

BASIC STAGES OF SEWING

Sewing Clothes is a talent which requires a lot of work, interest, talent. Usually it is considered very difficult and many women go to tailor for the clothes. But with basic stages and principles of sewing, it becomes not only helpful but also interesting. Following are the basic stages of sewing:

1. Operating sewing machine and protection
2. Choosing suitable things for sewing and cutting
2. Preparation of sewing clothes

1. OPERATING SEWING MACHINE AND PROTECTION

Nowadays, every house has sewing machine. From fixing clothes to making clothes every step requires a machine. Hence why, machine is needed for sewing clothes. And for designing clothes there are machines available, which a person chooses according to their need and budget. Usually there are following types of machines:

- i. **Hand operating Machine:** There is a handle with this machine which helps to sew. The benefit of this machine is that you can take it anywhere and start to sew. This machine is a lot cheaper than electronic sewing machine.
- ii. **Foot operating Machine:** There is a stand with this machine by putting foot on it, the machine starts to work. By putting electric motor, this machine can work on electricity. This machine easy to work.
- iii. **Electricity operating Machine:** This machine is quite expensive, but works very fast because of electricity. This machine is used a lot nowadays. It has special tools on it which can be used for different work and stitches.
- iv. **Computer operating Machine:** This machine is the latest machine. In this Discs are used, which we get with the machine. This machine saves time and energy, because by this many designs are made without any work. This machine is a lot expensive than others.

Main Parts of Machine and their Work:

- i. **Spool Pin:** It is used to place spool thread while sewing.
- ii. **Balance Wheel:** It controls the movements of the thread lever and the needle.
- iii. **Arm:** It is the front side of machine. From which the thread starts and put in the needle. If the bobbin is not working properly, then this part is removed to clean inside of the machine.
- iv. **Tension Regulator:** It either increases or decreases tension of the thread to obtain correct stitching.
- v. **Thread Lever:** it is responsible for smooth flow of the thread in the machine.
- vi. **Presser Foot:** It keeps the cloth pressed on the feed.
- vii. **Feed Dog:** It helps the cloth to move on at the time of sewing.
- viii. **Bed:** It is the smooth base of machine, under it are all the accessories.
- ix. **Slide Plate:** It slides backward and forward so that the bobbin can be put in or taken out.
- x. **Bobbin Winder:** It is used to fill the bobbin with thread. When the thread is filled it comes up automatically.
- xi. **Presser Bar Lifted:** It is used for lifting and lowering presser foot. It is located at the back of the machine.

- xii. **Stitch length Dial:** It has numbers on it showing how many stitching can be done in 2.5 centimeters. With the help of the reverse stitching is also possible.
- xiii. **Foot:** It helps to press and control the cloth.
- xiv. **Needle screw:** it clamps lightens the needle and keeps it in place.
- xv. **Thumb Screw Clamp:** it is used to screw or unscrew the foot.
- xvi. **Bobbin Winder, Thread tension:** When the bobbin is being wound, it releases the thread in just the right tension so the bobbin is evenly filled with thread.

In some machine, following accessories are also found.

- i. **Hemmer:** It is used for hemming.
- ii. **Binder:** It is used for pipping.
- iii. **Tucker:** It is used for making plates.
- iv. **Button-Hole Maker:** It is used for making button hole.
- v. **Quilter:** It is used for quilting.
- vi. **Ruffler:** It is used for making ruffles.
- vii. **Discs:** In computer operating machine, there are multiple discs of different designs. By using them many designs are formed.

Some Common Defects Occurring in the Machine and their Causes:

Sometimes some defects appear in the sewing machines while stitching. These defects interfere with the perfect operation of the machine. It is necessary to know how to correct these defects so that the machine will run smoothly. This will also save the machine from any major repair. Some common defects and their causes are given below:

Defects occurring in Machine

1. If the Needle thread breaks:

- i. The thread is too thin.
- ii. The needle is bent or blunt
- iii. The needle thread tension is too tight.
- iv. The needle is not inserted correctly in the needle clamp.

Prevention:

- i. The thread should be thick.
- ii. Change the needle.
- iii. Put the thread in the needle correctly.

2. If the Needle breaks:

- i. At the time of stitching you might have pulled the cloth to make it go faster.
- ii. Putting the needle too high or too low.
- iii. The needle is bent.
- iv. The size of the needle is not according to the thickness of the cloth.

Prevention:

- i. Pulling clothes according to cloth.

- ii. Putting new needle.
- iii. Before stitching, slightly pull the needle upwards.
- iv. Put needle according to the thickness of cloth.

3. If the Machine Works Heavily:

- i. Not oiling machine.
- ii. Thread being stuck
- iii. Dust being stuck for so long
- iv. Machine being jammed because of using it after a long time.

Prevention:

- i. Putting suitable oil in the machine.
- ii. Removing all the threads.
- iii. Cleaning each part with small brush.
- iv. Putting machine near direct sunlight and cleaning it afterwards.

Right way to Operate Machine:

It is important to know the right way of operating machine. And the posture and position of the person using machine also effects. It is important to keep your posture straight while working and feel comfortable. There should be coordination between hands, feet and back. The machine should be kept on a place where there good lighting away from direct sunlight.

Learning to operate the Machine:

To learn the talent of operating machine, it is important to know the right way. In this, the method of handling the cloth, to sew straight, to keep an eye on it is included. To sew in straight line, the coordination between both hands is important. And to know the art of starting and controlling the machine while working is also necessary.

Changing the needle:

- i. Raise the needle bar to its highest position.
- ii. Loosen the thumb screw of the needle clamp.
- iii. With the flat side of the needle towards the right side push the needle into the clamp.
- iv. Tighten the thumb screw.

Cleaning/Protecting the Machine:

A sewing machine has many complicated and delicate parts, therefore it should be looked after carefully. It may be new or old but if it is properly maintained it will last for many years. How often to clean and oil depends on how much it is used. If the machine is used often and is kept in hot and humid place, it needs more cleaning and oiling. The humidity might rust some parts of the machine. It can be saved from rusting by cleaning and oiling it.

- i. **Cleaning the machine:** After the machine has been used for a week or two it should be cleaned. If dirt as collected on the outside of the machine, dampen a piece of cloth and wipe it. Do not use any soap.
To clean the inside of machine some soft material should be used. Remove the side plate and feed dog and with a brush clean the inside of the machine. After the machine has been cleaned there should be no dust or dirt on it inside or outside. There should be no lint or pieces of thread in or around the shuttle case.
- ii. **Oiling the Machine:** It is a common belief that a lot of oil is good for the machine. This is not true. Just on drop of oil at one place is enough. There are places in the machine showing where to oil.
Remove the slide plate and apply oil to the shuttle case. Then put the slide plate back. After the machine have been oiled in the inside and outside run it rapidly on a piece of cloth. The excess oil will come off on this material.
The machine should be oiled only after all the dirt and lint has been removed from it. If you are not going to use the machine for some time, apply oil all over the machine with a piece of cloth. This oil will prevent the machine from rusting.
After every use when your sewing machine is put away a double layer of cloth should be put under the presser feet. Put the presser foot down and also move the balance wheel towards you till the needle goes inside the machine. Loosen the stop motion screw. Now your machine cannot stitch. This saves the needle from breakage by rough handling. Do not forget to cover your machine when you are not using it. By doing so you will protect it from dust.

2.CHOOSING SUITABLE THINGS FOR SEWING AND CUTTING

Besides machine, there are some equipment and tools which also help in sewing and stitching clothes. Good tools, end with good results. If some tools are not available, it causes delay in work. Every equipment and tool should be kept and considered before starting to work.

1. Measuring and Marking tools
2. Cutting tools
3. Sewing Tools

1.Measuring and Marking Tools:

- i. **Measuring Tape:** It is usually 60 inches long and is in plastic or metal. Metal one is only for measuring clothes. And plastic one is used for measuring clothes and taking size of the body.
Before buying the measuring tape, it is important to see that the numbers written on it is prominent. Good quality tapes are quite expensive but are very helpful because its numbers are not only prominent but also stay for longer time. After using the tape, it should be rolled properly to prevent knots.
- ii. **Yard Stick or Meter-Rod:** These are found in steel, wood and plastic. Also on this the numbers should be prominent. For cutting cloth, usually 12 inches yard stick is better. But for making drafts meter rod is suitable.
- iii. **Pin and Pin-Cushion:** A pin is used for fastening objects or material together. It is usually made of steel. It is very useful in stitching. And is necessary for fastening drafts with a cloth. It comes in card board box. They should be good quality and sharp.

A pincushion is a small cushion of different sizes, which is used in sewing to store pins or needles with their heads protruding so as to take hold of easily.

iv. Tracing Wheel and Tailors Chalk: Tracing Wheel is used to transfer markings from patterns onto fabric with or without tracing paper.

Tailors chalk is a material used for making alternations on fabric in tailoring and dressmaking. The marks are brushed or washed off the material when no longer needed.

2.Cutting tools:

In cutting tools, different types of scissors are included.

Shears and Scissors: For best cutting and stitching, scissors are necessary. A sharp and good quality metal scissors help to stitch easily. There are usually these kinds of scissors.

- i. **Scissors:** These scissors have both sides smooth and round. They are 5 to 6 inches in size. It is used to cut extra threads after or during stitching.
- ii. **Shears:** These scissors are used for cutting clothes. These scissors do not have both sides same. Instead one handle is big and the other is small. The bigger side is used for putting more fingers inside to handle it firmly, which helps to cut the cloth neatly.
- iii. **Scissors for heavy clothes:** These scissors are heavy and big in size. Hence why it is used for cutting heavier clothes like woolen cloth etc.
- iv. **Pinking Shears:** These are the scissors, the blades of which are saw toothed instead of straight. They leave zigzag pattern instead of a straight edge. Pinking shears have a utilitarian function for cutting woven cloth. The saw tooth pattern does not prevent the fraying but limits the length of the frayed thread and thus minimizes damage.
- v. **Button-Hole Scissors:** Buttonhole scissors are made for making buttonholes without stretching or damaging the fabric.

3.Sewing Tools:

Following tools are included in this:

- i. **Threads:** Threads are available in different types and colors. It is necessary to use thread according to cloth. Because using thin thread on thick cloth will make the stitch undone. It is important to have a thread long lasting color and thick. Usually, by breaking the thread the quality is determined. But by the numbers written on it can also help to determine. Number 30, 40 and 60 are usually available. Number 60 thread is thick and good quality. In market, cotton, silk, nylon and polyester threads are available. It is chosen according to the type and color of cloth.
- ii. **Needles:** In sewing, a needle is a long, slender, object with a pointed tip, usually made of metal. It is an important element in sewing. For thick cloth, thick needle should be used and for thin cloth, thin needle should be used.
The needles have numbers on them. These needles are in 6, 8 and 9 numbers. 6 number needles are the thickest and the rest of the numbers are thin. And 9 number is the thinnest. Besides this, some needles start from number 1 to 5. Some needles have small holes, these needles are used for hand sewing. These needles are called Sharp Needles. And the needles with longer hole is called Crewel Needle, these needles are used for embroidery.
- iii. **Thimble:** A thimble is a protective shield worn on the finger or thumb. Thimbles are usually made from metal, leather, rubber, wood glass or china. Early thimbles were

made from bone, horn or ivory. It is used in quilting to protect fingers because a lot of pressure of needle is required in this.

iv. **Ripper:** It is used for undoing the stitch or ripping it.

Sewing Kit: For keeping all the tools for sewing and cutting, a box is compulsory. Not only this protects the tools but also helps to find them easily when needed while sewing. This box could be big or small according to the number of tools.

3. PREPARATION OF SEWING CLOTHES

Choosing suitable cloth for preparation is very important. Sewing is a lot easier to learn on cotton cloth rather than learning on silk cloth. Because the edges of cotton cloth do not rip as compare to silk. Following are the important steps for preparation of sewing clothes:

1. To know the technical terms of making and using clothes
2. Preparing cloth before cutting
3. Choosing right place for cutting clothes
4. Basic principles of sewing

1. To know the Technical Terms of Making and Using Clothes

i. **Bias:** A cloth has two sides, which is neither on length nor on width. Diagonal line of a square piece is its True Bias. Which has the height and the breath 45 degrees angle and has the ability to stretch.

ii. **Selvedge:** An edge produced on fabric during manufacture that prevents it from unravelling. For this a thick thread is used. It is different from other fabrics. Usually selvedge is 25 centimeters broad and tight.

iii. **Warp:** To arrange strands of yarn or thread lengthwise onto a loom in preparation for weaving. For making it thick threads are used. In this yarn or thread is knitted vertically in a flat form.

iv. **Weft:** In weaving, the weft is the thread or yarn which is drawn through, inserted over-and-under, the lengthwise warp yarns that are held in tension on frame or loom to create cloth.

v. **Grain:** A thread or yarn which is used to make cloth is called Grain. It means the length and breadth of this fabric is straight. If you pull one corner of the fabric, then the selvedge of this fabric is easily guessed.

2. Preparing Cloth before Cutting

Any fabric is incomplete without suitable preparation. If the fabric is stitched without preparatory steps, it takes a lot of time to complete. And usually the fabric gets wasted. Therefore, following steps are important to do before cutting the cloth.

- i. **Shrinking and Ironing:** It is important to shrink all the fabrics which are not pre-shrink before cutting. Especially cotton fabric should be soaked in water for 3 to 4 hours before cutting. After taking out from water, squeeze it gently and spread it straight on plain surface. Iron the fabric when its little wet. It is not necessary to shrink silk, nylon, Dacron and polyester fabric. Woolen fabric is also usually shrinks. And is labeled as Pre-Shrink. Iron the cloth after shrinking so that all the creases disappear.
- ii. **To Straighten the Fabric:** This process is very important for preparing the fabric. Because woven fabrics, especially of lower quality, are often slightly off-grain, meaning their lengthwise and crosswise grains are not completely perpendicular.

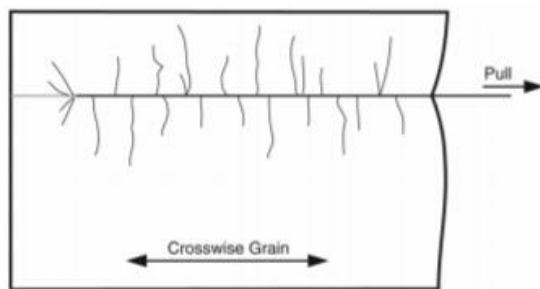
To make sure that the lengthwise and crosswise threads are at right angles, and that the fabric is “on-grain,” it’s necessary to straighten one of the cut ends. If there is a prominent design line, such as a woven stripe or plaid, cut along the design. Do not use a printed line as a reference; the print may not match up with the grain. If there is not a design line to follow, you need to pull a crosswise thread.

Snip through the selvage, find one crosswise thread and pull it, like a gathering thread, until you reach the opposite selvage. If the fabric is loosely woven, you might be able to pull the thread completely out of the fabric. If it is tightly woven, you will need to pull the threads every few inches or pull it slightly so it puckers (1); then slide the thread and push the fabric repeatedly until you reach the opposite selvage. Cut the fabric along the pulled thread. Once you have a perfectly straight cut edge, fold the fabric in half lengthwise (aligning the selvages). If the cut edge is not straight, or the corners don’t form right angles (2), the fabric is off-grain and needs to be corrected.

Refold the fabric to check that the ends are even. Take care not to pull too strenuously, or the fabric will stretch out of shape.

If a fabric is off-grain when the print is applied, once you straighten the fabric grain, the print will be off kilter. Carefully inspect print fabric before purchasing, and avoid any fabrics with a print that is badly off-grain.

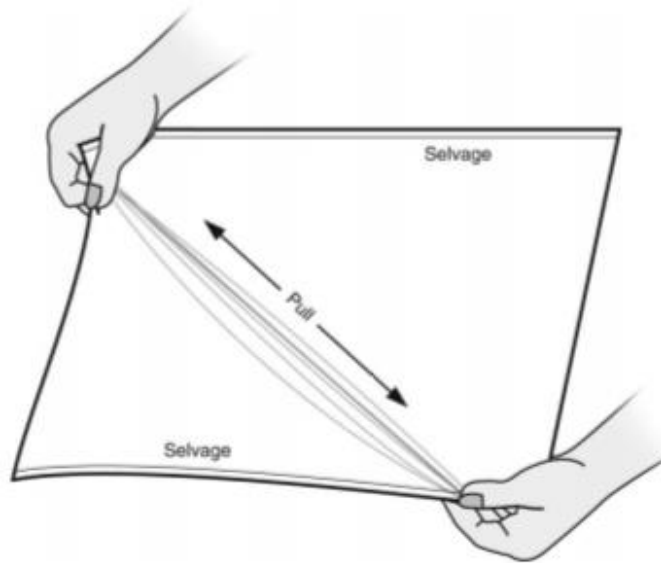
Fabrics with special finishes can’t be pulled on grain either; examine them carefully before purchasing.



(1) Pull thread from selvage to selvage.



(2) Cut ends are off-grain.



(3) Stretch fabric to straighten grain.

- iii. **Finding the front side of fabric:** Before cutting the fabric, testing the right and straight side of the fabric is important. Usually this test is not hard. But sometime the front and back side of the fabric does not have any difference. That's why this process gets difficult. Basically, the design of the cloth is more prominent and dark on the front side and the back side is dim. Besides that, the front side of the fabric is smoother than the back. This difference can be guessed by looking at the selvage. The front side of the fabric is on the front of the roll so that they look beautiful in the market and attracts the customers.
- iv. **Right direction of the height and breadth:** For making fabric two directions of thread are used. The length or height of the fabric is called Warp (Taana) and the breadth or width of the fabric is called Weft (Baana). The Taana (warp) of the fabric is stronger than Baana (weft) and is more flexible. That's why the fabric should be cut from the length direction. The height and breadth of the fabric should be correct while sewing. Otherwise the fitting of the dress is effects.

3.Choosing suitable place for cutting clothes:

Usually in houses, there is no specific place for cutting clothes because they don't know its importance. Although not cutting fabric on suitable place causes many problems. At tailor shop, you could see that there is specific high table for cutting fabrics. Which not only makes the cutting process easy but also prevents many problems.

At home, usually there is floor or bedside table for cutting fabric. Because the place is not suitable, hence why the fabric moves and cause problems. And working while bending down causes weariness and cutting process becomes difficult.

It is better to keep table for cutting at home. Or dining table can be used. This table is available at almost every house.

4. Basic Principle of Sewing:

Following steps are important to consider while sewing on machine:

1. Before sewing, join both seams together otherwise one side will become long and the other will be short.
2. While starting sewing, before putting presser foot down, lift the needle up so that the thread won't come out. This step should also be done at the end of sewing.
3. Put the long side of the fabric on your left-hand side so that the fabric does not collect on the inner side of the machine.
4. It is necessary to make the seams strong at the beginning and end. Otherwise they rip off. Usually two types are used for this:
 - i. First type is to put the fabric under the machine's foot before sewing. But do not crease the fabric and stitch 2 to 3 times at same place. By doing this, the fabric will have a small knot at the beginning of sewing, from which the stitch will not become undone. This process should also be done at the end of sewing so that both sides are strong.
 - ii. The second type is to fold the fabric and sew it again on 2 to 3 centimeters difference. By doing this the stitch will be double stronger. This type is especially used for round sewing fabric. For example; For stitching sleeves with shirt. This way the stitch become very strong.
5. For putting straight or tilted strip on neck, suitable width should be kept to prevent creases. Usually for tilted strip 2.5 centimeters and for straight strip 3 centimeters is kept. If the strip is too short, then the neck does not look neat.
6. Do not stretch the strip while applying tilted strip on neck. Otherwise it will not look neat and beautiful.
7. For sewing strips, put the tilted strip upwards and straight strip downwards.
8. Put the creasy side upwards and straight side downwards. Otherwise it will consume time.
9. In double seams, the stitch should be as less as possible so that it does not crease.
10. If the fabric is stitched wrong and while undoing the stitch do not stretch the fabric.
11. For the beginner it is important to repeat the steps learnt 4 to 5 times. Because doing it for first does not make you professional.
12. It is important to cut off extra threads while sewing small or big side of any fabric. Because cutting a lot of threads at the end will become hard.
13. Stitching on cotton fabric is a lot easy. Therefore, it is important to learn sewing on the cotton fabric.

