Learning Activity Package
Instructor Information

A. System Title: Communication Grade Level: _____

Concept: Graphic Communication 3D

Course Title: _____

B. Activity Title: Photographic Processes - Pin-Hole Camera

C. Length of time to complete this activity: 10 periods.

D. Objectives
As stated in the student activity package

E. Resources

As stated in the student activity package

F. References

As stated in the student activity package

G. Special safety considerations

General safety rules and procedures used in a comprehensive general shop.
Specific rules that apply to photography supplies and equipment.

H. Evaluation Criteria

Final project must be effectively used to the instructor's standards. Instructors should print a list of the requirements students must meet to be successful at this activity. Students should receive a copy of this list.

Student Learning Activity Package
for
Technology Education

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D. Introduction

If the photographic process suddenly disappeared from our society, many of our sciences, arts and social institutions would be unable to function unless the process or a substitute were immediately reinvented. Photography is woven into the fabric of our everyday life. Thousands of careers have been developed around a photographic process - studio photographer, accident investigators, graphic artists, journalists, etc. Virtually every home in the United States has at least one camera and yet very few of us know what takes place in the photographic process.

Of all the many inventions of the 19th century - (electric lamp, safety pin, dynamite, the automobile, to name just a few) - the invention of photography probably created the most astonishment and delight. Today most people take photographs for granted, but early viewers were awed and amazed by the detailed images the camera made:

"We distinguish the smallest details; we count the paving- stones; we see the dampness caused by the rain; we read the inscriptions on a shop sign..."

Photography gradually took over what previously had been one of the main functions of art - the recording of factual visual information, such as the shape of an object, its size and how it related to other objects. Instead of having a portrait painted, people had "Sun Drawn Miniatures" made. Instead of forming romantic notions of battles and faraway places from paintings, people began to see first-hand visual reports. Photographs recorded images that the unlaid eye could not see and social miseries that the eye did not want to see. Photography then began to function as an art in its own right. The complete photographic process was first developed in the

19th century, yet, basic optical and chemical principles had been around since the time of Aristotle (10th century). The 10th century Arabian scholar Alhazen described in detail that light rays passing through a pinhole would produce an image. By the time of the Renaissance, a lens had been fitted into a camera abscura (literally a "dark chamber" used to view an eclipse of the sun) to improve the sun's image. Camera abscuras were gradually reduced in size from a fixed room to a small tent and finally to a small portable box. Camera abscuras became important to artists who would project the image of their subject onto paper, pencil in the general outlines and then lay on colors later.

The next step in the development of the photographic process was to find a way to permanently save the image projected into the camera. The darkening of certain silver compounds by exposure to light had been observed as early as the 17th century, but the unsolved and difficult problem was to halt this reaction so that the image would not darken completely.

In 1826, Joseph Nicephore Niepce of France, developed the first true photograph. Niepce and another Frenchman, Louis Jacques Mande' Darguerre, worked together to further develop photography. Since photography's first development, the process has undertaken continual refinements each year. Today, there are many different types of high quality photographic films and processes.

Black and white photography is one of the easiest photographic processes to learn. Many of the worlds most famous photographers choose to use black and white photography because it is said to be a more creative medium than color photography.

This learning activity will explore the following aspects of black and white photography: the film, the camera, creative composition, developing film, exposing, developing, and mounting photographic prints.

Resource: Photography by Barbara and John Upton, Copyright 1976, by Little, Brown and Company, Inc., 6th edition.

E. Objectives

The student will:

- produce photographs using 5 different darkroom techniques commonly used in photographic communication.
- gain an understanding of each different darkroom process and the effect each has on the message the picture delivers.
- realize practical application for each of these processes.
- develop an appreciation for professional photographers' use of these techniques in adding meaning to their photos.

