1. **Chapter 12**
   DNA Replication & Recombination
2.
   - Speed & accuracy
     - E. coli
       - 1000 nucleotides per second
       - < 1error per billion nucleotides
3.
   - Semi conservative replication
     - Meselson & Sthal's Experiment
4.
   - Replicons
     - Replication origin
       - Bacterial
       - Eukaryotic
5.
   - Theta replication – (Greek letter θ)
   -
   -
   -
   -
   -
   - Rolling-circle replication
6.
   - Linear eukaryotic
     - 500-5000 nucleotides per minute
     - Thousands of replicons
7. **Replication**
   - DNA polymerase
     - Nucleotides added to 3' end of new strand
       - (5'→ 3')
       -
8. **Requirements of replication**
   - Template
     - ssDNA
   - Substrates
     - Deoxyribonucleoside triphosphates (dNTP's)
   - Enzymes
     - Read template assemble substrates
       - Phosphodiester bond
9.
   - Process at replication fork
     - DNA polymerases
       - Add only to 3' OH group
       - Always elongate 5' to 3'
     - Leading strand
       - continous
     - Lagging strand
       - Okazaki fragments
10. **Stages of replication**
    - Bacterial DNA replication
      - Iniation

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- Unwinding
- Elongation
- termination

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- Initation
  - oriC
  - Iniator proteins

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- Unwinding
  - DNA helicases
    - H-bonds
  - Single-strand-binding proteins
    - Non-specific
  - DNA gyrase
    - Topoisomerase
    - Antibiotics
      - ☐4-quinolones

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  - Primase
    - RNA primers

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- Elongation
  - DNA polymerase III
    - Synthesizes 5'→ 3‘
    - Endonuclease 3'→ 5‘
    - Clamp subunit
  - DNA polymerase I
    - Removes primers
  - DNA polymerase II, IV, V
    - Repair
  - DNA Ligase
    -

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- Termination
  - Encounter another fork
  - Termination sequences
  - Termination protein

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- Accuracy
  - <1 mistake per billion nucleotides
  - Proofreading
    - polymerase
  - Mismatch repair

17 **Eukaryotic**

- Replication licensing factor
  - Active after mitosis before replication iniation
- Different DNA polymerases
  - 15 polymerases
    - Replication, recombination, repair
- Nucleosomes
  - Histone proteins
- Cell cycle checkpoints

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- G1/S
- G2/M
- Spindle-assembly
-

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