

Names: _____

Analyzing Data: Genome Replication

Replication of the 4,639,221 base pairs of DNA in the bacterium *E. coli* begins at a single point and continues in both directions until the entire circular chromosome is copied. The bacterium can complete replication of its chromosome in as little as 20 minutes.

1. Two DNA replication complexes move around the *E. coli* chromosome. How many bases are copied by each complex during the replication process?

2. Calculate the number of bases that must be copied per second by each replication complex in order to replicate the entire *E. coli* genome in 20 minutes.

3. The human genome consists of approximately 3 billion base pairs of DNA. Calculate how long (in days) a single replication complex would take to copy the DNA of a single human cell (assume it moves at the same speed as an *E. coli* complex).

4. Does the length of time in #3 seem reasonable to you? How do cells speed up the rate of replication?

