CHAPTER 1 QUIZ

1. A substance that has distinct chemical properties and cannot be broken down into simpler substances by normal chemical means is a(n) _____.

2. The smallest unit of an element is a(n)_____.

3. A molecule containing two or more elements is a(n) _____.

4. The two subatomic particles contained in the nucleus of an atom are _____ and _____. What are their charges? (place the appropriate charge next to each name)

5. The subatomic particles contained in the shells orbiting the nucleus are the _____. Charge? _____

6. Atomic number is the number of _____.

7. Draw an oxygen atom (atomic number: 8).

8. Draw a water molecule (H_2O) showing orbitals and shared electrons (atomic number of hydrogen: 1).

9. A complete transfer of electrons from one atom to another resulting in oppositely charged atoms sticking together is called a(n) _____ bond.

10. When atoms are joined together because they are sharing electrons it is called a(n) _____ bond.

11. In a _____ covalent bond electrons are unevenly shared whereas in a _____ covalent bond electrons are evenly shared.

12. Weak attractions between partially positively charged atoms and partially negatively charged atoms within the same molecule or between different molecules are called _____ bonds.

13. The pH scale is a measure of a substance's _____ ion concentration.

14. A move from pH 6 to pH 5 has made the solution _____ times more acidic.

    a. 2
    b. 5
    c. 10
    d. 100

15. Substances that resist changes in pH are called _____.

CHAPTER 2 QUIZ

1. What are the 'TinkerToy rules' (how many bonds does it usually form with other atoms) for the following?
   a. Carbon _____
   b. Hydrogen _____
   c. Oxygen _____
   d. Nitrogen _____
   e. Phosphorus _____
   f. Sulfur _____

2. Name the four major biomolecule categories.
   a. _____
   b. _____
   c. _____
   d. _____

3. Name one example of a disaccharide. _____

4. Cellulose is one type of _____.

5. Give one function of cellulose: _____

6. Draw glucose doing a dehydration synthesis reaction with another glucose forming a disaccharide. Label the glycosidic linkage.

7. Draw a glycerol doing a dehydration synthesis reaction with a fatty acid (4 carbons long) to form a monoglyceride.

8. Draw a short section of a phospholipid bilayer (using stick figure phospholipids).

9. Draw an amino acid doing a dehydration synthesis reaction with another amino acid to form a dipeptide. Label the peptide bond.

10. A chain of 100 or more amino acids is called a _____.

11. A chain of 60 amino acids is called a _____.

12. Draw a stick figure of a nucleotide and label its three components.

13. The sequence of amino acids determines the _____ of the protein, which in turn determines the _____ of the protein.

14. Name five different types of jobs done by proteins.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

15. Name two functions of nucleotides other than storing genetic information.

    a. _____

    b. _____

UNIT 1 EXAM

1. A substance that has distinct chemical properties and cannot be broken down into simpler substances by normal chemical means is a(n) _____.

2. The smallest unit of an element is a(n) _____.

3. A molecule containing two or more elements is a(n) _____.

4. The two subatomic particles contained in the nucleus of an atom are _____ and _____. Place the appropriate charge next to each name.

5. The subatomic particles contained in the shells orbiting the nucleus are the _____. Place their charge next to the name.

6. Atomic number is the number of _____.

7. Atomic weight is the number of protons and _____.

8. Draw an oxygen atom (atomic number: 8).

9. Draw a water molecule (H_2O) showing orbitals and shared electrons (atomic number of hydrogen: 1).

10. A complete transfer of electrons from one atom to another resulting in oppositely charged atoms sticking together is called a(n) _____ bond.

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12. In a _____ covalent bond electrons are unevenly shared, whereas in a _____ covalent bond electrons are evenly shared.

13. Weak attractions between partially positive charged atoms and partially negative charged atoms within the same molecule or between different molecules are called _____ bonds.

14. The pH scale is a measure of a substance's _____ ion concentration.

15. A pH of 7 is termed _____. Below pH 7 is considered _____ and above 7 is considered_____.

16. A move from pH 6 to pH 5 has made the solution _____ times more acidic.
    a. 2
    b. 5
    c. 10
    d. 100

17. Substances that resist changes in pH are called _____.

18. What are the 'TinkerToy rules' (how many bonds does it usually form with other atoms) for the following?
    a. Carbon _____
    b. Hydrogen _____
    c. Oxygen _____
    d. Nitrogen _____
    e. Phosphorus _____
    f. Sulfur _____

19. Name the four major biomolecule categories.

    a. _____

    b. _____

    c. _____

    d. _____

20. Name one example of a disaccharide. _____

21. Cellulose is one type of _____.

22. Give one function of cellulose. _____.

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28. A chain of 60 amino acids is called a _____.

29. Draw a stick figure of a nucleotide and label its three components.

30. The sequence of amino acids determines the _____ of the protein, which in turn determines the _____ of the protein.

31. Name five different types of jobs done by proteins.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

32. Name two functions of nucleotides other than storing genetic information.

    a. _____

    b. _____

CHAPTER 3 QUIZ

1. What other invention was closely associated with the microscope?

   _____

2. Who was the English scientist who coined the term cell?

   _____

3. What Latin word is cell derived from? _____

4. Why did Hooke pick that term? _____

   _____

5. Who was the Dutchman who viewed microscopic life with a microscope of his own making? _____

6. What did he call these life forms? _____

7. In what century did he make these observations? _____

8. Were Hooke and Leeuwenhoek contemporaries? _____

9. What are the three tenets of the Cell Theory?

   a. _____

   b. _____

   c. _____

10. Who were the three men who composed this theory?

    a. _____

    b. _____

    c. _____

CHAPTER 4 QUIZ

1. How do prokaryotic cells differ from eukaryotic cells regarding:
   a. A nucleus? _____
   b. Organelles? _____
   c. Size? _____
2. If a cell is too big what becomes too small relative to the increased mass?

   _____
3. Using stick figures for phospholipids and blob-like shapes for proteins; draw a small section of a biological membrane.

4. Define diffusion: _____

   _____
5. What fundamental property of matter causes diffusion?

   _____
6. How does concentration affect diffusion rate?

   _____
7. Define osmosis: _____

   _____
8. If a plant cell is placed in a hypertonic solution, it will _____ (lose/gain) water. This condition is called _____.

   When this occurs what happens to the turgor pressure?

   _____

9. Movement of a substance across a membrane, through a protein gate but against a concentration gradient is called _____.

10. The engulfing of a food particle by a cell so that a food vacuole is formed within the cell containing the food is _____.

CHAPTER 5 QUIZ

1. The _____ contains the vast majority of DNA.
2. The _____ within the [answer to #1] is a site where certain components of ribosomes are made.
3. _____ are tiny organelles used in the construction of proteins.
4. The _____ is covered with ribosomes and is involved in the modification of newly made proteins.
5. The _____ is devoid of ribosomes and is mostly involved with the manufacture or remodeling of _____.
6. The fluid of the cell is called the _____ and is 80 to 95% _____.
7. The organelle that "burns" food to make ATP for the cells' energy needs is the _____.
8. The organelle that captures sunlight energy to make glucose out of carbon dioxide and water is the _____.
9. The organelle involved in modifying, packaging, and shipping various biomolecules to other organelles or the cell membrane is the _____.
10. If an ameba phagocytosed bacteria, the resulting vesicle within the cell is called a _____.
11. An organelle that contains digestive enzymes for the demolition of various biomolecules is the _____.

12. Various proteins that form internal 'tent poles' or form internal transport rails or form parts to molecular motors are called _____ elements.

13. One type of the above that form the inner framework and motor apparatus contained in flagella and cilia are _____.

14. The rigid to flexible supporting framework outside the cell membrane of plant, fungi, and bacterial cells is called the _____.

15. Cell-to-cell junctions that actually allow cytoplasm to flow between adjacent cells are called _____ junctions.

UNIT 2 EXAM

1. What other invention was closely associated with the microscope?

   _____

2. The first publication of microscope illustrations was done by

   _____.

   The creatures drawn were _____.

3. Who was the English scientist who coined the term cell?

   _____

4. What Latin word is cell derived from? _____

5. Why did Hooke pick that term? _____

   _____

6. Who was the Dutchman who viewed microscopic life with a microscope of his own making? _____

7. What did he call these life forms? _____

8. What century did he make these observations? _____

9. Were Hooke and Leeuwenhoek contemporaries? _____

10. What are the three tenets of the Cell Theory?

    a. _____

    b. _____

    c. _____

11. Who were the three men who composed this theory?

    a. _____ b. _____

    c. _____

12. How do prokaryotic cells differ from eukaryotic cells regarding:

    a. A nucleus? _____

    b. Organelles? _____

    c. Size? _____

13. If a cell is too big what becomes too small relative to the increased mass?

    _____

14. Using stick figures for phospholipids and blob-like shapes for proteins; draw a small section of a biological membrane.

15. Define diffusion: _____

    _____

16. What fundamental property of matter causes diffusion?

    _____

17. How does concentration affect diffusion rate? _____

    _____

18. How does temperature affect diffusion rate? _____

    _____

19. How does molecular size affect diffusion rate? _____

    _____

20. Define osmosis: _____

    _____

21. If a plant cell is placed in a hypertonic solution, it will _____ (lose/gain) water. This condition is called _____. When this occurs what happens to the turgor pressure? _____

    _____

22. Movement of a substance across a membrane, through a protein gate but against a concentration gradient is called _____.

23. The engulfing of a food particle by a cell so that a food vacuole is formed within the cell containing the food is _____.

24. The _____ contains the vast majority of DNA.

25. The _____ within the [answer to #24] is a site where certain components of ribosomes are made.

26. _____ are tiny organelles used in the construction of proteins.

27. The _____ is covered with ribosomes and is involved in the modification of newly made _____.

28. The _____ is devoid of ribosomes and is mostly involved with the manufacture or remodeling of _____.

29. The fluid of the cell is called the _____ and is 80 to 95% _____.

30. The organelle that 'burns' food to make ATP for the cells' energy needs is the _____.

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36. One type of the above that form the inner framework and motor apparatus contained in flagella and cilia are _____.

37. The rigid to flexible supporting framework outside the cell membrane of plant, fungi, and bacterial cells is called the _____.

38. Cell-to-cell junctions that actually allow cytoplasm to flow between adjacent cells are called _____ junctions.

CHAPTER 6 QUIZ

1. The law that states that matter cannot be created or destroyed but can be converted from one form to another is the _____ _____.

2. Contrast anabolic and catabolic reactions. _____
   _____
   _____
   _____

3. Which one above is endergonic? _____

4. Using A, B, and C show a catabolic reaction in symbolic form.

5. Proteins that speed up chemical reactions millions of times faster are called _____.

6. Name three things that affect enzyme activity.
   a. _____
   b. _____
   c. _____

7. Denaturation deforms or destroys the enzyme's _____.

8. Enzymes convert substrates into _____ using their active sites.

9. The sum total of all the chemical reactions in cells, tissues, or the entire body is called _____.

10. Heavy metals can act as poisons by binding to the enzyme's _____ site. This deforms the active site which destroys enzyme function.

