KNQF LEVEL 4 · TVET CDACC CYCLE 3

Fashion Design

Level 4

A Practical Study Guide for Kenyan Trainees

Skirts · Trousers · Shorts · Blouses · Dresses · Tie and dye · Batik · Printing



Realistic pictures **Step-by-step tasks** **Mock assessments**

For trainees, RPL candidates, trainers, dressmakers, tailors and dyers

Alphonce Kimutai Kirui

Aligned to the TVET CDACC Competency-Based Modular Curriculum, Fashion Design KNQF Level 4

Fashion Design Level 4

A Practical Study Guide for Kenyan Trainees

Styled Garments Production · Decorated Fabrics Production (Tie and Dye and Printing) · Industry Training
Kenya National Qualifications Framework (KNQF) Level 4

Alphonce Kimutai Kirui

Fashion Design Level 4: A Practical Study Guide for Kenyan Trainees
First edition, November 2026

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About the curriculum

This book follows the topics and units of the TVET CDACC Competency-Based Modular Curriculum and Occupational Standard for Fashion Design, KNQF Level 4 (Cycle 3, greened edition), and the assessment documents for the Level 4 units. It covers the two Level 4 units (Module II): Styled Garments Production (FAS/CU/FD/CR/01/4/MB, 300 hours) and Decorated Fabrics Production (Tie and Dye and Printing) (FAS/CU/FD/CR/02/4/MB, 120 hours), together with the industry training. The Level 3 units of the qualification (Module I: Sewing Machine Operations, Basic Ladies' Garments Construction and Basic Gents' Garments Construction) are covered in the companion book, *Fashion Design Level 3: A Practical Study Guide for Kenyan Trainees*, by the same author. Unit titles and codes are used for reference only.

This is an independent study guide. It is not published or endorsed by TVET CDACC, TVETA or the Ministry of Education. Always follow the current official curriculum and your trainer's guidance.

Safety and accuracy notice

Garment and textile workshops can injure. Industrial machines run fast enough to drive a needle through a finger; overlock knives, shears and rotary cutters cut; steam irons and boilers burn; damaged cables and wet floors near basins cause shocks and falls. The dye and print room adds its own dangers: caustic soda burns skin and eyes and must always be added slowly to cold water, never water onto caustic; damp sodium hydrosulphite can heat up and catch fire; bleach gives off a poisonous gas when mixed with acids, vinegar or ammonia; dye powders must not be breathed in; hot wax catches fire if it smokes; LPG burners and cylinders leak and burn; and full basins of wet fabric are heavy. The methods in this book are for training under the supervision of a qualified trainer, always with the correct personal protective equipment for the task: dust coat or apron, closed flat shoes and hair tied back at the machines, and chemical-resistant gloves, splash goggles, a waterproof apron and a dust mask in the dye room. Never use dye sufurias, spoons or jugs for food, never eat in the dye room, and never pour dye effluent into a drain, river or the soil. Values given as "typical" or "example" (measurements, pattern amounts, quantities, recipes, times and prices) are general guidance only: always follow the client's measurements, the maker's instructions for the machine, dye, ink or emulsion, and your trainer. Follow the current Kenyan laws and rules, including the Occupational Safety and Health Act 2007, the Environmental Management and Co-ordination Act 1999 and its regulations (including the Water Quality Regulations 2024), the Sustainable Waste Management Act 2022 and the Extended Producer Responsibility Regulations 2024, the Public Health Act and your county's laws. Prices are approximate (2026) and vary by town.

Names of people, businesses, schools, groups and places of work used in examples are made up for teaching. Machines, dyes, inks, emulsions and fabrics are described by type, not by brand.

Illustrations and photographs

The illustrations in this book were drawn for it. They are realistic teaching illustrations and are not to scale unless dimensions are given. Pattern drafts are drawn to the stated measurements, but always draft to your own client's measurements. Charts marked "typical" or "example" show typical shapes and values, not measured data. Photographs come from Wikimedia Commons under free licences (CC BY or CC BY-SA); some have been resized or cropped. Each photograph is credited under the picture, and the full list of credits is at the back of the book.

How this book was made

Automated tools, including AI writing and drawing assistants, were used under the author's direction to help draft the text, draw the illustrations, pattern drafts and charts, and check calculations, cross-references and layout. The content was checked against the curriculum documents and against published sources such as Kenya Standards and draft standards, makers' data and Kenyan law, and the author is responsible for it. If you find a mistake, please report it through alphoncekirui.com so that it can be corrected in the next edition.

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Preface

Walk down any busy street near a Kenyan market and you will find the work this book is about. A dressmaker pins the hem of a flounced kitenge skirt on a client at the mirror. A cutter lays tetron for sixty school skirts so that hardly a palm-sized piece is wasted. A tailor fits a pair of pleated trousers for a church elder and a bridesmaid's satin princess-line dress for a December wedding. Behind the shop, a women's group lifts vat-blue cloth out of the dye bath and watches it turn from yellow-green to deep blue in the air, while another member pulls a squeegee across a screen to print "MADE IN KENYA" on a row of tote bags. Schools, churches, wedding parties, tour companies, boutiques and county trade fairs all need people who can turn a client's idea into a styled garment that fits, and plain cloth into decorated fabric that sells. That is the Level 4 fashion designer.

This guide covers the new units of the Fashion Design KNQF Level 4 course (Module II): Styled Garments Production and Decorated Fabrics Production (Tie and Dye and Printing), together with the industry training and the assessments that lead to your certificates. The Level 3 units of the qualification (Module I: Sewing Machine Operations, Basic Ladies' Garments Construction and Basic Gents' Garments Construction) are not repeated here. They are covered in the companion book, *Fashion Design Level 3: A Practical Study Guide for Kenyan Trainees*, which this book calls "the Level 3 guide". Where a Level 4 job uses a Level 3 skill, such as taking measurements, drafting a basic block, setting in a zip or a sleeve, or pressing and packaging a finished garment, this book gives a short reminder and points you to the right chapter of the Level 3 guide.

The book is written for trainees in vocational training centres and technical colleges, for candidates seeking recognition of prior learning, for trainers, and for working dressmakers, tailors, fundi wa nguo and tie-and-dye and printing groups who want their skills recognised. Everything is explained in plain English, with realistic drawings of garments, workshops and dye rooms, pattern drafts drawn to real measurements, worked calculations using Kenyan fabrics, prices and conditions, practical tasks with record tables, and checklists matched to the way you will be assessed.

Above all, work safely and waste little. Machines, irons, caustic soda, hydrosulphite, bleach, hot wax and LPG all hurt people who are careless with them. Learn the safety rules in Chapter 2 before you sit at a machine or open a tin of dye, and keep to them on every job. Plan every lay for the least waste, turn offcuts into pockets, belts and bags, reuse dye baths and rinse water, and never pour effluent into a drain or burn textile waste. A Level 4 designer who wastes less earns more.

Alphonce Kimutai Kirui
Bomet, November 2026

How to use this book

This book follows the Level 4 part of the Fashion Design course from start to finish. It covers the two Level 4 core units and the industry training, in the same order as your training. You can read it cover to cover, or study one unit at a time if you are taking a part qualification. Topics that both units or all five garments share are taught once in Part 1: safety, PPE and green practice (Chapter 2), design interpretation, the specification sheet, pattern instructions and the six pattern-manipulation methods (Chapter 3), and fabrics, accessories, sustainable lays, marker efficiency and costing (Chapter 4 — the costing method the whole book uses). Within the units, transferring pattern marks is taught in depth in Chapter 7, finishing, quality control and display of all five garments in Chapter 10, dye classes and colour in Chapter 11 and dye-bath recipes in Chapter 12; later chapters refer back to them. Level 3 topics are summarised and referred to the Level 3 guide.

The course at a glance

Part	What it covers	Training time
1. Getting started, safety, design, patterns and costing	The Level 4 fashion designer and the course, assessment, workshop and dye-room safety, PPE and green practice, design interpretation, specification sheets, pattern instructions and manipulation, fabrics, accessories, lays, marker efficiency and costing	Used throughout (about 44 hours of the two units)
2. Styled garments production	Unit 1 (FAS/CU/FD/CR/01/4/MB): styled skirts, trousers, shorts (with transferring pattern marks), blouses and dresses, then finishing, quality control, display and housekeeping for all five	300 hours
3. Decorated fabrics production	Unit 2 (FAS/CU/FD/CR/02/4/MB): decoration planning, fabric and dye-bath preparation, tie and dye and wax resist, screen, block and stencil printing, and finishing decorated fabrics	120 hours
4. Industry training and assessment	Industry training, the mentoring tool and portfolio, a small styling, dyeing and printing business, and mock assessments for every learning outcome	320 hours (confirm the period with your institution)

The new Level 4 work is 300 + 120 = 420 hours of units (42 credits) plus 320 hours of industry training: 740 hours. The full Level 4 qualification also includes the three Level 3 units (Module I, 350 hours), covered in the Level 3 guide: 1,090 hours (109 credits) in all. The curriculum asks for at least 320 hours of industry training; the mentoring tool expects at least three months. Chapter 1 explains this in more detail.

The example jobs

A few jobs run through the book, so that each chapter builds on the last. **Neema Tailoring and Design** is a made-to-measure shop near the Eldoret municipal market, where Kiprop, a Level 4 trainee, does his industry training. **The Kapseret school order** is 60 six-gore A-line skirts, 60 blouses with a convertible collar and 60 pleated trousers, cut in a size range and made on a small production line. **The Kiprop–Atieno wedding** brings a kitenge two-piece for the bride's mother, five lined satin princess-line bridesmaids' dresses, a godet skirt, 18 m of tie-and-dye cotton and 60 screen-printed favour bags. **The Kerio Valley guides** order khaki cargo shorts and trousers. **The Tumaini Women's Group** in Iten dyes, waxes and prints calico, table runners, wraps and tote bags for a county trade fair. **The VTC fashion workshop** and its dye-and-print room are where you do the practical tasks and mock assessments.

What is in each chapter

- **What you will learn:** the chapter's goals, with the unit, learning outcome and training hours it belongs to.
- **Key words:** the trade words you need, explained simply. More are in the Glossary at the back.
- **Explanations and drawings:** each topic explained step by step, with realistic labelled illustrations, styled garments, pattern drafts, lays, dye-room and printing scenes, charts and photographs.

- **Worked examples:** dart and flounce geometry, pleat and pocket allowances, fabric quantities and marker efficiency, size ranges and production-line times, dye recipes by weight, water and energy use, and full garment and per-metre costings worked through with real numbers and Kenyan prices.
- **Practical tasks:** real workshop and dye-room jobs with the tools, materials, steps, safety points and a "Record your results" table to fill in. Do them with your trainer.
- **Check your competence:** a checklist of what an assessor will expect you to show. Tick each item when you can do it without help.
- **Practice questions:** answers, with full working for calculations, are at the back of the book.

Look out for these boxes

SAFETY FIRST

Hazards and how to stay safe. Never skip these.

GREEN TIP

Ways to cut fabric waste, reuse offcuts, dye baths and rinse water, save energy, choose greener accessories and packaging, and keep effluent out of drains and rivers.

TRAINER'S TIP

Advice from experienced trainers, dressmakers and printers to help you work faster and better.

COMMON MISTAKES

Errors trainees often make, and how to avoid them.

IN THE KENYAN WORKSHOP

How the topic looks in real Kenyan work: tailoring shops, uniform makers, wedding and church orders, markets, women's groups and trade fairs.

WORKED EXAMPLE

A calculation worked step by step with real numbers.

About the pictures and diagrams

This book uses realistic illustrations of real workshops, clients, styled garments, dye rooms and printing tables, together with pattern drafts, lays, flow charts, charts and photographs. Labels and thin leader lines point to the parts that matter. On pattern drafts, construction lines and the block are thin grey, the new style lines bold, slash lines red dashed, added (spread) paper pale blue, cutting lines solid, stitching lines red dashed, fold lines blue dash-dot and the straight grain a green arrow; fabric is soft rose on the right side and cream on the wrong side, as in the Level 3 guide. Measurements are in centimetres unless marked. Red marks a danger, fault or mistake; green marks the correct way or a green choice. Values marked "Example — follow the client's measurements and the maker's instructions" are typical, not rules. Some photographs show real workshops where people are not following every safety rule; the captions point this out. Always wear the PPE shown in Chapter 2.

PART 1

Getting Started, Safety, Design, Patterns and Costing

What a Level 4 fashion designer does beyond Level 3, how the two Level 4 units and the industry training are trained and assessed, and how this book links to the Level 3 guide. Then what both units share: safety, PPE and green practice in the sewing, pressing, dyeing and printing workshop; reading a client's design, the specification sheet, pattern instructions and the six pattern-manipulation methods; and fabrics, accessories, sustainable lays, marker efficiency and the costing method the whole book uses.

