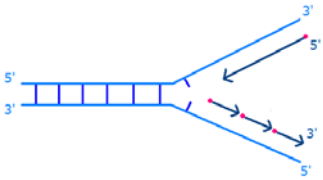
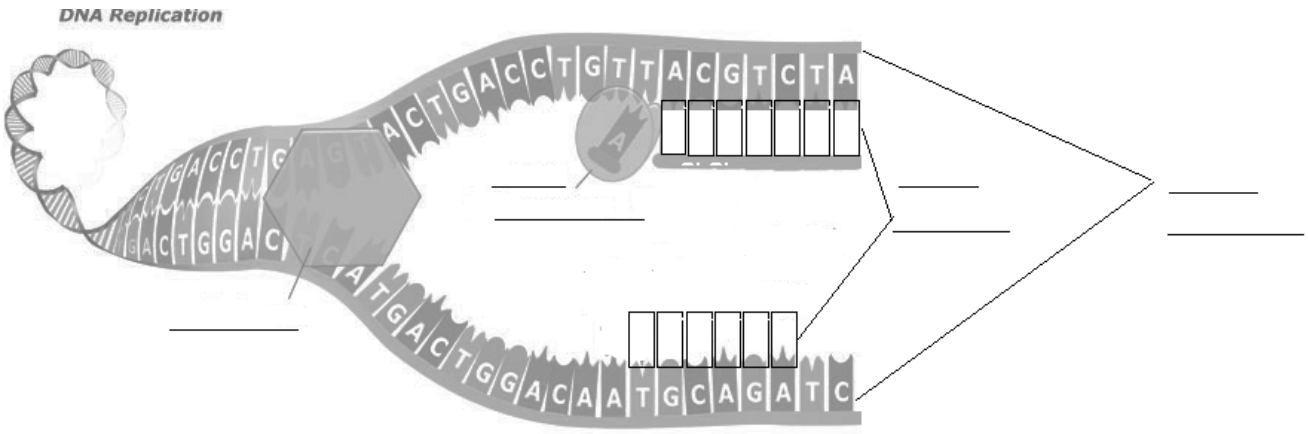
Class Notes *DNA Replication* **Questions/Main Idea:**	Name: _____ Period:_____ Date: _____ **Notes:**
Replication and cell division	• All DNA must be copied before cell division (mitosis) so each daughter cell can receive a complete set. • DNA replication occurs during the S phase of the cell cycle, before chromatin condenses into chromosomes.
3 main steps to replication	• Step 1 – **Helicase unzips** the DNA strand by breaking the hydrogen bonds between base pairs; creates two new "template" strands • Step 2 – **DNA polymerase** inserts new complementary bases • Step 3 –**DNA polymerase** proofreads the sequence; fixes errors
Antiparallel strands of DNA	• Notice that one strand is always upside-down relative to the other strand? • The two strands are antiparallel to each other
Direction of replication  	• One DNA strand forms in the same direction that helicase unzips it • The other one must go the other way (because DNA is **antiparallel**) • This causes fragments of DNA to form, which are then later sealed by another enzyme
The result of replication is…	…two new strands of DNA that are **exactly the same as the original strand**
Why is DNA called semi-conservative?	• DNA replication is called **semi-conservative** because each strand has an **old** part and a **new** part • **Semi** = half or part; **conservative** = preserving the old ways
DNA replication is very accurate	• DNA polymerase laying down new nucleotides makes 1 error per 1,000,000 nucleotides • Sounds good? • 3,000,000,000 base pairs in the each human cell…3,000 possible errors each time our cells replicate • BUT…after DNA Polymerase is done, other enzymes "proofread" and correct the new strand • Afterward, the error rate is about 1 error per 10,000,000,000 or 1 error every 3 cell divisions.
Summary:	

Base Pair Practice: For each example below, please give the correct complementary strand of DNA.

1. T T G C T A G
2. T A G C G C T
3. A C C G T C A
4. G C T A T G T

Replication Practice: Label the parts of the diagram, write the correct letters in the boxes: