

Name: _____

AP BIOLOGY SUMMER REVIEW

Your summer work is due as soon as you enter class on Monday, August 13th and will count as a test grade! It must be typed and printed or printed and handwritten. You may print two pages per sheet and front and back to conserve paper.

1. Fill in the table below distinguishing among proteins, carbohydrates, lipids, and nucleic acids.

Macromolecule	Elements	Shape	Monomer(s)	Used for/Found in
Protein				

2. Glucose is produced in the _____ during _____. Excess glucose (not used for energy) in a plant is stored as _____. In people it is stored as _____.

3a. Identify how enzymes control chemical reactions in the body by filling in the blanks.

Enzymes are _____, comprised of unique sequences of _____. They are very _____ specific because the active site has to match the shape of the _____ (s) for each specific enzyme. Because enzymes provide a meeting place for reactants, they _____ energy, as well as act as a _____ (speeds up chemical reactions). Enzymes do NOT provide _____, and can be reused over and over again.

Factors that affect enzymes are _____, _____, & concentration of substrate. All enzymes have their own unique optimal environments where they will function the best. A pH of 5 is _____, so in a human body the enzyme would be located in the _____. Enzymes in the human body work best at a temperature of _____ degrees Celsius.

3b. Draw & label a enzyme graph that has an optimal pH of 5.

4a. *Predict the movement of water and other molecules across a selectively permeable membrane by filling in the blanks..*

When particles travel through a cell membrane from an area of higher concentration to an area of lower concentration it is called _____. Particles will diffuse until _____ is reached (concentration is equal inside and outside of the cell).

When water diffuses through a membrane it is called _____. A cell placed in a _____ solution will get larger as water rushes into the cell. A cell placed in a _____ solution will get smaller as water leaves the cell.

If the concentration of solute is equal, the solution is _____.

Pure water is always considered to be _____ and a cell placed in it will _____.

4b. *Draw and label examples of hypertonic, hypotonic, and isotonic solutions with a cell placed in them. Use arrows to illustrate the direction water will flow.*

4c. Sometimes a substance needs to get into a cell, but is not able to get through the selectively permeable membrane without help. In this case, carrier _____ that are embedded in the cell membrane help the molecules get through. This is known as _____ and requires no energy.

5a. *Compare and contrast active and passive transport by filling in the blanks.*

Active transport requires the use of _____ (energy) because particles have to be moved from an area of _____ concentration to an area of _____ concentration. The way that energy is obtained is by taking an ATP molecule, and removing one of the _____. This releases energy and changes the molecule from ATP to _____.

5b. *Draw a picture of a concentration gradient that would result in the need for Active Transport.*

5c. Complete the table below.

Type of Transport	Energy Required?	Key Words
Active Transport		
Facilitated Diffusion		
Osmosis		
Diffusion		

6a. Distinguish between prokaryotic and eukaryotic cells by completing the table.

Cell Type	Nucleus	Ribosomes	Cytoplasm	Membrane	Other Organelles
Prokaryote					
Eukaryote					

6b. Fill in the blanks.

Prokaryotes are all _____ celled organisms, whereas Eukaryotes can be single celled or _____ cellular.

All cells need DNA because DNA provides the code which determines the type of _____ that are made. Proteins, because they are also enzymes, control what the cell will do, when they will do it, and even what they look like.

DNA for every organism is unique because the sequence of _____ (monomers of DNA are different for all individuals.)

7a. Identify the cellular organelles associated with major cell processes in the table.

Cell Organelle	Plant/Function	Animal/Function	Location/Appearance
Cell wall			
Cell membrane			
Nucleus			

Ribosome			
Mitochondria			
Chloroplast			
ER			
Golgi Body			
Lysosome			

7b. *Fill in the blanks.*

Plant cells have large _____, which store water and provide TURGOR pressure to cell walls that make them appear rigid (this is the reason they spray pure water on vegetables at the grocery store). Because of osmosis, cells will be filled with water, making the plants appear fresh and healthy. Plants that are dehydrated will wilt.

8a. *Distinguish between aerobic and anaerobic cellular respiration by filling in the blanks.*

The purpose of cellular respiration is for cells to be able obtain _____ (ATP). Both plants and animals use glucose as the fuel for energy. In plants, glucose is produced in the _____. In animals, glucose is obtained by organisms through their _____. In both cases, cellular respiration begins in the _____ with the process of _____, which yields two _____. If _____ is available the pyruvates move into the _____. If oxygen is not available, fermentation begins in the cytoplasm.

8b. *Fill in the blanks.*

<p>Aerobic respiration requires _____, occurs in _____, takes pyruvate through the _____ cycle and the _____ chain, and produces _____ energy and releases _____ gas.</p>	<p>Anaerobic Respiration requires no _____, occurs in the _____, yields only _____ ATP's and leaves a byproduct of _____ gas along with _____ (yeast) or _____ animals.</p>
<p>Better because ...</p>	<p>Less efficient because....</p>

9. Compare and contrast photosynthesis and cellular respiration in terms of energy transformation by filling completing the questions below.

