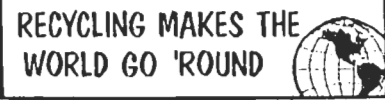


# Screen Process Printing:

## Hand-Cut Film, Bumper Stickers



### Introduction

**Screen process printing**, often referred to as silk screen printing, is accomplished by forcing ink through a stencil which has been attached to a piece of tightly woven fabric stretched over a frame.

Screen process printing is a versatile printing method used to print on a variety of surfaces and shapes. Paper, glass, fabric, plastic, wood, and metal are some of the materials on which we can screen print. The **stencil** for screen printing can be created by a number of methods. These methods include paper, hand-cut film, and photographic stencils.

**Hand-cut film** consists of a thin layer of gelatin with a plastic backing. There are two types of hand-cut film: **lacquer film**, which is soluble in lacquer thinner, and **aqua film**, which is soluble in water. For this activity, hand-cut lacquer film will be used.

### Job Description

This activity package deals with the design and production of a bumper sticker. The purpose of any printed job is to communicate a message. Before you can begin your design, you must have an idea of the message you are trying to communicate with your bumper sticker. The size of your bumper sticker will provide some limitations to the design possibilities.

Once you have completed your design, you will prepare a stencil for screen printing using hand-cut lacquer film. This form of stencil will also limit your design to some extent, as your artwork must be able to be hand-cut.

Next you will adhere your stencil to a printing frame and follow printing procedures similar to those used in the printing industry to print your bumper stickers.

### Materials and Supplies

To complete this activity, you will need the following materials:

tag board, bristol board, 6" x 13"  
non-photo reproducing pencil  
rubber cement  
rule, T-square, and triangle  
masking tape  
tracing paper  
clip art books  
lettering samples  
11" x 17" paper for sketching  
lacquer film  
stencil knife

adhering liquid  
blockout liquid, or wide masking tape  
screen frame with fabric  
screen base  
squeegee  
ink  
soap  
newspapers  
cleanup rags  
mineral spirits  
bumper sticker material

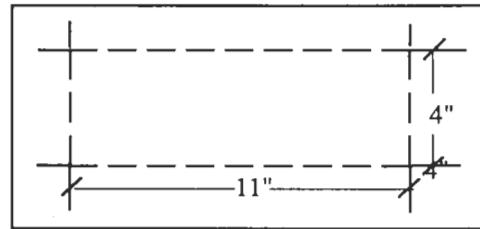
## Preparing Your Design

The first step in the design process for your bumper sticker is to draw your thumbnail sketches. By making a number of **thumbnail sketches**, you can explore various layout possibilities. Use the design sheet included for sketching your thumbnail sketches. Remember that the thumbnail sketches are drawn in proportion to the actual printed product.

After you have selected the most pleasing thumbnail sketch, you are to draw your design to actual size. The size of your bumper sticker will be 4" x 11". This **rough layout** should be considerably more detailed than the thumbnail sketch. Draw your design full size in pencil, with typefaces hand-lettered. Sketch in any artwork. You may use a series of parallel lines to represent smaller text copy, if there is any in your design. Remember that a bumper sticker should be able to be read from a distance, so try to keep all lettering fairly large.

After your rough sketch has been approved by your teacher, your next step is to prepare a **mechanical layout** on your illustration board. This final pasteup is done after all the design elements are completed. When positioning the copy elements, a T-square, triangle, and rule must be used. A light blue pencil is used to draw layout lines and guidelines. Begin by taping your illustration board to the drawing board and laying out your 4" x 11" rectangle. Rubber cement should be used to attach the copy elements to the illustration board.

There are several options for preparing your lettering. You may use the sample alphabet provided or a lettering book to trace your letters. If available, using a computer or lettering machine would be a good idea. If you are artistic, you may wish to design your own lettering. For any necessary artwork, clip art books will provide a ready source for your design.



Sample: Layout prior to paste-up

## Preparing Your Stencil

Cut a piece of film about 2" larger on all sides than your design. Place the film on top of your design with the gelatin side facing up. Use masking tape to attach the film, making sure that the film is centered over the design.

Using a sharp **stencil knife**, cut along the lines of your design. You must use a light knife pressure, cutting through the top layer of the film only. Do not cut through or **emboss** (make an impression on) the backing film.

Carefully lift and peel away the gelatin from the plastic backing only in the areas to be printed. Remember, you are peeling away the gelatin layer from the film only where you want the ink to go through the screen. When you have completed this process, remove the tape and your design from the back of the stencil film.

