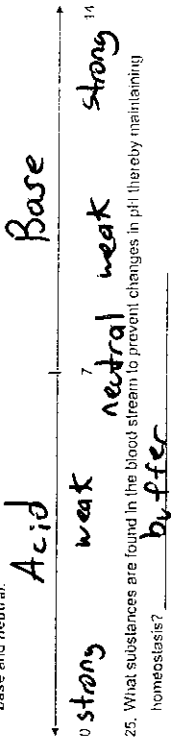
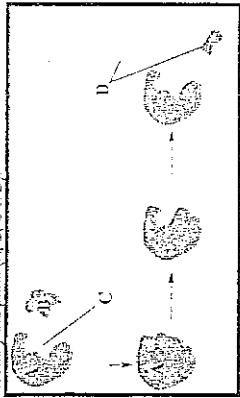


24. Label the numbers on the pH scale below and the terms *weak acid*, *weak base*, *strong acid*, *strong base* and *neutral*.



25. What substances are found in the blood stream to prevent changes in pH thereby maintaining homeostasis? buffer

26. Below is the picture of an enzymatic reaction. Identify the parts (A, B, C, & D):



- A. Enzyme
- B. Substrate
- C. Active site
- D. Product

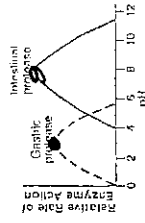
27. Identify two conditions that could change how quickly an enzyme can do its job.

Temp and pH  
high heat

28. Explain how the above conditions affect an enzyme's ability to do its job.

High heat - destroys enzyme & stops reaction  
High heat - slows down reaction.

- 29. How do enzymes speed up biological chemical reactions?
  - A. Enzymes increase the energy required for a reaction to occur.
  - B. Enzymes decrease the energy required for a reaction to occur.
  - C. Enzymes have no effect on the energy required for a reaction to occur.
  - D. Enzymes maintain the energy needed for a reaction to occur.



30. In this graph, what is the *optimal* pH for Gastric protease? 3

31. In this graph, what is the *optimal* pH for Intestinal protease? 8

32. What happens to the enzyme activity of gastric protease if the pH starts off at 3.0 and raises to a pH of 8.0 (see the graph)?

no longer work

33. What happens to the enzyme activity of intestinal protease if the pH starts off at 3.0 and raises to a pH of 8.0? works in all cases, but works best in the middle

34. Why would a distance runner consume carbohydrates instead of proteins before a race?

- A. Carbohydrates provide insulation for heat.
- B. Carbohydrates provide structure for tissues.
- C. Carbohydrates provide genetic material for muscle cells.
- D. Carbohydrates provide energy for endurance.

35. Determine which organic compound best matches with each example listed below (answers may be used more than once).

- 1. A Starch
- 2. D RNA
- 3. B Triglyceride
- 4. B Glycogen
- 5. B Insulin
- 6. A Cellulose
- 7. C Hemoglobin
- 8. D DNA
- 9. B Fats
- 10. C Enzymes
- 11. A Glucose
- 12. B Wax

- a. Carbohydrate
- b. Lipid
- c. Protein
- d. Nucleic Acid

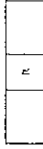
36. Which compound listed above is a monomer (only one)? glucose

Cells & Cell Transport (Packet 3)

37. If the R on the above slide was viewed under high power with the 40x objective lens, what would the total magnification be if the eyepiece has a magnification of 10x? 400x

38. While you are looking through the eyepiece you push the slide on the microscope stage to the right. Which way will the specimen appear to move in your field of view? left

39. Draw the image seen on the slide below, as it would appear in the field of view of a compound light microscope.



40. What is a benefit of using a compound light microscope?

can see living organisms

41. What is a benefit of using an electron microscope?

can zoom in to atomic level

Match the description of each part of the compound light microscope with the proper term.

- 42. E allows light to reflect upward
- 43. A lenses with varying magnification
- 44. D regulates amount of light
- 45. F platform to support slide
- 46. C holds and turns objectives
- 47. G contains lens to look through
- 48. B only used to focus images on the lowest power
- 49. H focuses image under high power only

- ocular lens / eyepiece
- stage
- objective lens
- D. coarse adjustment
- E. base
- F. fine adjustment
- G. light source
- H. diaphragm
- I. nosepiece
- J. arm

61. What type of cell is pictured above? plant Explain why you came to this conclusion. shape (square), has large vacuole, cell wall, chloroplast
62. Identify at least 3 differences between a plant and an animal cell:
- Animal has large vacuole - plant large
  - Plant has cell wall / Animal does not
  - Plant has chloroplast

