

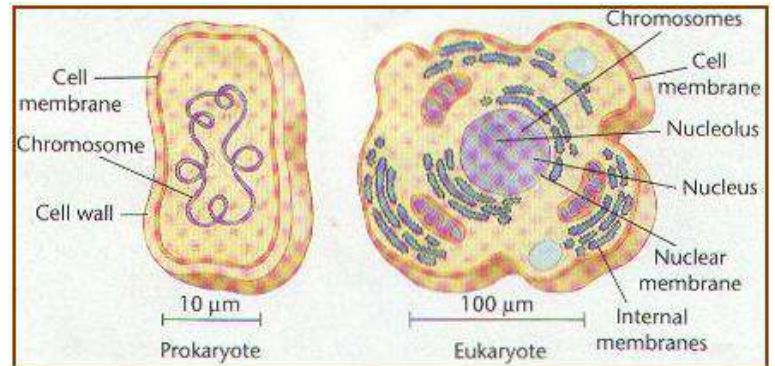
Guided Notes: DNA and Mitosis

The Structure of DNA

- DNA is _____
- Stands for:
- Made up of repeating _____
- “Unit of Heredity”

-Where is it found?

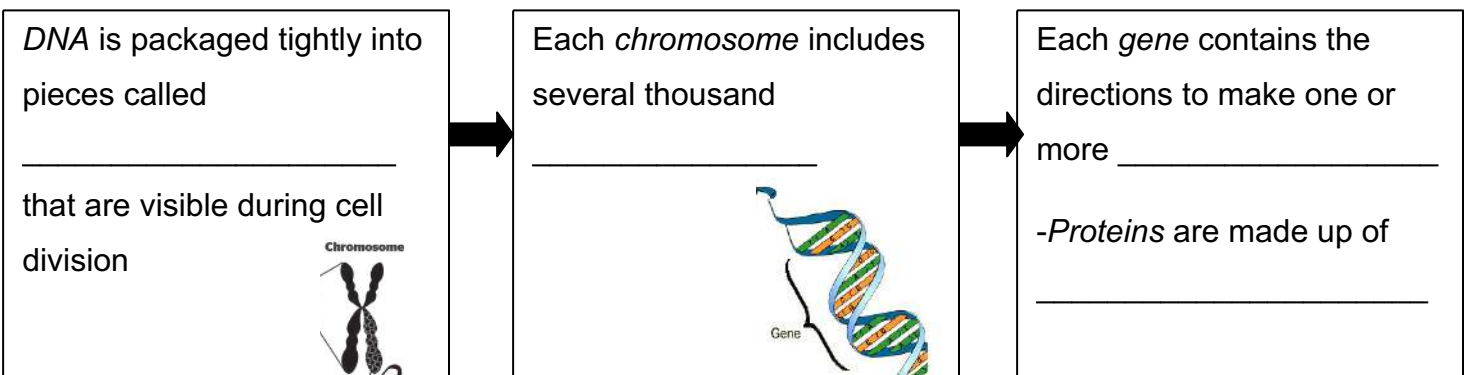
- DNA is in the _____ of prokaryotes and the _____ of eukaryotes
- The nucleus of a human cell contains 30,000 or more _____ in the form of DNA, called a _____.



-Function of DNA

- Purpose: _____
- This is essential to life! DNA → RNA → Proteins

-Structure of DNA



- These proteins play a key role in how we look and grow-“It’s in your genes!”
- **Specialization:**
 - In embryo, all genes on the DNA are “_____”. These _____ cells (_____) can develop into any type of cell
 - *Specialization* occurs when certain genes are turned “_____” and other genes remain “_____”-making that a particular type of cell.
 - Example: _____