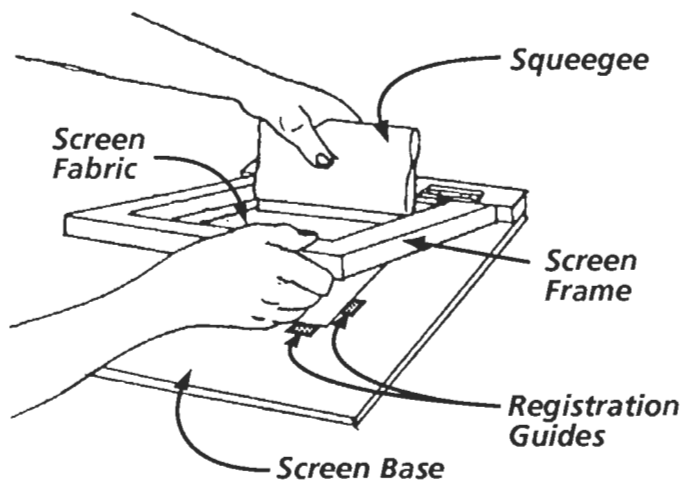
## Safety

Use all tools and materials in the screen printing area only with the teacher's permission. Use stencil cutting tools in approved holders and keep the cutting edges sharp.

Use screen inks and solvents only in well-ventilated areas. Many of them give off toxic fumes. Wear appropriate eye protection when working with screen inks and solvents.

## Printing Equipment

The screen **frame** is a wooden or metal rectangle, similar to a picture frame, that holds the fabric tightly stretched. **Screen fabric** must be a porous mesh material. Screen fabrics which can be used are silk, organdy, nylon, polyester, cotton, and fine-wire mesh. The size of the mesh, or weave opening, is indicated by a number, with the most commonly used being a 12XX fabric. There are two common methods of stretching the fabric on the frame. They are the **staple method** or the **tite-stretch**, or cord method. Which method you use will be determined by the types of frames available in your lab. Your teacher will show you the recommended method of stretching your fabric. Remember that the fabric must be tightly stretched on the frame and that new fabric must be washed to remove the sizing. The **screen base** provides the flat surface on which you will print. You must position the stock to be printed by using registration guides. Three **registration guides** are usually used, with two guides along the length of the stock and one on the left side. The **squeegee** is the rubber-bladed tool used to force the ink through the stencil.



Typical screen printing set-up.

## Adhering the Film to the Screen

Select a screen frame that is at least 2" larger on all sides than your design. Place the frame over your stencil. To insure that there is a good contact between the film and the frame, place several layers of newspaper (cut smaller than the frame) underneath your film.

Use two clean cloths, or cotton pads, to adhere the stencil. Moisten one with **adhering liquid** and wipe it over a small portion of the stencil. Immediately wipe the area with your dry cloth. The gelatin is softened by the adhering liquid, and applying downward pressure on the frame during this process will force the film to stick to the frame. Continue wetting a small area at a time and drying it until the entire stencil has been adhered.

The stencil will darken in color when adhered to the screen fabric properly. Too much adhering liquid and rubbing will destroy the stencil. If a small area has not adhered, you may go back over that area carefully.

When the stencil is dry, which takes about 15-20 minutes, slowly peel off the plastic backing sheet.

Before you can begin printing, you must block out those areas you do not want to print. The most commonly used materials are masking tape, paper mask (kraft paper), or blockout liquid. Check with your teacher to see which is the preferred method in your classroom.

## Safety

Keep all flammable liquids in approved containers and cabinets. Return cleaning rags to approved metal fireproof containers. Clean up oils, paints, or inks that are spilled on the floor immediately.

## Printing Your Bumper Sticker

Before you begin printing, you will need to prepare your work area. It is a good idea to place newspaper or some other protective paper on your work surface.

Get all the supplies that you will need for printing, including bumper sticker material, practice paper, ink, and solvent. Check with your instructor as to the kind of ink needed for this project.

Attach your frame to the printing unit. You will need to center your image on practice paper cut the same size as your bumper sticker. This can be done by lining up your original design under the frame. Use small pieces of cardboard taped to the printing unit along the bottom and one side of your paper. These **registration guides** will help you to position each paper or bumper sticker correctly. Place a sheet of practice paper on the printing base and lower the frame. Using an **ink knife**, place a small amount of ink inside the frame above the image. Select a squeegee that is slightly wider than your design. Holding the squeegee at a 30 degree angle, pull the squeegee across the screen while applying downward pressure. To avoid smearing your image, go over the stencil only once for each print.

Raise the frame and remove your print, placing it on the drying rack. If your practice copy is acceptable, continue printing by placing your bumper sticker in position and repeating the printing process until you have printed the required number.

