Question Bank - example questions that could be used for assessment of learning

1. On the DNA sequence displayed below,
   1. mark a codon on the top strand that could be used as a start codon.
   2. mark a codon on the bottom strand that could be used as a start codon.

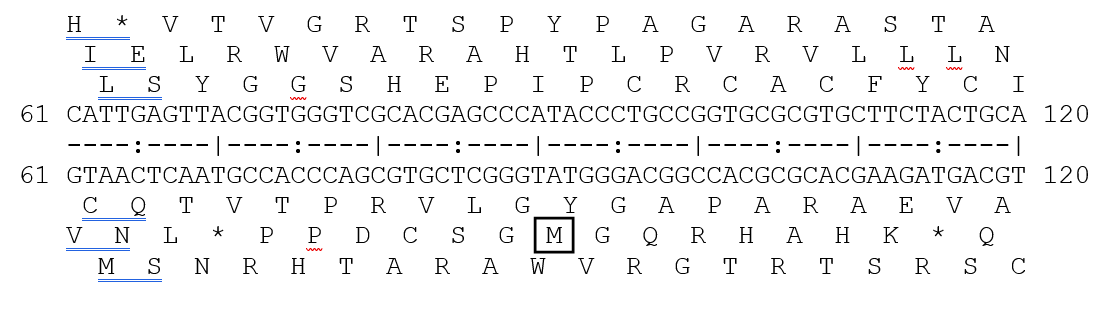
5’-CCGATGTACCATGTCATCGTATGGTACGCCATATGCCATACTGTTACG-3’

3’-GGCTACATGGTACAGTAGCATACCATGCGGTATACGGTATGACAATGC-5’

1. On the 6-frame translation below, mark two complete ORFs. One should be an ORF in the forward direction and one should be in the reverse direction. Assume that ATG is the only start codon used in this organism. For each ORF, circle the first amino acid, then draw a line to the end of the ORF.



1. Which of these finds and uses a start codon during gene expression?
   1. RNA polymerase
   2. DNA polymerase
   3. Ribosome
2. In a genome, it is possible for more than one potential start codon to be in an ORF.
   1. True
   2. False
3. During gene expression, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ begin(s) at a start codon.
   1. transcription
   2. translation
   3. both transcription and translation
   4. none of the above



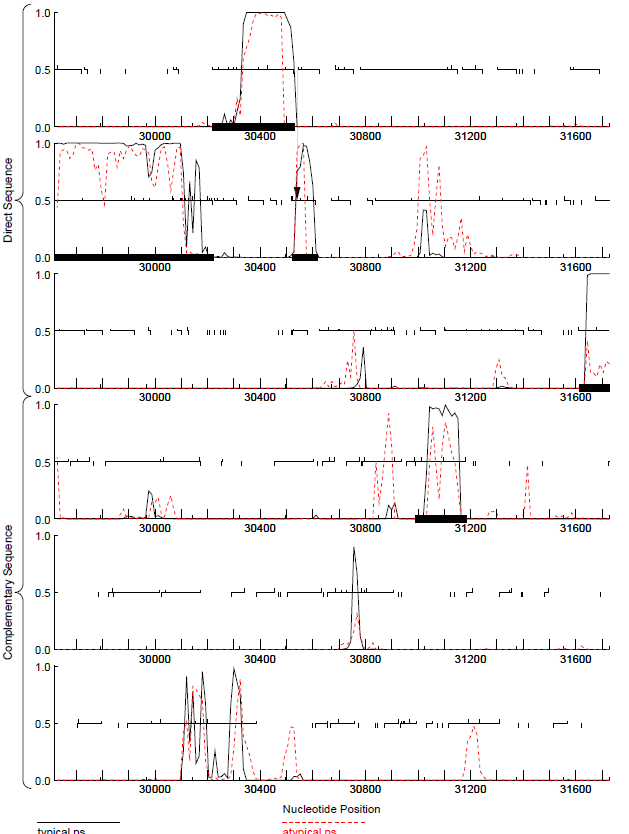
In the sequence displayed above, translation of a very small gene starts at the M marked with a square. When translation is finished, what is the amino acid sequence of the polypeptide that is produced? (The amino acids are written in the order they were added to the growing peptide chain, amino-terminus to carboxyl-terminus.)

1. M-G-Q-R-H-A-H-K
2. K-H-A-H-R-Q-G-M
3. M-G-S-C-D-P-P
4. P-P-D-C-S-G-M

The next four questions refer to the 6-frame translation displayed by GeneMark below.

1. On the 6-frame translation shown below, find a complete ORF on the top strand (forward) and draw a circle around it. No other ORF, or part of one, should be in your circle.
2. On the ORF that you circled, draw an arrow that points to the stop codon.
3. On the ORF that you circled, how many potential start codons are shown? \_\_\_\_\_\_\_\_\_
4. Find an ORF on the bottom strand (reverse) and draw a box around it.
5. Does this ORF overlap the forward ORF you circled? ( Y / N ) Explain your answer:

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The next four questions refer to the 6-frame translation displayed by GeneMark below.

1. Circle “A” shows an ORF on this display.
   1. True
   2. False
2. Circle “B” shows an ORF on this display.
   1. True
   2. False
3. Considering the direction of gene expression, “A” shows an ORF that goes from right to left (an ORF in the reverse direction).
   1. True
   2. False
4. How many potential start codons does “A” display?
   1. Zero
   2. One
   3. Three
   4. Eight
   5. Too many to count

