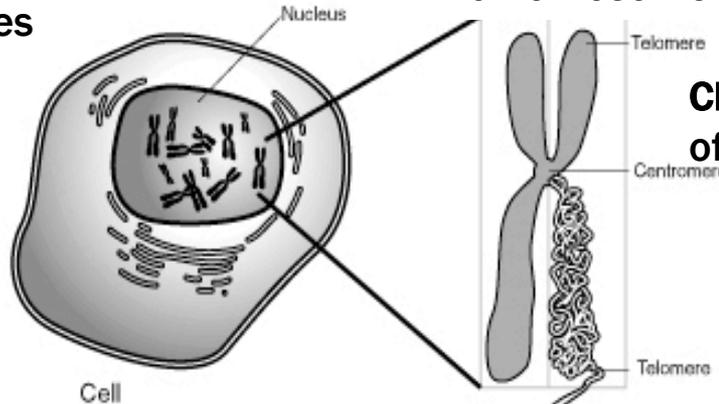


DNA REPLICATION

DNA Notes
Day 2

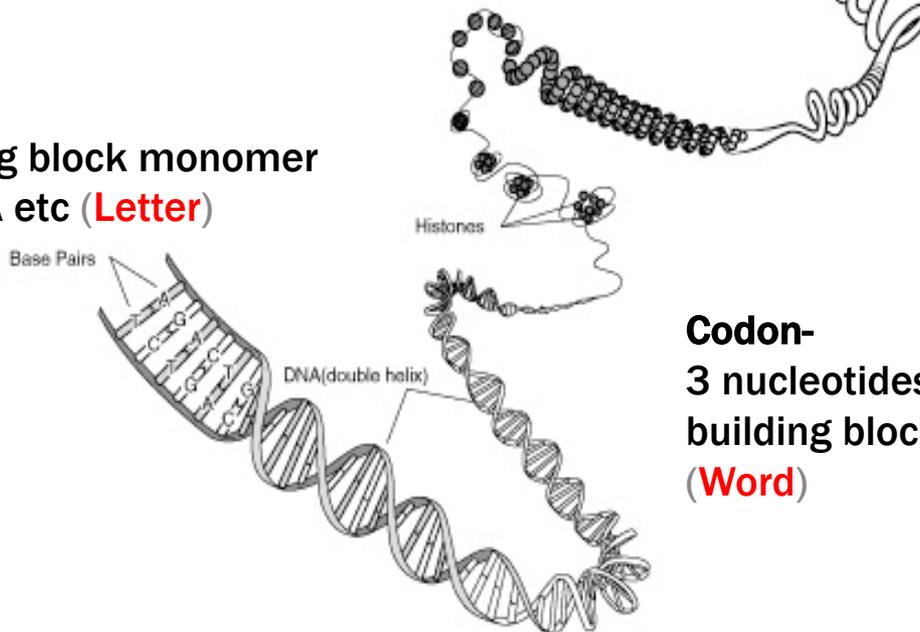
Genome-
full set of 46 chromosomes
(**Library**)



Sister chromatids-
Two identical copies of the same
chromosome (2 copies of same book)

Chromosome- one long strand
of DNA (**1 book**)

Nucleotide-
One building block monomer
of DNA; T, A etc (**Letter**)