CHAPTER 7 QUIZ

1. What is the general equation of photosynthesis?

   _____

2. CO_2 enters the leaf through the _____.

3. O_2 leaves the leaf through the _____.

4. Draw and label a chloroplast.

5. The photosynthetic pigments are in two clusters called _____ and _____.

6. The major pigment that captures light energy and drives the electron transport system in the chloroplasts is _____.

7. Other photosystem pigments that capture a wider range of wavelengths of light and transfer that energy to chlorophyll are the _____ pigments.

8. These pigments along with the electron transport system move electrons from _____ (the ultimate electron source) to _____.

9. What is a product of photosynthesis resulting from water being stripped of some of its electrons by Photosystem II? _____

10. What type of energy excites chlorophyll causing electrons to flow through the ETS? _____

11. What accumulates inside the thylakoid discs when they are receiving light? _____.

12. ATP is generated from ADP and P when _____ ions flow through a channel protein/enzyme called _____.

13. What are the two important products of the Light Dependent Reactions?

    a. _____

    b. _____

14. The cycle that produces glucose from CO_2 is called the _____ cycle. This cycle is considered the Light _____ Reactions.

15. The Light Dependent Reactions occur in the _____ membrane but the Light Independent Reactions occur in the _____ _____.

CHAPTER 8 QUIZ

1. The *net* production of ATP in glycolysis only is _____.
2. Glycolysis occurs in the _____.
3. The _____ cycle generates the most NADH.
4. In glycolysis, glucose is ultimately split (by oxidation) into two _____.
5. The NADH yield for glycolysis is _____.
6. In cellular respiration the Electron Transport System occurs in the _____ membrane of the mitochondrion.
7. Draw and label a mitochondrion.

8. In the mitochondria what two molecules release (dump) their electrons onto the Electron Transport System?
   a. _____
   b. _____
9. How much ATP does one NADH generate when using the ETS? _____
10. What ions are pumped out into the intermembrane space of the mitochondrion as electrons zip through the Electron Transport System?
    _____

11. Phosphorylation (ADP + P → ATP) occurs when _____ ions flow through a channel protein/enzyme called _____.

12. How many NADHs are produced (total) when burning one molecule of glucose (from glucose to CO_2)? _____

13. In cellular respiration what important molecule from the air does all aerobic life need, that accepts electrons (and hydrogen) at the end of the Electron Transport System? _____

14. What happens to ATP production if [the answer to #13] is unavailable?

    _____

15. What is the grand total ATP yield from burning one molecule of glucose into $6CO_2$ and $6H_2O$? _____

UNIT 3 EXAM

1. The law that states that matter cannot be created or destroyed but can be converted from one form to another is the _____ _____.

2. Contrast anabolic and catabolic reactions: _____ _____ _____

3. Which one above is endergonic? _____

4. Using the letters A, B, and C show a catabolic reaction in symbolic form.

5. Proteins that speed up chemical reactions millions of times faster are called _____.

6. Name three things that affect enzyme activity.
   a. _____
   b. _____
   c. _____

7. Denaturation deforms or destroys the enzyme's _____.

8. Enzymes convert substrates into _____ using their active sites.

9. The sum total of all the chemical reactions in cells, tissues, or the entire body is called _____.

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17. Other photosystem pigments that capture a wider range of wavelengths of light and transfer that energy to chlorophyll are the _____ pigments.

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23. What are the two important products of the Light Dependent Reactions?

    a. _____

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24. The cycle that produces glucose from CO_2 is called the _____ cycle. This cycle is considered the Light _____ Reactions.

25. The Light Dependent Reactions occur in the _____ membrane but the Light Independent Reactions (Calvin-Benson cycle) occur in the _____.

26. The *net* production of ATP in glycolysis only is _____.

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39. What happens to ATP production if [the answer to #38] is unavailable?

    _____

40. What is the grand total ATP yield from burning one molecule of glucose into $6CO_2$ and $6H_2O$? _____

CHAPTER 9 QUIZ

1. Who were the two main discoverers (full names) of the structure of DNA?

   a. _____

   b. _____

2. Who also won the Nobel Prize with them?

   _____

3. The data that was the most valuable to this discovery was generated by two scientists named _____ and _____(full names).

4. What are the three parts to a nucleotide?

   a. _____

   b. _____

   c. _____

5. What are the four different nitrogenous bases found in DNA?

   a. _____

   b. _____

   c. _____

   d. _____

6. The double helix can be likened to a twisted ladder. The "ladder sides" are called the _____ backbones and the "rungs" are the base-pairs.

7. In a chromosome, DNA is neatly wrapped around proteins called histones forming little repeating spools called _____.

8. The enzyme that unzips the two parental strands of DNA apart and constructs a complementary strand of RNA is called _____.

9. Name three structural differences between RNA and DNA nucleotides.

   a. _____

   b. _____

   c. _____

10. If a DNA strand is T-A-C-G-C-G-C-T-T-G-A-T-T-T-A, what is the mRNA sequence? (Put a slash between codons)

    _____

11. What is the amino acid sequence? (Use the three letter abbreviations for the amino acids; refer to the following genetic code.) _____

FIRST BASE	SECOND BASE				THIRD BASE
	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

12. When protein is made from an mRNA transcript, the process is called _____.

13. What molecule contains the anticodon and retrieves the appropriate amino acid? _____

14. True or false? Portions of RNA are snipped out (i.e., edited out) and the remaining pieces are spliced together before translation occurs.

15. What is the fundamental problem for those who think the central dogma evolved without a creator? _____

CHAPTER 10 QUIZ

1. Who were the two biologists that discovered the lac operon?
   _____ and _____

2. What organism is the lac operon in? _____

3. What protein attaches to the operator to prevent certain genes from being transcribed in the lac operon? _____

4. What is the place on DNA to which RNA polymerase attaches at the beginning of transcription? _____

5. A gene or a set of genes that are turned on or off by a single switch is called a(n) _____.

6. In the lac operon, lactose binds to the _____ which causes it to fall off the operator.

7. If this binding occurs, name the first enzyme that is made (translated)?
   _____

8. What does this enzyme do? _____

9. What is the second enzyme made and what does it do?
   _____
   _____

10. What happens to the repressor if all the lactose is consumed?
    _____
    _____

CHAPTER 11 QUIZ

1. Enzymes used to cut DNA at specific sequences are called _____ enzymes.

2. The enzyme used to splice DNA fragments together is called _____.

3. Overhanging ends of single-stranded DNA which facilitate the splicing process are called _____.

4. After a *gene of interest* is spliced into a plasmid, what must be done next in order to put the gene to work? _____

5. What mode of DNA acquisition involves a virus as a vehicle to inject DNA into the cell? _____

6. What mode of DNA acquisition involves shooting microscopic DNA-coated metal particles into the cell? _____

7. What mode of DNA acquisition is from a bacterium to another bacterium through pilus? _____

8. List the seven basic steps in recombinant DNA technology.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

   g. _____

9. The gene that codes for _____ was successfully inserted into a plasmid. *E. coli* was transformed with the plasmid and can now produce large quantities of this hormone for the treatment of diabetes.

10. *Agrobacterium tumefaciens* can be used to deliver beneficial genes to crops. What must be removed from the Ti plasmid for it to work without harming the plant? _____

UNIT 4 EXAM

1. Who were the two main discoverers (full names) of the structure of DNA?

   a. _____

   b. _____

2. Who also won the Nobel Prize with them?

   _____

3. The data that was the most valuable to this discovery was generated by two scientists named _____ and _____ (full names).

4. What are the three parts to a nucleotide?

   a. _____

   b. _____

   c. _____

5. What are the four different nitrogenous bases found in DNA?

   a. _____

   b. _____

   c. _____

   d. _____

6. The double helix can be likened to a twisted ladder. The "ladder sides" are called the _____ backbones and the "rungs" are the base-pairs.

7. In a chromosome, DNA is neatly wrapped around proteins called histones forming little repeating spools called _____.

8. The enzyme that unzips the two parental strands of DNA apart and constructs a complementary strand of RNA is called _____.

9. Name three structural differences between RNA and DNA.

   a. _____

   b. _____

   c. _____

10. If a DNA strand is T-A-C-G-C-G-C-T-T-G-A-T-T-T-A, what is the mRNA sequence? (Put a slash between codons)

    _____

11. What is the amino acid sequence? (Use the three letter abbreviations for the amino acids; refer to the following genetic code.) _____

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	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

12. When protein is made from an mRNA transcript, the process is called

    _____

13. What molecule contains the anticodon and retrieves the appropriate amino acid?

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14. What is the fundamental problem for those who think the central dogma evolved without a creator?

    _____

15. Who were the two biologists that discovered the lac operon?

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17. What protein attaches to the operator to prevent certain genes from being transcribed in the lac operon? _____

18. What is the place on DNA to which RNA polymerase attaches at the beginning of transcription? _____

19. A gene or a set of genes that are turned on or off by a single switch is called a(n)

    _____.

20. In the lac operon, lactose binds to the _____ which causes it to fall off the operator.

21. If this binding occurs, name the first enzyme that is made (translated)?

    _____

22. What does this enzyme do? _____

23. What is the second enzyme made and what does it do?

    _____

24. What happens to the repressor if all the lactose is consumed?

    _____

    _____

25. Enzymes used to cut DNA at specific sequences are called _____ enzymes.

26. The enzyme used to splice DNA fragments together is called _____.

27. Overhanging ends of single-stranded DNA which facilitate the splicing process are called _____.

28. After a *gene of interest* is spliced into a plasmid, what must be done next in order to put the gene to work? _____

29. What mode of DNA acquisition involves a virus as a vehicle to inject DNA into the cell? _____

30. What mode of DNA acquisition involves shooting microscopic DNA-coated metal particles into the cell? _____

31. What mode of DNA acquisition is from a bacterium to another bacterium through pilus? _____

32. List the seven basic steps in recombinant DNA technology.

    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
    g. _____

33. The gene that codes for _____ was successfully inserted into a plasmid. *E. coli* was transformed with the plasmid and can now produce large quantities of this hormone for the treatment of diabetes.

CHAPTER 12 QUIZ

1. Before mitosis, what process in the central dogma needs to occur for this process to occur? _____

2. [The answer to #1] occurs during _____ phase of interphase.

3. The enzyme that produces daughter strands of DNA by placing complementary nucleotides along each parental strand is called _____.

