

# Materials & Processes: Shark Wall Plaque

## Introduction

The **Materials and Processes** industries are involved with the production of many of the **consumer products** we use each day. These industries develop and use vast numbers of materials processing **technologies**. In this activity you will be involved with product design, material cutting, **lamination**, forming, sanding and finishing.

## Job Description

This activity packet deals with the design and production of a **decorative** wall plaque. The plaque will have a model of a shark of your choice mounted on it. When finished the shark will look like a real miniature shark, glass eye included. A number of steps are required to complete this product, which include designing the shark you wish to produce, drawing a pattern, cutting material, forming, sanding, assembling, and finishing.

## Materials, Supplies, and Tools

One of the items necessary for proper completion of this product is a glass eye suitable for your design. The suggested vendor for this item is Van-Dykes Supply. You can receive a catalog by calling 1-800-843-3320 and identifying your school. Other items necessary for the product are as follows:

soft pine lumber  
wood glue

cabinet files  
surform  
wood rasp  
rotary rasp  
disk sander  
scissors  
handsaw  
chisel  
sanding sealer  
router bits  
router  
paint brushes  
gloss finish  
brushes  
spray paint (various colors)  
epoxy glue  
glass eye  
hanger hardware  
coarse sandpaper  
bandsaw

## Preparing Your Design

The first step in the design process will be to decide on the type of shark you would like to produce. Figure 1 gives you some examples of possible designs. Notice in each example you are given a **profile** of the shark's body and the **pectoral fin**.

The shark will be what is called a **half-model**. That means that only half of the shark is produced and the flat side is attached to the display plaque with the formed and finished side visible. You may wish to research the school library to see examples of other kinds of sharks on which you may wish to base your design.

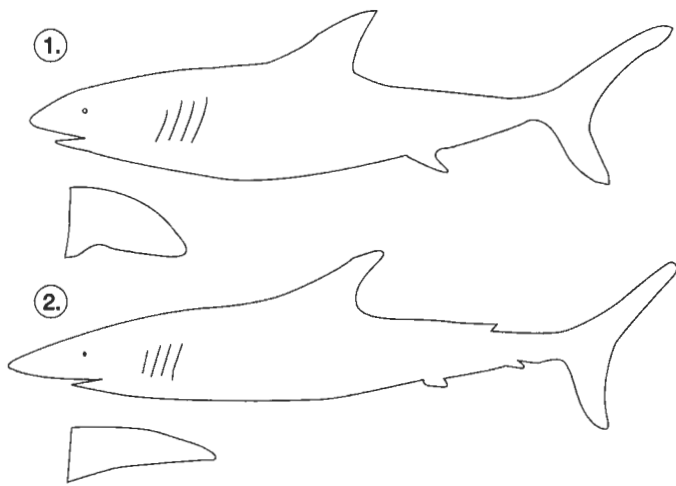


Figure 1 - Sketches of possible shark designs.

## Fabrication

1. When you have decided on the shark you want to produce, make a pattern of the shark and its pectoral fin.
2. A good size for the shark is 12 to 24 inches in length.
3. The paper patterns should be cut out and used to mark the wood from which the shark will be cut.
4. A good material for this product is soft pine. Other **low -density** lumber can also be used. It is important to use low-density lumber in order to make the **fabrication** of the shark easier and faster.

5. The proper method of **laminating** the shark body is illustrated in figure 2. This can be **accomplished** by making several accurately sized patterns of the pieces. This “sandwich” lamination method saves a great deal of material as you can see.

6. When the shark “sandwich” laminate has been glued and dried it is time to shape the body of the shark. The **gradual** shaping can be accomplished by using files, surform, wood rasp, rotary rasp, or disk sander. Having a photograph of the type of shark you are producing helps a great deal when you are forming the body.

7. When the rough forming of the body of the shark is complete, the finish-sanding can be started using course sandpaper.

8. At this point of fabrication the gill slits should be cut on the side of the shark. This can be done with a small handsaw or chisel.

9. The mouth of the shark can be cut to the proper shape with the bandsaw.

10. The pectoral fin should be fabricated, shaped, and sanded. When the body of the shark is finish sanded the finished pectoral fin can be attached.

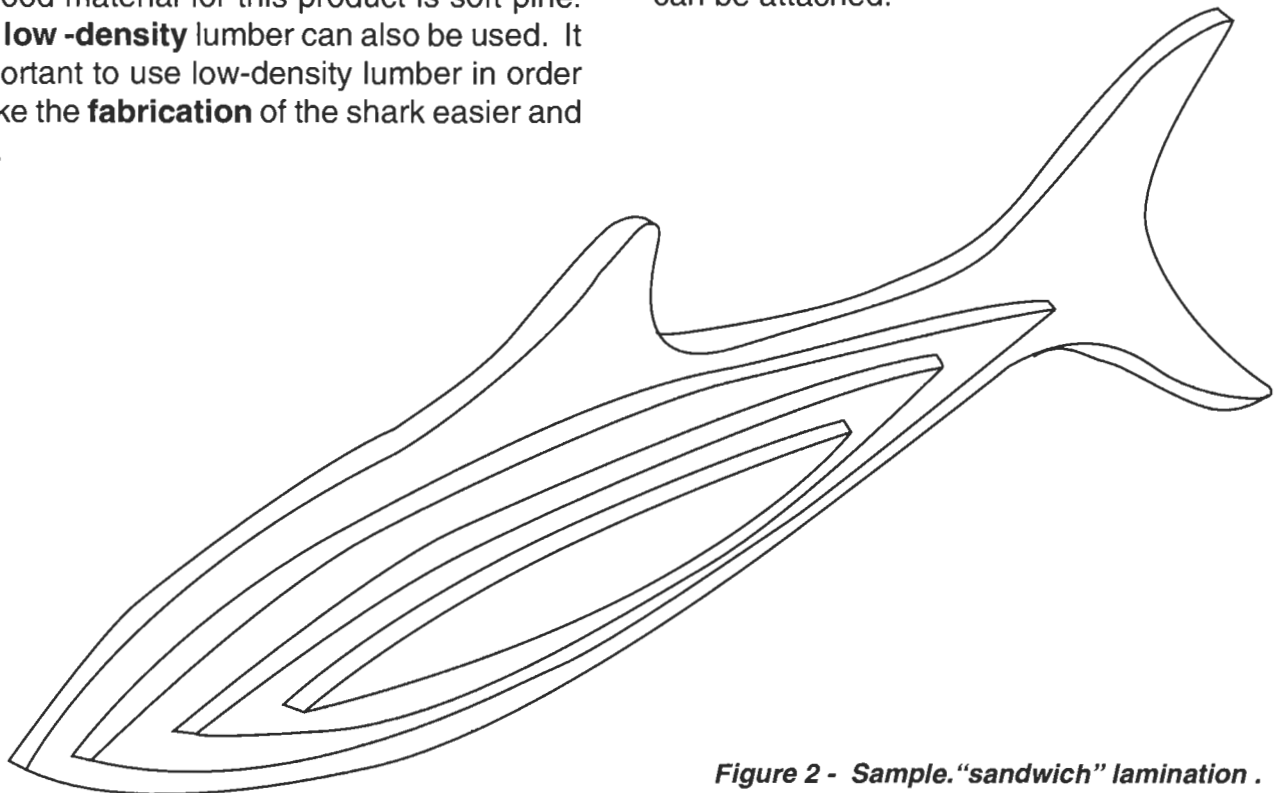
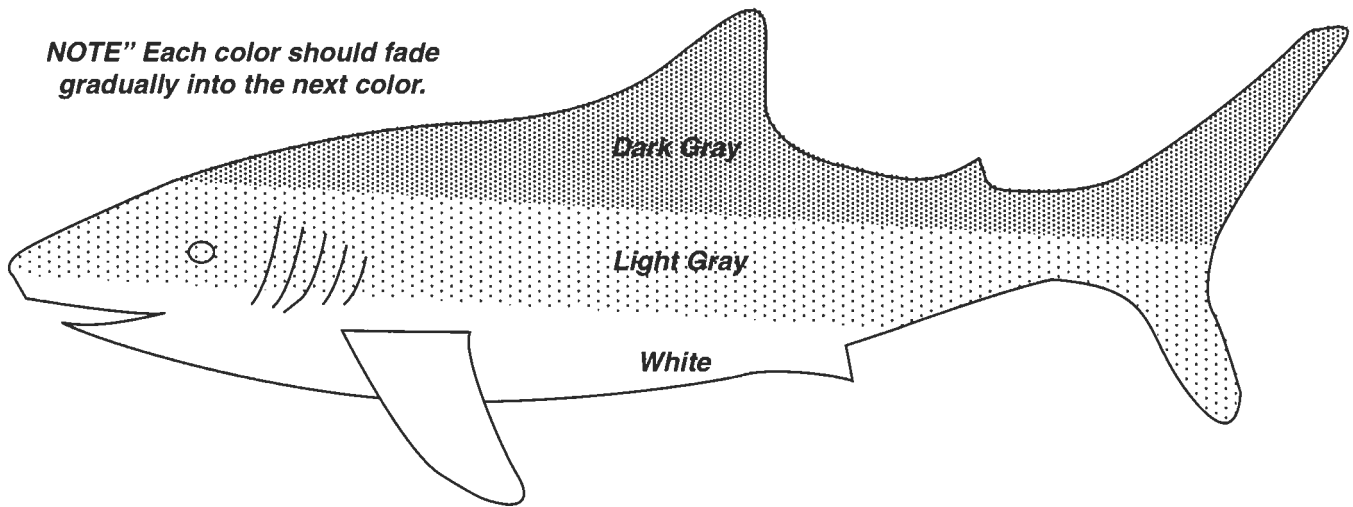


