UNIT-8 Sewing Basics (i)

Learning Outcomes
By the end of this unit the learner will be able to:
✓ Understand how different types of hand stitches are used when finishing a garment ✓ Succesfully sew a seam and darts

Unit 8

Sewing Basics (i)

Importance of Body Measurements

Body measurements must be very precise, in order to create well-fitting garments. Original patterns can be drafted based on measurements, which can be used as a basis for a variety of styles. Commercial patterns can be bought, but it is necessary to know the precise measurements of the figure you are designing for, in order to make appropriate adjustments.

1. **Preparation for Measuring**

   A good quality measuring tape is needed to take measurements. It should be strong and not stretch when pulled. Vertical measurements should be taken using the metal end of the tape, while horizontal and circumference measurements should be done with the other end. It will be necessary to take measurements over a smooth-fitting foundation garment, as opposed to anything bulky. Tie a cord or string around the waist before taking any measurements. Then, use a ¼" wide tape and place it around the armhole to measure shoulder width and armscye depth. The model should stand with arms hanging straight at the sides while someone is taking the measurements. Taking snug measurements as opposed to tight or loose ones is advisable. For horizontal measurements, hold the tape parallel to the floor. For vertical measurements, hold the tape perpendicular to the floor. Record the measurements in a note book.

2. **Ladies' Measurements**

   Measurements are to be taken on various positions on the body as shown below.

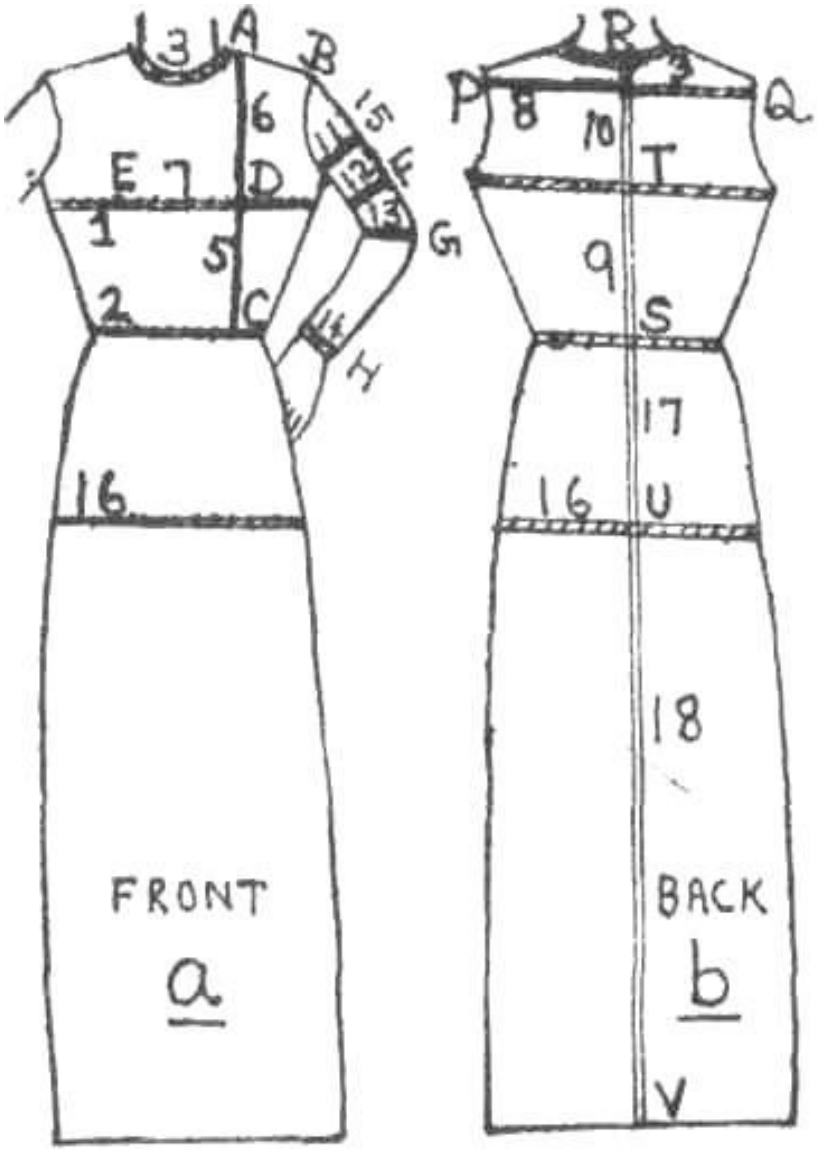


Fig.9.1

Bodice measurements

Bust: The fullest part of the bust should be measured with the measuring tape to a level just slightly below the shoulder blades at the back.

Waist: Measure snugly around the waist and keep the tape parallel to the floor. Measure where you tied the cord.

Neck: To measure around the neck, pass the tape just above the collar bone in the front and along the base of the neck at the back.

Shoulder: To properly measure the shoulders, measure from the neck joint to the arm joint along the middle of the shoulder (A to B in Fig.9.1).

Front waist length: Measure down from the neck at the highest point of the shoulder to the waist line through the fullest part of the bust (A to C in Fig.9.1).

Shoulder to bust: Measure down from the highest point of the shoulder to the tip of the bust (A to D in Fig.9.1).

Distance between bust points: Measure the distance between the two bust points (D to E in Fig.9.1) in a horizontal direction.

Back width or across back measurement: To measure across the back, do so from armhole to armhole around 3 inches below the base of the neck (P to Q in Fig.9.1).

Back waist length: Measure from the base of the neck at the centre back to waist line (R to S in Fig.9.1).

Armscye depth: Measure from the base of the neck at the centre back to directly below the centre level with the bottom of the arm where it joins the body (R to T in Fig.9.1).

Sleeve measurements

Upper arm circumference: This is to be measured around the fullest part of the arm.

Lower arm: Measure around the arm at the desired level corresponding to the lower edge of the sleeve.

