Name: _____

No calculators allowed. Show your work where appropriate and include units on all answers.
Assume that:

- Avogadro's number is $6 \cdot 10^{23}$

- The molecular weight of NaCl is 60 Daltons

- Each base pair of DNA is 1000 Daltons

You are setting up a 100 μL reaction containing buffer, NaCl, and DNA. You are given a 10x buffer, solid NaCl, and a 1000 bp DNA at a concentration of 0.1 mg/mL.

1. How much of the 10x buffer will you add to the reaction?

2. You wish to make 500 mL of a 1 M solution of NaCl. How many grams of NaCl will you measure out into 500 mL of water?

3. In your newly made salt solution, how many Na atoms are there?

4. You need a 10 mM final concentration of NaCl in your 100 μL reaction. How much of the 1 M NaCl will you add to your reaction?

5. What is the concentration of your DNA in ng/μL?

6. What is the mass of 1 mole of your DNA?

7. What is the molarity of your DNA solution?

8. In 1 μL of this DNA solution, how many DNA molecules are there?

9. You need 200 ng of DNA for your reaction. How much of your DNA will
   you add?