## Cleanup

When you have finished printing, remove any excess ink from the frame and the squeegee using the ink knife and placing it back in the can. If a paper mask or masking tape was used, remove it from the frame at this time.

Using a cloth and ink solvent (water or mineral spirits, depending on the type of ink used), clean the remaining ink from the squeegee and ink knife. Place newspaper under the frame, and pour a small amount of the ink solvent directly onto the screen. Wipe the screen with the cloth, pouring more solvent as necessary. You may need to change the newspaper and cloth several times during the process. Continue until all ink has been removed. Check that the screen has no clogged areas by holding it up to the light.

Once the stencil has been cleaned properly, it may be saved and reprinted at another time, or it may be removed from the screen so that a new stencil may be adhered.

## Vocabulary

stencil	emboss
screen process printing	screen frame
hand-cut film	screen fabric
lacquer film	screen base
aquafilm	registration guides
thumbnail sketch	squeegee
rough layout	adhering liquid
mechanical	solvent

## On Your Own

One advantage of screen printing is that it can be done on many different materials. Look around your home, school, and community and create a list of different materials and products which have been screen printed.



Office of Vocational, Adult,  
Career, and Community  
Education  
Technology Education  
Dade County Public Schools  
Miami, Florida

## **TEACHER GUIDE**

### **SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS**

**Objectives:** Upon completion of this assignment, students will be able to:

- Demonstrate knowledge of the design process.
- Prepare thumbnail sketches for the assigned project.
- Prepare a rough layout for the assigned project.
- Prepare a comprehensive layout, demonstrating proper use of basic layout tools and materials.
- Prepare a hand cut stencil for the assigned project.
- Reproduce the design using the screen process method.

#### **Helpful Hints:**

1. Collect sample bumper stickers, or ask students to bring them in for extra credit. A bulletin board display of the samples will motivate students.
2. Have students complete the Language Arts Application first. This will cause students to think of possible slogans the design can be based upon.
3. Have students determine the purpose of the message to be communicated on their bumper stickers. You may want to have all class members center their designs around a theme, ie: recycling, driving safety, or school spirit.
4. Review the basic principles of design: balance, proportion, contrast, rhythm, and unity. Have students identify these design principles as they apply to the sample bumper stickers. What works, what doesn't work, and why? Why is type size particularly important in the bumper sticker design?
5. Define the design process and review the steps: thumbnail, rough, comprehensive, mechanical (final art).
6. Obtain several copies of your school mascot. Make photocopies of the designs on a copy machine. Enlarge and reduce them to use as design materials for your bumper stickers. These copies can be traced on a light table for those students who have difficulty with freehand drawing.
7. Clip art books will help students come up with ideas and artwork. Be sure to photocopy the pages to save wear and tear on the originals.
8. Sample font sheets have been included in this package. You may want to reproduce these sheets for student use. If you have a desktop publishing system, have students use the computer to generate their written copy.

**TEACHER GUIDE**  
**SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS**  
**(Cont'd.)**

9. Bumper sticker stock is available from most printing paper supply houses. This is "tough" material that will stand up to weather. However, a cheaper alternative is "crack & peel" pressure sensitive label material available at most paper supply stores. Arvey has it available in small quantities off the shelf. Sheets 8 1/2" x 11" in size can be cut in half to make two stickers 4 1/4" x 11".

**LANGUAGE ARTS APPLICATION  
SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS**

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Student Name

In all types of jobs you will find that you need the ability to communicate your ideas effectively. Writing skills are necessary in all occupations. Here are a few examples of how writing skills are related to this activity.

In this activity package you will be designing a bumper sticker. Bumper stickers often contain messages, lines of copy related to the design, or even humorous quotations. Messages can be as simple as "We Can't Wait For Tomorrow; Recycle Today" or "Recycling Makes The World Go Round", like the examples on the front of the activity package.

Before you begin to create your design, consider what message you want to convey.

1. In the space below, write several different slogans that you might want to use on your bumper sticker.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

2. What illustrations could you use for the messages you have developed above?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

**MATH APPLICATION**  
**SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS**

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Student Name

In all types of jobs and occupations you will need the ability to apply mathematics effectively. Here are a few examples of how math skills are used in relation to this activity.

This screen process printing activity requires you to use lacquer film, which is usually sold in rolls. A screen printer must charge the customer for the supplies used for the job, including the cost of the film for the stencil. These calculations can be easily figured by measuring the area of the film for the project to be printed. Cost can then be computed by multiplying the area by the cost per unit. Area can be calculated in square inches for small projects, and in square feet for large projects.

