

# STEM from Home

## What's In It?

Have you ever wondered what makes a soufflé so light and cottony, freshly baked bread soft and fluffy or why a barbecue smells divine? There is certainly magic in the kitchen and this magic is Chemistry!

Yes. Cooking is chemistry! There's no doubt about it. Every time you boil water, add salt, or mix oil and spices or heat, boil, grill or bake, you're creating a chemical reaction. Knowing about how those reactions happen helps chefs and cooks create some truly delicious dishes. What you perceive as 'taste' is your brain interpreting the chemical composition of food. Sugars, for example, are sweet, fat gives foods that irresistible, savoury flavour, and proteins are generally attributed to have their unique flavour.

In this STEM pack you will create a webpage for your favourite recipes, experiment with different ingredients which combine to make a perfect cake and finally create a dish based on your knowledge of certain chemical reactions different ingredients undergo when mixed or cooked.

## Main Activity: **Delicious Chronicles!**

### Introduction

In this project, you'll create a webpage for your favourite recipe.

### What You Will Learn

1. You will learn about HTML lists and CSS colours.
  - ▶ Writing HTML:
    - i. `<ul>`, `<ol>` and `<li>` list tags
    - ii. `<hr/>` tag
    - iii. Consolidating the use of nested tags.
  - ▶ Writing CSS:
    - i. Colours (names & hexadecimal codes)
2. You will create your own recipe, adding ingredient and method lists

### What You Will Need

#### Hardware

- A computer (PC/Mac/Linux/Raspberry Pi)
- An internet connection

#### Software

Project resources

- [.zip file containing all project resources](#)
- [Online Trinket template](#)
- [Online blank Trinket](#)
- [template/index.html](#)
- [template/style.css](#)

### Getting Started

[Click on this link to access the online resource](#) and begin your project.

# Bonus Activities

## Activity 1: Let's Bake!

### Introduction

An endothermic reaction is the absorption of energy, usually heat, that changes the chemical structure of a compound. Cooking is a good example of an endothermic reaction. In a recipe, how each ingredient reacts to heat affects the final product. Let's explore the chemistry behind a delicious cake.

### What You Will Learn

How different ingredients interact with each other when combined or heated.

### What You Will Need

#### Ingredients:

- Egg whites
- Sugar
- Melted butter
- Vanilla essence
- Milk
- All-purpose flour (maida)
- Baking powder
- Salt
- Food colouring (any 4 colours of your choice)

#### Baking Equipment:

- Cupcake pan
- Cupcake liners or a little oil or butter to grease the moulds
- Small mixing bowl
- Measuring spoons
- Whisk

### Getting Started

Access the [Let's Bake](#) activity guidelines here.

## Challenge Activity: Delete a Username

Red cabbage juice contains a natural pH indicator that changes colour from purple to green under basic (alkaline) conditions. You can use this to change the colour of any alkaline food you intend to cook.

Mix it with egg white and cook the egg and voila! You get fancy green eggs for breakfast.

#### How Did This Happen?

The [pigments](#) in red cabbage are called anthocyanins. Anthocyanins change colour in response to changes in acidity or pH. Red cabbage juice is purplish-red under [acidic conditions](#), but changes to a blue-green colour under [alkaline conditions](#). Egg whites are alkaline (pH ~9) so when you mix the red cabbage juice with the egg white the pigment changes colour. The pH does not change as the egg is cooked so the colour is stable. It's also edible, so you can eat the fried green egg!

#### Your Challenge:

Experiment with other [edible pH indicators](#). Examples of foods that change colour in response to pH include beets, blueberries, cherries, grape juice, radishes, and onion.

Now using the knowledge you have gathered write out a unique recipe (it could be a sweet or savoury dish or a drink) where you use edible ingredients to change the colour of other ingredients and create a unique, creative and beautiful dish.

Remember to think about all the science behind it, including what would heating or freezing do to the final product.

You can add this recipe to the website you have created in the Main Activity.

Share your recipe and the science behind it by uploading a presentation. Your final submission can also be presented digitally using [Docs](#) or [Presentation](#) software.