

# Year 6 Project Work

## Chemistry and Chemical Reaction



Name: \_\_\_\_\_

Primary School: \_\_\_\_\_

### HEALTH AND SAFETY

Please be aware that the work contained in this booklet involves the use of **hot water**, **household chemicals** and **fire**. This work should only be done with **appropriate adult supervision** and the use of **protective equipment** such as gloves (e.g. marigold) and an apron.

# Kitchen Chemistry



The aim of this project is to investigate different chemical reactions and processes that you can do at home or with things you can get from the supermarket. The tasks set described will use a variety of different reactions.

You need to attempt as many of them as you can and record your observations and results. If possible, try and take some photos of what you are doing or a video. The final aim of this project will be to produce a small presentation about the types of chemical reactions you can do at home.

## Making Red Cabbage Indicator

### Equipment

- ◆ 1 red cabbage
- ◆ Saucepan
- ◆ Sieve
- ◆ 1000 cm<sup>3</sup> tap water (1 litre)
- ◆ Knife and chopping board or blender
- ◆ Job/Bowl
- ◆ (optional—freezer bag)

<https://www.youtube.com/watch?v=mQxknvSKwU4>



### Method

**Please make sure that when you are using sharp or hot objects there is appropriate adult supervision**

1. Chop the cabbage in half.
2. Take one half of the cabbage and chop into small pieces using the knife and board or the blender  
(2. a) **(OPTIONAL)** place the cabbage in the freezer bag and freeze over night)
3. Take the cabbage and boil for 20 minutes in boiling water.
4. Sieve the cabbage into a bowl, so you collect the liquid. Discard the cooked cabbage.
5. Allow the liquid to cool—this is your indicator.

## A RED CABBAGE pH INDICATOR



**Task 1** (you will need to keep some of the indicator solution for Task 3)

Around your home are lots of different materials that are acidic or alkaline (basic) you need to use the indicator that you've created to identify which substances are acidic and which are alkaline.

**Method:** Add a small amount of the substance to a clear container and then add some of your cabbage indicator. Mix well with a clean spoon. Record your observations and identify if the substance is an acid, an alkali or neutral.

Here are some suggestions of materials you could use, you do not need to try all of them.

**Please be aware that some of these you should only use with the supervision of a responsible adult and gloves, these are written in bold.**

*Lemon Juice, Salt Water, Egg Whites, Soapy Water, Vinegar (white vinegar will give a better result), **Bath Cleaner**, Mouthwash, Tap Water, Rain Water, Tomato Juice, Orange Juice (freshly squeezed at home), Milk, Baking Soda, Indigestion Tablets, Lemonade, Mayonnaise, Green Tea, Black Tea, Furniture Polish, **Bleach, Toilet Cleaner.***

**Results**

Material	Observation	Acid, Alkali or Neutral

Using your results, describe the differences in the types of materials that are acidic in the household and those that are alkaline.

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### Task 3

*Reacting acids and alkalis (bases)*

#### Materials

Cabbage indicator

Clear plastic cups/glass

#### Acids

- ◆ Lemon Juice
- ◆ Vinegar
- ◆ Coke-Cola



Something to use as a lid

(optional—a tea light/candle)

#### Bases

- ◆ Bicarbonate of soda (baking soda)
- ◆ Indigestion tablets
- ◆ 50 cm<sup>3</sup> Hand soap solution.



#### Method:

1. Add 50 cm<sup>3</sup> of one of your acids to a clear plastic/glass
2. Add some of the cabbage indicator
3. Add the base to the acid and put the lid on.
4. Repeat steps 1-3 with different combinations of acids and alkalis

#### Observations and Results

You need to make a note of any colour changes that happen in the indicator. Try to determine what pH the solution started at and what it ended on. Did you see any fizzing? How quickly was it fizzing?

	Baking Soda	Indigestion Tablet	Hand Soap Solution
	Observations		
Lemon Juice			
Vinegar			
Coke-Cola			

### **Task 3 (Optional Extra)**

Your task here is to try and determine that gas was produced by reacting your acids and bases.

When the reaction has stopped, take the lid off the container.

Light the tea light.

Gently, and without pouring out any of the liquid inside, pour the container over the tea-light and observe what happens.



Write down your observations and try to figure out what gas you have produced, if any.

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### **Task 4 — Hot ice**

#### **Equipment and Materials**

250 cm<sup>3</sup> of white vinegar      15g of baking soda  
a Heat Proof Jug      a Dish      a Spoon      a Saucepan

#### **Method**

1. Measure out the 250 cm<sup>3</sup> of white vinegar and pour into the saucepan.
2. Weigh out the baking soda and **slowly** add into the saucepan (record any observations).
3. Stir the solution until all the baking soda has dissolved.
4. Heat on a gentle heat until approximately  $\frac{1}{4}$  of the original volume remains. You should start to see crystals form on the side of the pan near the top of the solution.
5. Pour the solution into a heat proof jug and place in the fridge for 20-30 minutes to cool. (Take a few crystals from the side of the saucepan to use later on).
6. Place the crystals you took from step 5 and place them in the center of the dish.
7. Take the solution carefully from the fridge taking care not to splash or jog it too much, and pour slowly onto the crystals on the dish.
8. Touch the “ice” and record any other observations. (Make sure you wash your hands before you touch anything else).

## **Task 5—Water into Wine**

You will need:

- half a teaspoon of washing soda (sodium carbonate)
- half a teaspoon of turmeric
- a mug
- an eye dropper or teaspoon
- warm water
- 2 glasses
- a few drops of distilled vinegar



### **Method**

1. Add the washing soda to a mug of warm water.
2. Once the crystals have dissolved, add the turmeric and mix it well. This should produce a deep red colour.
3. The turmeric powder does not dissolve, so put it aside for a few minutes to settle out of the mixture.
4. Once it has settled, take an eye dropper (or a spoon) and transfer some of the deep red solution to a wine glass that has some water in it. Add enough of the red solution to make the water look like a pale red wine.
5. Put a few drops of distilled vinegar into a second wine glass.
6. Now pour your red 'wine' into the glass with the vinegar the red solution will turn yellow, just like white 'wine'!