Chapter 1: Moving Up to Level 4: The Fashion Designer Who Styles and Decorates
Chapter 2: Safety, Health and Green Practice in the Styling, Dyeing and Printing Workshop
Chapter 3: Design Interpretation and Pattern Development: From Client Brief to Styled Pattern
Chapter 4: Fabrics, Accessories, Sustainable Lays and Costing

CHAPTER 1

Moving Up to Level 4: The Fashion Designer Who Styles and Decorates

WHAT YOU WILL LEARN

- Describe what a Level 4 fashion designer does beyond Level 3: styled patterns, styled garments, bulk orders and decorated fabric.
- Find your way round the two Level 4 units, their codes, hours and credits, and the industry training.
- Explain what the greened curriculum asks of you in the tailoring shop and in the dye room.
- Work out a unit score, read your rating, and see where the marks are.
- Describe the Kenyan market for styled garments and decorated fabric, and the careers it opens.
- Behave professionally with clients, schools, groups and employers, and use this book well.

Course overview · Units FAS/CU/FD/CR/01/4/MB and FAS/CU/FD/CR/02/4/MB and industry training

At Level 3 you learned to make a simple skirt, blouse, dress, shirt, shorts and trousers from basic blocks. Level 4 asks for more. A client brings a photo of a flounced kitenge skirt, a school orders sixty uniforms, a women's group wants tie-dyed cloth for a trade fair. You must turn each request into a styled pattern or a decorated fabric, make it well, and deliver it on time. This chapter shows you the course, the marks and the market.

Key words

Styled garment
A garment changed from the basic block by style lines, fullness or details: a flounce, a godet, pleats, a yoke, a new collar.

Pattern manipulation
Changing a block into a styled pattern by moving darts, slashing and spreading, or adding pleats, panels and flare.

Specification sheet
The written plan of a garment: sketches, measurements, fabric, notions, allowances and construction notes.

Marker
The planned layout of all pattern pieces on the fabric before cutting.

Marker efficiency
The share of the fabric that ends up in the garment pieces, as a percentage.

Decorated fabric
Cloth coloured or patterned by tie and dye, wax resist (batik) or screen, block and stencil printing.

Effluent
Used dye baths, rinse water and printing wash-water that must be treated, never poured away.

Performance criterion (PC)
One task the assessor checks, such as "pattern developed and laid".

PC weighting
The tool that gives each performance criterion its share of the 500 marks in a unit.

Industry training
Supervised work in a real fashion business, recorded with the mentoring tool.

1.1 What a Level 4 Fashion Designer Does

Picture Neema Tailoring and Design, a made-to-measure shop near the Eldoret municipal market (Figure 1.1). Neema Jeruto, the owner, holds a Level 4 certificate. In one morning she fits a bride's mother, checks a cutting ticket for school skirts, prices a cargo-shorts order for a tour company and plans a dyeing day with a women's group. Kiprop, a Level 4 trainee on industry training, cuts six-gore skirts from a marker he planned himself. A machinist sews; a steam iron waits on its rest; tie-dyed cloth dries in the shade of the back yard. That is Level 4 work: **styling** and **decorating**, with the planning and supervision that go with them.

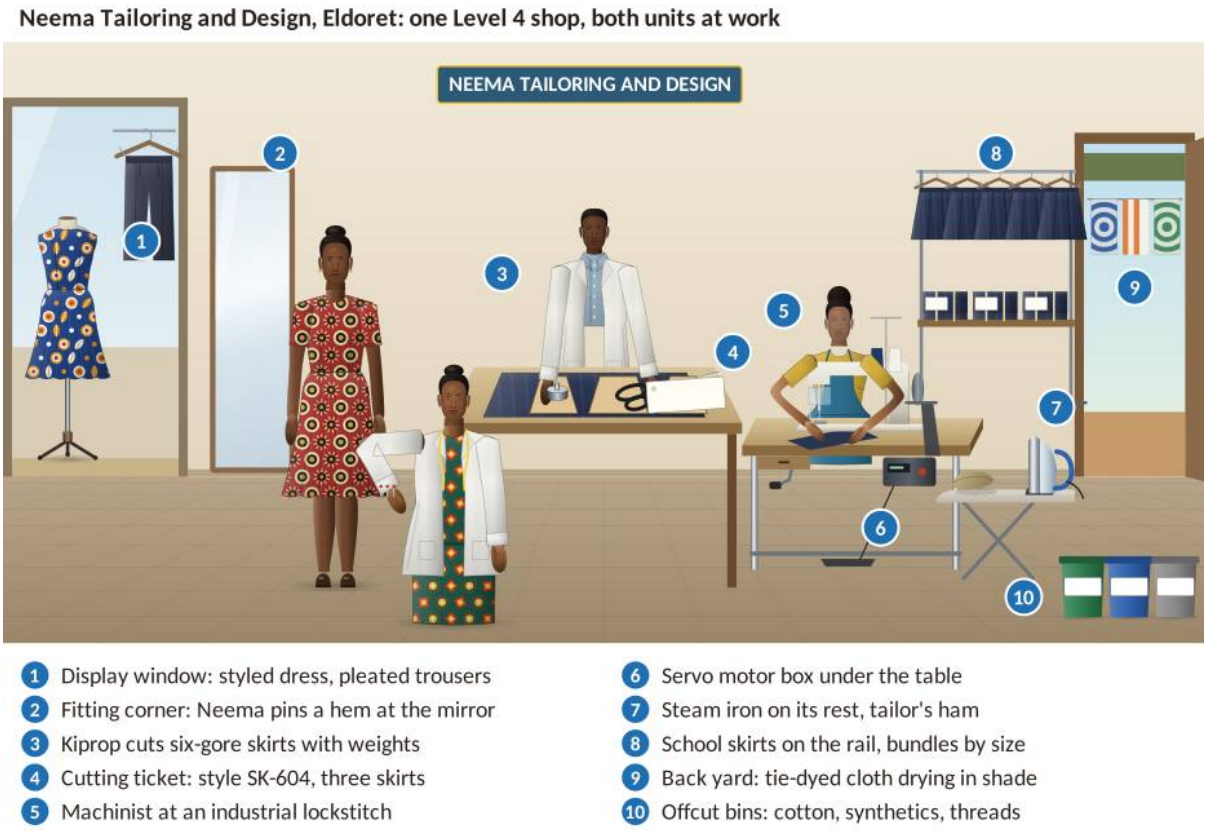


Figure 1.1 Neema Tailoring and Design in Eldoret, the book's example shop: styled garments are fitted, cut, sewn, pressed and displayed while decorated cloth dries in the shade outside.

Table 1.1 sets the two levels side by side. Level 4 does not throw away Level 3 skills; it builds on every one of them.

Table 1.1 From Level 3 to Level 4

Area	Level 3 (the Level 3 guide)	Level 4 (this book)
Patterns	Draft basic skirt, bodice, sleeve, shirt and trouser blocks	Manipulate the blocks into styled patterns with every pattern instruction
Garments	Simple skirt, blouse, dress, shirt, shorts, trousers	A-line, flounced, panel and godet skirts; pleated, cargo, flared and fitted trousers; styled shorts, blouses and dresses
Cutting	Economical lay for one garment	Markers for several sizes, marker efficiency, zero-waste cutting, drilled marks
Orders	One client, one garment	Wedding parties, school and tour-company orders with size ranges and bundles
Fabric	Buy and use it	Decorate it: tie and dye, wax resist, screen, block and stencil printing
People	Work under a fundi	Guide a machinist or juniors, train a group, deal with schools

1.2 Where This Book Fits

The Fashion Design Level 4 course has two modules. **Module I** is the three Level 3 units (Sewing Machine Operations, Basic Ladies' Garments Construction and Basic Gents' Garments Construction, 350 hours). They are taught in the companion book, the Level 3 guide. **Module II** holds the two new Level 4 units, and this book covers only them and the Level 4 industry training:

- **Styled Garments Production**, FAS/CU/FD/CR/01/4/MB: 300 hours, 30 credits, five learning outcomes of 60 hours each (skirt, trouser, short, blouse, dress).
- **Decorated Fabrics Production (Tie and Dye and Printing)**, FAS/CU/FD/CR/02/4/MB: 120 hours, 12 credits; learning outcomes of 30 hours (planning), 70 hours (decoration) and 20 hours (finishing).
- **Industry training**: 320 hours, 32 credits.

The occupational standard prints the same units with OS instead of CU, and the PC weighting tool you may be given uses the earlier .../MA version codes; they refer to the same units. After this chapter the book simply says "Styled Garments" and "Decorated Fabrics".

Figure 1.2 shows the whole course: 350 + 420 + 320 = 1,090 hours, 109 credits. The new Level 4 work is 420 + 320 = 740 hours. The curriculum asks for at least 320 hours of industry training; the mentoring tool expects at least three months, two-thirds of it in the fashion industry. Your institution confirms the period.

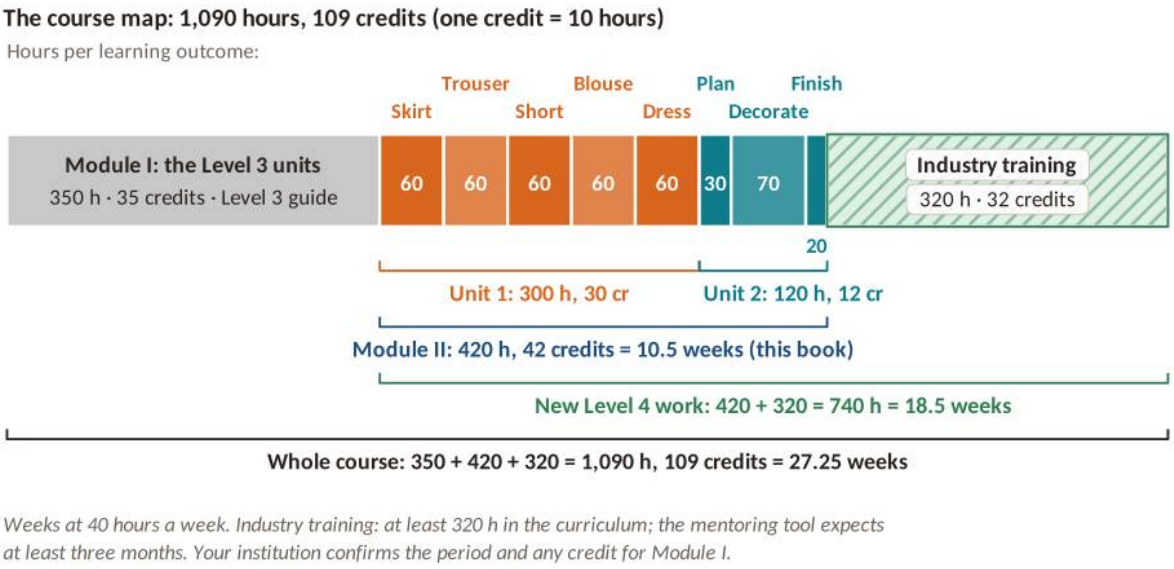


Figure 1.2 The course map in hours. This book covers Module II and the industry training: 740 of the 1,090 hours.

Entry. You may join with KCSE, or with a Fashion Design Level 3 certificate or an equivalent that TVETA accepts. If you hold Level 3, ask your institution about credit for Module I. If you are a KCSE leaver, study the Level 3 guide alongside this one: every Level 4 job assumes you can measure, draft a block, sew a zip and set a sleeve. Your trainer holds at least a Craft (Level 5) certificate in fashion design and is registered with TVETA. Assessors are TVETA-licensed trainers or industry experts registered with TVET CDACC.

Awards. TVET CDACC issues a Certificate of Competency for each unit you pass, a Statement of Attainment for a certifiable element, and the Kenya National TVET Certificate in Fashion Design Level 4 when you complete everything. Recognition of Prior Learning (RPL) can lead to part or all of the qualification, which matters for practising fundi wa nguo (tailors and dressmakers) who already do styled work.

WORKED EXAMPLE 1.1: HOURS INTO WEEKS

A full-time trainee works about 40 hours a week. Weeks = hours ÷ hours per week.

- Module II: 420 h ÷ 40 h per week = **10.5 weeks** (Styled Garments 7.5 weeks, Decorated Fabrics 3 weeks).
- Industry training: 320 h ÷ 40 = **8 weeks**.
- All new Level 4 work: 740 h ÷ 40 = **18.5 weeks**; the whole course with Module I: 1,090 h ÷ 40 = **27.25 weeks**.

Sense-check: 10.5 + 8 = 18.5 weeks. Three months at 40 hours a week is about 520 hours, so the mentoring tool's "three months" is longer than 320 hours. That is why your institution sets the period.

