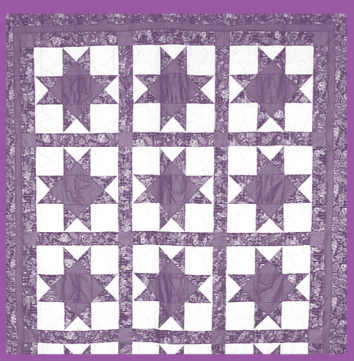
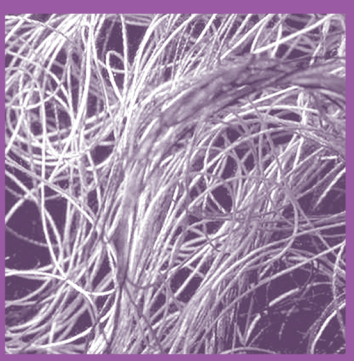
Design & Textiles

Years 12 - 13





Learning Guide

Student Learning Guide

Design and Textiles
Sāmoa Curriculum Years 12 and 13

Prepared by: Linda Moses

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INTRODUCTION

The purpose of this guide is to provide background knowledge and ideas for teachers creating a Year 12 and 13 Design and Textiles programme. Many of the techniques related to the construction of garments and textile items have already been covered in the earlier books written for Years 9-11. There is also considerable information in these books which will help students revise their basic knowledge and understanding of fibre and fabric construction, and fabric decoration - both applied and structural. Wherever possible references will be given to assist teachers in finding relevant information in the books already in schools.

Where appropriate this guide will indicate the links between Achievement Objectives at Years 12 and 13 and outline connections to the Year 13 South Pacific Board for Educational Assessment PSS Certificate in Design Technology.

There will also be some additional information provided that will help teachers extend their own knowledge of topics that need to be explored with Year 12 and 13 students. Where there is a direct relationship between Achievement Objectives at Year 12 and 13 they have been dealt with together e.g. Properties of fabrics and fibres.

GETTING STARTED – Years 12 and 13 linked Achievement Objectives

Here is an example of the first achievement objective in the Year 12 curriculum which is extended in Year 13. **"Students are required to experiment with natural fabrics to determine their properties of strength, elasticity, shrinkage and absorbency in Year 12."**

Students are required to extend their knowledge further in Year 13 by **"Comparing the characteristics of natural and synthetic fabrics for strength, durability, elasticity, absorbency, resilience and heat resistance."**

The starting point here is the Year 9 'Design and Textiles' book. On page 15 the qualities and properties of fibres are listed. It is important to remember that some students studying Design and Textiles in the senior school may not have been through a Year 9, 10 or 11 programme. Others may need to revise this earlier knowledge.

In Year 10 Design and Textiles Book 3, page 32, there is a useful chart that students can use to check out the 'Ratings' of a variety of attributes/characteristics e.g. Strength, Absorbency and Elasticity for a range of both natural and synthetic fibres.

In Years 12 and 13 students are expected to investigate these properties in greater depth. Teachers are advised to revisit the earlier information in the Year 9 book and build from there. Information on the properties of synthetic fibres can be found in the Design and Textiles Year 10 Book 3, pages 30-31. There is more background information on pages 32-41 that cover flammability, durability, strength and fibre blending.

The following information will also help teachers prepare for the teaching required for Year 12 and 13 Achievement Objectives related to FIBRES and FABRICS.

The performance and characteristics of any textile depends mainly on:

- the fibre from which it is made.
- the structure in which the yarns have been assembled.

The following properties depend mainly on the <u>nature of the fibre</u> from which they are made:

- crease resistance
- inflammability
- absorbency
- ability to take up dyes
- heat resistance
- light resistance

This means that when we "experiment with natural fabrics to determine their properties of strength, elasticity, shrinkage and absorbency" students should develop the understanding that natural fabrics will have very similar characteristics.

The following properties depend mainly on the <u>structure of the textile</u>:

- strength
- ease of distortion

To revise the effect that the structure of a textile has on its strength, refer to Page 22 of Year 9 Book 3 Design and Textiles.

The following properties depend mainly on the <u>structure and nature of the fibre</u> from which they are made:

- handling qualities
- thermal qualities
- wear resistance
- washability and aftercare.

