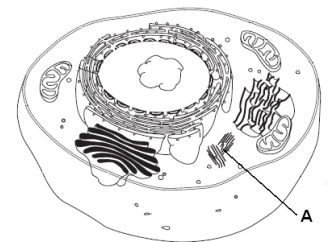


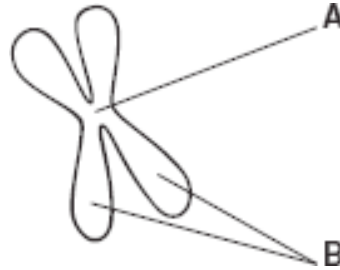
## Cell Cycle, DNA Replication, Transcription & Translation Worksheet:

### Chapter 10: The Cell Cycle

- The process by which a cell splits into two daughter cells is called Mitosis
- DNA wraps itself around proteins called Histone, which aid in the tight packing of DNA into chromosomes.
- Cells spend most of their time in what phase? Interphase
- During cell division, DNA are duplicated before cell division so that each new daughter cell has a complete set.
- The M phase of the cell cycle includes Prophase, Metaphase, Anaphase, and Telophase
- The centrioles and centrosomes are produced and duplicate during G2 phase
- During which step of interphase are the cell's chromosomes copied? S phase
- When a cell divides each daughter cell receives its own copy of the parent cell's DNA
- Explain one advantage of sexual reproduction over asexual reproduction.  
Genetic Diversity
- During prophase, DNA coils up and becomes a **visible** Chromosome
- The picture on the right shows a centrosome. What role do centrosomes play in mitosis? Make spindle Fibers in order to pull the chromosomes apart during anaphase
- Normal humans have 46 chromosomes.
- Human gametes have a total of 23 chromosomes
- During Prophase the nucleus begins to disappear.
- During telophase chromosomes uncoil to become DNA
- During which 3 phases are chromosomes visible? Prophase, metaphase, anaphase



16. During which step(s) of interphase does the cell grow? G1 Phase
17. A cell having two sets of chromosomes is called a diploid cell, while a cell with only one set is called a haploid cell.
18. During Telophase chromosomes uncoil, a nuclear envelope forms around each set of chromosomes, spindle microtubules disappear, and cytokinesis begins.
19. During cytokinesis in animal cells, a cleavage furrow splits the cell in two, while in plant cells, the cell plate splits the cell in two.



20. Using the picture to the right. What is

- A. Centromere
- B. Chromatid

21. During which phase of mitosis do the chromosomes line up along the middle of the dividing cell?

Metaphase

22. List the 4 phases of mitosis **in order**

prophase → metaphase → anaphase → telophase

23. Cytokinesis is referred to as the division of cytoplasm.

24. During anaphase of mitosis chromosomes are pulled apart into individual chromatids and the two new chromosomes move to opposite poles.

25. During normal mitotic cell division, a parent cell that has 10 chromosomes will produce two daughter cells, each containing 10 chromosomes.

26. When cells lose their ability to control their **growth rate**, they grow out of control and cause Cancer

27. Cancer cells divide so rapidly that they create a mass of cells called a tumor

### **Chapter 11.4: Meiosis Skip**

- The main purpose of meiosis is to produce \_\_\_\_\_ (also called sex cells)
- During which phase of meiosis do homologous chromosomes separate and begin to move to opposite poles? \_\_\_\_\_
- During mitosis there is \_\_\_\_\_ cell division while during meiosis there are \_\_\_\_\_ cell divisions.

