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Arts

Quarter 3 – Module 2:
T-Shirt Printing

ALTERNATIVE DELIVERY MODE

ADM

Arts – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 2: T-Shirt Printing
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Quarter 3 – Module 2:
T-Shirt Printing

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module is designed and written with you in mind. The scope of this module permits it to be used in various learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course but the order in reading them could be changed to correspond with the module you are now using.

After going through this module, the learner is expected to:

1. define silk-screen printing;
2. enumerate the different types of ink and tools used for silk-screen printing;
3. identify the different parts of the t-shirt where logos or prints are commonly placed, and the sizes of each design allowed; and
4. demonstrate the step-by-step process of silk-screen printing on t-shirt.

What I Know

Do you have a favorite t-shirt? Have you ever wondered how that design was printed to your shirt?

After learning about elements of art and principles of design, as well as realizing of modern print arts, you should be able to answer the following:

Direction: Fill in the blanks with the correct words to complete the statements.

1. _____ is a printing technique in which a woven mesh is used to support an attached stencil.
2. _____ is used to spread the paint into the mesh screen.
3. _____ this dulls the paint, makes it a flat, and gives the print a low gloss finish.
4. _____ thins the ink and reduces its viscosity and opacity.
5. _____ is a transparent film that is coated with an emulsion layer that allows for the deposit of large amounts of ink.

1

Have you ever wondered where art come from? Have you ever asked yourself why everything you see are placed in a manner which is pleasing to the eye? The signage, the layout of newspapers, the packaging of everyday products and the different designs used are all colorful and attractive. Some of them are made by hand, but mostly they are produced by modern machineries and equipment.

In this lesson, we will learn about the origin of art. Who were the people responsible in developing printed arts? How to use the different elements of art and principles of design to produce printable arts.

After using this module, you should be able to understand the beginning of printing arts, its application, and the modern machines used in printing.

Are you ready to start? You may go now to the next page and begin Lesson I.

What's In

Read the story. Find out the importance of print.

In the Savanna, there is a little zebra named Zeke who always asks questions.

Why can't I have a different print? Why must I look like the others?
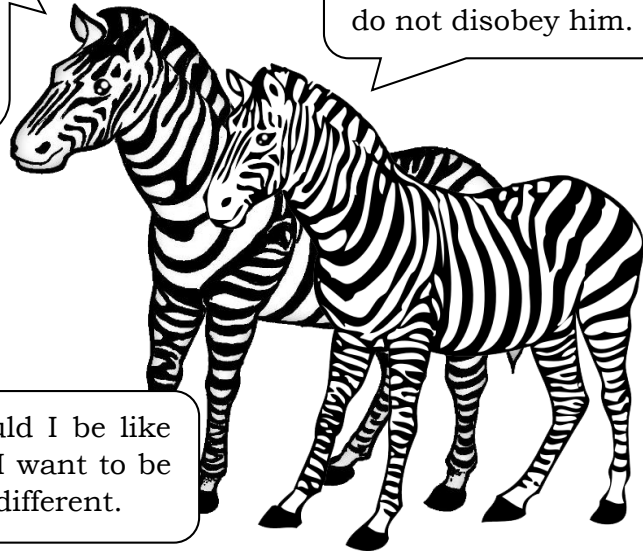
I wish I could be different.

Zeke belongs to the most powerful herd in the Savanna. His father and mother are always telling her to blend in with the herd.

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Suddenly an attack was launched. The predator Tsakah, a cheetah went for Zeke. She was helpless when Tsakah preyed on her. But his brave mother came to her rescue. Her mother snarled Tsakah and Zeke got away. Her mother was wounded and so was Zeke.

Heeeellllppp!!!!

Wounded, Zeke kept crying. She does not know why the Tsakah' choose to go after her.

I did not know why Tsakah chose to eat me. I was the most colorful zebra out there, yet he tried to eat me.

If only I had listened to you mom and dad.

Tsakah chose to run after you because of yoor colored prints Zeke, you stick out among the others. You were very easy to spot.

That is the reason why we kept telling you to blend in Zeke but you never listened. Our kind had survived here in Savanna because of our black and white print. We were made this way so that when predators come at us they will get confused because we all look the same.

5
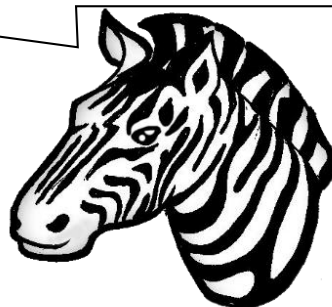
Zeke wanted to be unique and different but in doing so she endangered herself. She did not realize that Zebras looked alike because it is there way of camouflaging from predators. The similar black and white stripe design kept them safe and confused attacking predators.

There is nothing wrong in being different and unique. Uniqueness has its own beauty and characteristics. If we go back on the black and white stripes of the Zebras, none of them has the same pattern but they still look lovely and amazing individually.

Wild Fact:

In the wild Savanna of Africa, NO two Zebra has the SAME pattern print. Each Zebra has its own design of black and white pattern. Like humans, it serves as their fingerprints.
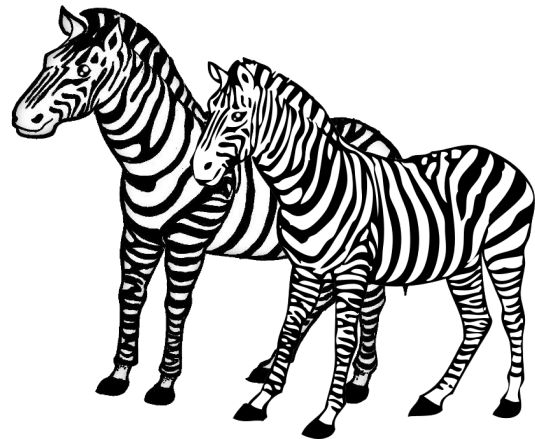
What's New

The most common print transfer technique used individually or in an industrial scale is screen printing.

