The science of baking

Objective

Key message: Prepare, cook and serve a range of predominately savoury dishes that use flour and other grains; demonstrate a range of skills and techniques; demonstrate safe and hygienic work practices.

Objectives

- Apply the principles of food safety and hygiene when cooking.
- Demonstrate a range of skills to prepare and cook a variety of dishes that demonstrate different uses of flour and other grains.
- Apply the principles of healthy eating when preparing and making dishes.
- Use sensory evaluation techniques to evaluate and modify dishes.

Resources

- Ingredients for demonstration set out on a tray; Strong bread flour, salt, quick acting yeast (or alternative) warm water, milk for glazing.
- Variety of toppings, e.g. seeds, nuts, dried fruit, grated cheese, chopped fresh herbs.
- Science of baking information sheet
- Recipe for bread rolls/small loaf.

Introduction

How many different types of flour can the pupils name? Have some examples or images available and discuss the different types for different uses. For example we use strong flour to make bread because:

- Strong flour gives a good volume and light texture to bread because:
- Strong flour has a higher gluten content
- The proteins are called gliadin and glutenin
- When water is added to the flour the proteins combine and make gluten
- Gluten is a soft stretchy substance that traps the bubbles of carbon dioxide produced by yeast as it ferments allowing them to expand and rise
- The heat of the oven stops the fermentation process and gelatinises the starch in the dough, 'setting' the bread
- Wholemeal flours produce bread with a closer texture and smaller volume because the bran and wheatgerm weaken the gluten
- To help lighten the texture use a mix of white and wholemeal flour.
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Activity session 2

You may wish to have some examples of pre-washed gluten balls so the pupils can see the gluten strands (see gluten content investigation for information on how to do this).

Compare the structure of bread dough made with strong flour and soft flour (take close up images of the crumb or use a visualiser).

Activity ideas

- Show the pupils different types of yeast and discuss the conditions needed for multiplication and successful production of carbon dioxide. If time allows carry out an experiment to investigate the fermentation action of yeast.
- Give each pupil the Bread making recording sheet to record information during your demonstration. Explain to the pupils that you are going to demonstrate how to make yeast dough and then to shape, finish and bake bread rolls.
- Demonstrate the bread making method, explaining the reasons why the ingredients are used and each step of the process. You may wish to have a pre-prepared and risen dough to show the pupils. Discuss a variety of toppings that could be used to add flavor and/or texture to the rolls.
- Challenge the pupils to make a batch of bread rolls using different types of flours. Pupils could work in pairs. Ensure that good food hygiene and safety is followed at all times. They could finish the rolls using topping ingredients to add extra flavour and/or texture.
- Compare the finished products: consider the different flour that was used. Question the pupils about the appearance, colour, texture and flavor of the baked rolls.
- Ask pupils to undertake sensory evaluation on the different breads that have been cooked. Challenge pupils to use a wide range of sensory vocabulary. Pupils could use the Sensory Evaluation worksheet.

Round up

Recap the learning with the pupils:

- Sequencing – can the pupils place the bread roll recipe method in the correct order?
- Question the pupils:
  - What are the conditions needed for the yeast?
  - Why does wholemeal flour need more water than white flour to make a soft, stretchy dough?
  - What would happen if very hot water was added to the yeast?
  - Can you explain what is happening when the dough is rising?
  - How could you modify the recipe?
  - What dishes could be made from using a basic bread dough?
- Use the Guess the words activity to test pupil’s knowledge.
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Extension ideas

- Review a range of rolls that are available to buy. Consider the variety of flour and other grains that are used in the manufacture and the effect on the texture and flavour of the rolls.
- Compare the cost of the (same type) of rolls that are purchased, homemade or made using a bread mix.
- Ask pupils to gather images of different types of bread from around the world for homework. The images should be annotated with name, country and any special ingredients used.
- Find out more about gluten free flour. How can it be used to make successful yeast dough for rolls and bread?
- Investigate ‘ready to bake’ rolls and bread products. How are they made? Try making a ‘ready to bake’ batch to freeze.
- Watch the Grain to loaf video showing the process used in commercial breading making. Discuss the differences and similarities to the domestic process. Follow up with the interactive activity Be the baker.

Fact file

Bread remains one of the UK’s favourite foods, with 99% of households buying bread – or the equivalent of nearly 12 million loaves are sold each day. (www.fabflour.co.uk)

There are over 200 types of bread available in the UK.

Wholemeal flour must contain the whole wheat grain; it has 100% extraction rate.