

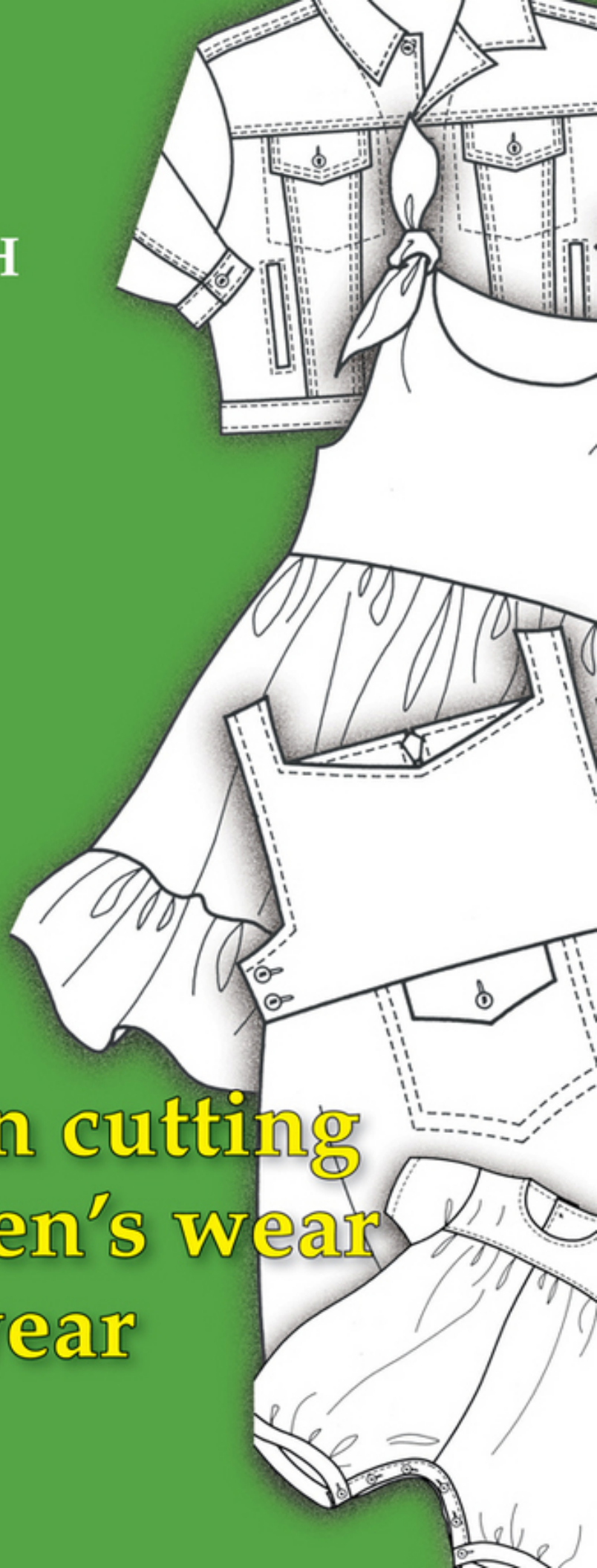
WINIFRED ALDRICH

4TH EDITION

**metric pattern cutting  
for children's wear  
and babywear**

 **WILEY**

A John Wiley & Sons, Ltd, Publication



# Metric Pattern Cutting for Children's Wear and Babywear

From birth to 14 years

Fourth edition

Winifred Aldrich



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# Introduction

## ***The fourth edition***

The first major change from the third edition is the reorganisation of the sections in the book. The popularity of easy-fitting styles and knitted fabrics has meant that basic '*flat*' *pattern cutting* is used to construct the majority of children's clothes and therefore, this type of cutting is found in most of the garments in the large retail stores. Shaped garments, cut to fit the body form, are mainly purchased for some school uniform garments or as more expensive formal garments.

The second change is the introduction of colour coding to the sections; this makes it easier to identify specific processes in the book. After Chapter One, 'The basic principles - sizing - using the blocks', the book is divided into six parts.

***Part One*** covers specific 'flat' blocks and pattern adaptation for babywear styles (birth-2 years).

***Part Two*** covers 'flat' blocks and pattern adaptation for a wide range of garments for boys and girls (1-14 years).

***Part Three*** covers the pattern cutting of the basic sleeves and collars. These are standard processes that are used in almost all types of pattern cutting adaptations.

***Part Four*** demonstrates '*form*' *pattern cutting*, this method requires blocks that conform more closely to the body form and often involves complex methods of cut and construction. This section includes basic blocks for classic formal garments used for schoolwear and styled formal garments and also chapters on methods of adapting them. The different methods of 'flat' and 'form' cutting are

explained further in 'Design and pattern cutting for children's wear'.