Screen printing is a printing technique in which a woven mesh is used to support an attached stencil. The attached stencil is created to form open areas blocking the transfer of ink to the substrate below. The ink is placed on the upper side of the screen mesh and a squeegee is used to move the ink across the screen and through the open areas of meas. The ink that passes through the screen is deposited onto the substrate. The ink is then cured using either air, heat, or both, until it has adhered to the substrate and created a permanent or semi-permanent bond.

http://pinoyfranchising.blogspot.com/2006/09/franchising-silkscreen-or-screen.html

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Here is an overview on how screen printing is done.

1.) Create or Edit Artwork
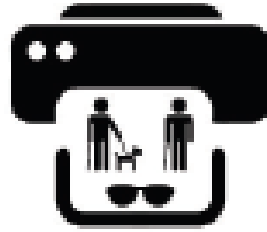
2.) Print Film Positive

3.) Degrease and Dry Screen

4.) Coat screen with Emulsion and Dry thoroughly
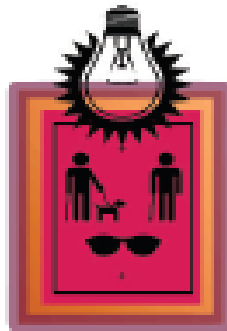
5.) Place film on screen and exposure to UV light
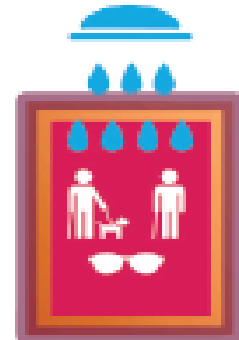
6.) Rinse screen with water until image appears and is clear

7.) Load screen with ink and run the squeegee across until image appears crisp and bright
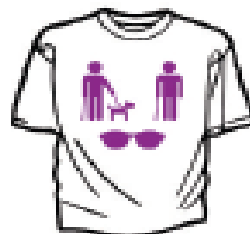
8.) Dry ink to appropriate temp
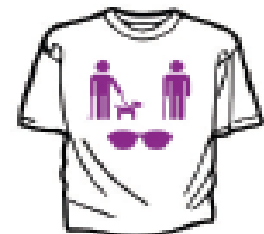
9.) Sell it and make money

To get the best possible print, you must use a good quality ink. Here we will discuss what are the ink types which suits your screen-printing needs.

Although screen printers may utilize a multitude of different ink over the course of their career, most are likely to use only two or three for printing on garments. Because water-based and plastisol inks are two most widely used for garment printing, we will focus on these.

Ink and Paint Types

Plastisol Ink or Paint

Plastisol ink has a high opacity and ability to sit on screen for long periods of time without drying that is why it is the most widely used garment ink. On top of that Plastisol is also durable, flexible, and versatile.

Characteristics of Plastisol for garment printing:

High Density – this makes the ink come straight from the garment without arching.

Puff – this makes the ink pop off the garment with an arch so that it looks puffy and soft.

Soft hand – this reduces the viscosity of the ink and allows for a softer print. and it may also reduce the ink's opacity.

Reducer – this thins the ink and reduces its viscosity and opacity.

Suede – this dulls the paint, makes it flat, and gives the print a low gloss finish.

Water-Based Ink or Paint

Another popular ink for screen printing is water-based inks. It is popular because it saturates the fibers of the garment and essentially dyes the garment rather than resting on top of the fibers like plastisol. Because of this, the print becoming softer and more solid than with plastisol.

Although water-based inks are popular, there are also some restrictions in using this kind of ink for garment printing. These are:

Low Opacity – because water-based inks are thinner and do not retain their base when cured, inks can often have issues achieving high opacity.

Drying – because water-based ink cure via simple evaporation, they can often be problematic if used in very arid environments. In contrast, if water-based inks are used in very humid environments, you may never get them dry without a proper heat source.

Custom color matching – while custom colors can absolutely be made with water-based inks, it is important to remember that they are semi-transparent and may not appear the same when printed.

Discharge Ink or Paint

Discharge ink is offered in both water-based and plastisol varieties and works well in both ways. Discharge ink works by removing the dye used to color the garment and replacing it with the pigmented ink or paint color. The picture below shows some inks or paints have gained popularity in recent years because they allow a printer to work on dark garments without the need for under basing.

Some important things to remember about discharge ink and paints include:

Garment selection – discharge ink will only work on 100% cotton garments. Additionally, printers should know the type of their garments if they chose to use discharge ink or paint because it may cause some issues during printing.

Odor – some discharge inks or paints will put off heavy odor and should be used only in a well-ventilated workspace.

Curing – discharge inks are activated by the heat of the dryer and must be dried thoroughly to work properly.

What is It

In knowing what ink or paint works best with certain types of fabrics, we will give you an advantage in getting best quality prints for your garments.

Let us do an experiment.

Activity 1: Ink or Paint Absorption Test

In this activity, we will do an experiment that would determine what ink or paint would be best for screen printing on different kinds of garments.

Materials Needed:

- o Garment Ink or Paint:
  - Plastisol
  - Water-based
  - Discharge
- o Garments (3 pcs each and all in color white)
  - 100% Cotton
  - Silk
  - Satin
  - Jersey
  - Poly Cotton
- o 1 pc small squeegee
- o Soap and water
- o 1 pc blow dryer or any source of heat.

Kindly follow the directions on how to apply the ink or paint on your garment.

Directions:

1. Lay the fabrics in in sequence and label them.
2. 1 set of garments must be for testing plastisol ink or paint, 1 set for water-based and 1 set for discharge ink or paint.
3. Apply each type of ink or paint in each set of fabrics using the squeegee.
4. Let the ink or paint dry using the blow dryer or any heat source.
5. Observe how the garments absorbs the ink or paint. Using the chart below rate the corresponding categories for pre-washing absorption test.
6. When all paints in the fabrics are dry, wash them with soap and water.
7. Using the second chart for the post-absorption test, rate the retention of the ink or paint on the fabric.
8. Score the ink absorption using the scale provided in the table, before washing and after washing.
9. Keep the data to be analyzed later.

Accomplish the following tables below by rating the quality and performance of inks used in different test with the given scale:

1 – Poor   2 – Good   3 – Very Good

Pre-Washing Absorption Test – Using Plastisol Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					

Pre-Washing Absorption Test – Using Plastisol Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

Pre-Washing Absorption Test – Water-based Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

Pre-Washing Absorption Test – Using Discharge Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

Post-Washing Retention Test – Using Plastisol Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

Post-Washing Retention Test – Water-based Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

| Post-Washing Retention Test – Using Discharge Ink or Paint					
Categories	Types of Fabrics				
	100% Cotton	Silk	Satin	Jersey	Poly Cotton
Density					
Puff					
Finish					
Gloss					
Semi-Gloss					
Flat					
Color Matching					
Odor					
Curing Time					
Rating Scale					
1 – Poor		2 – Good		3 – Very Good	

Silk screen printing would not be completed without the basic tools of the trade. Familiarize yourself with them and know their specific functions.

Tools used for Silk-Screen Printing

Screen Types:

1. Static screen

A static screen is a screen which is comprised of a rigid frame, usually made of wood or aluminum, that has been permanently adhered to a piece of stretched mesh. These are popular due their ease of use and inexpensive pricing.
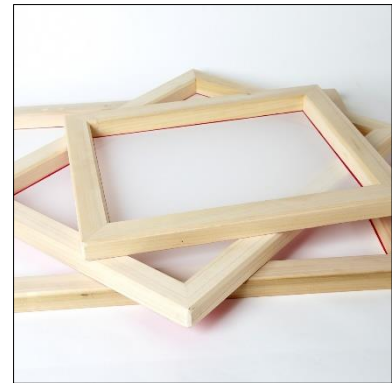
2. Adjustable screens

Adjustable screens are usually made of aluminum and allow the user to stretch the screen mesh to the desired tension either by hand or with pneumatic equipment. They are popular in print shops that uses rapid change of images because you can remove the mesh and simple replace it with a new piece, the need for cleaning of the old mesh is eliminated. Their popularity roused because of the high tensions that can be achieved, they are adjustable.

Emulsion:

Once your screen has been degreased and dried you will be ready to coat it with emulsion. There are two types of emulsion, liquid emulsion and capillary film.

Types of Emulsion

Direct Liquid Emulsions - is spread onto the screen mesh with a tool called a scoop coater. Scoop coaters come in a variety of sizes and have two coating edges, one for thick coats and one for thin. The decision to use one edge or the other will be based upon the thickness of the stencil you will need for your print.

1. Photopolymer

Photopolymer emulsions are premixed with sensitizer by the manufacturer so that they are ready to use straight out of the container. Most photopolymer emulsions will have a faster exposure time that can be a dual cure emulsion because these emulsions can go from under-exposed to over-exposed in a matter of seconds, they are most often less forgiving of errors during the exposure process. Exposure time in using this product must be accurate to within a few second. Photopolymer emulsion is recommended for use in print shops that have very controlled prepress and exposure process.

2. Dual Cure

Dual cure emulsion is a two-part product that comes in two separate containers. The user will mix the sensitizing agent with water and then stir and mix them into the emulsion base. The exposure of a dual cure emulsion is slower than a photopolymer emulsion. This product allows for variance of as much as 30 seconds in exposure time.

Capillary Film

Capillary film is an easy to use and inexpensive means of emulsifying screens. Capillary film is offered in sheets of varying size and thickness because it allows a printed to take a screen out of the box and have it ready to print in a matter of minutes. It is quickly becoming the preferred method of busy shops. Capillary films allow printers to know with certainty that they are achieving optimum stencil thickness.

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Film

Film Types

   1. Inkjet

Inkjet film is a transparent film that is coated with an emulsion layer that allows for the deposit of large amounts of ink. Of the three film types, inkjet film allows for the greatest image opacity and edge definition. Due to the ease and affordability of inkjet system it is popular among print shops.

   2. Laser

Laser film is transparent and designed for use with most laser printers. It is commonly less expensive than inkjet film. Although the opacity of the image printed on laser film is not usually as high as an image printed in inkjet film, many print shops use this product with success. Darkening sprays can be used to enhance opacity but are toxic and should be avoided if possible.

   3. Vellum

Vellum is a thin white or off-white paper product that can be printed with most desktop printers. It is the least expensive film type. However, because vellum is not transparent it can interfere with the transfer of light to the screen, for this reason vellum is not recommended for small or high detail images.

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Types of Exposure Units

1. **Sun**

   The sun is the only free exposure of unit. However, it is difficult to control. Although sunlight has been used to expose screens for many years, it is not a recommended method.

2. **Halogen**

   Halogen work light are inexpensive, easy to use. However, the downside is it produces poor quality of detailed images.

3. **Fluorescent**

   Fluorescent lights are affordable, easy to use, and good for high detail images. Fluorescent units are simple to use, inexpensive and relatively fast exposing. Fluorescent units are the most popular unit type in the market.

4. **Single-point Halide**

   This unit is expensive but reasonable. Easy to use, very accurate with very high detail images and very fast exposing time.
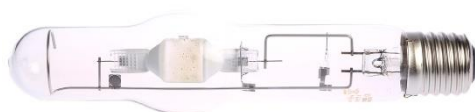
5. Light-emitting Diode

LED units are still in their infancy but are quickly proving to be not only accurate but also incredibly efficient.

6. Washout Booth

Washout booth are only differentiated by size and material. Regardless of which size and type you choose; a washout booth is a great tool for any print shop needs to keep things clean and dry.
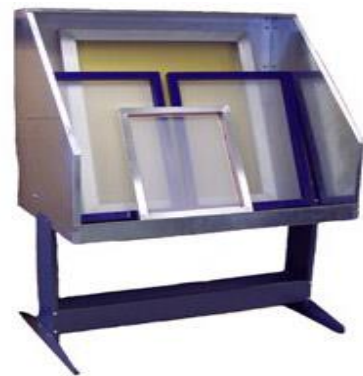
Printing Press Types

1. Table Top

This type of press is the least expensive and it can be paced in any flat surface. However, production is slow because changing garments is done manually.

2. Stand-alone

This unit is also affordable, easy to use and can handle large print designs. With this unit production is fast and the volume of work is in high.

3. Automatic

This unit is expensive. However, it can handle multiple prints in high quantity, production is fast and can produce the greatest multi-color capacity.

Types of Dryer

1. Handheld dryer

This dryer may be a blow dryer or a fan. It is cheap but inconsistent and the drying process is slow.

2. Flash dryer

This unit is affordable and easy to use. However, its results may be inconsistent depending on the environment. It is also hard on the printing pallets because the abrupt burst of heat may damage it.

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3. Conveyor dryer

A small unit of a conveyor dryer can be bought at a reasonable price. It is easy to use, dry garments and ink or paint fast and is reliable.


The above-mentioned tools are the basic materials used in t-shirt and garment printing. If you do not have these tools, do not worry because your teacher will help you acquire them so that you can practice your skill after this module.

There are also other tools that can help you with silk screen printing.

Here are the other tools that will help you make your t-shirt or garment printing consistent and with amazing results.

Other Screen-Printing Tools

Scoop Coater - is a must have tool for coating screen with liquid emulsions.
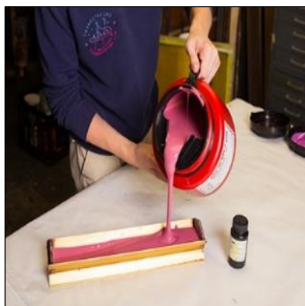
Squeegee - is used to spread the ink or paint in the screen. It is offered in many sizes and styles to fit your needs.

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Ink Knife – an easy and clean way to distribute ink and clean screens.
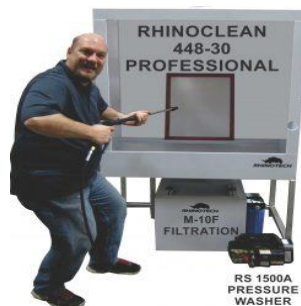

Drying rack – screen racks are an often overlooked but very valuable tool in any shop.

Scrub pad – the perfect tool for scrubbing screen and ink tools.

Pressure washer – a pressure washer is a great tool for cleaning a screen at any stage of the process.

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Laser temperature gun – by using this temperature control, it gives you a peace of mind that comes with knowing that you have properly cured your garments.

What I Have Learned

What is a silk-screen printing?

The most common form of commercial T-shirt decoration is **screen printing**. In screen printing, a design is separated into individual colors. **Plastisol or water-based ink or paint** are applied to the shirt through mesh screens which limits the areas where the ink or paint is deposited.

What are the different types of ink and paint?

- Plastisol
- Water-based
- Discharge

What are the tools used for silk-screen printing?

- Emulsions
- Film
- Exposure Units
- Wash both
- Printing press
- Dryer

Some other materials and equipment in t-shirt printing are as follows:

- Scoop coater
- Squeegee
- Ink knife
- Drying rack
- Scrub pad
- Pressure washer
- Laser temperature gun

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Why is it important that I should learn how to use this materials and equipments?

It is important that I should know how to use this equipment and materials for t-shirt printing can help you make your work easier and can drastically improve the finished product. Knowing how to use this materials is very crucial it t-shirt printing.

What I Can Do

Do you still remember the experiment you did earlier? Have you kept the data?

Let us try to analyze the data to know which garment absorbs, what type of ink or paint best before washing, and what garment retains the ink or paint best after washing.

Answer the following questions:

1. Using the scale, add the scores and divide them by 6. What garment absorbed the ink or paint well during the application?
    a. 100 % cotton
    b. Silk
    c. Satin
    d. Jersey
    e. Polycotton

2. Using the scale, add the scores and divide them by 6. What garment absorbed the ink or paint well during the application?
    a. 100 % cotton
    b. Silk
    c. Satin
    d. Jersey
    e. Polycotton

3. Solve and discuss your answer on a PowerPoint presentation.

Assessment

Write **<u>YES</u>** on the blank if the statement about photography is true and **<u>NO</u>** if it is not.

_____ 1. Scrub pad is the perfect tool for scrubbing screen and ink tools.

_____ 2. Squeegee are affordable, easy to use, and good for high detail images.

_____ 3. Laser film is transparent and designed for use with most laser printers.

_____ 4. Plastisol ink has a high opacity and ability to sit on screen for long periods of time without drying.

_____ 5. High density makes the ink come straight from the garment without arching.

_____ 6. Photopolymer emulsions are premixed with sensitizer by the manufacturer so that they are ready to use straight out of the container.

_____ 7. The sun is the most expensive exposure of unit.

_____ 8. Discharge ink is offered in both water-based and plastisol varieties and works well in both ways.

_____ 9. Discharge ink will only work on 100% cotton garments.

_____ 10. Dual cure emulsion is a two-part product that comes in two separate containers

Silk Screen Printing

Now that you have learned the different materials and equipment used in silk screen printing, it is time that we put that knowledge and skill to the test.

You must start in making your design out of stencil. What design would you like to print in your t-shirt?

In module 1, you have learned about the elements of art and principles of design. Explore in applying some of the elements and principles which are appropriate.

In module 2 - lesson 1, you have learned the different ways of printing a shirt. In this module, you will learn the most common way of printing on garments which is the silkscreen printing. In addition, you will learn about the types of garments suitable for screen printing.

If you are ready, read this module first as a guide and then practice it. You may ask the assistance of your teacher or you can explore it yourself.

Let us begin.

What's In

To start screen printing, there are some points that you should consider.

In making the design prints, you begin first by looking at the differences in the way fabric and paper handle printed designs. Paper as a print medium translates best from what you see from the computer screen to print. Since paper is not as absorbent as fabric, the inks dry faster with minimal color mixing. More important, the inks dry quickly near the surface.

Fabric, however, is absorbent, which allows the inks to saturate deeper than paper, which makes the fabric great for permanent print. This also greatly affects the way how the colors look, especially processing the light-colored inks on dark colored t-shirts.

For example, if you want a white print design on a black t-shirt, the color will change slightly since the black color of the t-shirt will dominate the white ink. The solution to this common problem is running the white ink twice with flashing in between each printer run.

What is flashing?

It is curing ink temporarily with a heat lamp before printing it again with the same screen. Running the same screen twice with flashing allows the ink to become double strength and stops the shirt color from pushing through.

Another very common technique for printing inks on dark colored fabric is to use a white under-base. The process involves printing all the design in white first, in order to create a blank canvas underneath the actual color design. Under base is a very effective method to get the colors as bright and true as possible on dark colored t-shirts. To apply this, make sure the inks are under-based and/or flashed on dark colored t-shirts.

With the process of screen-printing, colors in the design are printed individually with a short period in between each color. This is just enough time for the colors to spread evenly before settling. As a designer, there is a potential for details to be lost if they are too fine-grained, causing colors to spread. The main problem for spreading is the tightness or lack thereof in the mesh of the screen being used to squeegee the ink through. If the mesh is not tight enough, the ink will go through in bigger blobs causing more spreading. The easiest way fix it is to reduce the fine detail in the design in the places that are not necessary.

The complexity of the design could end up being its downfall, turning parts of the design into a mess. For the elements in the design that cannot be removed, take off those parts to make them thicker or try to rearrange them in areas that aren't touching other colors. On the print side, use a tighter mesh screen in case the printer has not already determined the need for one. Another tip is to remove unnecessary fine detail, avoid small design elements from touching other colors, and work with a tighter mesh screen for printing.

Introduction to Inks

Printed t-shirts are worn almost everyday. Heavy usage of a printed t-shirt over time requires the ink to permanently adhere to the fabric and maintain its quality. There are three major ink options for t-shirt print designs, and in order of popularity, they are: **plastisol ink, water-based ink, discharge ink**.

There are numerous benefits to plastisol: longevity and brightness of the print being two of the most important. The disadvantage of plastisol, however, is being thick to the touch. Designs that have a lot of ink coverage on the fabric can become intrusive when they should be seen and not felt.

One solution to this problem is make use of the negative space on the t-shirt. When used properly, incorporating the blank space in the t-shirt with your design can even make it appear as if you are using an additional print color without the disadvantages of additional ink use.

Screen printing inks come in singular solid colors. Each color is printed one at a time to accomplish the completed design. In doing so, it is not advisable to use color gradients, shading or photograph-like images that contain thousands of colors. Nevertheless, it is possible to print these more complex designs in screen printing inks, though quality suffers.

Registration of the Print
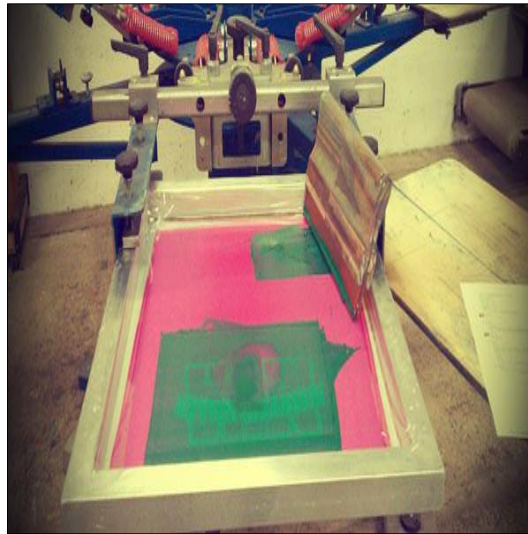
Fabric stretches a lot and rarely maintains a consistent size or shape. It is increasingly difficult when dealing with a material that can change shape.