1.3 The Level 4 Work in One Picture

Figure 1.3 shows the two flows you will master. In Styled Garments every garment follows the same steps: client brief, design and specification sheet, styled pattern, marker and cutting, construction and fitting, finishing and quality check, display and packing. In Decorated Fabrics you plan the decoration, prepare the fabric and dye bath, decorate it by tie and dye, wax resist or printing, then finish it: oxidise, rinse, dry in the shade, press, label, pack and store. The chapter numbers on the figure tell you where each step is taught. Chapters 2 to 4 serve all five garments; Chapter 10 finishes and displays them all.

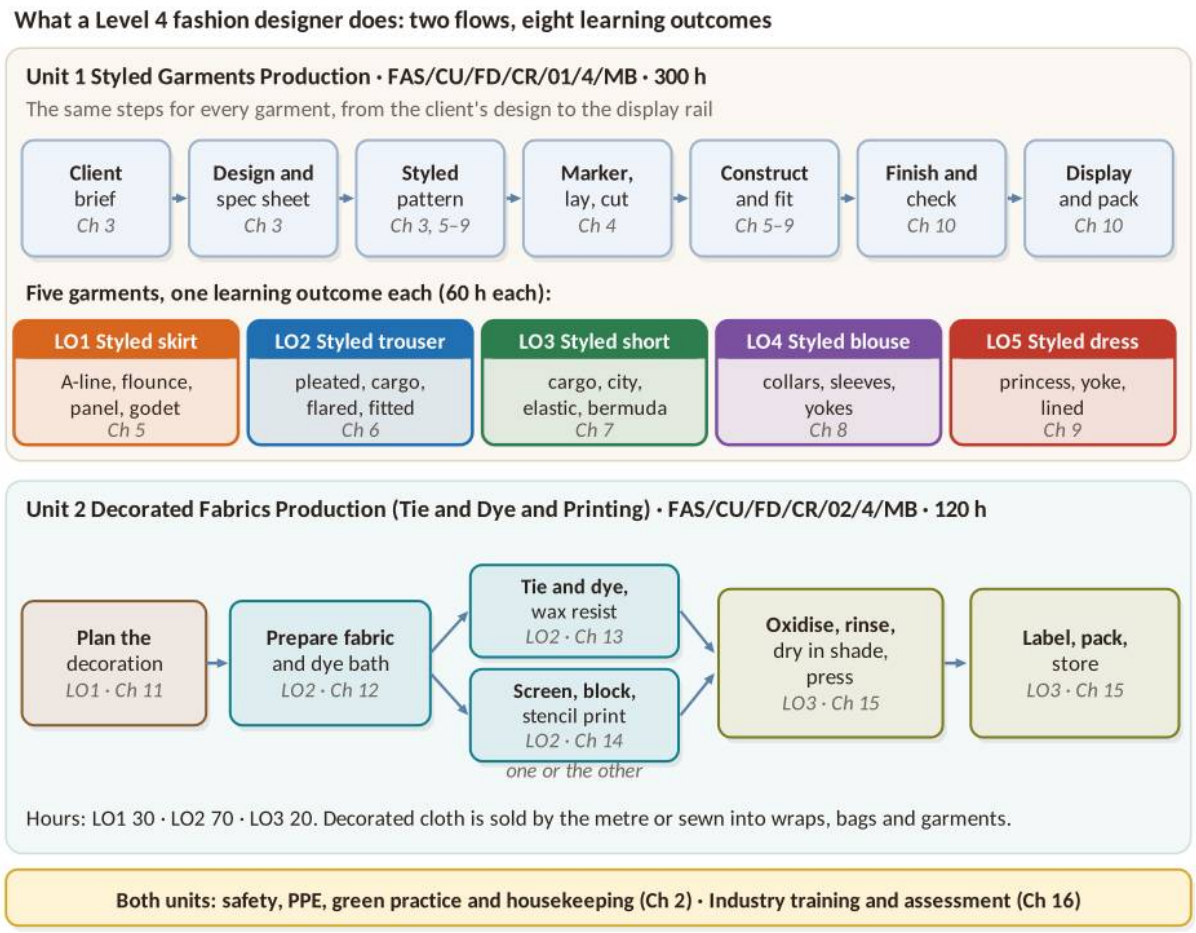


Figure 1.3 The Level 4 work as two flows. Every styled garment follows the same seven steps; decorated fabric is planned, prepared, decorated and finished. The eight learning outcomes are colour-coded with the chapters that teach them.

1.4 The Greened Curriculum

Your curriculum is "greened": every learning outcome expects you to save energy, fabric, water and chemicals and to manage waste. The Level 3 guide (Chapter 1, Section 1.8) gave the basics. At Level 4 green practice means:

- **In the shop:** servo motors that use power only when the needle moves; irons switched off between pressing batches; markers planned for efficiency and zero-waste pieces where the style allows; offcuts sorted and made into pockets, facings, belts and bags; coconut-shell, wooden or recycled buttons; fewer plastic zips and synthetic trims; machines cleaned with microfibre cloths and little water; minimal, reusable packaging.
- **In the dye room:** weighed recipes, never "a handful"; full loads; reused dye baths and last rinses; basins, not running taps; natural dyes where they suit; dye residues composted if natural or handed to a licensed handler if synthetic; effluent never poured into a drain, river or the ground.

> **GREEN TIP**
>
> Be honest about "natural". Onion-skin or tea dyes use more plant material and water than a synthetic dye and often fade faster. A synthetic dye used carefully (exact recipe, exhausted bath, reused water, treated effluent) can be the greener choice. Chapters 11, 12 and 15 show you how to judge.

1.5 How You Will Be Assessed

Your course is competency-based (CBET): you show that you can do the work to the standard and explain why (see the Level 3 guide, Chapter 1, Section 1.4). Each unit is assessed formatively during training, with at least as many formative assessments as elements (five in Styled Garments, three in Decorated Fabrics), and summatively at the end. Theory is not a separate paper: the assessor asks questions orally while you work. The rules:

- Theory : practical = **10 : 90**; formative **60%**, summative **40%**.
- You are assessed individually, in a workplace or a simulated one, with the materials, equipment, instructions and deadline of a real job.
- Evidence may be practical work, projects, a portfolio, written tests, oral questions and third-party reports.

Table 1.2 Ratings and what they mean for you

Unit score	Rating	What it means
80–100	Attained Mastery	Competent, to a high standard
65–79	Proficient	Competent, with good control of the work
50–64	Competent	Meets the standard
49 and below	Not Yet Competent	Retrain the weak elements and be reassessed
Y	Malpractice or irregularity	Result withheld or cancelled

WORKED EXAMPLE 1.2: KIPROP'S UNIT SCORE

Kiprop's Styled Garments marks: formative theory 60, practical 74; summative theory 55, practical 65 (each out of 100).

- Formative = 0.1 × 60 + 0.9 × 74 = 6.0 + 66.6 = **72.6**
- Summative = 0.1 × 55 + 0.9 × 65 = 5.5 + 58.5 = **64.0**
- Unit score = 0.6 × 72.6 + 0.4 × 64.0 = 43.56 + 25.60 = **69.2** → 65–79: **Proficient**

Sense-check: 69.2 lies between the two stage scores and nearer the formative one, which carries more weight. For Mastery (80) with the same formative score he would need 0.4 × S = 80 − 43.56, so S = 91.1 in the summative.

1.5.1 Where the marks are

The PC weighting tool marks each unit out of 500: 50 for theory and 450 for practical. Figure 1.4 shows how the marks are shared. Every garment has 60 hours, but the trouser and the short carry 300 of the 500 Styled Garments marks (60%), and the skirt only 33. In almost every garment, "garment constructed" is the heaviest criterion (62 marks for the trouser alone), with "pattern developed and laid" next. In Decorated Fabrics, carrying out the decoration (PC 2.4) is worth 176 marks, over a third of the unit. Finishing gets only 20 hours yet carries 167 marks: oxidation, rinsing, shade drying, pressing, labelling, packaging and storage are marked as seriously as the dyeing. PPE carries few marks, but you will not be assessed without it.

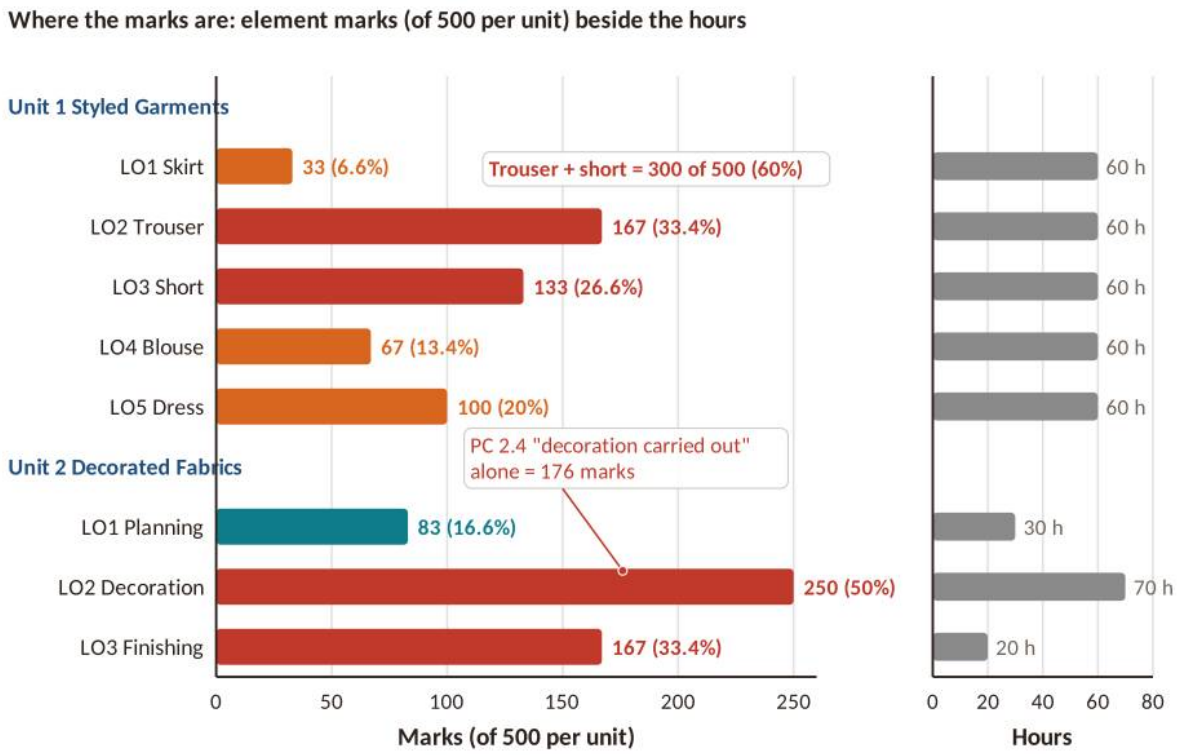


Figure 1.4 Where the marks are. Each unit is marked out of 500 by the PC weighting tool; the hours of each learning outcome are shown on the right. Equal hours do not mean equal marks.

WORKED EXAMPLE 1.3: READING A PC RECORD

Atieno's formative record in Decorated Fabrics shows 348 of 500. Percentage = marks ÷ 500 × 100 = 348 ÷ 500 × 100 = **69.6%**, the same as 348 ÷ 5. That is in the Proficient band.

A score of 49 means 245 of 500: only 5 marks short of Competent, but still Not Yet Competent. Ask your trainer which elements lost marks, practise those, and book a reassessment. Do not repeat the whole unit blindly.

COMMON MISTAKES

- Practising the skirt for weeks and the trouser for days. Follow the marks in Figure 1.4.
- Rushing the finishing of decorated fabric. Rinsing before oxidation or drying in full sun costs marks and colour.
- Treating oral questions as "only 10%". A blank answer tells the assessor you cannot explain your own work.
- Presenting a pattern or garment made by someone else. It is malpractice (Y).

1.6 The Kenyan Scene

Styled and decorated work has steady markets that cheap imports do not take (Figure 1.5):

- **Made-to-measure shops** on busy streets near town markets (Figure 1.6): office wear, church and wedding outfits, alterations, with deposits paid by mobile money.

- **Ankara and kitenge fashion**, bought as 6-yard pieces from Gikomba, Eastleigh, Nairobi CBD shops and every county-town market, sewn into two-pieces, dresses and shirts, and sold in boutiques and online.
- **School uniforms.** Parents may buy uniforms from any maker who meets the school's specification. In May 2026 a national education conference resolved to move towards one unified uniform design, so follow the school's current specification and the Ministry's latest circular.
- **Factories.** About 67,000 Kenyans, most of them women, worked in AGOA-accredited export apparel firms in EPZs in 2024 (KNBS Economic Survey 2025). Buy Kenya Build Kenya measures announced in 2024 also track the buying of locally made uniforms for the disciplined forces.
- **Decorated fabric:** women's and youth groups dyeing and printing kikoi-style wraps, table runners, tote bags and wedding cloth for markets and county trade fairs.