- a.) Write the balanced formula for photosynthesis (which takes place in the _____ of a plant).
- b.) Write the balanced formula for aerobic respiration (which takes place in the _____ of plants or animals).
- c.) How are photosynthesis and cellular respiration related?
- d.) What is the energy source for photosynthesis?
- e.) Why is the glucose called chemical potential energy?

10. Determine the relationship between cell growth and cell reproduction by filling in the blanks.

a.) Cells cannot grow too large because if they do, their surface area to volume ratio becomes too great, and they would no longer be able to support cell functions. Therefore, when they begin to get too large, they undergo a process called _____, which creates two _____ daughter cells.

b.) Complete the table below, you may draw or describe in the "What does it look like?" section.

Phase	What happens?	What does it look like?
G0		
G1		
S		
G2		
MITOSIS---prophase		
MITOSIS—metaphase		

MITOSIS--anaphase		
MITOSIS--telophase		
Cytokinesis		

11. *Associate the process of DNA replication with its biological significance by answering the questions below.*

a.) DNA replication doubles the amount of DNA, but does not change the chromosome number. Explain this.

b.) You can tell that DNA is replicating because ALL of the _____ bonds that join the nucleotides A-T and G-C will break and each strand will make a complementary strand.

12. *Identify the structure and function of DNA by completing the following task.*

a.) Using the space below, draw and label a DNA strand that has a leading strand nucleotide sequence of ATCGTA. Don't forget to include the correct number of hydrogen bonds!

b.) DNA is located in the _____ and uses its' unique nucleotide sequence to direct ALL cellular activities.

13. *Recognize the interactions between DNA and RNA during protein synthesis by filling in the blanks.*

a.) DNA cannot leave the nucleus during G₀, therefore, in order ensure that the proper proteins get assembled, DNA must use another molecule, _____, which can fit through the nuclear pores in the nuclear membrane. The difference between DNA and RNA is that RNA is a _____ strand (rather than double), and contains no thymine, but has _____ instead.

How many amino acids are there? _____ When amino acids are joined together one at a time, a _____ bond holds them together, which is why proteins are often referred to as _____ chains.

13b. Describe what happens in each of these processes and where they occur.

Step 1- Transcription

How can you be sure this is protein synthesis and NOT DNA replication?

Step 2- Translation

14. Determine the relationship between mutations and human genetic disorders by completing the table below.

If DNA is not replicated properly, or if in the process of protein synthesis, the sequence of nucleotides get in the wrong order, mutations can occur. Some mutations are minor, however, often they are very dangerous and create serious health problems for people.

Mutation	Description	Example (drawing)
Frameshift		
Point		
Deletion		
Duplication		
Translocation		
Non-disjunction		

15. Describe how meiosis is involved in the production of egg and sperm cells and how meiosis and sexual reproduction contribute to genetic variation in a population by filling in the blanks.

Meiosis only occurs in _____ cells and is used for the process of sexual reproduction. The main advantage is that it allows for _____. There are two processes, _____ and _____ that occur during meiosis to ensure that organisms are genetically varied.

Crossing over is similar to the mutation of _____. During crossing over the genetic exchange occurs between two _____ chromosomes and in _____ the chromosomes are not homologous matches.

There are two divisions in meiosis, PMAT I and PMAT II. When is a cell considered to be haploid and why? Normal human cells are _____ and contain _____ chromosomes, or _____ pairs. Chromosomes 1-22 are considered to be _____ and chromosome pair 23 are the sex chromosomes.

16. *Apply pedigree data to interpret various modes of genetic inheritance by filling in the blanks.*

Circles are _____, squares are _____. Shaded completely means they _____ or show the trait. Half shades mean they are _____, and are not affected by the trait.

Reminders:

-To determine sex-linked, look at fathers and daughters and fathers and sons. An affected Dad will give at least 1 gene to his daughter but NONE to his sons. CHECK FOR THIS FIRST!!!!

-To determine autosomal dominant, or simple dominance, every shaded person must have a shaded parent (or half shaded if carriers are shown).

-To determine autosomal recessive, an affected person might have two unaffected parents. CHECK FOR SEX-LINKED FIRST.

17. *Determine the probability of a particular trait in an offspring based on the genotype of the parents and the particular mode of inheritance by completing the tasks below.*

a.) Create a Punnett square problem and key using the idea of simple dominance. Provide parent and offspring genotype and phenotype with percentages of each.

b.) Create a Punnett square and key using the idea of co-dominance. Provide parent and offspring genotype and phenotype with percentages of each.

c.) Create a Punnett square and key using the idea of incomplete dominance. Provide parent and offspring genotype and phenotype with percentages of each.

d.) Create a Punnett square and key using the idea of sex-linked traits. Provide parent and offspring genotype and phenotype with percentages of each.

e.) Create a Punnett square and key using blood typing. Provide parent and offspring genotype and phenotype with percentages of each.