IMPORTANCE OF MEASUREMENT FOR BETTER FITTING

A good fitting dress is comfortable to wear, the body can move easily and the fabric does not crease. Every seam starts and ends on suitable place. Shoulder seams stay on right place and the lines of sleeves are continuous.

To make a good fitting dress, drafting is important. Drafting means paper draft which is pinned on fabric. And the fabric is marked and cut according to draft. The benefits of drafting are when someone makes mistake, the paper is only wasted. Besides that, drafting is important for beginners, to know which design will look better on the fabric before sewing. And the sides which have curves become easy by making it on drafts and cutting of fabric becomes easy. It is not necessary to make only one draft for all the dresses. After knowing the principles of drafting, a person can make draft directly on fabric like tailors.

Basic Principle of Drafting

Following principle should be considered before making drafts;

1. Choosing suitable paper and pencil
2. Taking correct measurement of the body
3. Taking measurement of basic parts according to formula
4. Completing draft in every way.

- 1. Choosing suitable paper and pencil:** It is important to use a good quality paper and pencil (lead). Usually Khaki paper is used for this purpose. Because on it almost every size of dress can be made. For making draft the back side of paper should be used because the front side is shiny and slippery which makes it hard to draw on it.
- 2. Taking correct measurement of the body:** Taking right or wrong measurement really effects the sewing process. Taking correct measurement will end up with better dress. Sometime, a lot of people just guess the measurements which cause problems at the end.
 - i. Do not take your own measurements.
 - ii. While measuring the body, make your loose and stay straight.
 - iii. And the body should not have thick clothes while measuring, the should be of good fitting and light.
 - iv. Moving and gesturing will affect the measurement.
 - v. Do not take measurement too loose or too tight.
- 3. Taking measurement according to formula:** After measuring, this step is very important. Because after taking measurement of every part, for marking, some calculation is needed for making draft. It becomes very easy to make draft if this calculation is done before hand. Following are the basic calculation for making shirt. Write down the measurements of basic five parts for drafting.

No. Basic Parts of Body	Measurements.	Measurement according to formula for Drafting.
1. Shoulders Line	36cm (14")	$\frac{1}{2}$ Shoulders = 18 cm.
2. Chest Line	80cm (32")	$\frac{1}{4}$ Chest + 2.5cm (Comfort right) = $4/80 + 2.5 =$ 22.5cm.
3. Waist Line	64cm (25")	$\frac{1}{4}$ Waist + 2.5 cm for dart = $4/64 + 2.5 =$ 18.5 cm.
4. Hips Line	90cm (36")	$\frac{1}{4}$ hip + 2.5cm (Comfort right) $4/90 + 2.5 =$ 25cm.
5. Bottom Width Line	25cm (10")	Hips line = Bottom width line.
6. Full Length of Shirt	100cm (40")	Full Length= 100cm

Because this formula is according to individual measurement, therefore this formula should be applied on them accordingly. And write it on notebook or learn it. It will become easy to make draft afterwards.

- 4. Completing draft in every way:** Draft means a complete dress. For making shirt it is important to make front, back side and sleeves, like wise these things should be drawn on paper. If the shirt is colored than it is important to make colored draft. Besides that, for making kid's frock the upper and the lower portion is made separately. And it is important to make the draft of sleeves and collar on paper so that it does not cause any problem while cutting. And draw the lines prominently so the sewing is done correctly.
- Usually people only mark the cutting lines on the cloth but they don't accentuate the sewing lines which causes problems while sewing and at the end.

IMPORTANCE OF KNOWLEDGE OF FIBERS.

FIBERS

Fiber is a class of material that are continuous filaments or are in discrete elongated pieces, similar to pieces of thread. Fibers are often used in the manufacturing of other materials. They can be spun into filaments, thread or rope. They can composite materials. They can also be matted into sheets to make products such as paper or felt.

The earliest fibers used by man for making cloth were that of cotton or wool. Today we have number of richly colored fabrics, both natural and synthetic, with which we cloth ourselves today.

Generally, a good fiber consists of long, straight, parallel and moderately rigid and interconnected molecules. However, the quality depends on the use to which a particular fiber is subjected. The characteristics of good fiber are:

- i. **It is tough:** That is, it is capable of standing up under hard use.
- ii. **It is strong:** That is, it is not broken easily by modern longitudinal stretching.
- iii. **It is heat resistant:** that is, moderate heat (as for instance, the heat required for ironing) does not damage it or change its characteristics.
- iv. **It is elastic:** that is, it stretches slightly and is capable of returning to its original size and shape.
- v. **It is water and cleaning liquid resistant:** that is, it is not damaged by water or ordinary cleaning liquids and is nearly as strong when wet as when dry.
- vi. **It is light resistant:** that is, it is not damaged much by direct sunlight or other sources of ultraviolet light.

TYPES OF FIBERS AND SOURCES

Following are the three types of fibers and its sources.

Types of Fibers.	Names of Fibers.	Sources of Fibers.
1.Natural Fibers	Cotton	Cotton Plant
	Linen	Flax Plant
	Silk	Silk Worm
	Wool	Hair of sheep
2.Man Made Fibers	Rayon Acetate	Cotton Linters + Acetate
	Rayon Viscose	Cotton Linters + wood pulp
	Rayon Cuprammonium	Cotton Linters+ copper + oxide + ammonia.

3. Synthetic Fibers	i. Polyester	Teraphic pure acid and Ethylene Glycol.
	Teraline	Hexamethylene.
	ii. Polyamide	Diamine and Adipic Acid.
	Fabron	
	Dacron	
	Nylon	
	Perlon	
	Brilon	
	iii. Poly- Acrylene	Ethylene + Hypochlorous Acid.
	Orlon- Acrylene	

1.NATURAL FIBERS

Natural fibers are gained from these sources

- A. Those fibers which are gained from animal sources are called Animal Fibers. For example, Silk, wool.
- B. Those fibers which are gained from vegetable sources are called Vegetable Fibers. For example, cotton, linen

A. Animal Fibers:

- i. **WOOL:** Wool is a species of hair of certain animal, specially sheep. It is distinguished by its fine, soft and wavy structure. It can, by pulling and twisting, be spun into thread and the thread woven into cloth. The finest quality of wool is obtained from the Merino, a breed that originated in Spain. The wool obtained from Angoora, Moheer sheep is considered good quality and is quite expensive. Besides sheep, the wool is also obtained from cat, rabbit and camel hair which is used to make thread.
The basic fibers of wool are obtained by wool, but nowadays, many woolen sweaters and clothes are not made of pure wool. They are made of mixture and are not warm as compare to pure woolen clothes.
- ii. **SILK:** Silk is very fine and glossy thread spun by the caterpillar of certain moths (called silk worm) and manufactured by man into fibers. The silk worm grows on the leaves of Maple. When this worm gets two months old, it salivates a glossy thread on the two holes beneath its mouth. With the thread the silk worm spins a cocoon in which it is soon enclosed and thus protected. After two weeks, before the moth is ready to emerge, it is killed by heating in heated chamber. Then the thread is released from the cocoon. This thread is 800 to 1200 meters long. This fiber is the longest amongst all the natural fibers. These two to three threads are now brought together and twisted and the yarn is sent to factories for silk manufacture.

B. Vegetable Fibers

- i. **COTTON:** Cotton fibers is obtained from cotton plant. Cotton is collected from cotton plant in huge amount which are sent to factories and after doing many procedure, the thread is made. From which cotton cloth is made.
- ii. **LINEN:** Flax is a plant. It gives a fiber which is obtained from its stalk or stem. Flax plant is grown by seeds. When is plant fades then it is pulled by hand or mechanical pullers since the fibers extend below the ground. It is collected in large amount and are soaked in water. After taking it out from water, it is made into fibers by going through many machines. And is spin into threads.

2.MAN MADE FIBERS

RAYON: Rayon is a type of artificial silk fiber, in which Cotton Linters are used. This is made in three different ways. Following are the three rayon fibers with its name:

- i. **ACETATE:** In this acetate is added with cotton linters, which is gained from different factors of Mollases. These mollases are obtained from sugar cane while making sugar.
- ii. **RAYON VISCOSE:** In this wood pulp is added along with cotton linters, from which rayon thread is obtained.
- iii. **RAYON CUPRAMMONIUM:** In this Copper oxide and Ammonia is used with Cotton linters. But in first step acetate is mixed which is obtained from different factors of mollases. In these three types, from different chemical factor are mixer is made. Which is made into fibers by using special machines which is used to make Rayon.

3.CHEMICAL FIBERS/SYNTHETIC FIBERS

You must have heard of these name polyester, dacron, fabron etc. These are the fabrics which are completely made of chemical components. Their features are completely differently from clothes made of natural fibers. These are recent invention of fibers. These are of three types:

- i. **POLYESTER:** This fiber is old but in 1979, ICI (which is world biggest company) made it in Shaikhupura and Karachi, named as National Fibers. It was prepared there and now it is used everywhere. Two chemical components are used to make this which are Pure Teraphic and Elthyene Glycol. And clothes made of these fibers are named as Fabron and dacron and are available in markets.
- ii. **POLYAMIDE:** To prepare this fiber, Diamine, Hexamethylene and Adipic Acid are used. This is also called Nylon. Fabric made of these fibers are known as the names Fabron, dacron and teraline.
- iii. **POLY ACRYLENE:** For this Hypochloric Acid and Elthylene are used. From this Orlon and Acrylene named fabrics are made.

TYPES OF FIBER AND PROPERTIES OF CLOTHES MADE OF THEM

Every fiber has its own basic properties. Therefore, they are used for different purposes. Besides that, the appearance and long lasting of fabric depends on fibers. Hence why, it is important to know the properties of fibers before selecting clothes.

1. NATURAL FIBERS

A. PROPERTIES OF CLOTHES MADE OF COTTON

- i. Cotton is the oldest fabric in the world. The fabric made of it is known as National Fabric. Because it is made and used the most all around the world. China, Japan, Egypt, America are popular for growing cotton plant. In Pakistan, there are the most factories in Faisalabad and Karachi for making cotton fabric.
- ii. These fibers are very short in length.
- iii. Cotton fabrics are not shiny. That's why own shine is added in the fabric. For example, mercerized fabric has little shine than cotton fabric. Like that, shine in cotton satin is because of satin weave.
- iv. Cotton fabric is a good conductor of heat. It means that cotton fabric can absorb and remove heat. That's why, cotton clothes are worn in summers.
- v. Cotton fabrics are easy to wash and clean. And are very great for protection of health. Therefore, from all the fibers, cotton fiber is used for medical need.
- vi. This fabric can natural and easily absorb colors. But as compare to woolen and silk fabric, the colors do not stay. It is why they fade as the passage of time.
- vii. Cotton fiber is the second strongest fiber after natural silk. But as compare to synthetic fiber it is not that durable.
- viii. The fiber can bear heat. And its clothes are used in summer. And it can bear high temperature iron.
- ix. Alkaline does not effects cotton. It can be washed with strong detergent.
- x. Cotton is easily attacked by fungi and the stains of fungi are hard to remove.

USES: Cotton fabrics are for following things:

- i. For men and women clothes
- ii. For children clothes
- iii. For curtains, sofas, bed, table cloth, bedsheets and towels
- iv. For patient's cloth and for medical uses

Cotton fabric is the only fabric which is used for medical needs all around the world.

B. PROPERTIES OF CLOTHES MADE OF LINEN

Linen is derived from dlin. It is an Egyptian word and the plant from which it is obtained is called dlin. Earlier, Egypt was known as house of linen. Linen is almost 10 thousand years old and was discovered by Egypt. But in other countries it is obtained from Flax plant. Australia, Belgium, Germany, Ireland, Canada and America are famous for original linen. In Pakistan it is not grown therefore, the cloth which is available is actually made of Rayon viscose and cotton fibers which looks like linen but its properties are different. The properties of original linen are:

- i. It is vegetable fiber. It is two times stronger than cotton.
- ii. It is smooth, soft and comfortable and has little shine.
- iii. This fiber is heat resistant. It can absorb and remove heat. Therefore, it is used in summer.
- iv. The fiber is not flexible or stretchy. That's why it has ability to crease and are not easily removed.
- v. It has natural ability to absorb colors. And the colors do not fade and it can be dyed in every color.
- vi. Protection is not needed to wash this. And alkaline does not affect it. It can be washed with strong detergent.
- vii. Linen can attract fungi like cotton. And the stains of fungi don't remove easily.
- viii. Light warm acid can affect it. But cold acid does not affect it.

USES: Real linen is very delicate and beautiful fabric. Embroidery looks beautiful on it. Therefore, it was basically used for Table linen and Household linen. Now also it is used for table cloth, bed cover, napkin, trolley set. And it also used for clothes but as compare to cotton, it is not used that much. Because it is too expensive.

C.PROPERTIES OF CLOTHES MADE OF WOOL

Wool fiber is the oldest discovered fiber. It is mentioned 1400 years ago in Holy Quran in Surah 14 Al Nahl Ayat 80. Wool fiber is obtained from sheep. Its quality is determined with its hair, environment, diet and health of sheep. Australia, Argentina, south Africa and America are famous for making good quality wool. In Pakistan, woolen fabric is prepared in Karachi, herna, larnes. Following are the properties of wool fabric.

- i. Wool fibers are short in length. Short fibers are of 2 to 7 centimeters and long fibers are 7 to 10 centimeters. Long wool fibers are used to make good quality clothes.
- ii. This fiber is rough and furry. That's why woolen clothes don't have shine.
- iii. Wool is the weakest fiber from all the natural fibers. But with special procedures it can become durable.
- iv. This fiber is the most stretchable fiber from natural fiber. It can be stretched for 30 percent in its real form. That's why clothes made of it doesn't crease.
- v. It is non-conductor of heat. Clothes made of it does not release body heat out. Therefore, it is used in winters.
- vi. This fiber is great at absorbing and can be in any color.
- vii. This fiber can't bear strong alkaline. So strong detergent should not be used for washing this.
- viii. This can't bear high temperature iron.
- ix. Because this is animal fiber, insects affect it quickly.
- x. Wool fibers can absorb quickly. Original wool fiber can absorb 20 percent of its weight. And after absorbing for 50 percent, the moisture comes out as droplets.
- xi. The fiber gets weak and loses its durability. Therefore, it should not be put near direct sunlight.

USES:

- i. Woolen fabric is mostly used in winter for men, women and children clothes. Sweater, socks, underwear, warm tank tops are also made with wool.
- ii. For carpet, blankets, wool fibers are also used.

D. PROPERTIES OF CLOTHES MADE OF SILK

Silk is known as queen of fabrics. It was discovered by one of the queen of China. Chinese took it a secret for three thousand years. It was transferred from China to Japan to Europe. After that it was made and used all around the world. The properties of silk are:

- i. It is the longest fiber from all the natural fibers. It is 800 to 1200 meters long. That's why clothes made of it are soft and smooth.
- ii. These fibers are very thin like thread. Hence why its clothes are light in weight.
- iii. It has natural shine. It is the only natural fiber which has its own shine.
- iv. It is also the strongest.
- v. It can be dyed in any color.
- vii. Fiber is soft and smooth because of its length, in which dust can't not collect. But if it does, it can easily be removed.
- viii. Don't use strong detergent for this. Use mild detergent.
- ix. This fiber gets weak from sun. White silk turns into yellowish color if kept near sun.
- x. It is very famous. And is also expensive.

USES: It is used for clothes for special occasion. Like wedding etc. Because its expensive, people don't use it a lot.

2.MAN MADE FIBERS

PROPERTIES OF CLOTHES MADE OF RAYON.

Because pure silk needs hard work to make and is expensive. Therefore, rayon which is artificial and man-made fiber, is used instead of silk. In Pakistan, the first rayon factory was made in Kalashah Kako. It in 10 tons of rayon is made every day. Following are the properties of rayon fabric:

- i. It has shine in it.
- ii. Colors are strong and beautiful.
- iii. Does not shrink after washing.
- iv. By mixing different fibers in it, many types of fabrics are made.
- v. Fungi and insects don't affect it.
- vi. It is cheaper than pure silk.
- vii. Rayon thread is very weak but it looks like pure silk. Clothes made of it are not durable.

USES: Rayon fibers are used for following things:

- i. 80 percent of sofas are made with rayon fabric.
- ii. Satin, tafita, shark silk, velvet, chicken design, praying mat, elastic, embroidery threads, lace are made with rayon thread.

3.CHEMICAL FIBERS/SYNTHETIC FIBERS

PROPERTIES OF CLOTHES MADE OF NYLON, DACRON, POLYESTER

Nylon, dacron and polyester are the important fibers in chemical fibers. Nowadays, 90 percent of clothes are made of synthetic fiber. Men shirts are made with the ratio of 35% cotton and 65% polyester. Properties of this are:

- i. Fibers are long therefore they are smooth and soft.
- ii. Air can't pass through this fiber. It feels very warm in summers.
- iii. It does not shrink.
- iv. These fibers are non-absorbent. They dry quickly and stains are removed easily.
- v. Colors are strong and beautiful. It can be colored in any color. Because they have their own dyes which are quite expensive.
- vi. It melts in high heat. Therefore, low heat iron should be used.
- vii. It is non-conductor and non-absorbent of heat. It is not suitable for summer. It can irritate sensitive skin and may cause allergy.
- viii. They are strong and durable. And can be used a lot. It can bear every kind of dirt.
- ix. They are made in endless types.
- x. Sunlight does not affect this fiber.
- xi. They does not crease and are smooth and soft.
- xii. The grease stains don't remove from this fabric because it absorbs it which gets hard to remove.

USES: Nowadays 90% of men and women clothes are made of synthetic fibers. Men shirt are made of 35% cotton and 65% polyester. It is also used for curtains and sofa cover.

IDENTIFICATION OF FIBERS

Identification of fibers is an important and interesting topic. Today, science is inventing new fibers and fabrics. Likewise, natural fibers are mixed with artificial fibers which gets hard to identify the fiber. It is important to identify the fabric before buying otherwise person can buy cheap fabrics for a lot of money. Following are the ways to identify the fibers

1. By touching the fabric
2. By breaking the thread of the fabric
3. By burning the Fabric
4. By testing the fabric through microscope
5. By chemical procedure

1. BY TOUCHING THE FABRIC

Usually, by touching and looking at the fabric, fibers can be identified. It means to put the fingers on the fabric, if the can feel the heat it means that the fabric is woolen. And for cotton fabric, the fabric will feel cold.

By touching the fabric, following fabrics can be identified.

Fabric.	Identification by touching
Cotton	It feels cold. It does feels flexible or stretchy by touching.
Linen	It feels cold and smooth than cotton. And feels stretchy or flexible by touching.
Woolen	It feels warm. And the texture feels rough.
Rayon	It feels soft but is heavier than natural silk.
Polyester	Smooth, soft and feels like silk.
Nylon	It feels warm and slippery.

