TOPIC EXPLORATION PACK

PROVISIONAL

Theme: Eggs

February 2015

GCSE (9–1) Food Preparation and Nutrition

OCR
Oxford Cambridge and RSA

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Contents

This Topic Exploration Pack should accompany the OCR resource 'Eggs' learner activities, which you can download from the OCR website.

This activity offers an opportunity for English skills development.

February 2015

Overview

GCSE (9–1) Food Preparation and Nutrition is a new GCSE qualification. It is designed to draw upon different elements of three existing qualifications and adds some new content, such as the scientific knowledge underpinning food preparation techniques.

The specification aims to:

- Equip students with the knowledge, understanding and skills required to cook and to apply the principles of food science, nutrition and healthy eating
- Enable students to make the connections between theory and practice so that they are able to apply their understanding of food and nutrition in practical cookery
- Enable students to make informed decisions about a wide range of further learning opportunities and career pathways as well as develop vital life skills that enable them to feed themselves and others affordably and nutritiously now and in later life.

When can I begin to teach this specification?

September 2016.

What topics are covered in the specification?

The main sections are:

- Nutrition and food commodities
- Food provenance and food choice
- Cooking and food preparation.

Are there tiers of entry?

No. There is only one examination for all candidates.

When will the first examinations take place?

June 2018.

What percentage of the mark is for the written examination?

50%

What percentage of the mark is for internal assessment?

50%

What is the purpose of the internal assessment?

Non-exam assessments will allow students to apply their theoretical knowledge and understanding in a practical context to plan, prepare and cook meals.

Topic: Food Commodities – Eggs

A wide range of food commodities are used to make food products. It is important to know and understand the working characteristics of the main food materials and what happens when they are combined by a variety of preparation and cooking methods. Learners will also need to understand the nutritional value of these commodities when making choices in planning meals to meet the needs of different groups of people.

Where eggs come from

Useful links

http://www.egginfo.co.uk/
http://www.tradingstandards.gov.uk/cgi-bin/glos/bus1item.cgi?file=*BADV643-1001.txt

In this section, you will need to cover:

- Where eggs come from
- Structure of eggs
- Tests for freshness
- Safe storage and handling
- Food value
- Methods of cooking and the effect of heat
- Versatility of eggs.

The eggs most commonly eaten in the UK are hen's eggs, but the eggs of geese, ducks and quails are also available to buy.

Eggs may be produced commercially by:

Battery cages
Hens are kept permanently in large sheds in cages stacked on top of each other.

Barn systems
In barn systems hens are not kept in cages and have space to move around within a building.

Free range
EU laws require that free-range hens must always have access to an outside area with adequate vegetation during the daytime and can move freely.

Activity

Ask your students to complete Student Worksheet 1 on the advantages and disadvantages of eggs from free range hens versus battery cage hens.

Popular misconceptions

Eggs and cholesterol

Eggs contain cholesterol and some years ago it was believed that eating foods containing cholesterol led directly to higher levels of cholesterol in the blood. For this reason people were advised to limit the number of eggs they ate. As research has developed, however, we have learned that much of the excess cholesterol in our bodies is actually produced by **eating too much saturated fat** rather than eating too much cholesterol, so there is no longer a restriction on egg intake.

Are brown eggs better than white eggs?

The colour of the egg shell depends on the breed of hen. The nutritive value stays the same.

The structure of a hen's egg

Shell	Protects the egg and is covered in small holes which let water pass out of the shell and air to enter over time.
Shell membrane	This is on the inside of the shell and slows down the loss of water evaporating from the egg and helps prevent the entry of bacteria. Air can move through the membrane to take up the space of the water that is lost.
Air sac	As an egg becomes older, the water from the egg evaporates through the shell and the air sac becomes bigger.
Yolk	The yellow oily part at the centre if the egg. This would feed the developing chick if the egg was fertilised.
Yolk membrane	This surrounds the yolk, keeping it separate from the egg white.
Chalazae	Twisted protein strands at either end of the egg yolk to hold it in place it in the centre of the egg.
Thick and thin white	This surrounds the yolk. As the egg gets older it becomes thinner and more watery.

Activity

Ask your students to label the diagram of the egg on Student Worksheet 2 – The structure of a hen's egg, using the information given in the table.

Activity

Ask students to complete Student Worksheet 3 – The structure of a hen's egg: Questions.

Teacher-led Activity

Crack an egg onto a plate and identify the different parts of the egg.

N.B. this provides an opportunity to introduce safe handling of eggs.

