



Chapter 1 - Biology: The Study of Life

Reading Guide

Section 1.1 What is Biology?

1. Define Biology.

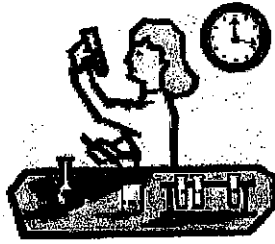
2. Explain the statement: "Living things do not exist in isolation."
3. What does "Diversity of Life" mean?
4. What are the two things that biologists do (blue headings). Give an example of each.
5. List the 4 major characteristics of life.
 - 1)
 - 2)
 - 3)
 - 4)
6. What is a species?

7. What is the difference between the terms GROWTH and DEVELOPMENT?

8. Explain the difference between stimulus and response. Give an example.

9. Why do organisms need to adapt? Give an example of an adaptation.

10. When organisms adapt to a new environment, the changes can result in



Section 1.2 - The Methods of Biology

1. The steps that biologists use to gather information and answer questions are called
_____.
2. How did the brown tree snakes get to the island of Guam?
3. Was there anything good about the introduction of this snake to Guam?
4. What did biologists hypothesize had caused the rapid decline of the birds on Guam?
5. Define hypothesis.
6. What has to happen before a hypothesis can be made?
7. How do scientists test their hypothesis?
8. Why does an experiment need a control group?

9. Explain the term independent variable.

10. Explain the term dependent variable.

11. If I were to set up an experiment to test how the number of hours of light affects the height of a bean plant, which factor (light or height of plant) would be the

Independent variable _____

Dependent variable _____

12. Give an example of an experiment that would not have a control.

13. List the common tools of a biologist.

14. Information gained from an experiment is called _____.

15. Give some examples of numerical data.

16. What is verbal data?

17. What happens if the experiment shows the hypothesis is true?

18. What happens if the experiment shows the hypothesis is not true?

19. List the steps of the Scientific Method as stated in Figure 1.14, page 17.

A)

B)

C)

D)

E)

F)

G)



Section 1.3 - The Nature of Biology

1. What is Quantitative information? Give some examples.

2. What is the International System of measurement?

3. What are the major units of measurement in the SI system?

- 1) length _____
- 2) mass _____
- 3) volume _____
- 4) time _____
- 5) temperature _____

4. What is Qualitative information? Give an example.

5. What are ethics?

6. How does ethics relate to biology?

7. What is technology?



Chapter 6 - The Chemistry of Life

Reading Guide

Section 6.1 Atoms and Their Interactions

1. What is an element? Give three examples.

2. 96% of the human body is made up of four elements. List these elements and write The symbol for the element next to its name.
 - 1)
 - 2)
 - 3)
 - 4)
3. What is a trace element? Give three examples.
4. Define atom.
5. The atom is made up of three particles. List these particles and their charge.
 - 1)
 - 2)
 - 3)
6. Which of the three particles are found in the nucleus of the atom?

7. Where are electrons found?
8. How many electrons can be in the first energy level?
9. How many electrons can be in the second energy level?
10. How many electrons can be in the third energy level?
12. Atoms have no net charge, therefore _____ = _____.
13. In the space below , draw the diagram of the hydrogen atom and the oxygen atom
Pictured in Figure 6.2 page 143.
14. Atoms of the same element, must have the same number of _____.
15. The number of _____ of the same element can differ.
16. Atoms of the same element that have different numbers of neutrons are called
_____.
17. Explain the difference between Carbon-12 and Carbon-14.
18. What is a compound?

19. Why do elements form bonds with other elements?

20. What is a covalent bond?

21. Reproduce the diagram of the water molecule pictured in Figure 6.6B and circle the shared electrons.

22. What is an ion?

23. What is an ionic bond?

24. Reproduce the diagram in Figure 6.7 of the formation of NaCl from the atoms Na and Cl.

25. Define metabolism.

26. In a chemical reaction, substances that undergo chemical reactions are called

_____.
substances that are formed by chemical reactions are _____.

27. Write the chemical equation for the formation of water, pictured in Figure 6.8, page 148.

28. Equations must always be _____. All atoms of the reactants must be equal to the atoms of the products.

29. What is a mixture? Give an example.

30. What is a solution? Give an example.

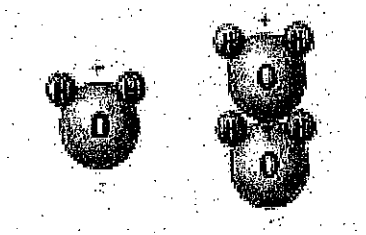
31. Why are solutions important in living things?