2. BY BREAKING THE THREAD OF THE FABRIC

For identifying the strength and durability of fabric, take out 10- 15cm long thread from a piece of fabric and untie the thread because usually they are tied in two to three threads. But in this one piece of thread is taken and break it into two. By breaking different thread, following fibers can be identified.

Cotton	After breaking its thread spread like a brush.
Linen	It does not break easily as compare to cotton. They are long and little bit shiny.
Woolen	It breaks with elasticity. Its thread has rough texture.
Rayon	It breaks easily. Its tip is like branches of tree.
Silk	It does not break easily. Its tips are strong and shiny.
Nylon	It does not break even after pulling it very hard.
Polyester	It does not break even after pulling it hard.

3. BY BURNING THE FABRIC

To identify the fabric, this is the most trustable way. In this process, a small piece of cloth is burned. While doing this procedure, following things should be considered.

- i. Hold the fabric and move them towards flame from the side. Observe the reaction.
- ii. The position of burned side.
- iii. The look of ashes and its smell.

Fabric	Identification of fabric by burning
Cotton	It catches fire quickly because it has cellulose. Its ashes are light. It smells like paper after burning.
Linen	It burns slowly. And ashes are cotton fabric because both are vegetable fiber. It also smells like paper after burning.
Wool	It burns slowly. Its ashes has a special smell, which is because of presence of sulfuric acid.
Silk	It burns slowly. It calms down after removing flame. Its ashes looks like sparkling pearls. It smells like burned feathers.
Rayon	It burns quickly like cotton. Its ashes smell like burned paper.
Nylon	It melts and turns into small ball. Which is not easily pinched with fingers. It smells very bad.
Dacron	It also melts and burns slowly. But its ashes can easily break. Its ashes smell like fruit.
Polyester	It melts. It forms grey color pearls, don't break easily.

4. BY CHEMICAL PROCEDURE

It is also trustable and accurate test. But it can't be done at home. It can be done at labs for business purposes to know about different fibers. In man-made fibers, chemical components are used for example, rayon, polyester, dacron, nylon etc. To identify different fibers, following chemicals are used.

A. PHENOL TEST:

- i. Small pieces of fabrics are put into boiling phenol. If this fabric melts then it means it is made of polyester.
- ii. Put pieces of fabric in cold phenol, if it melts then it means the fabric is made nylon.

B. ACETONE TEST:

All those fabrics which are made of acetate, melts in acetone. To identify that whether the fabric is rayon acetate or pure silk, polyester is added into this acetone. If the fabric melts then it means it is rayon acetate and if it does not melt then it is polyester.

C. FORMIC ACID TEST:

To identify polyester and nylon, formic acid is used. If the fabric melts, it is polyester and if not then it is nylon.

D.DIMETHYLE FORMAMIDE:

Fabric made of Acrylic easily melts in warm dimethyle formamide.

5.BY TESTING THE FABRIC THROUGH MICROSCOPE

It is accurate test but it is done in labs and factories. A small thread is placed under microscope to identify fibers easily.

Fabric	Identifying through microscope
Cotton	Fiber looks twisted and knotted.
Linen	It looks straight but joined everywhere.
Wool	This fiber looks a collection of small fibers and the base is rough.
Silk	It looks smooth, soft and round.
Rayon	It looks straight and round, without any knots.
Dacron	It looks straight and smooth.
Nylon	It has some shine and it looks round, smooth and straight.
Polyester	It has black dots. Fiber looks straight, smooth and transparent.

BASIC STAGES OF CLOTHING

1. FROM FIBER TO YARN

After special procedures, fibers are made into thread or yarn. These procedures have importance in clothing and textile. And it is very interesting to know how sheep's hair is turned into fabric. Following are the steps, which turn fibers into thread.

A. From Cotton to yarn

- i. **Opening and blending:** In this process, all the cotton which is collected and came from farms, is opened and spread all over in a factory. By opening and blending it, the fibers become equal.
- ii. **Carding:** After opening and blending, all the fibers are put into machine which is called Carding machine. This is a basic step of making thread which is done with electronic machine. In this process the fibers of cotton are separated. The dirt or dust separates and the cotton becomes smooth and soft.
- iii. **Combing:** After carding, all the cleaned fibers are again put into another machine which is called combing machine. It in there are huge combs of wire. By which small and big fibers are separated. And the wool which was soft and smooth, turns into one curtain.
- iv. **Drawing:** After combing, a curtain made of fibers is again put into another machine, which has drawing and folding tools in it. By which the curtain made of fibers separates into thick ropes. This process is done until the thick fibers turns into thin ropes and which is suitable for spinning. After this process, the prepared substance is folded into threads.
- v. **Spinning:** The folded threads are then put into spinning machine. This process is done until the required length of yarn is made. The spin and separated thick yarn ropes are joined by the machine. This yarn is used to make fabric.

B. The process of making Wool Fiber into Wool Thread

- i. The first step of making woolen threads is to take sheep's hair, this process is called shearing.
- ii. Then it is collected and sent to factories, where its grading is done on the basis of length of hair, thickness, color and other properties.
- iii. After grading the second step is to clean the hair. These hair is cleaned with a solution of light alkaline (Naoh), this clarifies all the dirt like grass stuck with hair, dust, greasiness etc. this stickiness is called Lanoline, which is used to make different makeup products.
- iv. After this process, the woolen fibers get through Carding and combing machines. This process is similar to making cotton and silk threads.

After all the processes, two types of threads are made;

- The yarn made of long and continues fibers is called Worsted Yarn. And the fabric made of it is also called Worsted Fabric.
- The yarn made of small and rough fibers is called Woolen Yarn. And the fabric made of it is called Woolen fabric.
- Yarn made of extra rough fibers is called Carpet Wool Yarn, which is used to make carpets.

2. FROM YARN TO FABRIC

There are many ways of making yarn into fabric. The most used procedures are;

- A. Weaving
- B. Knitting
- C. Felting.

A. Weaving

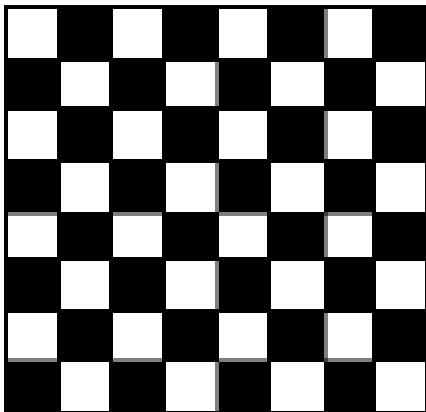
This is basic step of fabric making. Most of our clothes are made by this. By weaving the material is darned one step thread over the another. The first step is called the warp and the second is termed the weft. There are three types of weaving process.

i. Plain Weave: It (also called **tabby weave**, **linen weave** or **taffeta weave**) is the most basic of three fundamental types of (along with satin weave and twill). It is strong and hard-wearing, used for fashion and furnishing fabrics.

In plain weave, the warp and weft are aligned so they form a simple criss-cross pattern. Each weft thread crosses the warp threads by going over one, then under the next, and so on. The next weft thread goes under the warp threads that its neighbor went over, and vice versa.

- **Balanced plain weaves** are fabrics in which the warp and weft are made of threads of the same weight (size) and the same number of end per inch as picks per inch.
- **Basket weave** is a variation of plain weave in which two or more threads are bundled and then woven as one in the warp or weft, or both.

A balanced plain weave can be identified by its checkerboard -like appearance. It is also known as one-up-one-down weave or over and under pattern.



ii. Twill Weave: Twill is a type of textile weave with a pattern of diagonal parallel ribs (in contrast with a satin and plain weave). This is done by passing the weft thread over one or more warp threads then under two or more warp threads and so on, with a "step," or offset, between rows to create the characteristic diagonal pattern. Because of this structure, twill generally drapes well.

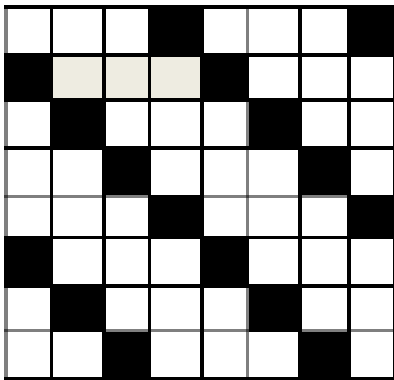
In a twill weave, each weft or filling yarn floats across the warp yarns in a progression of inter-lacings to the right or left, forming a pattern of distinct diagonal lines. This diagonal pattern is also known as a *wale*. A *float* is the portion of a yarn that crosses over two or more perpendicular yarns.

A twill weave requires three or more harnesses, depending on its complexity and is the second most basic weave that can be made on a fairly simple loom.

Sheer fabrics are seldom made with a twill weave. Because a twill surface already has interesting texture and design, printed twills (where a design is printed on the cloth) are much less common than printed plain weaves. When twills are printed, this is typically done on lightweight fabrics.

Soiling and stains are less noticeable on the uneven surface of twills than on a smooth surface, such as plain weaves, and as a result twills are often used for sturdy work clothing and for durable Denim, for example, is a twill.

Twills also recover from creasing better than plain-weave fabrics do. When there are fewer inter-lacings, the yarns can be packed closer together to produce high-count fabrics. With higher counts, including high-count twills, the fabric is more durable, and is air- and water-resistant.

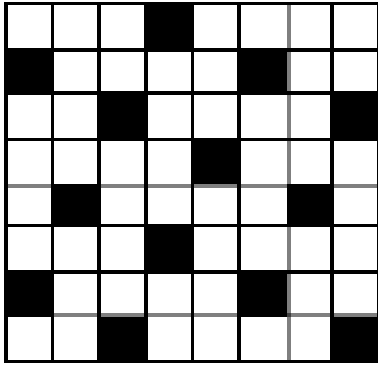


iii. Satin Weave: Satin is a weave that typically has a glossy surface and a dull back. The satin weave is characterized by four or more fill or weft yarns floating over a warp yarn or vice versa, four warp yarns floating over a single weft yarn. Floats are missed interfacings, where the warp yarn lies on top of the weft in a warp-faced satin and where the weft yarn lies on top of the warp yarns in weft-faced satins. These floats explain the even sheen, as unlike in other weaves, the light reflecting is not scattered as much by the fibers, which have fewer tucks. Satin is usually a warp-faced weaving technique in which warp yarns are "floated" over weft yarns, although there are also weft-faced satins. If a fabric is formed with a satin weave using filament fibers such as silk, nylon, or polyester, the corresponding fabric is termed a *satin*, although some definitions insist that the fabric be made from silk. If the yarns used are short-staple yarns such as cotton, the fabric formed is considered a sateen.

A satin fabric tends to have a high luster due to the high number of floats on the fabric. Because of this it is used in making bed sheets. Many variations can be made of the basic satin weave including a granite weave and a check weave. Satin weaves, twill weaves, and plain weaves are the three basic types of weaving by which the majority of woven products are formed.

Satin is commonly used in apparel: satin baseball jackets, athletic shorts, women's lingerie, nightgowns, blouses, and evening gowns, but also in some men's boxer shorts, briefs, shirts and neckties. It is also used in the production of pointe shoes for use in ballet. Other uses include interior furnishing fabrics, upholstery, and bed sheets.

Fabrics created from satin weaves are more flexible, with better draping characteristics than plain weaves, allowing them to be formed around compound curves, which is useful in carbon-fiber composites manufacturing. In a satin weave, the fill yarn passes over multiple warp yarns before interlacing under one warp yarn.



B. Knitting

This is a second way of making fabric. From our garments, many of them are made of this method. For example, Socks, sweaters, tank tops etc. In this continuous thread or yarn is used. From which loops are made and one loop is tied with another and thereafter by knitting fabric is made. It can be made with machine or hand made.

C. Felting

Felting is one of the oldest fiber crafts, it is a process to create an object made with wool fibers. There are two types- one is dry (needle) felting and the other one is wet felting. This video shows the creations I made with dry felting, this process uses a special barbed needle to create friction between the fibers when you use the needle to poke them up and down. This allows the fibers to tangle together and creates a volume.

In market it is available as felt fabric. Which is thick as compare to all woolen fabrics. From this, men waistcoat, towels, etc. are made.

3. THE FINISHING PROCESSES OF FABRIC

The fabric which is gained after weaving, knitting or felting is in its crude form. Every fabric which is made by machines, it has been through any of the finishing processes before using. Because most of the unprepared fabrics are rough and coarse. The real shape of fabric comes after completing the finishing process.

Some finishing procedures enhance the qualities of the fabric. For example, those fibers which have the ability to shrink and crease, their fabric can be made into crease and shrinking resistant by some chemical procedures.

Besides, the one aim of doing finishing process is also to increase the rate of fabric. Because people want less expensive and attractive clothes. These fabrics don't last very long, they don't stay the same after washing and the design changes. The processes are:

1. Sizing
2. Shrinking
3. Bleaching
4. Calendering
5. Mercerization
6. Singeing
7. Napping

8. Printing and Dyeing
9. Glazing
10. Crease resistant

1. Sizing

In this process, stiffness is added, which changes the appearance of the fabric. Usually it is called sizing. In factories, sizing is done with help of machines and many different things. If sizing is done reasonable its better but extra sizing affects the durability and thickness of the fabric. Because very stiff fabric is not comfortable to wear and after washing it removes and makes the fabric thin. This process is temporary.

To know that excess sizing is done, rub the fabric with both hands, if white powder comes out, then extra sizing has been done. Besides that, by putting a drop of iodine on the surface of the fabric, due to extra sizing the fabric will turn blue.

2. Shrinking

The fibers have tendency of reverting back to their natural state, thus causing shrinkage of the fabric. To avoid the subsequent shrinkage, the process of shrinking the gray good is carried out through different methods such as immersion in cold water, followed by hot water, steaming, resin or a chemical treatment.

The fibers and threads are stretched a lot during the process of making fabric. Because of that, it is important to shrink the fabric. Therefore, the fabric is dipped into cold water and it goes through warm water and steam. That's how the fabric is prevented from shrinking. But the price of the fabric also raises. That's why some markets sell the fabric without doing this process. And after using it is known that the fabric is shrinkable. It is important to know that cotton fabric should not be used without shrinking.

It is important to carefully look at the fabric before buying, because usually the factories put stamp as PRE-SHRINK on the fabric.

3. Bleaching

Usually bleaching means to cut down the colors and in making of fabric it means to remove natural color of the fibers to help make other designs and colors. Approximately every fiber has its natural color, which is important to remove it.

And to make white fabrics, it can only be done through bleaching. Which changes its appearance.

4. Calendering

It is done to add luster to fabrics. Calenders are heavy machines made up of at least two rollers that can go up to seven in number. Alternately, one roller is made of steel and the other is made of softer material like wool paper, cotton fiber and corn husks. The steel rolls may be equipped to be heated by gas or steam. The fabric passes rapidly between the rolls and then wound up on the back of the machine.

5. Mercerization

This is the process which makes the fabric shiny and strong. And the increases the ability to absorb colors. Usually this process is done on cotton fabric. Mercerized cotton fabric is softer, smoother and beautiful than normal cotton.

The Mercerizer contains a chemical solution, including caustic soda (also called lye), which is kept at moderately low temperatures. The mercerization process increases the size of the pores on the fabric threads, making it easier for them to accept color during the dyeing process. After that it is added into cold water. Mercerized fabrics are expensive than normal fabric. And is stronger and beautiful. This process has following properties:

1. It makes the fabric stronger
2. It adds shine to the fabric
3. It makes them easier to absorb colors.

6. Singeing

Usually the fabric which goes through machines is not smooth, because usually some threads, knots and fur are left. By this process these are removed, which makes the surface of fabric smooth and clean. In this process, the fabric is fitted in machine and drove through electric or gas-operated felt belt-like piece in high speed. This process is done on those fabrics which are made of shorter fibers. And this process is also done on cheap silk, cotton and woolen fabrics, so that they look expensive.

7. Napping

In the finishing process of manufacturing textiles, after the cloth is woven, it goes through processes such as washing, fulling, raising the nap and trimming the nap. After the nap is trimmed, the fabric is considered finished. The raising process, which draws out the ends of the fibers, is done on both woolen and cotton fabric. Flannelette is a cotton fabric that goes through this process. There are ways to 'raise the nap', most of which involve wire brushes such as raising cards. Originally, dried teasel pods were used and were still preferred for use on woolen cloth for a long time. Woolen fabrics, which must be damp when raising the nap, are then dried and stretched before the nap is trimmed or sheared. Cotton cloth goes straight to the shearing process, where the nap gets trimmed to ensure that all the raised fibers are the same length.

8. Printing and Dyeing

To make fabric attractive and decorative, dyeing and printing is done. Dyeing of fabrics is done which specific dyes. And printing is one of the important process of making fabric because we have more printed clothes. And removing from, mostly all fabrics are white and simple. And all the floral design on fabric is done by printing, which has different methods and gives different but beautiful result. Block printing, Batik, Tie and dye, screen printing and roller printing are the different methods of printing fabrics. In these block printing, tie and dye requires more work because the designs made from these are handmade, hence why these fabrics are expensive. Besides them, in roller printing design are made by machines, and these fabrics are less expensive. Roller printing method is used on all cotton, silk and woolen fabrics.

9. Glazing

This is the temporary finishing process, by which the cheap fabric looks better.

The Glazing process consists of treating the fabric with glue, starch, paraffin, shellac, or resin and then moving it through hot friction rollers. This process gives the fabric qualities such as luster, resistance to dust, spots and shrinkage.

10. Crease Resistant

Wrinkle-resistant fabrics are textiles that have been treated to resist external stress and hold their shape. By this the laundry gets easy and also requires less ironing.

In this process, fabric is added to a special mixture called Resin. Besides that, two types of fibers are mixed to make washing and drying easier. For example, silk is mixed with polyester to a make fabric which is easily washed and dried.

WARDROBE PLANNING

A wardrobe plan is a strategy, game plan or formula for meeting your clothing needs. It can be simple or very detailed, but it should be designed to meet your own needs. Because clothes enhance the personality. And wardrobe identifies our community. Therefore, we have to choose clothes after thinking, which gives respect and individuality to the community and the person has self-confident and responsible.

Literal meaning of wardrobe is cupboard in which keep our daily accessories like, clothes, shoes, and other stuff like, bangles, earrings and makeup etc. So, wardrobe planning actually means that the stuff used with clothes also match with it and are useful. They must be according to clothes and occasion.

For wardrobe planning, following things should be considered:

1. Clothing Budget
2. Number of Dresses
3. Needs
4. Activities
5. Personality
6. Analysis of Present wardrobe
7. Religious Requirements
8. Climate

1. CLOTHING BUDGET

In a family, clothes are made for everyone. It is important to make a clothing budget according to the need of every individual. It depends on a family's income. And some people like to wear different clothes and clothes requires some amount. It is important to know price which helps to select clothes according to fabric.

2. NUMBER OF DRESSES

Usually the number of clothes depends on the liking and sources of a person. Some people have more money but they don't like to spend on clothes because they think it is not important to spend on them rather they spend it on something they like. But some people have limited sources but they spend a lot on clothes. Therefore, the decision depends on the thinking of every person.

Clothes should be selected according to occasion and needs. The evaluation of clothes for college going girl is:

• College clothes	3 uniforms
• Changing clothes for home	6 dresses
• Usual and occasional clothes	7 dresses
• Sleeping clothes /pajamas	12 dresses
Total	<u>18 dresses</u>

3. NEEDS

It is important to know the needs before selecting clothes. And usually it is seen that people collect clothes without having its need and this is a reason of hoarding clothes. Wardrobe planning means, unless a person needs or likes the design or color of the clothes, he should

not buy other than them. Every person's needs are different, so it is important to evaluate the needs, activities and sources of every person.