4. Mitosis creates cells that are diploid (2 sets of chromosomes) while meiosis creates cells that are \_\_\_\_\_ (1 set of chromosomes)
5. During which phase of meiosis does synapsis occur and a tetrad form? \_\_\_\_\_
6. During mitosis \_\_\_\_\_ daughter cells are produced while during meiosis \_\_\_\_\_ daughter cell are produced.
7. Are the daughter cell produced in meiosis genetically identical or different? \_\_\_\_\_
8. During which phase of meiosis do tetrads line up along the metaphase plate? \_\_\_\_\_
9. During which phase of meiosis does crossing over occur? \_\_\_\_\_
10. How many chromosomes does a human zygote have? \_\_\_\_\_
11. During meiosis, chromatids may twist around each other and trade places in a process called \_\_\_\_\_
12. \_\_\_\_\_ chromosomes are pairs of chromosomes that are the same size and shape and carry genes for the same traits.
13. During meiosis homologous chromosomes pair up forming a structure called a \_\_\_\_\_
14. Individual chromosomes are pulled apart and individual chromatids go to each end of the cell during \_\_\_\_\_
15. During \_\_\_\_\_, cytokinesis occurs, creating 4 cells.
16. During \_\_\_\_\_ homologous chromosomes line up randomly in the middle of the cell.
17. During \_\_\_\_\_, individual chromosomes line up in the middle of the cell.
18. During \_\_\_\_\_, homologous chromosomes are pulled apart with an entire chromosome going to each end of the cell.

### **Chapter 12: DNA & DNA Replication**

1. What is the purpose of DNA? **\_To provide characteristics for individuals...there are a lot of reasons** \_\_\_\_\_
2. Watson & Crick determined that the shape of DNA is a **\_\_\_double-helix** \_\_\_\_\_
3. In what way is DNA like a book? **It can be read like a code to make protein** \_\_\_\_\_
4. DNA is made up of many smaller pieces called nucleotides. What is a nucleotide made up of?
  - a. **Sugar** \_\_\_\_\_
  - b. **\_Phosphate** \_\_\_\_\_

- c. Nitrogen Base (A,T, G, C, or U)
- List the four bases of DNA. A, T, G, C
  - What is the enzyme that unwinds the DNA molecule during replication?  
Helicase
  - In a DNA molecule, A (adenine) always binds with Thymine (T) and C (cytosine) always binds with Guanine (G)
  - If half of a DNA molecule has the bases GCATTCGA what would the other half of the DNA molecule be? CGTAAGCT
  - During DNA replication, two DNA strands are produced. Each new DNA molecule has one new strand and one old strand.
  - During DNA replication, the enzyme DNA Polymerase adds base pairs in order to create the new strands.

### **Chapter 13: RNA, Transcription, & Translation**

- DNA contains the sugar deoxyribose, while RNA contains the sugar ribose
- One difference between DNA and RNA is that DNA is a double helix shape while the shape of RNA is single stranded
- List the 4 bases in RNA.  
A,U,G,C
- All the bases in DNA and RNA are the same **except** that RNA has U and does not have T
- A **gene** is a small segment of DNA that contains the instructions for assembling proteins
- When making a protein, DNA is converted into RNA, which is then converted into a Protein
- During Transcription, an RNA molecule is formed that is complementary to part of one strand of DNA
- The RNA molecule made during transcription is called mRNA (Messenger RNA)
- Where does transcription occur? Nucleus
- When mRNA is being produced, the enzyme RNA Polymerase brings in nucleotides to form the strand.

11. mRNA is made in the Nucleus but travels to other parts of the cell in order to bring the information in the genetic code to other parts of the cell.
12. Translation occurs in the cytoplasm of the cell at a Ribosome
13. During Translation, the mRNA code is used to make proteins
14. A protein is being assembled when mRNA is being translated.
15. The mRNA is read in segments of 3's called **codons**. Each codon codes for 1 amino Acid
16. When building an amino acid sequence, what molecule picks up the amino acids and brings them to the ribosome? tRNA
17. If you have the RNA sequence GCA, what amino acid does that code for?  
Alanine
18. DNA sequence:           T A C C A G T A G G T T A G C C A A A T T  
RNA sequence:            A U G / G U C / A U C / C A A / U C G / G U U / U A A  
Amino acid sequence:    Met, Val, Iso, Glu, Ser, Val, Stop
19. Define mutation – **A change in the genetic material in a cell that may be passed on** \_\_\_\_\_
20. Do most mutations have an effect on organisms? No
21. A mutation that involves one or a few nucleotides is called a Point mutation
22. List two types of chromosomal mutations. inversion, translocation
23. A/an deletion occurs when one base is removed from the DNA sequence
24. Define inversion – **when a portion of the chromosome is in the opposite direction** \_\_\_\_\_