Tests for freshness

Teacher-led Activity

Brine test. A whole egg is placed in a bowl or jug of brine (salty water). If the egg sinks it is fresh. If it floats on the surface it is stale because the air sac has enlarged and water has evaporated from the egg making it lighter.

Plate test. Crack an egg onto a plate and look at the egg white. If it is fresh, a lot of thick white will be seen making the yolk stand proud. The white of a stale egg will be thinner and runny and the yolk will be lower.

Weight test. A fresh egg will feel heavy whereas a stale egg of the same size will feel much lighter because of the evaporation of water and the increase in the size of the air sac.

Activity

Ask students to complete Student Worksheet 4 – Tests for freshness.

Safe storage and handling

Care must be taken when storing and handling eggs because they may carry bacteria such as Salmonella which causes food poisoning.

Eggs should be stored in a refrigerator to slow the growth of bacteria. Store pointed egg down.

Do not use cracked eggs as bacteria may have entered the egg.

As the shell is porous, store away from strong smelling foods.

It is unwise to use raw eggs in food, e.g. in mayonnaise or sauces that will not be cooked. This is especially important for very young children, elderly and for pregnant mothers for whom food poisoning may be especially dangerous.

When eggs are cooked any harmful bacteria are killed by the heat.

After handling raw eggs during food preparation, e.g. making omelettes or batter, hands and utensils should be thoroughly washed with hot, soapy water.

Egg shells must be disposed of carefully to avoid contaminating other food.

Activity

Ask students to carry out research and write a fact sheet on Salmonella infection to include some tips on safe handling when preparing and cooking eggs.

Useful sources of information

http://www.patient.co.uk/health/salmonella-leaflet
http://www.foodsafety.gov/
http://www.egginfo.co.uk/
http://tna.europarchive.org/20100910172942/http://www.eatwell.gov.uk/healthydiet/nutritionessentials/eggsandpulses/eggs/
http://www.incredibleegg.org/egg-facts/egg-safety

The food value of eggs

Eggs contain the following important nutrients:

Protein. This is found in both the yolk (vitellin) and the white (albumin). It is needed for growth and for maintenance and repair of the body.

Fats. Found in the yolk.

Vitamins A, D, E and K. These dissolve in fat and so are found in the yolk.

B vitamins. These dissolve in water and so are found in the egg white.

Minerals. Iron, phosphorus, zinc and selenium are found in eggs.

Water. Both the white and the yolk contain water.

Activity

Ask students to complete Student Worksheet 5 – The food value of eggs.

Methods of cooking

Boiling

Scrambling

Poaching

Frying

Baking

The effect of heat on eggs

When the protein in eggs is heated its chemical structure is changed. The protein is said to be **denatured**. This process cannot be reversed. With continued heating, proteins coagulate (set). The white begins to **coagulate** at about 60°C and the yolk at about 65°C.

Over-cooking makes the protein become tough. When eggs are heated too quickly the protein in the eggs will coagulate and shrink causing water to be squeezed out. This is called **syneresis**.

Suggested practical experimental tasks

1. Fry an egg slowly and observe the white **coagulating** before the yolk. Continue cooking and describe the changes in the egg as it becomes overcooked.

2. Make scrambled egg, cooking quickly, and observe **syneresis** taking place.

3. Whisk egg white to see protein being **denatured** and air bubbles being trapped to make a foam. Observe what happens when the foam is left to stand for a while.

Activity

Ask students to complete Student Worksheet 6 – Methods of Cooking, which gives a 'fill in the missing words' exercise.

Versatility of eggs

As a main dish

Eggs can be used instead of meat or fish in a main meal, e.g. savoury flan.

Glazing and adding colour

Beaten egg can act as a glaze which turns golden brown on heating, e.g. scones.

Binding

Eggs can bind ingredients together, e.g. fish cakes.

Coating

Coating foods for frying will form a protective layer on the outside which sets and holds the food together, e.g. fish fingers.

Setting and thickening

Eggs can be used to form part of a liquid which sets (coagulates) when heated, e.g. egg custard tart. Some liquids may be designed to only thicken rather than set completely, e.g. custard and sauces.

Enriching

Eggs enrich a dish by providing extra protein, oil and colour, e.g. egg fried rice.

Aeration

Air can be whipped into egg white to form a foam because of the ability of albumin to stretch and hold air bubbles. When heated slowly the protein sets and the foam hold its shape, e.g. meringue.

Emulsification

Lecithin is an emulsifier found in egg yolk. It enables oil and water to be mixed into an emulsion without separating e.g. salad dressing.