4. ACTIVITIES

The numbers of clothes should be based on activities. To choose clothes it is important to know where you go and what do you do. Because, the girls who go out and participate in social activities and the women who go to parties or special occasions, it is important for them to have a lot of clothes. Whereas the girls who don't go anywhere except from college, they need less clothes. Besides that, the color and design of dress should be according to the occasion or activity.

5. PERSONALITY

Personality is a mixture of one's face and features, activities and attitude, way of talking and thinking. Everyone has their own unique personality. Which enhances by wearing suitable clothes. And the girl looks well-dressed is she wears designs and colors according to her personality.

It is important to evaluate yourself to know your personality. It includes skin color, height and body shape. Light color shows wider and dark color contours the body. Therefore, thin bodies should wear light tone colors and bulky bodies should wear dark tone colors. Normal size bodies can wear almost any tone of color.

After deciding light or dark color, it is to select colors according to the skin color. Try putting different colors of dresses on in front of sunlight and look at the mirror, some colors will enhance the features and some colors will make you look pale and dull.

Other than deciding the colors, it is important to choose the suitable design, because heavy, normal and light designs are found in clothes.

SELECTION OF CLOTHES ACCORDING TO BODY SHAPE	
Heavy and thick clothes like flannelette, warm wool and furry and heavy designs.	Makes the body look bigger and a person look bulky. Therefore, it is not suitable for bulky girls but is for thin and skinny girls.
Medium type thick and thin clothes like different types of silk, polyester and medium size designs like felt or crepe etc.	Makes the body looks slightly small. It is suitable for normal and bulky girls.
Clothes which stick to the body like, jersey, Georgette, pure silk etc.	Don't make the body look big or small, Perhaps, they enhance the real shape. Suitable for thin, normal and bulky girls.

Before buying new-things it is important to take good analysis of current wardrobe like clothes, shoes and accessorize etc. It is necessary so that you don't buy anything extra which you already have. And it is also important to know the designs and colors you already

have. Take a good hard look at the clothes you already have. If you have not worn certain items for a year or more there probably is a good reason why. Maybe the fit is wrong, or the fit, style, color or fabric, whatever the reason is, if you haven't worn it, you probably won't wear it.

7.RELIGIOUS REQUIREMENTS

Being a Muslim, our dressing should be according to Islam. The fabric shouldn't be thin through which the body can be seen and it shouldn't enhance the body. It should be similar to men's dressing. All these words are written in Holy Quran in Surah Al A'raaf ayaat no. 26 and 31. Its translation is:

“O children of Adam, We have bestowed upon you clothing to conceal your private parts and as adornment. But the clothing of righteousness – that is best. That is from the signs of Allah that perhaps they will remember.” **(Surah Al-A'raaf Ayaat no.26)**

“O children of Adam, take your adornment at every masjid, and eat and drink, but be not excessive. Indeed, He likes not those who commit excess.” **(Surah Al-A'raaf Ayaat no.31).**

8. CLIMATE.

Wardrobe planning should be according to climate of your country or city. For example, the clothes of girls living Muree or Quetta are different from girls living in Lahore or Karachi. In cold countries, thick and warn clothes are worn and in hot countries light and cold clothes are worn.

PERSONAL GROOMING

Personal grooming means to present your personality attractively. Personal grooming (also called preening) is the art of cleaning, grooming, and maintaining parts of the body. Any girl can look attractive and beautiful if she concentrates on grooming herself. The girl who grooms herself has complete different personality than the girl who doesn't take care of herself.

Clothing and personality has strong relation but only by wearing clothes a person doesn't look clean and healthy. Instead, to make personality attractive and charming, bright eyes, shiny clean hair, clean teeth, clean hands and nails are important. By which other people get inspired.

METHODS OF PERSONAL GROOMING

Two things are important for personal grooming:

- a. To know about things important for personal grooming
 - b. To regularly do the things which are important. Because some people don't do it regularly. Which affects their personality. No money is needed for personal grooming but by doing some things it can make your personality and health better.
1. Balanced diet
 2. Cleanliness of body
 3. Cleanliness and protection of hair
 4. Cleanliness of teeth
 5. Cleanliness and protection of hands and nails
 6. Exercise and posture.

1. Balanced diet

Personal grooming starts from good health and because of good health, the skin looks healthy. Otherwise it doesn't make any difference. Because health depends on balanced diet therefore, it is important to have habit of eating balanced diet regularly.

2. Cleanliness of body

Cleanliness of body includes washing hand, face and body carefully. Although everyone knows how to clean their hands, face and body but washing them carefully makes the skin glow and look fresh which stays for longer period. Two things should be considered:

1. Mild soap should be used
2. Soft towel should be used

Harsh soap makes the skin rough, dry and hard, and by using mild soap and soft towel leaves the skin soft and smooth. It is necessary to wash your face and hands two to three times a day. Because some people have oily skin and the dirt stick to their skin and clog the pores and the dirt stays in it. But use as less soap as possible. Chickpeas powder is best for oily skin but not for dry skin. Washing your face more often can also make the skin dry. Normal skin people should wash their face and hands two times a day. In summers, take a shower two times a day and in winters, two to three days a week is important.

3. Cleanliness of hair

Clean and brushed hair always look beautiful. Oily, dry and normal are the types of hair and are treated differently. Oily hair need more washing and normal hair should be washed two times a week. Following methods of cleaning and protecting hair are important to consider:

1. Always have your separate comb and brush.
2. Brush your hair for five minutes, two times a day and do it daily. It helps to circulate blood which makes the hair healthy.
3. Oil your hair once a week.
4. Always keep your hair combed.
5. Make your hair according to your face. It affects the personality.
6. Balanced diet is important for the health of hair. Fruits, vegetables, eggs, milk, meat and pulses make the hair shiny and soft.

4. Cleanliness of Teeth

Clean and shiny teeth is sign of good health. Teeth should be brushed three times a day. Following things should be considered for healthy and shiny teeth:

1. Use balanced teeth which has milk, eggs, vegetables, fruits, meat and different types of pulses.
2. Brush your teeth daily and carefully brush them upwards, downwards and both sides.
3. Regularly go to your dentist.

5. Cleanliness of hands and Nails

Cleanliness of hands and nails is an important part of personal grooming. We use our hands to do all the work and we eat with them therefore, it is important to keep them clean. To keep long nails clean and in good shape is hard and they require more time to care, so instead it is good to keep short nails. And it is the Hadith of Holy Prophet (S.A.W) to keep the nails short. Following are the principles of cleanliness of nails.

1. It is important to use a small Manicuring set for nails. It has nail cutter, nail filler and small scissors. These things help to clean the nails easily.
2. Nails should be cleaned immediately after bathing. Because at that time the nails are soft. And apply some cream after cleaning.
3. Always keep your nails clean.
4. Avoid the habit of biting nails because they look unflattering.
5. Keeping your feet and toe nails clean is also important. Especially, clean the heels and sole of the feet while bathing.

5. Exercise and Correct Posture.

Exercise is important for personal grooming to keep yourself energetic throughout the day. And keep your posture straight and comfortable while standing or sitting.

BASIC STEP OF SEWING

SEAMS AND ITS DURABILITY

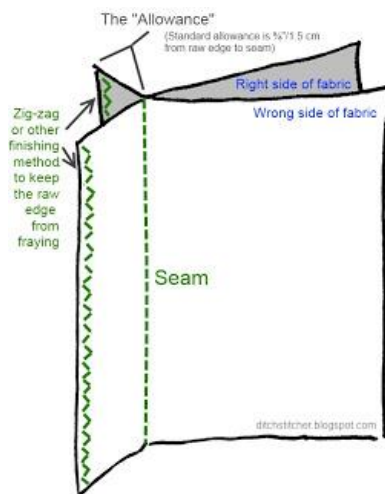
Seam is the basic element of clothing. Durability of seams means the stitch which are done on the edges of clothes are clean and strong and with the help of seams the threads don't come out of the fabric. There are four types of seams used for sewing clothes

1. Plain seam
2. French seam
3. Lapped seam
4. Flat felt seam

1. Plain Seam

It is the most used seam in clothes and is used for cotton, silk and woollen clothes. This simplest seam is made by placing the right sides of two pieces of fabric together, with even edges. To make the edges of this seam durable following methods are used:

1. The edges of plain seams are cut with pinking shears or simple scissors (in a zig-zag form) to prevent threads to come out.
2. The edges of plain seams are sewn 3cm under by machine with long stitches. This is called Edge Stitching.
3. Over cast stitches are used for the edges of plain seams.



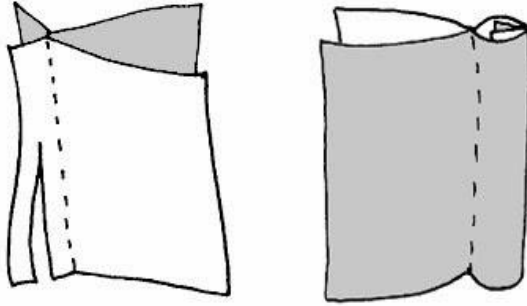
2. French Seam

This seam is great to use for a clean, finished look. It's created by sewing one plain seam, then encasing the seam allowance by pressing all the fabric to one side and sewing another plain seam. This technique is a practical way to prevent woven fabrics like voile, organza or burlap from unraveling. This is suitable for thin fabrics but not for thick

Method:

1. Baste (long stitches) along seam line with wrong sides of fabric together stitching from the edge. Trim seam close to stitching. Remove basting. Press seam to outside.

2. Turn seam to inside. Baste. Stitch on seam line. Press, if the first seam has been trimmed close enough no raw edges will be shown on right side.

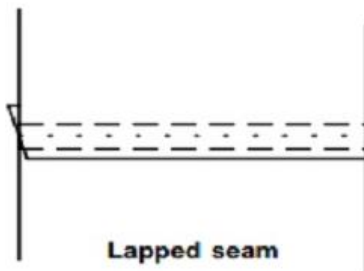


Step 1: Sew wrong sides together with 1cm seam allowance and trim excess.

Step 2: Turn so that right sides are facing and stitch again close to the seam.

3. Lapped Seam

This seam is used for folds, platted parts of clothes. The lapped seam is a very strong smooth seam which lies perfectly flat. Its strength is due to the fact that it is sewed with two rows of stitching. In a lapped seam, the two layers overlap with the wrong side of the top layer laid against the right side of the lower layer. Lapped seams are typically used for bulky materials that do not ravel, such as leather and felt.

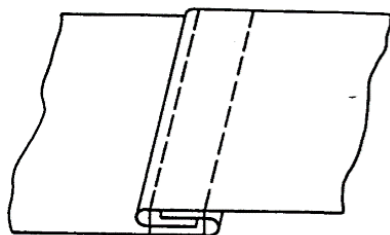


4. Flat felt Seam

In a flat or abutted seam, two pieces of fabric are joined edge-to-edge with no overlap and sewn with hand or machine stitching that encloses the raw edges.

Method:

1. Stitch a plain seam on fabric.
2. Trim about 6mm.
3. Crease the wider edge and turn our trimmed edge.
4. Baste, press and stitch.



FOOD AND NUTRITION

FOOD AND ITS IMPORTANCE

Every eating or drinking materials are not food but those staple things which fulfill the needs and are qualified to fulfill all the requirements of our body is called food. So, it is important to know about the needs of body to know the definition of complete food.

BODY NEEDS

To live and be healthy, it is important to fulfil three basic needs of the body. For example, Heat and energy, growth and the system of the body to regulate well.

1. Heat and Energy: This is essential for living, work, playing, growth and development, the movement of any system of body is impossible without it. The circulation of body, digestion, heart beating, breathing, and every system of body depend on this.

2. Growth: Growth and development is natural process for all living things. Through it the child become young and then old. The process of growth depends on the making of cells of body. By which the body grows and develops.

3. Correct System: For health and energy, all the system and functions of body should regulate well. Error in any system affects the health. Weakness and many diseases may cause. For example, If the circulation of blood is not correct, it causes blood pressure and if digestion system is not it correct causes constipation, vomiting, etc. and if respiration system is not correct it may cause asthma, and many lung diseases.

DEFINITION OF FOOD

Every edible or drinkable things which fulfills the requirement and needs of the body is called food. It gives heat and energy, helps to grow and develop and helps to regulate the system of the body correctly.

EXPLANATION

Every edible or drinkable things do not have the power to fulfill every requirement or needs of the body. Only those diet are called food which guarantee our health and growth. For example, milk, meat, fruits, vegetables, pulses and the things made of them. Every food which fills the stomach and are used in our lives is called Staple Foods. Like, wheat, rice, barley etc. Other things like pan, tobacco, loose tea, coffee powder, chewing gum etc. are only eaten for taste but these do not do anything for health and growth. These unnecessary things are called Non-Staple Food. And sometimes these tasteful things become addictive and are very harmful for health. And their excess may cause different cancer and other diseases.

BASIC FUNCTIONS OF FOOD

Food is not only for filling the stomach or for taste but it is also used for growth and to get energy. And to fulfill the needs and requirement of the body, food is important. After air and water, our live and health depends on our food. For example:

- Balanced food makes a person healthy, active and energized.
- Without food a person can't live.
- Unbalanced food makes a person weak and causes Malnutrition.

MALNUTRITION

Continuously having unbalanced food or deficiency of food nutrients effects health. It is called Malnutrition.

1. If the diet is less and unbalanced. It causes weakness and diseases related to it.
2. If the diet is more and is also unbalanced. It causes fatness and diseases related to it.

The food has following functions and basic goals:

1. Food supply heat and energy to the body.
2. Food builds and repairs body tissues.
3. Food regulates the body system and increases resistance power.

1.FOOD SUPPLY HEAT AND ENERGY TO THE BODY

Our body is busy in working every day and night continuously, even while sleeping and resting the system functions like heart beating, breathing, digestive system etc. are always busy working. If one of these system stops, death may occur. For all these systems and our movements of the body, energy is needed and this energy and heat are provided by the food.

2. FOOD BUILDS AND REPAIRS BODY TISSUES

Every part of our body is a collection of tissues, which do different work continuously therefore, they break. Food repairs these tissues and for growth and development, food builds new tissue. A child grows properly with balanced food.

3. FOOD REGULATES BODY SYSTEM AND INCREASES RESISTANCE POWER.

Food is important to regulate all the systems of the body. Which helps the body to fight against many diseases and increases immunity and protects from diseases.

Besides these basic functions, food also have a role in psychology and social work.

PSYCHOLOGY WORK: Food has a great impact on psychology of a person. Tasty food makes a person happy and he eats more. Whereas tasteless and unrepresentable food annoys a person and makes him angry and he eats less.

And having a variation of food everyday then basic bread or paratha also makes everyone happy and satisfied.

SOCIAL WORK: To make friends and in social gathering, food makes an important role in it. In school, home, neighborhood or at any occasion, without food they become boring and unexcited. Food increases the feeling of love and respect for the presenter.

PROPERTIES OF FOOD

All food has different properties than others. Different food does different work in body. For example, some food provides heat and energy to the body, some builds or repairs the tissues and some food have the ability to regulate the functions of body, but there are only few foods like, milk etc. which have the ability to do all three functions. The more the nutritive value of food the more it become important for the body. The food is divided into three types according to their ability of doing work.

1. Energy Foods: Their basic work is to provide heat and energy. These foods include, pulses, lentils, starchy vegetables and fruits (sweet potato), all sweet foods (jam, honey, fruits) and all healthy foods (ghee, butter, raisins, oil etc.).

2. Body Building Foods: Their basic work is to build and repair the tissues and to help in the growth of the body. Their sources are milk, meat, eggs, fish, cheese, and things made of them.

3. Protective Foods: Their basic work is to regulate the system of the body. Their sources are fresh vegetables and fruits and many other foods.

SOURCES OF FOODS

Every food we eat comes from two sources which are animal or vegetable sources.

Animal Sources: This source of food is obtained from animals and birds. For example, milk, meat, fish, eggs, cheese, cream, ghee, butter etc.

Vegetable Sources: This source includes all the foods obtained from plants. For example, pulses, lentils, fruits, vegetables and oil etc.

ESSENTIAL FOOD NUTRIENTS

It is important to know about the nutrients in our food which has the ability fulfills the needs of our body.

Actually, every edible or drinkable thing is a mixture of some chemical components. Different taste and colors in our food are because of these components. And from these components some are important for the growth, energy and heat. The importance of food depends on nutritive value of these components. Following are the food nutrients:

FOOD NUTRIENTS (DEFINITION)

Some components present in our food which helps in the growth, provides energy and regulates the system our body properly are important. These important components are called Food nutrients.

There are 6 food nutrients and their names are:

1. Proteins
2. Carbohydrates
3. Fats
4. Vitamins
5. Minerals
6. Water

IMPORTANCE OF FOOD NUTRIENTS AND THEIR FUNCTIONS

Food nutrients do important work in our body. Every food nutrient have their own different work which they provide to the body. But none of these nutrients can do their work alone, they are autonomous but still depend on others. Therefore, all these nutrients work together to fulfill the needs of body. And lack of any one nutrient effect other. So, it is important to the food which has all these nutrients in suitable amount. These food or diet is called Balanced Diet. Following are the specific work of food nutrients and their food sources:

1. PROTEINS

- **BASIC FUNCTION:** Builds and repairs tissues in the body and helps in the growth.
- **FOOD SOURCES:** Meat like, mutton, chicken, fish etc. Milk like fresh and powdered milk and eggs.

2. CARBOHYDRATES

- **BASIC FUNCTION:** Provides heat and energy to the body.
- **FOOD SOURCES:** Pulses and lentils and things made of them like semolina, flour, oatmeal. Sweet things like, sugar and things made of them like starch. Fruits and vegetable like potato, sweet potato etc.

3.FATS

- **BASIC FUNCTION:** This is the best to provide heat and energy.
- **FOOD SOURCES:** Animal sources like butter, ghee, fish oil etc. Vegetable sources like coconut, seeds oil, sesame seeds and soya bean oil etc.

4. VITAMINS

- **BASIC FUNCTION:** regulates the system of the body
- **FOOD SOURCES:** Every animal and plant source like, fruits, vegetable, meat, milk, eggs etc.

5. MINERALS

- **BASIC FUNCTION:** Keep the system of the body proper.
- **FOOD SOURCES:** Every type of animal and plant source.

6. WATER

- **BASIC FUNCTION:** To remove all the toxic elements from blood and body. And keep the skin and membranes hydrated.
- **FOOD SOURCES:** Besides fresh water, milk, juicy vegetable and fruits, juices, tea, and other drinks etc.

BALANCED DIET

Balanced diet or balanced food means the diet which has all the important nutrients like, carbohydrates, protein, fats, vitamins and minerals in their suitable amount. Balanced diet is also called as collection of all nutrients. Because every person's age, activities, gender, physique are different from others, therefore, every person's nutrition needs are different. So, every person is given balanced diet according to their needs.

IMPORTANCE OF BALANCED DIET

It is said that "health is wealth". Good health doesn't come naturally or coincidentally, instead it depend on our diet. Which provides important food nutrients to the body for the growth, regulation of physical functions and accuracy.

The feeling of balanced or unbalanced is caused when its lack effects the health. For example, skin color gets pale, pain in body organs, numbness of body, pain in eyes, headache, rough or shrinkage of skin etc. Usually we don't consider the nutrition value of food but we consider its taste and amount. By which a person looks healthy by appearance but from the inside he become weak. If one or more nutrient is missing in our food, it causes Malnutrition, which is caused by lack of or excess of food nutrients.