4. Why does this need to occur before mitosis? _____
   _____

5. A skein of DNA and proteins is called a _____.

6. Chromosomes are lined up at the spindle equator during _____.

7. DNA coils up into chromosomes, the spindle forms, and the nuclear envelope breaks up during _____.

8. Plant cytokinesis is accomplished through the formation of a _____ at the spindle equator.

9. Sister chromatids (one-copy chromosomes) migrate to opposite poles of the cell during _____ of mitosis.

10. When the spindle disappears, the chromosomes unravel, and the nuclear envelope reforms around each nucleus, the cell is in what phase of mitosis? _____.

CHAPTER 13 QUIZ

1. Homologous chromosomes separate during _____.
   a. Anaphase of mitosis
   b. Anaphase I
   c. Anaphase II
2. The reduction division occurs during _____.
   a. Mitosis
   b. Meiosis I
   c. Meiosis II
3. Sister chromatids separate during _____.
   a. Anaphase I
   b. Anaphase II
4. Pairs of chromosomes that resemble each other in size, shape, and the genes they carry are called _____.
5. Crossing over occurs during _____.
6. What does crossing over accomplish in terms of offspring?

   _____
7. What is the big difference between metaphase of mitosis and metaphase I of meiosis? _____

   _____
8. Reduction division is when the cell changes in ploidy from _____ to _____.
9. Where does meiosis occur in animals and humans?
   In males? _____
   In females?_____
10. What does it produce in animals and humans?

    _____

CHAPTER 14 QUIZ

1. Different versions of the same gene are called _____.

2. When a cell has two complete sets of genetic information it is said to be _____.

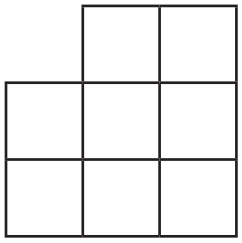
3. When a cell has one complete set of genetic information it is said to be _____.

4. The combination of alleles for a given gene is the organism's _____.

5. The actual physical appearance of the organism is _____.

Pea Traits
Y = yellow seeds (dominant)
y = green seeds (recessive)
R = round seeds (dominant)
r = wrinkled seeds (recessive)

6. Using a Punnett Square do the following monohybrid cross: F1: Yy x Yy. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)



7. What is the percentage of yellow seeded offspring in the F2 generation?_____

8. How do you determine whether yellow-seeded offspring is YY or Yy? _____

9. Using a Punnett Square do the following dihybrid cross: F1: YyRr x YyRr. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)

10. What percentage or proportion of offspring is green-round seeded? _____

11. What is the percentage or proportion of offspring is green-wrinkle seeded? _____

Hydra Traits (***Heterozygotes have six heads**)
F = Fire-breather (dominant)
f = non-fire breather (recessive)
*C = ten headed (incompletely dominant)
c = two headed

12. Using a Punnett Square do the following dihybrid cross: F1: FfCc x FfCc. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)

13. What is the phenotype of these F1 parents? _____

14. What percentage or proportion of F2 offspring can't breathe fire and has six heads? _____

15. What percentage or proportion of F2 offspring can breathe fire and has two heads? _____

UNIT 5 EXAM

1. Before mitosis, what process in the central dogma needs to occur for this process to occur? _____

2. [The answer to #1]y occurs during _____ phase of interphase.

3. The enzyme that produces daughter strands of DNA by placing complementary nucleotides along each parental strand is called _____.

4. Why does this need to occur before mitosis? _____
_____

5. A skein of DNA and proteins is called a _____.

6. Chromosomes are lined up at the spindle equator during _____.

7. DNA coils up into chromosomes, the spindle forms, and the nuclear envelope breaks up during _____.

8. Plant cytokinesis is accomplished through the formation of a _____ at the spindle equator.

9. Animal cytokinesis is accomplished through a process called _____.

10. Sister chromatids (one-copy chromosomes) migrate to opposite poles of the cell during _____ of mitosis.

11. When the spindle disappears, the chromosomes unravel, and the nuclear envelope reforms around each nucleus, the cell is in what phase of mitosis? _____.

12. Homologous chromosomes separate during _____.
    a. Anaphase of mitosis
    b. Anaphase I
    c. Anaphase II

13. The reduction division occurs during _____.
    a. Mitosis
    b. Meiosis I
    c. Meiosis II

14. Sister chromatids separate during _____.
    a. Anaphase I
    b. Anaphase II

15. Meiosis forms spores in _____.

16. Which division in meiosis (I or II) is similar to mitosis? _____

17. Pairs of chromosomes that resemble each other in size, shape, and the genes they carry are called _____.

18. Crossing over occurs during _____.

19. What does crossing over accomplish in terms of offspring?

    _____

20. What is the big difference between metaphase of mitosis and metaphase I of meiosis? _____

21. Reduction division is when the cell changes in ploidy from _____ to _____.

22. Where does meiosis occur in animals and humans?
In males? _____
In females? _____

23. What does meiosis produce in male animals (and humans)?
_____

24. What does meiosis produce in female animals (and humans)?
_____

25. Different versions of the same gene are called _____.

26. When a cell has two complete sets of genetic information it is said to be _____.

27. When a cell has one complete set of genetic information it is said to be _____.

28. The combination of alleles for a given gene is the organism's _____.

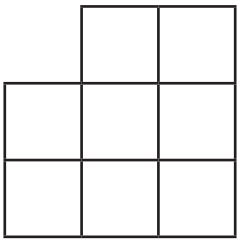
29. The actual physical appearance of the organism is _____.

30. Pp is _____ because it has two different _____ for the same gene.

31. P symbolically represents the _____ allele for purple flowers because it overrides the effects of p, which is the _____ allele.

Pea Traits
Y = yellow seeds (dominant)
y = green seeds (recessive)
R = round seeds (dominant)
r = wrinkled seeds (recessive)

32. Using a Punnett Square do the following monohybrid cross: F1: Yy x Yy. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)

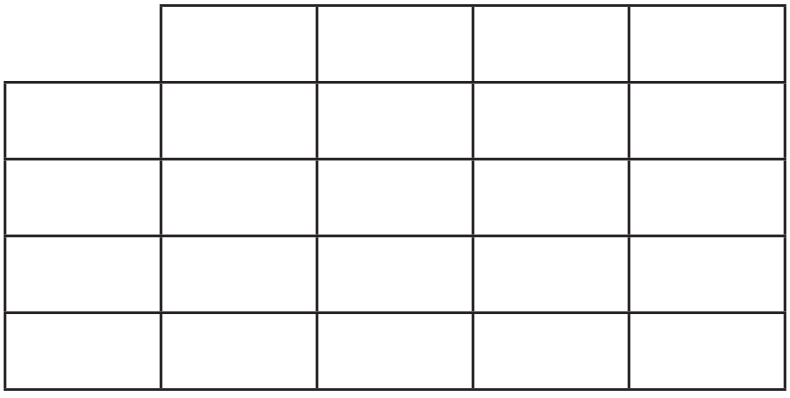


33. What is the percentage or proportion of yellow seeded offspring in the F2 generation? _____

34. How do you determine whether yellow-seeded offspring is YY or Yy?

_____

35. Using a Punnett Square do the following dihybrid cross: F1: YyRr x YyRr. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)



36. What percentage or proportion of offspring is green-round seeded? _____

37. What is the percentage or proportion of offspring is green-wrinkle seeded? _____

Hydra Traits (***Heterozygotes have six heads**)
F = Fire-breather (dominant)
f = non-fire breather (recessive)
*C = ten headed (incompletely dominant)
c = two headed

38. Using a Punnett Square do the following dihybrid cross: F1: FfCc x FfCc. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)

39. What is the phenotype of these F1 parents? _____

40. What proportion of F2 offspring can't breathe fire and has six heads? _____

41. What proportion of F2 offspring can breathe fire and has two heads? _____

COMPREHENSIVE EXAM FOR PART 1

1. The two subatomic particles contained in the nucleus of an atom are _____ and _____. What are their charges? (place the appropriate charge next to each name)

2. In a _____ covalent bond electrons are unevenly shared whereas in a _____ covalent bond electrons are evenly shared.

3. Draw a water molecule (H_2O) showing orbitals and shared electrons (atomic number of hydrogen: 1).

4. A move from pH 6 to pH 5 has made the solution _____ times more acidic.
   a. 2 b. 5 c. 10 d. 100

5. Name the four major biomolecule categories.
   a. _____
   b. _____
   c. _____
   d. _____

6. What are the 'TinkerToy rules' (how many bonds does it usually form with other atoms) for the following?
   a. Carbon _____
   b. Hydrogen _____
   c. Oxygen _____
   d. Nitrogen _____
   e. Phosphorus _____
   f. Sulfur _____

7. Draw an amino acid doing a dehydration synthesis reaction with another amino acid to form a dipeptide. Label the peptide bond.

8. Draw glucose.

9. Who was the English scientist who coined the term cell? _____

10. Who was the Dutchman who viewed microscopic life with a microscope of his own making? _____

11. What are the three tenets of the Cell Theory?

    a. _____

    b. _____

    c. _____

12. Define diffusion: _____

    _____

13. Define osmosis: _____

    _____

14. Movement of a substance across a membrane, through a protein gate but against a concentration gradient is called _____.

15. _____ are tiny organelles used in the construction of proteins.

16. The organelle that captures sunlight energy to make glucose out of carbon dioxide and water is the _____.

17. An organelle that contains digestive enzymes for the demolition of various biomolecules is the _____.

18. The law that states that matter cannot be created or destroyed but can be converted from one form to another is the _____.

19. Proteins that speed up chemical reactions millions of times faster are called _____.

20. Denaturation deforms or destroys the enzyme's _____.

21. CO_2 enters the leaf through openings in the epidermis called _____.

22. What are the two important products of the Light Dependent Reactions?

    a. _____

    b. _____

23. The cycle that produces glucose from CO_2 is called the _____ cycle. This cycle occurs in the _____ of the chloroplast.

24. Glycolysis occurs in the _____.

25. Phosphorylation (ADP + P → ATP) occurs when _____ ions flow through a channel protein/enzyme called _____.

26. In cellular respiration what important molecule from the air does all aerobic life need, that accepts electrons (and hydrogen) at the end of the Electron Transport System? _____

27. What is the grand total ATP yield from burning one molecule of glucose into $6CO_2$ and $6H_2O$? _____

28. Who were the two main discoverers (full names) of the structure of DNA?

    a. _____

    b. _____

29. What are the four different nitrogenous bases found in DNA?

    a. _____

    b. _____

    c. _____

    d. _____

30. If a DNA strand is T-A-C-G-C-G-C-T-T-G-A-T-T-T-A, what is the mRNA sequence? (Put a slash between codons)

    _____

31. What is the amino acid sequence? (Use the three letter abbreviations for the amino acids; refer to the following genetic code.) **Place genetic code table here**

    _____

    _____

32. What organism is the lac operon in? _____

33. What is the place on DNA to which RNA polymerase attaches at the beginning of transcription? _____

34. What protein attaches to the operator to prevent certain genes from being transcribed in the lac operon? _____

35. Enzymes used to cut DNA at specific sequences are called _____ enzymes.

36. The enzyme used to splice DNA fragments together is called _____.

37. List the seven basic steps in recombinant DNA technology.

    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
    g. _____

38. Before mitosis, what process in the central dogma needs to occur for this process to occur? _____

39. Chromosomes are lined up at the spindle equator during _____ of mitosis.

40. When the spindle disappears, the chromosomes unravel, and the nuclear envelope reforms around each nucleus, the cell is in what phase of mitosis? _____.