Mitumba is both competition and stock. Researchers estimate that about a third of imported second-hand clothing is waste. A Level 4 designer competes on fit, style and finish, and upcycles good mitumba into new garments.

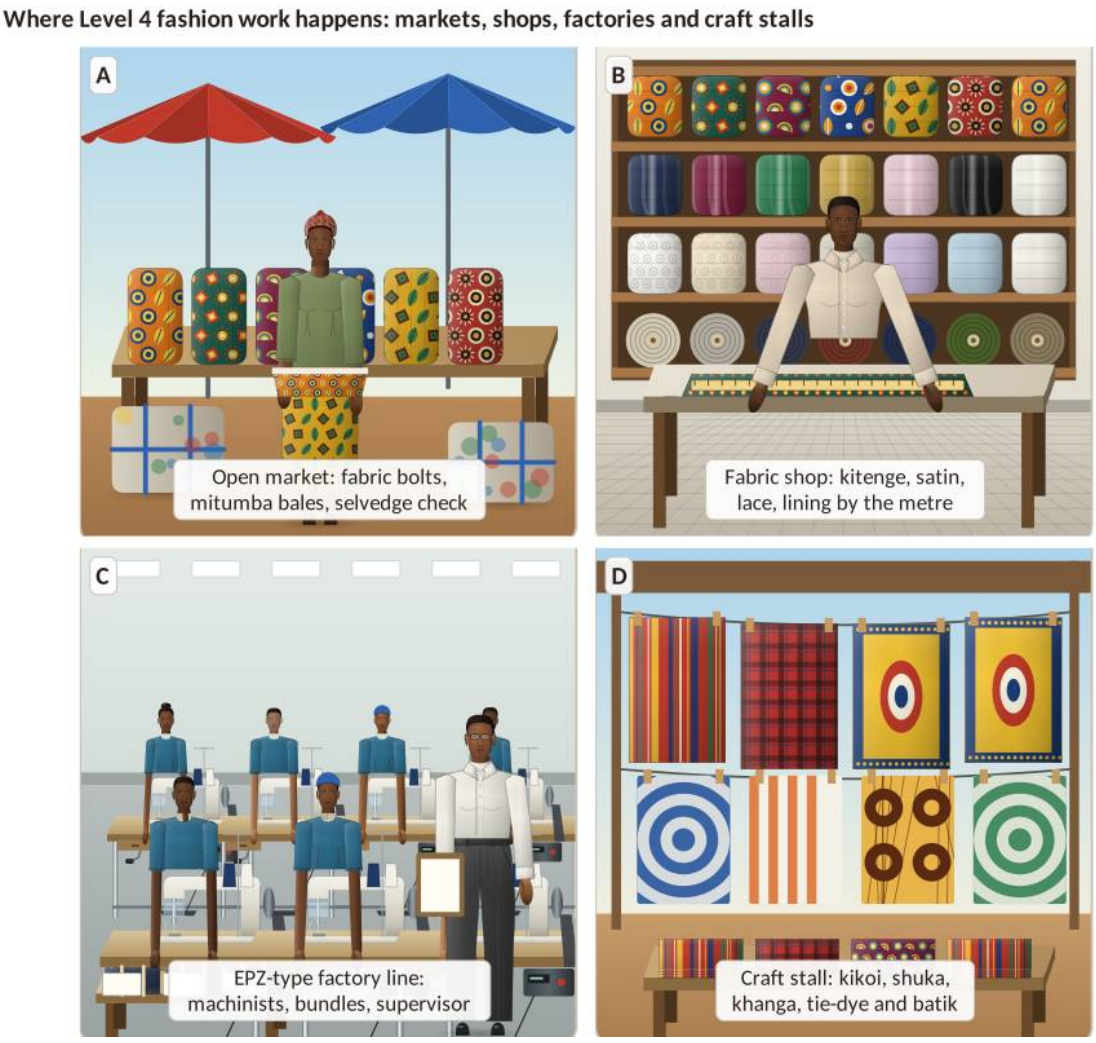


Figure 1.5 Where Level 4 fashion work happens: (A) an open market with fabric bolts and mitumba bales, (B) a fabric shop selling kitenge, satin, lace and lining by the metre, (C) an EPZ-type factory line, (D) a craft stall of kikoi, shukas, khanga and decorated cloth. Generic scenes.



Figure 1.6 A tailor in South Nyanza, Kenya, sewing printed cloth in a shop hung with kitenge and finished garments: the made-to-measure market a Level 4 designer grows into.

Photo: Isaiah Maghanga, CC BY-SA 4.0, via Wikimedia Commons

> **IN THE KENYAN WORKSHOP**
>
> A school order is won on the specification, not the price alone. Before quoting, ask for the school's written specification (colour, fabric, style, badge), a sealed sample if they keep one, and the size list. Write down who approved the sample. Uniform rules are changing, so a maker who checks the latest circular avoids sixty skirts the school cannot accept.

1.7 Careers, Pay and Professional Conduct

Figure 1.7 shows the ladder from Level 3 to the Craft (Level 5) certificate and the Diploma (Level 6), and the specialisms open at Level 4. Practising tailors can also take NITA government trade tests; ask NITA or your institution which tests are current. The 2026 minimum wage order sets the legal minimum for an employed tailor at about **KSh 30,600 a month** in Nairobi, Mombasa, Kisumu, Nakuru and Eldoret, and about KSh 25,100 elsewhere (prices change; this book uses 2026 figures). A Level 4 designer who styles, prices and delivers well earns above the floor, whether employed or self-employed.

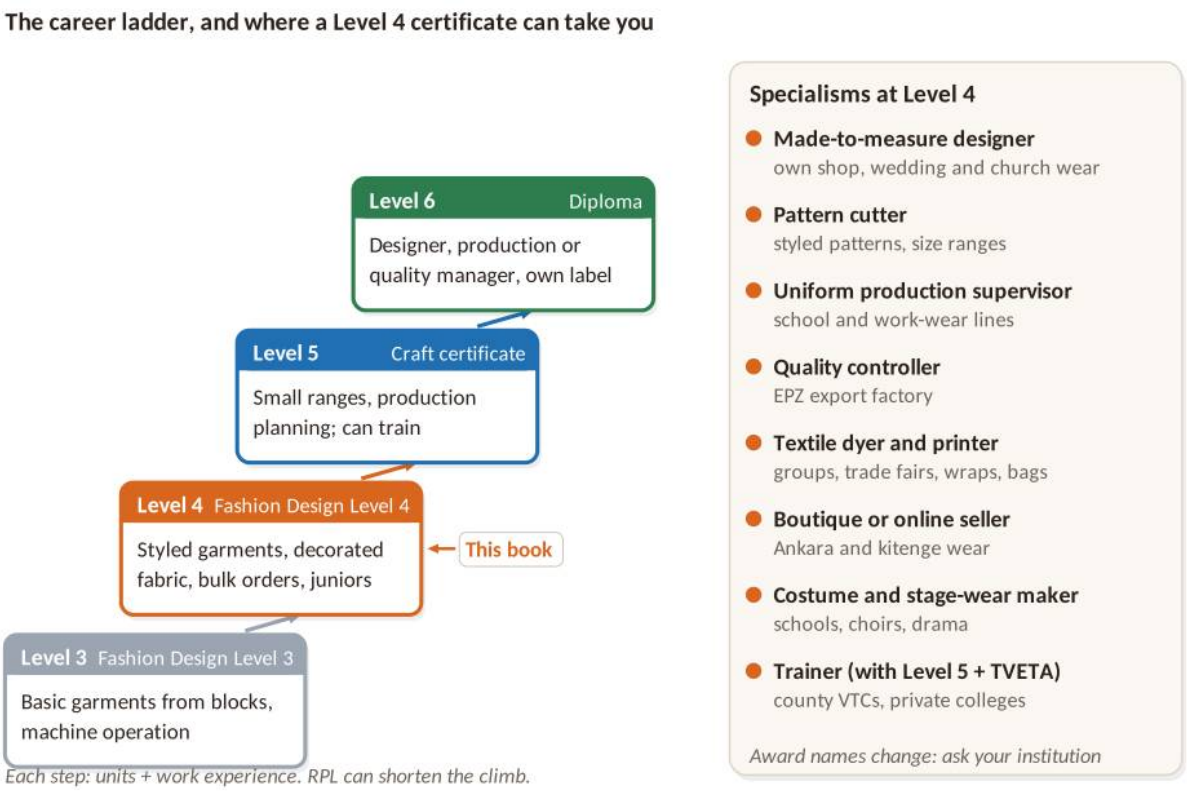


Figure 1.7 The career ladder from Level 3 to Level 6 and the specialisms open at Level 4. Award names change; ask your institution.

Good conduct (see the Level 3 guide, Chapter 1, Section 1.7) grows with your responsibility:

- **Clients:** agree the design, price and dates in writing; say early if a design does not suit the fabric or budget; fit in privacy with a second person present.
- **Schools and groups:** keep to the approved sample, deliver in full on the date, and give a written receipt for every deposit.
- **Employers:** keep time, follow the cutting ticket and the safety rules, and never take offcuts or chemicals home without permission.
- **Digital tools:** phone photos of every stage for your portfolio (with permission, never of a client's body or measurements); phone catalogues and written quotations; simple design apps for flats and colourways; and the shop's order book, still the best record.

TRAINER'S TIP

Start a Level 4 portfolio folder today: specification sheets, pattern check sheets, marker plans, dye recipe cards, swatches and dated photos. Assessors and your industry-training mentor ask for exactly these records, and they become your sales catalogue later.

SAFETY FIRST

Level 4 brings caustic soda, LPG burners, hot wax, steam irons and industrial machines into your day. Do not touch the dye room or a production machine until you have studied Chapter 2 and your trainer has checked your PPE.

1.8 How to Use This Book

Part 1 (Chapters 1 to 4) holds what both units share: safety and green practice, design interpretation and pattern methods, fabrics, lays and costing. Part 2 (Chapters 5 to 10) covers the five styled garments and their finishing. Part 3 (Chapters 11 to 15) covers decorated fabrics. Part 4 (Chapter 16) covers industry training, business and your assessment. Read the chapter before the practical, work every worked example yourself, fill in each "Record your results" table for your portfolio, and use the Level 3 guide wherever a basic skill is assumed.

Practical task 1.1: Know your Level 4 workshop

Tools and equipment

- Clipboard, checklist and pencil
- Tape measure
- Phone camera (with permission)
- Dust coat and closed flat shoes

Materials

- Workshop plan from your trainer
- Copy of the workshop rules

Steps

1. With your trainer, walk the sewing workshop. Record each machine: type, motor (servo or clutch), and whether finger, eye and belt guards are fitted.
2. Record the irons and pressing tools, dress forms and mannequins, pattern tools, and the stock of fabric, interfacing and notions.
3. Enter the dye-and-print room only with your trainer. Record the dyes and chemicals: is each container labelled, closed and in a locked store, with bleach kept apart?
4. Record the LPG burners and cylinders (upright, outside or ventilated), the PPE available, the first-aid box, eyewash water, fire extinguishers and exits.
5. Record where offcuts, threads and paper go, and where used dye baths and rinse water go.
6. Mark each item good, needs attention or missing, and write three improvements. Your trainer signs the record.

Safety

- Touch no machine, iron, burner or chemical during the tour.
- Stay with your group in the dye room; no food or drink.

Record your results

Area	Item	Condition / safety notes	Good / attention / missing
Sewing	Lockstitch 1 (servo, guards)		
Pressing	Steam iron, rest, cord		
Dye room	Chemical store, labels		
Dye room	LPG, eyewash, extinguisher		
Waste	Offcut bins, effluent drum		

Chapter summary

- A Level 4 fashion designer turns a client's design into a styled pattern, makes and finishes styled garments, plans bulk orders and decorates fabric.
- This book covers Module II: Styled Garments (FAS/CU/FD/CR/01/4/MB, 300 h) and Decorated Fabrics (FAS/CU/FD/CR/02/4/MB, 120 h), plus 320 h of industry training. Module I is the Level 3 guide.
- The course totals 1,090 hours and 109 credits; the new Level 4 work is 740 hours, 18.5 weeks at 40 hours a week.
- Unit score = 0.6 × formative + 0.4 × summative, each with theory and practical at 10 : 90; Competent from 50.
- Trousers and shorts carry 60% of the Styled Garments marks; decorating carries 176 marks and finishing 167 in Decorated Fabrics.
- Green practice is daily work: servo motors, efficient markers, sorted offcuts, weighed recipes, reused water, effluent never poured away.
- Made-to-measure, kitenge fashion, school uniforms, EPZ factories and decorated-fabric groups are steady Kenyan markets.

