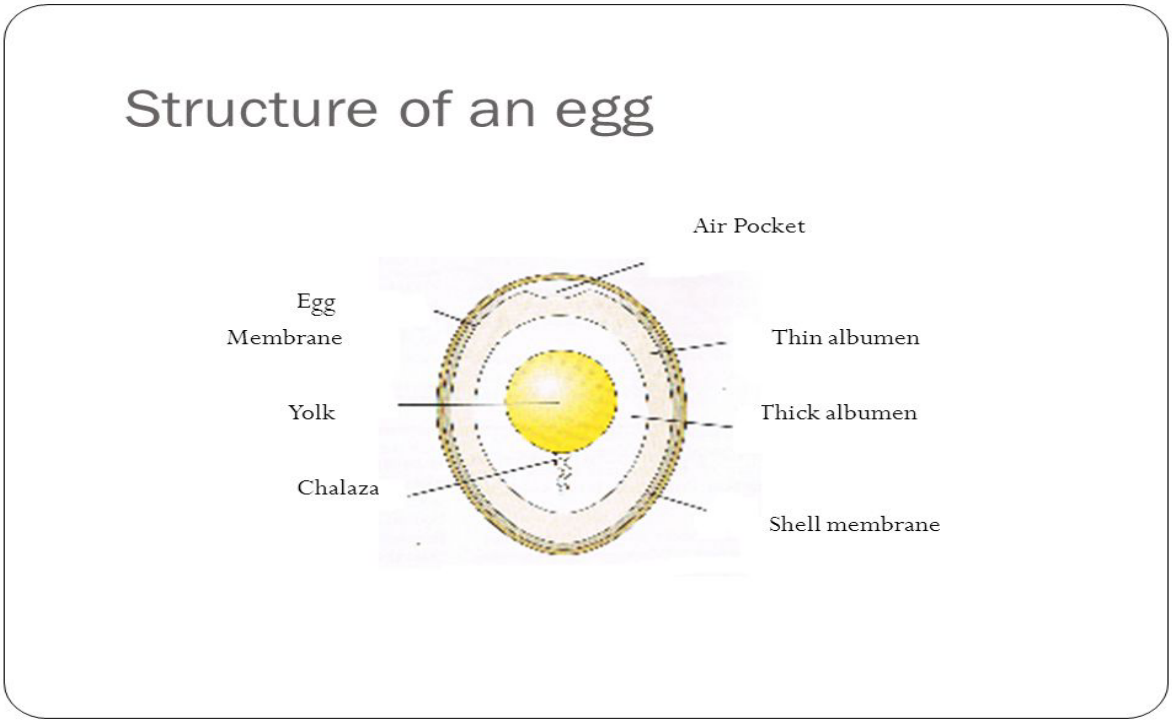
EGGS

Eggs are food proteins mainly obtained from birds both wild and domestic

- . Domestic birds include; chicken, turkey, goose, guinea fowls.
- Wild birds include; ostriches, kiwi

Structure of an egg

An egg is oval in shape where one end is narrow pointed and the other is blunt and broad. This enables it to be dispersed from caecum when being laid. It also encourages close packing of eggs in the rest so as to resist the external pressure and also when being collected in the tray.



Functions of each part of the egg

Egg shell/shell; consist of the outer which is a true membrane and the inner membrane. It is mainly made up of calcium carbonate ($CaCO_3$) and small quantities of calcium phosphate.

The shell; is porous and therefore allows air in for the growing embryo, unfortunately

bacteria also enters through the same pores which causes the decay of the egg. And through the same pores, moisture is lost from the egg and flavors are absorbed into the egg.

Keratin membranes; these are found under the shell and they are divided into two layers forming an air space at the broad end of the egg.

Egg white; has two visible layers namely the thick white (nearest to the yolk) and thin white (nearest to the shell). The thick white has more carbohydrates, which alter the pH and therefore it is more viscous than thin white.

The yolk; is a golden yellow fluid mass enclosed in the vitelline membrane. It has different layers i.e. white yolk, yellow yolk, inside the yolk is the germinal disc which the embryo develops. Mainly the egg yolk contains proteins, fats, fat soluble vitamins such as A, D, E, K and mineral elements such as iron, lecithin.

The chalaza; it is most known as a balancer and it is attached to both ends of the yolk and the egg white. The chalaza keeps the yolk in position and away from the shell where it could pick the bacteria.