Identify the correct organelle for Questions 63-72. 63-64

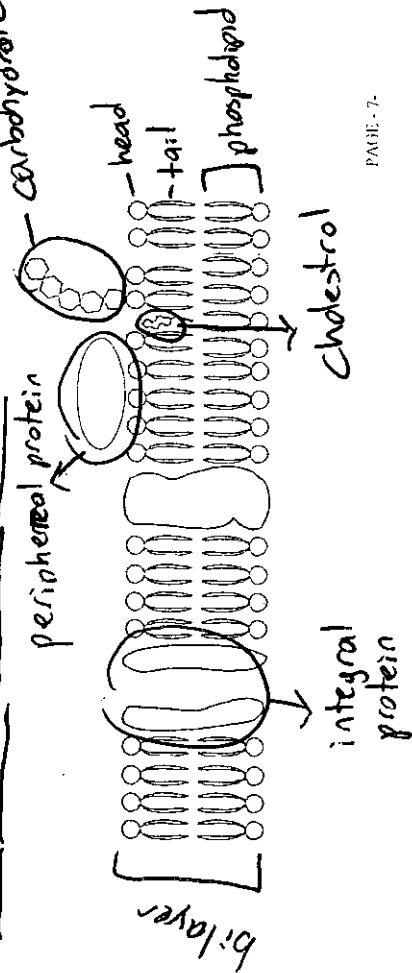
63. Cellular Respiration converts chemical energy from food (sugar) into ATP
64. Cell wall Found outside the cell membrane; provides support.
65. Ribosomes Protein factory found in all cells
66. Photosynthesis Converts solar energy into chemical energy (food/sugar).
67. Nucleus Control center of the cell which contains the DNA in eukaryotic cells.
68. vacuole Found in both plants & animals and stores liquids & dissolved materials
69. cell membrane Helps maintain homeostasis by controlling what enters and leaves the cell.

70. In multicellular organisms cells often become specialized. As a result one organism may have cells that vary in shape and structure based on each cell's active genes.

71. Examples of cells with specialized structures in the human body include:

- Cells in the trachea (windpipe) are lined with cilia to trap particles in the air and move mucus up and out.
- Sperm have flagellum which allow them to swim through fluid.

72. Label the following components: phospholipid bilayer, hydrophobic tail, hydrophilic head, cholesterol, integral protein, peripheral protein, carbohydrate



73. Describe the function or identify the part of the components of the cell membrane.

- phospholipids - make up a majority of the cell membrane. Has both polar and nonpolar parts to help control what goes in and out.
- Proteins - helps molecules that are large cross the membrane.
- Carbohydrates - Cell I.D.

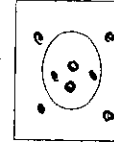
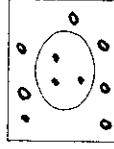
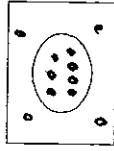
74. Explain what it means when we say that living cells are selectively permeable?

Some things can pass through the membrane.

75. Identify the three forms of passive transport.

- Diffusion - movement of small or uncharged solute (or dots) from a high to low concentration.
- Facilitate protein diffusion - movement of large or charged solute across the cell membrane, from a high to low concentration, with the help of a protein.
- Osmosis - movement of water across the cell membrane

76. Draw the dots in the 3 pictures so that each cell is in the solution indicated below the pictures.



A. Hypotonic solution

B. Hypertonic solution

C. Isotonic solution

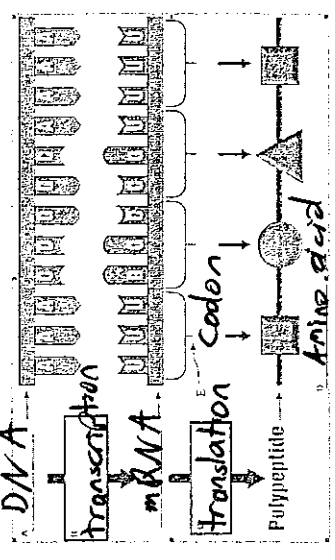
77. Which of the above diagrams (A, B, or C) shows the ideal conditions for a red blood cell? C

78. Which of the above diagrams (A, B, or C) shows the ideal conditions for a plant cell? C

Describe how this benefits the plant. N/A

79. Which of the above pictures shows what might occur if a freshwater fish were placed into a saltwater fish tank? B

80. What might happen to the fish? Explain. Water from the fish will rush out of the cells to dilute the saltwater. Cells shrink - fish dies.