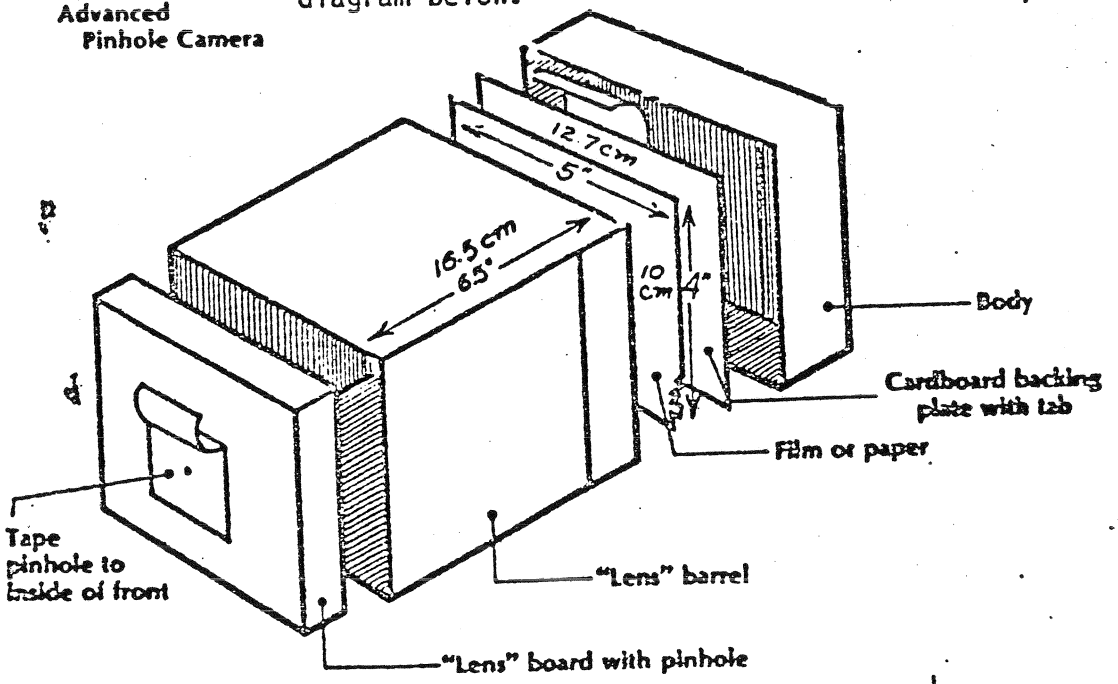
F. Procedure

PIN HOLE CAMERA

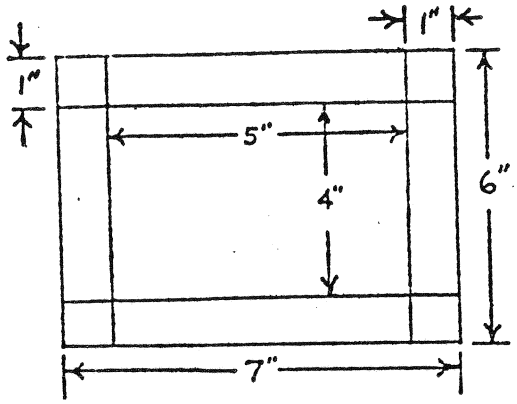
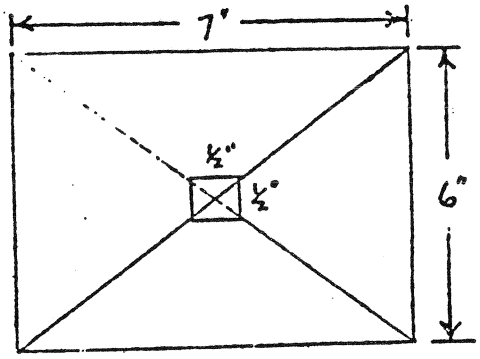
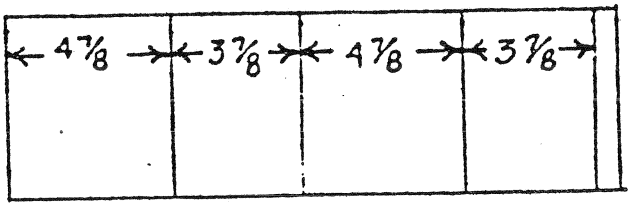
The object of this packet is to build and use a pin hole camera. A pin hole camera has no lens to collect and focus light rays. The pin hole acts as both the lens and aperture. If the pin hole is small, all points of the image will be sharply in focus. If you make your pin hole too large, the picture will be out of focus. With the correct size pin hole, a very long exposure is needed even in bright sunlight.

