**GENERAL INTEGRATED SCIENCE – UNIT 4**

**TASK 6 – SIMILAR INGREDIENTS EXTENDED RESPONSE**

**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ WEIGHTING: 15%**

**DUE DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MARK: \_\_\_\_\_\_ / = \_\_\_\_\_\_ %**

**Question: *Do the properties of a substance make it what it is?***

**Objectives**

* the use of substances is determined by the chemical and/or physical properties of the constituent chemicals
* rearrangement of reactant components occurs during chemical reactions to form new substances

**Task 1 – Research *(5 marks)***

You are to research the following questions in reference to ***BOTH*** eggs and plain flour in the baking process.

1. State their physical properties
2. State their chemical properties
3. Describe the uses of both eggs and plain flour in baking
4. What are the similarities between eggs and plain flour in the context of baking?
5. What are the differences between eggs and plain flour in the context of baking?
6. Both eggs and plain flour can be replaced in recipes with alternatives.
   1. Explain how egg can be replaced with the following. ***Include what is it and how it works.***
      1. Egg Replacer
      2. Chia Seeds
      3. Apple Sauce
   2. Explain how plain flour can be replaced with the following. ***Include what is it and how it works.***
      1. Gluten-free Flour
      2. Cornflour
      3. Almond meal
7. Describe one physical and chemical change that occurs during baking because of egg.
8. Describe one physical and chemical change that occurs during baking because of flour.
9. Discuss the difference between a **food intolerance** and a **food allergy** – i.e. the effect on the

human body

1. Find a recipe that uses both eggs and plain flour. State the function of eggs and plain flour within

the context of the recipe you have chosen.

**Task – Extended Response *(64 marks)***In class you will respond to a series of questions based on your research

on similar ingredients in the cooking process.

**In-Class Extended Response *(5 mins reading and 55 mins assessment)***

Use your research notes to answer all questions below.

**Outline** two similarities between the use of egg and plain flour within baking (2 marks)

- Both contain **protein,**

Both assist with **structure** of the dishes they are used in

Both are used as binding agents

*Any 2 points = 2 marks*

**Describe** the differences between the uses of egg and plain flour within baking (6 marks)

Egg: wet/liquid Flour: Dry

Readily available protein Need to activate gluten (pro)

Can be aerated and retain shape Requires rising agents to assist in aeration

Can be dextrinised-starch

*1 mark per point = 6 marks*

Outline the **physical properties** of both egg and flour using the five senses (10 marks)

|  |  |
| --- | --- |
| **SENSES** | **EGG EXAMPLE** |
| Sight | Layered, yellow white gooey |
| Smell | odourless |
| Taste | Eggy, savoury, rubbery, mildly sweet-yolk |
| Touch | Gooey, slimy, moist, wet |
| Sound (hear) | Shell-crack noise  Sloppy, wet |
| **SENSES** | **FLOUR EXAMPLE** |
| Sight | White, powdery, fluffy |
| Smell | Wheaty |
| Taste | Dry-claggy, sticky, floury, powdery |
| Touch | Soft, fluffy |
| Sound (hear) | No sound |

*1 mark per sense = 10 marks*

**State three chemical properties of an egg and outline what they are (6 marks)**

Leavening: acts as a rising agent ie soufflé/meringue

Structure: holds shape once it has been beaten/ aerated

Protein: readily available acts as a binding agent

*1 mark/property + 1 mark/outline = 6 marks*

**Explain what the following replacements are and how they work……. (7 marks)**

**Chia Seeds**

* By grinding these with water the mixture forms a mucilage/goop (1)
* contain protein, fiber and are an excellent source of omega-3 fatty acids (1)
* These seeds still act as a binding agent (1)

**Apple Sauce**

* ¼ cup of apple sauce = 1 egg (1)
* ½ cup = 2 eggs but have a different texture (1)
* for 3 eggs or more you cannot (1) use apple sauce as it is too wet (1)
* lacks structure, and applesauce has no comparable proteins (1)

**State three chemical properties of Plain Flour (3 marks)**

Endosperm:

* starchy centre of the grain
* contains carbohydrates, protein and a small amount of oil.
* Most simple white flours contain only this portion of the grain.

Gluten:

* Found naturally in the endosperm of wheat.
* gives strength, elasticity and a characteristic chewy texture to yeast breads, pasta and pizza dough.

Bran: The outer husk of the grain, known as bran, adds texture, colour and fiber to flour. Bran gives whole grain flours their characteristic brown color and rough texture.

Germ: The germ is the reproductive epicenter of the grain and is a concentrated source of nutrients. Flour that retains the germ during the milling process will contain more vitamins, minerals and fiber.

*Any 3 points = 3 marks*

**Explain what the following replacements are and how they work……. (6 marks)**

**Corn flour**

* milled from the whole kernel. Corn and potato starch consist of starch only, with no proteins.
* means you get the same stickiness from the starch when the dough is heated but no help from the proteins.
* White corn flour is used as a filler, binder and thickener in cookie, pastry and meat industries.

*1 mark = what it is*

*2 marks = how works*

**Gluten Free Flour**

Without gluten, bread loafs and rolls don't hold their shape. Bake bread in loaf pans or Bundt pans, and use muffin tins for rolls. Add gums to your gluten-free flour. The sticky effect created by gluten can be simulated to a certain extent by adding gums, such as guar gum or xantham gum

*1 mark = what it is*

*2 marks = how works*

**CUSTARD TART**

**State whether creating a custard tart is a chemical or physical change, justify your answer (2 marks)**

Chemical (1)

You have created a new product (1)

**Outline several chemical changes have occurred to the egg in the Custard Tart recipe during the baking process? (3 marks)**

Coagulation: =cooked the egg (1)

Aeration: Beating the eggs (1)

Gelatinisation liquid to solid by applying heat (1)

**Pizza Dough**

Two major reactions occur during the pizza dough making process that makes it useful to its purpose. Explain the two reactions, using a word equation for each reaction. (3 marks)

Water+Flour activates Gluten (1)

Kneading=Gluten turns gluten network into strands (1)

Add

Yeast+ Water= release of CO2 gas bubbles that get trapped in the gluten strand causing it to rise (1)

**What is the yeast's function in the bread? (1 mark)**

function is to create CO2 gas and make the bread rise (1)

Define leavening. (1 marks)

Leavening- a substance used to produce fermentation in dough (1)

**Why do you knead bread dough? (2 marks)**

To create elasticity (1)

Stretches gluten strands (1)

What causes the ‘elastic’ bread dough to form? (2 marks)

Water and flour activate glutenins (1)

therefore Gluten strands are created to produce the elasticity of dough (1)

**What exactly is gluten**? (1 mark)

A protein found in flour (1)

**Name the functional property** that occurs to the colour of your pizza dough when it is cooking and explain it (2 marks)

Dextrinisation (1)

the browning of starch (1)

**Outline and discuss the difference between Food Intolerance and Food Allergies (7 marks)**

**A true food allergy**

* immune system reaction (1)
* It triggers a histamine response in the body (1)
* anaphylaxis/need of an epi-pen which can be severe or life-threatening (1)
* symptoms: from vomiting/diarrhoea/joints swelling/itchy rashes/throat closing/ tongue swelling (1)

**food intolerance**

* digestive problems (1)
* symptoms are generally less serious and often limited (1)
* such as stabbing pains/wind/diarrhoea/vomiting (1)