Check your competence

- [ ] I can name both Level 4 units with their codes, hours and learning outcomes.
- [ ] I can explain how Level 4 work differs from Level 3 work.
- [ ] I can convert course hours into weeks.
- [ ] I can calculate a unit score and state the rating.
- [ ] I can say which elements carry the most marks.
- [ ] I can give green practices for the shop and the dye room.
- [ ] I can describe four Kenyan markets and four Level 4 careers.
- [ ] I can list the records I must keep for my portfolio.

Practice questions

1. Name the two Level 4 units with their codes, hours and credits, and list the learning outcomes of each with their hours.
2. A part-time trainee attends 35 hours a week. How many weeks will Module II take? How many weeks will all the new Level 4 work take, including 320 hours of industry training?
3. Wambui scores formative theory 70 and practical 81, summative theory 60 and practical 72. Work out her unit score and rating. With the same formative score, what summative score would give her Attained Mastery?
4. One trainee's record shows 412 of 500 marks and another's 240 of 500. Convert each to a percentage and give the rating each would mean as a unit score.
5. Oral: give four tasks a Level 4 fashion designer does that a Level 3 designer does not.
6. Use Figure 1.4 to explain why a trainee should not spend most of her practice time on the skirt. Which single PC in Decorated Fabrics carries the most marks?
7. Give three green practices for the tailoring shop and three for the dye room, with a reason for each.
8. Wanjiku, a KCSE leaver, enrols in Module II and says she will "pick up the basics as she goes". In week two she cannot draft the skirt block for her A-line pattern or set a zip. What has gone wrong, and what should she and her trainer do?
9. Name four specialisms open to a Level 4 fashion designer, with an employer or market for each. What is the legal minimum monthly pay of an employed tailor in Eldoret under the 2026 wage order?
10. Practical: carry out Practical task 1.1 and hand in your record with three improvements, signed by your trainer.

PART 3

Decorated Fabrics Production (Tie and Dye and Printing)

Unit 2: Decorated Fabrics Production (FAS/CU/FD/CR/02/4/MB, 120 hours). Planning a decoration: history, design, colour and the dye classes; preparing fabric and dye baths by weight; tie and dye and wax resist (batik); screen, block and stencil printing; and finishing the decorated fabric: oxidation, rinsing, shade drying, pressing, labelling, packaging, storage and safe effluent.

Chapter 11: Planning Fabric Decoration: History, Design, Colour and Materials
Chapter 12: Preparing Fabrics and Dyes: Scouring, Bleaching and the Dye Bath
Chapter 13: Tie and Dye and Wax Resist (Batik)
Chapter 14: Screen, Block and Stencil Printing
Chapter 15: Finishing Decorated Fabrics: Oxidation, Rinsing, Drying, Pressing, Labelling, Packaging and Storage

CHAPTER 13

Tie and Dye and Wax Resist (Batik)

WHAT YOU WILL LEARN

- Tie, fold, stitch and clamp cloth to give the shapes the assessor asks for, and predict each shape before you dye.
- Dye tied bundles in a vat bath and a reactive bath, oxidise them while still tied and untie them safely.
- Plan two-colour work from light to dark, and use bleach discharge safely.
- Make a two-colour batik with crackle: wax, dye cold, remove the wax and recover it.
- Find and correct common faults, and cost tie-dyed yardage and batik runners.

Unit: Decorated Fabrics Production · FAS/CU/FD/CR/02/4/MB · Learning outcome 2 (tie and dye and wax resist) · About 25 hours

Chapter 12 left the Tumaini Women's Group with scoured calico and tested dye baths. Now the cloth gets its pattern. Decoration carried out (PC 2.4) is the heaviest performance criterion in the unit: 176 of 500 marks, shared between this chapter and printing in Chapter 14. The assessor will ask you to show "various shapes" and to follow the steps in order, so this chapter is built around both.

Key words

Resist
Anything that stops dye reaching part of the cloth: a binding, a fold, a clamp, a stitch or wax.

Binding
Twine, raffia or rubber bands wound tightly round gathered cloth.

Tritik
Stitched resist: running stitches pulled up tight and knotted before dyeing.

Clamp resist
Folded cloth pressed between wooden shapes (shibori-style) so the shapes stay pale.

Overdye
Dyeing one colour over another; blue over yellow gives green.

Discharge
Removing colour from dyed cloth with bleach: "reverse" tie and dye.

Batik
Wax-resist dyeing: wax drawn or brushed on cloth keeps the dye out.

Tjanting
A small copper bowl with a fine spout on a handle, for drawing lines of hot wax.

Crackle
Fine dark veins made when cold wax is crumpled and dye runs into the cracks.

Boiling out
Removing the last wax from batik in hot water; the wax sets on the surface as it cools.

13.1 How Resist Dyeing Works

Dye colours only what the liquor can reach. Tie and dye blocks it with pressure: a tight binding squeezes the cloth so hard that little liquor gets in, and the inside of a fold is hidden behind the outside. Wax resist blocks it with a coat that fills the gaps between the yarns. Either way, the pale parts are the design. The tighter the resist and the shorter the time in the bath, the sharper the edges. Loose binding, long soaking or hard squeezing in the bath let dye creep under and blur the shape.

Preparation matters as much as the tying. Scoured, pressed and evenly wetted cloth (Chapter 12) is folded and tied **damp**: it folds crisply and the dye spreads evenly into the open parts.

13.2 Tie-and-Dye Techniques and Their Shapes

Learn each technique together with the shape it gives. Figure 13.1 shows the six you will be assessed on most often, each bundle beside its opened result. Table 13.1 describes how to tie them.

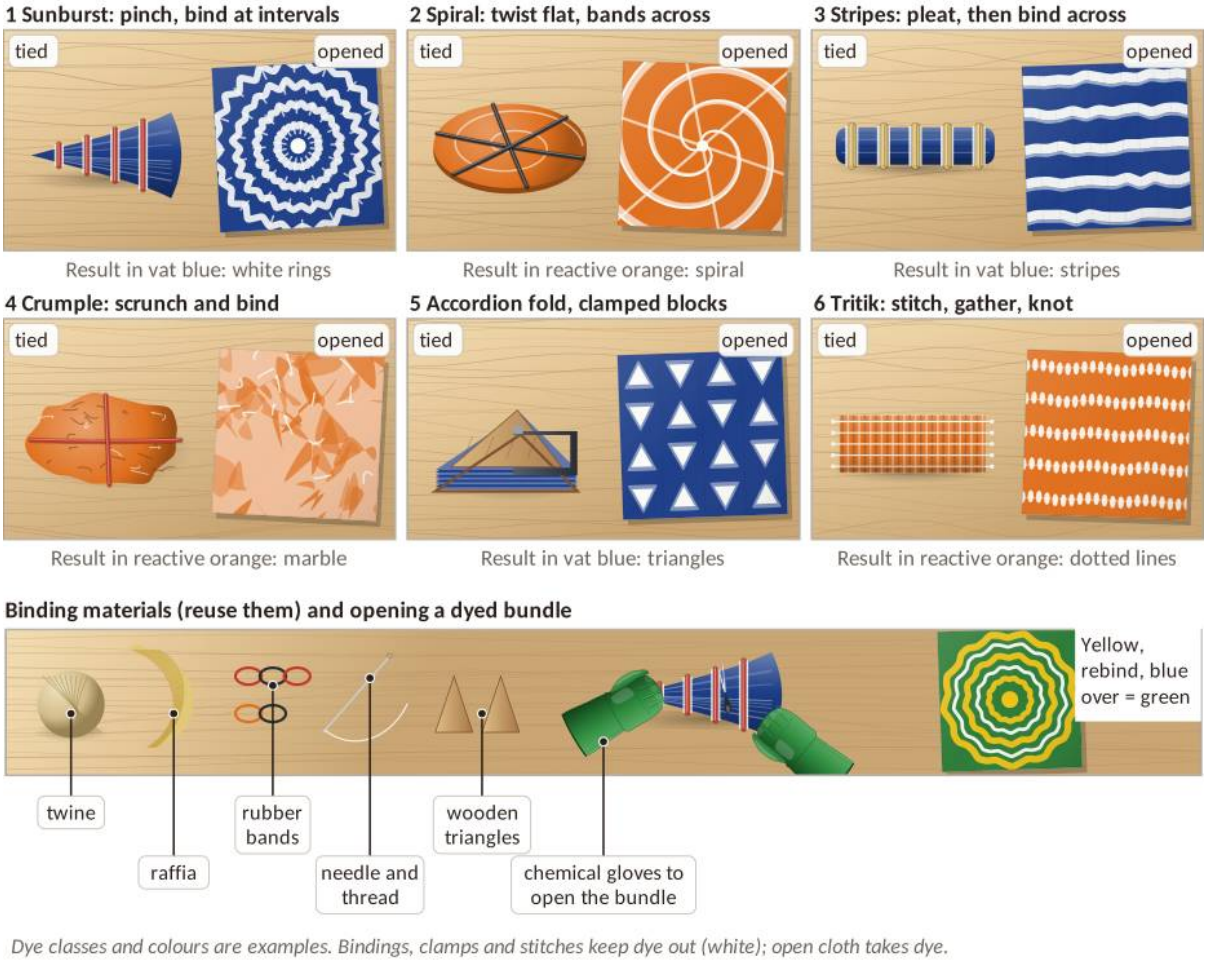


Figure 13.1 Six tie-and-dye techniques. Each bundle is shown dyed and still tied, beside the cloth opened out: bindings, clamps and stitches stay pale, open cloth takes the dye. Below: binding materials, gloved hands opening a bundle and a two-colour overdye.

Table 13.1 Tie-and-dye techniques and the shapes they give

Technique	How to tie	Shape	Good for
Circles and sunburst	Pinch a point, pull it up into a cone, bind at intervals down the cone	Rings round a centre; jagged rays where folds lie	Shirts, wraps, centre motifs
Spiral	Twist flat from a centre into a disc; bands across it	A spiral with radial lines	T-shirts, scarves
Stripes	Pleat or roll the cloth, then bind across at intervals	Straight or wavy stripes	Yardage, kikoi-style wraps
Crumple (marble)	Scrunch loosely into a pad and bind across	Random crinkled veins	Quick yardage, linings, bags
Ruching	Wrap the cloth round a rope or pole and push it into tight gathers	Fine wavy lines, like water	Scarves, long lengths
Fan and triangle folds, clamped	Accordion-fold into a strip, fold into triangles or squares, clamp between wooden shapes	Repeating shapes, mirrored at each fold	Table linen, wraps
Tritik	Running stitches along a drawn line, pulled up tight and knotted	Dotted lines that follow any drawing	Fine motifs, names, borders
Knotting	Tie the cloth itself in knots	Bold irregular rings	Children's projects, scarves

Figure 13.2 shows two techniques step by step. In the **spiral**, the twist hides part of each fold, so a pale spiral appears, and every band leaves a pale line across it. In the **accordion fold**, the wooden shapes press every layer at once, so the shape repeats across the cloth and is mirrored at each fold.