32. What is pH?

33. A solution with a $\text{pH} < 7$ is a _____. An example is _____.

34. A solution with a $\text{pH} = 7$ is _____. An example is _____.

35. A solution with a $\text{pH} > 7$ is called a _____. An example is _____.



Section 6.2 - Water and Diffusion

1. The most important compound in living organisms is _____.
2. What is a polar molecule?
3. Water molecules are attracted to other water molecules. The bonds formed between
Water molecules are _____.
3. Why is water a polar molecule?
4. List four properties of water that are the result of water's polarity?
 - 1)
 - 2)
 - 3)
 - 4)
5. Draw a water molecule and show its positive and negative ends. (Figure 6.12, page 153)
6. Explain Brownian movement?

7. What is diffusion? Give an example.

8. What are the three factors that affect diffusion?

1)

2)

3)

9. Diffusion will continue until there is no further change in concentration or
has been reached.

10. What is a concentration gradient? What are concentration gradients important in
living systems?



Section 6.3 - Life Substances

1. A carbon atom can form _____ covalent bonds.
2. A carbon atom can form _____ bonds, _____ bonds,
and _____ bonds.
3. How can carbon make so many different compounds?
4. Compounds that have the same formula, but different structures are called _____.
Glucose and fructose are examples.
5. Organic compounds contain the element _____.
6. Large organic compounds are called _____.
7. Simple molecules called monomers can join together to form larger _____.
8. When molecules join together by losing a molecule of water between them, this reaction is called _____.
9. Polymers can be broken into smaller subunits by adding a water molecule; this reaction is called _____.



10. The four biomolecules that make up living organisms are

1)

2)

3)

4)

11. Define carbohydrate.

12. What is a monosaccharide? Give an example of a monosaccharide.

13. What is a disaccharide? Give an example.

14. What is a polysaccharide?

15. The three important polysaccharides are? Their function is:

1)

2)

3)

16. What is a lipid? Give an example.

17. What subunits combine to make a lipid?

18. A fatty acid with all single bonds between the carbons is _____.

19. A fatty acid with a double bond present is _____.

20. A fatty acid with more than one double bond is _____.

21. Draw and label the diagram Figure 6.20, page 160.

22. Animal fats are _____ fats.

23. Plant fats are _____ fats.

24. Lipids are important because:

25. What is a protein?

26. Draw the basic structure of an amino acid. Figure 6.21A, page 161.

27. The bond that forms between amino acids in the formation of proteins is called
a _____ bond.

28. Proteins are important because:

29. What is an enzyme?

30. What can affect the functioning of an enzyme?

31. What is the active site of an enzyme?

32. What is a nucleic acid and what are the subunits that make up nucleic acids?

33. Draw and label the three groups that make up a nucleotide, Figure 6.24, page 163.

34. List the two types of nucleic acids and briefly describe their function.

1)

2)



Chapter 7 - A View of the Cell

Reading Guide

Section 7.1 The Discovery of Cells

1. Who invented the first light microscope in the 1600's?
2. What is a compound light microscope?
3. What is the maximum magnification of a compound light microscope?
4. Who was Robert Hooke?
5. What did Schleiden and Schwann do?
6. The cell theory is made up of three main ideas. List the three statements.
 - 1)
 - 2)
 - 3)
7. How is an electron microscope different from a light microscope?
9. The two types of electron microscopes are SEM and TEM. How do they differ?

10. Define: Organelle

11. What is a prokaryote? Give an example.

12. What is a eukaryote? Give an example.

13. What did Robert Brown and Rudolf Virchow do?



Section 7.2 The Plasma Membrane

1. What is the job of the plasma membrane?
2. What is homeostasis?
3. What is selective permeability? Give an example.
4. What is a phospholipid?
5. Reproduce and label the diagram of a phospholipid molecule in Figure 7.4, page 177.
6. Explain why the phospholipids form a bilayer.

