Section 12.2

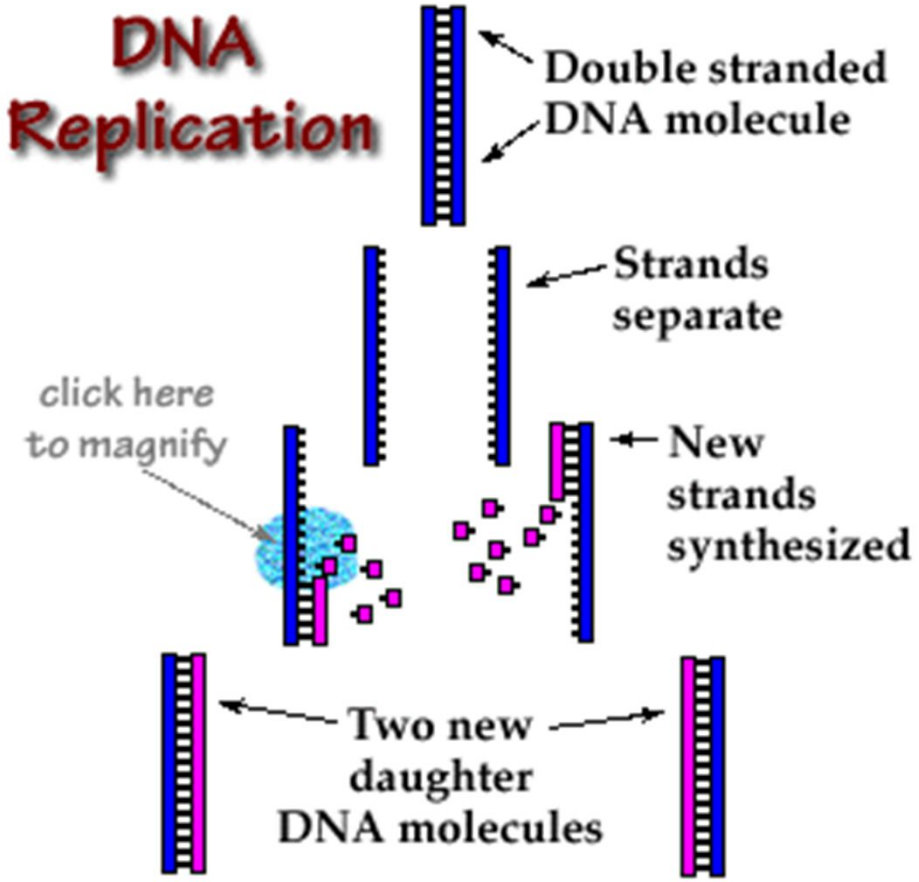
Replication of DNA

Semiconservative Replication

- *DNA replicates by making a strand that is complementary to each original strand*
  - What does replicate mean?
  - What does complementary mean?
  - What is a strand?
- Must be done correctly so the DNA stays the same
  - What could happen if it is done incorrectly?

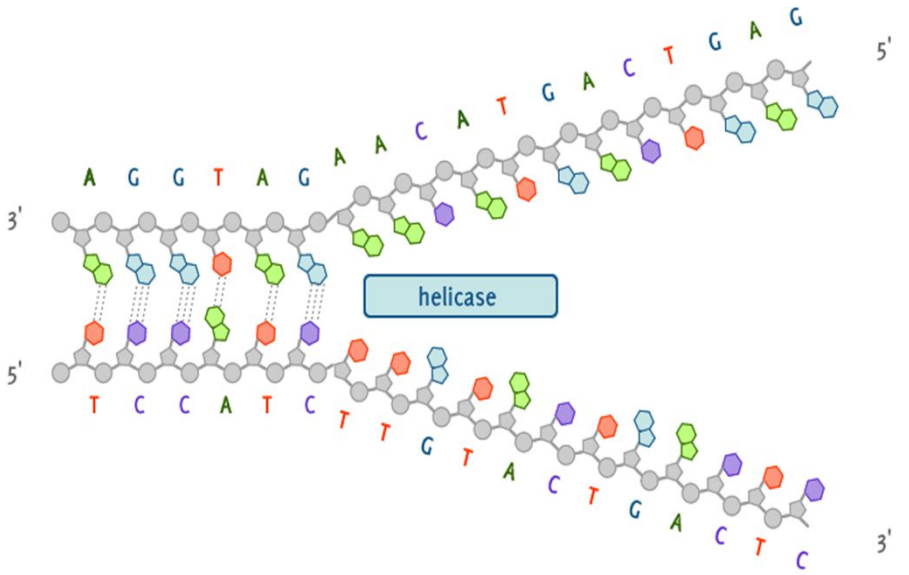
Semiconservative Replication

- Parental strands of DNA separate
- These serve as templates to produce new DNA
- New DNA has one strand of parental DNA and one strand of new DNA
- Occurs during interphase of mitosis and meiosis