98. Two opposing strands of DNA are held together by a weak hydrogen bonds. These bonds are weak so DNA can separate for replication and transcription.

99. The two strands are said to be complementary. (Since by knowing one half you can figure out the other).

100. The process in which DNA makes an exact copy of itself is called replication.

101. Why is it necessary for a cell to make an exact copy of its DNA. What is it getting ready to do? divide

102. A / An enzyme called helicase causes the double stranded DNA to split or "unzip" by breaking the bonds between the base pairs which.

103. A second enzyme called polymerase is responsible for building the new strand of DNA (and also checking it for mistakes).

104. Changes or mistakes in DNA are called mutations.

105. List three basic differences between DNA and RNA:

- A. DNA double stranded RNA single stranded
- B. DNA deoxyribose sugar RNA ribose sugar
- C. DNA A, C, G, T RNA A, C, G, U

106. Identify the RNA that would form from the following strand of DNA: G C A T T C A T G  
CGU AUG UAC

107. If the above strand of DNA was changed to: GCA ATC ATG CIRCLE THE MUTATION.  
What type of mutation caused this change? substitution / point

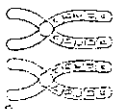
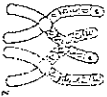
108. Where are the following types of RNA found in a cell.
- A. mRNA - Cytoplasm
  - B. tRNA - Cytoplasm
  - C. rRNA - Ribosome

109. Label boxes B & C with the name of the process (translation or transcription) and A, D & E with the name of the structure (amino acid, DNA, codon or mRNA)

110. Transcription and translation are the two steps involved in protein synthesis.
111. Three nucleotides of mRNA are called a/an codon.
112. Three nucleotides of tRNA are called a/an anti-codon.
113. Where are the proteins made in a cell (which organelle)? ribosome
114. Proteins (or polypeptides) are made out of many amino acids that are bonded together.
115. When using the amino acid table, the codons that do not code for an amino acid are called start stop.
116. What is the purpose of the above codon? start & end protein chain
117. What type of mutation is most likely to cause the biggest change in a protein (point of frameshift)? frameshift Explain why. bc it shifts the codon reading.

124. The greatest advantage of meiosis and sexual reproduction is GENETIC DIVERSITY. This is seen in several ways. Identify factors that contribute to genetic diversity below:

A. Genetic Crossover... during meiosis I, your homologous chromosomes pair up. The chromosome from your mom and the one from your dad swap pieces (seen below):



1. Homologous chromosomes before crossing over has occurred
2. Homologous pairs exchanging genes (may contain different forms of the same trait).
3. Homologous pairs contain new combinations of traits.

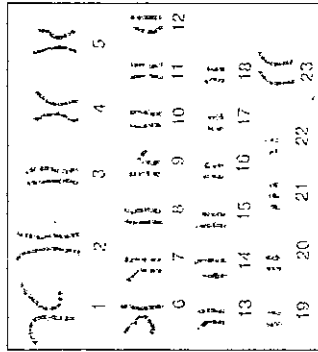
B. Independent assortment - random alignment of homologous pairs at the equator. There's nothing that says mom's chromosomes line up on the left and dad's on the right... it is random.

X - which ever sperm makes it to the egg first gets the chance to become a child. And thanks to crossing over & independent assortment, each gamete is genetically different from another.

125. Use the karyotype to the right to answer the following questions.

- Total number of chromosomes? 47
- Number of autosomes? 45
- Boy or Girl? girl
- Normal or Disorder? disorder

126. What causes a person to have too many or too few chromosomes? nondisjunction



Genetics (Packet 2)

127. Genetics is the study of \_\_\_\_\_.
128. \_\_\_\_\_ is the segment of DNA that codes for a trait (protein).
129. The different forms of a trait are called \_\_\_\_\_.
130. The appearance of a trait is determined by the two alleles that a person has. One allele comes from their \_\_\_\_\_ and the other allele comes from their \_\_\_\_\_.

131. Fill in the missing term that matches with each definition.

The genetic makeup of an organism represented by a pair of symbols.	_____	The physical appearance of a trait (described by a word).	_____
Having a pair of alleles that are the same (ex: TT or tt)	_____	Having a pair of alleles that are different (ex: Tt)	_____
The allele that is shown even when paired with a different allele.	_____	The allele that is hidden when paired with a different allele.	_____

132. Show the Punnett square for the following cross: Rr X Rr

R = tall  
r = white

Genotypic Ratio: \_\_\_\_\_  
Phenotypic Ratio: \_\_\_\_\_