Figure 2 - Sample. “sandwich” lamination .

**NOTE** Each color should fade gradually into the next color.



**Figure 3 - Sample finish detail.**

## Finishing

1. The shark can be finished with a clear protective finish allowing the natural grain and color of the wood to show.

2. The other **alternative** is to provide a **realistic** painted finish using the proper colors for the type of shark you are constructing. This can be accomplished by using spray paints of the proper color(s). Figure 3 shows how the spray should be applied to give a realistic appearance. After the colors have been applied and allowed to dry, a coat of clear gloss is sprayed on the shark to give a smooth finish.

3. The next step is to set the glass eye. Drill a hole the size of the eye to the proper depth in the shark body. Mount the eye with an epoxy cement.

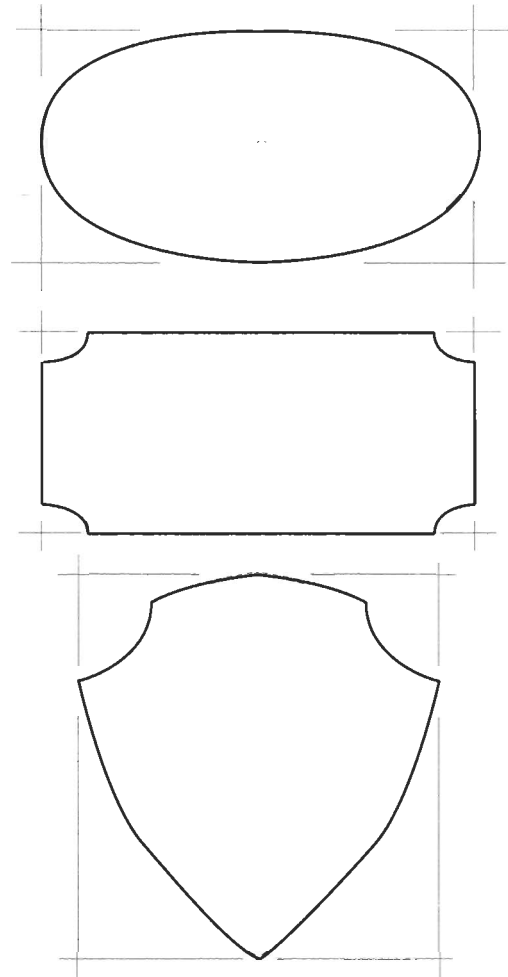
## Fabricating the Plaque

The shark is mounted to the display plaque in order to mount it to the wall. Figure 4 shows several examples of shapes you may wish to use for your plaque.

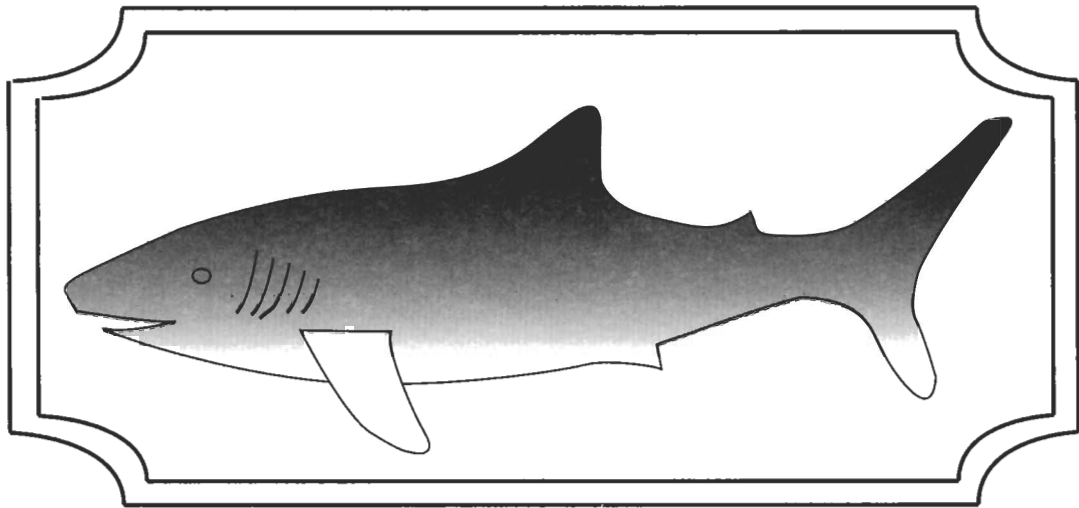
It will be necessary to draw a pattern for the plaque you design. The plaque can be cut from any material you choose. After cutting and shaping the plaque you may wish to use the router to cut a decorative edge on the plaque. Next

comes the final sanding. The finishing is done with a clear protective coating.

The final step in the production process is to mount the shark on the display plaque and put some type of hook or hanging device on the back of the plaque.



**Figure 4 - Sample plaque shapes.**



*Figure 5 - Sample of a finished plaque.*

### **Safety**

All power tools used to produce this product are to be used only with the teacher's permission. Safety instruction will cover two major components: (1) general laboratory safety and (2) power-tool safety. You will be tested on your knowledge of each area.

### **Vocabulary**

materials processes

consumer products

technologies

lamination

decorative

profile

pectoral fin

half-model

low density

fabrication

accomplished

gradually

alternative

realistic

### **On Your Own**

1. There are many sources you can research concerning types of sharks. Some resources are the internet, books, magazines, movies, nature films, and aquariums. The more information you have, the more life-like your product will be.

2. Try to visit various stores, art galleries, or fairs where you will find examples of such decorative plaques. This will help you gather ideas for your design and its fabrication.