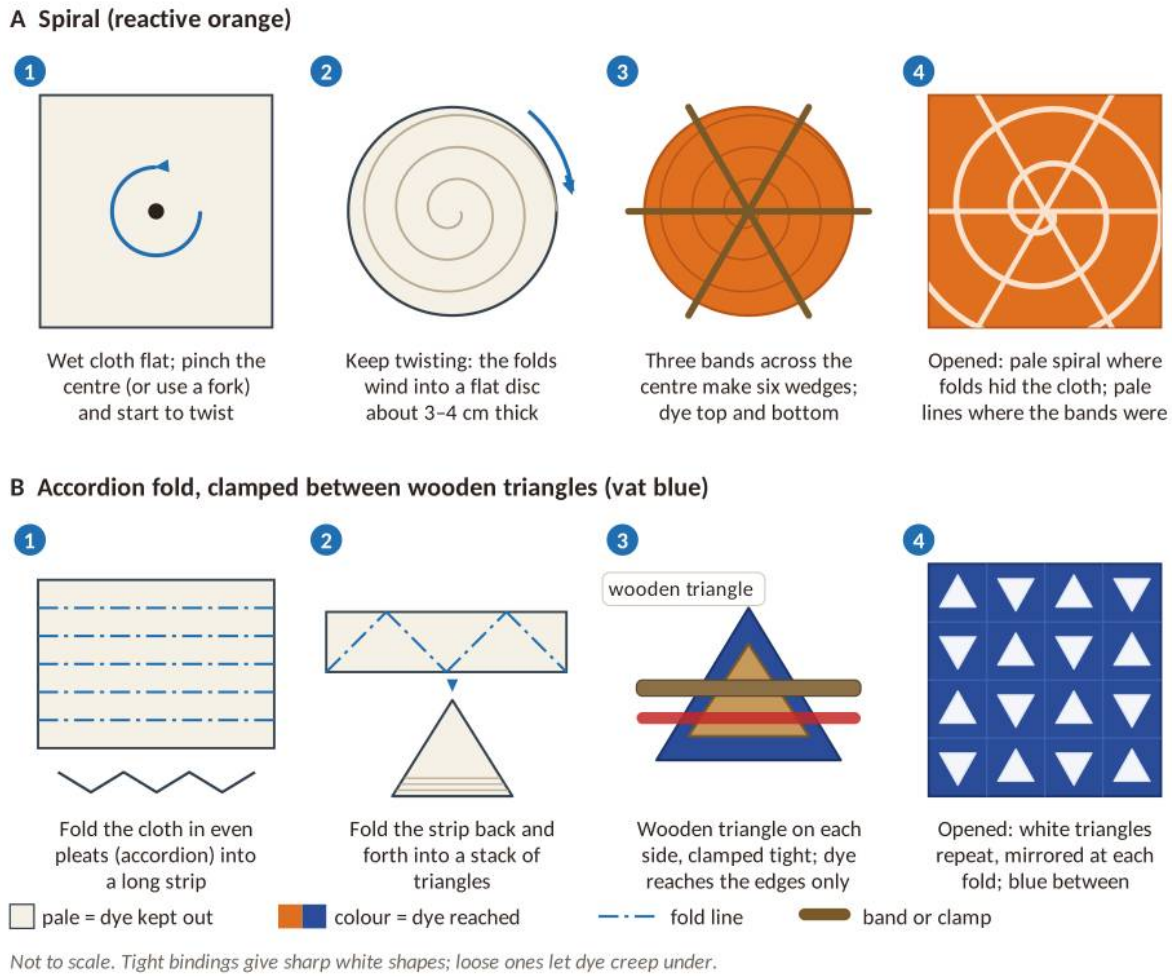


Figure 13.2 Folding and binding step by step. A: the spiral. B: the accordion fold clamped between wooden triangles. Pale parts are where the dye could not reach.

Binding materials. Cotton twine grips well and can be cut and knotted; raffia is cheap and biodegradable; rubber bands are quickest and give slightly softer edges. Clamps use offcut wood, plastic lids or old CDs. Untie carefully and reuse twine and bands: wash them with the tools and hang them to dry. Tools and supplies for the whole unit are in Figure 11.6.

13.3 Dyeing the Tied Bundle

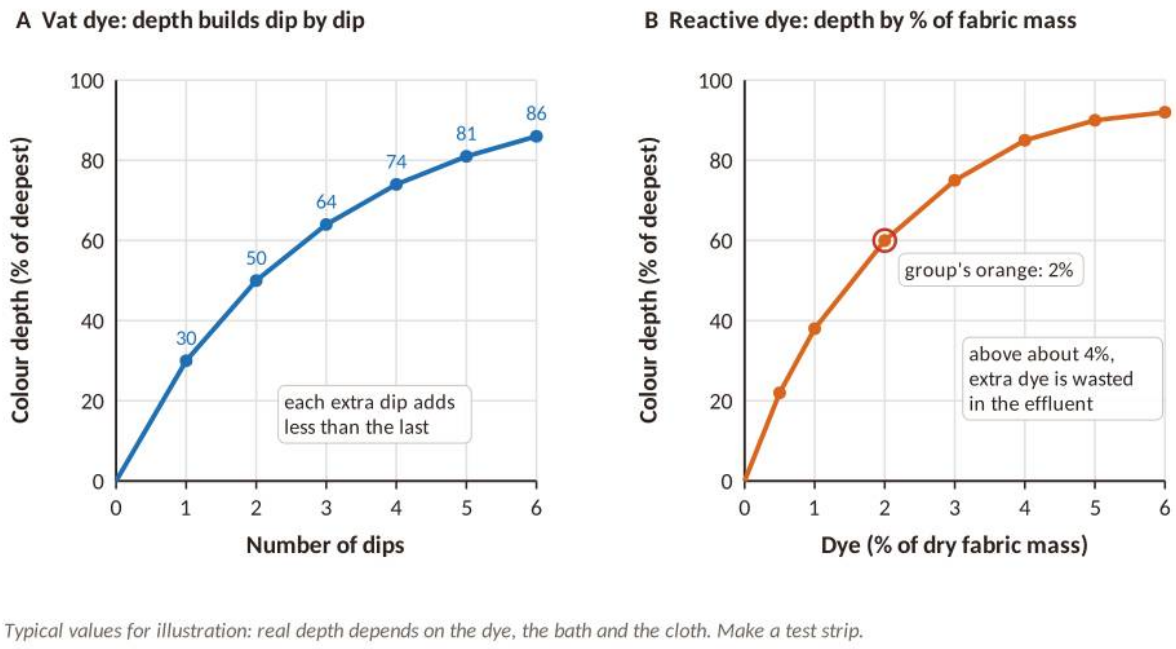
13.3.1 In the vat bath

1. Wet out the tied bundle until bubbles stop rising (Chapter 12). Squeeze, never wring.
2. Test the vat with a strip: it must come out yellow-green and turn blue in air.
3. Lower the bundle in slowly with gloved hands and hold it **under the surface** for 10–30 minutes. Do not splash or whip in air.
4. Lift it out gently, squeeze lightly over the bath and hang or lay it on a clean surface to **oxidise in air for 10–20 minutes while still tied**. Open the outer folds a little with gloved fingers so air reaches inside.
5. Re-dip for more depth. Each dip-and-oxidise adds colour, but less each time (Figure 13.3 A).
6. When the colour is deep enough and fully oxidised, give a first cold rinse **still tied**, then untie.

Why oxidise while still tied? Until it meets air, the vat dye in the cloth is still in its soluble form. If you open the bundle too soon, soluble dye runs into the white parts and the edges blur; rinsing it now washes colour away (Chapter 15). Oxidising first locks the dye where it is.

13.3.2 In the reactive bath

Put the wetted bundle into the bath, then add salt and soda ash on time as in Worked example 12.2. Turn the bundle every few minutes so all sides take dye, keeping it under the surface. There is no oxidation: after 45–60 minutes rinse cold while still tied, until the water runs nearly clear, then untie. Depth depends mainly on the dye per cent (Figure 13.3 B).



Typical values for illustration: real depth depends on the dye, the bath and the cloth. Make a test strip.

Figure 13.3 Typical shade depth. A: a vat colour deepens with each dip and oxidation, but each dip adds less. B: a reactive colour deepens with dye per cent up to about 4%, then levels off. Typical values.

13.3.3 Untying

Untie over a basin, wearing gloves. Slide a small pair of scissors or a seam ripper under the binding **away from the cloth** and cut the twine, never the fabric; unpick tritik stitches from the knot end. Open the cloth, rinse until the water runs nearly clear, then hot-wash and dry in the shade (Chapter 15). Keep a swatch for the decoration record.

> **SAFETY FIRST**
>
> Vat baths contain caustic soda and sodium hydrosulphite. Wear long-cuff chemical gloves, splash goggles and a waterproof apron over the dust coat, with sleeves down. Lift bundles with gloved hands or a stainless stick, never bare hands, and squeeze them over the bath, away from your face. A full 40 L bath weighs over 40 kg: never carry it alone. Splashes on skin or eyes: flush with running water for at least 15 minutes, and take eye injuries to a clinic (Table 2.2). Never untie with a blade pulled towards your hand.

13.4 More Than One Colour

Dye the **lighter colour first**. Tie, dye in the light colour, rinse, then add more bindings over the parts that must keep that colour, and dye in the darker colour. Dark colour covers light, never the other way round. Where the second dye falls on the first, the two mix: blue over yellow gives green, red over yellow gives orange (the colour wheel in Figure 11.3). Figure 13.4 follows one cloth through the sequence. You can also **untie and retie** in a different technique between colours, for example stripes over a crumple.

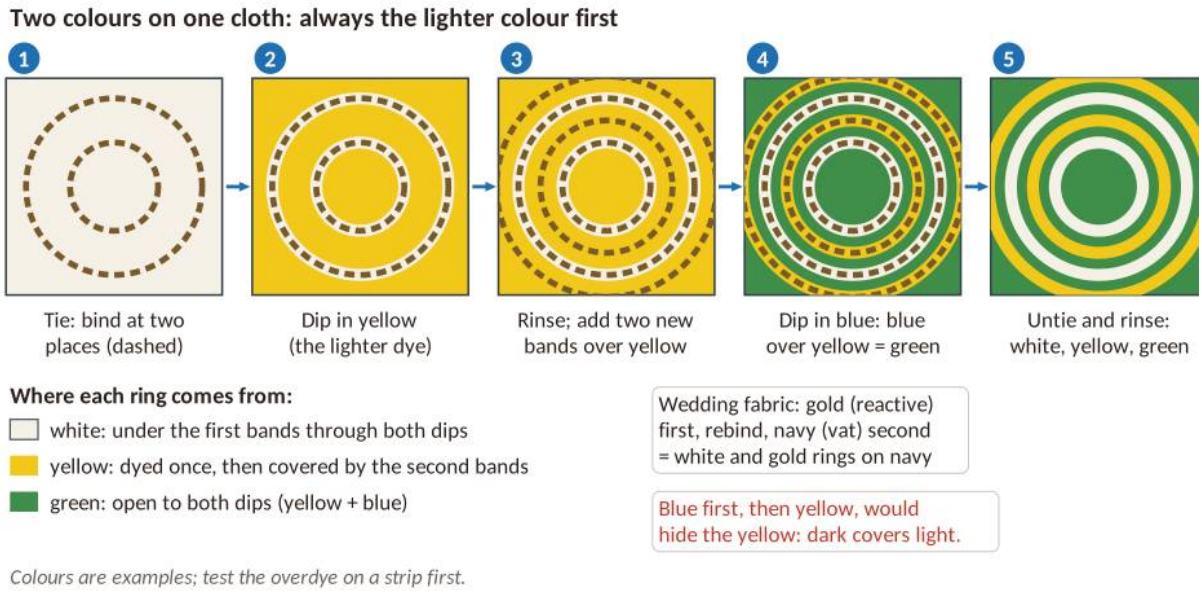


Figure 13.4 Two colours on one cloth, lighter first. The cloth is drawn flat to show where each ring will be; in practice it is tied as a cone. White rings stay under the first bands, yellow rings under the second, and green forms where blue goes over yellow.

Two-colour bundles hold more resist, so give the first colour a full rinse before rebinding and keep the bundle damp. Write both colours, the times and the order on one recipe card.

13.4.1 Discharge: reverse tie and dye

Discharge starts with dark cotton and takes colour **out**. Tie the cloth, then dip it in the diluted bleach solution from Chapter 12 (test strengths such as 1 : 4 and 1 : 8 on a strip first). Watch it: most reactive-dyed and ready-made black cottons turn rust, orange or cream within minutes, while vat dyes hardly bleach at all. Stop by rinsing well, give the anti-chlor rinse and wash. Bleach left in the cloth goes on weakening it.

> **SAFETY FIRST: DISCHARGE**
>
> Work outdoors or in a well-ventilated room, in gloves, goggles and apron. Never mix bleach with acids, vinegar, lemon juice or ammonia cleaners: they give off toxic gas. Use a labelled plastic or glass basin kept only for bleach. Make the solution fresh and send spent bleach to the effluent drum, never a drain.

13.5 Natural-Dye Tie and Dye

The group's onion-skin, tea and eucalyptus trial (Chapter 12) can be tied too. Mordant the cloth with alum first, dry it, then tie and dye in the strained natural bath. Natural baths are simmered, so use cotton twine (rubber bands perish in heat) and tie a little tighter than usual. Edges are softer and colours gentler, which suits crumple and stripes better than fine tritik. Expect each batch to differ; sell it as a feature.

13.6 Quality and Faults

A good tie-dyed piece has sharp, deliberate edges, even depth in the coloured parts, clean white or pale areas and no tide marks. Check it wet and again dry, against your swatch. Table 13.2 lists the faults you will meet and how to prevent them; most come from preparation, loose tying or the bath.

