

# Moles Aforethought

**Problem:** How does the amount of product in a chemical reaction compare with the predicted amount of product?

**Materials:** potassium dichromate,  $K_2Cr_2O_7$   
lead II nitrate,  $Pb(NO_3)_2$   
2-150 ml beakers  
funnel and filter paper

**Hazard Warning:** Wear goggles. Both reactants may be corrosive to skin. Wash your hands before leaving lab. Dispose of the products according to your teacher's directions.

**Procedure:**

1. In this lab you will use the same number of moles of each reactant. Using the assigned number of moles given in your data table, calculate the number of grams needed of each reactant. Measure these amounts as closely as possible in clean, dry, premeasured beakers. Record your measurements.
2. Add about 30 ml of distilled water to each of the beakers and swirl until the solids dissolve. The solutions may have to be warmed to get the solids to dissolve.
3. Slowly add the lead nitrate solution to the potassium dichromate solution while stirring. Wash the lead nitrate beaker with distilled water, pouring the wash in the mixture.
4. Boil the mixture slightly, then let the mixture cool and settle.
5. Filter the mixture, saving the filtrate in a premeasured beaker and the precipitate in a premeasured filter paper. Wash with distilled water to transfer all of the precipitate into the filter paper.
6. Record the color of the filtrate. \_\_\_\_\_
7. Dry the precipitate and filter paper. Record the weight of the precipitate.
8. Evaporate the filtrate. Record the weight of the solute.

	moles	grams
Reactant $K_2Cr_2O_7$	.0045 moles	
Reactant $Pb(NO_3)_2$	.0045 moles	
Product $PbCr_2O_7$	X	
Product $KNO_3$	X	
Beaker #1	X	
Beaker #2	X	
Filter Paper	X	

1. Write a balanced chemical equation for the reaction in this experiment. Include states of matter.
2. Explain the difference in colors of the filtrate: (why were some colored and some clear?)
3. Calculate the theoretical mass of the two products. If your filtrate was colored, use your measured amount of  $\text{Pb}(\text{NO}_3)_2$  in your calculation. If your filtrate was clear, use your measured amount of  $\text{K}_2\text{Cr}_2\text{O}_7$ .
4. Calculate the experimental error for both products.