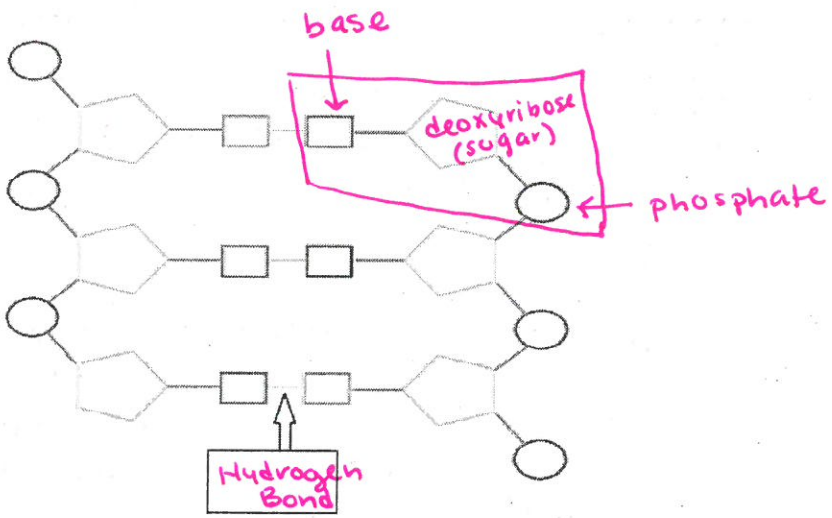
Chapter 10 and 12 DNA Structure, DNA Replication, Mitosis and Meiosis (20 Questions)

DNA & RNA:

67. What is the full name for DNA? Deoxyribonucleic Acid

68. What 3D shape is used to describe a DNA molecule? double helix

Use the picture below to answer the following questions



69. Circle one nucleotide.
70. Label the three parts of the nucleotide you circled.

71. Identify the chemical bond the arrow is pointing to in the picture above.

72. If a DNA molecule has 30% thymine, what percent of adenine, cytosine, and guanine must the molecule have? Remember, all should equal 100% total!

A= 30%
C= 20%
G= 20%

DNA Replication

73. What is DNA replication? The process of making an identical copy of DNA so new cells get a complete copy of the genetic code.

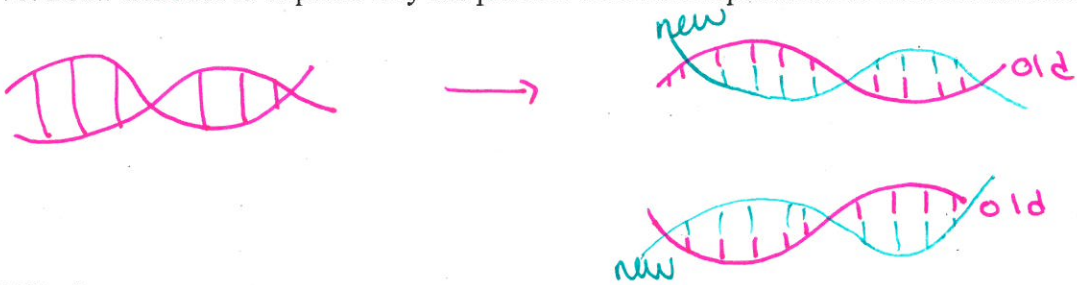
74. Complete the other half of the DNA molecule. **CGG ATC AAA TGA**

GCC TAG TTT ACT

75. Fill in the table below regarding the steps of DNA Replication.

Step	Enzyme Involved	Summary of the Step/Process
1	helicase	Helicase attaches to DNA and breaks the Hydrogen bonds holding the double helix together separating it into two strands.
2	DNA polymerase	DNA polymerase attaches to DNA and brings in complementary /Matching nucleotides making a new strand of DNA.
3	ligase	Ligase reforms hydrogen bonds and glues the newly made DNA to the original DNA.

