Describe the Function of Ingredients

Description
This activity gives students a quick overview of what different ingredients do in a recipe, how an ingredient functions, and how to measure it. This allows students to evaluate the end products and see where they may have had difficulties. By understanding ingredient function, students can determine which ingredient was lacking or in excess, and what steps are needed to improve their future products.

Examples where an understanding of ingredient function can help include:

- cookies are too thin and crispy
- cookies spread too much
- cupcakes are dense, and
- scones are tough and did not rise.

Lesson Objectives
Students will be able to:

- understand the function of ingredients and their impact on baked goods
- learn how to measure specific ingredients
- evaluate baked products based on ingredient function, and
- adjust future recipes based on product observation and evaluation.

Safety Considerations
Basic food and kitchen safety

Terminology
**Function of an ingredient**: How a specific ingredient behaves in a baked product (i.e., What does it contribute to the overall product?).

**Leaveners**: Products such as baking soda, baking powder, and yeast that raise, lift, or lighten a baked product through the production of gas.

Estimated Time
45–60 minutes

Recommended Number of Students
This activity should be done individually and discussed as a class.
Facilities
Access to reference materials (Internet-accessible computer and/or textbooks)

Resources
Culinary Institute of America (CIA). *Baking and Pastry: Mastering the Art and Craft*. Wiley, 2004

Crafty Baking
https://www.craftybaking.com/
Demonstrating Skills And Knowledge

Procedure
1. Discuss the importance of understanding ingredient function and how it allows students to evaluate and change or correct recipes.
2. Introduce the resources that are available to the students.
3. Hand out the table “Function of Ingredients in Baking”. Note: This is not an exhaustive list of ingredients.
4. Give them a deadline to complete the chart (the sooner the better as it affects all their lab work).
5. Check or mark the assignment.
6. Discuss through questioning of some common baking mistakes to reinforce understanding of the topic.
7. Ask students to write a reflection piece for their portfolio.

Evaluation Guidelines
This can be assigned as a pass/fail assignment as the reference is for the students' benefit.

Student responses need not be as in-depth, depending on their interest and the time allowed for the assignment.