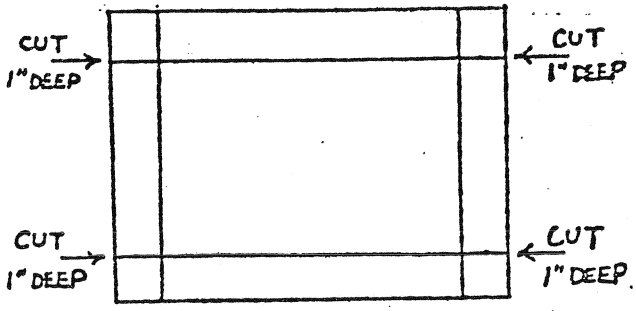
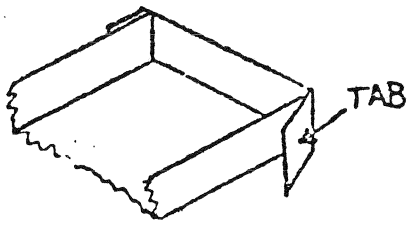
STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
1.		Your pin hole camera will have three main parts - the Body, a 4-sided box to hold the film; the "lens" board, another 4-sided box with the pin hole; and the "lens" barrel, a rectangular tube open at both ends to connect the body and "lens" board. Study the diagram below.	

Advanced Pinhole Camera

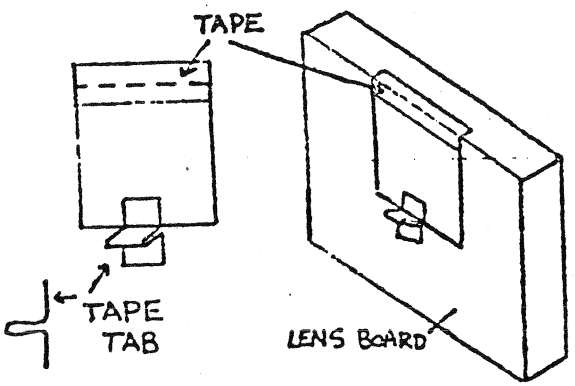
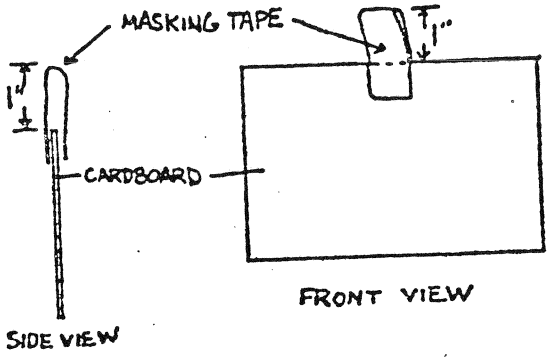