SELECTION OF BALANCED DIET

During the selection of balanced diet, following principle should be considered:

1.FOOD GROUPS

Diet should be selected from all food groups. There are four food groups. One or two things should be selected from each food group which are good for health.

2.AGE

Diet should be according to age because the requirements of food for growth are different for different ages. For example, young children require more calories and food nutrients for their growth of height, teeth and both as compare to adults.

3. GENDER

Men do more heavy or hard work than women therefore, they require more calories than women.

4.PHYSIQUE

Tall, broad and heavy weight and height person require more nutrition than his same aged weak person.

5.CONDITION OF THE BODY

A sick person requires more calories and nutritious food for repairing of tissues and for immunity. And pregnant or lactating women require double amount of nutrients than normal women.

6.ACTIVITIES

A person lifting heavy weights and working physically hard requires more calories than a person working mentally while sitting.

7.ENVIRONMENT

In winter and people living in cold countries require more energizing foods which help them to fight against cold and keep their body temperature normal.

FACTORS CAUSING LACK OF BALANCED DIET

Following are the factors which cause disturbance and lack of balanced diet. For example:

1, IGNORANCE

A person has a habit of consuming same diet every day and doesn't like to have any change in his diet. And because of lack of knowledge of food nutrients and their importance for the body, he doesn't like any unnecessary changes in his diet which may cause Malnutrition.

2. NON-AVAILABILITY

Sometimes, in some areas, due to non-availability of income and facilities, the people have to depend on them, by which required food nutrients are not provided. This effects in obtaining balanced diet.

3. FOOD FADS AND FALLACIES

Some people have misconception about food. They don't add some food or their components in their diet and they try to avoid them. For example, some people don't eat cucumbers because they think that it may cause diarrhea. Some people think that beef can cause many diseases. They don't eat fish with dairy products. Whereas science doesn't prove these fads and fallacies. Therefore, these people couldn't have balanced diet.

4.CUSTOMARY FOOD HABITS

Some people have a habit of eating same food that they don't prefer or like any change in their diet. This becomes a tradition which passes from generation to generation. Likewise, some people don't eat meat because that's their tradition. Therefore, they aren't provided with balanced diet.

FOOD GROUPS

Different food is divided into groups based on their nutrients and components which are called Food groups. Initially there were 11 food groups but that they become 7 then 5 and then they are 4 which became easy to remember and acceptable. But nowadays, experts made them into 4 Food groups which are based on basic functions of the body. The benefits of these groups are:

1. If one component of food is added to the diet from all Food groups, the diet will have all the important nutrients which become Balanced Diet.
2. To regulate the functions of the body, food from all these groups can be used so that no nutrient is missed.
3. Sweet and fatty foods are not usually added in these groups because they are mostly used in our daily diet. And excessive use of sweet and fatty foods may cause diseases like diabetes, blood pressure, fatness and heart diseases.

Following are the three basic Food Groups:

NAME OF GROUPS	BASIC FOOD NUTRIENTS	BASIC FUNCTION
1.Pulses, lentils, barley and their products (energizing food).	Carbohydrates	To provide heat and energy to the body.
2. Milk	Calcium and phosphorus	Growth of body
3.Meat, eggs and their products	Protein	To repair cells and tissues of the body.
3. Fruits and vegetables (protective foods).	Vitamins and Minerals	To keep and regulate functions of the body.

1.MILK AND ITS PRODUCTS.

Like fresh milk and things made of milk for example, yogurt, buttermilk, butter, kheer, pudding etc. They have high quality protein in large amount and these are easily digested which even infants can easily digest. The amount of calcium and phosphorus present in milk cannot be found in any other food. It is best source of vitamin A and vitamin B-complex. According to age, a child should consume 2 to 4 cups of milk and adult should have 2 cups of milk or dairy product daily. Yogurt and buttermilk are equally nutritious as milk. Because there is no other source of calcium as compare to milk therefore, it should be added in our daily diet.

2. FISH, EGGS, BEANS AND NUTS ETC.

Food from this group obtain high quality and quantity of protein. The basic function of these foods is to help in the growth of the body, repair and building of tissues. Animal source of food like: milk, meat, eggs etc. have complete protein whereas vegetable source of food like: soya bean, peanuts, kidney beans, peas and nuts etc. have low biological value and are called incomplete protein. Following are the properties of different food from this group:

a. Meat:

Like beef, chicken, mutton, fish etc. have complete protein. Even its small amount provides essential amino acids to the body. Meat contains iron, protein and vitamin b especially niacin in large quantity. Therefore, meat should be consumed at least two days a week. Besides that, liver, ribs, kidneys should also be used.

b. Eggs:

Eggs and its products contain protein, iron, and vitamin A. Therefore, eggs should be used at least 2 to 3 days a week. If someone is allergic to eggs, he can have other protein products to fulfil the requirement of his body.

c. Lentils and Beans:

Soya bean is considered an alternative for milk due to its nutritional value. Dried peas, kidney beans, chickpeas and lentils have high quality protein.

d. Nuts:

Like, almond, peanuts, walnuts etc. They have protein nearly equal to meat and soya bean. By extracting oil from almonds and peanuts etc. they can be mixed with wheat after grinding them into powder (75% wheat + 25% extract) for making bread which is nutritious and flavorful.

2.PULSES, LENTILS, RICE, SUGAR, OIL ETC.

The food which contain carbohydrates and calories are included in group. In this all type of pulses, barley, lentils, rice, wheat, flour and things made of them, besides that sweet and oily products are included. These foods are the most inexpensive source of obtaining heat and energy and other nutrients like vitamin, minerals and protein. Because they are inexpensive, pulses, barley etc. and their products are used as Staple Food all over the world. In Pakistan and other Asian countries 80% to 90% of calories are obtained from pulses and are used 3 to 4 times a day.

Raw pulses are more nutritious than grinded pulses. Because while grinding their peels are removed which have vitamins and minerals in them. So, it is better to sometime use raw barley like wheat, oats etc. because their peels have large amount of vitamin B1. Flour is least nutritious.

Pulses have 65% to 80% starch and vitamin B1 and small amount of iron. Therefore, if 2 to 3 types of lentils are cooked together, they become more nutritious and obtain complete protein. Likewise, if dough is kneaded with a milk, buttermilk, yogurt or any small amount of animal protein instead of water, then its nutritional value gets equal to animal sources of protein.

3.VEGETABLES AND FRUITS

Green, yellow and other vegetables like turnip, spinach, cauliflower, cabbage, carrot and potatoes contain a lot of vitamins and minerals. Besides that, potatoes and sweet potatoes contain some starch too. These vegetables should be used in our daily diet. Some vegetables like, carrots, tomatoes, and cucumbers should be used in salad daily.

Juicy fruits like, oranges, peaches, grapefruit and lemon are great source of vitamin C. And fruits like mango, pear, plum, watermelon, melon and dates are important for obtaining vitamins and minerals.

NUTRITIONAL REQUIREMENTS

A person needs balanced diet for physical growth, health and energy throughout his life. Nutritional requirements are change to according age, gender, activities, occasion and season.

Nutritional requirements are determined by amount of heat and energy present in food and to calculate its temperature a term calorie is used. It is important to know about amount and requirement of calories before determining the nutritional needs of any person. Individually, calories are determined according to age, gender, activities and environment. For example:

Daily requirement of calories according to age			
AGE	CHILDREN	WOMEN	MEN
2-6 months	120x gram		
7-12 months	100x gram		
1-3 years	300		
3-6 years	1700		
7-9 years	2100		
10-12 years	2500		
13-15 years		2600	3100
16-19 years		2400	3900
25 years		2300	3200
45 years		2200	3000
65 years		1800	2550

NOTE: Pregnant women require 300 more calories during last 6 months and lactating women require 1000 more calories.

Food which contain less than 100 calories					
Butter	1 tablespoon	Banana	1 large	Coca cola	1 bottle
Cream	2 spoons	Apple	1 piece		
Milk	172 grams	Grapes	20 pieces		
Bread (roti)	1 medium	Watermelon	1 medium		
Bread	2 small+1 slices	Pear	2 medium		
Lentil	2/3 cup	Carrot	4 pieces		
Meat	½ cup	Peas	¾ cup		
Fish	3"x6" piece	Cauliflower	1 small flower		
Liver	57 grams	Potato	1 medium		
Egg	1 large	Ice cream	½ cup		

Consuming of calories according to activities per hour:

ACTIVITIES	REQUIRED CALORIES
<p>Sedentary work Like: reading, writing, listening radio, tv, playing carom board and doing little movements while sitting.</p>	<p>80-100</p>
<p>Light Activities Like: cooking, ironing clothes, lightly washing clothes, light walk, And doing some work with arms movements.</p>	<p>110-160</p>
<p>Moderate Activities Like: making bed, sweeping floor, dusting, brushing carpets, fast Walking, and doing those work while standing or sitting which requires fast movements of arms and hard work, like washing clothes in machine.</p>	<p>170-240</p>
<p>Vigorous Activities Scrubbing floor, washing heavy clothes with hands, running, Gardening etc.</p>	<p>250-350</p>
<p>Streneous Activities Like: playing tennis, riding cycle, playing football, construction work like, lifting heavy weights, dragging cement bags etc.</p>	<p>More than 350</p>

INDIVIDUAL FOOD REQUIREMENTS

Life is usually divided into 4 stages according to age. Like:

1. Infancy
2. Childhood
3. Adolescence and youth
4. Old Age

In these stages, there are some other conditions which should also be considered like: illness, pregnancy, lactating etc. So, every person's nutritional requirements are different from others due to their growing process.

Young children go through their growing stage hence why their nutritional requirements are different from adults. Besides that, children are more physically active and a lot of physical movements are included in their activities which make their nutritional requirements different from others. Therefore, before making menu for a family, children nutritional requirements should be considered because:

- a. Children require more heat and energy according to per unit of their weight than adults.
- b. Children require more building materials in their diet like: protein, vitamin and minerals than adults.
- c. Digestibility of children is different than adults. Therefore, they need different and easily digestible food.

1. HEAT AND ENERGY

Food nutrients in children's diet are same as adult's diet but the quantity of them is prominently different. Children require more food nutrients than adults because the speed of functions and systems of the body of children are faster than adults therefore, they require more heat and energy. For growth and development, building of cells is required so, children should have more diet. Besides that, children are more active and hyper so they require more energetic food in large amount for playing and running etc. Boys also require more heat and energetic foods than girls.

2. DEVELOPMENT

Heat and energy are required for development which calories depends on the weight, physique and activities of the body. And protein is also required which helps to build, repair and develop cells, tissues, muscles and other organs of the body.

Infants and young children require more calories than adults. And young people require two times more protein and four times more calcium than adults. Year old child requires 3.5 grams of protein per kilogram of his weight, 6 years old child requires 2.5 grams per kilogram his weight, 12-17 years old requires 1.5 grams protein per kilogram his weight and adults require 1.0 gram per kilogram of his weight.

Animal protein (like, milk, buttermilk, cheese, meat, eggs etc.) should be 40% of adult's diet and 60% in children's diet because they have other nutrients too. Like: milk has calcium, phosphorus, vitamin A, vitamin B, and vitamin D along with protein in large amount. For vitamin C, oranges, grape fruit, green leafy vegetables, eggs, liver, and meat etc. are necessary to include in diet. Vegetables and egg yolk provide iron and vitamin A. Small

amount of Fish oil provides large amount of vitamin A and vitamin D. Best sources of iron are liver, legumes (lentils, beans, peas).

3. DIGESTIBILITY

Children have weak stomach that's why they are given only milk in first few months after birth. After few months, slowly his stomach able to digest starch. As the stomach gets stronger, he begins to have teeth which helps him to chew. Children should have clean, properly cooked and easily digestible food. Children should have raw fruits and vegetables especially, fruit with their peels, oats, lentils, rice pudding, vegetables etc. Hard to chew foods like, dry fruits, nuts etc. should be avoided for children. In first few years oily food like, ghee, butter etc. should be avoided. Extra sweet food like chocolate, cocoa, toffee should be avoided and spicy food like pickles, chutney should be given after the age of 12- 14 years.

FOOD REQUIREMENTS ACCORDING TO AGE

INFANCY (WEANING FOOD)

First 1 to 1.5 years of life are the fastest growth stage. In which children's weight grows three times or more. That's why he requires more heat, energetic and growing foods. Because infant's weak stomach and cannot digest starch therefore, they are given only milk in their first few months. After few months they are given some drops of fruits juice. After 3 to 4 months their stomach gets able to digest starch so, they are given some staple starchy food and pulses. For example; rice pudding and in 5-6 months some vegetables like, potato, carrots, spinach soup, meat without fat and in 6-8 months fruits like, apples, pear, mashed bananas should be given. After 8 months shredded meat should be included. But following advices should be considered before giving any new food to the children:

- a. It should be properly mashed and watery.
- b. Start with two to three drops.
- c. Slowly and gradually, increase the amount and change the texture of the food.
- d. After increasing quantity of food, the quantity of milk should be suitably decreased.

Following food can be chosen for children of 9 to 18 months, they are: milk, egg yolk, banana, fruits juices, semolina pudding, oatmeal, soup etc.

2 YEARS OLD

At this age, increase in quantity of food and developing new tastes is important. And growth of bones is important for walking at this age for which vitamin d should be included in diet along with milk. A menu is given as a sample for the children of this age to choose suitable food as required.

- **JUICES:** Like: orange or tomato juice for vitamin C.
- **COD LIVER OIL:** 2 to 3 spoons or other foods.
- **PULSES:** Like: rice, oatmeal $\frac{1}{4}$ to $\frac{1}{2}$ cup two times a day, roti and bread should be increases in diet.
- **FRUITS AND VEGETABLES:** Like; boiled potatoes, carrot, apple, pear etc. 3-6 spoons rice two times a day.
- **EGGS:** (Whole) once every day.
- **MEAT:** mutton, fish, chicken etc. 28-50g 3-7 times a week.
- **MILK:** Half kilo milk and another half a kilo of things made of milk like: cream, butter etc. 1-3 teaspoons.

3 TO 6 YEARS

The basic diet is same as before at this age but the quantity of food is increased. Quantity of milk should be decreases and raw vegetables and fruits should be included. Meat especially fish should be increased in diet. Sweet food like; ice cream, syrup, cake, biscuits etc. can be include in suitable quantity. Butter, ghee and oily food etc. should be increased. Bread, sandwiches etc. with milk or juice can be given as snacks between meals.

7 TO 12 YEARS

The diet at this age should be full of variety and quantity so that the child gets to know about all the different tastes. At this age, building and energizing materials like, protein, minerals and vitamins should be included in huge quantity. And the diet should be according to the Basic Food Groups.

13 TO 16 YEARS

At this age, the height and physique of boys and girls grows rapidly. Therefore, they require iron in a huge quantity.

17 TO 20 YEARS

The growth gets slow at this age but boys require energizing food for body building and for doing hard activities. At this age, chocolates, toffees and a lot of sweet food etc. should be avoided.

PREGNANT WOMEN

A pregnant woman and her child should be healthy and it depends on mother's diet. If there a mother has something missing in her diet then the child gets calcium from mother's bones and tissue to fulfil its requirements which cause different problems for the mother. Therefore, a pregnant woman should take good care of her diet and food should be selected carefully. For example:

- a. All food groups should be included.
- b. A lot of milk, buttermilk and yogurt should be consumed.
- c. Good quantity of fruits and vegetables should be used to obtain vitamins and minerals and to prevent constipation.
- d. Avoid sweet and oily food.

Calories in diet of a pregnant woman should be increased by 10% and meals should be increased by 50%. For absorbing calcium in the body, at least 400 vitamin D is important. Following is a day chart as a sample:

Pulses especially raw like chickpeas, barley, wheat etc. 4 to 5 roti or oatmeal equal to it should be used.

- **MEAT:** 120g daily.
- **MILK, BUTTERMILK, YOGURT etc.:** At least 4 cups daily.
- **EGGS:** At least one daily.
- **FRUITS:** 250g daily.
- **VEGETABLES:** 250g daily.

LACTATING WOMEN

The diet of lactating woman is almost same as pregnant woman. A lactating woman's diet must include calcium, phosphorus, vitamin B, iron and other minerals. Her diet should include, meat, pulses, vegetables and fruits in large quantity. Sugar, ghee and butter can also be used to fulfil lack of calories but it should be in easily digestible form.

OLD PEOPLE

As the time passes, a person gets older, the speed of doing work is delayed and taking rest is required. Therefore, light and easily digestible foods should be given which can maintain the health. For example; complete protein, vitamins and minerals should be in large amount but carbohydrates and fats should be in small amount. A diet of old people should be based on following things:

- **MILK:** 250g to 500g daily.
- **EGGS:** One daily or 4 in a week.

- **MEAT OR FISH:** 95 grams.
- **PULSES:** 2 to 3 roti or rice.
- **FRUITS:** Seasonal fruits.
- **VEGETABLES:** Seasonal vegetables.

PATIENTS

A patient requires a strong immunity system to fight against disease. Therefore, a diet should be given after the consultation of the doctor and according to disease. Following points should be considered for patient's diet. For example;

1. The diet should be balanced.
2. Food should be tasteful and beautifully presented.
3. Diet should be easily digestible.

If a patient can't eat solid food, he should be given liquid food like, milk, fruit juices, soup etc. Rice pudding and custard are easily digestible and energizing food.

PROTEINS

Protein is considered the most important nutrient. Protein is derived from a Greek word (Proteios) which means high quality or which tells the importance of protein. Every living body is made of tissues and every tissues life depends on protein. Therefore, every part of body like bones, muscles, meat, nerves, fibers, brain, blood, hair, nails and enzymes etc. are made from protein. 1/3 of our body is based on proteins.

COMPOSITION OF PROTEINS

It is a composition of carbon, hydrogen and oxygen and is one of fuel nutrient. But protein foods have one more component which is nitrogen. It is the reason of growth, development and body building. The presence of nitrogen in protein makes it different from other fuel nutrients (carbohydrates and fats). Besides nitrogen, some minerals like Sulphur, phosphorus, iron, iodine are also found in protein.

STRUCTURE OF PROTEINS

When carbon, hydrogen and oxygen present in protein meet nitrogen then one element is made which is called Amino Acid. It is present in protein as alkaline and properties and identification of protein depend on these amino acids. They are stick together like magnet through peptide link. And during digestion, these peptide link breaks and leave the protein in its simple form.

1. Essential Amino Acids

They are very important for growth because body doesn't make them by itself but are obtained from food. There are 8 essential amino acids.

2. Non-Essential Amino Acids

They are the amino acids which our body make by itself with the help of essential amino acids and is not necessary to obtain from food. There are 11 to 14 non-essential amino acids.

<u>ESSENTIAL ANIMO ACIDS</u>	<u>NON-ESSENTIAL AMINO ACIDS</u>
1. Leucine	1. Glycine
2. Isoleucine	2. Alanine
3. Valine	3. Serine
4. Threonine	4. Systine
5. Lysine	5. Tyrosine
6. Phenyle Alanine	6. Aspartic acid
7. Tryptophane	7. Glutamic acid
8. Methionine	8. Proline
	9. Hydroxy proline
	10. Arginine
	11. Thyroxine

There are two types of proteins based on presence of amino acids:

1. COMPLETE PROTEINS

Those foods which have all the essential amino acids proportionally and enough for the body are called complete protein. Because they are the best element for growth of body and tissues therefore, they are known as High Biological Value of protein. These proteins are present in all animal source of food e.g. meat, milk, cheese, yogurt, eggs and things made of them.