In Year 12 and 13 students should have a basic understanding from their learning in science to support their understanding of textile performance and characteristics. First check students understand that the performance of textiles depends on:

- the molecules of the fibre. These consist of atoms held together by chemical forces
- the fibres themselves. These are molecules held together by inter-molecular forces.

Then check students understand that when fibres are made into yarns they are held together by physical forces – friction. The way the fibres are lined up together and the amount of twist put into the yarn will both play a part in determining the strength and durability of the yarn. When the yarns are made into fabric it is the forces between the yarns that create the friction which hold together the yarn as they are interlaced into woven fabric or formed into loops to create knitted fabric.

Finally the fabric is used to make a textile item. Seams will be used to hold the textile item together. The strength of the textile item being made e.g. a skirt, will only be as strong and durable as its weakest link. So a very strong fabric made from a strong fibre will make a useless garment if a weak thread is used for construction.

Students need to understand that when we carry out tests on fabric it may be the quality of the yarn rather than the fibre which creates problems. When we rub a fabric, if the yarn is not well made, the fibres can pull loose. The fabric may become fluffy and in the end the fibres may all work loose to leave a hole.

It is important to point out to students that testing the performance of different fibres is a complex exercise. The obvious way to investigate durability for example would be to get someone to use the fabric. But then people use things differently and wearer tests as they are called take a long time to carry out.

Students need to think about the type of tests that could be created and carried out by them. For example students can carry out tests to discover

- if a fabric will shrink when washed,
- if the colour will run,
- how much it creases when worn,
- how much it creases when washed,
- if the fabric gets weaker or stronger when wet,
- how much liquid can be applied to the fabric before it becomes soaked,
- if it fades in sunlight,
- how readily the fabric tears,
- how well the fabric stands up to heat.

Students will need to do some critical thinking to come up with the tests that they want to carry out to investigate the qualities of fabrics. Remember that at Year 12 it is just natural fibres and at Year 13 they compare natural fibres with synthetic fabrics. To get students started it would be advisable to get them all to carry out a shrinkage test. This will involve them in measuring a square of fabric before and after washing. Keeping a ‘controlled’ sample of fabric is important for students to be able to make comparison.

FABRIC ANALYSIS

Attach a swatch of your original fabric below. This is the control sample.

Name of the fabric: _____

Fibre content: _____

Method of construction: _____

Name of knit or weave if known: _____

DESCRIPTION (of tests used to evaluate the following qualities)	**RESULTS** (from testing the fabric for this quality)	**CONCLUSION**
Shrinkage		
Absorbency		
Durability		
Strength		
Elasticity		
Resiliency		
Heat Resistance		

YEAR 12 - Fibres and Fabrics Achievement Objectives

The next Achievement Objective in the Year 12 FIBRE AND FABRIC section requires students to:

'Investigate the preparation and uses of u'a and fau'.

In the Year 9 Book 3, Page 11, the first reference is made to siapo being made from u'a (Paper Mulberry). In the Year 11 Book 2 Food and Textiles Technology, pages 14-18, there is a section on creating siapo. It covers basic information on the use of natural dyes but it does not provide information on the preparation and uses of u'a and fau.

It is recommended that local people with expertise in the making of siapo be asked to run workshops for teachers on this traditional craft. It would be preferable if local people with skill in siapo could work along side teachers in school passing their knowledge at first hand to senior students.

With the input of local experts, teachers should be able to carry out the following achievement objectives from the curriculum at Year 12.

Experiment with different types of natural dyes e.g. those used in the making of siapo (tapa) cloth.

Investigate the making of siapo (tapa) cloth.

This traditional art form needs to be preserved and developed further for local use, for retailing to visiting tourists and for overseas export. Siapo has always been used creatively in homes in Samoa and now there is a growing trend to incorporate its use in homes overseas. It is also being used in the creation of unique fashion garments. The colour, pattern and form of siapo create a vibrant Pacific feeling for interiors and clothing. When exporting siapo overseas, it is important that quality control is applied. Students could discuss, as an extension to their studies, the importance of quality control and ways of implementing it when producing siapo for the overseas market. This task could be used to help students prepare for the Evaluative Project which is one of their SPBEA Pacific Senior Secondary Certificate tasks for Design Technology in Year 13.

For schools that are unable to seek local expertise to create their own siapo in Year 12 they can still carry out the next achievement objective using siapo that has already been made.

Design and make a craft item that incorporates siapo.

To maximise the use of this Achievement Objective teachers will need to format a design brief for their students. The design brief that teachers provide students with will depend on the amount of experience students have had with Textile Technology during Years 9,10 and 11. It may be necessary for the teacher to give them a very directive 'Design Brief' if they have had limited experience with Textile Technology.

The brief will outline

- the problem or the need
- the task expected to be undertaken e.g. the type of craft item to be made,
- any specifications for the solution and any special conditions, for example
  - who it is being made for. This allows students to interview the type of customer expected to purchase the craft item to find out what sort of items they would be interested in buying.
  - what the craft item's intended end use will be (what the product has to do).
  - any other important details such as other materials to be used apart from siapo.

In the case of Year 12, the teacher would probably decide that the 'specification' could be left more open because the requirement of the related Achievement Objective only states that students will 'Design and make a craft item that incorporates siapo'.

In deciding what the brief will be it is important to read through the 'Learning Guide for Design and Technology'. This will ensure that teachers are preparing their students for the South Pacific Board for Educational Assessment PSS Certificate in Design Technology.

Providing a 'need' or 'problem' gives the student a starting point. So for example the problem might be that

- tourists are looking for items made in siapo that have a functional use in the home.
- a new hotel complex that is open on the beach wants to use functional items made from siapo in the guest fales.
- a village that makes siapo wants to produce craft items that are unique and decorative to sell at the market in Apia.

One of the Minor Areas of Study in the PSSC involves students in "conceiving ideas, practising and refining processes and learning the skills and techniques necessary for the making and replicating of pieces of craft using chosen materials." The prescription goes on to state that 'The design of craft pieces is a crucial part of the process of craft and allows the student to develop skills in the design that satisfy the requirements of form and function of the craft piece which should be able to be replicated'.

Students covering the Achievement Objective at Year 12 "Design and make a craft item that incorporates siapo" are being appropriately prepared for one of their assessment opportunities in Year 13.

YEAR 12 - Techniques and Processes Achievement Objectives

Students will be able to investigate and develop their skills and understanding of production techniques used to manufacture of textile items when they:

Research the factors that need to be taken into consideration when manufacturing textile items for retail.

The aim of this Achievement Objective is to encourage students to explore the skills and knowledge needed to undertake a small production run of textile items which could be sold at a profit. Keeping an account of costings and working out profit margins will be two of the factors that will need to be taken into consideration. Reference to these topics can be found in the Business Studies books.

The main aim of this Achievement Objective is to encourage students to explore skills in design and construction so they can use their spare time for pleasure and/or financial gain in full or part time employment. There are a number of ways in which students can develop their skills in textile technology. Initially it might be members of the family who have skills in this area and are keen to pass them on. A positive experience from working with textiles in school fosters student interest and this can lead to them becoming involved in sewing clothes for family and friends. When students have developed a good standard of finish with techniques and processes associated with garment construction they can adapt these to create a range of other textile items. They may become interested in sewing textile items to sell at the market or art and craft outlet shops and stalls.

The information below will provide some background knowledge for teachers preparing to cover the knowledge required for both the Achievement Objective noted above and the following Year 12 Techniques and Processes Achievement Objectives.

Compare and contrast the different techniques and processes used in manufacturing clothing domestically and commercially.

Report on the effectiveness of quality control in completing the textile items to a marketable standard.

The method of construction used when mass producing manufactured textile items is different to the method used when making 'one off' textile items.

The best way for students to understand this is to organise a visit to a clothing factory or a manufacturing outlet which produces large quantities of textile items. However there will be few students in Samoa who can have that opportunity. But by researching and using manufacturing methods, students will gain an understanding of how these can increase productivity.

One of the first things to be considered when making any item is economical use of resources.

The fabric being used is one of the resources that will need to be conserved. The starting point here is placing pattern pieces on the fabric to ensure that there is minimal wastage, remembering to still follow the rule about 'Straight Grain'. To revise laying pattern pieces on fabric before cutting out, refer to Year 9, Book 3 'Design and Textiles' page 39-44.