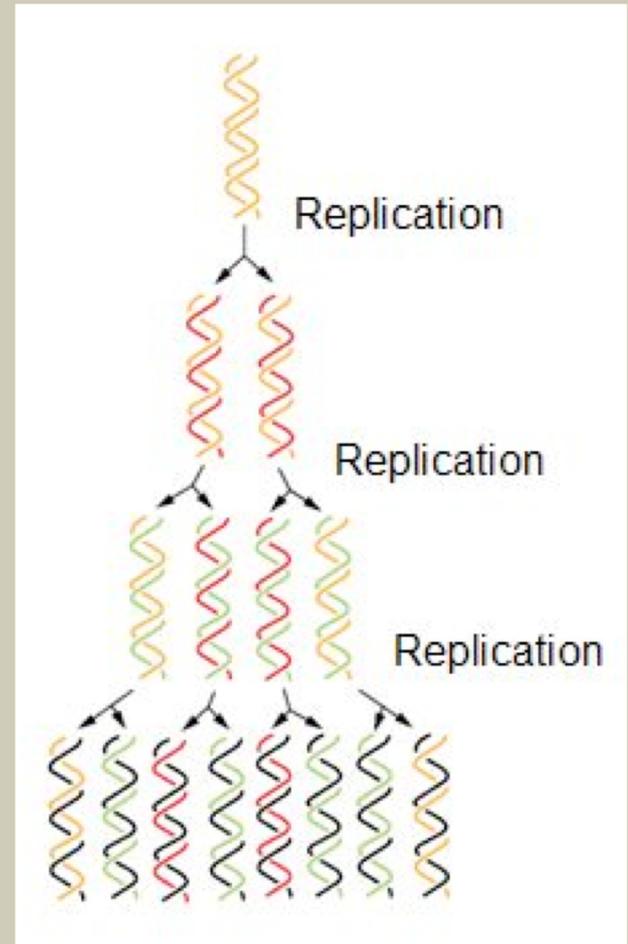
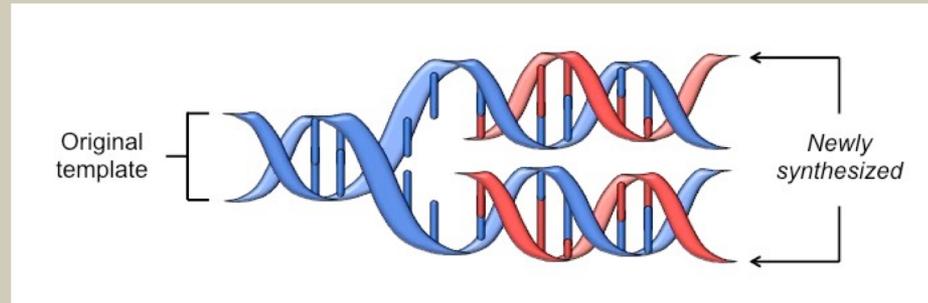
Gene-
A section of a chromosome
that codes for one protein
(**Recipe**/Story)

Codon-
3 nucleotides that code for one amino acid
building block of a protein (TAC or TTA)
(**Word**)

DNA REPLICATION

DNA Replication = the process of copying 1 strand of DNA into 2 identical strands

DNA copied in nucleus and then cell splits

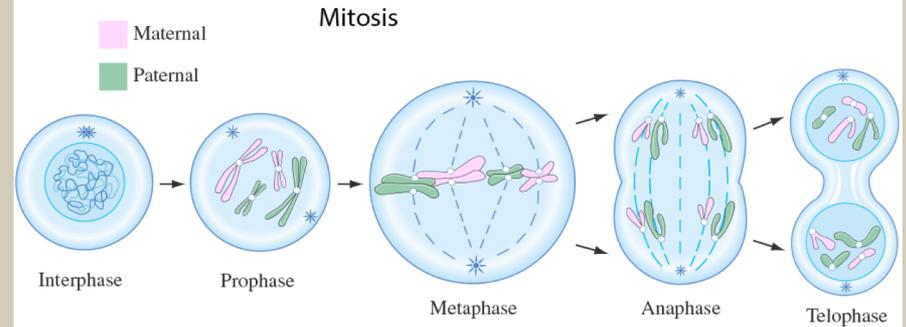


WHY COPY DNA?

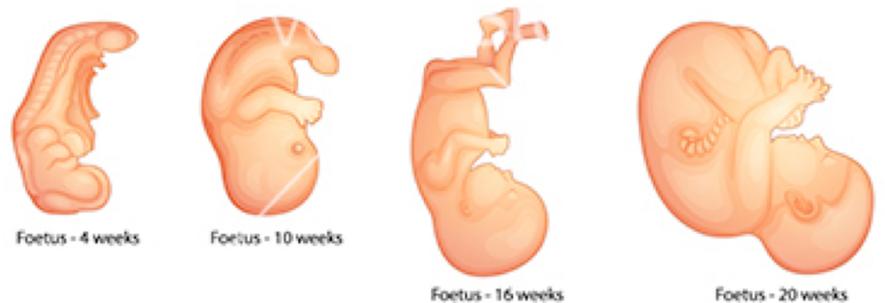
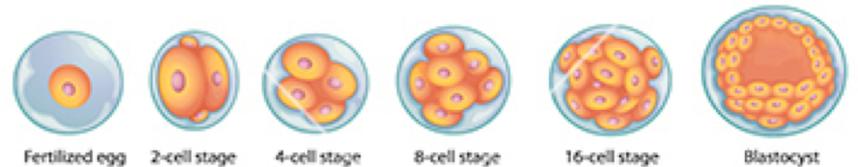
Purpose

