$Z_2O_6^{3-}(aq) + JO_2^-(aq) \rightarrow J_2O_7^{2-}(aq) + Z_7O_4^{3+}(aq)$

$68H^+(aq) + 41e^- + 7\ Z_2O_6^{3-}(aq) \rightarrow 2Z_7O_4^{3+}(aq) + 34H_2O(l)$

$3H_2O(l) + 2JO_2^-(aq) \rightarrow J_2O_7^{2-}(aq) + 6H^+(aq) + 6e^-$

$82JO_2^-(aq) + 42Z_2O_6^{3-}(aq) + 162H^+(aq) \rightarrow 41J_2O_7^{2-}(aq) + 12Z_7O_4^{3+}(aq) + 81H_2O(l)$

REDOX REACTIONS

- TODAY:
- We’re going to perform calculations to determine the quantities of substances involved in redox titrations

- In other words we’re going to learn the stoich involved for our lab

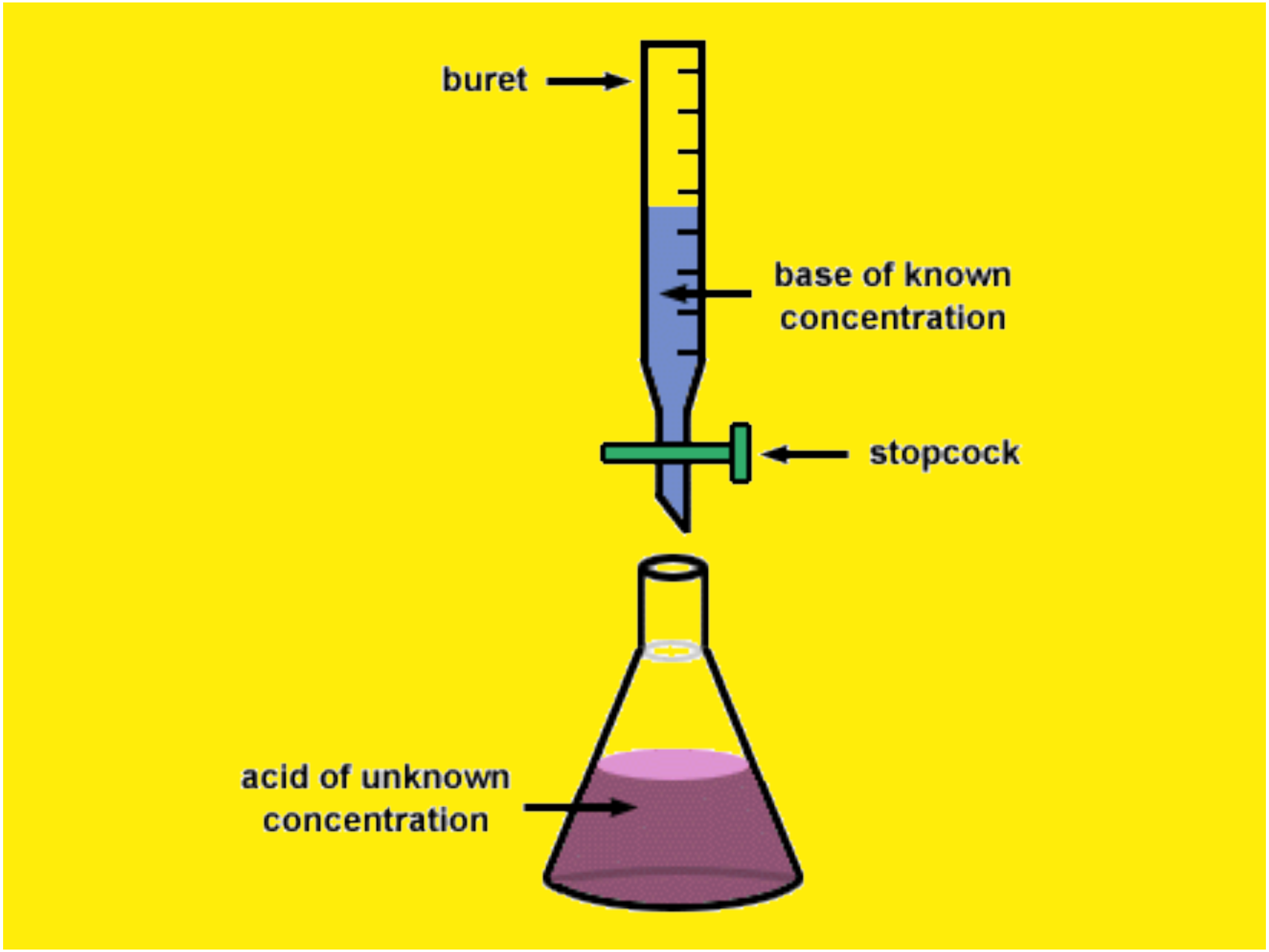
REDOX STOICHIOMETRY

Stoichiometry

- the study of the quantitative aspects of chemical reactions

- how much of each substance we need in a reaction

- Stoich allows us to use concentration equations to find unknown value in REDOX


buret
base of known concentration
stopcock
acid of unknown concentration

Titration

- Slowly add 1 solution (titrant) to another solution (sample)

- As the titrant is added to the sample, the 2 solutions react

- As more titrant is added a redox reaction occurs until equilibrium is reached and the reaction can no longer proceed

- 2 strong oxidizing agents often used are solutions containing permanganate ions (MnO_4^-) or dichromate ions ($Cr_2O_7^{2-}$)

- The endpoint can be seen when the addition of ONE DROP of the titrant causes a permanent color change in the sample.

- That is when no more of the sample is available to react with the titrant

Titration Calculations

- Using the known concentration and volume of the titrant we can find the moles used

- Using the stoichiometric ratio we can find the moles of the sample reacting

- With the moles of the sample known, we can use our known volume to find the concentration of the sample

Very Important!

- The only difference in redox stoich vs regular stoich is you determine the balanced equation through half reactions and the net equation!

Example 1:

- Find the concentration of $Fe^{2+}(aq)$ in a 10.0mL sample that requires 14.0mL of a 0.050mol/L acidic permanganate solution to reach the endpoint.

Example 2:

- Find the concentration of $Sn^{2+}(aq)$ in a 50.0mL sample that requires 64.8mL of a 0.080mol/L acidic dichromate solution to reach the endpoint.