Semiconservative Replication

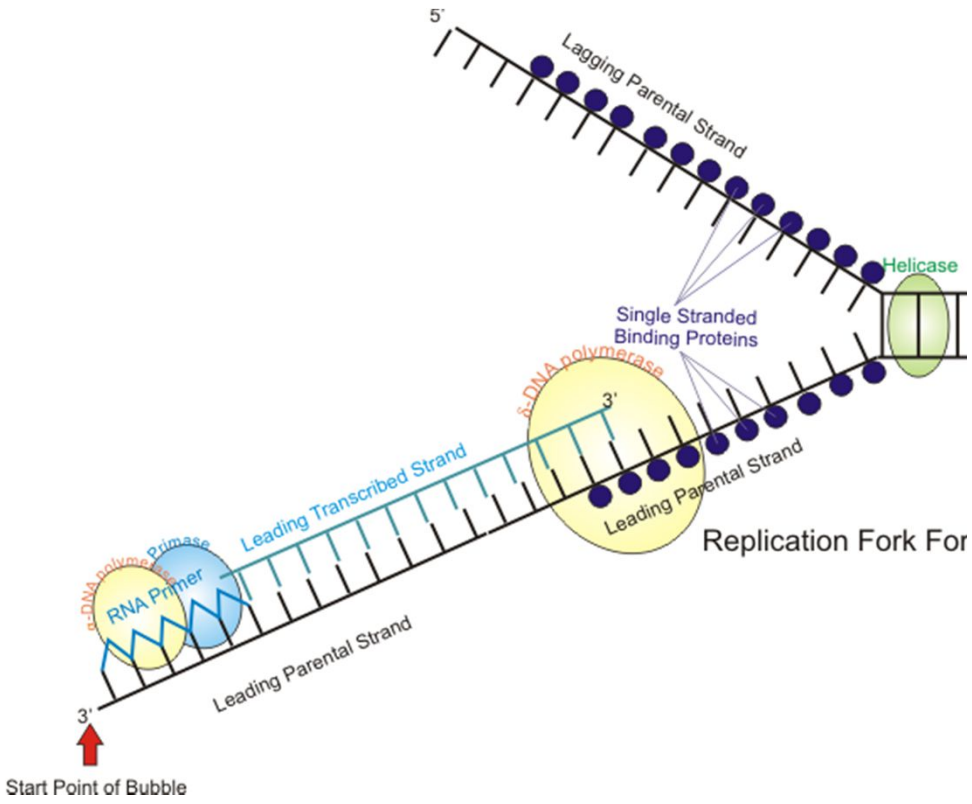
- Step One: Unwinding
  - An enzyme named **DNA helicase** unzips the helix
  - This breaks the hydrogen bonds between the bases
  - Results in single strands of DNA



helicase

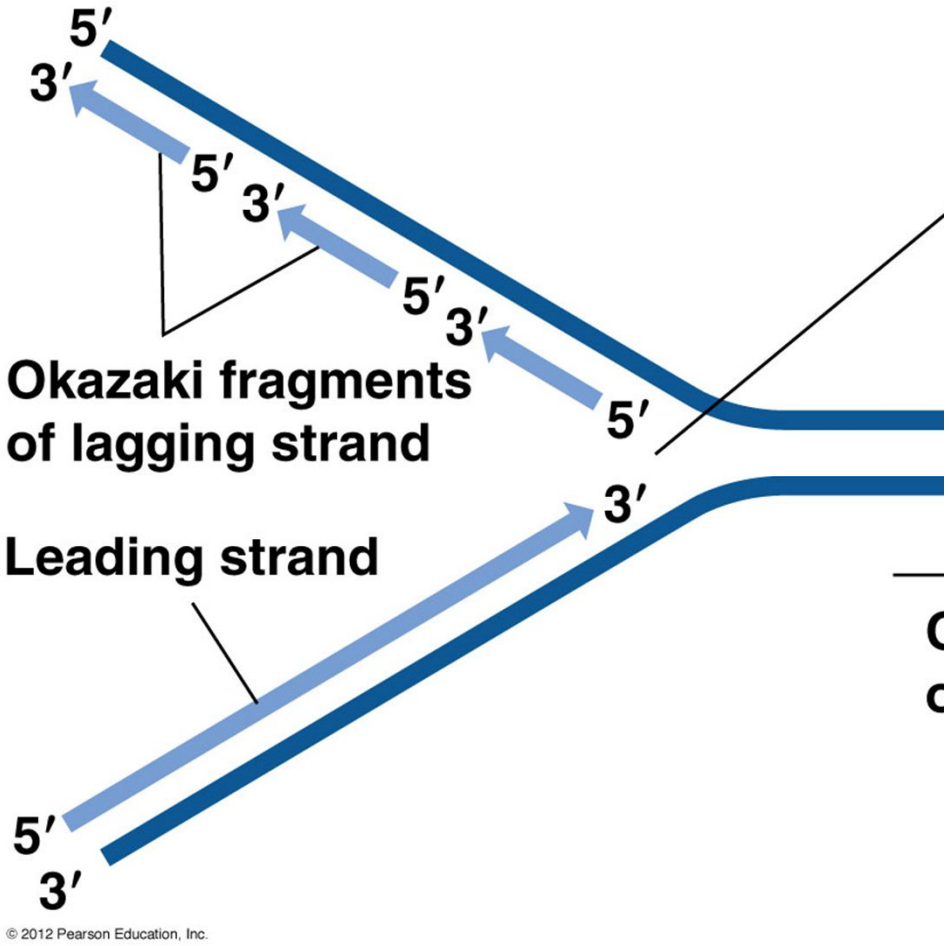
Semiconservative Replication

- Step Two: Base Pairing
  - A new enzyme, **DNA Polymerase**, helps to add correct bases
  - Added to the 3′ end of the new strand
  - Still observes base pairing rules
  - <u>Leading strand</u> – made as the DNA unwinds from the 3′



Semiconservative Replication

- Step Two: Base Pairing
  - Lagging Strand – added in fragments
  - Okazaki fragments are added to the lagging strand
  - connected later by another enzyme, **DNA ligase**



Semiconservative Replication

- Step Three: Joining
  - DNA ligase comes at the end as well
  - Joins the pieces of DNA together to form the final double helix
  - In eukaryotes, many sites of replication occur at once