Elbow circumference: Measure around the elbow.

Wrist: Measure around the wrist.

Sleeve length: For a short sleeve length, measure down from the tip of the shoulder at the top of the arm to the desired length of the sleeve (B to F in Fig.9.1). For an elbow-length sleeve, measure from the top of the arm to the elbow point (B to G in Fig.9.1). For full length, it is necessary to bend the elbow slightly and measure down from the top of the arm to the back of the wrist. Pass the tape over the elbow point (B to H in Fig.9.1).

Skirt measurements

Waist: This is the same as for the bodice.

Hip: Measure horizontally around the fullest part of the hip. (For an average figure, this will be around seven to nine inches below the waist).

Waist to hip: Measure down from the waist at the centre back to the fullest part of the hip (S to U in Fig.9.1).

Skirt length: Measure down the centre back from the waist to the desired length of the skirt (S to V in Fig.9.1).

Boys And Men's Measurements

In many cases, measurements are similar for both men's and women's garments. Fewer measurements are needed for men's and boy's garments, however. They are:

Shirt Length

This is measured from the neck (at the highest point of the shoulder) to the desired length along the front.

Pant Length

This is measured from the waist to the ankle. Measure along the side of the body.

Cuff Measurement

Measure the wrist loosely and add ½" overlap extension.

Standardizing Body Measurements

Importance and Techniques

To produce sizing systems, measurement surveys are used to collect data. They are very expensive, however, and it is difficult to get funding for these. In order to obtain reliable data, thousands of subjects must be measured. The last time a large British survey of women's body measurements was published was right back in in 1957.A lot of companies continue to use this data from 1957, though modify it using other European surveys as a reference, their own sample surveys of their specific market, or any other relevant information. Younger women have, for example, increased slightly in height, and information like this will help when designing and creating garments.

Scanning as a means by which to obtain measurement information is being developed in many places. At University College London, a near infrared scanner (Hamamatsu Photonics Bodyline) is being used for experimental work in the Department of Computer Science. At Loughborough University, more recent surveys have been done using a shadow scanner (LASS) which produces a measurable three-dimensional

image. This way, the dimensions around and also through the body can be recorded. TELMAT, a French system which can conduct 2D body measurements, has now been updated to provide 3D imagery. This gives more accurate calculations.

Converting imagery into body measurements can be especially difficult with complex angular measurements, the identification of body landmarks and recognising the changing states of the body. Clothing technologists consider these things when taking body measurements manually. A researcher at Manchester Metropolitan University has developed an anthropometric stand and special harness to assist in manual measurement. Many measurement surveys are joint co-operations between public research bodies and companies, and thus the resulting data is viewed as commercial information that is privately held.

British Standards BS5511 and BS3666 are still used as guides for British size ranges and also for labelling information. The handbook is currently available for designers and manufacturers from the Consumer Safety Unit (CSU) of the UK Department of Trade and Industry. This book is produced by the Institute of Occupational Ergonomics and Nottingham University and is a design resource. It contains anthropometric and strength information for 266 dimensions and 28 strength measurements. Data from quite a few European and Asian countries as well as the USA is included in the guide.

British Standards

Sizing: An established size-designation system which indicates women's body sizes that garments are intended to fit is provided by the British Standards Institution. It does so in a simple, direct and meaningful manner. This system is based on body measurements, not garment measurements.

Size Designation: The size designation of garments should cover the control dimensions of the intended wearer of the garment in centimetres.

TABLE 1

SIZE CODES AND ASSOCIATED BODY MEASUREMENTS

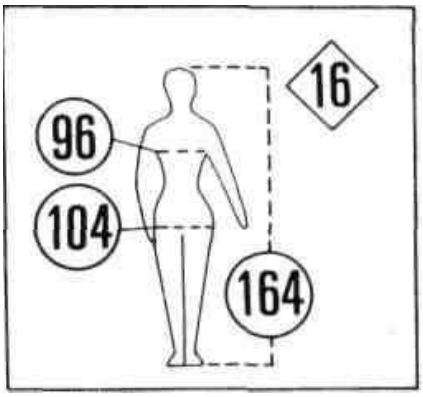
Size codes	Body measurements			
	Hips		Bust	
	From	To	From	To
	cm	cm	cm	cm
8	83	87	78	82
10	87	91	82	86
12	91	95	86	90

14	95	99	90	94
16	100	104	95	99
18	105	109	100	104
20	no	114	105	109
22	115	119	110	114
24	120	124	115	119
26	125	129	120	124
28	130	134	125	129
30	135	139	130	134
32	140	144	135	139

Where it is practical to do so, use the pictogram as a means of showing the size designation. In cases where it is not practical to use the pictogram, give the control measurements as well as the relevant descriptive words such as bust girth, hip girth, etc., in the order shown below.

Tables from BS 3666: 1982 Size coding scheme for women's outer wear are reproduced by permission of The British Standards Institution, 2 Park Street, London W1A 2BS.