### **Ecology**

The lumber used to construct this product is the same material used in the construction and furniture industries. This lumber is a renewable resource. This is accomplished by selectively cutting only certain trees and then replanting areas where the trees are cut down.

The protective finishes used for this product can be harmful to the environment if used or disposed of improperly. Be sure to read the manufacturer's directions for use of the product and follow instructions carefully.



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## **TEACHER GUIDE**

### **MATERIALS & PROCESSES: SHARK WALL PLAQUE**

**Objectives:** Upon completion of this packet, the student will be able to:

1. Demonstrate a knowledge of the design process.
2. Prepare sketches of possible product designs.
3. Choose proper materials for a manufactured product.
4. Demonstrate knowledge of the routing process.
5. Demonstrate knowledge of the gluing process.
6. Demonstrate knowledge of hand-tool operations.
7. Demonstrate knowledge of power-tool operations.
8. Demonstrate knowledge of the sanding process.
9. Demonstrate knowledge of several types of finishing processes.
10. Complete the manufacturing process of a product.

#### **Helpful Hints**

1. It is very important to have a quantity of pictures of various sharks. Without them, it will be hard for the students to properly structure the bodies and fins of their shark.
2. Because of the complex nature of this product, it would be wise to have an actual model for the student to use as reference.
3. Have a large selection of router bits available for decorative routing of the wall plaque.
4. Show students how the design process can be applied to many other products.
5. Discuss the basic principles of design, balance, rhythm, proportion, contrast, unity, and how these elements apply to product design.

**LANGUAGE ARTS APPLICATION**  
**MATERIALS & PROCESSES: SHARK WALL PLAQUE**

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Student Name

In all types of jobs, you will find that you need to be able to communicate your thoughts and ideas effectively. Writing skills are necessary in all occupations. Here is an example of how writing skills are related to this activity.

In this activity package, you will be manufacturing a consumer product. Like all manufacturing activities, there are specific steps and procedures. Using the proper technical terms from this activity, write a detailed "List of Procedures" covering all the steps necessary to manufacture this product.

**MATH APPLICATION**  
**MATERIALS & PROCESSES: SHARK WALL PLAQUE**

\_\_\_\_\_

Student Name

In all types of jobs and occupations, you must be able to apply mathematics effectively.

This activity will require the use of measuring and layout tools in the design and manufacturing of this product.

Complete the following questions and note their relationship to the project at hand.






1. The radius of a circle is a line running from the \_\_\_\_\_ to the outside of a circle.
2. The diameter of a circle is \_\_\_\_\_ the radius of a circle.
3. The \_\_\_\_\_ of a circle is the distance around a circle.
4. Soft pine comes in boards that are 12 feet long. How many 16" plaques can be made from one board?

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

5. If the radius of a piece of wood is 6", what is the diameter?

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

Measure the following lines.

6. \_\_\_\_\_ 
7. \_\_\_\_\_ 
8. \_\_\_\_\_ 
9. \_\_\_\_\_ 
10. \_\_\_\_\_ 

## QUIZ

### MATERIALS & PROCESSES: SHARK WALL PLAQUE

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Student Name

1. Name one low-density lumber. \_\_\_\_\_
2. Explain the term half-model.  
\_\_\_\_\_  
\_\_\_\_\_
3. Name three hand tools that can be used to remove large amounts of material on a wood product.  
\_\_\_\_\_  
\_\_\_\_\_
4. Name two types of router bits that you might use.  
\_\_\_\_\_
5. What is the lamination method for the shark construction called? \_\_\_\_\_
6. In order to laminate the shark body as illustrated in Figure 2, how many patterns would be necessary to make all the initial body parts? \_\_\_\_\_
7. Name two different methods for finishing the shark body.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
8. Name best tool to use in forming the mouth of the shark?  
\_\_\_\_\_
9. Name three kinds of sharks.  
\_\_\_\_\_  
\_\_\_\_\_
10. The final step in the production process is  
\_\_\_\_\_