41. Homologous chromosomes separate during _____.

    a. Anaphase of mitosis
    b. Anaphase I
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42. Pairs of chromosomes that resemble each other in size, shape, and the genes they carry are called _____.

43. During meiosis reduction division is when the cell changes in ploidy from _____ to _____.

44. During meiosis sister chromatids separate during _____.
    a. Anaphase I
    b. Anaphase II

45. The combination of alleles for a given gene is the organism's _____.

46. The actual physical appearance of the organism is _____.

Hydra Traits (***Heterozygotes have six heads**)
F = Fire-breather (dominant)
f = non-fire breather (recessive)
*C = ten headed (incompletely dominant)
c = two headed

47. Using a Punnett Square do the following dihybrid cross: F1: FfCc x FfCc. (First determine the possible gametes and place them in the first column and row; then fill in the Punnett square.)

48. What percentage or proportion of F2 offspring can't breathe fire and has six heads? _____

49. What percentage or proportion of F2 offspring can breathe fire and has two heads? _____

CHAPTER 15 QUIZ

1. One of the first taxonomists of the fourth century B.C. was _____.

2. Different classification schemes result from differences of opinion on what _____ are the most important to compare or contrast.

3. A Swedish naturalist named _____ was the father of modern taxonomy. He proposed the _____ system of naming that is still used today.

4. What are the seven ranks (taxa) in the classification hierarchy below domain that Linnaeus developed but was added to? Go from general to specific.
   a. Domain
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
   g. _____
   h. _____

5. Similar families are grouped into a single _____.

6. A class is split into several _____.

7. The binomial of the American toad is "bufo americanus." Rewrite it correctly: _____
   What is its genus name? _____
   Species name? _____
   Specific epithet? _____

8. Draw a Creationist Orchard and circle one baramin.

9. From an evolutionary perspective, butterfly wings and bat wings would be considered _____structures because they didn't evolve from the same feature in their common ancestor.

10. A baramin is _____.
    a. Monophyletic
    b. Polyphyletic
    c. Paraphyletic

11. From an evolutionary perspective, front flippers in dolphins and human arms would be considered _____ structures because they did evolve from the same feature in their common ancestor.

12. From an evolutionary perspective, the evolution of a totally new anatomical feature (a derived character) is considered a(n) _____.

13. If two or more clades are lumped into one group because they share a common feature but the grouping excludes the common ancestor and other members that would unite them into a single clade, it is termed _____.

14. Creationists object to evolution when it involves the _____.
    a. Minor modification of a plesiomorphy
    b. Addition of an apomorphy.

CHAPTER 16 QUIZ

1. The viral _____ is a protein container for _____ or _____.

2. True or false? Viruses have their own metabolism apart from the host cells they infect.

3. True or false? Viruses only infect animals and humans.

4. The two major groups of prokaryotes are the_____ and the_____.

5. Bacterial cell walls are made of a polysaccharide called _____

6. Cytoplasmic tunnels that temporarily connect bacterial cells and allow for the transfer of genetic information are called _____.

7. A chain of rod-shaped bacteria hooked end to end are termed _____.

8. Besides the circular chromosome, bacteria often contain smaller hoops of DNA called _____.

9. Most species of bacteria _____
   a. are disease-causing (pathogenic).
   b. do not cause disease but aren't beneficial to the environment.
   c. perform many beneficial ecological functions.

10. Which one of the following Archaean groups is not an extremophile?
    a. Halophiles
    b. Methanogens
    c. Acidophiles
    d. Thermophiles

CHAPTER 17 QUIZ

1. A complex arrangement of contractile proteins beneath the cell membrane of euglenoids that enable them to change shape is called a _____.

2. Some photosynthetic euglenoids have a _____ that is light sensitive and enables them to determine the direction of the light and swim towards it.

3. Free-living dinoflagellates have two flagella. One is situated in a _____ groove. The other is in a _____ groove.

4. Red tide is caused by a population explosion of certain species of _____.
   a. Dinoflagellates
   b. Diatoms
   c. Red algae

5. Which marine algal group is the most important photosynthesizer of the oceans? _____

6. The toxic chemicals that make red tide dangerous to certain sea life are _____.

7. What lives in the tissues of corals that enable them to live in such nutrient-poor water? _____
   What do these microscopic tenants produce? _____
   How do they produce it? _____

8. Certain kinds of _____ are able to undergo bioluminescence.

9. The beautiful cell walls of diatoms are composed of _____ compounds.

10. All photosynthetic (autotrophic) protists are termed _____.

11. _____ is a multipurpose product extracted from certain types of brown algae.

12. What are the technical names of these seaweed groups?

    a. Brown Algae—_____
    b. Red Algae -_____
    c. Green Algae—_____

13. Their photosynthetic _____ serve as the basis of their classification.

14. Brown algae often have four major organs that compose their body:

    a. The _____ which is used for anchoring the algae to the sea floor.
    b. The _____ which acts a flexible stem or stalk.
    c. The _____ which is analogous to a leaf and serves as the primary area of photosynthesis.
    d. The _____ which is gas filled and grants buoyancy to some underwater seaweeds.

15. _____ is a polysaccharide extracted from certain types of red algae and is used as a gel-like material for bacteria to grow on in Petri dishes.

UNIT 6 EXAM

1. One of the first taxonomists of the fourth century B.C. was _____.

2. Different classification schemes result from differences of opinion on what _____ are the most important to compare or contrast.

3. A Swedish naturalist named _____ was the father of modern taxonomy. He proposed the _____ system of naming that is still used today.

4. What are the seven ranks (taxa) in the classification hierarchy below domain that Linnaeus developed but was added to? Go from general to specific.

   a. Domain
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
   g. _____
   h. _____

5. Similar families are grouped into a single _____.

6. A class is split into several _____.

7. The binomial of the American toad is bufo americanus. Rewrite it correctly.

   _____

   What is its genus name?_____
   Species name? _____
   Specific epithet?_____

8. Draw a Creationist Orchard and circle one baramin.

9. Draw an Evolutionary Tree.

10. Draw a Linnaean Lawn (what does each vertical line represent?)

11. Whose writing was most influential in causing a paradigm shift from a Linnaean Lawn view of life to an Evolutionary Tree view of life?

_____

12. From an evolutionary perspective, butterfly wings and bat wings would be considered _____ structures because they didn't evolve from the same feature in their common ancestor.

13. A baramin is _____.
    a. Monophyletic
    b. Polyphyletic
    c. Paraphyletic

14. From an evolutionary perspective, front flippers in dolphins and human arms would be considered _____ structures because they did evolve from the same feature in their common ancestor.

15. From an evolutionary perspective, the evolution of a totally new anatomical feature (a derived character) is considered a(n) _____.

16. If two or more clades are lumped into one group because they share a common feature but the grouping excludes the common ancestor and other members that would unite them into a single clade, it is termed _____ .

17. Creationists object to evolution when it involves the _____.
    a. Minor modification of a plesiomorphy
    b. Addition of an apomorphy.

18. The viral _____ is a protein container for _____ or _____.

19. True or false? Viruses have their own metabolism apart from the host cells they infect.

20. True or false? Viruses only infect animals and humans.

21. The two major groups of prokaryotes are the _____ and the _____.

22. Bacterial cell walls are made of a polysaccharide called _____ .

23. Cytoplasmic tunnels that temporarily connect bacterial cells and allow for the transfer of genetic information are called _____.

24. A chain of rod-shaped bacteria hooked end to end are called _____.

25. Spherical bacteria clustered in pairs are called _____.

26. Besides the circular chromosome, bacteria often contain smaller hoops of DNA called _____.

27. Most species of bacteria...
    a. are disease-causing (pathogenic).
    b. do not cause disease but aren't beneficial to the environment.
    c. perform many beneficial ecological functions.

28. Which one of the following Archaean groups is not an extremophile?
    a. Halophiles
    b. Methanogens
    c. Acidophiles
    d. Thermophiles

29. Halophiles are _____ loving prokaryotes.

30. True or false? No thermophiles can tolerate temperatures over the boiling point of water.

31. A complex arrangement of contractile proteins beneath the cell membrane of euglenoids that enable them to change shape is called a _____.

32. Some photosynthetic euglenoids have a _____ that is light sensitive and enables them to determine the direction of the light and swim towards it.

33. Free-living dinoflagellates have two flagella. One is situated in a _____ groove. The other is in a _____ groove.

34. Red tide is caused by a population explosion of certain species of _____.
    a. Dinoflagellates
    b. Diatoms
    c. Red algae

35. Which marine algal group is the most important photosynthesizer of the oceans? _____

36. The toxic chemicals that make red tide dangerous to certain sea life are _____.

37. Diatomaceous earth is composed of massive deposits of diatom _____.

38. What lives in the tissues of corals that enable them to live in such nutrient poor water? _____

39. What do [the answer to #39] produce? _____
    And how do they produce it? _____

40. Certain kinds of _____ are able to undergo bioluminescence.

41. The beautiful cell walls of diatoms are composed of _____ compounds.

42. All photosynthetic (autotrophic) protists are termed_____.

43. _____ is a multipurpose product extracted from certain types of brown algae.

44. What are the technical names of these seaweed groups?
    a. Brown Algae: _____
    a. Red Algae:_____
    b. Green Algae: _____

45. Their photosynthetic _____ serve as the basis of their classification.

46. Brown algae often have four major organs that compose their body.

    a. The _____ which is used for anchoring the algae to the sea floor.

    b. The _____ which acts a flexible stem or stalk.

    c. The _____ which is analogous to a leaf and serves as the primary area of photosynthesis.

    d. The _____ which is a gas filled and grants buoyancy to some underwater seaweeds.

47. Which group of algae is thought to be the direct ancestors of the plant kingdom?

    _____

48. What trait in this group leads them to this conclusion? _____

49. _____ is a polysaccharide extracted from certain types of red algae and is used as a gel-like material for bacteria to grow on in Petri dishes.

