

**DNA Replication Basics**

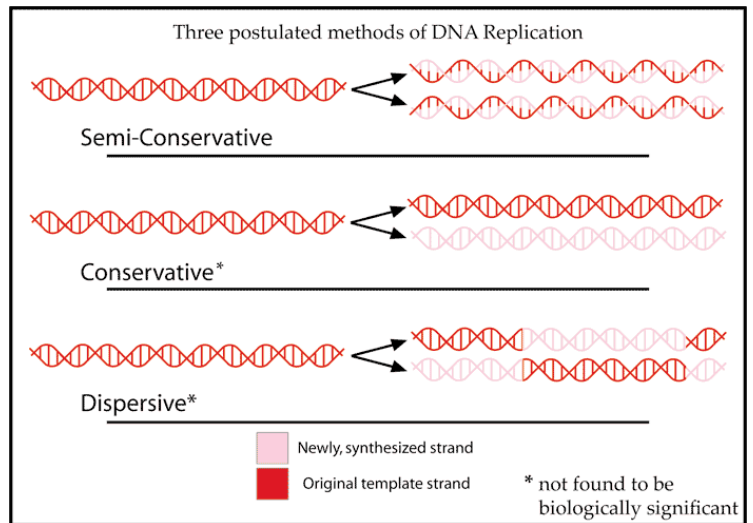
1. If a strand of DNA has 14 guanines and 37 thymines, how many adenines will it have? (3)
2. If a strand of DNA has 12 cytosines and 15 thymines, how many guanines will it have?
3. For each of the following complete the missing line:
 

a. DNA: T A A G C G T A G C T G Complimentary DNA: _____	c. DNA: _____ Complimentary DNA: C A A A A T G C G T G T
b. DNA: G C C G A T A T G C A A Complimentary DNA: _____	d. DNA: _____ Complimentary DNA: A C T C T C G T G T G A

**Analysis of Meselson and Stahl's Experiment: Theory of Semi-conservative DNA Replication**

The image to the right details the three possible methods of DNA replication.

Deepen your understanding of Meselson and Stahl's experiments by using the McGraw and Hill animation ([http://highered.mheducation.com/sites/0072437316/student\\_view0/chapter14/animations.html](http://highered.mheducation.com/sites/0072437316/student_view0/chapter14/animations.html)) or the Scitable article by Nature Education ([nature.com/scitable/topicpage/Semi-Conservative-DNA-Replication-Meselson-and-Stahl-421](http://nature.com/scitable/topicpage/Semi-Conservative-DNA-Replication-Meselson-and-Stahl-421)).



1. At the start of a Meselson and Stahl experiment (generation 0) a single band of DNA with a density of 1.730 g cm<sup>-3</sup> was found. After 4 generations two bands were found, but the main band had a density of 1.700 g cm<sup>-3</sup>.
  - a. Explain why the density of the main band changed over four generations. (2)
  - b. After one generation only one DNA band appeared, but the density had changed.
    - i. Estimate the density of the band. (1)
    - ii. Which (if any) mechanisms of DNA replication are falsified by this result? (1)
    - iii. Explain why the identified mechanism(s) are falsified. (1)
  - c. Describe the results after two generations and which mechanisms and explain the identified mechanism(s) (if any) are falsified as a consequence. (3)
  - d. Describe and explain the result found by centrifuging a mixture of DNA from generation 0 and 2. (2)