In industry, the way the layout is done is carefully planned. Whilst it may only save a few inches per garment it can mean a considerable amount of money is saved when several items are being made. In industry this is known as 'lay planning.' The fabric is laid up in many layers, one on top of the other, and then the pattern is placed on top of all the layers and made to fit so minimum fabric is used. With many layers of fabric to cut through, a factory will use an electric knife cutting through perhaps a hundred layers at once.

Another method used in industry is die cutting. Knives shaped exactly like the part to be cut are laid on the fabric and then pressed through with a heavy press (a bit like using a pastry or biscuit cutter). This method gives a very accurate cut and when used on a large scale is highly economical. This is a method of cutting that would only be found in use overseas where mass production of clothing or textile items takes place. Many thousands of articles would need to be made to cover the initial cost of setting up die cutting. However, it is important that students have knowledge of the technology that is available for garment construction today.

Once the fabric pieces are cut out the next stage is neatening the raw edge of fabric to prevent fraying. The usual method used to do this is to use overedge stitch (often called overlocking in industry). Most students will only be familiar with the use of machine neatening over a small folded edge of the raw fabric or zigzag stitch to neaten edges.

A plain pressed open seam is the usual way of making the join in home sewing. In industry, the joining seam and overedge stitching are sometimes combined in one operation. This is known as overedge safety stitching.

Only when very expensive items are being created will complex seams like French, Lapped and Run and Fell be used. It would be very unusual for these types of seams to be used in industry because they take too long to create and therefore cost too much to use on items being manufactured for profit.

The most popular stitch used for general seams in both industry and in domestic sewing is the normal straight stitch found on the sewing machine. This is known as 'lock stitch'. However, many of the industrial machines use 'chain stitch' The chain stitch machine uses more thread but it does not have an underbobbin. The advantage of this is that the machine does not have to be stopped frequently to load a new under bobbin. The saving of time for machinists doing long seams is worth the slight amount of extra thread used.

The sewing machines used in industry are far faster than domestic machines. A domestic machine operates at approximately 500 stitches per minute while an industrial machine does over 5,000. A machinist has to be highly skilled to be able to run the sewing machine at this speed without making errors.

When it comes to joining together the various pattern pieces in a textile item there is a correct order. Unlike domestic sewing, where just one item is made at a time, in industry construction is carried out using a more time efficient method. One machinist will not be sewing the complete textile item. Each machinist working on the assembly floor will have responsibility for one part or section of the item being constructed. This method of construction ensures that the most economical use is made of everyone's skills. By ensuring that each person focuses on a different set of skills they become faster and this saves on the valuable resource of 'time'.

Below is an example of how the assembly of a textile item might be carried out. Every factory will have its own way of carrying out 'piece construction' depending on the textile item being made, the facilities and equipment available and the skills of the machinists. These are factors that the students will need to take into consideration when they address the Achievement Objective - **"Develop a plan to meet a limited production run of identical textile items to be sold for profit"**

This will be a joint class activity and students will need to share out tasks and develop expertise in their allocated section of the construction task.

Here is an example based on the manufacture and construction of a man's business shirt. This will help students work out their plan of action for their limited run of identical textile items.

1. Once the pattern pieces are cut out in bulk they will be allocated to the various machinists who will be working on the construction.

2. The first machinist might be responsible for sewing the shoulder seams in a shirt and then attaching the sleeve into the armhole. The same machinist may also be responsible for creating the opening at the bottom of the sleeve. (Sometimes this task might be allocated to a different machinist).

3. Meanwhile the second machinist will have been sewing the collar in preparation for attaching it to the neckline of the shirt which has just been created by the first machinist. This machinist may also be responsible for creating the front facing down each side of the shirt.

4. When the second machinist has completed the front opening and attached the collar to the shirt they may then pass on the garment to a third machinist who has been making up the cuffs for the shirts. Their task would be to sew the shirt underarm and side seams together on each shirt and then attach the cuffs. At this stage the same machinist may be responsible for sewing the hem, buttonholes and attaching the buttons. However, it is more likely that a fourth machinist will have this task.

Each machinist will be an expert on the section of the garment they have to complete. As they develop their expertise they will also increase their production rate.

There will also be a person designated with the task of carrying out **quality control**. They have to ensure that each machinist is doing their step in the construction chain correctly. With this type of construction method it is very easy to discover who is responsible for any errors in construction.

Students will have the opportunity to put this Achievement Objective into practice when they carry out the following achievement objective.

"Report on the effectiveness of quality control in completing the textile items to a marketable standard".

After studying the manufacturing process, students should have a clear understanding of the importance of careful planning when it comes to managing a **"limited production run of identical textile items to be sold for profit".**

It is envisaged that students will carry out all the Achievement Objectives in this section in small groups. It will be important for the teacher facilitating this process to ensure that all students participate in the activities involved.

Teachers will develop a good understanding of what each student has learnt from this process by reading through their completed evaluations.

THE DESIGN PROCESS FOR YEARS 12 and 13

Students will be able to apply the Design Process found on Page 82 of the curriculum document when in Year 12 they

- design and make a craft item that incorporates siapo.
- develop a plan to meet a limited production run of identical textile items to be sold for profit.

and in Year 13 when they

- produce a design brief for specific needs and purposes which incorporates structural and applied design.

In all these cases the students will need to apply **Design Principles** by

- writing a statement for a perceived need or situation.
- resolving competing choices of materials, processes and equipment.
- effectively communicating their design thinking and product proposals.
- competently explaining the purpose and construction of design briefs.

For each brief worked with students will be applying **Problem Solving** skills when they

- accept the need to work within organisational structures in the production environment or workplace.
- initiate a design brief from a perceived need or situation.
- investigate a range of solutions thoroughly.
- defend the choices made of equipment, materials and processes.

Finally, students will carry out evaluations of their work having completed their briefs outlined above and they will apply **Design Decisions** skills when they

- Confidently evaluate a product outcome in relation to the design specifications.
- Evaluate the strengths and weaknesses of products from different perspectives including safety, health, environment, cost and appropriate use of resources.
- Evaluate product outcomes in relation to qualities of appropriateness, elegance and simplicity.

YEAR 13 – Fibres and Fabrics Achievement Objectives

The first Achievement Objective which comes under this section has already been discussed on Page 1 of this resource.

> **"Compare the characteristics of natural and synthetic fabrics for strength, durability, elasticity, absorbency, resilience and heat resistance."**

The next step for students at Year 13 is

> **"Investigating special finishes on fabrics e.g. anti-stat, flame resistance, thermal finish."**

The information below will provide some background knowledge for teachers preparing to cover the knowledge required for this Achievement Objective at Year 13.

Fabric Finishing

Fabric finishes refers to a variety of treatments applied to fabrics before, during and after construction. Most of the finishing is done as a final stage of fabric construction to highlight or to modify the fabric's characteristics or qualities.

Some of the finishes can have less desirable effects on the fabric as well as sought after positive effects. For example, crease-resistant finishes applied to cotton will mean that the fabric is less likely to wrinkle; however, it is not as cool or comfortable to wear.

On the other hand, other finishes may impact more than one desirable property. For instance, pre-shrinkage will make the weave more compact, giving the fabric greater dimensional stability and making it more durable.

Being familiar with finishing processes will assist the consumer select a fabric that best suits their particular needs. Some finishes may require extra care when laundering to ensure longer life of the finish.

The finishing processes can be divided into two categories: functional and decorative.

- Functional processes are those which affect the fabrics performance and physical characteristics
- Decorative processes are those which affect the way the fabric looks and handles. The decorative finish on fabrics will always attract the customer before the functional finishes.

The permanence of any finish applied to fibres and fabrics will depend on the techniques used to apply them and the quality of the chemicals and dyes used. Permanence also depends on the consumer's care of the fabric.

It needs to be noted that some finishes are not intended to be permanent. Their purpose is to disguise poorer quality fabric. This is a common practice with cotton fabrics, A starchy substance is applied to the fabric to give it a shine and make it feel stronger. Unfortunately after the first wash the starchy finish starts to disappear and eventually the fabric will be limp and dull.

The chart that begins on the next page gives some basic notes on fabric finishes which should help guide students in their investigation.

Anti-static treatment

Anti-static finishes are important in both the production and utilisation of fabrics. Static charges that develop on fabrics cause them to cling to people, attract dirt and dust and produce sparks and small shocks. Increasing the humidity and adding some lubricant during the manufacture of natural fibre fabrics is sufficient to reduce the problem. However for synthetic fibres, which have been made from chemicals and are therefore low in moisture, a different treatment is needed. Finishes have been developed which improve the surface conductivity so that excess electrons move to the atmosphere, attract water molecules or neutralise electrical charges on the fibres. Many anti-static finishes include all three methods.