-to create 2 identical DNA copies to pass down to dividing daughter cells

(**Mitosis** = cell division for growth and repair)



Human Embryonic and Foetal Development



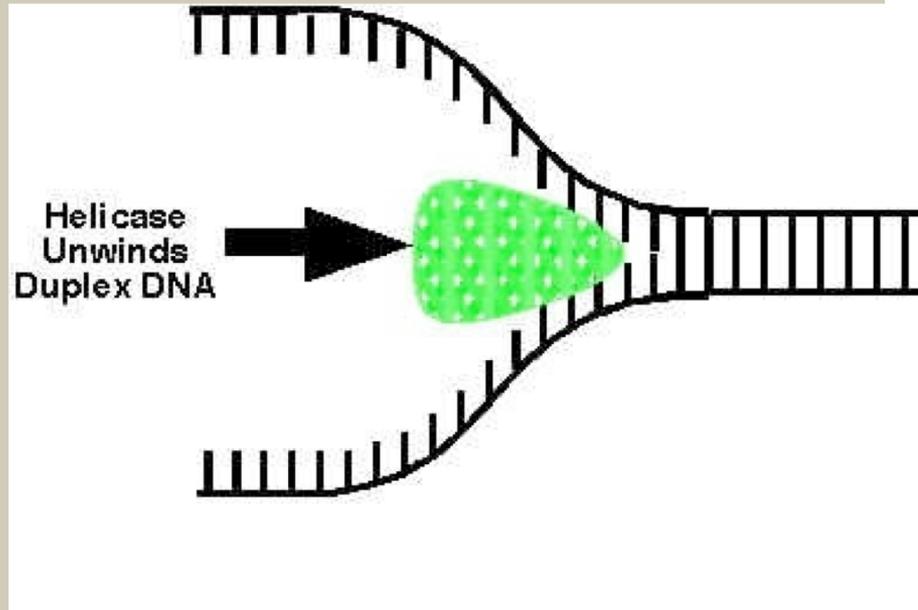
Embryonic Development

STEPS OF DNA REPLICATION

1. Unzip

Helicase Enzyme-

