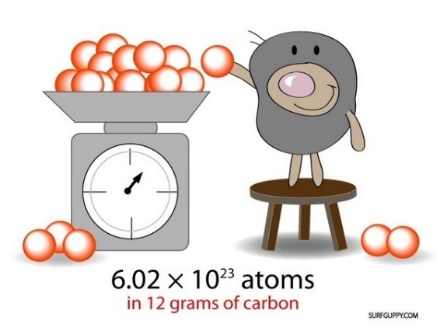
**Chem 12 Lab 4D: Molar Mass of an Acid - *TEACHER NOTES***

*(From Lab 13G, Part III, Essential Experiments)*

***Constraints***: The unknown acids are in solid form.   
 (we used KHC8H4O4 and KHSO4)  
 Use approx. 0.60 g of it in your experiment   
 (but be sure to exactly weigh the amount you use).  
 You will have access to a standardized base.

**Implementation Details**  
\*The original lab calls for 0.75g of acid.   
 I chose to use 0.60g of acid with a 0.117M NaOH sample, so that students would not require   
 more than 50mL of NaOH per trial. (38mL for one acid, less for the other).

\*When students tried to come up with a procedure, their first instinct was to look for the pH of the weak acid and complete an ICE table. But without the identity of the acid, they didn’t have a Ka to work with.

\*Once students figured out they could titrate to find the moles of acid, they tried to write Bronsted-Lowry acid/base reactions, rather than straightforward neutralizations. They did, eventually, get there… it took some prompting.

\*Students had time, in an 80min period, to design a procedure and complete 3 trials.

\*Analysis notes: if students did not use the same MASS of solid in each trial, they will not be able to average titration volumes. EITHER – direct students to use identical masses in all 3 trials, OR – have them do the stoichiometry math for all 3 trials, then average the molar masses instead.

**\*Sources of error**:  
We used phenolphthalein as an indicator. It worked well for the KHSO4 (Kb is very small), but it was not as useful for the KHC8H4O4  (Kb ~ 10-9)… students who observed a faint pink colour with the latter had not yet reached the equivalence point. Their molar masses were too low.

While this prompted an interesting side-conversation about hydrolysis, I wasn’t really prepared to talk about titration curves for weak acids and bases yet. I might try thymolphthalein next time, and avoid this glitch.