

## Quantitative Acid-Base Titration in the Kitchen

### *Equipment*

Below is the list of equipment and chemicals that were used for this analysis. Alternate sources for these materials are available and substitutions can be readily made.

#### Equipment:

**Scale** - American Weigh Scale BT2-201 - **\$45** & 200 g calibration weight - **\$7.50** (1 per kit)

**Syringes** - 10 mL sterile syringes with luer slip tip - 100 count - **\$15** (4-5 per kit)

**Micropipette tips** - Eppendorf 2-200  $\mu$ L tips (yellow) - 1000 - **\$75** (6-8 per kit)

**Beakers** - preferably 50 mL, clear glass (2-4 per kit)

**Plastic Bottle 1 L** - for distilled water (1 per kit)

**Plastic Bottle ~50 mL** - for indicator solution storage (1 per kit)

**Syringe Stand** - 3D printed from PLA or ABS see .stl file on ASDL site (1 per kit)

#### Chemicals:

**Borax** - 450 g for **\$10** - need ~2 grams per kit

**Ammonia** - 1.9 L for \$12 - need 10 mL per kit

**Turmeric** - ~\$10 for ~80 grams - need 10-20 mL per kit

**Cream of Tartar** - ~\$7 for 100 grams - need ~2 grams per kit

**Lemon or lime concentrate** - multiple pricing options based on size - need 5-10 mL per kit

#### Solution Preparation:

The only solution that needs to be prepared in advance is the turmeric indicator solution. The turmeric is not particularly soluble in water, and is somewhat more soluble in alcohol solutions. The best approach to preparing the solution is to saturate a solvent with the turmeric, filter out the solids, and use the supernatant as the indicator. The solvent can be either pure water, or a water alcohol mixture (ethanol or isopropanol would be best for keeping with the theme of at home chemicals). Several liters of this solution are likely needed for an entire class. I anticipate that the solubility of the turmeric is less than 1 g per liter.