breaks hydrogen bonds to unzip the DNA helix down the middle

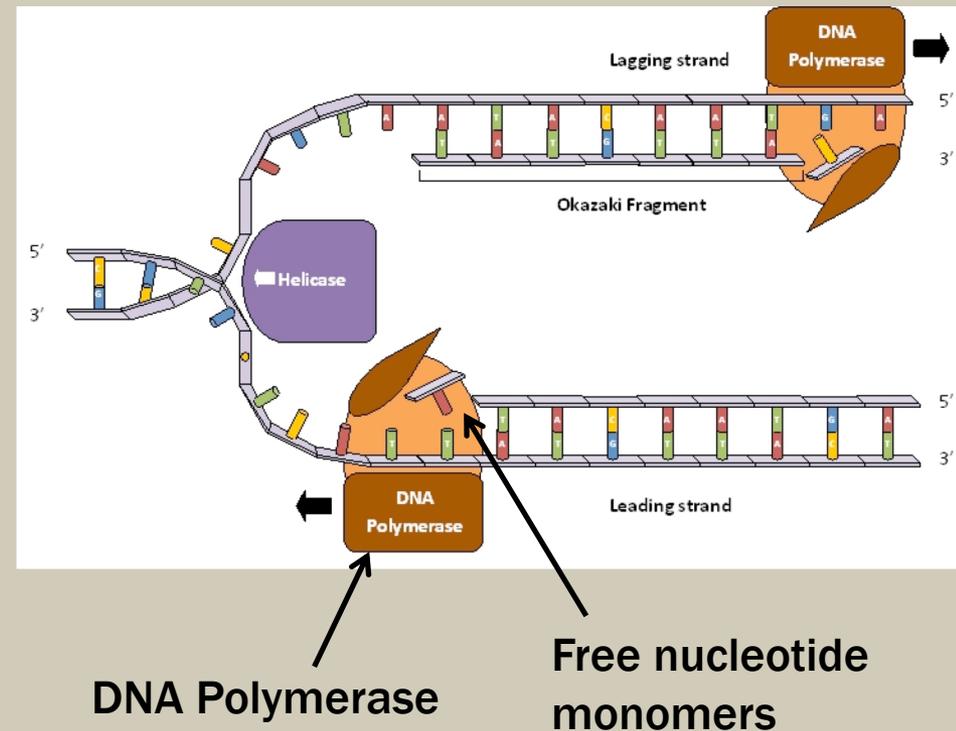


STEPS OF DNA REPLICATION

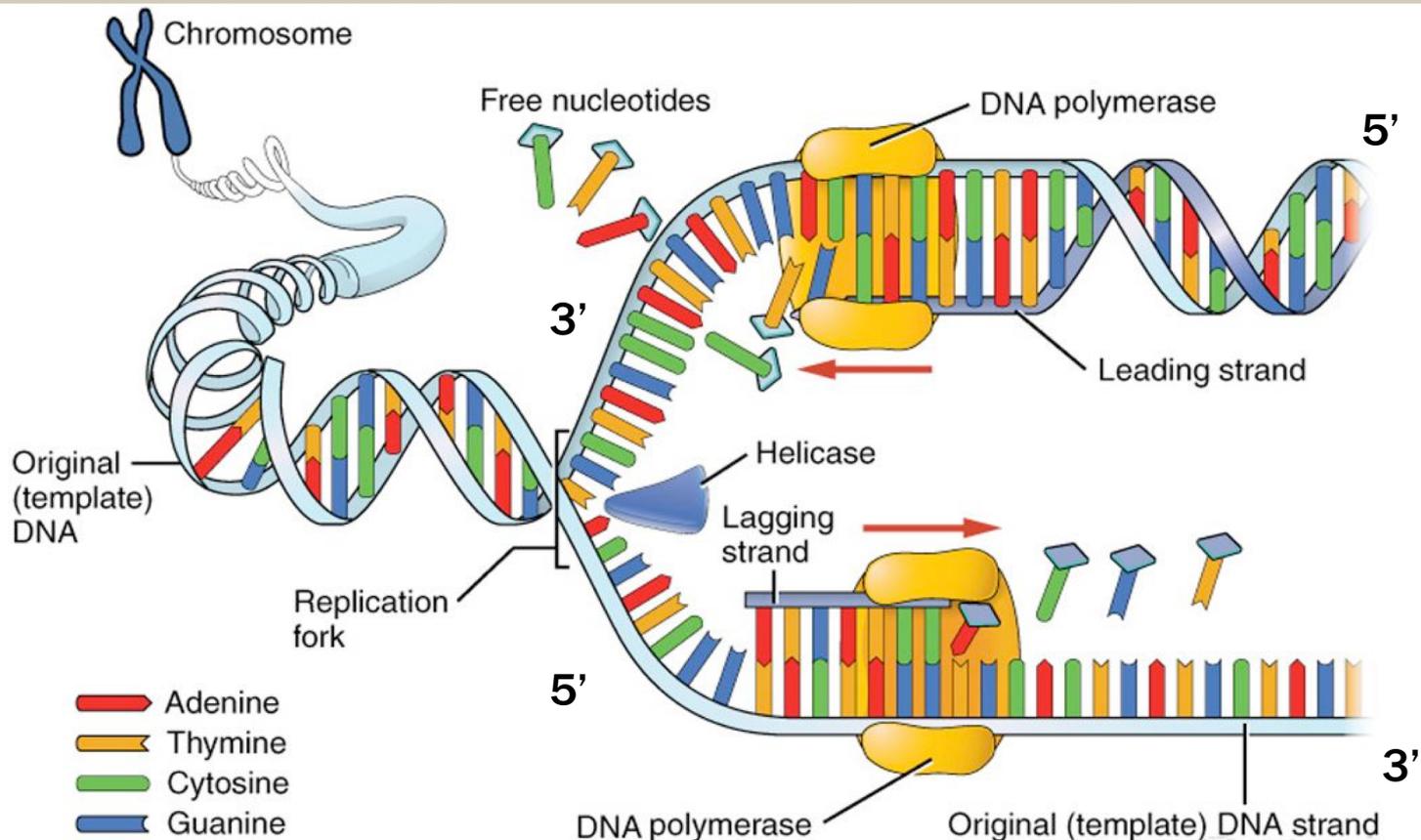
2. Build Polymer

DNA Polymerase

Enzyme – builds DNA polymer by pairing free nucleotides to open DNA using base pair rule