Example of inclusion of size code number into labels



SIZE	16
BUST GIRTH	96
HIP GIRTH	104
HEIGHT	164

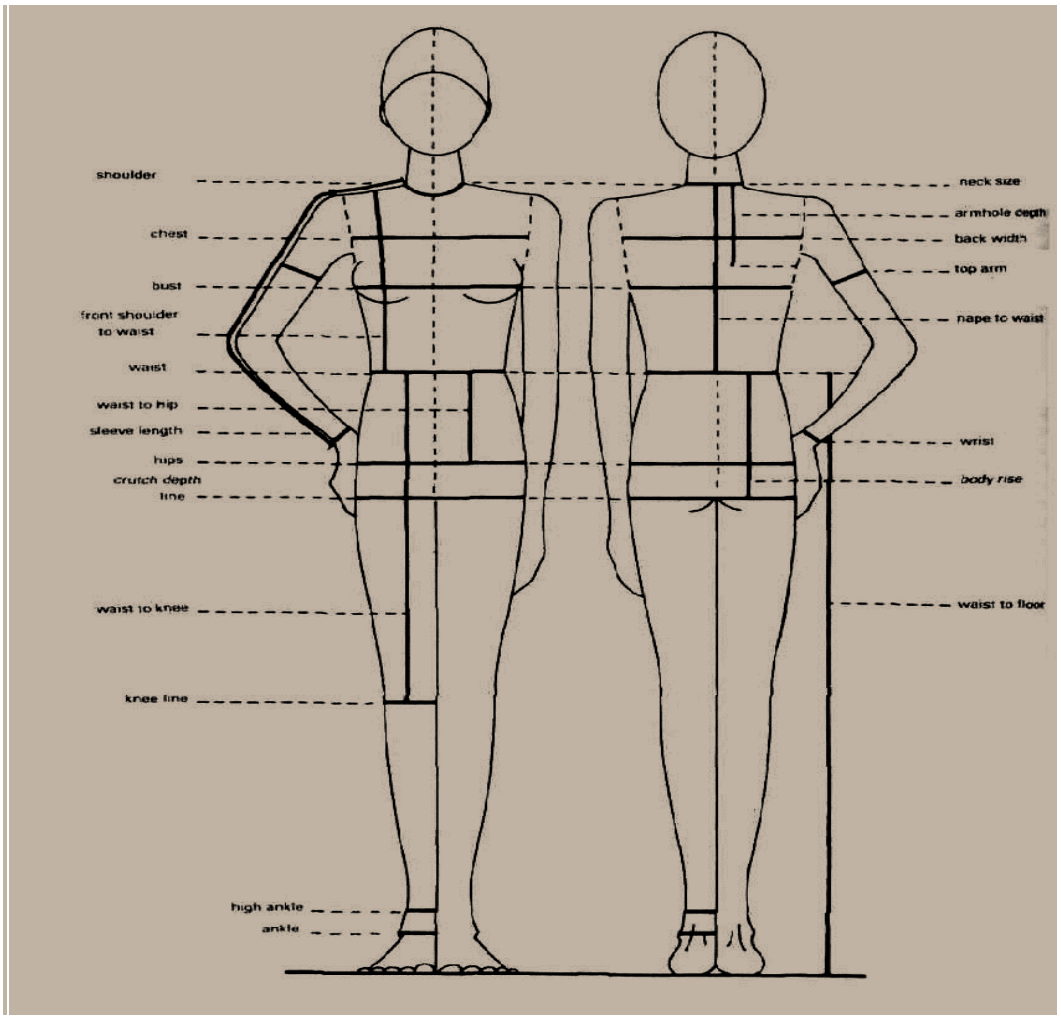


Fig.9.2

Most of the population falls into the medium height range. Girth varies, but the general trend is for weight to increase with height. This is reflected in the size charts.

	WOMEN OFMEDIUM HEIGHT 160cm, 170cm (5ft 2½ in – 5 ft 6½ in)											
SIZE SYMBOL	8	10	12	14	16	18	20	22	24	26	28	30
BUST	80	84	88	92	97	102	107	112	117	122	127	132
WAIST	60	64	68	72	77	82	87	92	97	102	107	112
HIPS	85	89	93	97	102	107	112	117	122	127	132	137

BACK WIDTH	32.4	33.4	34.4	35.4	36.6	37.8	39	40.2	41.4	42.6	43.8	45
CHEST	30	31.2	32.4	33.6	35	36.5	38	39.5	41	42.5	44	45.5
SHOULDER	11.75	12	12.25	12.5	12.8	13.1	13.4	13.7	14	14.3	14.6	14.9
NECK SIZE	35	36	37	38	39.2	40.4	41.6	42.8	44	45.2	46.4	47.6
DART	5.8	6.4	7	7.6	8.2	8.8	9.4	10	10.6	11.2	11.8	12.4
TOP ARM	26	27.2	28.4	29.6	31	32.8	34.4	36	37.8	39.6	41.4	43.2
WRIST	15	15.5	16	16.5	17	17.5	18	18.5	19	19.5	20	20.5
ANKLE	23	23.5	24	24.5	25.1	25.7	26.3	26.9	27.5	28.1	28.7	29.3
HIGH ANKLE	20	20.5	21	21.5	22.1	22.7	23.3	23.9	24.5	25.1	25.7	26.3
NAPE TO WAIST	39	39.5	40	40.5	41	41.5	42	42.5	43	43.2	43.4	43.6
FRONT SHOULDER TO WAIST	39	39.5	40	40.5	41.3	42.1	42.9	43.7	44.5	45	45.5	46
ARMHOLE DEPTH	20	20.5	21	21.5	22	22.5	23	23.5	24.2	24.9	25.6	26.3
WAIST TO KNEE	57.5	58	58.5	59	59.5	60	60.5	61	61.25	61.5	61.75	62
WAIST TO HIP	20	20.3	20.6	20.9	21.2	21.5	21.8	22.1	22.3	22.5	22.7	22.9
WAIST TO FLOOR	102	103	104	105	106	107	108	109	109.5	110	110.5	111
BODY RISE	26.6	27.3	28	28.7	29.4	30.1	30.8	31.5	32.5	33.5	34.5	35.5
SLEEVE LENGTH	57.2	57.8	58.4	59	59.5	60	60.5	61	61.2	61.4	61.6	61.8

SLEEVE LENGTH (JERSEY)	51.2	51.8	52.4	53	53.5	54	54.5	55	55.2	55.4	55.6	55.8
Extra measurements (garments) CUFF SIZE SHIRTS	21	21	21.5	21.5	22	22.5	23	23.5	24	24.5	25	25.5
CUFF SIZE, TWO-PIECE SLEEVE	13.25	13.5	13.75	14	14.25	14.5	14.75	15	15.25	15.5	15.75	16
TROUSER BOTTOM WIDTH	21	21.5	22	22.5	23	23.5	24	24.5	25.4	26.2	27	27.8
JEANS BOTTOM WIDTH	18.5	18.5	19	19	19.5	20	20.5	21				