Most anti-static finishes lose their effectiveness with time. Using fabric softeners in the rinsing water when washing synthetic fabrics helps to reduce the build up of static. It will prevent the article attracting dirt and prevents it from 'clinging' to the body.

Crease-resistance

This finish is applied to aid resistance of, and recovery from, wrinkles and creases in normal wear. It was the introduction of rayon fibre which creases readily when wet that initiated the development of the first resin finish. Fibres that have strong molecular bonds (good molecular memory) resist wrinkling and creasing, whereas those with weak bonds wrinkle and crease readily. The cellulose fibres do not have natural cross links. Molecular chains are held together by hydrogen bonds that operate like the attraction of a magnet to a nail. The hydrogen bonds of cellulose break with the stress of bending and new bonds form to hold the fibre in this bent position, thus forming a wrinkle. Resin cross links will prevent this and give the fibre good wrinkle recovery.

Urea formaldehyde was the first resin used to prevent wrinkles. Although fabrics treated with this and similar substances became smooth and wrinkle resistant, they had poor abrasion resistance and lessened tear strength. They were also likely to develop a slightly fishy odour from the chemicals used. Today many of these problems have been minimised. By using a blend of polyester/cotton instead of 100% cotton, less resin is needed. The high strength and abrasion resistance of polyester makes these fabrics far more durable.

Flame resistance and retarding

Flame resistant does not mean flameproof. Flame resistant means slow to burn and /or self extinguishing. Flame retardant refers to finishes that are applied to fabrics to make them flame resistant.

Fabrics can be treated to stop them burning once the source of the fire has been removed. The finish is most commonly used on cotton fabric. It is a requirement in some countries overseas to have children's nightwear manufactured with a flame retarding agent.

Mercerising
This is one of the first fabric finishes introduced to improve the quality of fabric. Used on cotton originally and then on other cellulosic yarns e.g. Rayon, Acetate and Triacetate as they were developed, this finish improves the strength and lustre of a fabric. It also increases a fabric's affinity to dye.
Stiffening
Similar to the process above, this finish gives the fabric more body and crispness. Permanent stiffening often involves chemically changing the nature of structure of the fibre so that the fabric maintains its crisp finish through repeated washes.
Waterproofing
Waterproofing makes a fabric impervious to water. The pores of the fabric are completely closed by impregnating them with rubber, waxes or resins which will not let moisture pass through. Unfortunately this also means the air can not penetrate through the fabric once it has been waterproofed so any garment which has been given this treatment will become hot and sticky if worn for any length of time.
Water-repellent
With this treatment the fabric is less waterproof but because the fabric remains porous it is air-permeable making it more comfortable to wear than a waterproofed garment. To create the water repellent finish the fabric is coated with a hydrophobic chemical.

The next two Achievement Objectives are closely linked together.

Differentiate between yarn (e.g. spun and continuous filament) and fabric construction, (e.g. weaving and crochet).

Predict fabric performance based on knowledge of fibre, yarn and fabric construction.

They require students to be able to analyse the make up of textiles by investigating their characteristics in two parts:

1. As a yarn - how was it made? Is it made from a fibre of natural, man-made or synthetic origin? Reaching a decision about these questions will inform students about how the fibre will behave when made into yarn.
2. As a fabric - how was it constructed? The method of construction will determine among other factors the amount of stretch, resilience and elasticity in a fabric. For example cotton yarn woven into medium weight cotton fabric will have little stretch because it is made from spun yarn. The same cotton yarn knitted into T-shirt material will have more give and stretch.

Students need to be given a range of fabric samples to investigate. The work students carried out in Year 12 when they analysed the characteristics of different fabric samples will lead them into this Year 13 investigation.

The basic background knowledge that students need to be able to carry this work out successfully can be found in the first three units of work in the Design and Textiles Year 10 Book 3.

YEAR 13 – Techniques and Processes Achievement Objectives

Three of the Achievement Objectives which come under this section will give students the opportunity to extend the basic knowledge they should have of structural and applied design from work in Years 9 and 10.

Select appropriate materials and use safe practices when creating printed fabrics using a range of methods e.g. block, roller, batik.