Table 13.2 Common faults in tie and dye and batik

Fault	Likely cause	Prevention or remedy
Pale, blotchy patches away from the ties	Size left in the cloth, dry spots, or bundle floating	Scour, wet out fully, hold the bundle under the surface
Blurred edges	Loose binding, untied before oxidising, long soak	Bind tightly, oxidise while tied, dip in shorter dips
Whole bundle pale inside	Bundle too thick for the dye to reach	Smaller bundles, open folds to oxidise, re-dip
Tide marks (dark lines)	Bundle half in the bath, or dried unevenly in sun	Keep under the surface; dry flat in the shade
Colour washes out	Vat not oxidised, or reactive soda ash missing or late	Oxidise fully; add soda on time; follow the recipe card
Batik lines blurred, colour under the wax	Wax too cool to soak in, or on the top face only	Hotter wax (still not smoking); check the back; wax again
Unwanted cracks in batik	Too much paraffin, cloth folded or crushed, cold room	More beeswax, handle flat, roll not fold, lukewarm (not hot) bath
Wax melted in the bath	Dye bath too warm	Cold or lukewarm bath only; check with a thermometer

13.7 Wax Resist (Batik)

Batik gives drawn, painterly designs that tying cannot. It is slow, so the group uses it for finished table runners and wall pieces, not yardage (Chapter 11). Figure 13.5 shows the stages at the VTC.

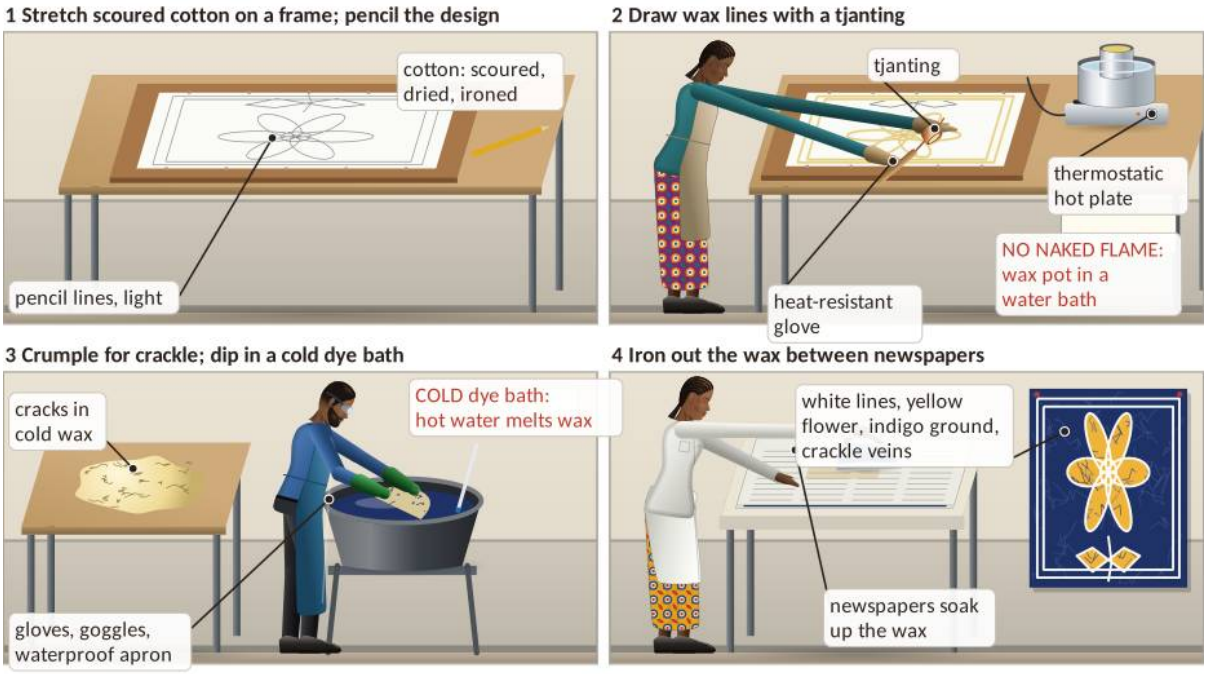


Figure 13.5 Batik at the VTC. The wax pot stands in a water bath on a thermostatic hot plate, the tjanting hand wears a heat glove, the dye bath is cold, and the wax is ironed out between newspapers.

13.7.1 Cloth, frame and design

Use scoured, dried and ironed cotton: any size or crease shows. Pin it taut on a wooden frame so it does not touch the table, otherwise the wax sticks to the table and does not reach through. Draw the design lightly in pencil; heavy lines show through pale colours.

13.7.2 Wax

The group uses the Chapter 12 blend of about 50 : 50 paraffin wax and beeswax. Paraffin cracks easily; beeswax is flexible and sticks well. More paraffin gives more crackle; more beeswax gives clean, unbroken areas. Melt the wax in a pot standing in a water bath, or on a thermostatic hot plate, at about 60–80 °C. Test on a scrap: wax at the right heat soaks in and makes the cloth look **clear and darker**; wax that is too cool sits on top, looks white and will let dye under. Wax must **never smoke**.

13.7.3 Drawing and filling

Draw lines with the **tjanting**: fill the bowl, hold a folded scrap of cloth under the spout as you carry it, and draw with steady, even speed. Fill larger areas with a brush kept for wax. Then turn the frame over and look at the **back**. Every waxed part must look the same from both sides; go over thin places from the back. Figure 13.6 shows a maker drawing wax lines by hand; compare her set-up with the safety box below.



Figure 13.6 Drawing wax lines by hand on a large cloth. Hot wax can burn: she works without a heat-resistant glove or apron, and the cloth lies on the table, so wax may stick to it instead of soaking through. Use a frame, a glove and a wax pot in a water bath.

Photo: Dappasolomon001, CC BY-SA 4.0, via Wikimedia Commons

> **SAFETY FIRST: HOT WAX**
>
> Wear a heat-resistant glove on the hand holding the tjanting, closed shoes and an apron, with hair tied back. Heat wax only in a water bath or on a thermostatic plate, never over a naked flame, and never leave it. If wax smokes, switch off. If it catches fire, cover it with a lid or fire blanket and switch off; **never throw water** on burning wax. Cool a wax burn under running water for about 20 minutes and do not peel off the wax. Keep the hot plate's cable away from the dye basins.

13.7.4 Crackle and dyeing

For crackle, let the wax harden, then crumple the cloth in your hands, or chill it first for finer cracks. Dye only in a **cold or lukewarm bath**: hot water softens wax and it slides off. Cold-water reactive dyes suit batik well; use a vat dye only if its maker says it can be used cold. Keep the bath at the cool end of the dye's range and check it with a thermometer.

Batik builds from light to dark (Figure 13.7). Wax the parts that stay white, dye the lightest colour, rinse and dry in the shade, wax the parts that keep that colour, then dye the next. Two or three stages are plenty for trainees.

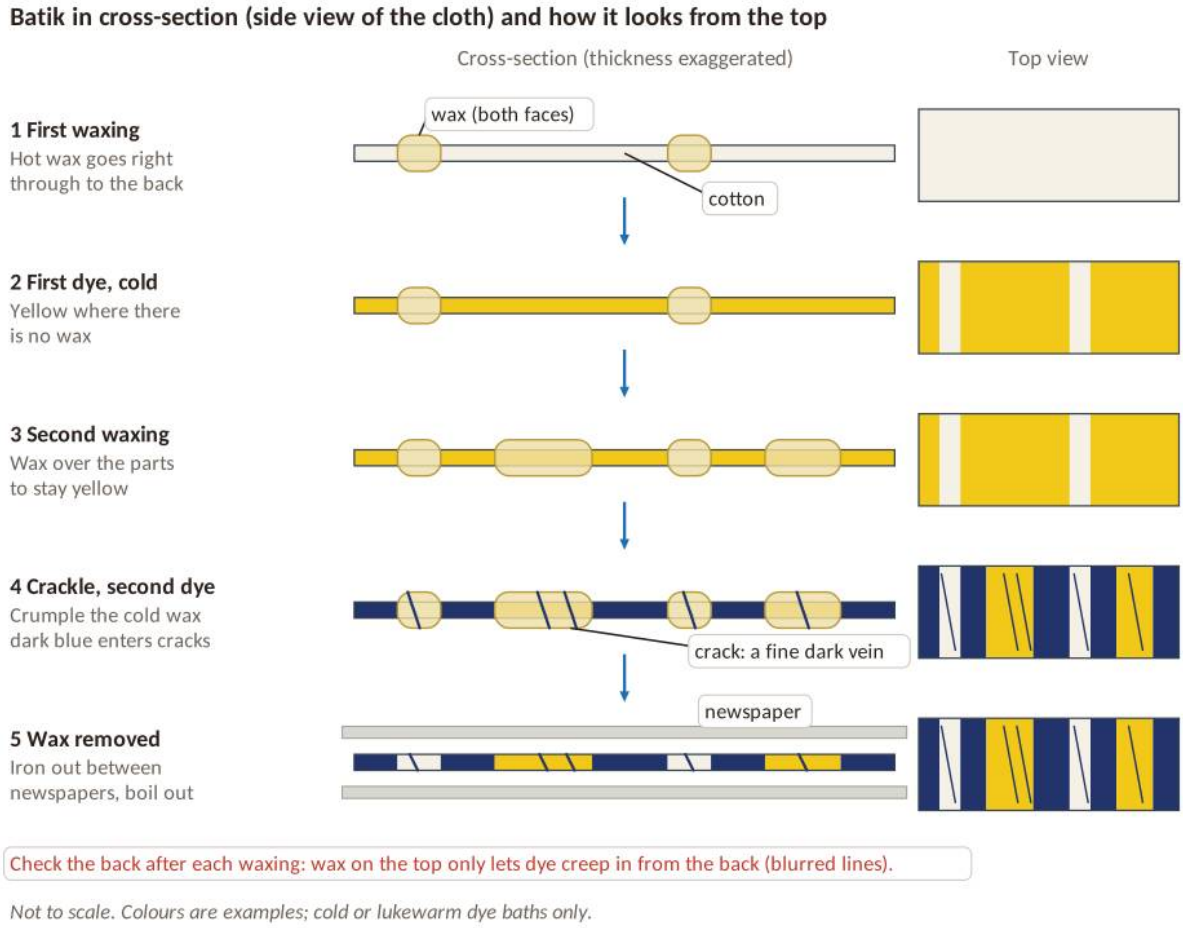


Figure 13.7 Batik in cross-section through two colours. The wax must go right through the cloth; each colour is protected by the waxing before the next dye. Example colours.

13.8 Removing and Recovering the Wax

1. **Scrape** off thick wax when cold with a blunt knife, into a tin.
2. **Iron out** the rest between layers of old newspaper on a padded table, with plain absorbent paper next to the cloth on light colours so newsprint ink does not mark it. Change the paper as it fills with wax.
3. **Boil out** the last film in a pot of water with a little soap for a few minutes, moving the cloth with a stick. Lift it out, rinse in hot then warm water, wash and dry in the shade.
4. **Recover the wax.** Let the boiling water cool undisturbed: the wax rises and sets as a cake. Lift it off, dry it and keep it for crackle areas and first waxings. The cooled water goes to the effluent drum.

Never pour hot wax water into a sink, drain or pit latrine: the wax sets in the pipe and blocks it, and the dye goes with it. Waxed newspapers go into general waste; do not burn them in the dye room.

> **GREEN TIP**
>
> Recovered wax, washed twine and rubber bands, and clamp shapes cut from offcuts all cut costs and waste. Plan the dyeing so several bundles or batik pieces share one bath, and save the last rinse for the first rinse of the next batch. Natural-dye residues go to compost; synthetic baths and wax water go to the effluent routine in Chapter 15.

13.9 Making the Products

13.9.1 The wedding fabric

The groom's family wants 18 m of 150 cm cotton poplin in navy and gold for shirts and wraps. Shirt pieces will be cut from the dyed cloth, so the pattern must match across pieces: tie the **same technique at the same spacing** along the whole length, and dye every length to the same recipe and times. Mark the tie points on the damp, pressed cloth with a chalk grid before tying.

WORKED EXAMPLE 13.1: RECIPE FOR THE WEDDING FABRIC (VAT NAVY)

Mass = 18 m × 1.5 m × 120 g/m² = **3,240 g** (3.24 kg).

One bath at 1 : 20 would be 3.24 × 20 = 64.8 L: too big for a sufuria, and 18 m dyes unevenly in one bundle. Use **two batches of 9 m**: 9 × 1.5 × 120 = 1,620 g each.

Bath per batch = 1.62 kg × 20 = **32.4 L**.

Vat dye (navy, 5%) = 1,620 × 5 ÷ 100 = **81 g** a batch.

Caustic soda = 8 g/L × 32.4 L = **259 g**; sodium hydrosulphite the same, **259 g** (example; follow the maker).

Cost per batch = 81 × 4 + 0.2592 × 200 + 0.2592 × 500 = 324 + 51.84 + 129.60 = **KSh 505.44**. Two batches = KSh 1,010.88, or 1,010.88 ÷ 18 = about **KSh 56 a metre**.

The gold goes first (reactive 2%, Worked example 12.2 scaled to 32.4 L): dye 32.4 g, salt 1,944 g, soda ash 486 g = KSh 311.04 a batch, about KSh 35 a metre. Navy and gold together: about **KSh 91 a metre** for dyes and chemicals.