	Short Women 152cm-160cm (4ft 11 ½ in 5ft-2 ½ in)	**Tall women 170cm-178cm (5ft 6½ in 5ft-9 ½ in)**
NAPE TO WAIST	-2cm	+2cm
SCYE DEPTH	-0.8cm	+0.8cm
SLEEVE LENGTH	-2.5cm	+2.5cm
WAIST TO KNEE	-3cm	+3cm
WAIST TO FLOOR	-5cm	+5cm
BODY FISE	-1cm	+1cm

There are a number of companies using 5 cm intervals between all sizes. This is done for commercial reasons. This particular system eliminates size 8 and allows for many grading increments to stay the same across the size range. Below is a 5cm interval size chart with the popular sizes from 10-22. This

chart remains within the lower limit of the BSI size range standard for size 10.

WOMEN OF MEDIUM HEIGHT 160cm-l 70cm (5ft 2 '/2 in - 5ft 6 1/2 in)							
SIZE	10	12	14	16	18	20	22
BUST	82	87	92	97	102	107	112
WAIST	62	67	72	77	82	87	92
HIPS	87	92	97	102	107	112	117
BACK WIDTH	33	34.2	35.4	36.6	37.8	39	40.2
CHEST	30.5	32	33.5	35	36.5	38	39.5
SHOULDER	11.9	12.2	12.5	12.8	13.1	13.4	13.7
NECK SIZE	35.6	36.8	38	39.2	40.4	41.6	42.8
DART	6.4	7	7.6	8.2	8.8	9.4	10
TOP ARM	26.4	28	29.6	31.2	32.8	34.4	36
WRIST	15.5	16	16.5	17	17.5	18	18.5
ANKLE	23.4	24	24.6	25.2	25.8	26.4	27
HIGH ANKLE	20.4	21	21.6	22.2	22.8	23.4	24
NAPE TO WAIST	39.5	40	40.5	41	41.5	42	42.5
FRONT SHOULDER TO WAIST	39.5	40	40.5	41.3	42.1	42.9	43.7
ARMHOLE DEPTH	20.5	21	21.5	22	22.5	23	23.5
WAIST TO KNEE	58	58.5	59	59.5	60	60.5	61

WAIST TO HIP	20.3	20.6	20.9	21.2	21.5	21.8	22.1
WAIST TO FLOOR	103	104	105	106	107	108	109
BODY RISE	27.3	28	28.7	29.4	30.1	30.8	31.5
SLEEVE LENGTH	57.3	58	58.7	59.4	60.1	60.8	61.5
SLEEVE LENGTH (JERSEY)	51.3	52	52.7	53.4	54.1	54.8	55.2

Standard Body Measurements

This chart is compiled for High Street Fashion garments

Small = approx size 8-10

Medium = size 12

Large = approx size 14-16

X Large = size 18

SIZE SYMBOL BUST	SML S	MED M	LGE L	XLGE XL
BUST	82	88	94	100
WAIST	62	68	74	80
HIP	87	93	99	105
BACK WIDTH	32.8	34.4	36	37.6
CHEST	30.6	32.4	34.2	36
SHOULDER	11.9	12.3	12.6	13
NECK SIZE	35.5	37	38.5	40
DART	6.1	7	7.9	8.8

TOP ARM	26.4	28.4	30.4	32.4
WRIST	15.3	16	16.7	17.4

ANKLE	23.1	24	24.9	25.8
HIGH ANKLE	20.1	21	21.9	22.8
NAPE TO WAIST	39.2	40	40.8	41.6
FRONT SHOULDER TO WAIST	39.2	40	41	42
ARMHOLE DEPTH	20.2	21	21.8	22.6
WAIST TO KNEE	57.7	58.5	59.3	60.1
WAIST TO HIP	20.2	20.6	21	21.4
Extra measurements (garments) CUFF SIZE SHIRTS	21	21.5	22	22.5
CUFF SIZE, TWO PIECE SLEEVE	13.5	13.75	14	14.25
TROUSER BOTTOM WIDTH	21.5	22.	22.5	23
JEANS BOTTOM WIDTH	18.5	19	19.5	20

Head Theory

Eight Head Theory

As mentioned in an earlier unit, artists use eight equal parts (heads) when measuring body height. These eight divisions are:

1st head = from hair to chin or nape of neck.

2nd head = from nape of neck to nipple or bottom of scye.

3rd head = from bottom of scye to naval or hollow of waist.

4th head = from navel to fork or pubic organs.

5th head = from fork to mid-thigh or end of fingers, with arm at side.

6th head = from mid-thigh to small, below knee.

7th head = from small to lower leg, just above the ankle.

8th head = from lower leg to ball of foot, standing tip-toe.

Note: The total human height is actually figured at 7 1/2 heads, but to make the calculations easier, the length is taken from hair to the foot, standing tip-toe, which makes eight equal parts.

Relative Length Measurements in Men/Women

Using the eight heads theory, the following length measures can be obtained for a fully proportionate, adult human body.