CHAPTER 18 QUIZ

1. The flagellates share a locomotion device called a device called a _____.

2. Shelled amebas that produce a calcium carbonate test (shell) are called _____.

3. *Giardia*, *Trichonympha*, and *Trypanosoma* are all examples of a disease-causing _____

4. Shelled amebas that produce a test composed of glass compounds are called _____.

5. White Cliffs of Dover are partly composed of the shells of which protozoan group? _____

6. Protozoans that get around with and obtain food with cilia are classified in the group called _____.

7. The common feature of all amebas is the _____ which is an extension of the cell used for locomotion and feeding.

8. All single-celled, non-photosynthetic (heterotrophic) protists resembling little animals are called _____.

9. Many freshwater protozoa have an osmotic problem because they live in a hypotonic environment. What organelle do they possess that helps them cope with the constant influx of water? _____

10. Many ciliates have a depression on their cell surface where they channel food to be phagocytosed. This is called the _____.

11. A plasmodial slime mold is a gigantic multinucleate blob that resembles fungi by producing _____ which produce spores.

12. The 'slug' in cellular slime molds differs with the plasmodium in that it is composed of many _____ moving together.

13. Water molds differ from Fungi in two significant ways.

    a. They have a cell wall made of _____ rather than chitin.

    b. They are _____ (ploidy) for most of their life cycle.

14. Name the water mold that had a great historical impact in Ireland.

    _____

15. What was the historical impact? In other words, what did the water mold do that had a huge impact on the United States? _____

    _____

    _____

    _____

CHAPTER 19 QUIZ

1. List six characteristics of Fungi other than eukaryotic, heterotrophic, and multicellular.
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
2. Fungi obtain nutrients through a process called _____ digestion. This occurs when the hyphae exocytose _____ releasing digestive enzymes onto the surrounding organic material.
3. Name two destructive activities of fungi.
   a. _____
   b. _____
4. Name three beneficial activities of fungi.
   a. _____
   b. _____
   c. _____
5. The zygomycete fungi reproduce asexually from spores that have been released from knob-like spore containers called _____.
6. In the black bread mold, tough spore containers called _____ are formed from the sexual union of two different mating strains.
7. Zygomycetes have hyphae with different job-descriptions and special names. The root-like _____ penetrate the substrate and absorb nutrients.

8. Ascomycete fungi reproduce asexually by spores called _____ that form pop-it bead-like chains.

9. Ascomycete fungi, during the sexual phase form fruiting bodies called _____. The concave (usually) spore-producing surface called the *hymenium* is formed by one layer of densely packed parallel _____ each containing eight _____.

10. An atypical ascomycete is _____ and is essential in the brewing and baking industry.

11. The shelf fungi, mushrooms, puffballs, earthstars, and coral fungi are all examples of _____.

12. In mushrooms, the hymenium is the surface of the _____ and is composed of parallel-arranged basidia. Each one forms four _____ which eventually get placed on the outside surface until they drop off.

13. Lichens are formed by a mutualistic relationship between _____ and _____.

14. The growth form of lichen that is bushy and branching is called:
    a. Fruticose b. Foliose c. Crustose

15. Fungi called _____ form a mutualistic relationship with vascular plant roots. The fungi benefits from the _____ of the plant and the plant benefits because the fungi enhances _____ and _____ absorption for the plant.

CHAPTER 20 QUIZ

1. List five general characteristics of all animals.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

2. What type of tissue grants animals the ability to move? _____

3. In what type of symmetry can an animal be divided into only two mirror image halves by only one plane? _____

4. What is the most common symmetry of animals? _____

5. Name two animal groups that show [answer to #3] symmetry.

   a. _____

   b. _____

6. If an animal is divided into similar halves by more than two planes running through the central axis of an animal it has _____ symmetry.

7. Name two animals that show [answer to #6] symmetry.

   a. _____

   b. _____

8. Name one animal that is asymmetrical. _____.

9. Between invertebrates and vertebrates, which spans the most phyla?

   _____

10. Phylum _____ is composed almost entirely of vertebrates.

UNIT 7 EXAM

1. The flagellates share a locomotion device called a _____.
2. Shelled amebas that produce a calcium carbonate test (shell) are called _____.
3. *Giardia*, *Trichonympha*, and *Trypanosoma* are all examples of a disease-causing _____
4. Shelled amebas that produce a test composed of glass compounds are called _____.
5. The White Cliffs of Dover are partly composed of the shells of which protozoan group? _____
6. Protozoans that get around with and obtain food with cilia are classified in the group called _____.
7. The common feature of all amebas is the _____ which is an extension of the cell used for locomotion and feeding.
8. All single-celled, non-photosynthetic (heterotrophic) protists resembling little animals are called _____.
9. Many freshwater protozoa have an osmotic problem because they live in a hypotonic environment. What organelle do they possess that helps them cope with the constant influx of water? _____
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12. The 'slug' in cellular slime molds differs with the plasmodium in that it is composed of many _____ moving together.

13. Water molds differ from Fungi in two significant ways:

    a. They have a cell wall made of _____ rather than chitin.

    b. They are _____ (ploidy) for most of their life cycle.

14. Name the water mold that had a great historical impact in Ireland.

    _____

15. What was the historical impact? In other words, what did the water mold do that had a huge impact on the United States? _____

    _____

    _____

16. List six characteristics of Fungi other than eukaryotic, heterotrophic, and multicellular.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

    f. _____

17. Fungi obtain nutrients through a process called _____ digestion. This occurs when the hyphae exocytose_____ releasing digestive enzymes onto the surrounding organic material.

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    b. Foliose
    c. Crustose

30. Fungi called _____ form a mutualistic relationship with vascular plant roots. The fungi benefits from the _____ of the plant and the plant benefits because the fungi enhances _____ and _____ absorption for the plant.

31. List five general characteristics of all animals.

    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

32. What type of tissue grants animals the ability to move? _____

    _____

33. What is the symmetry where the animal can only be divided into two mirror image halves by only one plane? _____

34. What is the most common symmetry of animals? _____

35. Name two animal groups that show [answer to #34] symmetry.

    a. _____
    b. _____

36. If an animal is divided into similar halves by more than two planes running through the central axis of an animal it has _____ symmetry.

37. Name two animals that show [answer to #36] symmetry.

    a. _____

    b. _____

38. Name one animal that is asymmetrical. _____

39. Between invertebrates and vertebrates, which spans the most phyla?

    _____

40. Phylum _____ is almost entirely composed of vertebrates.

CHAPTER 21 QUIZ

1. Sponges are _____-feeders because they strain out microscopic plankton from the water that circulates through them.

2. Sponge skeletons are composed of beautiful siliceous or calcareous _____ that provide rigidity.

3. The specialized cells in a sponge that generate the water current and capture and phagocytose the microscopic plankton are called _____ cells.

4. What is the protein that serves as a flexible skeleton for sponges?

   _____

5. What canals are lined with collar cells in syconoid sponges?

   _____

6. Asexual reproduction in sponges occurs through budding and by the production of tiny tough capsules containing sponge cells called _____ that can survive adverse environmental conditions.

7. Draw a simple body outline of a syconoid sponge (using dashes to show the pores or prosopyles). Label the incurrent canal, radial canal, spongocoel, and osculum. Use an arrow to show the pattern of water flow through the sponge.

8. In the more complicated leuconoid sponge, what is lined with collar cells?

   _____

9. What important ecological service do sponges perform as they filter feed?

_____

10. In sexual reproduction of most sponges, the sperm and egg cells are produced in:

    a. the same sponge.
    b. different male and female sponges.

CHAPTER 22 QUIZ

1. The hallmark characteristic of phylum Cnidaria are the possession of cells called cnidocytes which contain stinging organelles called _____.

2. Cnidocytes are mostly concentrated in bands in the epidermis on which body part?
   a. Stalk
   b. Pedal disk
   c. Tentacles
   d. Mouth

3. True or false? All nematocysts are designed to sting.

4. Finger-like projections of the body wall surround the mouth and are called _____.

5. Once triggered _____ flows into the capsule from the cytoplasm of the cnidocyte causing the nematocyst to be discharged. Then _____ flows out into the prey through the tube.

6. There are two general body forms of Cnidaria: the _____ and the _____.

7. Hydra, coral, hydroid colonies, and sea anemones exhibit the _____ form while jellyfish exhibit the _____ form.

8. The digestive system of Cnidarians is composed mostly of the mouth and the _____ cavity. Solid waste must be excreted out of the _____.

9. Generally there are two cell layers that comprise the body wall: the _____ and the_____.

10. Nutrients are absorbed by which cell layer? _____

11. Name two prey items of larger sea anemones.

    a. _____

    b. _____

12. Name two very different ways coral polyps can feed themselves.

    a. _____

    b. _____

13. The Portuguese Man-of-war is a:

    a. colony of polyps.

    b. jellyfish.

14. Sperm and eggs from the gonads are released out of the _____ of separate male and female jellyfish. Fertilization happens in the open sea water and the zygote grows into a small ciliated larva called a _____.

15. A thin to thick non-cellular layer is sandwiched between the epidermis and gastrodermis and is called the_____.

CHAPTER 23 QUIZ

1. Phylum _____ are the flatworms because they are all dorsoventrally flattened.

2. Name the three classes of flatworms (common name of the class is fine).

   a. _____

   b. _____

   c. _____

3. The tapeworms don't need a digestive tract because _____

   _____

4. Which two classes of flatworms have an incomplete digestive tract?

   a. _____

   b. _____

5. Which class of flatworm is parasitic and has a mollusk for a primary host and a vertebrate for a final host? _____

6. The tapeworms have segments called _____ that detach and leave the host with the feces when they mature and are loaded with eggs.

7. Tapeworms anchor themselves to the gut lining using hooks and or suckers mounted on the head-like _____.

8. Planaria are known, after being cut in pieces, for each piece to _____ the missing parts.

9. The planaria's mouth is located on the end of a hose-like _____ which is positioned in the middle of the underside. Incoming food is brought into its _____ cavity.

10. Roundworms:
    a. have tapered ends.
    b. have a complete digestive system.
    c. are round in cross section.
    d. all the above
    e. only a and b
    f. only a and c
    g. only b and c

11. Roundworms belong to Phylum _____.

12. How does their digestive tract differ from Phylum Platyhelminthes?

    _____

13. Many filarial worms cause massive swelling that is due to the blockage of _____ coming back from the extremities. The swelling is also aggravated by the victim's immune response called _____. This disfiguring disease is called _____.

14. Filial worm larvae are injected into human hosts by a _____ which is the intermediate host.

15. The segmented worms belong to Phylum _____.

16. List three major classes of segmented worms.
    a. _____
    b. _____
    c. _____

17. True or false? Earthworms are the only kind of oligochaetes.

18. Name three ways earthworms benefit the soil.

    a. _____

    b. _____

    c. _____

19. True or false? All leeches suck blood or body fluids out of their prey.

20. What class of segmented worms is mostly found in marine (ocean water) environments? _____

UNIT 8 EXAM

1. Sponges are _____-feeders because they strain out microscopic plankton from the water that circulates through them.

2. Sponge skeletons are composed of beautiful siliceous or calcareous _____ that provide rigidity.

3. The specialized cells in a sponge that generate the water current, capture, and phagocytose the microscopic plankton are called _____ cells.