Select appropriate materials and use safe practices when creating products that incorporate different types of structural design e.g. appliqué, embroidery, crochet.

Produce a design brief for specific needs and purpose which incorporates structural and applied design.

To revise how these various skills are carried out refer to:
1. Unit 5 - Applied Surface Decoration in Year 10 Book 3 Design and Textiles.
2. Unit 5 - Exploring Textile Printing in Year 11 Book 2.

As with the work in Year 12 based on creating siapo, it is intended that local people with expertise in the skills of fabric decoration be invited to run courses for teachers. If possible it would be to the students advantage if the school could encourage people in their community with the appropriate skills to come in and work with students at first hand. It is also envisaged that the Textile teacher will work closely with the Art teacher in delivering any material where their combined expertise could benefit students. Handing on knowledge at first hand is always the easiest way to learn. However, teachers and students will also find it useful to explore library books and if possible the internet for more information on any form of fabric decoration method they want to explore in depth.

It will also be important for teachers to make links between these achievement objectives and the projects in the SPBEA Pacific Senior Secondary Certificate – Design Technology 1 and 2. For example the Independent Project for Textile Printing and Design reads:

> **Design a garment (skirt/sulu/tee shirt/scarf) to sell during a school 50th Anniversary. It should be of a memorable design and help to raise funds for the school.**

Task:
Choose the decorative method to use. Investigate some patterns/designs and comment on their differences in value/money. Decide on the pattern/design and provide costings to order for one and make (and decorate) the article.

The Expectations:
The article should cost no more than X dollars (teacher to specify the amount) and students to be able to make it in one week of lesson time.

The final achievement objective in the Techniques and Processes section is

> **Explore the influence of technology on textile prints and design using computer aided design (CAD).**

The aim of this achievement objective is to introduce students to the idea that the use of new technology is becoming more widespread in the textile industry. Overseas, more Computer-Aided Manufacture (CAM), Computer-Aided Design (CAD) and Computer Integrated Manufacture (CIM) are being used. It is intended that at some stage in the future students will have access to computerised sewing machines so they can at least explore some basic techniques and processes that use modern technology. The information that follows on the next page will provide a starting point for teachers covering the above Achievement Objective.

TECHNOLOGY AND TEXTILES

An increasing number of production processes can now be done by machines which are controlled by computers. Students need to be introduced to the idea that automated manufacturing is quicker, more reliable and in the long run, cheaper.

CAM is the term used to describe the process whereby parts of a product are manufactured by equipment that is controlled by a computer. With CAM, instructions can be downloaded and stored electronically in machinery very quickly. It replaces the manual operation of machinery so once set up the machine can work continuously. This means there is greater productivity. There is also greater consistency of product and fewer faulty goods. One of the tasks the computer will do is work out the most economical way to lay patterns for bulk cutting of fabric. Once the information has been downloaded to the fabric cutting machinery it can be automatically operated with the push of a button.

The CAD takes the hard work out of drafting. Patterns can be drafted and graded on a computer using CAD and then produced to the full-size using a plotter. Lays can be planned on the computer which can then quickly work out the percentage wastage of fabric created by the use of that lay. This was previously an extremely time-consuming process.

Using numerical control the cutter can then be programmed to cut round each pattern piece on the lay. 80% of the time required for garment assembly goes on handling component pieces. This time can be reduced using robotic devices. Programmable sewing and embroidery machines and garment presses also speed the manufacturing process up considerably.

With the creation of textile designs, a CAD-CAM system can make the colour separations which can be saved onto disc or CD. The disc can then be sent to the mill and the printers can use the information to engrave the screens with the required design. This eliminates any translation from the artist's design concept to the final printed fabric. The computer interfaces with a larger engraver at the mill which will then print the fabric. The quality assurance built into this process eliminates the time and expense of having a stylist at the mill supervising the printing of samples.

Colour matching and the dispensing of the correct dyes can both be done automatically by the computer.

Computer technology has taken the ancient craft of weaving and designing fabrics into a new realm that is faster, cheaper and more accurate than ever before. The method of weaving pattern into fabric can take months without a computer. It involves patterns being fashioned using coloured squares and then translated by punch card into final instructions on the loom. Now the whole process can take just minutes. The CAD package can produce all types of designs from simple to complex and there are sixteen million colours that can be experimented with on screen.