Take home points:

- We can categorize foods (chemicals, everything!) as acidic or basic.
- Acidic things are sour.
- Acids and bases are opposites and create chemical reactions (like mixing vinegar and baking soda). Sometimes, we use these chemical reactions in making food.

Extra/bonus points:

- Acids and bases are opposites and create chemical reactions (like mixing vinegar and baking soda). We can use these chemical reactions in making food.
- There are different levels of acidity and basicity. Strong acids and strong bases are both very dangerous. But mild acids and mild bases are common in our everyday lives!

Discussion (Part I -- Acids):

Who has heard of an “acid” before? What do you think of when hear the word “acid?”
Who has heard of an “base” before? What do you think of when hear the word “base?”
Have you ever tasted an acid/base before? (What does it taste like? OR if no one thinks they have tasted an acid, how many people like sour candies or soda?) Today we are going to use a chemical reaction to test for acids/base.

1. **Acid Test:**

Materials:

• 4 plastic cups (per group)
- Vinegar
- Lemon juice
- Grapefruit juice
- Tomato juice

• Red cabbage water
• Water
• pH strip

What is your favorite food and least favorite food? How do they taste? Can you think of other “taste” words? Last week, we talked about five different tastes. Which taste do you think is most associated with acids?

Procedures:

1. Line table with drinks: vinegar, lemon juice, grapefruit juice and tomato juice
2. Describe the taste of the different drinks (vinegar, lemon juice, grapefruit juice and tomato juice). Rank them from most sour to least sour.
3. Rank them from most sour to least sour.
4. Add two spoons of cabbage water in the vinegar cup. What color did your indicator become?
5. Add two spoons of cabbage water in the rest of the cup. What color did your indicator become? From this test, do you think the soda has acid in it? Check the soda ingredients and find out!

6. **Tutors: demonstrate what would happen in a water cup.**
7. Order the indicators from most acidic to least acidic. If time permits, discuss/write about what colors did we mix and what color was produced? Would this happen with normal paint? (This week a chemical reaction produced a new color. May need to explain that a chemical reaction is when two things mix to create a new thing.)
8. **Tutors: demonstrate with pH strip. Did you students get the orders right?**

Where's the Chemistry?
Most sodas have an acid in them called citric acid. This is the acid that gives lemons, oranges, and other citrus fruits a sour taste.
Red cabbage contains natural chemicals, called anthocyanins, that can be used as an indicator. When certain acidic or alkaline chemicals (such as the lemon juice or lemon-lime soda) are added to an indicator, a chemical reaction occurs causing a color change. An indicator can give you an idea about how acidic a solution is. Where did your soda's power rate on a scale between water and lemon juice?

2. **Base test:**

Materials:
• 3 plastic cups (per group)
- Surface cleaner
- Baking soda + water
- Egg white

• Red cabbage water
• Water
• pH strip

Procedures:
1. Line table with drinks: egg white, detergent and baking sodea
2. **DO NOT TASTE.** Explain thgat
3. Guess which one would be more basic.
4. Add two spoons of cabbage water in each cup. What color did your indicator become?
5. What color did your indicator become? From this test, do you think the soda has acid in it? Check the soda ingredients and find out!
6. Compared to the water cup what do you think these compounds are? Which one do you think is more basic?

3. **pH test: Tutors: demonstrate with pH strip. Did you students get the orders right?**
pH is a measure of how acidic or basic a substance is. Use the pH paper to test all the things we tested and see how it compares to your cabbage scale.

4. **Neutralization:**

Materials:
• plastic cup containing vinegar + cabbage water
• plastic cup containing baking soda + cabbage water
• Tums
• Vinegar

Neutralizing acid:
1. Use the plastic cup containing vinegar + cabbage water
2. Add tums to this cup. Relate this to real-life uses of Tums
3. Use the plastic cup containing baking sodar + cabbage water
4. How would you neutralize this baking soda solution based off of what we saw from neutralization of acids. Ask the students what should be added to neutralize
5. How did the indicator color become? From this test can you figure out what would happen if you add acid and bases together?

Group Discussion
What happened when you added the substances to cabbage water? (turned color to a lighter pink/red)
A lot of chemical reactions happen between acids and bases. One example of an acid-base reaction is vinegar and baking soda. Which is the acid and which is the base?

Where would the egg whites fit on your scale from most acidic to least acidic?

What happens when you add more lemon juice to your egg white/cabbage juice mixture?