18. *Interpret a diagram that illustrates energy flow by filling in the blanks and completing the tasks.*

a.) Draw a terrestrial energy pyramid showing the amount of available energy at each level, use grass, a grasshopper, a songbird, and a hawk. Be sure to label each level.

b.) Draw a food chain as well using the same organisms. Most energy is lost as _____. Arrows always point from energy _____ towards energy _____.

19. *Predict how population changes of organisms at different trophic levels affect an ecosystem by answering the questions below.*

a.) What is the immediate effect if you remove a secondary consumer?

b.) Where does ALL energy come from?

20. *Analyze factors responsible for the changes associated with biological succession by answering the questions below.*

a.) What is humus and how does it relate to succession?

b.) List several factors that might lead to primary succession.

c.) What is the pioneer organism?

d.) Secondary succession begins when there is soil on the ground. What is the pioneer organism in secondary succession?

e.) List several events that might lead to secondary succession.

f.) Pond succession begins with _____ accumulating in the pond due to organisms dying and wind blowing in dust and dirt. The last stage of pond succession is when the pond is _____.

21. *Predict how various types of human activities affect the environment by filling in the blanks.*

Most of the time, human interference is _____. We do things like, overhunt and put hunting bans in place, which allow organisms to grow unchecked.

People are also responsible for the introduction of _____ species that can become _____ if there are no natural predators and their population grows unchecked.

22. *Predict how changes in a biogeochemical cycle can affect an ecosystem by filling in the blanks.*

Carbon Cycle—too much carbon in the atmosphere leads to global climate change and ocean acidification, both of which lead to a reduction in _____.

Water Cycle –plants take in water through their roots and lose it through the _____ in their leaves, this is called _____.

Phosphorus is a mineral that is found in _____ and has to be leached out by water. An excess of phosphorus is caused by the _____ that people use to clean their clothes or _____ that they put on their lawns and leads to overgrowth of _____.

Nitrogen Cycle—Nitrogen has to be fixed by _____ or through _____ that live in root nodules. An excess in nitrogen (due to people using _____), can run off into ponds and lakes and cause an overgrowth of algae, an increase of _____, and an overall lowering of pond _____. Pond death is called _____.

23. Recognize the relationship between form and function in living things by 1.) describing general characteristics of the biomes below and 2.) adaptations that plants and animals have to survive their environment.

Desert: 1.)

2.) plants would have small leaves to reduce water loss---Animals are nocturnal.

Rainforest: 1.)

2.)

Tundra: 1.)

2.)

Grasslands: 1.)

2.)

Ocean: 1.)

2.)

Estuaries: 1.)

2.)

24. Determine how the carrying capacity of an ecosystem is affected by interactions among organisms by completing the tasks below.

a.) Carrying capacity describes the _____ available to support life. Once a population exceeds their carrying capacity, death will occur and only the strong will survive.

b.) Draw a population graph and illustrate growth, stabilization, and decline.

25. *Recognize the relationships among environmental change, genetic variation, natural selection, and the emergence of a new species by answering the question below.*

List the four criteria for adaptation through natural selection.

- 1.)
- 2.)
- 3.)
- 4.)

26. *Infer relatedness among different organisms using modern classification systems by filling in the blanks.*

Modern classification uses Kingdom, phylum, _____, _____,
_____, _____, _____

Species is not a good classification category to determine relatedness because a species name is often an adjective, therefore, start with _____ to determine relatedness.

27. *Apply evidence from the fossil record, comparative anatomy, amino acid sequences, and DNA structure that supports modern classification systems. (Nothing to answer)*

These are all ways to identify common ancestors.

- Fossils are used when things have been dead for a very long time.
- Amino acid sequence and DNA sequencing can be used on living animals.
- Comparative anatomy means looking for homologous bone structures.
- Phylogenetic trees trace hypothetical evolutionary relationships.

28. *Evaluate the scientific and ethical issues associated with gene technologies; genetic engineering, cloning, transgenic organisms production, stem cell research, and DNA fingerprinting by writing a brief description of each.*

a.) DNA Fingerprinting- Use of gel electrophoresis to separate DNA fragments by size.

b.) Cloning-

c.) Stem Cell Research-

d.) GMO's-

e.) Transgenic Organisms Production-

29. What are steps of good science experiment?

30. What are dependent and independent variables?

31. How can you reduce bias?

32. What is the difference in accuracy and precision?

33. What is a cost to benefit ratio?