76. Draw a model to explain why the process of DNA Replication is considered semi conservative.



Each time DNA is copied one original strand is kept so you never have to completely start over.

Mitosis

77. How many cell divisions occur in mitosis? 1

78. What type of cells are produced by ~~meiosis~~ mitosis? x cells

79. Describe the amount of chromosomes contained in cells produced by ~~meiosis~~ mitosis? contain number of chromosomes as the original cell.

80. Define the following terms:

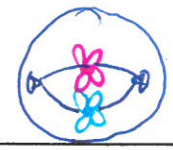
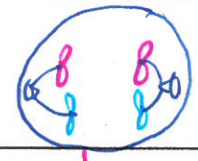
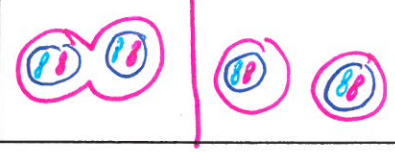
A. Sister chromatid – Identical chromosomes held together by a centromere.

B. Centromere – The center of a sister chromatid. Used to hold identical chromosomes together.

C. Centriole – Used to hold spindle fibers

D. Spindle Fiber – rip sister chromatids apart and sort chromosomes into new cells.

81. Describe what happens in each of the following phases and draw a cell in that phase.

Phase	Description	Drawing
Interphase	- Cell prepares to divide - cell grows, makes new organelles, and copies DNA	
Prophase	- sister chromatids are visible - nucleus begins to disappear - centrioles + spindle fibers appear	
Metaphase	- sister chromatids line up in the middle of the cell. - spindle fibers attach to centrioles and to the centromere.	
Anaphase	- sister chromatids rip apart and lone chromosomes move to opposite sides of the cell	
Telophase/ Cytokinesis	- nuclei reform - cell division parts begin to disappear - Cytokinesis - cytoplasm divides between the two cells	

82. Color in the phases in the table above that are included in mitosis/cell division? prophase, metaphase, anaphase, telophase

83. How does cancer form?

uncontrolled cell division.

Meiosis

84. How many cell divisions occur in meiosis? 2

85. What type of cells are produced by meiosis? sex cells/gamettes (sperm & eggs)

86. Describe the amount of chromosomes contained in cells produced by meiosis? cells with 1/2 the number of chromosomes as the original cell

87. Define crossing over:

when homologous sister chromatids pair up, form a tetrad, and kick over each other. This will result in sister chromatids exchanging genetic info.

88. Describe what happens in each of the following phases and draw a cell in that phase

Phase	Description	Drawing
Interphase	- cell grows - DNA replication - cell makes new organelles	
Prophase 1	- nucleus begins to disappear - cell division parts (centrioles/spindle fibers appear) - sister chromatids pair up (tetrad) + CROSS OVER (exchange genetic info	
Metaphase 1	- homologous sister chromatids stay paired up in the center of cell. - spindle fibers attach to centrioles & centromeres	
Anaphase 1	- Entire sister chromatids move to opposite ends of the cell	
Telophase/Cytokinesis 1	Telo - the nucleus reforms and whole sister chromatids are inside Cyto - cytoplasm divides between the 2 cells	Telo - Cyto
Prophase 2	- nucleus begins to disappear - cell division parts appear (centrioles/spindle fibers). - sister chromatids become visible	
Metaphase 2	- sister chromatids line up in the center of the cell - spindle fibers attach to centrioles and centromeres	
Anaphase 2	- sister chromatids rip apart and lone chromosomes move to opposite sides of the cell (genetically different)	
Telophase /Cytokinesis 2	telo - nucleus reforms. All cells contain genetically different chromosomes cyto - cytoplasm divides between all cells	cyto

89. Describe how Mitosis and Meiosis Relate.

Mitosis	Both	Meiosis
makes diploid cells	PMAT • interphase before division occurs	makes haploid cells sex cells / gametes / sperm & eggs
• body cells • identical cells • 1 division		• different cells • 2 divisions