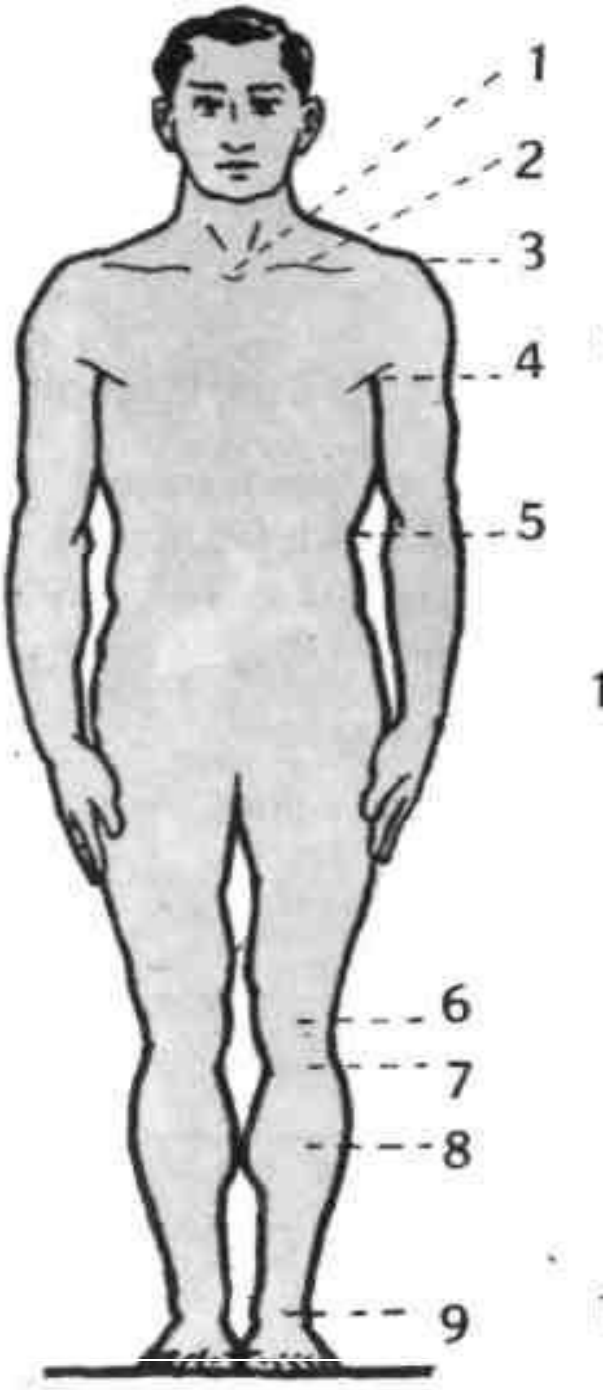


Fig. 9.3

Nape to the level of armpit natural waist (i.e., nape to waist)

Fore-arm (i.e., armpit to wrist bone)

Elbow to armpit

Inside leg or leg measure

Slope of shoulder

Sleeve length (up to wrist) from shoulder

Both the arms extended

Knee from fork

Small from knee

Calf from small

Body rise (i.e., waist to fork).

= one-eighth of the height (i.e., 1 head)

= one-fourth of the height (i.e.,2 heads)

= one-fourth of the height (i.e., 2 heads)

= one-eighth of the height (i.e., 1 head)

= half the full height (i.e., 4 heads) less 5 to 6 cm (2 to 2 ¼")

= one-sixth of the natural waist length

= three-eighths of the height (i.e., 3 heads less 2 to 4 cm 3/4 to 1 ½")

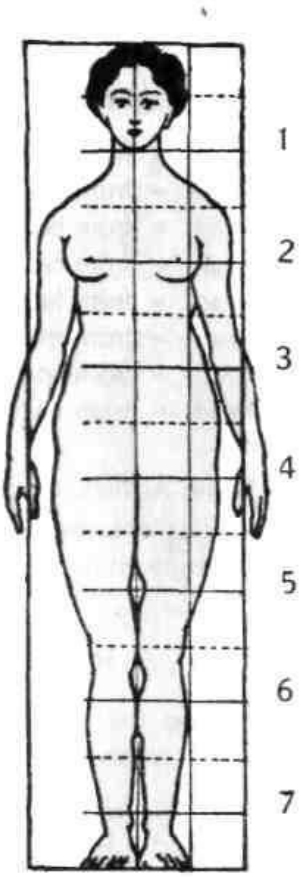
= full height of the figure (i.e., 8 heads)

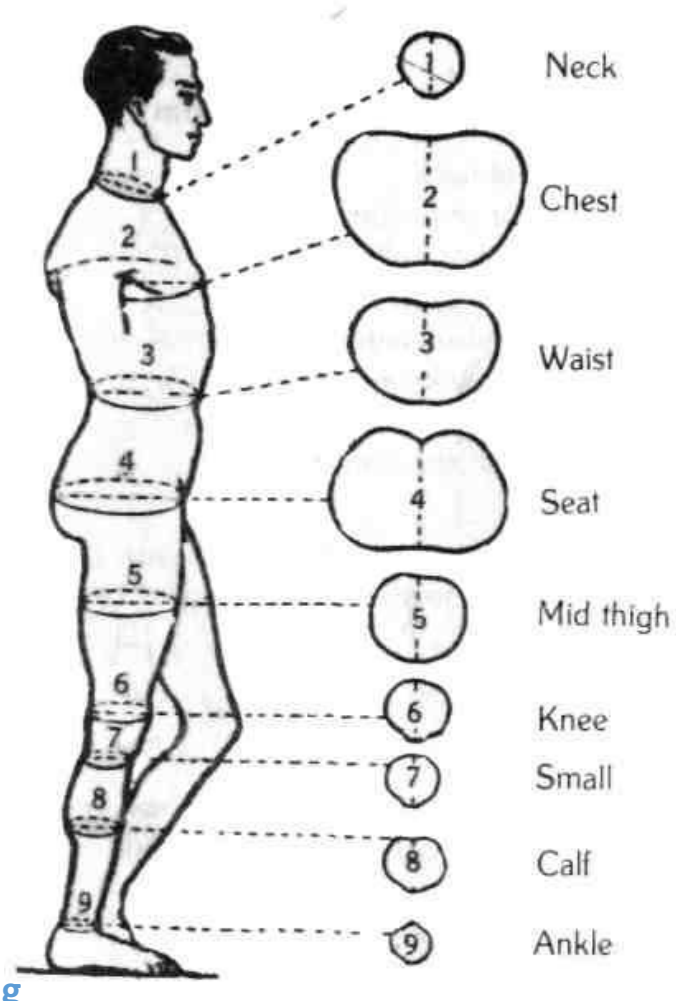
= half inside leg less 5 cm (2")