4. What is the protein that serves as a flexible skeleton for sponges?

   _____

5. What canals are lined with collar cells in syconoid sponges?

   _____

6. Asexual reproduction in sponges occurs through budding and by the production of tiny tough capsules containing sponge cells called _____ that can survive adverse environmental conditions.

7. Draw a simple body outline of a syconoid sponge (using dashes to show the pores or prosopyles). Label the incurrent canal, radial canal, spongocoel, and osculum. Use an arrow to show the pattern of water flow through the sponge.

8. In the more complicated leuconoid sponge, what is lined with collar cells?

   _____

9. What important ecological service do sponges perform as they filter feed?

   _____

10. In sexual reproduction of most sponges, the sperm and egg cells are produced in:
    a. the same sponge.
    b. different male and female sponges.

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12. Cnidocytes are mostly concentrated in bands in the epidermis on which body part?
    a. Stalk b. Pedal disk c. Tentacles d. Mouth

13. True or false? All nematocysts are designed to sting. _____

14. Finger-like projections of the body wall surround the mouth and are called _____.

15. Once triggered _____ flows into the capsule from the cytoplasm of the cnidocyte causing the nematocyst to be discharged. Then _____ flows out into the prey through the tube.

16. There are two general body forms of Cnidaria: the _____ and the _____.

17. Hydra, coral, hydroid colonies, and sea anemones exhibit the _____ form while jellyfish exhibit the _____ form.

18. The digestive system of Cnidarians is composed mostly of the mouth and the _____ cavity. Solid waste must be excreted out of the _____.

19. Generally there are two cell layers that comprise the body wall: the _____ and the _____.

20. Nutrients are absorbed by which cell layer? _____

21. Name two prey items of larger sea anemones.

    a. _____

    b. _____

22. Name two very different ways coral polyps can feed themselves.

    a. _____

    b. _____

23. The Portuguese Man-of-war is a:

    a. colony of polyps.
    b. jellyfish.

24. Sperm and eggs from the gonads are released out of the _____ of separate male and female jellyfish. Fertilization happens in the open sea water and the zygote grows into a small ciliated larva called a _____.

25. A thin to thick non-cellular layer is sandwiched between the epidermis and gastrodermis and is called the _____.

26. Phylum _____ are the flatworms because they are all dorsoventrally flattened.

27. Name the three classes of flatworms (common name of the class is fine).

    a. _____

    b. _____

    c. _____

28. The tapeworms don't need a digestive tract because _____ _____.

29. Which two classes of flatworms have an incomplete digestive tract?
    a. _____
    b. _____

30. Which class of flatworm is parasitic and has a mollusk for a primary host and a vertebrate for a final host? _____

31. The tapeworms have segments called _____ that detach and leave the host with the feces when they mature and are loaded with eggs.

32. True or false? These tapeworm segments only have male or female gonads; never both.

33. Tapeworms anchor themselves to the gut lining using hooks and or suckers mounted on the head-like _____.

34. Planaria are known, after being cut in pieces, for each piece to _____ the missing parts.

35. The planaria's mouth is located on the end of a hose-like _____, which is positioned in the middle of the underside. Incoming food is brought into its _____ cavity.

36. Roundworms:
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    c. are round in cross section.
    d. all the above
    e. only a and b
    f. only a and c
    g. only b and c

37. Roundworms belong to Phylum _____.

38. How does their digestive tract differ from Phylum Platyhelminthes?

_____

39. Many filarial worms cause massive swelling that is due to the blockage of _____ coming back from the extremities.

40. This swelling due to the blockage is also aggravated by the victim's immune response called _____.

41. [The answer to #40] is caused by filarial worms is called _____ .

42. Filial worm larvae are injected into human hosts by a _____ which is the intermediate host.

43. The segmented worms belong to Phylum _____.

44. List three major classes of segmented worms.

    a. _____
    b. _____
    c. _____

45. True or false? Terrestrial earthworms are the only kind of oligochaetes.

46. True or false? Among annelids, polychaetes are the only group that has bristles.

47. Name three ways earthworms benefit the soil.

    a. _____
    b. _____
    c. _____

48. True or false? All leeches suck blood or body fluids out of their prey.

49. Which of the following annelid classes don't have bristles?

    a. Oligochaetes
    b. Polychaetes
    c. Hirudinea

50. What class of segmented worms is mostly found in marine (ocean water) environments? _____

CHAPTER 24 QUIZ

1. List six characteristics of mollusks (one is possessed by most but not all mollusks).
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
2. The _____ secretes the shell in mollusks.
3. Which class of mollusks are filter feeders? _____
4. The tongue-like rasping organ in many mollusks is the _____ .
5. Name three mollusks that don't have a shell of any kind.
   a. _____
   b. _____
   c. _____
6. In bivalves, what organ collects plankton on its surface and sweeps it toward the mouth with cilia? _____
7. In bivalves, what organ is the gateway of water into the mantle cavity? _____
8. What organ is the exit of water out of the bivalve? _____
9. By expanding and contracting their mantle, cephalopods accomplish at least two important things. They are:
   a. _____
   b. _____

10. Cephalopods have an _____ from which black fluid is expelled out the funnel to confuse and distract predators in an attempt to get away.

11. Name three types of cephalopods.

    a. _____

    b. _____

    c. _____

12. Name three types of bivalves.

    a. _____

    b. _____

    c. _____

13. Name three types of gastropods.

    a. _____

    b. _____

    c. _____

14. Slugs and land snails have two pair of tentacles. What do the upper ones have at their tips? _____

15. Slugs have a _____ which serves as an organ of respiration.

CHAPTER 25 QUIZ

1. List four major characteristics of the arthropods.
   a. _____
   b. _____
   c. _____
   d. _____

2. Arthropod means _____.

3. In the molting process, the new cuticle is produced _____the old cuticle.
   a. Underneath
   b. On the outside of

4. An extinct group of arthropods having a head, thorax, and pygidium is the _____.

5. Slow, graceful arthropods that feed on lichens, detritus, and some plants and have two pairs of legs per segment (on most segments) are the _____ and belong to class _____.

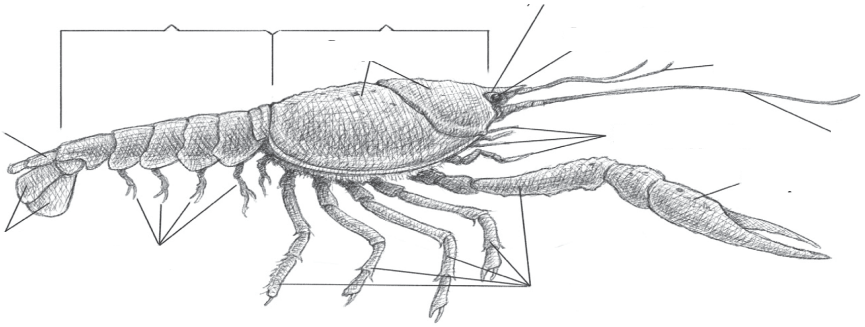
6. Fast, creepy predatory arthropods having one pair of legs per segment are the _____ and belong to class _____

7. List five general characteristics of a large group of arthropods called the crustaceans.
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

8. Sessile or stalked crustaceans called _____ are covered in calcareous plates and use their wispy legs (cirri) to filter-feed on plankton.

9. A group of crustaceans, many of which are popular among seafood lovers, that have ten walking legs, are the _____.

10. Label the crayfish with these body parts: carapace, cephalothorax, feeding appendages, walking legs (specify the chelipeds), abdomen, telson, uropods, swimmerets, antennules, antennae, and compound eye.



11. A group of crustaceans that is dorso-ventrally flattened and has seven pairs of legs is called the _____. List two extremely different habitats that these crustaceans can be found in.

    a. _____

    b. _____

12. A group of crustaceans that is laterally flattened and also has seven pairs of legs is called the _____

13. The largest group of arthropods (by far) possessing head, thorax, abdomen, _____ legs, _____ wings (if present), and _____ pair of antennae is the insects.

14. Draw and label a generalized insect with these body parts: head, thorax, and abdomen; prothoracic, mesothoracic, and metathoracic legs; forewings and hind wings; antennae, compound eyes, and mouthparts.

15. The forewings of beetles, comprising the biggest order of insects (order _____) are hardened wing covers called _____

16. Order _____are also known as the flies, have only _____ wings. In place of hind-wings are gyroscopic organs called _____ , which are needed for balance during flight.

17. Order Hemiptera are also known as the true _____ have _____ mouthparts.

18. Butterflies and moths (order _____) have microscopic scales covering their _____ and _____ mouthparts.

19. Beetles, flies, and butterflies, and wasps have _____ metamorphosis because their larval body form is drastically different from their adult body form. The _____ stage is when most of the transformation occurs.

20. True or false? Horseshoe crabs are crustaceans.

21. Arthropods called arachnids have two body regions: the cephalothorax and _____.

22. In arachnids, the cephalothorax has _____ (mouthparts), short sensory leg-like appendages called _____ , and four pairs of _____.

23. Which of the following is not an arachnid?

    a. Ticks
    b. Lice
    c. Mites
    d. Daddy longlegs (harvestmen)
    e. Scorpions
    f. Spiders

24. Spiders may use silk for:

    a. Prey capture.
    b. Prey wrapping.
    c. Making egg sacs.
    d. Lining their nests.
    e. Containing sperm.
    f. All the above.

25. Which of the following are not arthropods?

    a. Insects
    b. Arachnids
    c. Crustaceans
    d. Polychaetes
    e. Centipedes
    f. Millipedes
    g. Horseshoe crabs

CHAPTER 26 QUIZ

1. Echinoderm means _____.

2. Name the hydraulic system that all echinoderms share:

   _____

3. Which is not part of this hydraulic system?
   a. sieve plate
   b. stone canal
   c. ring canal
   d. pedicellariae
   e. radial canal
   f. lateral canal
   g. ampullae
   h. tube feet

4. Echinoderm walking appendages are called _____ and are extensions of the above system.

5. Give the common names of these echinoderm classes.
   a. Asteroidea: _____
   b. Echinoidea: _____
   c. Ophiuroidea: _____
   d. Holothuroidea: _____

6. Which of those classes is known to have the longest spines?

   _____

7. Which of those classes is mostly herbivorous on kelp and other seaweeds and uses a jaw-like apparatus called Aristotle's lantern to graze the bottom?

   _____

8. Which of those classes is usually lacking spines and can eviscerate when disturbed? _____

9. A predatory sea star can extrude its _____ outside its body and insert it into its bivalve prey.

10. Sea cucumbers collect food on their mucous-coated branching _____. Once enough is collected, it is inserted into its mouth and the food is swallowed.