7. Reproduce the drawing of the plasma membrane, Figure 7.4, page 177.

8. Why is the model of the plasma membrane called a fluid mosaic model?

9. What is the function of cholesterol in the plasma membrane?

10. What is the function of the transport proteins in the plasma membrane?



Section 7.3 Eukaryotic Cell Structure

1. What is a cell wall?

2. Which groups of organisms have cell walls?

1)

2)

3)

4)

3. Plant cell walls are made of _____.

4. Reproduce and label the drawing of the cell wall found in the circle, Figure 7.7, page 180.

5. What is the function of the nucleus in the cell?

6. Reproduce and label the drawing of the nucleus, Figure 7.8, page 181

7. What is the function of chromatin?

8. What is the function of the nucleolus?

9. What are ribosomes and where are they found?

10. What is cytoplasm?

11. What is the function of the nuclear envelope?

12. What organelles are involved in assembly, transport, and storage within cells.

1)

2)

3)

13. What is the advantage of folding in the endoplasmic reticulum?

14. What is the difference between rough and smooth endoplasmic reticulum?

15. What is produced in the rough endoplasmic reticulum?

16. What is produced in the smooth endoplasmic reticulum?

17. Reproduce the diagram of the endoplasmic reticulum, Figure 7.9, page 182.

18. What happens to proteins that are transferred to the Golgi Apparatus?

19. Reproduce the diagram of the Golgi Apparatus, Figure 7.10, page 183.

20. What are vacuoles?

21. What are lysosomes and what do they do?

22. Name the two organelles that are involved in energy transformations.

23. What type of cells contain chloroplasts?

24. What is the function of chloroplasts?

25. Reproduce and label the circular diagram of the chloroplast, Figure 7.12, page 184.

26. What is grana?

27. What is stroma?

28. What can be found in plastids?

29. What is chlorophyll?

30. What happens to the chemical energy stored in the bonds of sugar molecules by the Chloroplast?

31. What is a mitochondria?

32. Which type of cells have mitochondria?

33. Why are there folded membranes in both the chloroplast and mitochondria?

34. Reproduce and label the diagram of a mitochondria, Figure 7.13, page 185.

35. What are the two main parts of the cytoskeleton and how do they differ?

36. What types of cells contain centrioles?

37. What do centrioles do?

38. What is the difference between cilia and flagella?



Chapter 8 Cellular Transport and the Cell Cycle

Reading Guide

Section 8.1 Cellular Transport

1. Define osmosis.

2. What is selective permeability?

3. What is a concentration gradient?

4. Define isotonic solution.

5. Look at Figure 8.2. What happens to cells in an isotonic solution?

6. What is a hypotonic solution?

7. According to Figure 8.3, what happens to a red blood cell in a hypotonic solution?

What happens to a plant cell in a hypotonic solution?

8. What is a hypertonic solutions?

9. Looking at Figure 8.4, what happens to a red blood cell in a hypertonic solution?

What happens to a plant cell in a hypertonic solution?

10. Transport requiring NO energy is called _____.

11. Facilitated diffusion using channel proteins or carrier proteins is considered passive transport because...

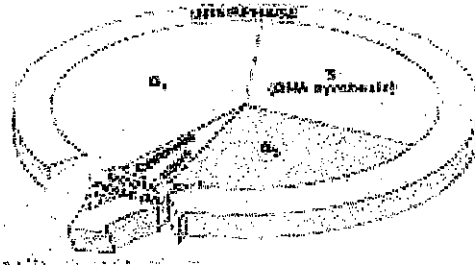
12. What is active transport? Give an example.

13. Reproduce and label the diagrams of passive transport, Figure 8.5, A,B,C, page 198 and active transport, Figure 8.6, page 199. Pay particular attention to the arrow showing the direction of the concentration gradient.

14. How do cells transport large particles?

15. Differentiate between endo and exocytosis?

16. Are endocytosis and exocytosis, active or passive transport?



Section 8.2 Cell Growth and Reproduction

1. What is the size range for most cells?
2. What are the three limits to cell size?
 - 1)
 - 2)
 - 3)
3. Which increases faster, volume or surface area?
4. If the size of the cell doubles, how many times more nutrients would the cell require?
5. What happens when a cell gets to its optimum size?
6. What is cell division?
7. When a cell divides, the two new cells are _____ to the parent cell.

