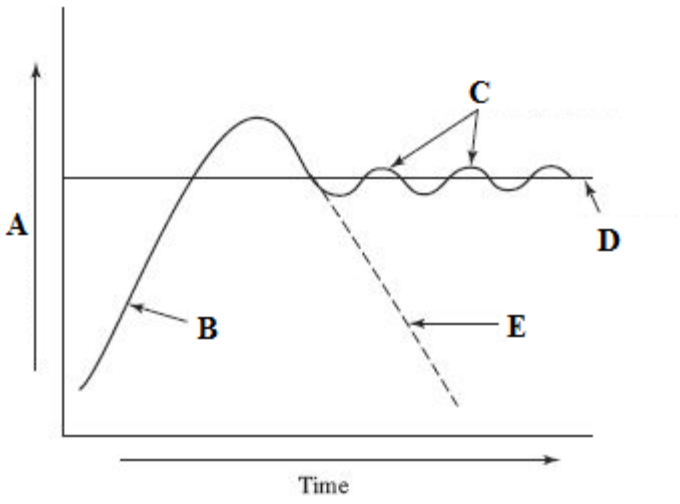
For questions 10-15, refer to the following figure. Answers may be used once, more than once, or not at all



10. Number of individuals in a population

11. The maximum number of individuals an environment can support

12. Exponential growth after introduction

13. Would most likely happen if a new predator were to be introduced

14. Would most likely happen if a food source went extinct

15. Carrying capacity

17. Compare and contrast the following reproductive strategies.

	r-strategist	**K-strategist**
Example		
Number & Size of Offspring		
Nurture & Care		
Maturation		
Reproductive Opportunities		
Preference	Reproduce rapidly when environment is under-crowded and resources are vast	Maximize carrying capacity for an environment

18. Identify whether the following are density dependent (DD) *or density independent* (DI) *factors.*

A. Food _____
B. Floods _____
C. Predators _____
D. Competition _____
E. Disease _____
F. Earthquakes _____
G. Birth control _____
H. Prey _____
I. Pollution _____
J. Temperature _____
K. Clean Water _____
L. Fire _____

19. The competitive exclusion principle would predict which of the following
A. If a predator is introduced to an area, its prey population would most likely go extinct
B. If a fox and a wolf compete for the same prey in an area, both their populations will decrease
C. If a population of species is too large to be supported by a niche, some will evolve to exploit other niches
D. If a macaw and a parrot both compete for the same bug in the same area, one species will die out
E. If two species share a niche and compete for the same resources, one will evolve to take advantage another resource

20. The process of resource partitioning would predict which of the following
A. If a predator is introduced to an area, its prey population would most likely go extinct
B. If a fox and a wolf compete for the same prey in an area, both their populations will decrease
C. If a population of species is too large to be supported by a niche, some will evolve to exploit other niches
D. If a macaw and a parrot both compete for the same bug in the same area, one species will die out
E. If two species share a niche and compete for the same resources, one will evolve to take advantage another resource

21. The process of character displacement would predict which of the following

A. If a predator is introduced to an area, its prey population would most likely go extinct
B. If a fox and a wolf compete for the same prey in an area, both their populations will decrease
C. If a population of species is too large to be supported by a niche, some will evolve to exploit other niches
D. If a macaw and a parrot both compete for the same bug in the same area, one species will die out
E. If two species share a niche and compete for the same resources, one will evolve to take advantage another resource

For 22-27 refer the following. Some answers may be used once, more than once, or not at all.

A. Batesian Mimcry B. Muellerian Mimicry C. Aposematic Coloration
D. Camouflage E. Active Defense

22. The poison dart frog is brightly colored to deter predators.
23. Both Viceroy and Monarch butterflies have brightly colored orange wings, and are both toxic.
24. A nonvenomous snake looks like a venomous snake.
25. The walking stick insect looks like a twig.
26. Two poisonous snakes look like each other.
27. Some bioluminescence can only be seen by members of the same species.

For 28-33, refer to the following. Answers may be used, more than once, or not at all.

A. Mutualism B. Commensalism C. Parasitism D. Predation E. Inhibition

28. A plant that grows non-parasitically upon another plant (such as a tree), and derives its moisture and nutrients from the air, rain, and sometimes from debris accumulating around it instead of the structure it is fastened to.
29. Blood fluke in a human heart.
30. A certain octopus at the Monterey Bay Aquarium eats crabs.
31. Barnacles grow on a whale without harming the whale.
32. Sea anemones give protection to hermit crabs using its stinging cells, and it remolds its shell to fit the crab while the hermit crab allows the sea anemones to consume the remains of its food
33. When a dog gets worms.

For 34-39, refer to the following. Answers may be used, more than once, or not at all.