**Part Five** addresses the problem of providing clothing for girls with developing figures. It offers blocks for those designers who want to create ranges specifically for the early teen market.

**Part Six** covers the grading of garment patterns into different sizes (birth-14 years).

Pattern grading has to take place with reference to body growth and body size charts. Although different manufacturers and retailers offer their garment ranges in the stores in different age groupings, the grading of their garments takes place with reference to basic body size charts.

The data from the author's original survey still provides a basis for the size charts in this book. Some reorganisation of the size groupings in the size charts has been made to reflect the present marketing strategies of children's clothes and the sharp design divisions between clothes for boys and clothes for girls. The changes have not altered the sizing divisions that are based on children's growth.

Some grading increments in the main size charts have been refined. However, it has become apparent that over the last decade a proportion of children has become larger in girth with reference to their height and also the shape of children who do little exercise is also changing. Because the control measurement that directs the labelling and selling of clothes is *height*, this can be confusing for customers. This problem is addressed by the inclusion of additional 'plus' size charts for children of larger girth. The increase in overweight and obese children is also discussed in more detail on in 'Overweight and obese children'.

The book now clearly separates the sections useful to student beginners (Parts Two and Three). It also offers more advanced or specialist sections aimed at students who wish

to have a career in children's wear or for designers working in the different manufacturing sectors of the trade. There is an increasing demand for original designs that recognise the practical demands of a child's lifestyle. The blocks can be made for individual children by mothers who want to experiment with original designs or have children that are not of the standard sizes available.

The blocks and pattern adaptations could be very useful in senior schools for examinations and the section on the developing figure could be useful for project work with individual teenage students.

# Design and pattern cutting for babywear and children's wear

## ***Retailing***

Since this book was first published, an enormous difference has taken place in attitudes to the design and marketing of children's clothes. A major obvious trend in children's wear design is the separation of the sexes from an early age. This is particularly noticeable in the large retail stores.

These stores, mail order catalogues and the Internet offer a wide range of good quality well designed garments for children, but there are also many niche market collections. There are concept own label stores that offer a unique style of childhood. Although some buyers were doubtful about the trend for collections of children's clothes inspired by men's and women's ranges, with a strong fashion influence of current colours and fabrics, it is proving to be a growing market. Some of these ranges are up-market offshoots of established Designer collections. However, other ranges offer classic British designs that offer a timeless vision of childhood. Other growing markets are Fair Trade clothing and garments made from organically grown or recycled sources. These are responding to customers' concerns about the exploitation of workers in developing countries and the environment.

The most difficult market is the sub-teen group. Boys' attitudes are fairly rigid, responding to peer pressure and group demands. Particular labels become important, the fashions often starting at street level. Girls in this age group are very fashion conscious, yet their figures may not have developed sufficiently to wear adult clothes. However, there comes a point when the sub-teen or early teenager does not

want to be seen in a childrens' shop. Large or wealthy stores set up sections aimed directly at this group; the garments on offer can include ranges from the top designers. Other fashion retail outlets, which originally aimed at a 'teen twenty' market have extended their size ranges downward to fit smaller figures. This is possible because many of their garments are 'flat' cut in jersey fabric and with little body shaping.

## ***Design***

Children's wear is no longer a neglected area of design in Britain. The increasing quality of mass production garments from the Far East and developing countries has allowed designers to offer complex detailing and cut on low-cost garments. The use of new technological communications has reduced response times and increased the practicality of manufacturing offshore. Children's wear offers special opportunities for design to be creative yet functional by using colours, prints, shapes, trimmings and textures with imagination. Garment designers often work directly with textile designers to produce new exciting prints.

The designer must understand the requirements and the lifestyle of babies and children at different ages. Designing garments for young babies is complex with the special considerations of fabric choice, ease allowances, and garment openings that allow for the minimum handling of the baby. Most babywear ranges are available up to 92cm height (age two years). Toddlers still require extra ease allowances for nappies; however many ranges from children's wear are available as small as 80cm height (age one year). The pattern adaptations in this book allow for this overlap in sizing.

Whilst many children spend hours indoors with computer games, it is ironic that sportswear has been such a huge

influence on children's design; it has directed many new fabric developments, and changed methods of cut and manufacture. But designs based on sport and leisurewear are also ideal for most children's activities in terms of comfort and practicality.

