Title of Lesson: How to Make Watercolors from a Cabbage	**Approximate Grade Level:** **4-6**	**Time Required:** **35-55 min + 2 days to dry**
Subject: Chemistry		
Outcome of Activity: Students will learn about the pH scale and what acids and bases are.		
Materials: 1 red cabbage 709 mL of room temp water 1 pot 1 knife 7 clear half cut water bottles 1 whole lime or lemon 14 mL of vinegar 14 mL of powdered soap 14 mL of basking soda 14 mL of cornstarch 14 mL of honey or any kind of syrup Container to store paints in		

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Procedure:

DISCLAIMER: THIS ACTIVITY WILL BE DONE UNDER ADULT SUPERVISION

STEP 1: Cut cabbage and use half of it only

STEP 2: Pour 709 mL of room temp water into pot along with cabbage

STEP 3: Boil until water is dark (approx 15 min on medium heat)

STEP 4: Cool down for 10 minutes

STEP 5: Pour water evenly into the 7 clear water bottles

STEP 6: Add 1 lime or lemon to 1 water bottle

STEP 7: Add 14 mL of vinegar to 1 water bottle

STEP 8: Add 14 mL of powdered soap to 1 water bottle

STEP 9: Add 14 mL of baking soda to 1 water bottle

STEP 10: Leave remaining 3 water bottles aside

STEP 11: Mix in 14 mL cornstarch and 14 mL of corn syrup into the 4 water bottles that had an acid or base added to them

STEP 12: Mix in 14 mL of cornstarch and 14 mL of corn syrup to 1 of the 3 water bottles that was previously left aside

STEP 13: Excess solution from the 5 colors created can be mixed together with the remaining 2 water bottles set aside

STEP 14: Pour inside container

STEP 15: Let paints dry outside in the sun for 2 days

Science Behind it: The foods we eat everyday all taste different. Some taste sweet, others sour, and sometimes even bland. Each food has a pH of its own that makes it taste the way it does. For example, a green apple has a pH level of about 4. This makes it acidic because it falls on the smaller number side of the pH scale, which indicates that a substance is acidic. The acidity level of the green apple can also contribute to its slightly sour taste it naturally has. A red cabbage is slightly less acidic compared to a green apple, with a pH of about 6. This still makes it an acid, so when another acidic substance like vinegar and lime or lemon juice is added, a change in color happens such as red. If a base like baking soda or powdered soap is added, the color changes to blue because a base is the opposite of an acid so it reacts differently when mixed together.

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