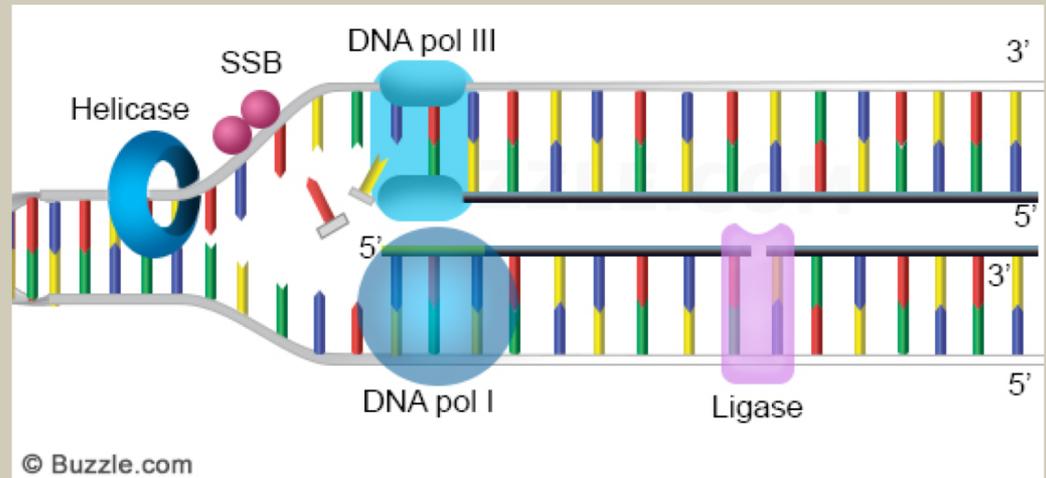


- Polymerase builds **5' to 3'** direction only
- **Leading strand** works into the **Replication Fork**
- **Lagging strand** works in small sections (Okazaki fragments) as helix unzips



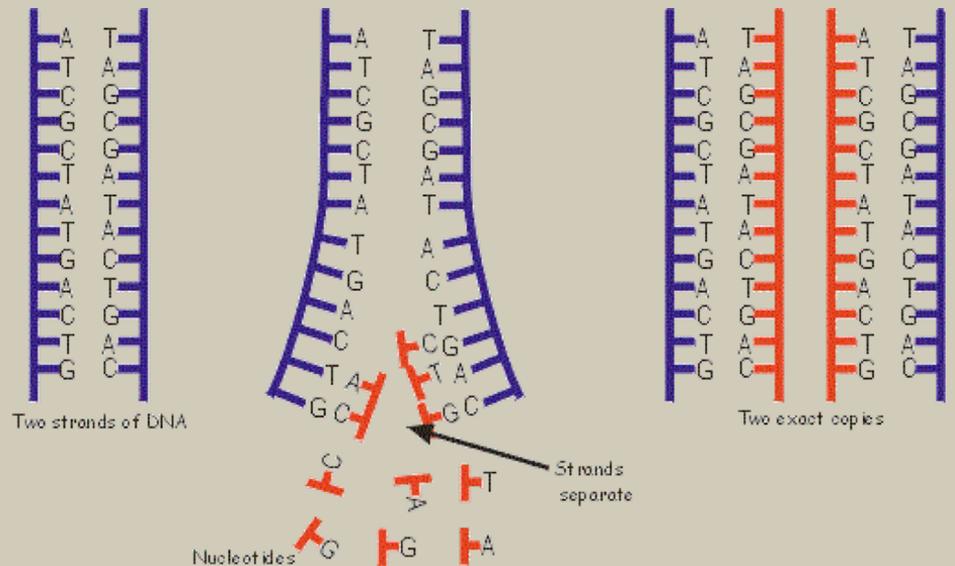
STEPS OF DNA REPLICATION

3. Repair and Glue
Ligase Enzyme-
repairs any mutations (copy errors) and glues open covalent bonds in the sugar-phosphate sides