The designer is responsible for providing information to those who source materials and manufacture garments. The British Standard *BS 7907: 2007, Code of practice for the design and manufacture of children's clothing to promote mechanical safety*, states precisely the areas for which the designer is responsible. It covers the materials of the garments and all the trimmings, fastenings and other components. It also states the ages below which certain components cannot be used. Wear and fit trials undertaken by manufacturers and retailers usually also include risk assessment. A child's everyday garment has to be made up in a fabric that will stand up to punishing wear and repeated launderings. Some manufacturers are using new technological fabrics such as those that have 'breathing' properties or UV protection.

Any student wishing to design clothes for children must be aware of the changing shape of the growing child and the different proportions of different parts of the body. The proportions and lengths of children's garments are crucial. Students should experiment with shapes that are innovative yet practical, and also allow for the child's growth.

The size charts in this book are constructed and divided in response to the needs of designers and pattern cutters working for the large retailers and mail order companies who have the largest share of the children's wear market and dictate the size range groupings. The ranges and size charts are discussed in detail in Chapter 1.



# ***‘Flat’ pattern cutting: Parts One and Two***

The number of garments cut from simple ‘flat’ blocks now covers the majority of garments sold in the main retail outlets. This dramatic increase has taken place for three main reasons: the popularity of easyfitting styles and sportswear, the increase in the use of knitted fabrics and the use of manufacturing methods that keep price levels low. Methods of computer grading encourage the re-application of existing grades, and this is easier when applying them to simple styles. The insertion of sleeve heads is faster when machined on ‘the flat’ with little ease in the sleeve head. Most garments constructed by simple flat cutting and manufacture lay flat when completed and therefore are easier to store, transport and package.

The attraction of these garments depends heavily on fabric design, simple but innovative shapes and decorative features. The flat blocks are used for a wide range of garments, i.e. dresses, shirts, blouses, most types of leisurewear, overgarments, knitwear, nightwear, and almost all types of babywear. ‘Flat’ pattern cutting processes for these garments are demonstrated in Chapters 2–8.

The simplicity of ‘flat’ pattern cutting means that it is a method that allows students, beginning pattern cutting courses, to combine colour, pattern and shape in an uncomplicated yet experimental way.

Some basic pattern cutting processes are applicable to both ‘flat’ pattern cutting and to classic ‘form’ cutting. These basic methods are located in Part Three, Chapters 9 and 10.

**Special note** The changing body shape of many sedentary children means that there are wide variations in waist measurements (‘Overweight and obese children’). Many

children's designs avoid fitted waistlines using stretch jersey fabrics, and elasticated or adjustable waistbands.

## ***Classic 'form' pattern cutting: Part Four***

There remains a demand for school uniforms and also a small but steady demand for more formal clothes and well cut high quality garments that refer directly to the child's shape.

Classic 'form' pattern cutting is used for garments which have a close relationship with the body shape and which is achieved by pattern cutting. This is required mainly when working with fabrics without stretch characteristics, for cutting garments for traditional masculine and feminine clothes or for ranges that are influenced by more adult fashion styles.

'Form' cutting entails more complex methods of sizing and pattern construction and therefore is suitable for more advanced students who may wish to specialise in this type of children's wear.

# The growth of children and adolescents

Designers of children's clothes should be aware of the way that a child's body shape changes as it grows and to recognise the shape of a child at a particular stage. Well-designed children's clothes take account of the child's continually changing shape.

In the first two editions of this book the size charts were constructed and divided in the way a child's body develops and changes. Today, clothes are designed and sold as ranges for particular target groups dictated by the large retailers. The revised size charts in the third, and this fourth edition, have been divided to enable pattern cutters to cut clothes for these ranges. However, by creating subdivisions, the size charts still reflect the uneven body shape changes that occur during children's growth.

The problem of overweight and obese children has had to be considered when updating this edition. It is useful to understand how it may affect the size and shape of approximately 25% of children, and therefore the problem is discussed in 'Overweight and Obese Children'. However, the following descriptions of the basic features of growth are relevant to the majority of children.

## ***Basic features of growth***

The rapid growth and changing shape of the child from birth to age one means that close increments in sizing have to be made; this is done usually in three-month intervals. It is at this stage that weight and the age of the child are the predominant descriptions for garment selection, whereas

height becomes the critical sizing division once a child begins to walk.

The speed at which a child grows decreases steadily from shortly after birth onwards until puberty when the rate of growth accelerates (this acceleration is known as the 'adolescent growth spurt'). Until this growth spurt occurs, there appears to be little difference between boys and girls in the speed at which they grow. There is a short-lived mid-growth spurt at about 7-8 years but this is often not detectable.