Structure of DNA

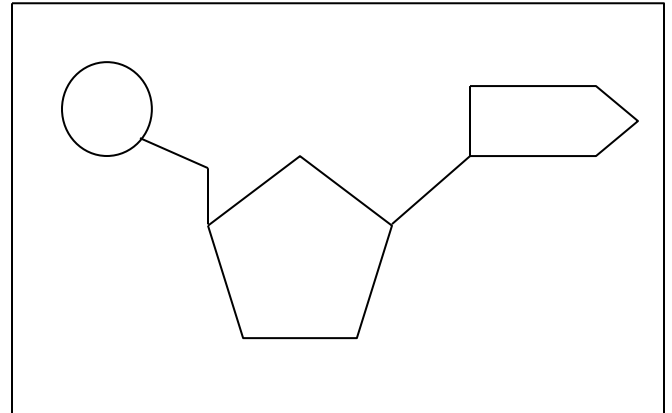
- DNA is comprised of two strands that twist around each other, called a _____

- Discovered by _____
- “Twisted Ladder Structure”

- DNA is made of building blocks called _____

- A nucleotide is made up of:

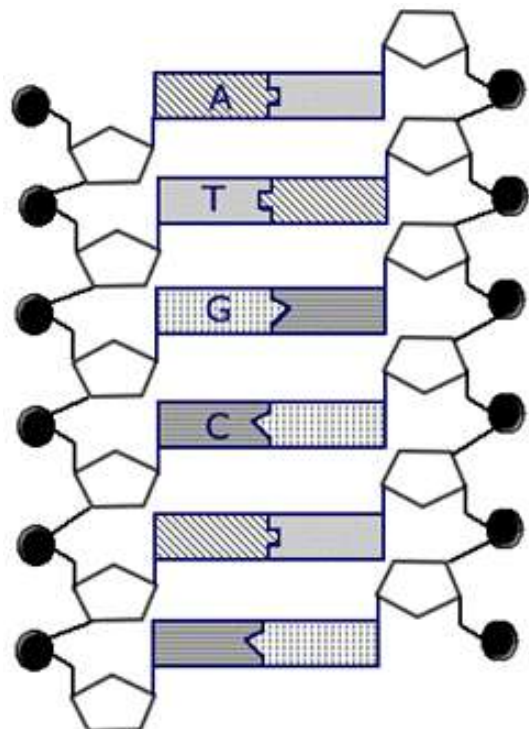
- One _____
- One _____ (called _____)
- One _____ (adenine, thymine, cytosine, guanine)



- Nucleotides put together make up the DNA strand!
- “Backbone of DNA” is composed of _____
- “Rungs of the ladder” make up _____
 - The four bases are: A (_____), T (_____), G (_____), and C (_____)
 - A pairs with T (____ H Bonds)
 - G pairs with C (____ H Bonds)

In the diagram of DNA on the right, do the following:

1. Label a phosphate of the backbone
2. Label a sugar (deoxyribose) of the backbone
3. Identify and pair the bases
4. Place a square around 1 nucleotide

