

SEED Academy, Spring 2009  
Synthetic Biology Module

Quiz #4  
April 4, 2009  
Due at 1:00pm

**NO Calculators Allowed**

- 1) Warm up question...How many nanograms are in one milligram?
  
- 2) **Calculate** the molarity of water ethanol, show ALL work. (Hint what does molarity mean? Assume that the molecular weight of ethanol is 46 g/mol, and that the density is 0.75 g / mL)
  
- 3) For this question, assume that each *nucleotide (not pair!)* weights 500 Da.
  - a. What is the molecular weight of a 10,000 nucleotide length *double stranded* piece of DNA?
  
  - b. What is the molarity of a 100 ug / mL solution of the DNA from part a?
  
  - c. How much of the solution from part b do you need to make 25 uL of a 400 pM solution?
  
  - d. Complete the reaction master mix with the answer from part c, (your stocks are: enzyme = 5,000 U/mL, dNTPs = 10 mM, primers = 10 uM):

Reaction Buffer (10X):	_____
DNA (final 400pM):	_____
dNTPs (final 200 uM):	_____
Forward Primer (0.5 uM):	_____
Reverse Primer (0.5 uM):	_____
Enzyme (final 2.5 U):	_____
Water	_____
	_____
Total Volume	<u>25 uL</u>