8. The two reasons that cells need to divide are:

1)

2)

9. What is a chromosome?

10. Explain the relationship between chromatin, chromosome, and DNA?

11. What is a histone?

12. What is a nucleosome?

13. Reproduce and label the Diagram of the Cell Cycle, Figure 8.11, page 206.

14. What happens during interphase?

15. Mitosis, the division of the nucleus, is divided into four parts. Draw and label each phase of mitosis, Figure 8.13 and state what is happening during that phase.

Prophase

Metaphase

Anaphase

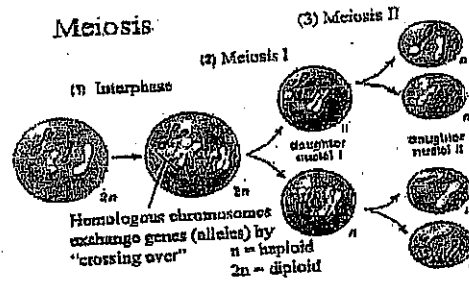
Telophase

16. The division of the cytoplasm is called _____.

17. How does cytokinesis differ in plant cells and animal cells.

18. In a multicellular organism, cells work together to form _____.
that organize to form _____,
which work together to form _____, which
work together for the survival of the _____.

10.2 Meiosis



1. What is a diploid cell? What symbol is used to represent it?

2. What is a haploid cell? What symbol is used to represent it?

3. Human haploid number is _____.
Human diploid number is _____.

4. What are homologous chromosomes? Draw and label a pair of homologous chromosomes using Figure 10.10.

5. Why is meiosis important to living things?

6. What kind of cell does meiosis start with?
7. What kind of cells does meiosis produce?
8. What happens during interphase of meiosis?
9. Meiosis is divided into two complete divisions of the nucleus. Draw and label each phase of meiosis using Figure 10.12. State what happens during each phase.

Prophase I

Metaphase I

Anaphase I

Telophase I

Prophase II

Metaphase II

Anaphase II

Telophase II

-
10. Crossing over occurs during _____. What are the results of crossing over?
11. Draw, label and explain Figure 10.13

12. Define genetic recombination.

13. Define nondisjunction.

14. What human condition is the result of a trisomy, an extra chromosome #21?

15. Name one example of a human monosomy, a missing chromosome.



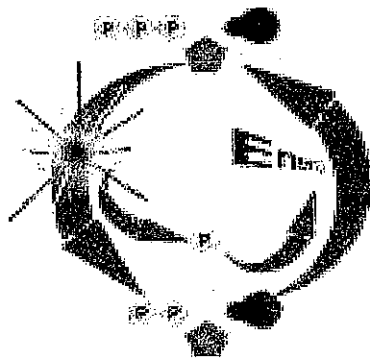
Section 8.3 Control of the Cell Cycle

- 1. What controls the cell cycle?**

- 2. What happens when a cell loses control of the cell cycle?**
- 3. What can cause uncontrolled division of cells?**
- 4. What does a gene do?**
- 5. How are genes and cancer related?**
- 5. What happens when a metastasis occurs?**
- 6. The most common types of cancer in the United States are:**

7. Name some environmental factors that could cause cancer.

8. Explain some ways in which diet relates to cancer prevention.



Chapter 9 Energy in a Cell Reading Guide

Section 9.1 The Need for Energy

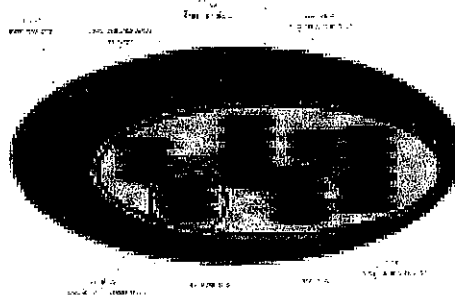
- 1. How do plants obtain energy?**

- 2. How do animals obtain energy?**

- 3. List 5 ways in which organisms use energy?**
 - 1)
 - 2)
 - 3)
 - 4)
 - 5)

- 4. What is the significance of ATP (adenosine triphosphate)?**

5. What is the charge of a phosphate group?
6. How many phosphate groups are in AMP?
7. How many phosphate groups are in ADP?
6. How many phosphate groups are in ATP?
7. Why do phosphate groups have to be forced onto AMP and ADP?
8. Where is energy stored in ATP?
9. How is energy released from ATP?
10. Why is the formation and breakdown of ATP called a cycle?
11. Reproduce the ADP > ATP cycle, Figure 9.2, page 223.
12. How is ATP like a flashlight battery?