A. Producer B. Primary Consumer C. Secondary Consumer D. Tertiary Consumer E. Food Web

34. Herbivores _____ *37. A frog eats a grasshopper* _____
35. Plants and diatoms _____ *38. A hawk eats the frog* _____
36. A fruit eating bat _____ *39. A hawk eats the plant* _____

40. Which of the following is NOT true of producers?

A. Angiosperms are producers
B. Diatoms are producers
C. Phytoplankton are producers
D. Have the greatest biomass of any trophic level
E. Contain the least amount of energy to be transferred

For 41-45, refer to the following. Answers may be used once, more than once, or not at all.

A. Productivity B. Gross Primary Productivity C. Net Primary Productivity D. Biomass E. Biomagnification

41. The amount of energy converted to chemical energy by photosynthesis per unit time.
42. The rate at which organic matter is created by producers.
43. The higher on the food chain an organism is, the smaller its total of this
44. The total energy converted to chemical energy minus the energy used by producers for respiration
45. A fish has a greater density of mercury in its body than the plankton that it eats.

46. Ecological succession
A. Is the rebuilding an abiotic system
B. Is the entrance of a pioneer organism like a lichen after a fire has destroyed a forest
C. Is most heavily dependent on soil building
D. A & B are true
E. A B & C are true

47. A final stable community is called a
A. Realized Niche
B. Ecosystem
C. Stable Population
D. Climax Community
E. Biome

48. An example of secondary ecological succession is
A. A fire kills most of the vegetation in the area, and within a year, new vegetation has grown in its place
B. A flood completely destroys an ecosystem, and a pioneer organism must start rebuilding soil
C. After lichen rebuild soil, grass begins to grow
D. A climax community
E. Well established sequoias in Muir Woods

49. Which is true of ecological succession?
(A) Pioneer species move into new communities first.
(B) Climax communities have lower total biomass than preceding communities.
(C) Species diversity is greatest in the early stages of succession.
(D) Climax communities shift constantly.
(E) All of the above

50. Match the following biomes to its characteristics. Biomes may be used once, more than once, or not at all.

A. Marine B. Tropic Rain Forest C. Desert D. Temperate Grasslands
E. Deciduous Forest F. Taiga G. Tundra

1. Presence of epiphyte
2. Greatest biodiversity
3. Highest average temperature
4. Most extreme temperature fluctuations of any biome
5. The largest biome
6. Greatest quantity of rain
7. The largest terrestrial biome
8. Characterized by gymnosperms or conifers
9. Trees change colors in the fall
10. Permafrost
11. Most stable biome
12. Least rainfall
13. Dense canopy
14. Provides most of the Earth's food and oxygen
15. Found closest to the poles

51. Which of the following represents the correct steps in the water cycle

I. Evaporation II. Precipitation III. Condensation IV. Photosynthesis V. Respiration

A. I → II → III → IV → V
B. I → III → II → IV → V
C. I → IV → V → II → III
D. II → III → IV → V → I
E. III → II → I → IV → V

52. Which of the following represents the correct steps in the carbon cycle

I. Cellular Respiration by animals and decomposers adds CO2 to air and removes O2
II. Photosynthesis removes CO2 from air and adds O2
III. Burning fossil fuels adds CO2 to air

A. I → II → III
B. I → III → II
C. I & III → II
D. I & II → III
E. More than one answer is correct

53. All of the following are paired correctly EXCEPT
A. Nitrogen fixing bacteria – Rhizobium
B. Rhizobium – convert atmospheric N2 to NH4+
C. Nitrifying bacteria – convert NH4+ to NO2- → NO3-
D. Decomposers – convert nitrates to atmospheric nitrogen
E. Denitrifying bacteria – convert nitrites into ammonium

54. All of the following are sources of human alteration of ecosystems EXCEPT

For 56-60, refer to the following.
A. Eutrophication B. Acid Rain C. Toxins D. Global Warming E. Chlorofluorocarbons

55. Caused by excessive burning of fossil fuels, creating a global greenhouse effect
56. Chemicals responsible for the depletion of ozone
57. Antibiotics in chicken and cows have the potential to be carcinogenic and teratogenic to humans
58. Chemical runoff increase nutrients in lakes, causing excessive growth of algae, killing fish
59. Rain of pH < 5.6 caused by the combustion of fossil fuels, deleterious to plants and organisms in lakes

60. Advantages of biological control include all of the following EXCEPT
A. Exposing male insects to radiation to make them sterile
B. Introduction of a new pest predator that becomes invasive
C. Replacement of synthetic toxins with natural toxins
D. Rotation of crops in a field to deter return of crop specific pests
E. All are advantageous