The decrease in the rate of growth varies from approximately 8cm per year at three years to 5cm per year at ten years. Manufacturers have decided to accept a 6cm height interval as a base for a coding scheme, as this approximates to the average growth per year over this period. However, it must be noted that the range of heights in children in any particular age group is larger than the amount of growth that occurs in any one year, therefore a child's age is only a very crude guide or 'designation' of his/her expected stature. It is better to link other body measurements to height rather than age, and one must recognise that age on clothing labels is only a secondary description. During puberty, age ceases to have even a descriptive value as variations in height linked to heredity are further distorted by the variability of the onset of puberty and the growth spurt.

In early childhood there is little difference between the sexes. Small differences begin to appear at four, but significant differences begin to appear at about seven. This means that it is advisable to offer a size chart for each sex from the age of four but necessary by seven. Puberty brings dramatic differences between boys and girls, the onset of puberty occurring eighteen months to two years earlier in the girl.

Children of the same height can have variable arm and leg measurements and these differences become more apparent as the limb length increases. Children in the North of England, Scotland and Northern Ireland have been found to be slightly smaller than average. This may be due in part to the greater numbers of working-class children in these areas. Significant differences can be found between children of classes I and II (managerial and professional occupations) and classes IV and V (semi-skilled and unskilled occupations). Children from classes I and II appear to be taller (2–5cm) but not necessarily heavier than classes IV and V.

## ***Children from birth to age seven***

The most apparent characteristic of a small child's shape is its head size: by the age of three the child's head has almost completed its growth. A small child has a head one fifth of its height, while the adult's head is only one eighth. The head size of a child must be taken into account when designing bodice openings for the head to pass through. From the age of two, the average child loses fat until about the age of eight. This 'slimming down' process is apparent and is generally spoken of as the child 'losing his baby fat'.

Boys are often a little thinner than girls at this stage, but as the differences in measurements are small, a common size chart can be used. The most significant difference occurs on the hip/seat measurement and some manufacturers of boys' wear take account of this.

Toddlers have very little waist shaping and their stance gives them a hollow back and protruding stomach. These features decrease as the child grows and loses fat.

## ***Children from age seven to puberty***

By the age of seven the posture of the child has straightened. From seven years to puberty the average child has a greater relative increase in body girth to height. Despite this increase, a girl's waist develops more shape. Girls who do little exercise, even if not overweight, will still retain abdominal fat and have less shape. At this period the legs of children of both sexes grow faster than the trunk.

Although the speed at which a boy and a girl grows is similar until puberty, the average girl is slightly shorter than the average boy and slightly heavier. During this period, figure differences become more apparent, the most significant being the wider shoulders of the boy and the smaller waist and larger hips of the girl (the latter features are increasingly apparent as the girl enters puberty earlier than the boy).

## ***Boys and puberty***

The average boy starts his growth spurt at about the age of thirteen and grows rapidly until the age of fifteen, then more slowly until he is seventeen. However, as the timing of the spurt varies, height and age have little correlation at this time. Age therefore has little relevance on size charts at this stage. Boys often become thinner during this growth spurt but they begin to gain muscle.

Before puberty, leg length grows faster than trunk length, but during the period of peak growth the trunk grows faster than the limbs, the rate of growth of the shoulders is at a maximum and the rate of growth of the head accelerates slightly. Boys have two more years of growth than girls and therefore attain a greater final height.

## ***Girls and puberty***

Girls begin to grow quickly at about the age of eleven or twelve; however, their growth spurt is shorter in duration than that of boys and proceeds at a slower rate. Because girls enter puberty earlier, a proportion of eleven to thirteen-year-old girls is taller than boys of the same age. Girls continue to get fatter during their growth spurt, but this is in the trunk rather than the limbs and a girl's hip size shows a particular increase.

The bust development of a girl is the most dramatic change in her shape. The early stages of development result in little bust prominence and it is only when the bust begins to develop a structural shape that a girl will require to have blocks which have bust darts. The age at which these different development stages of maturity are reached can differ widely; children between ten and fourteen of similar height and weight can have very different bust measurements. Girls with developing figures require a specific size chart and block construction as children's blocks are inadequate and women's blocks too mature. At this stage in a girl's development the relationship between height and age is now too variable to be recorded as yearly increments.

## ***Overweight and obese children***

Obesity and overweight is usually measured by BMI (body mass index,  $\text{weight kg} \div \text{height m}^2$ ). Although not a perfect measure, it is seen as the best single method of assessing these features over extensive populations. It was used by The Health Survey of England in 2002 which published some important statistics on children's weight and height from 1995-2002. The following findings would seem to be relevant to clothing producers.