UNIT 9 EXAM

1. List six characteristics of mollusks (one is possessed by most but not all mollusks).

   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____

2. The _____ secretes the shell in mollusks.

3. Which class of mollusks are filter feeders? _____

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23. Sessile or stalked crustaceans called _____ are covered in calcareous plates and use their wispy legs (cirri) to filter feed on plankton.

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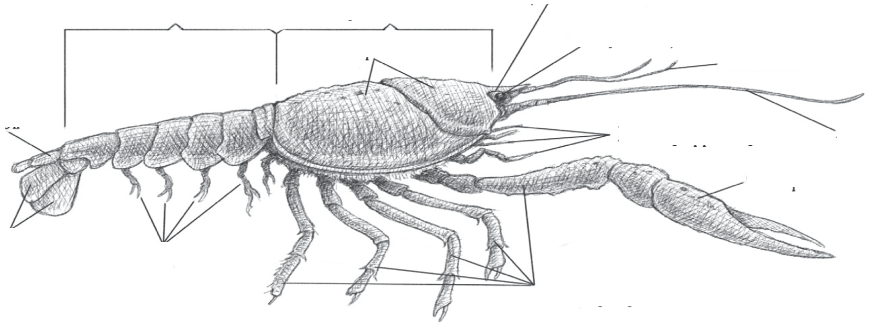

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30. The forewings of beetles are hardened wing covers called _____ . Beetles comprise the biggest order of insects, called _____ .

31. Order _____, also known as the flies, have only _____ wings. In place of hind-wings are gyroscopic organs called _____ needed for balance during flight.

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33. Butterflies and moths (order _____) have microscopic scales covering their _____ and _____ mouthparts.

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38. Which of the following is not an arachnid?

    a. Ticks
    b. Lice
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    e. Scorpions
    f. Spiders

39. Spiders may use silk for:

    a. Prey capture.
    b. Prey wrapping.
    c. Making egg sacs.
    d. Lining their nests.
    e. Containing sperm.
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40. Which of the following are not arthropods?

    a. Insects
    b. Arachnids
    c. Crustaceans
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    e. Centipedes
    f. Millipedes
    g. Horseshoe crabs

41. Echinoderm means _____.

42. Name the hydraulic system that all echinoderms share.

_____

43. Which is not part of this hydraulic system?

a. sieve plate
b. stone canal
c. ring canal
d. pedicellariae
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g. ampullae
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44. Echinoderm walking appendages are called _____ and are extensions of the above system.

45. Give the common names of these echinoderm classes.

a. Asteroidea: _____
b. Echinoidea: _____
c. Ophiuroidea: _____
d. Holothuroidea: _____

46. Which class is known to have the longest spines? _____

47. Which class is mostly herbivorous on kelp and other seaweeds and uses a jaw-like apparatus called Aristotle's lantern to graze the bottom?

_____

48. Which class is usually lacking spines and can eviscerate when disturbed? ___

_____

49. A predatory sea star can extrude its _____ outside its body and insert it into its bivalve prey.

50. Sea cucumbers collect food on their mucous-coated branching _____. Once enough is collected, it is inserted into its mouth and the food is swallowed.

CHAPTER 27 QUIZ

1. Sea squirts belong to _____.
   a. Urochordata
   b. Cephalochordata
   c. Vertebrata
2. Lancelets belong to _____.
   a. Urochordata
   b. Cephalochordata
   c. Vertebrata
3. What is unique about the mouth of lampreys and hagfish (the agnathans)?

   _____
4. What is unique about the skeleton (except the jaw) of all sharks, skates, rays chimaeras, and sawfish?_____
5. Sharks, skates, rays, etc. belong to the class _____.
6. Class Osteichthyes are the _____ fish and include (list three examples that highlight some of the extreme differences in this group).
   a. _____
   b. _____
   c. _____
7. The gill covering called the operculum is a feature of _____.
   a. Bony fish
   b. Hagfish
   c. Lampreys
   d. Chondrichthyes

8. What type of fertilization do most frogs and toads (order Anura) exhibit?
   a. internal
   b. external
9. What is the order or common name of a legless group of tropical amphibians?

   _____
10. Which amphibian order employs a spermatophore to inseminate the female resulting in internal fertilization? _____
11. What is the common name for order Testudines? _____
12. Most amphibians can breathe using both lungs and _____.
13. True or false? All frogs are oviparous (lay eggs).
14. List two main groups of order Squamata.
    a. _____
    b. _____
15. Name one feature that is unique to order Squamata (other reptiles don't have it).

    _____
16. Name one feature that is unique to order Testudines (other reptiles don't have it).

    _____
17. Name two general characteristics of *all birds* that would be considered synapomorphies by evolutionists, in that the presumed reptilian ancestor didn't have them?
    a. _____
    b. _____
18. Match the following to the correct order.

Duck _____	a. Order Passeriformes
Sparrow _____	b. Order Falconiformes
Penguin _____	c. Order Galliformes
Ostrich _____	d. Order Sphenisciformes
Turkey _____	e. Order Struthioniformes
Hawk _____	f. Order Anseriformes

19. What two chordate (vertebrate) classes are endothermic?

    a. _____

    b. _____

20. Name two general characteristics of *all mammals* that would be considered synapomorphies by evolutionists, in that the presumed reptilian ancestor didn't have them.

    a. _____

    b. _____

21. Name two general characteristics of *all reptiles* that would be considered synapomorphies by evolutionists, in that the presumed amphibian ancestor didn't have them.

    a. _____

    b. _____

22. Match the following to the correct order.

Fruit bat _____	a. Order Rodentia
Sperm whale _____	b. Order Marsupalia
Beaver _____	c. Order Chiroptera
Horse _____	d. Order Artiodactyla

Cougar _____	e. Order Perissodactyla
Deer _____	f. Order Cetacea
Kangaroo _____	g. Order Carnivora

23. Which of the following are not vertebrates?

a. lampreys and hagfish
b. cuttlefish
c. cartilage fish
d. bony fish
e. amphibians
f. reptiles
g. birds
h. mammals

CHAPTER 28 QUIZ

1. Which of the following is *not* a characteristic of Plantae?
   a. autotrophic
   b. multicellular
   c. chitin cell walls
   d. cell plate formation in cytokinesis
   e. contains chloroplasts

2. In the alternation of generations life cycle, sporophytes produce _____ within a structure called a sporangium, through a cellular division called _____.

3. What is the ploidy of the gametophyte generation?
   a. Diploid
   b. Haploid

4. In mosses, what is the generation composed of a slender leafless stalk with a knob on top? _____

5. Answer the following questions about ferns:
   a. What are the visible spots on the undersides of fern pinnae called? _____
   b. What is each spot on fern pinnae composed of? _____
   c. What structure in fern sporangia fling the spores abroad in a catapult fashion? _____

6. Which phylum of plants has a more conspicuous or dominant gametophyte generation?
   a. Flowering plants
   b. Conifers
   c. Ferns
   d. Mosses

7. Pine, spruce, fir, and cedar belong in the phylum _____.

8. Male cones of conifers are made up of many tiny microsporangia which release microgametophytes which are also known as _____.

9. Female cones of conifers have many woody _____ scales each of which bears two ovules on its upper surface.

10. In conifers, successful pollination is achieved when pollen grain(s) of the correct species lands near the _____ (opening in the integument) of the ovule within a female cone.

11. List four main differences between the two main classes of flowering plants, the dicots and the monocots.

Dicots	Monocots
_____	_____
_____	_____
_____	_____
_____	_____

12. In flowering plants pollination is simply the transfer of pollen to a receptive _____. Name two very different creatures (from different phyla) that can serve as pollinators.

    a. _____

    b. _____

13. In flowering plants sperm comes from within the _____ .

14. In flowering plants the egg is within the ovule which is within the _____.

15. Draw a simple longitudinal section of a complete flower. With a clear, neat line trace the growth of the pollen tube. Also label the pistil composed of stigma, style, ovary and ovule, and stamen composed of filament and anther.

CHAPTER 29 QUIZ

1. The study of the interactions between living creatures and their environment is called _____.

2. A naturally functioning system comprised of a living (biotic) community and its nonliving (abiotic) environment is a(n) _____

3. Name the three types of symbioses and their corresponding symbols.

   a. _____

   b. _____

   c. _____

4. Give one example of a pair of creatures in a mutualistic relationship

   _____

5. Give one example of a pair of creatures in a ectoparasitic relationship

   _____

6. In logistic growth what prevents a population from continuing to grow exponentially? _____

7. Which diagram more accurately represents the complex and variable energy flow in a community?

   a. Food web
   b. Food chain
   c. Trophic pyramid

8. Which diagram shows the relative abundance of producers, primary consumers, secondary consumers, etc.?

   a. Food web

   b. Food chain

   c. Trophic pyramid

9. What two major groups are decomposers?

   a. _____

   b. _____

10. Animals (or plants) within the same population often compete for food, water, territory, sunlight, or mates. This is called _____ competition.

11. The total lifestyle of an organism including its habitat requirements (both biotic and abiotic) and how it uses these requirements to survive and reproduce are all part of its ecological _____.

12. When animals, plants, fungi, bacteria, and protists burn glucose during cellular respiration and release (or exhale) CO_2, it is a very important part of what biogeochemical cycle? _____

13. Name one other plant process that is also part of this cycle:

    _____

14. Ammonification, nitrogen fixation, nitrification, denitrification are all parts of the _____ cycle.

15. When atmospheric nitrogen is converted into ammonia by bacteria it is called _____.

UNIT 10 EXAM

1. Sea squirts belong to _____.
   a. Urochordata
   b. Cephalochordata
   c. Vertebrata

2. Lancelets belong to _____.
   a. Urochordata
   b. Cephalochordata
   c. Vertebrata

3. What is unique about the mouth of lampreys and hagfish (the agnathans)?

   _____

4. What is unique about the skeleton (except the jaw) of all sharks, skates, rays chimaeras, and sawfish? _____

5. Sharks, skates, rays, etc. belong to the class _____.

6. Class Osteichthyes are the _____fish and include (list three examples that highlight some of the extreme differences in this group).
   a. _____
   b. _____
   c. _____

7. The gill covering called the operculum is a feature of _____.
   a. Bony fish
   b. Hagfish
   c. Lampreys
   d. Chondrichthyes

8. What type of fertilization do most frogs and toads (order Anura) exhibit?_____
   a. internal
   b. external

9. Which amphibian order employs a spermatophore to inseminate the female resulting in internal fertilization? _____

10. What is the common name for order Testudines?_____

11. Most amphibians can breathe using both lungs and_____.

12. List two main groups of order Squamata.

    a. _____

    b. _____

13. Name one feature that is unique to order Squamata (other reptiles don't have it).

    _____

14. Name one feature that is unique to order Testudines (other reptiles don't have it).

    _____

15. Name two general characteristics of *all birds* that would be considered synapomorphies by evolutionists, in that the presumed reptilian ancestor didn't have them?

    a. _____

    b. _____

16. Match the following to the correct order.

Duck _____	a. Order Passeriformes
Sparrow _____	b. Order Falconiformes
Penguin _____	c. Order Galliformes
Ostrich _____	d. Order Sphenisciformes
Turkey _____	e. Order Struthioniformes
Hawk _____	f. Order Anseriformes

17. What two chordate (vertebrate) classes are endothermic?

    a. _____

    b. _____

18. Name two general characteristics of *all mammals* that would be considered synapomorphies by evolutionists, in that the presumed reptilian ancestor didn't have them.

    a. _____

    b. _____

19. Name two general characteristics of *all reptiles* that would be considered synapomorphies by evolutionists, in that the presumed amphibian ancestor didn't have them.

    a. _____

    b. _____

20. Match the following to the correct order.

Fruit bat _____	a. Order Rodentia
Sperm whale _____	b. Order Marsupalia
Beaver _____	c. Order Chiroptera
Horse _____	d. Order Artiodactyla
Cougar _____	e. Order Perissodactyla
Deer _____	f. Order Cetacea
Kangaroo _____	g. Order Carnivora

21. Which of the following are not vertebrates?

    a. lampreys and hagfish
    b. crayfish
    c. cartilage fish
    d. bony fish
    e. amphibians
    f. reptiles
    g. birds
    h. mammals

22. Which of the following is *not* a characteristic of Plantae?

    a. autotrophic
    b. multicellular
    c. chitin cell walls
    d. cell plate formation in cytokinesis
    e. contains chloroplasts

23. In the alternation of generations life cycle, sporophytes produce _____ within a structure called a sporangium, through a cellular division called _____.