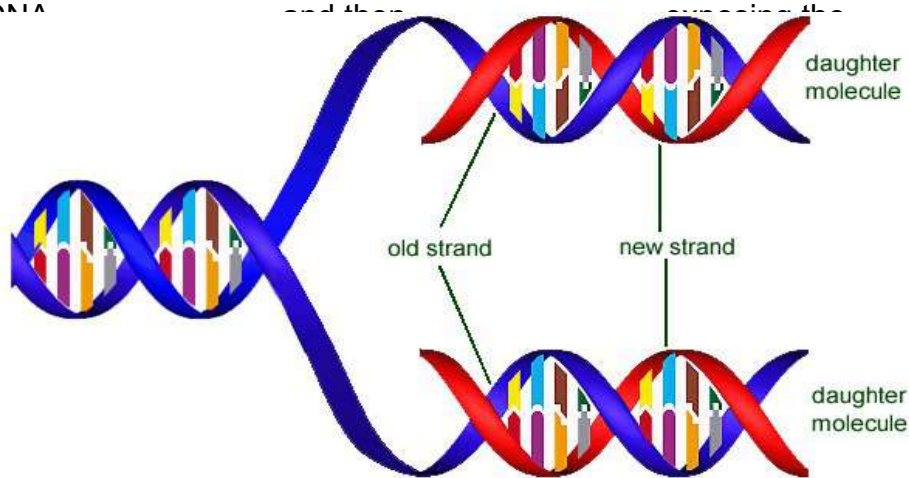


DNA Replication

- DNA Replication is the process of producing 2 _____ replicas from one _____ DNA molecule
- 1. To replicate means “_____”
- During replication, the DNA molecule separates into _____ strands, and builds two new _____ strands using the base pairing rule! (A::T; C::G)
- The molecule is _____ and _____ with the help of _____, an enzyme!

-Steps in DNA replication:

1. DNA _____
2. _____



separate _____

- If the unzipped side read ATCG, then _____ would be added to that

side. Now it is an _____ strand!

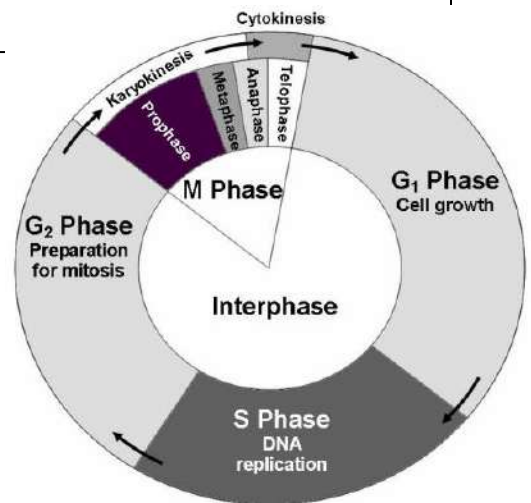
- Each new DNA strand (_____) is made up of 1 strand from the _____ DNA, and one _____ strand

Think about it: Use the strand below to fill in what the complementary DNA strand would be.

Old Strand:	A	G	G	T	C	A	C	T	A	C	C	T
New Strand:												

The Cell Cycle

- The _____ describes the life of a cell from birth to death
- There are three main parts of the cycle:



- _____ : Normal cell activities; broken up into 3 parts
- _____ : The process of cell division (1 cell becomes 2)
- _____ : The division of the organelles and cytoplasm following mitosis

Interphase

- _____ : Period of cell growth
 - Cells can remain in the G1 phase indefinitely, called _____
- _____ : Period when DNA replication occurs
 - Once a cell copies its DNA, it _____ divide
- _____ : Cell growth and preparation for Mitosis

Mitosis

- *Mitosis* is a form of _____ reproduction
 - Means only _____ organism required
- Occurs in response to the body's need for growth and repair
- _____ stages of mitosis: Prophase, Metaphase, Anaphase, Telophase

Cytokinesis

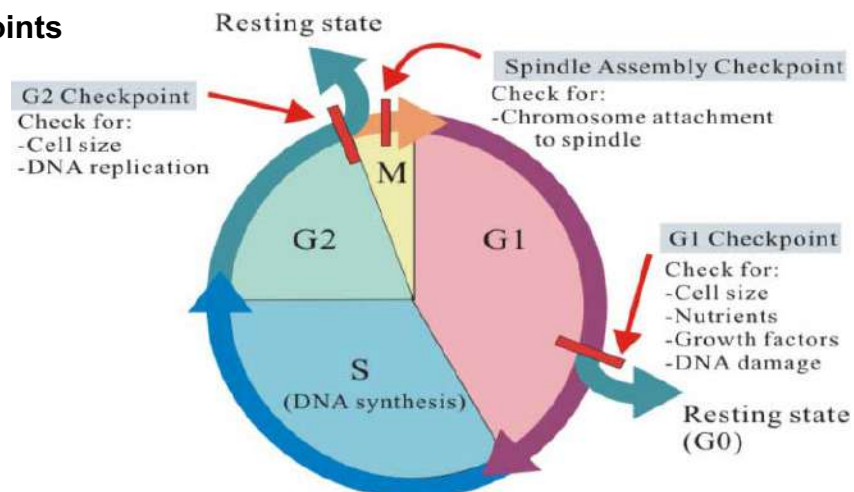
- The cell cycle ends with _____ : the division of the _____
 - Accompanies *mitosis*
- This means one cell has divided into two cells, and those two cells can continue with their own independent cell cycles!