Sense-check: Chapter 12's 4% blue cost about KSh 57 a metre; navy at 5% on lighter poplin costs about the same.

WORKED EXAMPLE 13.2: SUNBURST SPACING AND TWINE

The family chose sunbursts at **30 cm centres**.

Across: 150 ÷ 30 = **5 sunbursts**, centres 15, 45, 75, 105 and 135 cm from one selvedge.

Along: 1,800 ÷ 30 = **60 rows**. Sunbursts = 5 × 60 = **300**.

Ties: two bindings each before the gold (white rings) and two more before the navy (gold rings): 300 × (2 + 2) = **1,200 ties**.

Twine at about 40 cm a tie = 1,200 × 0.4 = **480 m**. Buy a 500 m cone and reuse what comes off clean.

Time: at about 1 minute a tie, 1,200 ÷ 60 = **20 hours** of binding: share it between two people.

Sense-check: 30 cm divides 150 cm and 18 m exactly, so every shirt piece meets the same pattern.

13.9.2 The trade-fair stock

The group mixes techniques on its 50 m: the quick ones sell at a lower price, the slow ones must earn their time (Figure 13.8). Its plan (18 m sunburst, 10 m each of spiral and stripes, 5 m each of crumple and accordion, 2 m tritik) takes about 60 hours, the 1.2 hours a metre planned in Chapter 11.

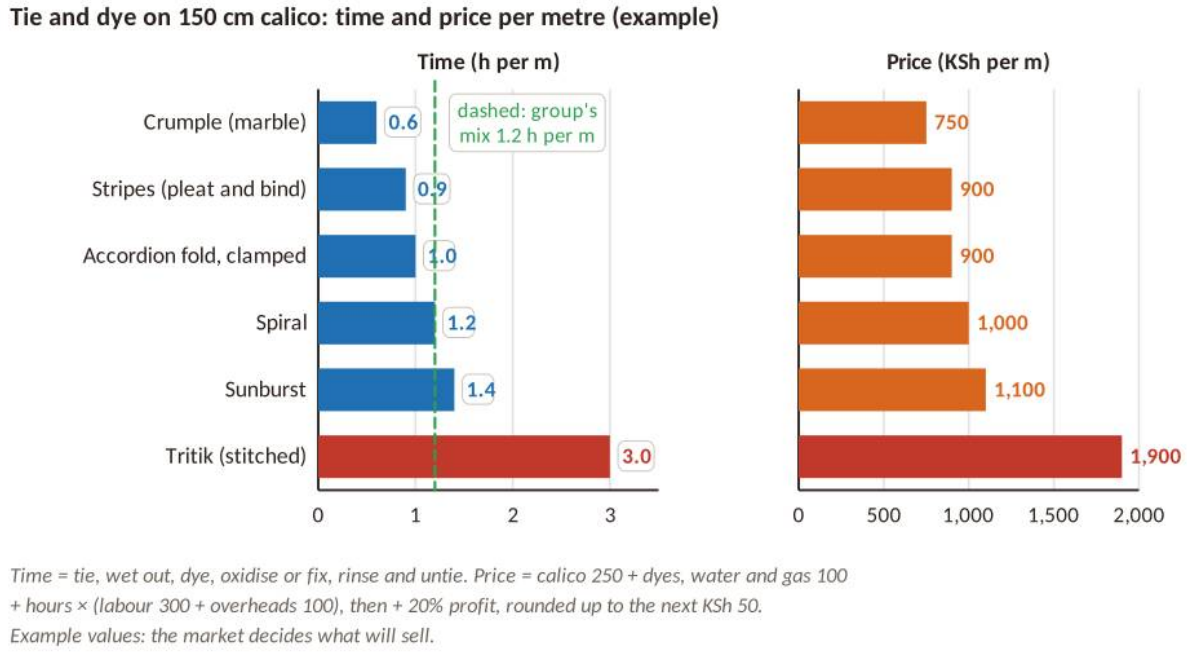


Figure 13.8 Time per metre for each tie-and-dye technique and the price per metre it needs by the Chapter 4 method with 20% profit. Quick techniques sell cheaply; tritik must be sold on small, high-value pieces. Example values.

The 20 batik runners (1.8 × 0.4 m) come from the same calico as the wraps in Chapter 14: each 1.8 m length of 150 cm cloth gives one wrap 1.0 m wide, one runner 0.4 m wide and a 10 cm strip for ties.

WORKED EXAMPLE 13.3: WAX AND PRICE FOR 20 BATIK RUNNERS

Runner area = 1.8 × 0.4 = **0.72 m²**. Each waxing covers about 40% at about 100 g/m² (typical): 0.72 × 0.4 × 100 = **28.8 g**.

Two waxings = **57.6 g** a runner; 20 runners = **1,152 g**. Buy 0.6 kg paraffin + 0.6 kg beeswax = 240 + 720 = **KSh 960**. The blend costs KSh 0.80 a gram, so wax is 57.6 × 0.80 = **KSh 46.08** a runner.

Recovered (example, about half) = 576 g, worth KSh 460.80, saving about KSh 23 a runner on the next job.

Other materials a runner (two cold reactive baths, hot plate and iron, water) bring materials to **KSh 105.24**. Calico share 0.72 ÷ 1.5 × 250 = **KSh 120**.

Cost = 120 + 105.24 + 3 h × 300 + 3 h × 100 = **KSh 1,425.24**. Twenty pieces is a bulk order: + 20% = 1,710.28, rounded up to **KSh 1,750** a runner.

Sense-check: labour is 900 of the 1,425 (63%). Batik pays only as a finished product.

TRAINER'S TIP

Before any job, make a test strip of each technique on a 30 cm square of the real cloth, in the real bath, and staple it to the recipe card. Clients choose from swatches, assessors see your "various shapes", and you learn how tight to bind that cloth.

IN THE KENYAN WORKSHOP

Many women's groups tie on the veranda, in the shade, while the vat reduces: tying is social work and it goes faster together. Rubber bands cut from old bicycle tubes and raffia from the market cost almost nothing. Batik wax is sold by candle and craft suppliers; buy it in blocks, not as candles, which often contain additives. At the trade fair, hang one finished piece of each technique at eye level with its price.

COMMON MISTAKES

- Tying dry cloth, so folds slip and the dye reaches unevenly.
- Untying a vat bundle before it has oxidised, so the edges blur.
- Dyeing the dark colour first and expecting the light one to show.
- Cutting the cloth when cutting the twine.
- Wax too cool, sitting on top of the cloth; nobody checks the back.
- A warm dye bath for batik, so the wax lifts off.
- Pouring wax water into a sink or drain.

Practical task 13.1: A tie-and-dye sampler in two colours

Tools and equipment

- Full dyeing PPE: chemical gloves, splash goggles, waterproof apron, dust coat, closed shoes
- Vat and reactive baths from your trainer, basins, stainless sticks, thermometer, scissors, needle, clamps and wooden shapes

Materials

- Four 50 × 50 cm squares of scoured calico (about 35 g each)
- Twine, raffia, rubber bands, strong thread; decoration record

Steps

1. Choose four techniques from Table 13.1, including one stitched or clamped technique. Sketch the shape you expect from each.
2. Weigh the squares and work out the dye and bath share from your trainer's recipe.
3. Tie the damp squares. Dye two in the reactive bath and two in the vat; oxidise the vat bundles while tied.
4. Rebind one square from each bath and overdye it in the other colour.
5. Rinse, untie safely, wash, dry in the shade and press. Compare each result with your sketch.

Safety

- Caustic bath: gloves, goggles and apron on before you approach it.
- Cut bindings away from the cloth and your hand.

Record your results

Square	Technique and sketch	Bath, dips and times	Swatch	Shape achieved? Faults
1				
2				

Square	Technique and sketch	Bath, dips and times	Swatch	Shape achieved? Faults
3				
4				

Practical task 13.2: A two-colour batik panel with crackle

Tools and equipment

- Frame and pins, pencil, tjanting and brushes, wax pot in a water bath on a thermostatic hot plate, heat-resistant glove
- Cold reactive baths, thermometer, iron, padded table, old newspapers and plain paper, pot for boiling out

Materials

- A 50 × 50 cm panel of scoured, ironed cotton
- About 20 g of 50 : 50 wax blend; two cold-water reactive dyes

Steps

1. Pin the cloth on the frame and draw a simple design in light pencil.
2. Test the wax on a scrap, then wax the parts to stay white; check the back.
3. Dye in the lighter colour, rinse and dry in the shade.
4. Wax the parts that keep the first colour; crumple for crackle.
5. Dye in the darker colour, rinse and dry.
6. Scrape, iron out between papers and boil out; recover and weigh the wax.

Safety

- Wax never over a flame or smoking; lid ready; never water on a wax fire.
- Gloves and goggles for the dye baths; heat glove for the tjanting.

Record your results

Stage	Details (wax temperature, bath, times)	Result
First waxing		
First dye		
Second waxing, crackle		
Second dye		
Wax removed; wax recovered (g)		

Chapter summary

- Bindings, folds, clamps, stitches and wax resist dye; the pale parts are the design.
- Each technique gives its own shape: rings, spirals, stripes, marble, mirrored shapes, dotted lines.
- Vat bundles are dipped under the surface, oxidised in air while still tied, rinsed, then untied.
- Two colours go light to dark, with new bindings between; overdyes mix the colours.
- Discharge with bleach works on many reactive-dyed cottons; never with acids or ammonia.
- Batik wax is melted in a water bath, must soak through, and is dyed only in cold or lukewarm baths.
- Wax is ironed out between newspapers, boiled out and recovered; wax water never goes down a drain.
- Labour is most of the cost: price slow techniques and batik as finished products.

Check your competence

- [ ] I can tie at least six techniques and predict the shape of each.
- [ ] I can dye tied bundles in vat and reactive baths in the right order.
- [ ] I can oxidise, rinse and untie without blurring the design or cutting the cloth.
- [ ] I can plan and dye two colours from light to dark.
- [ ] I can use bleach discharge safely.
- [ ] I can wax, crackle, dye and dewax a batik, and recover the wax.
- [ ] I can work out recipes, tie counts and wax for a job, and price it.
- [ ] I can find the cause of a fault and correct it.

Practice questions

1. Describe how to tie a sunburst, a spiral, stripes and a tritik design, and the shape each gives.
2. Explain to your assessor why a vat-dyed bundle is oxidised while still tied, and what happens if it is opened too soon.
3. The wedding fabric is navy and gold. In what order are the colours dyed, and why? What happens where both dyes reach?
4. Give four safety rules for bleach discharge, and say why some dyed cloth will not discharge.
5. At what temperature is batik wax used, how is it heated, and why must the dye bath be cold or lukewarm?
6. Practical: remove the wax from your batik panel. List the steps you followed and how you recovered the wax, and explain why wax water must never go down a drain.
7. Work out the vat recipe for 6 m of 150 cm poplin (120 g/m²) at 1 : 20, dye 3%, caustic soda and sodium hydrosulphite 8 g/L each, with the cost and cost per metre.
8. Sunbursts at 25 cm centres are tied across 115 cm poplin, 6 m long, with three bindings each. How many sunbursts, ties and metres of twine at 40 cm a tie?
9. A trainee's tie-dyed calico has large pale patches away from the ties and a dark line round each one. Give the likely causes and how to prevent them.
10. A batik table runner has fine cracks all over the white flower, where none were wanted. Explain the causes and how to avoid them next time.

Enjoyed this sample?

This free sample of **Fashion Design Level 4** has the front matter, Chapter 1 and the full Chapter 13 on tie and dye and wax resist: how resist dyeing works, sunburst, spiral, stripe, marble, clamp and tritik techniques, vat and reactive recipes worked out by weight, multi-colour and natural-dye work, faults and quality, batik with the tjanting and crackle, recovering the wax, and costing finished products. The complete guide has **16 chapters** and **292 pages**. It covers both Level 4 units (Styled Garments Production and Decorated Fabrics Production) plus the industry training: design interpretation and specification sheets; dart manipulation, flare, pleats, flounces and godets; styled skirts, trousers, shorts, blouses and dresses from pattern to fitting; zero-waste lays and marker efficiency; finishing, quality control and display; fabric preparation and dye baths; screen, block and stencil printing; finishing decorated fabric safely; and costing every job in KSh.

It also includes 124 realistic illustrations, pattern drafts, charts and photos, 50 worked examples, 37 practical tasks with record tables, 160 practice questions with full answers, eight mock assessments (one per learning outcome), a 211-term glossary, a quick reference of allowances, formulas, size charts, dye recipes and prices, and photocopiable logbook, client specification, quality-check, dye recipe and waste register sheets.

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