The measuring of area involves determining the number of unit squares that are equal in measure to the given area. To find the area of a square, rectangle, or parallelogram, simply multiply the length by the width.

Example: A customer needs posters that are 3 feet long and two feet wide.

$$\begin{aligned}\text{Area} &= \text{length} \times \text{width} \\ \text{Area} &= 3 \text{ ft.} \times 2 \text{ ft.} \\ &= 6 \text{ ft.}^2 \text{ or } 6 \text{ square feet}\end{aligned}$$

**Try these:** Calculate the area and/or costs for each of the following problems.

1. The length of a rectangle is 8 inches and the width is five inches. What is the area in square inches?

Answer: \_\_\_\_\_

2. One side of a square is 2 feet long? What is the area in square feet?

Answer: \_\_\_\_\_

3. Mr. Sloan wants to tile his family room floor. The room is 14 feet long by 10 feet wide. How many square feet of tiles will he need?

Answer: \_\_\_\_\_



**MATH APPLICATION**

**SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS (Cont'd.)**

4. Mary wants to paint one wall of her living room. The wall measures 21 feet by 8 feet. How many square feet will she need to paint?

Answer: \_\_\_\_\_

5. Advertising space on a billboard costs \$15 per square foot. The Acme Tire Company wants to rent a billboard that is 25 feet long and 12 feet high. How many square feet does the billboard have?

Answer: \_\_\_\_\_

What will Acme's cost be for the billboard?

Answer: \_\_\_\_\_

6. How many square centimeters of glass are needed to cover a picture which measures 25 centimeters by 35 centimeters?

Answer: \_\_\_\_\_

7. Figure the supply cost of the film for the four screen projects listed below if the film costs 4 cents (\$.04) per square inch.

- A. 10 inches by 12 inches

Answer: \_\_\_\_\_

- B. 11" x 14"

Answer: \_\_\_\_\_

- C. 11 inches by 17 inches

Answer: \_\_\_\_\_

- D. 22" x 34"

Answer: \_\_\_\_\_

**QUIZ**  
**SCREEN PROCESS PRINTING: HAND-CUT FILM, BUMPER STICKERS**

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Student Name

**Multiple Choice:**

- \_\_\_\_\_ 1. Screen process printing :
- A. is also referred to as silk screen printing.
  - B. allows you to print on a variety of shapes and surfaces.
  - C. is accomplished by forcing ink through a stencil.
  - D. all of the above.
- \_\_\_\_\_ 2. The rubber-bladed tool used to force ink through the screen is the:
- A. frame
  - B. squeegee
  - C. registration guides
  - D. stencil knife
- \_\_\_\_\_ 3. A common method of stretching the screen fabric on the frame is:
- A. with staples
  - B. using masking tape
  - C. the tite-stretch method
  - D. both A & C.
- \_\_\_\_\_ 4. The adhering liquid for lacquer film is:
- A. mineral spirits
  - B. water
  - C. lacquer thinner
  - D. none of the above.
- \_\_\_\_\_ 5. Thumbnail sketches are:
- A. drawn small, but in proportion to the printed product.
  - B. drawn the same size as the product to be printed.
  - C. the final step in the design process.
  - D. none of the above.

**True or False:**

- \_\_\_\_\_ 6. Methods for making a stencil for screen process printing include paper, hand-cut film, and photographic film.
- \_\_\_\_\_ 7. The two forms of hand-cut film are lacquer film and thermal film.
- \_\_\_\_\_ 8. When cutting your film, use heavy knife pressure so that you can emboss the plastic backing.
- \_\_\_\_\_ 9. The film is removed or peeled away only from the areas to be printed.
- \_\_\_\_\_ 10. Inks and solvents should be used in well-ventilated areas.