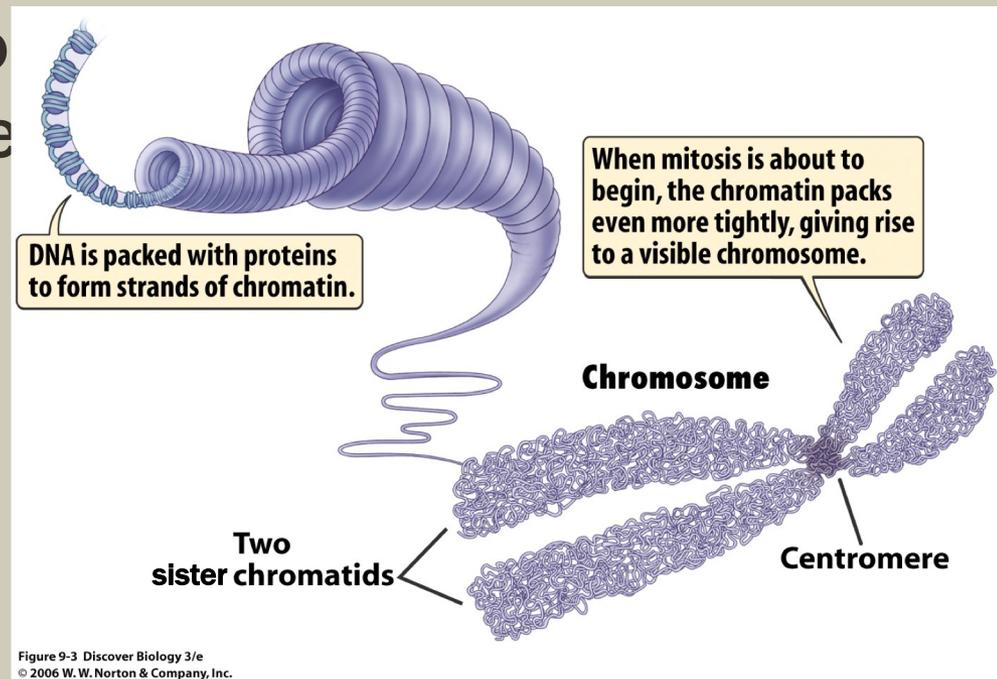
SEMI-CONSERVATIVE

- The copy process is **semi-conservative**; the new DNA is half (semi) old and half new.
- The **old** side was kept (conserved) as a template to make the **new** complementary side