= 5 to 6.5 cm (2 to 2 ½")

= about 7.5 to 8.75 cm (3 to 3 ½)

= one-eighth of the height + 5 cm (2")





Preparation Of Fabric For Cutting

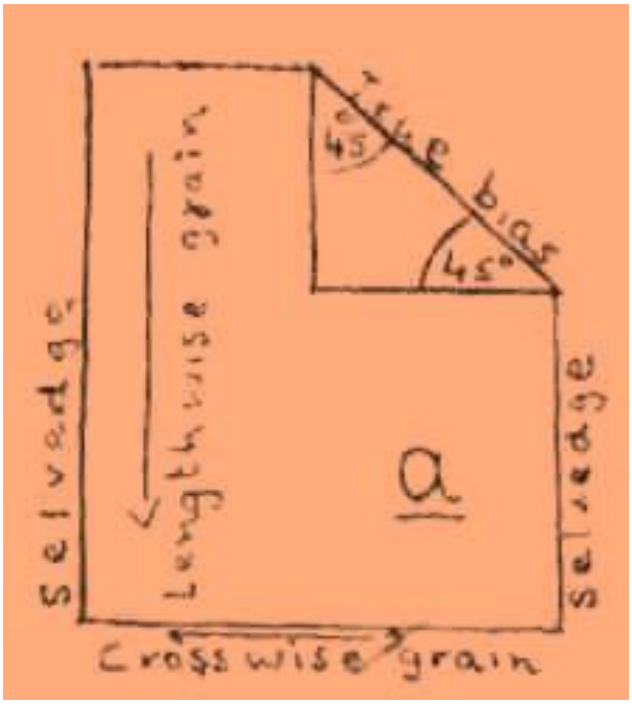
Before preparing any fabric, the following basic terms must be fully studied and understood:

Grain (Fig 9.4) refers to the direction of yarns in a fabric. Woven fabrics have **lengthwise grains** and **crosswise** or filling yarns interlaced with each other at right angles. These are the yarns that are referred to as lengthwise and crosswise grains. The lengthwise grain on patterns is called straight grain. **Bias grain** moves in any direction on a pattern and does not follow a lengthwise or crosswise yarn. True bias will make a 45˚ angle with crosswise and lengthwise yarns.

Lengthwise yarns tend to be heavier and stronger and do not stretch as much as crosswise yarns. Using this information, it is possible to identify the lengthwise grain on fabric which has no selvage. Hold the fabric taut with both hands and stretch it along one grain at around 2" - 3" apart. Then stretch it the same way along the perpendicular grain. The one that stretches the least is the lengthwise grain.

Selvedge: Selvedges are the finished edges of fabric that run lengthwise. See Fig 9.4. The selvedges are woven with more yarn and stronger yarn than the rest of the fabric. The selvedge will be very tightly woven in good quality fabric. It will be about half an inch wide. On inferior fabrics, the selvedge will be loosely woven and will more likely be narrow.

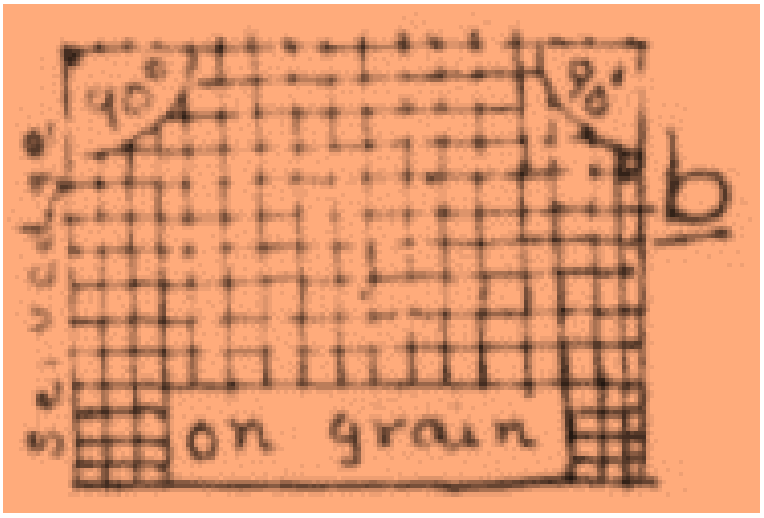
Fig.9.4



Grain and its Types

On Grain: When the crosswire yarns run at right angles exactly to lengthwise yarns and have right-angled corners, this is referred to as being on grain or grain perfect. See Figure 9.5 below.

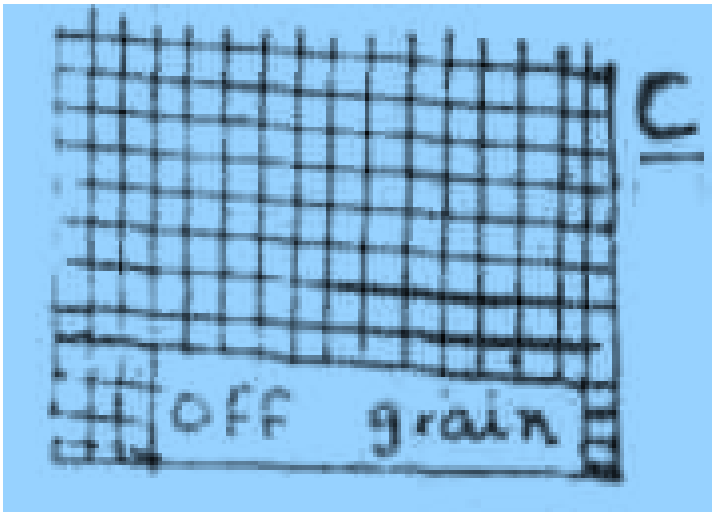
Fig.9.5



Off Grain: When a fabric has the crosswise yarns not running at exact right angles to lengthwise yarns, it is said to be off grain fabric. This occurs when the fabric has been pulled out of shape and pressed in that

position during the finishing process at the factory. See Figure 9.6 below.

