

(p.308)25. Explain the concept of a reading frame.

The concept of a reading frame stems from our ability to extract an intended message from a written language which depends on reading the symbols in the correct groupings.

EX: "The red dog ate the cat" versus "her edd oga tet hec at"

26. Now here is an important idea: **DNA is DNA is DNA**. By this we mean that the code is nearly *universal*, and because of this, jellyfish genes can be inserted into pigs, or firefly genes can make a tobacco plant glow. Enjoy a look at Figure 17.5 in your text . . . and no question to answer here!

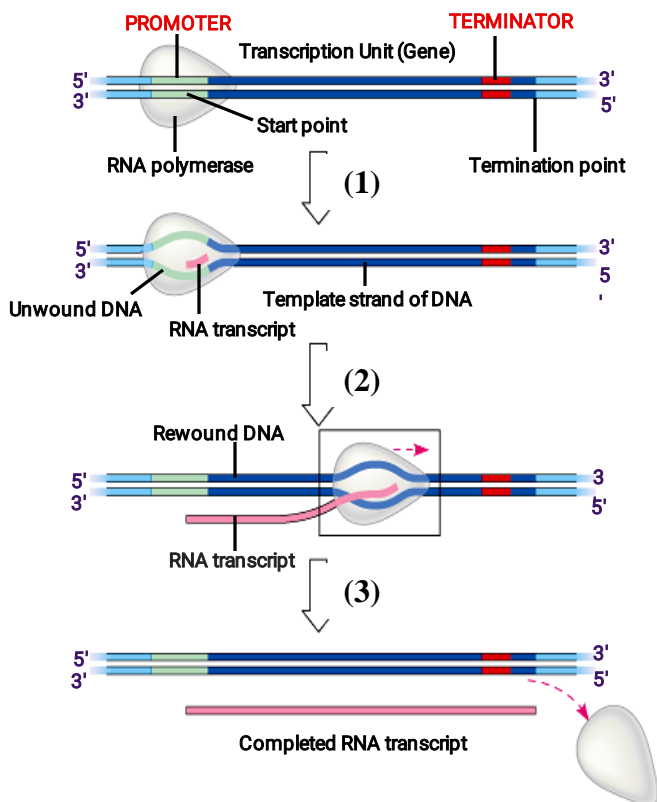
(p.309)27. Name the enzyme that uses the DNA template strand to transcribe a new mRNA strand.

RNA polymerase

(p.310)28. You will recall from Chapter 16 that DNA polymerase adds new nucleotides to the template DNA strand to assemble each new strand of DNA. Both enzymes can assemble a new polynucleotide only in the 5' → 3' direction. What does this mean exactly?

This means that RNA polymerase can add nucleotides only to the 3' end of the growing polymer. Thus an RNA molecule elongates in its 5'→ 3' direction.

(p.309)29. Figure 17.6 in your text will require a bit of study. Use it to label the following elements on the diagram below: promoter, RNA polymerase, transcription unit, terminator, template of DNA, and RNA transcript. Then, to the right of the figure, name the three stages of transcription and briefly describe each stage. (*Activity 17B*)



(1) **Initiation** - After RNA polymerase binds to the promoter, the DNA strands unwind, and the enzyme initiates RNA synthesis at the start point on the template strand.

(2) **Elongation** - The polymerase moves downstream, unwinding the DNA and elongating the RNA transcript 5'→ 3'.

(3) **Termination** - Eventually, the polymerase transcribes a terminator sequence, which signals the end of the transcript unit. Shortly thereafter, the RNA transcript is released, and the polymerase detaches from the DNA.

(p.310) 30. What is the difference between the promoter and terminator?

The promoter is the DNA segments where RNA polymerase attaches and initiates transcription while the terminator is the DNA sequence that signals the end of transcription.

(p.311) 31. RNA processing occurs **only** in eukaryotic cells. The primary transcript is altered at both ends, and sections in the middle are removed.

(a) What happens at the 5' end? **A guanine or a 5' cap is attached**

(b) What happens at the 3' end? **A poly(A) tail is attached**

(p.311) 32. What are three important functions of the 5' cap and poly-A tail?

(1) **Helps protect the mRNA from degradation by hydrolytic enzymes.**

(2) **Acts as an "attach here" signal for the ribosome.**

(3)

(p.312) 33. Distinguish between introns and exons. **HINT: Exons are expressed. (1993 Nobel Prize)**

Introns are the NONCODING segments of RNA while exons are the EXPRESSED regions which are eventually translated into amino acid sequences.

(p.312) 34. What are snRNPs? What two types of molecules make up a snurp?

(I like the word snurp! It reminds me of little blue cartoon characters called smurfs.)

snRNPs are small nuclear ribonucleoproteins composed of RNA and proteins which combine to form a spliceosome.

(p.312) 35. You will be introduced to a number of small RNAs in this course. What type is the RNA in a snRNP?

The type of RNA in a snRNP is a *small nuclear RNA* (snRNA).

(p.312) 36. Snurps band together in little snurp groups to form spliceosomes. What do spliceosomes do?

Spliceosomes cut out the introns and joins together the exons.