Section 9.2 Photosynthesis: Trapping the Sun's Energy

1. Define photosynthesis.

2. What are the two phases of photosynthesis?

1)

2)

3. Write the general equation for photosynthesis.

4. What does it mean to be light dependent reactions?

5. Where do the light dependent reaction occur?

6. What are pigments?

7. What is a photosystem?

8. What is the most common pigment in a photosystem?

9. Why do leaves look green?

9. Energy from sunlight is transferred from a chlorophyll molecule to _____.

10. Next the highly energized electrons are passed to the _____
located in the thylakoid membrane.

11. As the highly energized electrons pass through the electron transport chain,
the electrons lose _____.

12. This "lost" energy is used to make _____.

13. The electrons then go to a second _____.

14. The electrons get _____.

15. The electrons pass through a second electron transport chain and are carried to
the stroma by the electron carrier molecule _____.

16. NADP^+ accepts 2 electrons and becomes _____.

17. NADPH _____ energy.

18. What is photolysis?

19. What happens to the oxygen released through photolysis?

20. What happens to the hydrogen released through photolysis?

21. Electrons are also released during photolysis. What happens to the electrons?

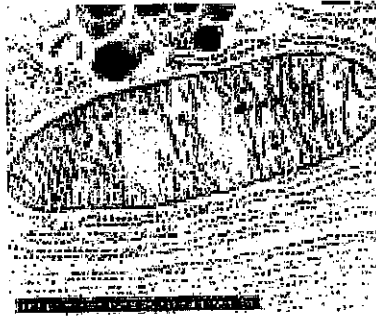
22. Why is the second phase of photosynthesis, the Calvin Cycle, called light independent?

23. Where does the Calvin Cycle take place?

24. _____ and _____ produced in the light dependent reactions provide the energy to run the Calvin Cycle.

25. Why is the Calvin cycle called a cycle?

26. In carbon fixation _____ is added to _____
to form a six carbon sugar.
27. This sugar breaks down into 2 molecules of _____, a three
carbon compound.
28. Three rounds of the Calvin cycle, each fixing 1 molecule of CO₂, results in _____ PGAL
molecules.
29. _____ of these PGAL recycles in _____, the sixth PGAL is used to make
_____.



Section 9.3 Getting Energy to Make ATP

1. The three stages of cellular respiration are

1)

2)

3)

2. The first stage _____ requires _____,
meaning it is anaerobic.

3. The last two stages, the Citric Acid cycle and electron transport are _____,
meaning, they require oxygen.

4. In glycolysis, _____, a 6-carbon compound is broken down into
Two 3-carbon compounds, called

_____.

5. Where does glycolysis occur?

6. According to Figure 9.8, what are the products of glycolysis?

1)

2)

3)

4)

7. If oxygen is available, the pyruvate formed during glycolysis will move into the _____.
8. Before the citric acid cycle can begin the pyruvate loses a _____ and combines with coenzyme A to become _____.
9. According to Figure 9.10, summarize the citric acid or Krebs's cycle.
10. High energy electrons are carried by _____ and _____ to the electron transport system.
11. Where is the electron transport system located?
12. What is the function of NADH and FADH₂ in the electron transport system?
13. What happens to the electrons delivered to the electron transport system?
14. What provides the energy for the production of ATP in the electron transport system?

15. What is the role of oxygen in the electron transport system?

16. How many ATP are produced from 1 molecule of glucose in the electron transport system?

17. What is the process cells use to produce ATP if oxygen is not available, for example, when you are out of breath from heavy exercise?

