

# **MATERIALS**

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On behalf of The World Association of Technology Teachers

# W.A.T.T.



World Association of Technology Teachers

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# MATERIALS RESEARCH

I have researched a range of materials that could be used in the manufacture of my product. This help me develop my designs as I will be able to select suitable materials for the demands made by the design of my product.

MATERIALS	PROPERTIES	USE IN MY PROJECT

**SUMMARY:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**MATERIALS RESEARCH**

PRODUCT: ROCKING CHAIR

I have researched a range of materials that could be used in the manufacture of my product. This help me develop my designs as I will be able to select suitable materials for the demands made by the design of my product.

MATERIALS	PROPERTIES	USE IN MY PROJECT
MDF Medium Density Fibre Board	Composed of fine wood dust and resin, pressed into manmade boards. Easily machined. Can be sprayed giving a good finish	MDF could be used to manufacture the main parts of my project, as it is shaped easily and can be sprayed any colour. It is cheap to buy and this will keep my costs down.
PINE	Relatively cheap and used widely in the furniture and building trade. Light brown in colour, quite easy to cut and shape. Gives a good finish when varnished.	A natural wood that could be used for parts of my project. A basic framework could be built with square section pine and MDF panels could be added. Pine could add to the quality of my project.
OAK	A quality and expensive wood. Light brown in colour. Difficult to cut and shape. Used to manufacture quality furniture. Quality finish when varnished.	Unlikely that I will use this materials as it is too expensive. Using a high quality material like this may be wasteful and extravagant. It will add unnecessary cost to the product.
MILD STEEL	Tough with high tensile strength. Dark grey. Can be case hardened. Rusts if left in contact with water as it is a ferrous metal. Manufactured in sections, rods and sheets.	Mild steel could be used to build the basic framework to my project. However, this would add weight to the product. On the other hand, the product will be extremely strong.
ALUMINIUM	A non-ferrous metal. Ductile, soft, malleable and can be beaten into shape with ease. Light silver colour. Manufactured in sections, rods and sheets.	Aluminium is light and the cost of this material are reasonable. the sides of my project could be made from this material because it can be shaped into a curved surface quite easily. It can ne formed by hand.
PERSPEX / ACRYLIC	Manufactured in a range of colours, sizes and sections. Also supplied in translucent and transparent form. Easy to machine and can be polished to a quality finish.	Could be used to manufacture any plastic parts of my product. The range of colours could be useful when I am considering the colour scheme of the product. Can be used to manufacture colourful and yet strong parts.
POLYSTYRENE (COMPRESSED)	An excellent material for vacuum forming. manufactured in a range of colours. Also provided as translucent or transparent. Has a polished surface, easily scratched.	I am more than likely to use this for any vacuum formed parts of my project. I can choose from a vast range of colours including gold and silver. The different texture available may also be useful.
CARD	An excellent material for modelling. Manufactured in a vast range of colours and shades and thicknesses. Can be cut and shaped very easily.	I can use this material when modelling. I am unlikely to use this as a material for the main product as it is too weak. It is still valuable because it can be modelled so easily and it is relatively cheap.

**SUMMARY:** The plastics I select will be used sparingly as they are made from non-renewable sources (oil). Where possible I will save the scrap plastics I create while cutting and shaping. These will be kept for recycling or reuse in smaller projects. I will use beech for the main body of the chair. The beech will be supplied from a sustainable source. I will consider using recycled / reclaimed beech if it is of the right quality. When manufacturing the scaled model, I will only use materials from the recycle bin. I will consider reusing textile materials for the cushions.