-Regulation of the Cell Cycle

- _____ : Proteins that regulate the rate of the cycle
 - _____ regulation: cell cycle can't proceed until certain levels of these proteins are reached
 - ex. Poor nutrition → cell stays in G1
 - _____ regulation: cycle can speed up or slow down

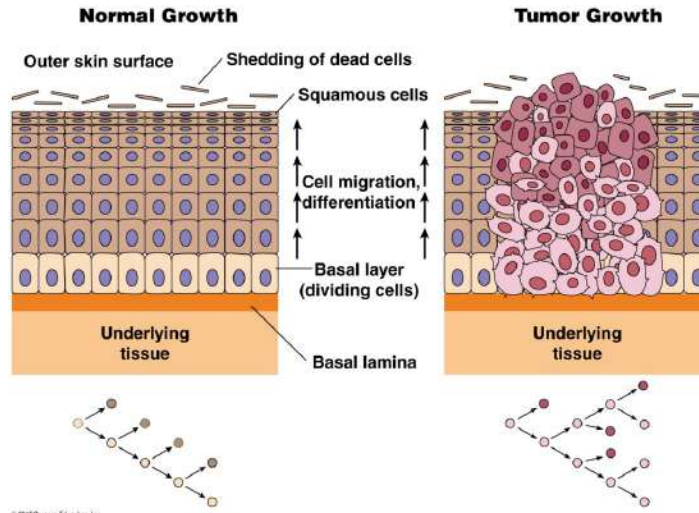
Think about it: Do you think a paper cut on your finger would cause the cell cycle to speed up or slow down?

Cell Cycle Checkpoints



Cancer

- Sometimes errors in the cell cycle can lead to _____: uncontrolled cell growth
 - Errors can be _____ or due to an _____ toxin
- Internal regulation error followed by external; cells cannot “feel” their neighbors, and thus begin uncontrolled division
 - Lack _____ dependence (tumor) and _____ dependence (metastasized cancer cells)



Mitosis

- _____ refers to the division of the cell
- Asexual reproduction for _____
- Occurs in response for the body's need for _____ and _____

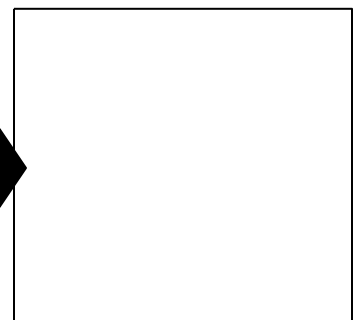
-More about Mitosis

- Occurs in _____
- _____ cell divides to produce _____ daughter cells
- These cells are _____ to the original cell
 - Same number of _____

-Stages of Mitosis

Stage 1: _____

- _____ dissolves
- _____ condenses into _____
 - _____: uncondensed DNA (looks like spaghetti)
 - _____: condensed DNA (looks like X's)



- _____ move to opposite ends of the cell
- _____ forms and fibers extend from one side to the other

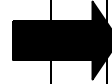
Stage 2: _____

- _____ (middle of chromosome) attach to spindle fibers
- Chromosomes are _____ to the middle of the cell



Stage 3: _____

- Spindle fibers pull _____ apart
- Each sister _____ moves toward _____ end of the cell



Stage 4: _____

- _____ reforms
- Spindle fibers disappear
- Animal Cells:
 - Cell membrane _____
- Plant Cells:
 - New _____ begins to form



Cytokinesis

- Division of _____ and _____
- _____ cell is now _____ identical cells