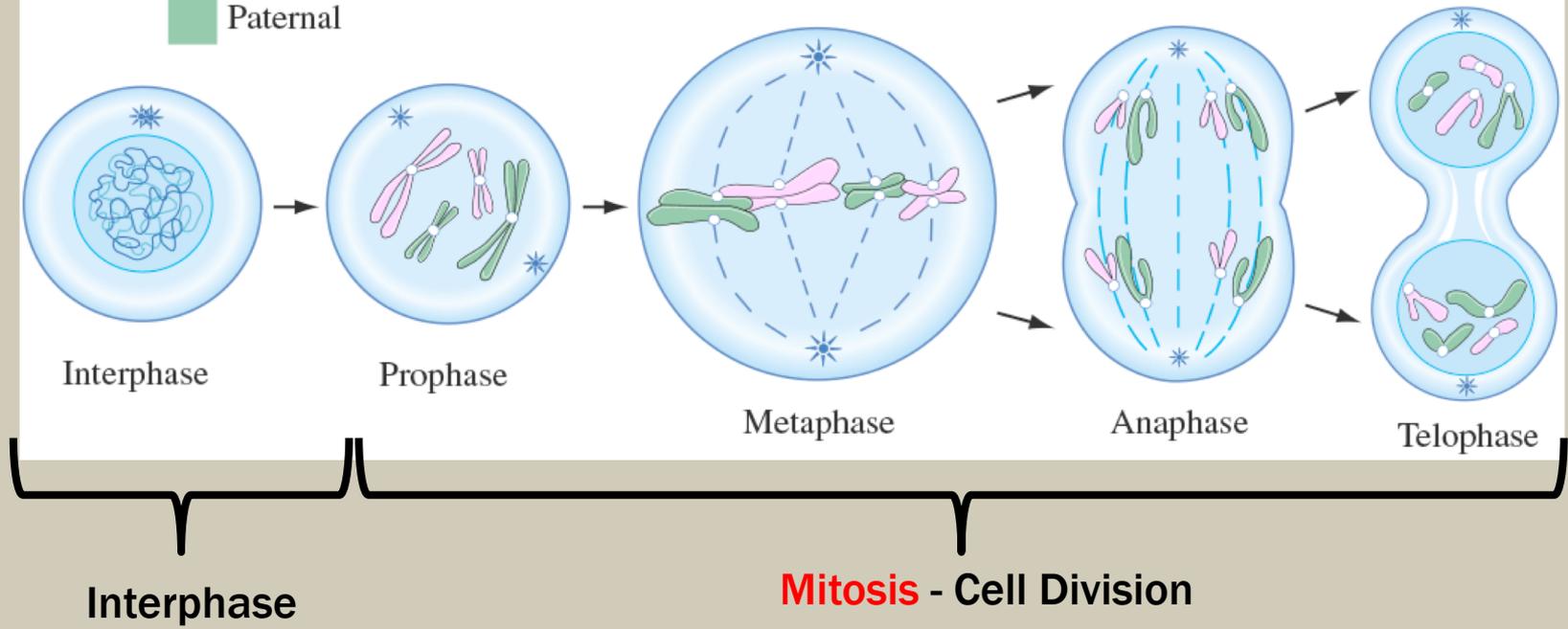
WHAT IS PRODUCED?

- **Sister chromatids** 2 identical DNA copies of the same chromosome ready to be passed down to dividing cells.
- After replication DNA is coiled up to prevent damage during cell division



Cell Cycle

Maternal
Paternal

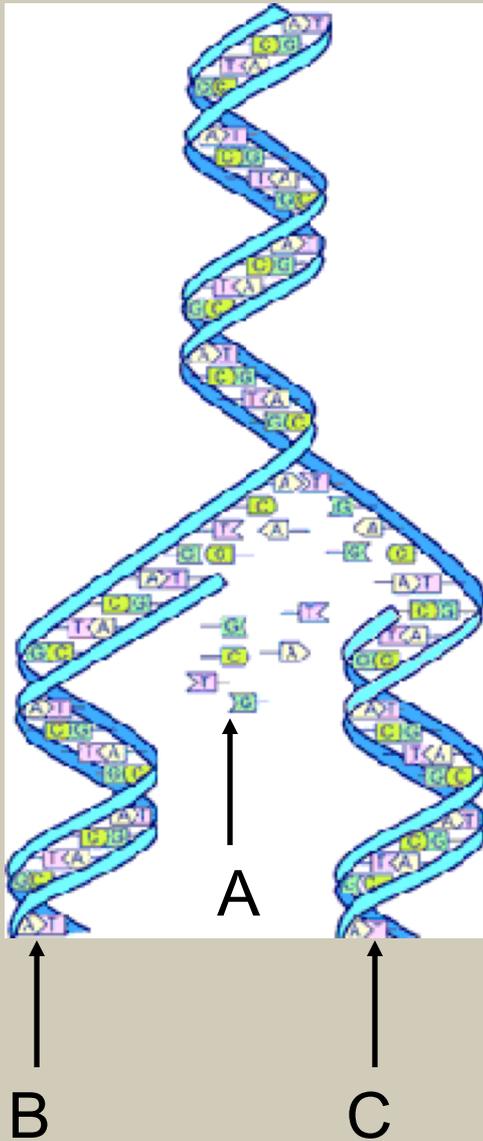


Cells are “actively metabolizing” unwound DNA (**chromatin**) to make protein.

At end of interphase DNA replicates to prepare for mitosis

Metabolism shuts down and DNA coils up.

Chromosomes line up and separate into 2 new identical **daughter cells**



1. What is happening in the picture?
What is that process called?
2. Why does this happen?
3. What is made?
4. What are the 3 steps (and their 3 enzymes)?
5. What are the objects labeled A?
6. How do the two strands compare when this process is complete?
7. Why is this process called semi-conservative?