Fig.9.6



Off Grain Print When a print has lines or checks, etc. and the lines do not run straight along the lengthwise or crosswise grain, it is called an off grain print. See Fig. 9.7a below. It is almost impossible to ensure that the left and right sides of a garment end up identical in a design or match perfectly along the seams. For this reason off grain print fabrics should be avoided for garment creation. See Fig 9.7b.

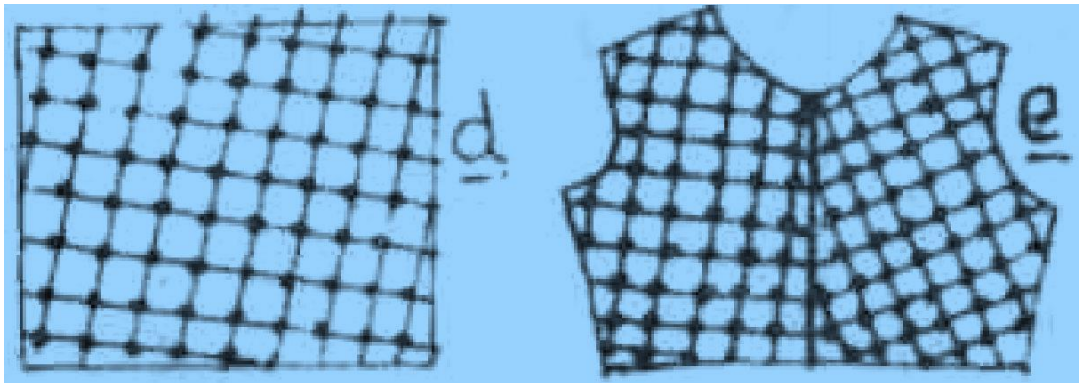


Fig.9.7a Fig.9.7b

With the Grain, Against the Grain You can find out if a fabric is going with or against the grain by using your thumb to stroke a bias-cut edge of the fabric. If you stroke in one direction, the yarns will come apart and the edges will begin to fray. This would be referred to as going against the grain. If you stroke in the opposite direction, the yarns will close up tightly with the remaining fabric, then this would be going with the grain. In Fig 9.7c, the arrow is showing the direction of the grain. In order to avoid any stretching or raveling, it is best to work *with* the grain when cutting or stitching, and even ironing. It is especially important to ensure this when working with any fabric which ravels easily.

Fig.9.7c

Importance of Grain in Cutting and Construction

A garment's fit, durability and hang will be affected by the manner in which it is cut in relation to its grain lines. It is important to cut garments in a way so that the lengthwise grain is parallel to the length of the garment along the centre front. Fig 9.7d see centre back, centre of sleeve, which would be from C to D, as an example.

Fig.9.7d

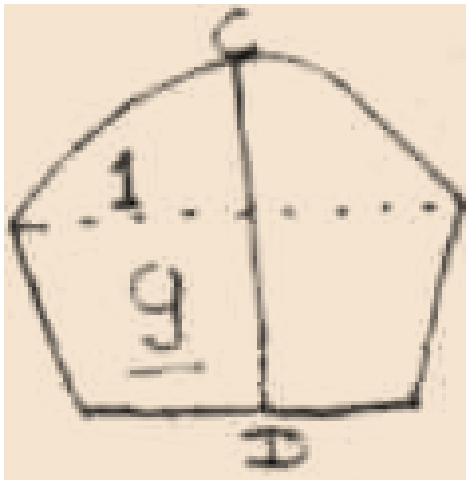
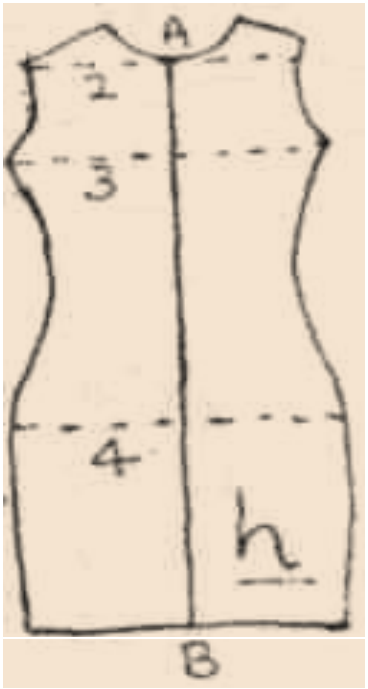


Fig.9.7e



Lengthwise yarns are stronger and as such, garments cut on a lengthwise grain will be more durable and hang better. Any pleats or ruffles will fall in graceful folds when these folds follow lengthwise yarns. In order to achieve proper movement, the additional stretch of the crosswire grain is needed.

There is an exception to the rule mentioned above and that regards yokes. These are usually cut on the crosswise grain with both the centre front and back parallel to the crosswise grain. In some cases, in order to achieve design interest, yokes are cut on bias. To produce a chevron effect, it is possible to cut the front and back of the garment on true bias with striped fabrics.

Garments that are well-made have lengthwise grains running the length of the body and crosswise grains at right angles to the lengthwise grains, or parallel to the floor at the base of the neck. See Fig 9.7e, line 2, line 3 for across the bust, and line 4 across the widest part of the hip. If using an off-grain fabric for cutting, this cannot be done and the end product will be a garment that is unbalanced, ill-fitting, wrinkled, and uncomfortable to wear. Achieveing balance in dress design means ensuring that both left and right sides are identical in design, shape and grain.

When considering all of the above, it is clear then that care should be taken when buying fabrics with checks or printed stripes. You can balance the right and left sides of the design if the prints are off the grain, Fig 9.7b, by disregarding the grain. This, however, will create the issues mentioned earlier. Despite this, it is better than making the fabric grain-perfect at the cost of balance in the design. In the case of woven checks and stripes, these issues do not occur.