Raising agent

When whisked, eggs can hold air and become a raising agent and can make a mixture light in texture, e.g. chocolate éclairs.

Garnishing

Hard boiled eggs, sliced diced or chopped, can be used to decorate a finished dish, e.g. salad.

Activities

Ask students to undertake Student Worksheet 7 – Versatility of eggs which consists of two short tasks: one is to complete a table and one is to fill in missing words.

Student Worksheet 8 – Versatility of eggs: Research task could be undertaken as a teacher-led class discussion, individual research or both.

Student Worksheet 9 gives some ideas for practical activities to do with students.

Suggested answers

Student Worksheet 1 – Free range vs battery cage hens: suggested answers

Identify one advantage and one disadvantage to the consumer of eggs produced by the following methods:

Free Range	Battery Cages
Advantage Better quality of life for hens	**Advantage** Cheaper
Disadvantage More expensive	**Disadvantage** Concerns over animal welfare

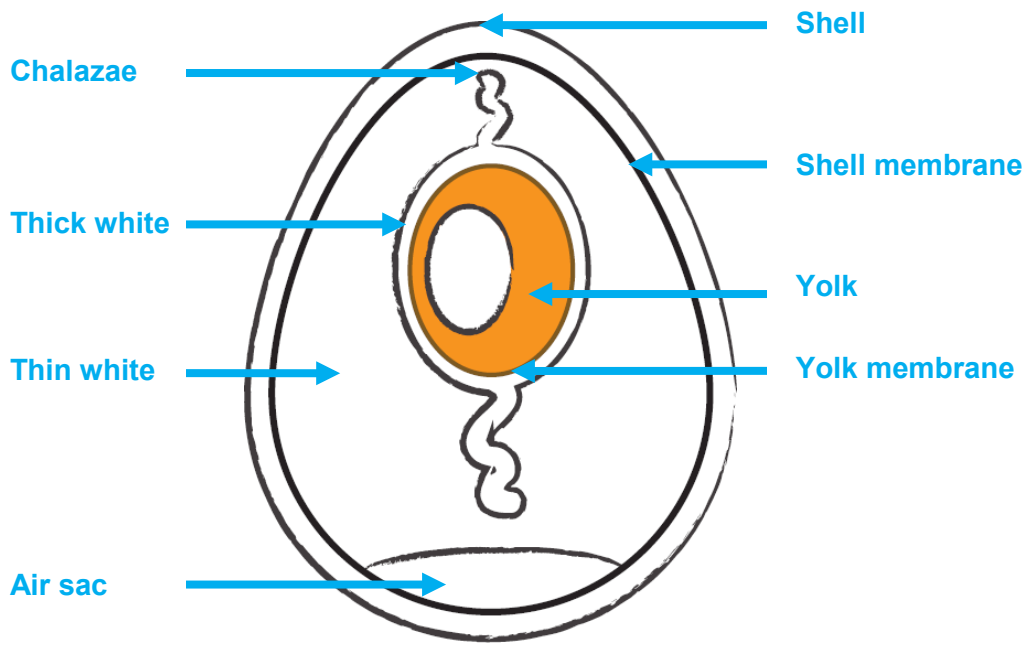
The Lion Mark

Eggs are stamped with the Lion Quality Mark if they come from hens that have been vaccinated against Salmonella. They must also have a date stamp to show they are fresh.

Student Worksheet 2 – The structure of a hen's egg: suggested answers

Shell	Protects the egg and is covered in small holes which let water pass out of the shell and air to enter over time.
Shell membrane	This is on the inside of the shell and slows down the loss of water evaporating from the egg and helps prevent the entry of bacteria. Air can move through the membrane to take up the space of the water that is lost.
Air sac	As an egg becomes older, the water from the egg evaporates through the shell and the air sac becomes bigger.
Yolk	The yellow oily part at the centre if the egg. This would feed the developing chick if the egg was fertilised.
Yolk membrane	This surrounds the yolk, keeping it separate from the egg white.
Chalazae	Twisted protein strands at either end of the egg yolk to hold it in place it in the centre of the egg.
Thick and thin white	This surrounds the yolk. As the egg gets older it becomes thinner and more watery.

Use the terms in the table above to label the diagram of an egg:



Student Worksheet 3 – The structure of a hen's egg: Questions: suggested answers

1. Which part of the egg would provide food for a growing chick if the egg was fertilised?

Yolk

2. What slows down the evaporation of water from an egg?

Shell membrane

3. What structures hold the egg yolk in place?

Chalazae

4. Which part of the egg starts off thick but becomes thinner as the egg gets older?

Egg white

5. What part of the egg increases in size as the egg gets older?

Air sac

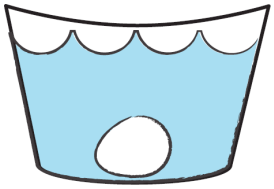
6. State why eggs should be stored away from strong smelling foods such as onions.

