**Study Guide**

**DNA to protein review**

1. Briefly explain what is so special about the three features of DNA that make it an “ideal” genetic material.
2. Why is it important that DNA be capable of change, but not too much change?
3. Briefly describe the importance of the 1’, 3’, and 5’ carbons in a nucleotide of DNA.
4. In the context of a DNA double helix, what is meant by the term “complementary base pairing”?
5. In what direction does DNA polymerization proceed (in other words, are nucleotides added to the 3’ or the 5’ end of the developing strand)?
6. Why is DNA replication said to be “semi-conservative” rather than conservative”?
7. Briefly explain the DNA code.
8. Define three types of SNP mutations.
9. How does an INDEL differ from a SNP?
10. Briefly describe three ways in which RNA is different from DNA.
11. Compare and contrast mRNA, rRNA and tRNA in terms of their information content and functionality.
12. What is transcription, and where does it occur in the cell of a higher plant?
13. What is translation, and where does it occur in a cell of a higher plant?
14. What is the importance of the anticodon in a tRNA?
15. What are ribosomes made of and what do they do?
16. What is the difference between the sense and anti-sense strands of DNA in a particular gene?
17. What part of a gene is not transcribed, but is key for the initiation of transcription?
18. How does a freshly transcribed mRNA in the nucleus differ from a fully processed, mature mRNA in the cytoplasm?
19. What are introns and exons?
20. What are UTRs?
21. Do all genes code for proteins? If you answer “no”, give an example of what else a gene could code for.
22. Why is the genetic code said to be “degenerate”?
23. Which DNA strand (sense or antisense) is listed in sequence databases, and how does this relate to the information provided in a codon translation table?
24. Is the linear sequence of amino acids the end of the DNA-to-protein story?
25. Explain why you can deduce amino acid sequence from antisense DNA strand sequence but not DNA sense strand sequence from amino acid sequence.