2.	____ M	MATERIAL CHECK POINT: Obtain cardboard for camera parts. 2 - 7" x 6" 1 - 6½" x 18"	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
3.		The camera parts must fit snugly together when completed so that light does not get in either end. ALL MEASUREMENT MUST BE EXACT. Lay out the fold lines for the body and lens board as shown in the diagram below. Use a pencil and ruler.  	
4.		On the back side of the camera body and the lens board draw two diagonal lines from corner to corner. Then draw a ½" square box in the middle.  	
5.		Lay out the fold lines for the lens barrel as shown in the diagram below. Use a pencil and ruler. MARKINS MUST BE EXACT!  	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
6.	I	INSTRUCTOR CHECK POINT: Take your camera pieces and a ruler to an instructor for quality check point. (Layout accurate)	
7.		Use scissors to make 4 cuts for corner folds on both the camera body and lens board pieces. DO NOT CUT BEYOND 1" LINE OR YOUR CAMERA WILL HAVE LIGHT LEAKS. 	
8.		Use an exacto knife and ruler to VERY LIGHTLY cut part way into the cardboard at each fold line. If properly done this will make folding the camera parts easier. IF YOU CUT TO DEEP YOU WILL DESTROY THE CAMERA PARTS. DO NOT CUT THE X LINES OR THE ½" BOX ON THE BACK SIDE OF THE camera body and lens.	
9.		Carefully bend the lens barrel into a square shape and tape and seal the seam together with masking tape. Use tape the entire length of the seam - inside and outside.	
10.		Carefully bend the sides on the body and lens board. Use masking tape to tape the tabs to the outside of the edges. 	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
11.		Fit both body and lens board onto the lens barrel to see which one fits best. The one that fits best should be used as the camera body.	
12.		Use the one that fits the worst as the lens board because it will be taped on permanently later. Use an exacto knife to cut the ½" hole from the center of the lens board.	
13.	I/M	INSTRUCTOR & MATERIAL CHECK POINT: Have an instructor inspect your camera and obtain: 1 - 1"x1" thin gauge aluminum 1 - 4"x5" cardboard 1 - 3"x3" cardboard 1 pc. - 280 grit - abrasive paper	
14.		Use a push-pin to make a small "pin hole" in the center of the thin gauge aluminum. It is important to make a SMALL ROUND hole. JUST USE THE TIP OF THE PIN. ONCE THE TIP OF THE PIN HAS MADE A HOLE - STOP. DO NOT ENLARGE THE HOLE BY PUSHING THE PIN FURTHER IN. ALSO, TWISTING THE PIN WILL HELP MAKE A ROUNDER HOLE. SO, TWIST THE PIN AS YOU EASE IT THROUGH THE METAL.	
15.		Use the abrasive paper to sand the jagged edge off the hole. After sanding twist the push-pin in the hole to clean and round the hole.	
16.		Use a black marker to blacken both sides of the metal.	
17.		Use masking tape to tape the metal to the inside of the lens board. Make sure to center the pin hole and tape around all four sides of the metal so there are no light leaks.	
18.		Use a black marker to blacken the tape on the inside of the lens board.	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
19.		The 3"x3" cardboard square will be used as a shutter. Use masking tape to make a tape tab and also to tape into position along the top edge of the lens board. See diagram below. 	
20.		The 4"x5" cardboard will be used as a backing plate behind your film. Make a tab with masking tape. See diagram below. This backing plate will make it easy to remove your photo film after taking a picture. 	
21.		Tape the lens board and lens barrel together with masking tape to seal all four sides.	
22.		On the masking tape on the top of the camera neatly print your name and folder number.	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
23.	I/M	INSTRUCTOR & MATERIAL CHECK POINT: Have an instructor inspect the quality of your completed camera. And obtain a packet of enlarging paper packaged in a light tight bag. DO NOT LOSE THIS BAG - YOU WILL CHECK IT BACK IN LATER.	
24.		You are now ready to start taking pictures with your pin hole camera. The "FILM" you will be using will be photographic enlarging paper.	
25.		To load your camera you must be in total darkness or under "safelight" conditions. To load, remove the body from the lens barrel. Place the cardboard backing plate inside the body (with tab showing). Position a sheet of photographic paper on top of the backing plate making sure the EMULSION SIDE (shiny side) IS FACING OUT.	
26.		Place the camera body back on the lens barrel. Your camera is loaded and ready to take a picture. Before going out into room light, make sure your shutter is closed.	
27.		To take a picture, the camera must be held perfectly still during exposure time. Some people like to put the camera on the ground, or on a table, or fence post, or on the hood of a car. Whatever method you use, the camera must not move once the shutter is opened.	
28.		Exposure time (the amount of time the shutter is left open) is best determined by trial and error because pinhole cameras are so variable. The amount of time will be affected by the type of enlarging paper used, the size of your pin hole, the amount of light available, full sun, cloudy, indoors, etc., the size and construction of your pinhole camera, etc....Roughly enlarging paper will need an exposure of a few minutes in bright sunlight, 8-20 minutes in cloudy bright daylight, 10-30 minutes in full clouds, and as much of 60 minutes in low light situations.	