**QUIZ**

**SCREEN PROCESS PRINTING:**

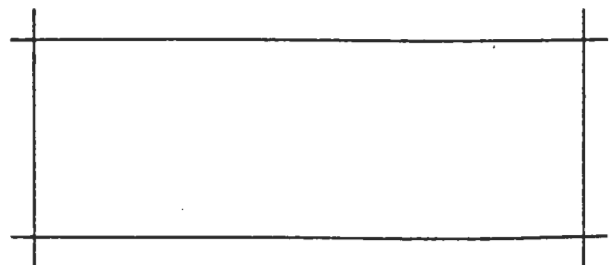
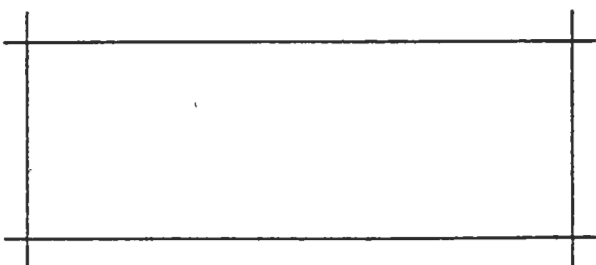
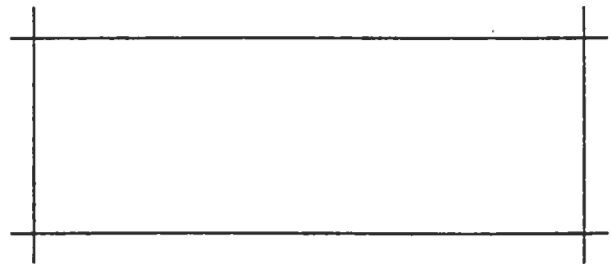
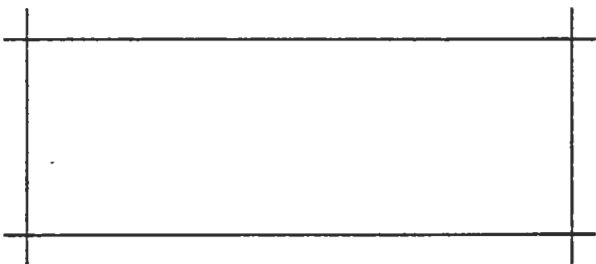
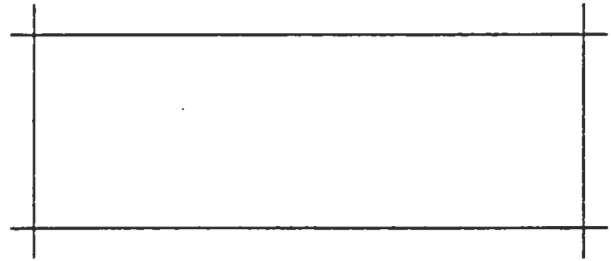
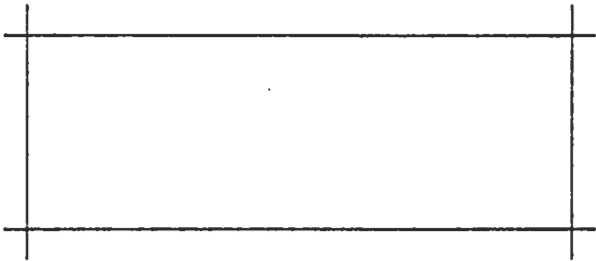
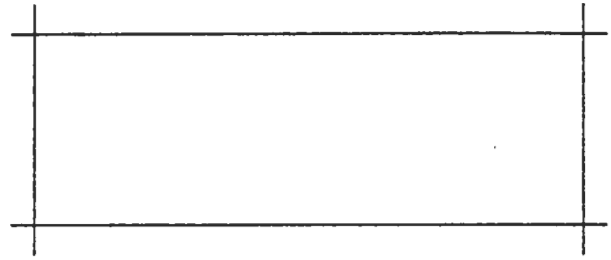
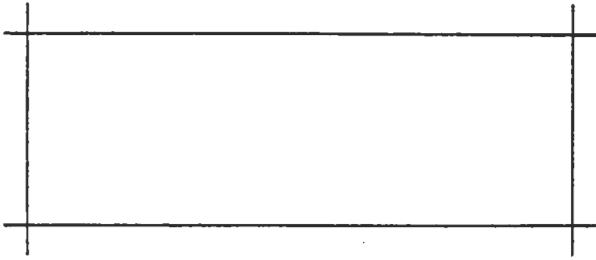
**HAND-CUT FILM, BUMPER STICKERS (Cont'd.)**

- \_\_\_\_\_ 11. Too much adhering liquid and rubbing will destroy your stencil.
- \_\_\_\_\_ 12. After adhering the film to the frame, you must wait at least 24 hours before peeling off the plastic backing.
- \_\_\_\_\_ 13. Block-out liquid is the only acceptable method of blocking out the open areas between the film and the frame.
- \_\_\_\_\_ 14. It is important that you select a squeegee that is the same size as the design to be printed.
- \_\_\_\_\_ 15. To avoid smearing your design when printing, you should go over the stencil only once for each print.

# Screen Process Printing of a Bumper Sticker

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Place Thumbnail Sketches Here:



**AAABBBCDD**

**DEEEFFGGHH**

**HHIIJKLLMM**

**MNNNOOPPQ**

**RRRSSTTUUVV**

**WWXYZ&&"":;**

**AAABBBCDDDEEEFF**

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