Air space; is a small space at the broad and it is where gaseous exchange takes place

NUTRITIVE COMPOSITION OF AN EGG

	Protein	CHO	Fats	Vitamins	M salts	water
Egg white	10.5%	Nil	0.25%	B_1, B_2	0.75%	88.5%
Egg yolk	16.5%	Nil	33%	A, D,E,K	2%	50%
Whole shelled eggs	3%	Nil	nil	A,D, B_1, B_2	97%(calcium)	74%

The egg weighs about 55g of which the shell and the membrane 10.1% the white takes 59.1% and the yolk takes 30.2%.Eggs are highly nutritious foods.

NUTRITIVE VALUE OF AN EGG

An egg is nutritionally rich almost in all nutrients as it is meant to supply the embryo with the basic nutrients and the nutrient missing in an egg is carbohydrates.

Proteins

The egg contains high biological value proteins with the white containing oval albumen present are globulins proteins and the yolk has two important proteins namely vitellin and livetin.

Fats

These are found in the egg yolk and are mostly olein and stearin. There is also phosphorised fat sterols e.g. cholesterol. The phosphorised **lecithin** is important in cookery practices as an emulsifier.

Mineral salts

The egg supplies calcium, iron, sulphur and phosphorous. The shell mainly calcium inform of calcium carbonate, the white contains mainly sulphur and the yolk contains calcium, iron, phosphorous.

Vitamins

The egg has vitamin A, D, E, K and b group vitamins, in the yolk with B2 also mainly. The yolk also contains carotene gives the yolk a yellow color .vitamin .C is absent in the egg.

Carbohydrates

Are absent in eggs.

Water

The whole egg contains 74% of water with the highest percentage in the white.

GRADING OF EGGS

There are basically three quality groupings as below.

Class A; these are top quality eggs, with small airspace, clean, thick white and the yolk in the Centre. They may have been packed within the last seven days.

Class B; fair quality, these may have been preserved or refrigerated and may be dirty or un washed. They have a flatter yolk and more watery white.

Class C; mainly used in manufacture. May be cracked or opened and beaten.

DIGESTIBILITY OF EGGS

The more heat applied to an egg to more indigestible it becomes. Therefore a lightly boiled egg is more easily digested than a hard-boiled egg. Largest amount of fat in the yolk prevent it from becoming tough as the white. If a hard-boiled egg is finely chopped and served and well masticated, it becomes more digestible. Note* newly laid eggs are easily digested than old eggs.

USES OF EGGS IN COOKERY (CULINARY VALUE)

Eggs are used in a variety of dishes and provide an important supply of protein in the diet.

Binding agent; eggs are used for binding food for example in making meat dishes they bind together the food ingredients so that when heated it coagulates to hold them thereby preventing them from breaking.

Garnishes; a hard-boiled egg white and yolk can be used to garnish salads if shredded and finally chopped, eggs make attractive decorating for savory dishes, fish dishes among others as food invalids.

Enriching agents; eggs can be added to sauces so as to improve on the nutritive value of these dishes for example milk puddings, soups, sauces.

Trapping air; the egg white traps air due to the ability of ovalbumin to stretch hence find use in cake making as a raising and lightening agent.

Thickening agents; egg proteins have the ability to coagulate when heated at a temperature of about 45^0c. Therefore eggs are used to thicken custards, sauces, soups among others.

Coating agents; eggs are used to coat fried foods such as fish cakes, fish fillets, hamburgers and they can be heated with dry ingredients such as bread crumbs and flour which hold the food intact and prevent it from over cooking.

Glazing agents; eggs can be used to brush pastries using the egg white or the whole egg which after provides a golden brown color after baking.

Emulsifiers; a beaten egg yolk contains protein lecithin which enables oil and water to mix up hence making an emulsion. This property is used in preparing mayonnaise and also used in baking by the use of creaming methods.

Main dish; Eggs are also used as a main dish for example fried eggs, omelets, scrambled and stuffed eggs among others.

CHANGES DURING STORAGE/ DETERIORATION OF EGG QUALITY

A newly laid egg has a mucous covering which prevents entry of bacteria between but when it is washed, bacteria enter through the pores on the egg and cause decay.

Water is lost by evaporation and replaced by air which weakens the shell and consequently it may break with the yolk becoming flat. Egg white becomes so thin when the egg is broken and the white spreads out. It may turn yellow and become cloudy.