EASILY SPRAYED,  
CHEAP AND EASY TO  
CUT/SHAPE. IDEAL  
FOR MY PROJECT



MDF  
Medium Density  
Fibre Board



PERSPEX /  
ACRYLIC

GOOD RANGE OF COLOURS,  
IDEAL FOR MY PROJECT. CAN  
BE CUT, SHAPED AND  
FORMED EASILY

LOW COST, LIGHT WEIGHT. I  
COULD USE THIS IN PLACE  
OF MDF

HARDBOARD



PINE

NATURAL WOOD, LIGHT  
BROWN, RELATIVELY  
CHEAP, EASY TO CUT  
AND SHAPE

# MY PROJECT

STYROFOAM

IDEAL FOR MODELLING MY  
PROJECT. EASY TO SHAPE,  
CAN BE COLOURED WITH  
WATER BASED PAINTS.

# MATERIALS

POLYSTYRENE  
(COMPRESSED)

IDEAL FOR VACUUM  
FORMING. I WILL USE THIS  
IN MY PROJECT. LIGHT  
WEIGHT AND COMES IN A  
RANGE OF COLOURS



CARD

I COULD USE THIS  
MATERIAL FOR MODELLING  
MY IDEAS / DESIGNS

NO

MAHOGANY  
TOO EXPENSIVE

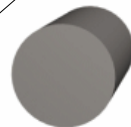


NO

OAK  
TOO EXPENSIVE

CHEAP, STRONG, COULD  
BE USED TO BUILD A  
FRAMEWORK

MILD STEEL



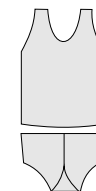
ALUMINIUM

NO

COPPER

MY CIRCUIT WILL CONTAIN COPPER -  
TRACKS. SOME OF THE COMPONENTS WILL  
ALSO CONTAIN COPPER.

TEXTILES



I MAY NEED TO USE VELCRO  
AND OTHER PIECES OF  
TEXTILE MATERIAL TO FINISH  
MY PROJECT

NAME:

MATERIALS

DATE:

# DEVELOPMENT SHEET No \_\_\_\_\_

## HAND MADE VERSION

The DVD storage unit seen below could be manufactured from a natural wood such as pine. Pine cuts and shapes relatively easily and finishes well. Also, it darkens with age. Traditional joints will be used to ensure that it is permanently glued / fixed together. This means that it cannot be disassembled after gluing.

**ADVANTAGES:**  
This type of manufacture means that the furniture is likely to be ready assembled when it arrives in the shops. It will also be very strong and robust. Using a natural wood such as pine will ensure that the final finish will be a quality one.

**DISADVANTAGES:**  
This type of furniture is more expensive than 'flat pack' furniture. It is more difficult to transport as it takes up much more room than a flat pack package.

### HOUSING JOINTS

A plain housing joint is suitable for the shelves. Recesses are cut into the sides and each shelf fits tightly in position. Again PVA glue is used to fix the shelves permanently

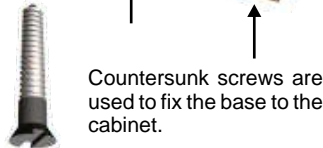
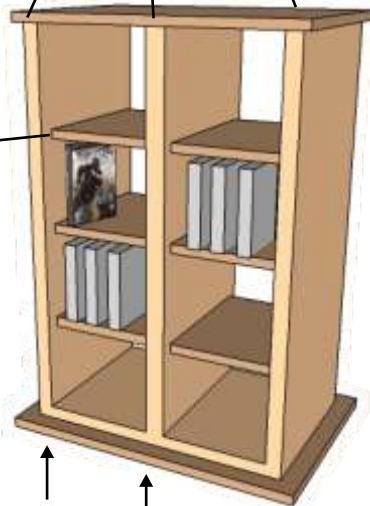
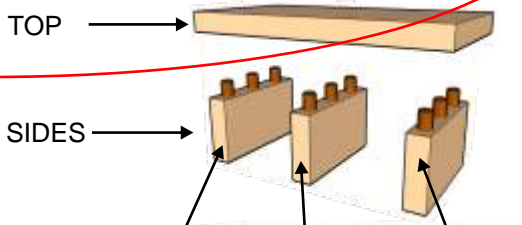
**CLIENT/POTENTIAL CUSTOMER COMMENT:**  
Looks strong and has plenty of storage space. This is exactly what I want.