2. INCOMPLETE PROTEINS

These are the proteins which have less and not enough essential amino acids. Therefore, they are not capable for growth of body. These proteins are present in all plant source of food e.g. soya bean, peas, beans, lentils, wheat, barley and vegetables etc. If the food has more amino acids, its biological value increases. e.g. soya bean has more amino acids and its biological value is near to meat.

FUNCTIONS OF PROTEINS IN BODY

Protein foods do a lot of functions in our body like:

1. It builds and repairs tissues of the body. It is important for growing children, pregnant women and ill people for their health.
2. It forms hormones and enzymes in body. Which is important for every chemical process of the body. And regulates the systems of body.
3. It forms antibodies in our body which help to fight against many diseases.
4. In absence of carbohydrates and fats, protein works as fuel to provide heat and energy to the body. 1gram protein provides 4 calories. After helping in growth, extra protein change into fat and stays to provide energy.
5. It keeps the water in blood proportional. And maintains the P.H level of blood.
6. It helps to maintain red blood cells and its deficiency may cause anemia. It helps to supply oxygen to the organs.

DEFICIENCY OF PROTEINS

Deficiency of protein causes problem in all the systems of the body. Which can become fatal. For example:

1. Lack of growth. It stops the building of tissues. Unnecessary weight loss which makes a person weak, lazy.
2. Because of lack of hormones and enzymes systems of the body like digestive etc. slows down.
3. Lack of white blood cells cause lack of immunity and a body can't fight against diseases.
4. Blood stops making red blood cells which cause anemia especially in children.
5. Because of deficiency of protein, the water doesn't add to blood instead it collects in tissues which swells different parts of the body. This disease is called Edema which is caused mostly in children aged 1 to 4 years.
6. Severe deficiency of protein causes a disease called Kwashiorkor. It makes a child mentally annoyed, deficiency of blood makes his skin pale, spots on skin. The hair become blonde and rough. It is also called Red headed child. It also causes diarrhea and cramps. The stomach bloats and it gets fatal. If it's not treated, death may occur.

7. After kwashiorkor gets severe, it causes a disease called Marasmus is more dangerous. In which the deficiency of protein also causes deficiency of calories in a child's body. The skin becomes dry and damaged. Skin becomes thin and wrinkled. Because of diarrhea or loose motion the organs become dehydrated and death may occur.

DAILY NEED OF PROTEIN

Daily use of protein depends on person's age, height and weight. But for normal person's weight each kilo is equals to one gram of protein is required. Whereas for a child 2.5 kilo per gram and for pregnant and lactating woman require more protein then normal.

For teenagers 10% to 12% from total calories, for children 15% from total calories are protein required. 1/3 of diet should consist of protein.

SOURCES OF PROTEIN

Protein is found in most of the food which are present in both animal and vegetable source.

1. Animal Sources

It includes meat (chicken, fish, mutton, beef etc.) gelatin, eggs, cheese, buttermilk etc. and things made of them. These are best source of protein. Especially when they are in dried forms like, dry milk, dry meat, dry eggs powder etc. Fresh forms have 12% to 29% pure protein.

2. Vegetable Sources

It includes soya bean, beans, peas, lentils, pulses, few vegetables and dry fruits. In which soya bean, beans, nuts and dry fruits have high quality protein. Whereas pulses and vegetables have limited amount of amino acids.

Only sugar, ghee, etc. have no protein in them

SOME IMPORTANT POINTS ABOUT PROTEIN FOOD

While eating protein food, following important points should be considered. e.g.

1. Amino acids are important for the body.
2. If carbohydrates and fat food is not present in our food, protein does their functions in the body. We can stay 30 to 50 days during which $\frac{1}{4}$ part of protein is used which effects the health.
3. By mixing different pulses (Haleem), complete amino acids are obtained.
4. By using pulses and lentils with less animal source can also provide complete protein.
5. If protein is taken in more than enough amount can also cause several diseases:
 - i. Pressure on lungs and liver
 - ii. Fatness and heart diseases
 - iii. Continuous excess protein may cause colon cancer
 - iv. It causes weakness of bones for aged people.

CARBOHYDRATE OR STARCH

Carbohydrate is present in all starch or sweet foods. Like: rice, pulses, lentils, potato, sweet potato, sugar, honey, sweet fruits and vegetables etc. It is the most inexpensive way of getting energy which is easily available. In Pakistan and other under developing countries, the food which provides heat and energy are 80% to 90% based on carbohydrate. Pulses are 60% to 80% carbohydrate and rice have it in large quantity. Besides that, carbohydrate is also found in root vegetables, sweet fruits and vegetables etc.

STRUCTURE OF CARBOHYDRATE

Structure wise, carbohydrate is a mixture of carbon, oxygen and hydrogen.

TYPES OF CARBOHYDRATE

Following are the types of carbohydrate:

1. **MONO-SACCHARIDES:** It is simple sugar, which is sweet in taste, easily digestible and water soluble. It includes glucose, fructose and glyctose. It is found in honey, fruits and vegetables in large quantity.

2. **DI-SACCHARIDES:** This carbohydrate is sweet in taste, water soluble and easily digestible.

Following are the names of sugars included in this:

- SUCROSE (Glucose + Fructose)
- MALTOSE (Glucose + Glucose)
- LACTOSE (Glucose + Glyctose)

It is obtained from sugarcane, beet root, sugar, berries, and starch of pulses, fruits and vegetables. Lactose is the only sugar which is obtained from animal source which is Milk.

3. **POLY-SACCHARIDED:** These carbohydrates are complicated. Following are the sugars included in this:

- Starch
- Dextrin
- Glycogen
- Cellulose

These are present in roots of plants, twigs, branches and seeds and also in fruits like apple, bananas, pulses, barley and peas etc. in large amount. They are usually less sweet and non-soluble. It is necessary to coo and soak the pulses to make them easily digestible but cellulose present in the peels of fruits and vegetables can't be digested and creates bulk in stomach and causes constipation.

FUNCTIONS OF CARBOHYDRATES IN THE BODY

Following are the functions of carbohydrates in our body:

1. It provides heat and energy to the body.
2. Assists the body to make incomplete amino acids. And thus, saves the protein from doing hard work.
3. Glucose is important for transferring messages of the body to the brain.

4. It saves the body from dehydration.
5. It provides other food nutrients too. Like potato, wheat flour etc. also provides iron, fats and vitamin etc.
6. By having 15% of diet based on carbohydrates (digestible) will help to get heat and energy.

DEFICIENCY OF CARBOHYDRATE

Carbohydrate is present in our diet in large quantity that there are least chances of getting deficiency of it. But its deficiency may cause following problems:

1. Weight lost and a person becomes weak.
2. Protein and fats work as an alternate for carbohydrates to provide heat and energy by which stops their own functions.
3. Transferring the messages to brain is disrupted. Because there is no alternative of glucose besides carbohydrates.
4. It causes irregularity in getting heat and energy.
5. To fulfill its deficiency, protein and fats food are increased and their excessive use may cause heart diseases and cancer etc.

SOURCES OF CARBOHYDRATE

It is the inexpensive food nutrient and is easily available. It is found in pulses, honey, sugarcane, sugar and things made of them, fruits and vegetables, dry fruits and nuts etc. besides that, it is also found in milk and meat in small amount.

FATS AND OILS

This is the most used food nutrient after carbohydrate which includes fatty or oily food like ghee, butter, cream, oil etc.

STRUCTURE:

Its structure is also based on chemical compounds which are carbon, hydrogen and oxygen. They are in different ratio in different fatty components which effects their process of digestion. Every fatty food is a mixture of two components and are necessary to divide because of their digestibility.

- Glycerol
- Fatty Acids

NATURAL TYPES/KINDS OF FATS

Some fats containing foods are found in solid, hard and stiff at room temperature like: ghee (desi or Vanaspati) butter etc. whereas some are found in liquid form like any type of oil etc. Solid or liquid form of any food depends on ratio of hydrogen present in them. Therefore, fats are of two types:

1.SATURATED FATS

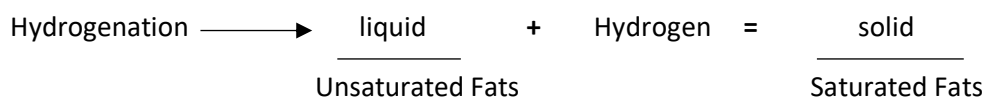
All the carbon atoms are saturated with hydrogen atoms and cannot accept any more. Fats that are solid at room temperature are mostly saturated fatty acids. Like: butter, cream, ghee etc. Besides palm oil and coconut oil, all saturated fats containing food are obtained from animal source.

2.UNSATURATED FATS

Some of the carbon atoms are joined to others by a double bond and so are not completely saturated with hydrogen atoms. They could therefore accept more hydrogen atoms. They have less hydrogen in them as compare to carbon and oxygen. They are in liquid form at room temperature. Like: olive oil, mustard oil, almond oil, soya bean oil and sunflower seeds oil and many other oils.

HYDROGENATION

Hydrogenation is a chemical reaction widely used in the processing of cooking oils and fats that turns unsaturated fatty acids into saturated ones. Technically speaking, during this process unsaturated bonds between carbon atoms are reduced by attaching a hydrogen atom to each carbon. Simply speaking, hydrogenation is a process in which hydrogen atoms are added to vegetable oils. Vanaspati ghee are made with this process.



FUNCTIONS OF FATS

Following are the functions of Fatty or oily food in our body:

1. Provides a convenient and concentrated source of energy, supplying more energy than the same weight of other nutrients. One gram of fat provides nine calories.
2. Provides a reserve of energy for long term storage, which can be used if energy intake is restricted and avoid weakness. If 'fuel food' are consumed more than needed, the extra fats deposit in different parts of body and cause fatness or bulkiness of body.
3. They help to gain weight.
4. Surrounds and protects certain vital organs e.g. kidneys heart, glands etc. from shock or any dangerous situations.
5. Foods containing fat provide feeling of fullness (satiety value) after a meal, as fat digestion is slow.
6. Provides a source of fat soluble vitamins A, D, E and K and those essential fatty acid like Linoleic Acid which are not produced by body. Its deficiency affects the process of growth, the skin gets rough and injured and eventually causes Eczema.
7. Forms part of the structure of cell membranes throughout the body, especially in the brain.
8. Provides texture and flavor in food and helps to make it palatable.
9. Forms an insulating layer beneath the skin and organs to lubricate and help preserve body heat and protect the skeleton and organs.

EFFECTS OF DEFICIENCY OF FATS

It is least likely to have deficiency of fats in our diet because if not used in butter, cream etc. form but they are still consumed in form of curry, paratha, ice cream, cake, pastries etc. Besides that, the extra amount of carbohydrates and protein in of body change into fats and deposit in different parts of our body. But continuous lack of fats may cause following problems:

1. The body becomes weak, skinny and tired. The shape of body is changed and the bones become more visible.
2. It causes lack of heat and energy in the body.
3. The skin becomes rough, dry and injured which causes a disease called eczema.
4. The lubrication of the organs stops which causes roughness and pain.
5. Structure and process of cells and tissues are affected which causes problems.
6. It affects the consuming of fat soluble vitamin (A, D, E, K) which cause many other diseases.

EFFECTS OF EXCESSIVENESS OF FATS

Fatty foods are used excessively in our diet that it causes many problems and fatal diseases like:

1. Animal fat contains a compound called cholesterol which starts to deposit in surface of blood vessels and they vessels become tight. It disturbs the circulation of blood which ends in causing heart diseases and high blood pressure.
2. The blood gets thick and something creates small clot like shape which if gets stuck in thin blood vessels my lead to paralysis because of unavailability of blood and if gets stuck in heart, becomes a reason of heart attack or heart fail.
3. It provides double the amount of energy than carbohydrate and protein which also leads to excessive weight gain. The body becomes bulky which is called Obesity. Obesity not only

makes the body unattractive but also causes many fatal diseases. It may cause diseases like High blood pressure, Heart diseases, joints problem and diabetes etc.

DAILY REQUIREMENT OF FATS

The specific amount of fats is not determined. Although, 70 to 80 grams of fats should be included in diet daily to fulfil its requirement.

SOURCES OF FATS

1. The best source of fat in diet is vegetable source which includes, seed oil, almond oil, coconut oil, soya bean oil, mustard oil and olive oil etc.
2. Animal source are different from one another due to their fatty components. Salmon oil and cod liver oil are an example of fatty food. All the cheeses except white cheese contain a large amount of fat. Cream, butter, ghee also contains a large quantity of fat whereas egg yolk contains a small amount fat. Fresh vegetables and fruits almost don't contain fat in them.

VITAMINS

Vitamin is based on two ingredients Vita and Amine. "Vita" is an English word and "Amine" means the most important thing for life. Two combined mean Vitamins are most important for life.

GENERAL FEATURES OF VITAMINS

1. Like carbohydrates, fats and protein, vitamins are also complex organic compound due to their chemical structure.
2. Vitamins are required in small amount by the body but it is important for life and its absence affects the health.
3. Vitamins do not provide heat to the body as compare to 'fuel foods' and don't help to gain weight but they help to regulate every function of the body.
4. Some small quantity of vitamins is self-produced in intestines.
5. Vitamins are sensitive, delicate and non-stable which are wasted by direct light air and heat. Therefore, vegetables are important to use in diet.

FUNCTIONS OF VITAMINS

Every vitamin does its own individual function but collectively following are their general functions:

1. They are important for the growth of the body.
2. They are important for reproduction.
3. They play a vital role in keeping body healthy and active.
4. They help to regulate all the functions of the body and help in digestion.
5. They work as catalysts in form of enzymes and co-enzymes in the body to keep all the systems regulate.

SOURCES OF VITAMINS

Vitamins are found in both animal and vegetable source in large quantity. They are initially found in leaves and vegetables which animals eat and thus are transferred into them.

VEGETABLE SOURCE

Green leafy vegetables are a great source of vitamin. Lentils, chickpeas, kidney beans, raw cereals, root vegetable are good source of some vitamins. Juicy fruits and vegetables have least quantity of vitamins due to presence of water in them.

ANIMAL SOURCE

Besides liver, kidney, meat and fish, milk, egg and things made of them are great source of vitamins.

TYPES OF VITAMINS

There are two types of vitamins. Like

1. FAT SOLUBLE VITAMINS

It includes vitamin A, D, E and K

2. WATER SOLUBLE VITAMINS

It includes vitamin C and B-complex. A group of vitamins related to vitamin B-complex are included in it. Like, vitamin B1 (thiamine), vitamin B2 (riboflavin), Niacin or nicotinic acid), vitamin B6 (pyridoxin), vitamin 12 (Pantothenic Acid), folic acid and biotin.

FAT SOLUBLE VITAMINS

VITAMIN A

PROPERTIES OF VITAMIN A

1. It is found as Retinol in animal sources and as yellow, orange and green pigment (Carotene) in vegetable source which changes into vitamin A after transferring to intestines. Carotene is also known as Pro-vitamin or Pre-cursor.
2. Heat and warmth doesn't affect it. It means that vitamin A is unaffected by normal temperature and methods of food preparation.
3. Liver works as a storage for vitamin A and its excessiveness may lead to bad effects like; headache, vomiting, diarrhea, problems in bones etc.

FUNCTIONS OF VITAMIN A

1. It helps in growth and reproduction.
2. It is important for healthy eyesight.
3. To protect skin, eyes tissues, intestines, throat and other organs, vitamin A helps in making epithelial cells and to keep them in correct form. And also helps keeping the eyes wet.
4. Helps in making strong immunity to fight against contagious infections.
5. It is important to change glucose into Glycogen in liver.
6. Helps in making Cortisone enzyme.
7. Helps in growth and development of bones and teeth.

DEFICIENCY OF VITAMIN A

1. It affects the regulatory system and growth.
2. The retina ceases to make visual purple, and vision in dim light is impaired, leading to night blindness. In severe cases the structure of the eye deteriorates and eventually ruptures, causing total blindness. The cornea of the eye becomes dry leading to Xerophthalmia which eventually takes a form of ulcer. This happens in infants but can easily be treated.
3. The skin becomes dry and rough and injured due to itchiness. This skin disease is called keratinization. Hair also becomes dry, hard and stingy.
4. The mucous membranes become dry and infected, and resistance to disease is reduced.
5. The immunity system becomes weak and the body is unable to fight against diseases. The body gets infected easily but wounds are not filled easily.

6. It becomes a hurdle in manufacturing of bones and teeth. The enamel of teeth becomes weak. Incorrect growth of bones affects the spinal cord and cause many diseases.

SOURCES OF VITAMIN A

Best animal source of vitamin A includes liver, butter, egg yolk, fish, fish oil, cream and cheese. Vegetable source include green vegetables, beans and salad leaves, beet root, carrot, sweet potatoes, and fruits like apricot, pear and water melon etc.

DAILY REQUIREMENT

- Average Person 5,000 international units
- Pregnant woman 6,000 international units
- Lactating mother 8,000 international units
- 13- 20 years old boy and girl 5,000 international units.

VITAMIN D

Vitamin D is related to a Sterole named organic group. This vitamin is very stable. It is not affected by heat, oxygen, acid and alkaline and is not wasted. Though it is affected by light.

FUNCTIONS OF VITAMIN D

Required for the proper formation of bones and teeth, which contain large amounts of the minerals calcium and phosphorus. Vitamin D helps to promote the absorption of these minerals. After digestion, they are absorbed from the small intestine into the blood, which takes them to the bones and teeth.

DEFICIENCY OF VITAMIN D

1. Absorption of calcium and phosphorus from the small intestine is reduced, so that there is insufficient to maintain the strength of the teeth and bones. These become weak, and the bones of the legs may bend under the weight of the body. The ends of the limb bones become enlarged and the skull becomes fragile. This disease is called Rickets, and mainly affects children.
2. An adult form of rickets known as Osteomalacia may occur, particularly in the elderly and can result in serious fractures after a minor fall.

SOURCES OF VITAMIN D

Vitamin D is found in good supply in: liver, cod liver oil, oily fish e.g. herring, pilchard, sardine. It is found in smaller amounts in: egg yolk, milk and dairy products. Sunlight is also an important source.

DAILY REQUIREMENT

From birth to 20 years old, 400 international units of vitamin D are required.

VITAMIN E

It is the only natural anti-oxidant which acts as an antioxidant to protect cells from damage. As it is fat-soluble, it is found in large quantity in fatty foods. Its best sources are both animal and vegetable.

FUNCTIONS OF VITAMIN E

Vitamin E does a lot to keep your body healthy, including promoting healthy blood flow to keep it from clotting. Being deficient in vitamin E can lead to nerve and muscle damage, as well as vision problems and overall weakness.

DEFICIENCY OF VITAMIN E

The symptoms of deficiency of vitamin E doesn't show on the body due to its plenty of supplies.

SOURCES OF VITAMIN E

Vegetable oils, Avocados, leafy green vegetables, Wheat germ, sunflower seeds, some nuts, peanut butter are its best sources.

VITAMIN K

FUNCTION OS VITAMIN K

Makes proteins that cause our blood to clot when you are bleeding. Helps to thicken our blood. Involved in making body proteins for our blood, bones and kidneys.

DEFICIENCY OF VITAMIN K

Without enough in your body, you may experience bruising and bleeding problems. It may cause hemorrhage and wastage of blood, especially in children.

SOURCES OF VITAMIN K

Broccoli, soybeans, dark green leafy vegetables such as kale, collards, turnip/beet greens and spinach, meat are its sources whereas egg yolk, soya bean oil and liver etc. are also its best sources.