The yolk loses its central position because the thin white cannot keep it in the Centre.

As the egg becomes older;

- Water moves from the white into the yolk.
- Yolk membranes weaken.
- Thick white becomes thinner.
- Size of the air space increases.
- Moisture is lost through the shell.
- Bacteria enters through the shell.
- There is an odour of hydrogen sulphide due to the sulphide from the egg white

and the phosphoric acid in the yolk.

TESTING FOR THE FRESHNESS OF AN EGG

The shell must be rough.

Saucer test; if broken on a saucer, the yolk fresh egg should be transparent to allow you observe all the inside parts while the yolk of a stale egg is opaque.

The weight/ brine test; tests for the buoyancy of an egg. The eggs are placed in 10% salt solution where a fresh egg sinks and a stale egg floats over. That's to say;

- A two day old egg will float near the bottom with the broad end up wards.
- A newly laid egg will sink and lay float at the bottom.
- A three day old egg will float half way the solution.
- A 5 day old egg will float on the surface.

Note: an old egg loses water through the porous shell by evaporation causing shrinkage of contents. Thereby enlarging the air chambers and as a result the egg becomes lighter and more buoyant with the age.

Candling test; these tests for the transparency of an egg. It is used on a wider scale. It's a quicker method although it requires skills and experience. The experiment set up is as follows;

- Place a lamp in a metal shade bored with a hole
- Place the egg to be tested against the hole and slowly turn it between the finger and the thumb while observing its transparency.
- A new laid egg has a white hole which appears dense and homogenous, a small air chamber and a yolk aligned on the middle of the egg.
- An older egg has a white which appears cloudy and enlarged air chamber.
- The yolk is displaced to the egg since the chalaza can no longer hold it yet a

rotten egg is opaque.

Position of the yolk; shake the egg, if the egg is shaking, it is a stale egg well as a yolk which is intact with the white and chalaza is a fresh one.

STORAGE AND PRESERVATION OF EGGS

- Eggs should be wiped with a cloth or a nylon scouring pad to clean off any poultry dropping if any and stored with a rounded end upper most, in a cold larder or a refrigerator.
- They should not be placed near strong smelling foods such as fish the odors are passed through the shell into the egg.
- Eggs should not be washed as this may wave away the protective cuticle of wax which prevents substances which could enter through the shell.
- The shelf life of eggs can be prolonged by pickling and can keep up to six months.
- Eggs can commercially be stored in rooms with high humidity and low temperature just above 20^0C to prevent moisture loss and deterioration.

EFFECTS OF HEAT ON EGGS

- The protein in the egg white coagulates at approximately 60^0c. In the yolk, it coagulates at approximately 68^0c i.e. below boiling point.
- If eggs are cooked at high temperature or for too long, they cuddle i.e. the protein shrinks and water separates from the egg.
- If over cooked, the white becomes tough and leathery and the yolk becomes crumbly. Eventually a greenish black rim appears around the yolk owing to the combination of iron and sulphur forming ferrous sulphide. Raw or hard boiled eggs are more difficult to digest that light cooked eggs.
- Egg albumin is soluble in cold water but becomes insoluble when even slightly heated.
- Small amounts of vitamin B2 (thiamine) are destroyed on cooking.
- Denaturation of the proteins in the egg white causes the egg white to become white and opaque.

- ❖ Pathogenic organisms are destroyed thereby making the egg safe to consume.

HINTS FOR USING EGGS

- ➢ For boiled and poached eggs, the water should simmer very gently for 2-5minutes depending of the degree required. For hard boiled eggs, cook in boiling water for ten minutes and cool quickly.
- ➢ Always cool hot mixtures before adding to the eggs. Add warm mixtures to beaten eggs, and then the reverse may cause curdling.
- ➢ When whisking egg whites, make sure the bowl and the whiskers are clean and clean and free from fat. Even a small amount of fat will prevent the white from reaching the required volume.
- ➢ Use eggs at room temperature. Whisking should be done at approximately 20^0c (70^0f) to achieve a good volume.
- ➢ When making mayonnaise, oil will emulsify more easily if slightly warmed and added very slowly.

The phosphorised lecithin is of importance in cookery practices. Linking up of water and oil substances in the case of making mayonnaise. The fats supply the body with the necessary energy

ACTIVITY

1. Discuss the dietetic value of eggs.
2. Eggs are considered as an economic food. Discuss
3. How can one preserve eggs at home?