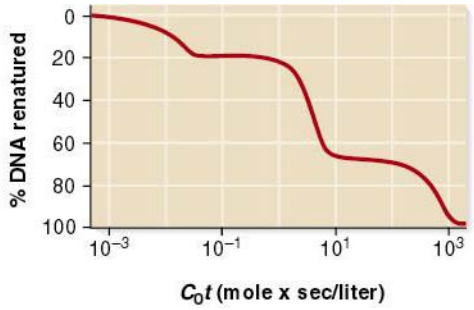
S1.Here is a C_0t curve for a hypothetical eukaryotic species:



Estimate the amount of highly repetitive DNA, moderately repetitive DNA, and unique DNA.

Answer: About 20% is highly repetitive and renatures quickly, about 50% is moderately repetitive, and about 30% is unique and renatures very slowly.

S2. Let's suppose that a bacterial DNA molecule is given a left-handed twist. How does this affect the structure and function of the DNA?

Answer: A left-handed twist is negative supercoiling. Negative supercoiling makes the bacterial chromosome more compact. It also promotes DNA functions that involve strand separation. These include gene transcription and DNA replication.

S3. To hold bacterial DNA in a more compact configuration, specific proteins must bind to the DNA and stabilize its conformation (as shown in fig. 10.5). Several different proteins are probably involved in this process. These proteins have been collectively referred to as "histonelike" due to their possible functional similarity to the histone proteins found in eukaryotes. Based on your knowledge of eukaryotic histone proteins, what biochemical properties would you expect from bacterial histonelike proteins?

Answer: The histonelike proteins have the properties that are expected for proteins involved in DNA folding. They are all small proteins that are found in relative abundance within the bacterial cell. In some cases, the histonelike proteins are biochemically similar to eukaryotic histones. For example, they tend to be basic (i.e., positively charged) and bind to DNA in a non-sequence-dependent fashion. However, other proteins appear to bind to bacterial DNA at specific sites in order to promote DNA bending.

S4. If an organism is shown to have two different satellite DNAs by equilibrium density gradient centrifugation, what does this tell you about the types of sequences within the satellites? In other words, do the two satellites have the same or different repeated sequences? Explain your answer.

Answer: The two satellites must have different sequences. The density of the DNA depends on its base sequence.