

Solutions

2.1 A New DNA is synthesized in the 5' to 3' direction. In a simplified fork model, one new strand can be synthesized continuously while the other is produced in fragments that are joined. Distinguish these molecular mechanisms from the later separation of chromosomes during cell division. Copying errors can occur despite proofreading and repair.

2.2 After 3 complete rounds there are $2^3 = 8$ molecules. Two retain original strands; $2/8 \times 100 = 25\%$.

2.3 False. Replication uses DNA as a template to make DNA; transcription uses a DNA template to make RNA. A predicted label distribution assumes complete rounds and no degradation or exchange of the labelled material.

2.4 semi-conservative replication. semi-conservative replication means DNA copying in which each daughter double helix retains one parental strand.

3.1 Two original strands persist among 16 molecules: $1/8 = 12.5\%$. Templates are retained while new strands are synthesized; assume no degradation or strand exchange. This does not require unsupported SL fork detail.