- 1.** The height of children remained stable.

**2.** 21.8% of boys and 27.5% of girls were overweight or obese.

**3.** The number of boys who were obese rose from 2.9% to 5.7%, and girls from 4.9% to 7.8%.

**4.** This study and many others (see the bibliography) have shown that there has been a particular increase in abdominal fat, and this had not been confined to overweight and obese children.

**5.** The main variables that appeared to affect the current figure changes of children were: a sedentary lifestyle, nutrition, social class, ethnicity and parental BMI status.

Later studies appear to show that the trend towards overweight and obesity has continued from 2002. However, there is now a focus on this problem, and government health and education initiatives may begin to reduce this trend.

Exporters should note that the increased prevalence of childhood overweight and obesity is also occurring in most developed countries.

### *Waist circumferences*

Some research into overweight and obesity focuses on the waist circumference. Sizing surveys developed for the clothing industry should use the same measuring position and method as that used in health studies, the measurement is taken 'at the end of normal expiration'.

The sizing survey done for the BSI 7231:1990 took the waist measurement with the subject standing 'erect' with no instruction to breathe out (a position which relaxes the body shape). The simple erect position will result in a smaller waist measurement. The later Standard BS EN 13402:2000 directs that the measurement be taken 'with the abdomen relaxed'.

A consistent method of measuring the waist circumference in both health and clothing surveys would be helpful. This



could mean that body measurements taken by 3D computer surface imagery may need a second image with the subject in a relaxed 'breath expiration' position for the waist circumference.

# Tools and equipment for making patterns

A student should aim to acquire a good set of equipment. However, some items are very expensive. The items marked with an asterisk denote those that are not essential immediately.

*Working surface* A flat working surface is required. However, a tracing wheel will mark any polished or laminated top, therefore some protection must be given to this type of surface.

*Paper* Strong brown paper or white pattern paper is used for patterns. Parchment or thin card should be used for blocks that are used frequently.

*Pencils* Use hard pencils for drafting patterns (2H). Coloured pencils are useful for outlining complicated areas.

*Fibre pens* These are required for writing clear instructions on patterns.

*Rubber*

*Metric ruler and metre stick*

*Curved rules* These are used for drawing long curves.

*Metric tape measure*

*Set square* A large set square with a 45° angle is very useful; metric grading squares can be obtained.

*Compass* The compass is used for constructing patterns which are based on a circle.

*Tracing wheel*

*Shears* Use separate shears for cutting cloth and paper as cutting paper will blunt the blades.

*Sellotape*

*Pins*

*One-quarter and one-fifth scale squares* These are essential for students to record pattern blocks and adaptations in their notebooks.

*Stanley knife*

*Tailor's chalk* This is used for marking out the final pattern onto the cloth and for marking alterations on the garment when it is being fitted.

*Toile fabrics* Calico is used for making toiles for designs in woven fabrics. Make sure the weight of the calico is as close to the weight of the cloth as possible. Knitted fabric must be used for making toiles for designs in jersey fabrics; the toile fabric should have the same stretch quality.

*Calculator* The calculator is now a common tool in all areas of skill as it eliminates the hard work of calculating proportions and it is accurate. If a calculator is not available use the table of aliquot parts in 'Appendix'.

*\*French curves* Plastic shapes and curves are available in a range of sizes and they are useful for drawing good curves. A flexicurve which allows a shape to be manipulated is also available.

*\*Pattern notcher* This is a tool which marks balance points by snipping out a section of pattern paper.

*\*Pattern punch*

*\*Pattern hooks*

*Pattern weights* These keep pieces of pattern in position on the paper or cloth.

*\*Model stands* Although not essential for a beginner, they are invaluable to the serious student for developing designs.

*\*Computer equipment* Computer systems for cutting and grading patterns.

The equipment above can be obtained from:

*R. D. Franks Ltd, 5 Winsley Street, London*

*W1W 8HG. Tel: 020 7636 1244;*

*e-mail: [info@rdfranks.co.uk](mailto:info@rdfranks.co.uk)*

*Morplan, 58 Great Tichfield Street, London*

*W1W 7DF. Tel: 020 7636 1887;*

*e-mail: [web.support@morplan.com](mailto:web.support@morplan.com)*

*Eastman Staples Ltd, 131 Lockwood Road, Huddersfield*

*HD1 3QW. Tel: 01484 888 888;*

*e-mail: [enquiries@eastman.co.uk](mailto:enquiries@eastman.co.uk)*