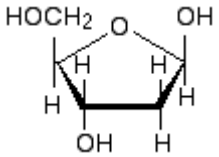
DNA: TRANSCRIPTION TO RNA

1. This question looks at how messenger RNA differs from DNA. All references to RNA imply messenger RNA.

   a) DNA is found as a double helix. What is the physical structure of RNA?

   b) RNA is much shorter than DNA. Why?

   c) DNA contains the sugar deoxyribose; RNA contains ribose instead. Deoxyribose is



   Draw the structure of ribose.

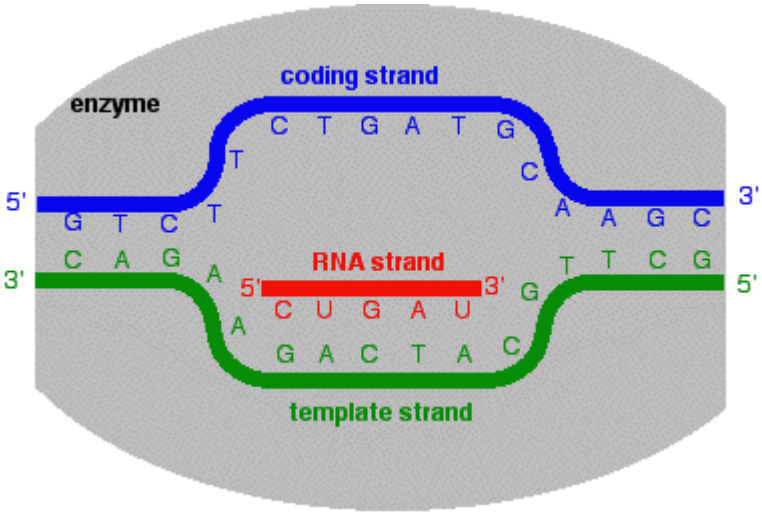
   d) The four bases in DNA are adenine (A), thymine (T), guanine (G) and cytosine (C). What are the bases in RNA?

2. This question is about the transcription process. In the DNA molecule, one of the strands is known as the coding strand, and the other as the template strand. Transcription is under the control of the enzyme RNA polymerase.

   a) Transcription involves copying the information in individual genes in the DNA molecule into messenger RNA. What is a gene?

   b) How does the enzyme find the start of the gene in the DNA coding strand?

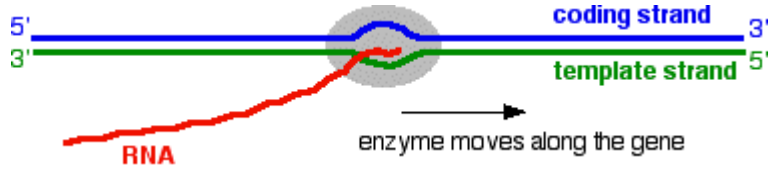
   c) The diagram (taken from the Chemguide page) shows the beginning of a transcription process. The enzyme has split the DNA strands apart, and is building a new RNA molecule on the template strand.



(i) What would be the next four bases in the RNA chain?

(ii) The RNA strand being formed isn't an exact copy of the DNA coding strand. What is the difference?

d) The enzyme moves along the chain, zipping the two strands up again behind it, as in this diagram also taken from the Chemguide page.



How does the enzyme know when it has got to the end of the gene and so must stop the transcription process?