18. What are the two types of fermentation?

1)

2)

19. What type of fermentation occurs in fatigued muscle cells?

20. What type of fermentation is used by yeast and some bacteria?

21. What is produced in alcoholic fermentation?

22. How is alcoholic fermentation important to humans?

23. According to the table in Figure 9.12, page 235, how many ATP are formed as a result of:

1) glycolysis and lactic acid fermentation _____

2) glycolysis and alcoholic fermentation _____

3) glycolysis and cellular respiration _____

24. Reproduce the table 9.1, page 237 Comparison of Photosynthesis and Cellular Respiration.

Reading Guide : Chapter 10.1



Mendel's Laws of Heredity

1. Gregor Mendel was the first person to do what? How
2. What is a gamete?
3. Why did Mendel choose garden peas to experiment on?
4. What happens to gametes during fertilization?
5. After fertilization, the resulting cell is called a _____.
6. Are there male and female pea plants? Explain.
7. What is cross-pollination?
8. How did Mendel cross-pollinate his pea plants?
9. How did Mendel control his experiments?
10. What does true-breeding mean?

11. What did Mendel cross in his first experiment?

12. What did the first generation of plant offspring look like?

13. What is a hybrid?

14. What did Mendel do next?

15. How many tall and how many short plants grew in the second generation?

16. Fill in the table to help you understand what P, F₁, and F₂ mean:

	<i>Definition</i>	<i>Example in Mendel's peas</i>	<i>Example in your family</i>
P ₁			
F ₁			
F ₂			

17. List the seven garden pea traits that Mendel studied.

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)

18. What is a monohybrid cross?

19. What did Mendel observe for every single monohybrid cross that he did?

20. What did Mendel call the "unit factors"? What do we call them now?

20. If an organism has two alleles, where does each come from?

21. Define dominant.

22. Define recessive.

23. In Mendel's experiment with the tall and short pea plants, which was dominant and which was recessive?

24. In the cross between tall and short, why was the first generation all tall?

25. What is Mendel's Law of Segregation?

26. Reproduce the drawing in Figure 10.5.
What did Mendel conclude from this cross?

27. What is the difference between a phenotype and a genotype?

28. Explain why tall plants from the F₁ generation look exactly like the same as the true breeding plants, but can produce a different-looking offspring?

29. After reading "Phenotypes and Genotypes" fill in the table:

	Phenotype (short or tall)	Genotype (TT, Tt, or tt)	Homozygous	Heterozygous
Tall P ₁ plant				
Short P ₁ plant				
Tall F ₁ plant				
Tall F ₂ plant				
Short F ₂ plant				

30. What is a dihybrid cross?

31. In Mendel's dihybrid cross, what were the two traits that he tested?

32. What did the F1 plants look like, and what did the F2 plants look like?

33. Why were there no wrinkled yellow, wrinkled green, or smooth green seeds in the F1 generation?

34. What happened in the second generation?

35. Why did Mendel decide that the genes for different traits were inherited independently of each other?

38

Use a Punnett square for Mendel's second dihybrid cross, two heterozygous round yellow pea plants ($RrYy$), to determine the genotypes and the phenotypes of the offspring.

39

Use a Punnett square to determine the genotypes and the phenotypes of the following hypothetical dihybrid cross: a homozygous wrinkled green pea plant ($rryy$) and a heterozygous for round but homozygous for yellow pea plant ($RrYY$)



Chapter 11 Reading Guide DNA and Genes

Section 11.1 DNA: The Molecule of Heredity

What is DNA?

1. How does DNA achieve control in a cell or organism?

2. List 3 examples of body parts that contain protein:

3. What do enzymes do?

DNA as the genetic material

4. In the 1950's scientists believed _____ was the genetic material.

5. In 1952 _____ and _____ proved that DNA was the genetic material.

6. Explain Hershey and Chase's experiment by stating what they did in their experiment:

The Structure of Nucleotides

7. DNA is a polymer made of small sub units called _____.
8. The 3 parts of a nucleotide are: _____,
and _____.
9. Look at Figure 11.1 on pg. 282 and draw the example of the nucleotide shown in part C of the figure.

10. Name the four nitrogen bases found in DNA:

1)

2)

3)

4)

11. What is the backbone of the DNA chain/molecule composed of?

12. The amount of _____ is always equal to the amount of _____ and the amount of _____ is always equal to the amount of _____ in a DNA molecule.