Once more, it is important to remember a key point mentioned earlier regarding cutting and stitching along a bias direction: always work *with* the grain and do not work *against* the grain.

Steps in Preparing the Fabric for Cutting

The following four steps are necessary in the preparation of fabric and will be expanded on a little later:

1. Check to see whether each end of the fabric is straight along a crosswise yarn. If it is not, cut it along a crosswise yarn (See Fig.9.8a). This is a process called straightening or evening the ends.
2. Check to see whether the fabric is grain perfect (whether the corners form right angles). If the fabric is off grain, straighten the grains. (See Fig.9.8b-d).
3. Shrink the fabric if it has not already been pre-shrunk by using appropriate treatments.
4. Press the fabric to remove all creases.

Checking each end of the fabric and straightening it (Fig.9.8)

Firstly, it is necessary to see if the fabric is cut or torn. With a torn fabric, the end is straight along a crosswise yarn. As such, it doesn't need straightening. To recognise a torn edge, look for small ends of lengthwise threads that are visible along its edge. See edge AB in Fig 9.8.

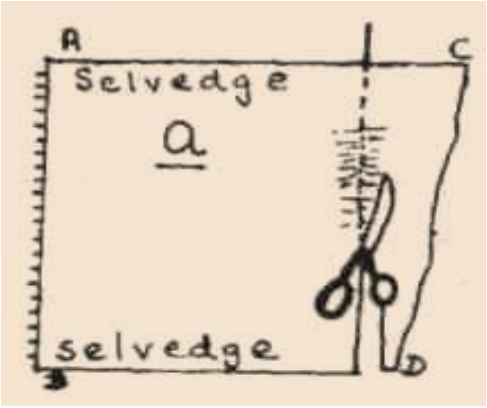
With fabrics that have cut edges, make sure they are examined to see if they are cut along crosswise yarns. If they are not, then straighten the fabric as detailed below. In Fig 9.8b, CD needs straightening as it is a cut edge.

Methods of Straightening Fabric Ends

Below is a list of how to straighten different types of fabrics.

a) Fabrics that are loosely woven or have prominent crosswise yarns – cut straight along the visible crosswise yarn.
b) Fabrics that are firmly woven – tear with a quick jerk across after clipping it into the selvedge.
c) Fabrics that fray or are sheer – clip the selvedge and pull one crosswise yarn gently so that it makes a puckered line. Carefully cut along this puckered line and try to follow it as well as you can. Take the yarn (or the next one to it) and repeat the process of pulling and cutting across the full width of the fabric. Fig 9.8a shows this.

Fig.9.8a



Checking and Straightening the Fabric Grain (Fig.9.8 b-d)

Once the ends are straightened, fold the fabric in half (lengthwise), making sure to match the selvedges precisely. Then place it onto a table (see Fig 9.8b below). Make sure the selvedges are in line with the long edge of the table and the crosswise ends are close to the short edge of the table. This way, you can clearly see if there is a proper right angle and if the fabric grain is perfect.

Fig.9.8b

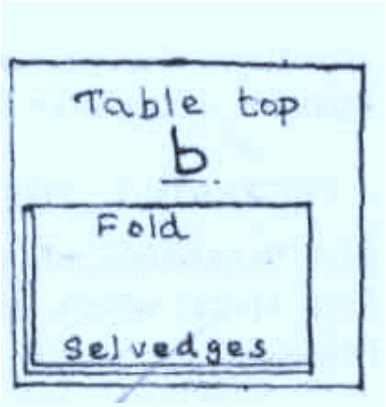


Fig 9.8c

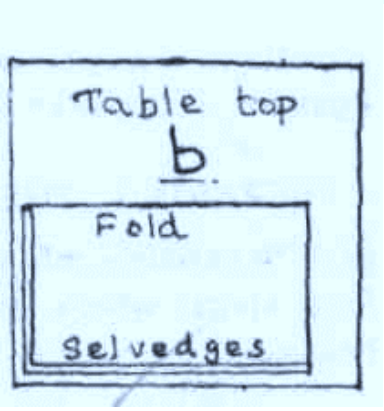


Fig.9.8d

It will be very clear if the crosswise ends are not at right angles to the selvedges because they will not be parallel to the short edge of the table. As such, this off-grain fabric will require straightening or restoration of the right angled structure. For this see Fig. 9.8 c and 9.8 d above.

Methods of Straightening Fabric Grain

The following methods are used for straightening fabric grain:

(a) **Stretching Method (Fig.9.8d):** Stretching the fabric grain is the simplest way of making it perfect. Open the fabric up on the table near the corners and pull it on the true bias and in the right

direction as shown in Fig 9.8d. Keep pulling for some time and then fold the fabric, checking for grain perfection as before. This may have to be repeated several times before the fabric is straightened.

(b) **Steam Press Method:** If the method mentioned above does not work, then clipping the selvedge at intervals, sprinkling it with some water and then using a hot iron to press it may work better. Make sure you iron in the appropriate direction, until the fabric becomes grain perfect.

(c) **Immersion Method:** One of the most effective methods is the immersion method. For this, fold the fabric lengthwise and tack the selvedges together. Place it in water until it is completely wet. Squeeze out any excess water. Hang up the fabric and wait until it is half dry. Place it near the corner of the table and begin the stretching process, in order to make it grain perfect. While doing this, place cloth or paper underneath. This will prevent the fabric getting soiled - especially from wooden tables. Once it is straightened, place it on a flat surface to dry. Once it is dry, press with an iron and remove any tacking stiches from the edges.

Shrinking Fabrics and Pressing

Cotton fabrics, in particular those with low thread counts that are not sanforised or pre-shrunk, must be shrunk before any cutting is done. In order to shrink fabrics that need it, follow the immersion method mentioned above.

Further Reading:

- ✓ ***Sew Step By Step (By Alison Smith)***
- ✓ ***Me and My Sewing Machine: A Beginner's Guide by Kate Haxell***