The technical printing term to ensure the colors are in the right place in relation to the other colors is **registration**. Errors in registration will result in a design that appears misprinted and poorly aligned. Even a slight movement in the fabric can result in a blurry appearance or a misaligned print.

While most of the registration process lies on the print side, you can make it easier and more accurate in the design phase by using **trapping**. Trapping the design simply means adding a very small stroke to the colors that touch each other so there is a little overlap. This small step can make all the difference in registration.

Know Your Colors

Your blue is not someone else's blue. In fact, to get even more granular, your navy blue is not someone else's navy blue. The most widely used universal color system used by designers and printers is the Pantone Color Matching System, or abbreviated as **PMS colors**. It serves the purpose of transferring the color you want in your design to the printer in exact terms. The printer can take the PMS color number you need and mix their standard ink colors to reproduce the PMS color. This is crucial because it removes opinions on what a color should be, and turns it into a measurable result.

If you will take this advice a step further and convert your design colors to PMS colors using a swatch library, you should be aware that your screen settings alter the color's appearances. The best way to ensure that all parties involved in the design and print process are on the same page, is to refer to the paper PMS color chart. Be explicit in your color selection by providing PMS colors for print.
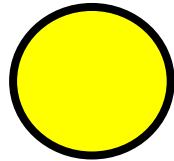
Understanding these problems and solution when using fabric as a design medium can lead you to a more improved finished product. It is very important that you are aware of this things as a designer.
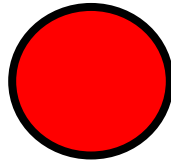
What's New

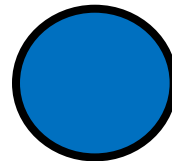Here is an activity that can help you understand how colors behave.
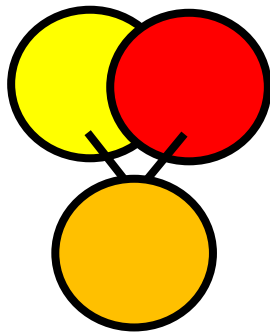
There are what you call the primary colors:
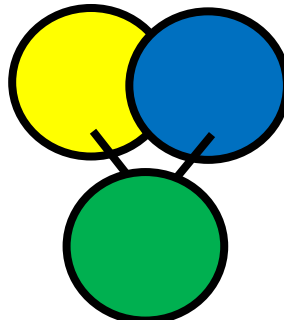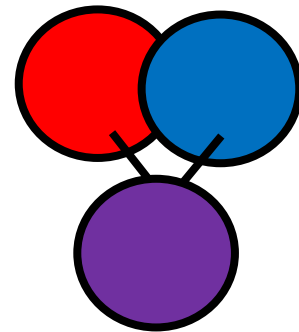
| Yellow | Red | Blue |

By mixing the primary colors, the results will be the secondary colors:

| Orange | Green | Violet/Purple |

Materials needed:

- o 6 bottles of empty water bottles
- o 3 packs of Venus dye (Yellow, Red and Blue)
- o Water
- o Mixing stick
- o Teaspoon
- o 6 pcs of white cotton fabrics

Directions:

1. Fill each bottle with enough water.
2. In the first 3 bottles put 1 teaspoon each of venus dye; yellow, red and blue.
3. Mix well. Observe the intensity of colors. Where the colors dark and intense?
4. Dip the cotton fabrics in each bottle. Did the colors transfer well to the fabrics?
5. Was the color transfer intense and have a deep contrast?

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6. In the other three bottles:
    a. Mix 1 teaspoon each of yellow and red dye. What color came out?
    b. Mix 1 teaspoon each of yellow and blue dye. What color came out?
    c. Mix 1 teaspoon each of blue and red dye. What color came out?
7. Dip the cotton fabrics in the colors and see if the color transferred to the fabric well.
8. Dry the fabrics. Did the colors retain their intensity?

What I Can Do

Now that you have a wide range of knowledge and techniques in screen printing. Let us put your knowledge to skill by this time.

A step-by-step procedure on how to do screen printing is given below.

Screen Printing

Step 1: Preparing all the needed materials

1. Screen printing screen
2. Emulsion kit
3. Ink or paint
4. Masking tape
5. Squeegee
6. 150-watt bulb
7. Iron
8. Negative print design

Step 2: Preparing Your Screen

Your screen will not be prepared when you first buy it. You need to apply masking tape to the inside and back as shown to stop the flow of the emulsion when preparing your screen.
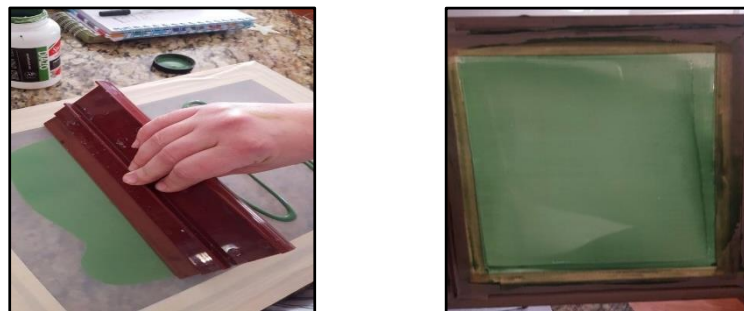

Step 3: Applying the Emulsion

Mix the emulsion as instructed, then pour onto screen.

Step 4: Spreading the Emulsion

Using the squeegee, spread the emulsion on both sides of the screen. Note that since it is liquid, the emulsion will seep through to the other side of the screen when spreading.

Make sure that your screen should be as even as possible, hold it up to light to see if it smooth and all areas are fully covered.