**OVERALL SIZE**  
800mm x 650mm x 300mm

MATERIAL/PART	DESCRIPTION	COST
PINE BOARDS	1 pack of pine boards, 250mm x 15mm x 1200mm, 5 lengths.	£35.50
DOWELS	1 pack of precut dowels, pack of 100, 8mm dia.	£55.00
STEEL SCREWS	1 box of 5 gauge, 30mm steel countersunk screws.	£2.95
WOOD ADHESIVE	1 litre, fast cure PVA	£4.99

### DOWELLED JOINTS

Dowel rod is used as a method of joining the sides to the top. The dowels fit into accurately drilled holes in both the sides and the top and PVA is used as the permanent glue.



**ENVIRONMENT** - recycled materials will be used where possible, as well as reclaimed components. Non-toxic finishes and adhesives will be used. Any packaging will have all the appropriate symbols for recycling. Materials will be purchased from sustainable sources, where possible.

### POSSIBLE AREAS TO BE DEVELOPED

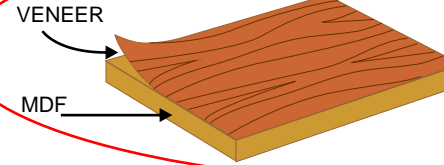
JOINTS AND FIXINGS - USE OF ADHESIVES - ADD HEALTH AND SAFETY DETAIL - SELECT MATERIALS AND WHY? - ELECTRONIC CIRCUITS - COSTING - ENVIRONMENT - ERGONOMICS - MECHANISMS - ACCESSORIES - FINAL OVERALL SIZE - DESCRIBE FEATURES/FUNCTIONS - ADD COMMENT FROM CLIENT/POTENTIAL CUSTOMERS

## PRODUCT: CD/DVD STORAGE CABINET FLAT PACKED VERSION

Flat pack furniture arrives in a cardboard package. When unpacked it has to be put together using tools such as a screwdriver and other simple tools. Usually it is put together by the customer. One advantage of this type of furniture is that it can be disassembled.

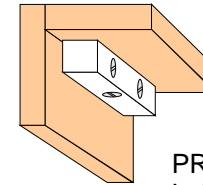
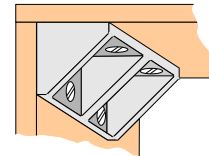
**CLIENT/POTENTIAL CUSTOMER COMMENT:**  
Looks reasonably strong and has plenty of storage space. Although not exactly what I want, it will suit some of my furniture shop customers.

**MATERIAL:** Veneered MDF  
A cheap material such as MDF is given a layer of more expensive natural wood such as mahogany or oak or even pine.



**RIGID JOINT:** These are normally moulded in plastic which makes them strong. Screws pass through the four holes which hold the sides at each corner firmly together.

**PLASTIC CORNER BLOCK (FIXIT BLOCKS):** Screws are used to fix the block into position. This type of joint is used to fit modern cabinets such as those found in a typical kitchen. It is a reasonable joint although it has the advantage that it can be dismantled using a screwdriver.



**TWO BLOCK FITTING (LOK-JOINTS):** These are made from plastic. A bolt passes through the first fitting into the thread of the second. As the bolt is tightened it draws the two fittings together. The pins help keep the fitting straight. This gives a very strong joint and it can be dismantled using a screwdriver.

**PREFERRED JOINT / FIXING**  
Lok joints - due to strength and ease of use.

**OVERALL SIZE**  
800mm x 650mm x 300mm

MATERIAL/PART	DESCRIPTION	COST
VENEERED MDF	1 pack of MDF, veneered board, 250mm x 15mm x 1200mm, 5 lengths.	£25.50
LOK JOINTS	1 pack of plastic LOK joints, 50 pack.	£10.00
STEEL SCREWS	1 box of 5 gauge, 30mm steel countersunk screws.	£2.95