WATER SOLUBLE VITAMINS

VITAMIN C

The chemical name of vitamin C is Ascorbic Acid which is derived from the word "Anti-scorbutic" which means Scurvy preventive. It is a simple organic component which the most delicate and sensitive vitamin out of all the others and is wasted in presence of oxygen or by air. It is found a lot in fresh fruits and vegetables. But its consuming depends on how to prepare them and cook them. It can easily be dissolved in water.

FUNCTIONS OF VITAMIN C

1. It is important for producing collagen named protein in the body. Collagen works as a cement to join every two cells.
2. This vitamin helps to cure wounds.
3. It helps in the manufacturing of teeth and bones.
4. It helps to make tissues of the gums stronger and is important for their manufacture. And helps to build muscles.
5. Makes the blood veins or vessels flexible.
6. It changes iron into "ferric" to prepare it for absorption. Ferris is the only form of iron which absorbs into the body.
7. Helps to make red blood cells.
8. Helps to fight against disease and germs and makes the immune system stronger.
9. It plays a vital role in the chemical process and absorption of carbohydrates and protein.

DEFICIENCY OF VITAMIN C

1. Deficiency of vitamin C leads to a disease called Scurvy, in which a person loses appetite, weight loss, body starts to ache and he becomes mentally disturbed.
2. Production of collagen gets weak, by which the tissues of bones, teeth, gums, muscles and blood vessels get weak. Teeth and bones get unable to store calcium and phosphorus and they start to get weak.
3. Because of weak blood vessels, bleeding inside the skin starts which is called Hemorrhage. Sometimes nose bleeding, bruised skin etc.
4. Swelling and bleeding of gums and they loses their capacity to hold teeth properly. Teeth gets crocked.
5. Blockage of absorption of iron leads to many heart diseases.

DAILY REQUIREMENT

Average person requires 70-75mg, children from 16-19 years require 80-100mg, infants require more and pregnant woman require 150mg of vitamin C daily.

SOURCES OF VITAMIN C

Best source of vitamin C includes green chilies, coriander, salad, orange, amla, lemon, grape fruit, guava, watermelon, cauliflower, and cabbage. Besides them, pineapple, melon, potato, sweet potato contains some amount of vitamin C. Food based on vitamin C are:

Amla	700mg	tomato	32mg
Guava	300mg	mango	24mg
Cauliflower	124 mg	eggplant	23mg
Beet root	124mg	potato	17mg
Pineapple	68mg	okra (bhindi)	16mg
Lemon juice	63mg	onions	11mg
Spinach	48mg	grape fruit	10mg
Papaya	46mg	banana	1mg
Apple	2mg	sweet potato	24mg

VITAMIN B1 THIAMINE

PROPERTIES OF VITAMIN B1

1. It is a mixture based on carbon, hydrogen, nitrogen and Sulphur.
2. It smells like yeast and tastes like salt.
3. It is wasted in the presence of oxygen and heat. Because its sensitivity is less than vitamin C.
4. It is easily dissolved in water. Therefore, the things in which vitamin B1 is present shouldn't be soaked in water for long duration otherwise it gets wasted.

SOURCES OF VITAMIN B1

It is found in large quantity food and is present naturally in every food which are good source of protein. Raw cereals are its best source whereas ground cereals have less amount of it because it is present in the peel and seeds of the grain which gets wasted after being grinded. Following are the best, good and ordinary sources of vitamin B1:

BEST SOURCES	GOOD SOURCES	ORDINARY SOURCES
Sunflower seeds, peanuts, Soya bean, wheat grain, liver.	Whole wheat flour, cereals, peas, mutton.	Beef, fish, chicken, eggs, Potatoes, orange and Orange juice, bread.

FUNCTIONS OF VITAMIN B1

1. This vitamin is not only important for growth of the body and regulatory system but its most important function is the process of survival and keeping the cells alive, because it is the co-enzyme which helps to provide oxygen to the tissues of the body, especially Nervous Tissues depends on this vitamin.
2. Thiamine helps to provide heat and energy to the body, because it is the co-enzyme which changes carbohydrates into heat and energy through chemical process.
3. It helps in digestion which then helps in growth and development.

4. Thiamine prevent the problem of constipation.

DEFICIENCY OF VITAMIN B1

1. Indigestion, loss of appetite which effects the process of growth and development and weight loss.
2. Its deficiency causes mental problems like stress, depression etc.
3. The function of heart becomes irregular.

VITAMIN B2 RIBOFLAVIN

PROPERTIES OF VITAMIN B2

1. It is obtained from yeast, milk and egg white. It is orangish yellow in solid form but its color gets greenish yellow in liquid form.
2. It is water soluble.
3. It is not affected by acid or air but alkaline may damage it.
4. It fights against heat and is not wasted by heat.
5. Its absorption requires a combination of phosphorus in intestines.

SOURCES OF VITAMIN B2

Riboflavin is found in large quantity in both animal and vegetable source. Milk and things made of it are its best source. Besides them, leafy vegetables and beans also contain it whereas pulses and cereals contain the least amount of vitamin B2. Its best, good and ordinary sources are:

BEST SOURCES	GOOD SOURCES	ORDINARY SOURCES
Milk, liver, cheese, heart.	meat, chicken, fish, egg.	cereals, pulses, lentils
Kidney, seeds, wheat, yeast.	Squash, peas, dried beans, nuts.	

FUNCTIONS OF VITAMIN B2

This vitamin is an important element of Flaro protein which helps to provide heat and energy to the cells and tissues of the body. It is also important for the tissues which help make a “protective layer” between internal and external organs. Therefore, it is necessary for the growth of the body. Extensive use of riboflavin leads to better health.

DAILY REQUIREMENT OF VITAMIN B2

Its daily requirement depends on age, weight etc. An average person requires 1-3mg of vitamin B2 whereas children, lactating mothers and pregnant woman require double the amount of riboflavin.

DEFICIENCY OF VITAMIN B2

Continuous deficiency of vitamin B2 may lead to following effects:

1. Its deficiency effects growth and a person become weak and lazy.
2. Problem in the process of digestion which leads to weakness and weight loss and death may occur. Its initial symptoms are visible on eyes, skin, face and organs.
3. Hair loss because of weakness.

4. Skin gets dry and rough and causes wounds and greasy dermatitis. Chin, nose and lips get cracked.
5. Lips get red and swelled and their edges get wounded. This disease is called Cheilosis.
6. Eyesight gets weak. Eyes get dried and itchy. Its latter effect is cataract which leads to blindness.

NIACIN

PROPERTIES OF NIACIN

1. Niacin's initial name was Nicotinic Acid. It tastes bitter.
2. It is water soluble. Therefore, it gets wasted in excess water while cooking.
3. It has stable structure and can fight against air, heat, acid and is not wasted easily.

SOURCES OF NIACIN

It is found extensively in both animal and vegetable source especially "protein foods". The body requires small amount of niacin and is naturally produced in the intestines. Its best, good and ordinary sources are:

BEST SOURCE	GOOD SOURCE	ORDINARY SOURCE
Yeast, peanuts, chicken, Fish, soya bean, sunflower seeds.	meat, nuts, wheat germ	raw cereals and their products, peas, potato, Tomato, banana

FUNCTINS OF NIACIN

1. Niacin is a part of the two co-enzymes which helps to provide heat and energy and to build the cells of the body.

DEFICIENCY OF NIACIN

Deficiency of niacin may cause two specific diseases. Like: slight deficiency may cause Latent Pellegra and severe deficiency may cause Pellegra.

1. **LATENT PELLEGRA:**
In initial stage and slight deficiency, tongue, throat, and mouth get swelled and red and becomes a reason for pain. Deficiency of niacin in children causes problem in digestion which effects their process of growth.
2. **PELLEGRA:**
Severe deficiency of niacin causes severe diseases. Disturbance in every process in which niacin containing co-enzymes are required, by which all the tissues of the body get injured. Three types of specific tissues are affected by deficiency of niacin which includes
 - i. Skin.
 - ii. Gastric intestinal.
 - iii. Nervous tissues.

It causes pellagra disease. The diseases which are caused by disturbance in the process of these three types of tissues are called "three D's" because their name starts with D. They are:

- a. **DERMATITIS:** Pellegra means “rough skin”. Because deficiency of niacin makes the skin rough, thick and dark that’s why it is called pellagra. The skin on which the sunlight touches gets dark red and causes acne like; hands, feet, face and skin etc. And tongue and mouth also swell and red.
- b. **DIARRHEA:** next stage causes problem in digestive system like: diarrhea, bleeding stool etc.
- c. **DEPRESSION:** Deficiency of niacin badly effects the organs and a person gets mentally disturbed which leads him to insomnia and madness which affect talking skills and memory.

DAILY REQUIRMENT OF NIACIN

Daily requirement of niacin depends on weight and activities of a person. If determined individually, every kilogram of body’s weight is equal to 0-15mg of niacin. But an average woman requires 10-12mg and an average man requires 13-16mg of niacin whereas pregnant and lactating mother require 15mg of niacin daily. Children require double the amount of niacin as compare to adults.

VITAMIN B-COMPLEX

Besides the important vitamins like thiamine, riboflavin and niacin, vitamin B-complex contains some other vitamins like: Vitamin B5, B6, B12 and folic acid etc. their “common properties” and “common functions” functions in the body are almost same. For example:

1. All these vitamins are required in small quantity by the body.
2. These are found in both animal and vegetable source extensively.
3. All these “vitamin B” are produced naturally in intestines. Therefore, there are least chances of their deficiency.
4. All these vitamins are water soluble.
5. These are important part of Co-enzymes which helps chemical process. They are important for survival and growth of tissues and cells.

MINERAL SALTS

PROPERTIES OF MINERALS

Making of a building depends on concrete, cement etc. likewise, for making all the organs, tissues, cells and internal and external structure basically depends on some “chemical components” and their absence affects the structure of body, these components are called Mineral Salts which help to make our bones stronger to hold the weight of the body.

Minerals contain inorganic properties and are also known as Ash elements. These minerals are 16 to 19 kinds. There are two kinds of minerals: macro-minerals and trace minerals. Macro-minerals are minerals your body needs in larger amounts. They include calcium, phosphorus, magnesium, sodium, potassium, and chloride. Your body needs just small amounts of trace minerals. These include iron, copper, iodine, zinc, fluoride, and selenium.

Following are the minerals required by the body:

1. Calcium
2. Chlorine
3. Iron
4. Cobalt
5. Phosphorus
6. Sodium
7. Manganese
8. Fluorine
9. Potassium
10. Magnesium
11. Bromine
12. Silicon
13. Sulphur
14. Copper
15. Iodine
16. Zinc

FUNCTIONS OF MINERALS

Minerals do two main functions in our body and these two functions are then divided into other functions such as:

1. Minerals as Building materials
2. Minerals as Body regulators

1. MINERALS AS BUILDING MATERIALS:

All the tissues of the body are divided into three groups and minerals work as a main component in building these tissues. For example:

i. **HARD TISSUES:**

These form teeth and bones. It requires minerals like calcium and phosphorus whereas mineral like Sulphur is required for making the tissues of nails hair and skin.

ii. **SOFT TISSUES:**

They include meat, glands and organs tissues. Their building requires almost all the minerals but specifically potassium, phosphorus, Sulphur and chlorine are required.

iii. **FLUID TISSUES:**

These make blood, digestive juices and glands juices. For making blood specifically iron is required and for digestive juices, chlorine, sodium and iodine are necessary.

2.MINERALS AS BODY REGULATOR:

- i. For maintaining fluid in tissues, regulations of organs and strength in muscles almost all minerals are required in which calcium, phosphorus and sodium are important. They also maintain temperature of the body.
- ii. Calcium helps to make our blood thick.
- iii. Iron and iodine provides oxygen to the cells of the body through blood by which “oxidation” process regulates hence build red blood cells.
- iv. Sodium, potassium, calcium, magnesium and iron help to prevent acidity in blood.

SOURCES OF MINERALS

They are naturally present in both animal and vegetable source extensively.

DEFICIENCY OF MINERALS

A deficiency often happens slowly over time and can be caused by a number of reasons. An increased need for the mineral, lack of the mineral in the diet, or difficulty absorbing the mineral from food are some of the more common reasons. Mineral deficiencies can lead to a variety of health problems, such as weak bones, fatigue, or a decreased immune system.

CALCIUM AND PHOSPHORUS

Calcium and phosphorus play a vital role in making the “Bony Structure” of the body.

FUNCTIONS OF CALCIUM AND PHOSPHORUS

1. They both are needed for forming bones and teeth. And to keep them strong.
2. They are the most important component for Nucleic of cells. They work as a cement to join cells. Phosphorus helps to digest other nutrient like carbohydrates and fats which provide heat and energy to the body.
3. Calcium makes our blood thick. It enables blood to clot. In case of its flow through a wound, it could never be stopped.
4. Calcium helps in muscular contraction and in the conduction of nerve impulse.
5. Calcium helps to maintain the health and shape of our heart.
6. Phosphorus prevents the creation of acids of our blood. Excess of acids in blood causes death.

DEFICIENCY OF CALCIUM AND PHOSPHORUS

Following are the effects of deficiency of calcium and phosphorus in children:

1. The process of growth stops.
2. Crooked teeth and bones.
3. Teeth and bone get weak, soft and sensitive.
4. Severe deficiency leads to a disease called Rickets. Because rickets softens the growth plates at the ends of a child's bones, it can cause skeletal deformities such as: Bowed legs or knock knees, Thickened wrists and ankles, Breastbone projection. Child suffering from this can be treated by providing a lot of calcium and phosphorus immediately.
5. Lack of calcium in adults over the long term can lead to decreased bone mineral density called osteopenia. If left untreated that can turn to osteoporosis. This increases the risk of bone fractures, especially in older adults. It is also called Adult Rickets.
6. Deficiency of calcium and phosphorus weakens the muscles, causes problems in regulation of heart and weakness of organs.
7. In case of injury, the blood flow through a wound and it could never be stopped easily.

SOURCES OF CALCIUM AND PHOSPHORUS

The best sources of calcium include milk, fish, cheese and products made of milk. Vegetables sources include green leafy vegetables, flex seeds and spinach, peas, beans etc.

Phosphorus are usually present in protein food in which include fish, meat, eggs, chicken, raisins, nuts, lentils and beans etc. are included. Besides that, it is also present in milk, cheese, raw cereals and seeds.

DAILY REQUIREMENT OF CALCIUM AND PHOSPHORUS

An average person requires 0.8g of calcium and 2.1g of phosphorus. Growing children, pregnant woman, lactating mothers require double the amount of calcium.

IRON

Iron is the third most important mineral for the growth and maintaining health of the body. It is important for blood as calcium and phosphorus are important for bones. An average healthy person has 1-3g of iron in his body.

Iron is present in both inorganic and organic form. Iron is absorbed by the body in the presence of vitamin C.

FUNCTIONS OF IRON

1. Iron is an important element of hemoglobin which helps in making red blood cells and turns our blood red.
2. Iron helps to purify blood with the help of red blood cells. They circulate oxygen in the whole body through lungs.
3. It is important for tissues and cells. It works as a catalyst in the process of Oxidation and Reduction and provides heat.
4. It is an important component in Myoglobin of muscles.

DEFICIENCY OF IRON

There are three reasons of deficiency of iron in the body. For e.g. Lack amount of iron in diet or lack of absorption of iron due to problem in digestive system. Besides, nose bleeding, ulcer, wastage of blood due to internal bleeding of veins or wastage of blood through wounds due to some accident. These badly effect the health of the body like:

1. ANEMIA: It is a disease in which a person looks healthy externally but is very weak internally. The person looks pale, dark circles around eyes, headache. And due to deficiency of red blood cells, oxygen is not properly provided to the body. Trouble in breathing and functions of heart are disturbed, weak digestive system, loss of appetite and weak immune system. If this disease is caused by lack of iron in diet, it is called Nutritional Anemia.

SOURCES OF IRON

The best animal sources of iron include liver, kidney, meat, fish and eggs whereas vegetable sources include beans like kidney beans, peas, raw cereals, wheat flour, raisins, and green leafy vegetables.

DAILY REQUIREMENT OF IRON

A special quality of iron is it is wasted in small amount and after 120 days red blood cells are produces again. Therefore, an adult man requires 12g and woman requires 20g daily. Growing children, pregnant woman and lactating mothers require more amount of iron than others.

IODINE

This salt is used in both organic and inorganic form. Iodine can be absorbed by the body if rubbed on skin.

FUNCTION OF IODINE

1. Iodine is important for a gland present near throat called Thyroid which helps make hormones called "Thyroxine". Thyroxine helps to regulate chemical functions of the body.
2. Iodine is important for mental and physical growth of the body.

DEFICIENCY OF IODINE

1. A deficiency of iodine leads to a reduction in the amount of thyroxine produced by the thyroid gland. As a result, the metabolism slows down, and the gland swells up. This swelling can be seen in the neck and is called a Goiter.
2. Cretin disease effects growth of the body. Swelling of organs. Features of the become uneven, rough and swelled.
3. One becomes mentally unstable because deficiency of iodine effects the mental growth.

SOURCES OF IODINE

Iodine is present in fresh water, seaweeds, seafood and cod liver oil extensively. Amount of Iodine present in animal and vegetables sources depends on the diet of animals and soil of the land. But still it is found in eggs, milk and cheese. Green leafy vegetables contain small amount of it whereas there is no iodine found in cereals.

DAILY REQUIREMENT OF IODINE

An average person requires 0.15g to 0.3g of iodine daily.

MENU PLANNING

Menu planning refers to a planning in which tasteful and colorful, good for digestion, suitable for growth of the body and nutritious food are selected.

1. SUFFICIENT QUANTITY OF FOOD:

Food should be in sufficient quantity. It means that it should be in such quantity, which fulfills our body needs. Different people need food in different quantity according to their age and work. More food is required for a big family.

2. NUTRITIOUS FOOD:

All food groups should be included in our diet. It should be kept in mind that at least one food from each group must be included in daily meals.

3. FULFILMENT OF REQUIREMENT OF CALORIES:

According to this, 25% calories for breakfast, 35% calories for lunch and 40% calories for dinner should be included. Percentage of division of calories depends on activities of a person for example, a person who does heavy work early in the morning requires more calories in his breakfast.

It is better to fulfil the daily requirement of calories through combining all three “fuel food” rather than from only one. Its suggestions are:

Calories of Protein containing food: 15% for children and 10% for adults.

Calories of Carbohydrate containing food: 60% of total required calories.

Calories of Fat containing food: 35% for children and 30%-40% for adults.

4. FOOD ACCORDING TO BUDGET:

Food should be selected according to budget. 80-85% of low class income, 50-60% of middle class income and 35-45% of high class income should be spent on food. According to income more than half section on milk, 1/5 on fruits and vegetables, and almost equal section on cereals, sugar, tea, spices should be used. To get balanced and inexpensive food, following points should be considered:

- i. **Seasonal food:** They should be most used in their season.
- ii. **Preservation of seasonal food:** So that they can be helpful in expensive season. Like, pickles, jelly, jam, squash, sherbet etc.
- iii. By growing vegetables and animal like chicken, hen, goat etc. at home, inexpensive and balanced food can be obtained like: vegetables, meat, milk and eggs.
- iv. Leftover food can be mixed together with other spices to add variety and taste into new dish.
- v. Knowledge of all food group and its price is important, so that inexpensive food from every group is selected. Food substitution is done by two methods by their nutritional value. A) Food substitutions within a food group. B) Food substitutions in non-similar food groups.
 - A. **FOOD SUBSTITUTIONS WITHIN A FOOD GROUP:** For example: mutton is quite expensive so instead of that beef can also provide complete protein and is not as expensive. And instead of meat soya bean, red kidney beans etc. can also be

used. For 250g of protein, 2.5 cups of milk or 2.5 cups of cooked beans can be used in place of meat. Two to three types of lentils mixed together or a combination of cereals mixed with milk, eggs, yogurt or buttermilk can provide complete protein.