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Step 5: Drying the Screen

Put the screen, flat side up, in a dark room to dry. You can also use a small fan if you want to circulate air so it will dry faster. Mostly, it will take about 3 hours to dry without using a fan.

Step 6: Printing your Transparency

You will need a transparency of the image you want to print. Make sure the image is in black or in a negative image.

Step 7: Exposing Your Screen

On the flat side of the screen, place the transparency upside down then put the piece of glass on top to ensure the transparency is flat against the screen. We put the transparency upside down, because the flat side of the screen is the back side.

Expose the screen with the light about 2 ft. away, for 13-14 minutes. Make sure to time it because an over exposed screen will not wash clean for printing.

Step 8: Checking Your Screen

Once the time is up, turn the light off and remove the transparency and glass. It may not look like anything happened, but when you hold the screen to a light, you will see a difference in color.

By exposing the screen to the light source with the transparency, a reaction occurs. The exposed area becomes hardened and will not wash away. The unexposed area (the image on the transparency) is still soft enough to wash out in the next step.

Step 9: Cleaning Your Screen

Use either a handheld shower head, sink sprayer or pressure washer, to clean your screen. All you need is water and pressure. Note that the only part that will wash away is where the screen was not exposed to light.

Once clean, hold up to light to see if you missed any spots.

If you see any areas on your screen with "holes" (gaps in design or missed coverage of emulsion), just cover with masking tape on the back side of the screen once the screen is dry.

Step 10: Preparing to Print

Use cardboard or any stiff object in between the front and back of your shirt. Don't use corrugated cardboard because the surface may be smooth, but when pressing down to ink your shirt, the waves of the corrugation will show as a pattern.

The reason we use a surface in between the layers is because we don't want the ink to bleed through to the opposite side of the shirt.

Step 11: Placing the screen

Place your screen, flat side down on your shirt. Using the flat side allows the screen to make a direct connection for printing.

Step 12: Applying Ink to the Image

Using a spoon, put a glob of ink or paint on the screen. Drag the glob across the top for even coverage.

Use the squeegee to ink the design onto the shirt.

Make sure it covers the design. Too much amount of ink will cause over-inking and you will lose the sharpness of the design.

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Step 13: Finishing

Pull the screen off, lifting from right to left to reveal your design.

Once 100% dry, iron the image using the highest setting before steam. Iron for at least 10-15 seconds on all areas of the design. Place the iron on one half (no need to apply pressure, just place directly on top of the ink) for 10-15 seconds then move the iron to the other half. This will set the ink and will avoid the design to be washed off.

Now you're done!

Assessment

Answer the following questions below. Write your answers on the space provided before the number.

_____ 1. Which of the following allows the ink to become double strength and stops the shirt color from pushing through.?
   a. Trapping   c. Registration
   b. Flashing   d. None of the above

_____ 2. The following are the three major ink options for t-shirt print designs **except**?
   a. Plastisol ink   c. Discharge ink
   b. Water-based ink   d. Poster ink

_____ 3. Fabric is absorbent. Is the statement **true**?
   a. Yes   c. Maybe
   b. No   d. Sometimes

_____ 4. Which of the following is the technical printing term to ensure the colors are in the right place in relation to the other colors?
   a. Trapping   c. Registration
   b. Flashing   d. None of the above

_____ 5. The following are primary colors **except**?
   a. Violet   c. Yellow
   b. Red   d. Blue

_____ 6. Which of the following refers to adding a very small stroke to the colors that touch each other so there is a little overlap?
a. Trapping   c. Registration
b. Flashing   d. None of the above

_____7. Which of the following does the abbreviation PMS stands for?
a. Phantom Color Matching System
b. Pantone Color Matching System
c. Phantom Colours Matching Systems
d. Phantone Colours Matching Systems

_____ 8. The one of the benefits of using plastisol ink is having longevity and brightness of the print. Is **true**?
a. Yes   c. Maybe
b. No   d. Sometimes

_____ 9. Which of the following is one of the secondary colors?
a. Orange   c. Violet
b. Green   d. All of the above

_____ 10. Paper is not as absorbent as fabric. Is the statement **true**?
a. Yes   c. Maybe
b. No   d. Sometimes

What's More

The following information can give you more ideas on how to place some of your images on your t-shirt for a more stunning and beautiful finish product. Kindly study and read it carefully.

T-shirt Printing – Placing Your Image in the Correct Position

Setting Up Your T-shirt Printing Project:

When we begin t-shirt printing project, it is crucial that we place your images correctly on the shirt so that they look their best. This is particularly important when we are placing an image on the left chest area. I'm sure you've seen T-shirts where the image is placed almost under the arm. We make sure that doesn't happen.

Position T-shirt Printing Across the Chest

Our maximum t-shirt printing area is 10.5" x 8". When we line this up on the t-shirt the top of the image is normally about 3 inches below the bottom of the collar hem.

This is determined by centering the image and also viewing where the line across the bottom of the sleeves would intersect. The image is centered so that the top two thirds of the image is above that imaginary line and the bottom third is below.

Printing in the Left Chest Area

The correct placement of an image or graphic in the left chest area is that the center of the image is directly below the collar hem at the top of the shirt and either sitting on the line from the bottom of the sleeves or slightly above it.

Now naturally different images are going to display differently on the t-shirts so one that we do is we put a T-shirt on a mannequin or a person, place the image and then evaluate that printing position by measuring. We do not just eyeball it simply because we want all of the shirts to look consistent.

