

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
Physics Department

Physics 8.01T

Fall Term 2004

**Experiment 03: Modeling Forces**

**Group:** \_\_\_\_\_

**Participants:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Note:** each group should hand in a completed copy of this page (one page per group) before leaving the classroom today.

(a) Consider the exponential function

$$y = A e^{-Cx}$$

that you fit to your measured force.

1. What value did you find for  $A$ ? (Give your answer in pennies or N.)
2. What value did you find for  $C$ ?
3. What is the characteristic distance  $\ell$  over which the force decays by a factor  $1/e$ ? (Give your answer in mm.)

(b) Use the “Slope Tool” on your graph of  $\ln(F)$  vs.  $\ln(\text{gap})$  to fill in the table below.

Gap (mm):						
$\frac{d \ln(F)}{d \ln(\text{gap})}$ :						

(Choose six values of the gap that are approximately evenly spaced over the range from the minimum to the maximum values you measured. Do not use more than two significant figures in your answer.)