Likewise, for juicy vegetables and fruits such as orange, grapefruit, etc. instead of them tomatoes and lemon can be used to obtain vitamin C.

- B. **FOOD SUBSTITUTIONS IN NON-SIMILAR FOOD GROUPS:** For calcium and vitamin B2 substitute of milk can be a combination of eggs and leafy vegetables. Large quantity of green leafy vegetables and yellow beans can be a substitute of vitamin A present in fatty food. Potatoes can be used as a cheap substitute of peas, beans or barley for gaining energy and can also provide vitamin C. Dried fruits are a great substitute of fresh fruits.

Some food does not have any substitute like protein present in milk cannot be obtained from any other food. Likewise, there is no substitute for juicy fruits and vegetables for vitamin C. and can only be fulfilled with supplements.

5. FOOD SHOULD BE ACCORDING TO LIKING OF A FAMILY:

If the food is according to the liking of a person, it has good effect on digestive system because unlikable food causes irritation which become the reason of digestive and body weakness. Keeping the liking of every member in the family in mind is quite difficult for home-maker but one by one every person's favorite food can be cooked.

6. FOOD SHOULD BE TASTEFUL:

Tasty food creates pleasure in nature and the food is enjoyed and eaten properly.

7. FOOD WHICH ARE NUTRITIOUS SHOULD BE USED:

Food which are quite nutritious should be used once twice a week such as, liver, kidneys, heart and raw cereals etc. likewise, the requirement of nutrients by the body is fulfilled. And raw vegetables and fruits should be used as much as possible.

8. FOOD SHOULD BE CHANGED NOW AND THEN:

Diet should be changed every day so that a person doesn't get sick of it and by changing it, many other nutrients are obtained.

9. VARIETY IN FOOD:

It is very important, because nobody likes to eat even his favorite food stuff over and over again. Therefore, to introduce variety, do not repeat same food items during day-meal. Also, variety in meal planning is the sum total of many kinds and classes of food served in pleasing color combinations, with judicious mixture of soft and crisp foods, blunt and sharp flavors, hot and cold dishes. It ensures better nutrition and also result in more interesting meals with an attractive variety of texture, color, taste and appearance which in turn stimulates appetite and please the palate. Various methods of working can also introduce a variety – a meal consisting of tandoori roti, dal and seasonal green vegetable also with a crisp salad.

10. FOOD SHOULD BE COLORFUL AND ATTRACTIVE:

The color and proper presentation of the food does matter a lot because every person is attracted to colors and beauty. The color of dishes, plates glasses etc. and also table cover also matter. And the shape of dishes like oval, squares, round etc. should also be considered according to the meal.

11. TRADITIONAL FOOD SHOULD BE INCLUDED:

Because if the food is completely different than traditional or customary food, the mind becomes unsatisfied.

12. DIET SHOULD BE FRESH AND EASILY DIGESTIBLE:

Ghee or any oily food are not easily digestible whereas soggy and old food becomes the cause of indigestion and different diseases.

13. MEAL TIMES:

It is also an important factor in meal planning. The meals should be planned according to the time for meal i.e. whether it is breakfast, lunch or dinner. Normally while planning the meal for whole day, it is seen that 1/3rd of days requirement are met by lunch 1/3rd by dinner and 1/3rd by breakfast and evening tea. But this is not a rigid schedule and can be changed according to individual requirement. But as long as the total nutritional requirements are being met.

METHOD OF MENU PLANNING

1. First of all, every meal time should be determined such as; morning tea, breakfast, tea at 10 o'clock, afternoon meal, evening tea and dinner etc.

EXAMPLE OF MENU PLANNING

Breakfast: Milk-1 cup, 1 paratha, 1 fried egg.

Lunch: 1 plate of mutton curry, 2 rotis, ½ plate yogurt, ½ plate salad, 2 oranges.

Dinner: 1 plate of boiled rice, 1 plate of lentil, pickle, yogurt raita, sweet dish.

2. Collect all the information regarding the price and nutrition value of daily food such as cereals, fruits, vegetables, meat, milk, eggs etc. after selecting. For example:
Usage of wheat flour per day 125g
Butter, ghee, cream approximately 62g
Rice
Sugar etc.
3. Make a schedule of all food, their quantity and their prices as well as nutrients present in them. By adding their total amount, daily nutrition and amount is determined.

PURCHASE OF FOOD

Getting anything through money is called “process of purchasing”. Process of purchasing depends on the requirement and economical or financial availability but good purchasing tells the intelligence of a person. Purchasing food after thinking guarantees better health, mental peace and comfort and saving of money. Many problems are solved if following steps of purchasing food are kept in mind:

1. The most important thing for purchasing food is the knowledge about food nutrients. By having this knowledge, a person can use the amount accordingly and buy food which are nutritious as well as “budget friendly” and provides basic nutrients.
2. The knowledge of nutrient present in different food is important. By this, a person becomes capable of choosing a substitute of expensive food. This provides health to the family and saves money.
3. Fruits or vegetables of small size are cheaper than bigger one but there is slight difference in nutrition value due to size but purchasing smaller fruits or vegetables is a sign of intelligence.
4. Knowledge of different prices in different market or grocery store is important.
5. Fresh fruits or vegetables which are expensive in the morning gets cheaper after the sun starts to set.
6. It is important to buy clean and fresh food.
7. Expiration date on canned or packed food should be considered before buying.
8. If the fruits or vegetables are purchased to be used after few days, then they should be bought in raw form so that they get ripe at the time of their cooking.

PRINCIPLES OF PURCHASE OF DIFFERENT FOOD

To buy healthy, fresh and low-cost products depends on the wisdom and intelligence of the buyer. Old, rotten and soggy food not only waste money but also are unhealthy for the body and may cause several diseases. Therefore, knowledge of food is important before purchasing.

FRUITS AND VEGETABLES

The sign of good quality of all fruits and vegetables whether they are juicy, leafy (like; spinach) are:

1. They are fresh.
2. Their condition is specified and beautifully maintained.
3. Their skin or peel has fresh and nature shine.
4. Peels or skin should be thin and the surface should be smooth. Thick and uneven skin shows that fruit or vegetable is not juice and fresh.
5. Their color should be naturally attractive.
6. Their peel should be spotless. Some spots are only on the surface which can be wiped off with a clean cloth and this does not affect the quality of the product.
7. Leafy vegetables like, spinach etc. should be fresh crunchy, clean and attractively green.
8. Juicy fruits and vegetables whether in small size but if are light in weight means that they are juiceless and are dried inside. Therefore, heavy fruits and vegetables is a sign of good quality and freshness.
9. The peel or skin of old, rotten and soggy fruits and vegetables are soft, loose wrinkled and uneven. Their color is dull, they have no shine or attractiveness, they shrink and have some dark spots on them.

CEREALS, RICE, LENTILS, FLOUR etc.

Raw or semi-raw cereal like; rice, lentils and chickpeas etc. should be clean and pure from dust or dirt. They shouldn't have any moisture in them and they shouldn't be too old that they don't even have their natural smell. The quality of them can be determined by putting some grains on the palm. They should be checked before purchasing to know that they are clean from mold, fungus, insects etc.

MEAT

Two points should be considered before purchasing meat whether fish, chicken, mutton or beef etc. First of all, the meat should be fresh and second that the animal should be young because meat of old animal is hard to cook and stiff.

1. The sign of fresh meat is that it is clean and fragile. Its color is pinkish red. Darkish red is a meat of old and adult animal.
2. The fibers of meat are soft, stiff and strongly connected with each other. They look fresh and juicy and stays in its form.
3. If the meat is soft, loose, its fibers are separated and its color is dark are the sign old meat. Rotten meat has unpleasant smell.

EGGS

The sign of fresh eggs is;

They are heavy. If a heavy egg is placed in water, it sinks and if an egg is defective, it floats.

MILK

The sign of good and fresh milk is that it has good smell, it is thick and drop of fats can be seen on its surface. If the milk is thin or its smell is different than its specific smell, then water or another component is mixed in it and it is not fresh.

OTHER PRODUCTS

SUGAR

Sugar should be clean and white, and pure from any moisture. Because sugar is made with either beet root and sugarcane so it is important to know the difference because beet root sugar is less sweet. And sometimes sugar is less sweet because some other components are mixed in it which changes its taste.

SPICES

If unpacked spices are bought, they should be pure from fungi or mold, clean and there should no dirt or stones etc. Every spice has its own smell.

TEA

If loose tea is unavailable, it should have specific smell and brownish color. Tea should be dry, clean and pure from moisture, dust or dirt.

PACKED OR CANNED PRODUCTS

Nowadays, everything such as spices, salt, pepper etc. are available in packets. Products like, milk, yogurt, cream, butter or cheese etc. or juices of fruits and vegetables have expiration date written on them which is important to read before purchasing.

METHODS AND PRINCIPLES OF COOKING

Our everyday diet consists of some foods that be eaten in any state i.e. raw or cooked. For example; carrots, tomatoes, radish and mangoes etc. Moreover, there are some foods that cannot be eaten uncooked. For Example; meat, chicken, eggs etc. food is not only eaten for its taste and for our satisfaction. There are some important reasons of eating and cooking food that should be kept in mind. These reasons are as follows:

REASONS OF COOKING FOOD:

1. Cooking makes the food the soft, warm and digestible.
2. Heating milk kills bacteria that cause different diseases.
3. Cooking makes our food delicious and eatable.
4. Cooking makes the food look presentable and inviting.
5. The rancid smell of meat, fish, cauliflower and radish is removed by cooking.
6. The quantity of our diet can be correctly determined by cooking. For Example; if we cook a full cup of rice, its quantity is doubled.
7. The food can be cooked hot, cold or mushy according to the age, condition and nature of the person. It is difficult for children, old people and for the sick to chew and swallow raw vegetables and fruits.

METHODS OF COOKING

Even today the different methods of cooking food are being adopted. They can be divided into three groups which are as follows:

1. Dry heat cooking.
2. Moist heat cooking.
3. Combined heat cooking.

1. DRY HEAT COOKING:

In this method of cooking, water and steam is not used. This type of cooking includes grilling, broiling and roasting etc.

2. MOIST HEAT COOKING:

Any type of cooking that is done by water is included in moist heat cooking. For example; boiling in water, simmering and steaming. E.g. eggs, vegetables, boiling meat, heating milk and vegetables using water, cooking in pressure cooker etc.

3. COMBINED COOKING METHOD:

This method is a combination of dry and moist cooking methods. In this method, the food is first cooked or fried dry and then to make it soft, it is cooked in water. Our everyday curry is cooked using this method. Braising and roasting is included in this method.

SOME IMPORTANT PRINCIPLES REGARDING COOKING

From cooking till storing, some important points should be kept in mind that helps us in keeping our food nutritious and saves it from spoiling. For example;

1. The food should not be washed more than its requirement. The water in which the food is saturated should also be used for boiling.
2. For the process of boiling to work, it is important to cover the pot with the lid. This decreases the chances of multiplication in the amount of vitamin C from 10 percent to 20.
3. The food after cooking should not be kept constantly hot. It should be cooled down immediately.
4. The oil and fats used in frying should not be heated excessively to the point of smoke. The smoke is a sign that the oil is excessively hot that results in the breakdown of the structure of the oil.
5. The oil used before should be used again to fry. This is because very little of nutrition is left in the oil due to which rancid oils are produced.

1. FRESH FRUITS AND VEGETABLES

Fresh fruits and vegetables contribute the most towards salts and vitamins. The vitamins and salts are dissolved in water. Keeping their properties and nutritional value in mind, we should try to eat raw fruits and vegetables. Whereas the vegetables that cannot be eaten raw, for their preparation and cooking, the following points should be kept in mind:

- i. Before peeling fruits and vegetables, they should be washed properly. If we wash them after peeling, they lose their nutrition and the layer of dust on the skin of the vegetable or fruit can prove to be harmful for us.
- ii. After washing, we should rinse green vegetables like spinach in vinegar solution. This helps it in killing the bacteria and keeps the vegetable fresh.
- iii. The crust of some fruits and vegetables should not be peeled off because most of the vitamins and salts are present in the crust or around it. For example; apple, carrot and radish.
- iv. The vegetables should be eaten when they are fresh. We should cut the vegetables few minutes before eating so that the nutrition does not go to waste due to the oxidation in the air.
- v. The fruits or vegetables that lose their color due to oxidation should be immersed in salt water beforehand so that they don't lose their color.
- vi. We should not saturate the vegetables and fruits for a long time. This is because the vegetables and fruits lose their nutrition in water when saturated for a long time. It is

better to use the saturated water while cooking so that we can maintain the nutritional value of the vegetables and fruits.

- vii. The nutritional value of cut up pieces of vegetables and fruits is safer when they are fried or cooked in butter (ghee).
- viii. We should stop cooking as soon as the vegetables turn soft.
- ix. Usually the vegetables are cooked in their own water, but if necessary, we should add the right amount of water needed for it to cook so that we won't have waste water.
- x. If it is important to freeze the food, the food should be frozen in its fresh state.
- xi. Fresh or frozen, the food should not be cooked for long. It is better to immediately cook the frozen food in boiling water than to defrost it.
- xii. It is important to keep the pot covered with lid while cooking. The vitamins are wasted due to the air if we cook without the lid.
- xiii. The smaller the pieces of vegetables, the more air they absorb and more are their vitamins lost.

2. FATTY FOOD

Fats consist of butter, oil, dairy, fats, cream and margarine etc. They provide us taste, strength and comfort to our stomach. Solid fats like butter and lipids require more time and temperature to melt than liquid fats.

Fats themselves are not cooked, they are used in the cooking of other foods.

a. Dry or pan-frying:

The fat in this method is only used to grease the pan so that the food does not stick to the pan. Spices and lentils are cooked using this method.

b. Shallow flat frying:

In this method, the amount of oil is equal to the $\frac{1}{2}$ amount of food that is to be fried. Usually, the frying is done in a pan that is $\frac{1}{2}$ or half inch in depth. For example, omelet, French toast, shami kebab etc. The depth of the pan depends upon the size of the food.

c. Deep fat frying:

In this method, the amount of oil is such a quantity that the food to be fried is completely immersed in the oil. For example, pakora, fried chicken, chops, fries etc. While deep frying, we should keep in mind that the oil used once for frying should not be used again because it breaks the structure of fats that produces toxins in the oil.

3. CEREALS AND LENTILS:

Cereals consist of every kind of lentils, pulses, maize, barley and rice. They provide us the best nutrition that is important for our health.

Cereals provide us corn flour, sugar, salt and vitamins.

For these cereals to be useable, they are first crushed into powder. During crushing, the flake of the cereal is separated from the powder. The flake is bland in taste and is indigestible because of the cellulose in it. Apart from this, it is rich in vitamins, proteins and salts. These properties are lost when the flake is removed. The vitamins and proteins present in the powder are more in quantity than the flake. They are lost when the cereals are crushed into powder form. This is why it is suggested to use cereal in bulgur (Dalia) form rather than in powder form.

There are several steps included in the preparation of intact cereals e.g. washing and saturating for half an hour. This water is then drained. Draining causes some of the vitamins and proteins in the cereal to break. These are some methods used for the preparation on cereals and lentils:

1. Rice and lentils should not be washed more than required so that the saturated fats do not go to waste.
2. To saturate the lentils, the amount of water should be according to the requirement of the lentil to bloat and soften. The water should then be used to make the gravy of the lentil so that the saturated vitamins and proteins can be used.

Methods of cooking:

Powdered or intact, cereals cannot be eaten if they are uncooked. The cereals are cooked so that the cellulose in them can soften and make them taste good. Cereals can be cooked in any state, dry or moist. For dry cooking of cereals, the process of parching is used in which the seeds of rice, wheat and maize etc. are exposed to heat without burning. In moist cooking, the processes of kneading the dough using water or milk and boiling the cereals in the presence of water are included. For example, the cooking of rice lentils and chickpeas etc.

Combination methods are also used for the cooking of cereals in which the lentils are saturated in water overnight and the water is then dried and used for the frying of these lentils.

Starch and globin are found in big amounts in lentils. These lentils are cooked so that they starch and globin can be digestible. For this purpose, the lentils are cooked in water. During this process, the starch in the lentils absorbs the water and when the water turns into steam and tears through the walls of the lentil causing the lentil to soften. If the lentils are cooked for a long time the starch takes a glutinous shape and causes the mixture to be thick. The ductility of dough is also due to this glutinous starch. This glutinous starch is present in different amounts in different cereals and lentils. This is why the amount of water used in cooking is different for different cereals.

If you intend to add water in lentils, the water should be added in small amount and within breaks similar to that of kneading a dough. If you want to add milk or hot water to your starch, first make a

paste of cold water and powdered flour and add the paste to the hot water or milk in small amounts and in between breaks to avoid forming bubbles.

4. FOODS RICH IN PROTEIN:

In this group of food meat, milk and eggs and things made from these are included. The particular characteristic of protein endorsed foods is that they harden upon cooking making the food hard to swallow.

MILK:

Milk is a complete nutritious drink but lacks vitamin c and iron. The proteins present in milk are indigestible. Milk can be drunk in raw form but the irritating smell is the cause of spread of several diseases. For this reason, it is boiled on high heat. This causes the odor and bacteria to finish.

Just like the other protein foods, on extreme cooking the proteins of milk also start to harden. For example, “rabri” but due to the high amount of water in proteins, the hardening of milk is not felt.

EGGS:

The protein of eggs is divided into 2 parts i.e. the yolk and the egg whites. Apart from proteins, several vitamins, fats and salts are also found in the egg yolk.

The eggs are cooked in different ways i.e. salted, sweet or hard boiled. The distinct feature off eggs is that their proteins coagulate upon fervor (heat). If cooked for a long time, they harden, making the eggs indigestible. Upon whisking, air enters the eggs causing their volume to increase and become lighter. The noticeable characteristic of eggs is that they are “Binding agents”. For this reason, it is mixed in several sweet and salty foods like kebabs, Gulab jamuns and ras malai etc. The food is also egg washed so that it does not break and increases in volume.

The lesser the eggs are boiled, easier it is to digest them because of their softness. On the contrary, the more the eggs are boiled like that of fried eggs, the harder it is to swallow their proteins. For this reason, it is preferable for the eggs to be cooked on low heat for a short amount of time. As compared to boiled egg, fried egg is much harder to digest.

MEAT:

Meat can't be eaten raw, doesn't matter if it's cow, goat, chicken or fish meat. It is not only cooked to make it digestible but also to make it delicious and enjoyable by the help of several spices. Cooking of meat removes several bacteria stuck to the raw meat.

If the meat is washed for a long time under running water, the nutrition in it finishes.

Due to the presence of protein, meat also hardens upon cooking. The hardening of meat depends upon the type of meat, age and organs of the animal.

Usually, the tissues of meat contract upon cooking but due to presence of water, the meat softens upon cooking.

Heart, kidneys and livers are sensitive organs and soften easily upon cooking. This is why they are cooked using the stewing and braising methods in the presence of water and low heat.

The softest kind of meat is that of a fish. On the contrary, the hardest meat is that of a cow. High heat causes damage to the meat of fish and chicken and the meat stays raw on the inside. That is why they should be cooked on low heat in the presence of water. Dry cooking methods like frying and roasting are the most suitable methods for the cooking of these kinds of meat.