Evidence of understanding comes in their reflections and evaluations of final products as well as working with the ingredients throughout the module.
<table>
<thead>
<tr>
<th>Name of Ingredient</th>
<th>All purpose flour</th>
<th>Pastry flour</th>
<th>Bread flour</th>
<th>Sugar</th>
<th>Eggs-whole</th>
<th>Egg whites</th>
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<tbody>
<tr>
<td>Function(s) in Baking</td>
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<td>Ways it is Measured (Method and Equipment)</td>
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<td>Unique Properties or Types</td>
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<tr>
<td>Name of Ingredient</td>
<td>Liquids - Water</td>
<td>Chemical leaveners: Baking soda Baking powder</td>
<td>Organic leaveners: Yeast</td>
<td>Fats</td>
<td>Salt</td>
<td>Flavourings</td>
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<td>Egg yolks</td>
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<td>All purpose flour</td>
<td>Provides structure to baked products.</td>
<td>Comes in many forms and textures; usually pre-sifted. Moderate amount of gluten.</td>
<td>Weighed, or stirred, scooped and leveled.</td>
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<tr>
<td>Pastry flour</td>
<td>Provides structure to baked products.</td>
<td>Lower amounts of gluten used to make cakes and pastries; is finer and compacts easily.</td>
<td>As above</td>
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<tr>
<td>Bread flour</td>
<td>Provides structure to baked products.</td>
<td>Higher amounts of gluten used for bread making or pizza crust. Makes a sturdier dough.</td>
<td>As above</td>
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<td>Sugar</td>
<td>Increases tenderness and volume, aids in browning-caramelization by heat or Maillard reaction when mixed with heat and protein. Changes the freezing and boiling point in mixtures.</td>
<td>Comes in various forms or textures. Granulated: white most common. Brown has some molasses; is acid. Confectioners white is finely ground or powdered. Berry sugar dissolves quickly and is between granulated and confectioners.</td>
<td>Weighed, scooped into dry measures and levelled.</td>
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<td>Eggs—whole</td>
<td>Add moisture, color, fat, flavor; function as a leavening agent. Helps combine fats and liquids. Increases the volume and rise of baked products.</td>
<td>Generally large sized eggs are used.</td>
<td>Sold by size/weight by numbers by the dozen.</td>
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<td>Egg whites</td>
<td>Expand and give volume to a baked product; by trapping air in the protein strands of a foam.</td>
<td>Can increase in volume by 6-8 times when beaten. Be sure there is not even a trace of fat on equipment or in the whites or they will not produce a foam.</td>
<td>Generally large sized eggs are used.</td>
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<td>Egg yolks</td>
<td>Work as an emulsifier (helps combine fats and liquids). They add fat and color as well as nutrients. They also enhance texture making things creamier and smoother.</td>
<td>All the vitamins (A,D,E) are in the yolk. It also has phosphorus, manganese, iron, iodine, copper, calcium and zinc.</td>
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<td><strong>Liquids:</strong></td>
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<td>Water</td>
<td>Water hydrates starch particles and softens the proteins in flour. It activates leaveners. It affects the structure and texture of baked products. When heated (baked) water creates steam which increases volume. Milk adds nutrients and color (browning) to the final product. Juice hydrates and adds flavor and acid to initiate leaveners.</td>
<td>Use a good quality drinking water as chemicals and minerals can affect fermentation. Milk may need to be warmed according to recipes. Juice used to replace water but usually for baking soda mixes. Pineapple juice does not set a gelatin mixture.</td>
<td>Liquids are generally measured by volume but can also be measured by weight: 1 mL of water weighs 1 gram.</td>
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<td>Milk</td>
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<td>Juice</td>
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<td><strong>Chemical Leaveners:</strong></td>
<td>Increases volume: leaven means to lighten, lift, or raise. Leaveners also affect taste, texture and color of a product.</td>
<td>Too much leavener can over stretch the gluten strands and cause a cake to have a depression in the center. Baking powder reacts when moistened with any liquid: use 1–1 ¼ tsp per cup of flour. Too much makes things taste bitter. Baking soda requires an acidified liquid to react. Too much soda can cause a soapy flavor. Generally, use ¼ tsp per cup of flour.</td>
<td>Weighed or use a small measure leveled; make sure all lumps are removed or sifted out.</td>
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<tr>
<td>Baking soda</td>
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<td>Baking powder</td>
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<td><strong>Organic Leaveners:</strong></td>
<td>Through a process known as fermentation, yeast produces carbon dioxide which raises a dough. It also affects the crumb texture and gives a pleasant flavour.</td>
<td>Can be dried active or instant or fresh-cake yeast. Too much heat will kill yeast; too cold and it grows too slowly. Salt affects fermentation.</td>
<td>Measured by weight, or small measures; also comes pre-packaged.</td>
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<td>Yeast</td>
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<td>Fats</td>
<td>Solid fats (lard, shortening, butter or margarine) contribute tenderness, flavour and when blended with sugar, aid in leavening.</td>
<td>Liquid fats like oils and clarified butter moisten ingredients and make dough smoother and easier to mix.</td>
<td>3–4 different ways to measure: sold by weight, solid fats can be packed into dry measures; blocks can be cut using a guide or they can be melted and measured in liquid measures. Liquid fats sold by volume are measured in liquid measures.</td>
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<tr>
<td>Salt</td>
<td>Regulates yeast growth (volume and speed). It enhances the flavour of other ingredients.</td>
<td>Add it in with the dry ingredients so it doesn’t shock or kill the yeast. There are many different types so more research is needed if substituting. Not recommended to reduce salt in recipes especially yeast bread doughs.</td>
<td>Usually measured with small measures or weighed.</td>
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<td>Flavourings</td>
<td>They add many distinctive flavours to baked products.</td>
<td>There are many types (extracts, oils, spices and herbs) and forms (powders, purees, peels and liquids). More research will be needed for how they are used.</td>
<td>Usually used in small quantities, measured with small liquid or dry measures.</td>
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