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29.		To compose a picture that you want to take, set your camera so it will not move. Aim the pin hole at the center of the picture. Open the shutter. Time the exposure. Close the shutter. You have just taken a photograph.	
30.		CAUTION: DO NOT REMOVE THE ENLARGING PAPER FROM THE CAMERA UNLESS UNDER SAFELIGHT CONDITIONS OR TOTAL DARKNESS. To develop the picture, have an instructor let you in to the darkroom and follow the chart step by step on paper development located above the sink.	
31.		After washing, place the print in the print dryer (emulsion side toward canvas), plus in and let dry until dry (approx. 5-10 min.).	
32.		Once developed the photograph will be a "negative". That means light areas from the scene will be dark in the photo and dark areas will be light. If the total photograph is real light you need a longer exposure time when taking the picture. If the total photograph is real dark you need a shorter exposure time. If you have a wide range of tone from white to black you have a properly exposed photograph.	
33.		One you have a properly exposed photo-graph you should make a "positive". This is done in the darkroom under safelight conditions.	
34.		Place the "negative" on the contact printer face up.	
35.		Place a piece of unexposed enlarging paper on top of the "negative" in contact with each other (emulsion to emulsion).	

STEP #	INSTR. CHECK	PROCEDURE - INCLUDE INSTRUCTOR CHECK POINTS	TOOLS & EQUIPMENT
36.		Place the felt pad on top and close the lid of the contact printer.	
37.		Set the timer for *ONE* seconds and expose.	
38.		Remove the exposed positive and process in the photo chemicals following the chart step by step on paper development located above the sink.	
39.		After washing, place the print in the print dryer (emulsion side toward canvas), plug in, and dry until dry (approx. 5-10 min.).	
40.		Neatly print your name and folder number on the back side of each photo. Place all pictures inside your pinhole camera.	
41.		Complete the evaluation portion (both sides) of an A.R. (activity Record). Print your name and other information in the space provided.	
42.		Turn in your pin hole camera with photo inside, your completed A.R., and this instructional packet to an instructor for evaluation. Make sure your name and folder number is on each item.	
43.	M	MATERIAL CHECK POINT **Return the light tight photo bag to an instructor.**	

F. Procedure Continued

1. Read the pages listed for each technique.
2. Make a print using each of the five different techniques. You may use five different photographs if you'd like to.
3. Make a basic print of each picture without the techniques so you have something to compare it to.
4. Submit your photos for grading.

G. <u>READINGS</u> - References

The following readings can be found in the supplement that follows and in the Photo Technology textbook by Marshall La Cour and Irvin T. Lathrop.

Solarizing- 291 Photo Tech., 110-111 supplement
Dodging- 144 Photo Tech., 92 supplement
Burning- 140 Photo Tech., 92-96 supplement
Vignetting- 142 Photo Tech., 103 supplement
Diffusion- 148 Photo Tech., 98-99 supplement

H. Evaluation Criteria

Final project must be effectively used to the instructor's standards. Students should receive a copy of your instructor's requirements for this activity. Try and meet as many of these requirements as possible.