

## Problem Set 1

**DUE: September 4, 11:59 PM**

Using the following sequence:

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CCGTCGTAGCACCGAGCCTCAGCACACGAAAGAGATTGAAGTAGTTCCTCGGAAAGTTCTTCGACTCTT
CCTTGAAACATGTCTTCTGGAGCAACCAACCTGCCATGGATGATTATGGCCTGCCATCCTCCAACCCTT
ATGGGAACCTTCACAGTTGTGGACATGGCCCCTAAAGACATCCTTCACATGATTACCTCACTGGTACCA
ATATCCCCCATGAACCAATGATGTATCCATTACTTTTAATATTATGCTCTTCACCGGCATACTCTGC
CTGGCAGGTAACCTTGTACCATCTGGGTGTTTCATGAACACCAAATCTCTCCGCACTCCTGCCAATCTCC
TTGTTGTTAACTTGGCCATGTCCGACTTCCTCATGATGTTCACTATGTTCCCTCCCATGATGGTCACATG
CTACTATCACACATGGACACTTGGCCCCACATTCTGTCAAGTTTATGCCTTCCTCGGAAACTTGTGCGGC
TGTGCATCCATCTGGACGATGGTGTTTCATCACCTTTGACCGCTATAATGTCATTGTAAAGGGAGTGGCTG
GTGAGCCTCTTAGTACAAAGAAAGCATCTTTGTGGATATTAACAATATGGGTATTATCTATTACCTGGTG
TATAGCACCATTTCTCGGCTGGAACCGCTACGTTCCCGAGGGCAACCTTACTGGCTGTGGTACTGATTAT
CTGTCTGAGGACATTTTATCCCGCAGCTACCTATACGACTACTCCACATGGGTCTATTACCTCCCTCTAT
TACCAATCTATTGCTACGTTTCCATCATCAAGGCTGTTGCTGCCACGAGAAAGGTATGCGTGATCAGGC
CAAGAAGATGGGAATAAAGTCCCTGAGGAACGAAGAAGCACAGAAGACTTCTGCCGAGTGCCGCTGGCC
AAGATTGCTATGACGACAGTGGCTCTGTGGTTCATTGCTTGGACTCCCTATCTCCTCATCAACTGGGTGCG
GCATGTTGCGCCAGGTCCTACCTGTCTCCTGTCTATACCATCTGGGGCTACGTGTTGCGCAAGGCCAACGC
TGTCTACAACCTATTGTGTATGCCATCAGCCACCCCAAGTACCGCGCTGCCATGGAGAAGAAGCTGCCA
TGTCTCTCTTGCAAACTGAAAGTGATGACGTTAGCGAAAGTGCCTCAACTACCACCAGCTCAGCGGAAG
AAAAGGCAGAAAGTGCTTAGACTTTTGTGGGGAACCTCGTACTTCAACTGATCAACGACTGTATGCATAT
TATATATCATACAATGTAATTTAAAGTAATTCCTAAATGGTAGCAATTTTCTAGATTCTAATAAACCCA
GCATCAT
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Please conduct the following:

1. Translate this nucleotide sequence to amino acids and provide the amino acid sequence in FASTA format for each of 6 possible reading frames. Which do you like best? Why?
2. What is the frequency of A's, C's, G's and T's in this nucleotide sequence? What is your expected frequency of these nucleotides and does your data meet your expectations?
3. Design a pair of PCR primers to amplify these gene region based on the provided sequence. What are your primer sequences? How did you decide on these primers? What factors did you take into account in designing this primer pair?
4. Check to ensure that you answered *all* of the questions and requests posed in the previous three items, showing work where possible. You may use any computational tools (online or otherwise) as needed, but you must explain how you did it and which tools you used.