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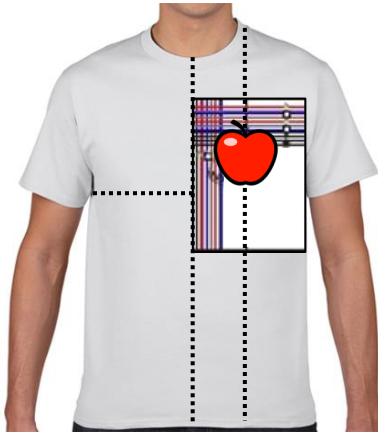
Creating a template for your T-shirt Printing

Once we have determined the optimal position for your logo, we simply create and print a t-shirt printing template on cardstock. We cut out where the image shape so that we can place the transfer into the hole. This allows us to lay the template on top of the shirt, place a transfer through the hole directly to the shirt, line the transfer up, hold the transfer in a place while removing the cardstock template and then pressing the shirt.

This way the t-shirt printing is on straight and the shirts look great!

T-shirt Printing on the Back of the Shirt

When doing the t-shirt printing on the back, the same general guidelines apply as for the front. So again, this means centering on the shirt with two thirds of the image being above the line that would intersect the bottom of each sleeve and the other third below the line.

Now there are times when the image which sits on that line because naturally it's all about how it visually looks. There are also times when we will shift the transfer up so that the t-shirt printing remains balanced looking.

Printed just Below the Collar

The image must be about 4 inches below the bottom of the collar since when the t-shirt is laid flat on our heat press, the hem of the collar on the front is lower than that of on the back.

Naturally, we can also print on different areas of the shirt such as the sleeves and down at the bottom hem or off to the side, but this should give you an idea how we go about lining up your t-shirt printing.
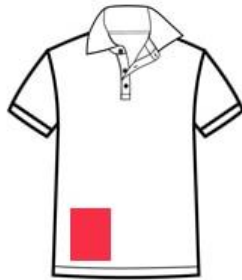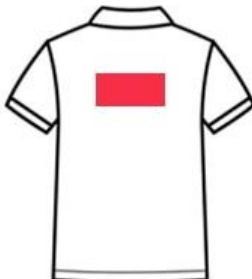
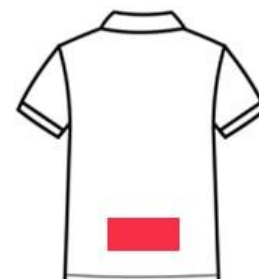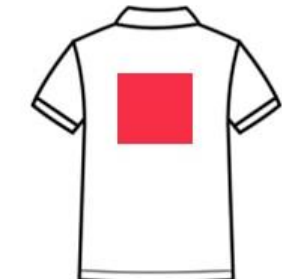**LOGO POSITION**

A

B

C

D

E

F

G

H

I

J

K

L

T-shirt Placement Guide

These are some suggested sizes and placement for your T-shirt designs.

Centered Design Area
- Adult Standard Front 11" x 11"
- Youth (med/lg) 10.5" x 10.5"
- Youth (small) 8.5" x 8.5"
- Toddler 5.5" x 5.5"

Centered Design Placement
- 3–3.5" from the collar, for any size shirt

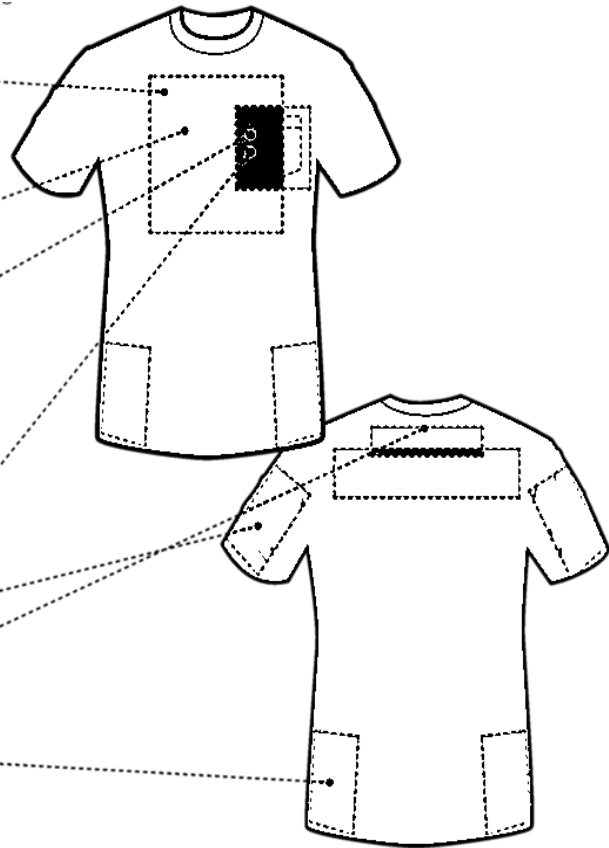**Left Chest/Pocket Design Size**
- Adult 3.5" x 3.5"
- Youth (med/lg) 3.5" x 3.5"
- Youth (small) 3.5" x 3.5"
- Toddler 2.5" x 2.5"

Left Chest/Pocket Design Placement
- 5.5–8" down from the shoulder's left seam
- and 4–6" over from the center

Other Placement Options
- Sleeves
- Vertical down the front
- Hip area
- Yoke
- Upper back

Answer Key

Lesson 1

What I know
1. Screen printing
2. squeegee
3. suede
4. reducer
5. Inkjet film

Assessment
1. T
2. F
3. T
4. T
5. T
6. T
7. F
8. T
9. T
10. T

Lesson 2

Assessment
1. b
2. d
3. a
4. c
5. a
6. a
7. b
8. a
9. d
10. a

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https://www.instructables.com/Screen-Printing-3/