Egg shell is porous

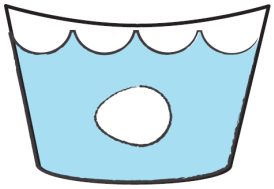
Student Worksheet 4 – Tests fo freshness: suggested answers

Explain what is happening in the two tests for freshness in the diagrams below.

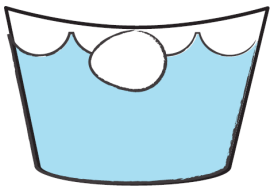
Brine test

1. 

Fresh egg has small air sac and lots of water in egg white making it heavy.

2. 

An egg starting to become stale as there is some loss of water which has been replaced by air.

3. 

A stale egg. Further loss of water and more air taken in. Egg is lighter.

Plate test

1. 

Fresh egg has thick white which supports the egg yolk.

2. 

Egg becoming stale. The white gradually thins and the yolk becomes flatter.

3. 

Stale egg. White is now nearly all thin and the yolk is flat.

Student Worksheet 5 – The food value of eggs: suggested answers

1. Find out how the important nutrients are used in the body.
   (Nutrients are listed on page 9.)

2. Give the names of:

   - two macronutrients found in eggs

   Protein and fat

   - one vitamin found in egg yolk

   Vitamin A, D, E or K

   - one vitamin found in egg white.

   B vitamins

3. Identify one macronutrient and one vitamin that are not found in eggs.

Macronutrient Carbohydrate

Vitamin Vitamin C

Student Worksheet 6 – Methods of cooking: suggested answers

Fill in the missing words.

When cooking eggs for breakfast, poaching and frying* are two different methods that could be used. As the egg is cooking, the white sets first but overheating will lead to the eggs becoming tough and water may be squeezed from the protein.

This is called syneresis. Another word for eggs setting is coagulation. This process cannot be reversed and is called denaturing. It is advised to only eat eggs that have been cooked to prevent food ** poisoning. Two groups of people who are particularly at risk and should always ensure their eggs are cooked are pregnant women and elderly people***.

*or any of the methods listed on page 10 **or salmonella poisoning ***or young children or ill people

Student Worksheet 7 – Versatility of eggs: suggested answers

Task 1

Complete the table showing some uses of eggs in cooking.

Name of dish	Use of eggs in cooking
Mayonnaise	Emulsification
Meat pie	Glazing and adding colour
Falafels	Binding/Enriching
Fish in bread crumbs	Coating
Victoria sponge	Aeration/Raising agent
Pancakes	Setting
Cheese omelette	Main dish/Setting
Mousse	Aeration/Setting
Bread and butter pudding	Enriching/Setting

Task 2

Use the words in the box to complete the sentences below.

lecithin	**set**	**white**	**separation**
foam	**oil**	**solid**	**water**

If air is whisked into egg [white] a [foam] is made.

Heat will [set] this mixture and it will become [solid] .

Egg yolk contains a fat called [lecithin] which stabilises emulsions of [oil]

and [water] which prevents [separation] .

Student Worksheet 8 – Versatility of eggs: Research task – suggested answers

Complete the table below by identifying some dishes showing the different uses of eggs.

As a main dish Quiche Savoury bread and Butter pudding Scotch eggs Eggs mornay Omelette Savoury pancakes	**Enriching** Scones Cheese straws Bread doughs Mashed potato Soups
Glazing and adding colour Pastries/sausage rolls/pies Scones Bread rolls	**Aeration** Meringues Cakes Whisked flans Swiss rolls Sponge drops Soufflés
Binding Fish cakes Beefburgers Meatballs Stuffings Pastries	**Emulsification** Mayonnaise Salad cream French dressing/salad dressings Creamed mixtures
Coating Fish cakes Potato cakes/croquettes Chicken/fish portions Scotch eggs Chilladas	**Raising agent** Cakes Whisked mixtures Chocolate éclairs Profiteroles
Setting and thickening Egg custard Quiche Bread and butter pudding Pancakes Sauces Yorkshire puddings Toad in the hole	**Garnishing** Salads Egg fried rice Jambalaya Savoury flan Pasta dishes

The above task could be done as a teacher-led class discussion, individual research or both.

N.B. Many dishes may have more than one use of eggs.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