The Structure of DNA

13. Name the two scientists in 1953 who proposed the structure of DNA:

14. Describe the structure of the DNA molecule:

15. What type of bond holds the two sides of the DNA molecule together?

16. Which nitrogen bases always pair together? _____ and _____
and _____.

17. How did Watson and Crick describe the shape of DNA?

18. DNA is referred to as a _____ because of its shape.

The importance of nucleotide sequences

19. The differences between different organisms results from what?

20. What spells out the genetic information for each organism?

21. If two organisms are closely related what does this mean about their DNA?

22. List 3 ways scientists can use nucleotide sequences:

1)

2)

3)

Replication of DNA

23. What happens to the chromosomes during DNA replication?

24. Reproduce/draw Figure 11.4 on pg. 285 and explain what is happening.

How DNA replicates

25. Based on the reading and Figure 11.5 on pg. 285 explain what happens step by step when DNA replicates.

26. What is the final result of DNA replication?

Chapter 11 Reading Guide DNA and Genes



11.2 From DNA to Protein

Genes and Proteins

1. What do proteins fold into?

2. What do enzymes do?

3. What do the sequences of nucleotides in each gene contain?

RNA

4. What is RNA?

5. In what ways does the RNA structure differ from the DNA structure?

A.

B.

C.

6. What is the role of RNA in a cell?

7. What are the three types of that help build proteins and what do they do?

A.

B.

C.

Refer to the picture in figure 11.6.

8. What does a typical RNA molecule consist of?

9. What is the sugar in RNA?

10. What nitrogenous base replaces thymine for RNA and what does it pair with?

Transcription

11. How does the information in DNA move to the ribosomes in the cytoplasm?

12. What is transcription?

13. What is the difference between transcription and DNA replication?

14. Explain the three steps from the figure 11.7.

A.

B.

C.

15. Draw the figure 11.7

RNA Processing

16. Genes usually contain many long noncoding nucleotide sequences, called _____, that are scattered among the coding sequences.

17. Regions that contain information are called _____ because they are expressed.

The genetic code

18. The nucleotide sequence transcribed from _____ to a strand of _____ acts as a genetic message, the complete information for the building of a _____.

19. There are _____ common amino acids. mRNA only contains _____ types of bases.

20. What is a codon?

21. What is the stop codon? _____

22. What is the start codon? _____

23. Why is it said that the genetic code is universal?

Translation: From mRNA to Protein

24. What is translation?

25. Where does translation take place?

26. What is the role of transfer RNA?

27. Draw figure 11.8 and label it.

28. How does the tRNA molecule carrying its amino acid recognize which codon to attach to?

29. Look at figure 11.9 to answer the following:

As _____ begins, a _____ attaches to the mRNA strand. Molecules of _____, each carrying a specific amino acid, approach the ribosome.

The codon _____ signals the start of _____ synthesis. The tRNA molecule carrying methionine attaches to the ribosome and _____ strand.

A new _____ molecule carrying an amino acid attaches to the ribosome and mRNA strand next to the _____ tRNA molecule. The amino acids on the tRNA molecules join by _____.

After the peptide bond is formed, the _____ slides along the mRNA to the next _____. The tRNA molecule no longer carrying an amino acid is released. A new _____ molecule carrying an amino acid can attach to the ribosome and mRNA strand.

A _____ of _____ acids is formed until a _____ codon is reached on the _____ strand.

Chapter 11 Reading Guide

DNA and Genes



11.3 Genetic Changes

Mutations

1. Organisms have _____ in many ways to protect their _____ from _____.
2. What is a mutation?
3. What are four causes of mutations?
 - 1)
 - 2)
 - 3)
 - 4)
4. How do mutations affect the reproductive cells of an organism?
5. How can a mutation have a positive effect?
6. What happens if powerful radiation hits the DNA of a nonreproductive cell?

7. What happens when mutations of DNA in body cells affect genes that control cell division?

8. What can cancer result from?

9. What are point mutations?

10. Reproduce the example of a point mutation shown in figure 11.11A, page 298..

11. What are frameshift mutations?

12. Reproduce the example of a frameshift mutation shown in figure 11.11B, page 298.

Chromosomal Alterations

13. What are chromosomal mutations?

14. Can chromosomal mutations be passed on to the next generation?

15. List and explain the four types of chromosomal mutations shown in figure 11.12.

1)

2)

3)

4)

16. Reproduce the drawings of the four types of chromosomal mutations, figure 11.12, page 300.

Causes of Mutations

15. What is a spontaneous mutation?

16. What is a mutagen?

17. What are some sources mutagens in and organism's environment?