24. What is the ploidy of the gametophyte generation?

    a. Diploid
    b. Haploid

25. In mosses, what is the generation composed of a slender leafless stalk with a knob on top? _____

26. Answer the following questions about ferns:

    a. What are the visible spots on the undersides of fern pinnae called? _____
    b. What is each spot composed of? _____
    c. What structure in fern sporangia fling the spores abroad in a catapult fashion? _____

27. Which phylum of plants has a more conspicuous or dominant gametophyte generation?

    a. Flowering plants
    b. Conifers
    c. Ferns
    d. Mosses

28. Male cones of conifers are made up of many tiny microsporangia, which release microgametophytes which are also known as _____ .

29. In conifers, successful pollination is achieved when pollen grain(s) of the correct species lands near the _____ (opening in the integument) of the ovule.

30. List four main differences between the two main classes of flowering plants, the dicots and the monocots.

Dicots	Monocots
_____	_____
_____	_____
_____	_____
_____	_____

31. In flowering plants pollination is simply the transfer of pollen to a receptive _____. Name two very different creatures (from different phyla) that can serve as pollinators.

    a. _____
    b. _____

32. In flowering plants sperm comes from within the _____ .

33. In flowering plants the egg is within the ovule which is within the _____.

34. Draw a simple longitudinal section of a complete flower. With a clear, neat line trace the growth of the pollen tube. Also label the pistil composed of stigma, style, ovary and ovule, and stamen composed of filament and anther.

35. The study of the interactions between living creatures and their environment is called _____.

36. A naturally functioning system comprised of a living (biotic) community and its nonliving (abiotic) environment is a(n) _____ .

37. Name the three types of symbioses and their corresponding symbols.

    a. _____

    b. _____

    c. _____

38. Give one example of a pair of creatures in a mutualistic relationship.

    _____

39. In logistic growth what prevents a population from continuing to grow exponentially? _____

40. Which diagram more accurately represents the complex and variable energy flow in a community?
    a. Food web
    b. Food chain
    c. Trophic pyramid

41. Which diagram shows the relative abundance of producers, primary consumers, secondary consumers, etc.?
    a. Food web
    b. Food chain
    c. Trophic pyramid

42. What two major groups are decomposers?
    a. _____
    b. _____

43. Animals (or plants) within the same population often compete for food, water, territory, sunlight, or mates. This is called _____ competition.

44. The total lifestyle of an organism including its habitat requirements (both biotic and abiotic) and how it uses these requirements to survive and reproduce are all part of its ecological _____.

45. a. When animals, plants, fungi, bacteria, and protists burn glucose during cellular respiration and release (or exhale) CO_2, it is a very important part of what biogeochemical cycle?_____
    b. Name one other plant process that is also part of this cycle.
    _____

46. Ammonification, nitrogen fixation, nitrification, denitrification are all parts of the _____ cycle.

47. When atmospheric nitrogen is converted into ammonia by bacteria it is called _____.

COMPREHENSIVE EXAM FOR PART 2

1. What are the seven ranks (taxa) in the classification hierarchy below domain that Linnaeus developed but was added to? Go from general to specific.

   a. Domain

   b. _____

   c. _____

   d. _____

   e. _____

   f. _____

   g. _____

   h. _____

2. Creationists object to evolution when it involves the _____.

   a. Minor modification of a plesiomorphy
   b. Addition of an apomorphy.

3. From an evolutionary perspective, butterfly wings and bat wings would be considered _____structures because they didn't evolve from the same feature in their common ancestor.

4. The two major groups of prokaryotes are the _____ and the_____.

5. The viral _____ is a protein container for _____ or _____.

6. Most species of bacteria _____.

   a. Are disease-causing (pathogenic).

   b. Do not cause disease but aren't beneficial to the environment.

   c. Perform many beneficial ecological functions.

7. What lives in the tissues of corals that enable them to live in such nutrient poor water? _____
   What do these microscopic tenants produce? _____
   How do they produce it? _____

8. What are the technical names of these seaweed groups?
   a. Brown Algae: _____
   b. Red Algae:_____
   c. Green Algae:_____

9. _____ is a polysaccharide extracted from certain types of red algae and is used as a gel-like material for bacteria to grow on in Petri dishes.

10. Many kinds of brown algae often have an organ called a _____, which is used for anchoring them to the sea floor.

11. Protozoans that get around with and obtain food with cilia are classified in the group called _____.

12. The common feature of all amebas is the _____ which is an extension of the cell used for locomotion and feeding.

13. Many freshwater protozoa have an osmotic problem because they live in a hypotonic environment. What organelle do they possess that helps them cope with the constant influx of water? _____

14. Water molds differ from Fungi in two significant ways.
   a. They have a cell wall made of _____ rather than chitin.
   b. They are _____ (ploidy) for most of their life cycle.

15. List six characteristics of Fungi other than eukaryotic, heterotrophic, and multicellular.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

    f. _____

16. The zygomycete fungi reproduce asexually from spores that have been released from knob-like spore containers called _____

17. Ascomycete fungi, during the sexual phase form fruiting bodies called _____. The concave (usually) spore-producing surface called the *hymenium* is formed by one layer of densely packed parallel _____ each containing eight _____.

18. Lichens are formed by a mutualistic relationship between _____ and _____.

19. List five general characteristics of all animals.

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

20. What is the symmetry where the animal can only be divided into two mirror image halves by only one plane? _____

21. Sponges are _____-feeders because they strain out microscopic plankton from the water that circulates through them.

22. The specialized cells in a sponge that generate the water current, capture, and phagocytose the microscopic plankton are called _____ cells.

23. What important ecological service do sponges perform as they filter feed?

    _____

24. The hallmark characteristic of phylum Cnidaria are the possession of cells called cnidocytes which contain stinging organelles called

    _____ .

25. Once triggered _____ flows into the capsule from the cytoplasm of the cnidocyte, causing the nematocyst to be discharged. Then _____ flows out into the prey through the tube.

26. There are two general body forms of Cnidaria: the _____ and the _____.

27. Phylum _____ are the flatworms because they are all dorsoventrally flattened.

28. Roundworms...

    a. have tapered ends.
    b. have a complete digestive system.
    c. are round in cross section.
    d. all the above
    e. only a and b
    f. only a and c
    g. only b and c

29. Name three ways earthworms benefit the soil.

    a. _____

    b. _____

    c. _____

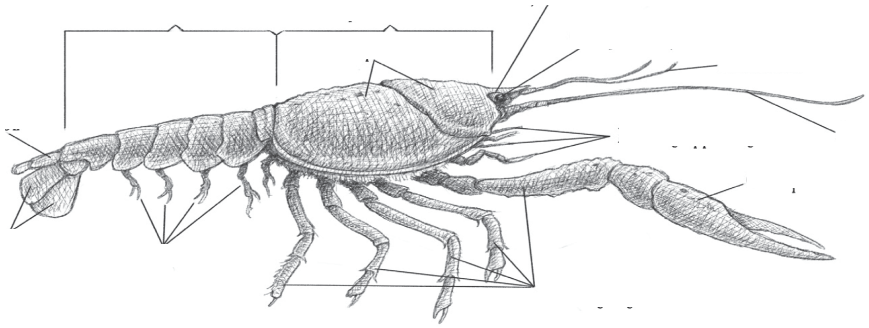
30. List six characteristics of mollusks (one is possessed by most but not all mollusks).
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____

31. Which class of mollusks are filter feeders? _____

32. By expanding and contracting their mantle, cephalopods accomplish at least two important things. They are:
    a. _____
    b. _____

33. List four major characteristics of the arthropods.
    a. _____
    b. _____
    c. _____
    d. _____

34. Label the crayfish with these body parts: carapace, cephalothorax, feeding appendages, walking legs (specify the chelipeds), abdomen, telson, uropods, swimmerets, antennules, antennae, and compound eye.



35. Draw and label a generalized insect with these body parts: head, thorax, and abdomen; prothoracic, mesothoracic, and metathoracic legs; forewings and hind wings; antennae, compound eyes, and mouthparts.

36. In arachnids, the cephalothorax has _____ (mouthparts), short sensory leg-like appendages called _____ and four pairs of _____.

37. Which is not part of the water vascular system in Echinoderms?

    a. sieve plate
    b. stone canal
    c. ring canal
    d. pedicellariae
    e. radial canal
    f. lateral canal
    g. ampullae
    h. tube feet

38. Give the common names of these echinoderm classes.

    a. Asteroidea: _____
    b. Echinoidea: _____
    c. Ophiuroidea: _____
    d. Holothuroidea: _____

39. A predatory sea star can extrude its_____ outside its body and insert it into its bivalve prey.

40. What is unique about the skeleton (except the jaw) of fish of Class Chondrichthyes? _____

41. Which amphibian order employs a spermatophore to inseminate the female resulting in internal fertilization? _____

42. What two chordate (vertebrate) classes are endothermic?

    a. _____

    b. _____

43. Name one feature that is unique to order Squamata (other reptiles don't have it).

    _____

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    a. autotrophic
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    a. What are the visible spots on the undersides of the fern pinnae called?

       _____

    b. What is each spot on fern pinnae composed of? _____

    c. What structure in fern sporangia fling the spores abroad in a catapult fashion? _____

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    c. Trophic pyramid

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    b. Name one other plant process that is also part of this cycle.
    _____