Key Holder Project

Where are Those Keys?

Western Technical-Commercial School

School:

Exploring Technologies, TIJ101

Course:

Grade 9 juniors

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Key Holder

Project:

21

Pages:

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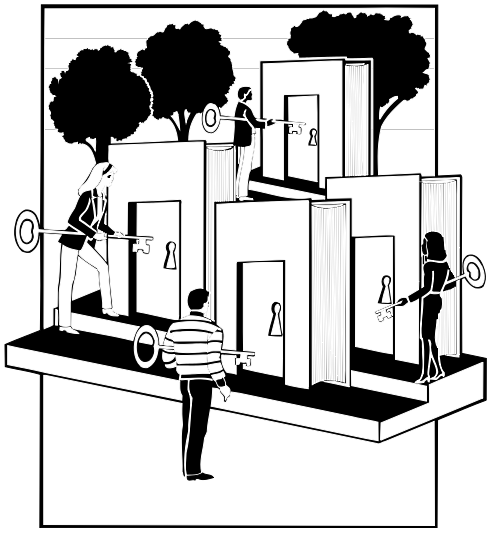
Key Holder Needed

Making a Key Holder



Situation:

You come home every day and your keys seem to get misplaced. You decide that something has to be done so that the keys have a place keep.

Requirements:

The challenge is to design, cut, shape, and finish a custom key holder with following requirements in its design:

1. Minimum of at least 5 wide round cut corners
2. Minimum of at least 5 sharp inside or outside corners at any angle
3. At least one big non-circular hole, hint you will need to drill two holes close
4. A length of 20 to 26 cm
5. A minimum thickness of 9mm and minimum width of 2 cm width everywhere (keep in mind placement of hole and shape features)
6. Installed 4-6 key holder hooks with some method of mounting to wall
7. A smooth finish with no real sharp edges and corners
8. Finished and coated by brush to seal and protect the wood on front and sides
9. Your name permanently on the back of key holder, 20 mm Gothic font style
10. Require hand-sketched thumbnails, computer or hand sketched final full-size oblique, and a computer or hand sketched scaled orthographic of key holder shape
11. Final submission to include key holder and report (title page, SPICE process, rough work and sketches, and conclusion/reflection -digital and/or hand) in project box

Resources, Time and Materials

- You will receive one piece of wood measuring ~ 10 cm * 25 cm * 1.3 cm
- Shop hand tools: layout, files & sand paper, 4-6 hooks to hang keys with
- Shop equipment: miter & band saw, combo & spindle sander, & drill press
- Paint bush, CMYK colours for paint, mixing cups, stain, & Varathane
- Apron, safety glasses, dust mask, and hearing protection

Due Dates:

Thumbnails_____, Orthographic, _____, Oblique_____,

Key holder cut out and smooth_____, 2 coats of finish_____, and Report_____,

Information and Planning

Each task or activity is going to follow the SPICE pattern, but different products will follow different processes. Keep in mind that you should put your name permanently into wood once you get it on the back and keep in your box. The following is a 3-step outline:

Initial Design Stage (see page 5 for related info)

1. Five Detailed thumbnails, with labels and legend showing symbolic requirements
2. Orthographic at a reduced scale of 1:2 with overall and detail dimensions
3. Final idea showing a full 1:1 scale oblique sketch showing requirements in detail, colour, hook locations

Construction and Wood Working Stage (see page 6 to 12 for related info)

1. All students must complete their safety contracts on shop machines first
2. Practice with all machines prior to cutting your good piece, new pieces will cost you marks if you mess up your piece
3. Miter cut your length needed for your key holder length
4. Transfer your design using your oblique to your wood and remember that your finished design is to match exactly to what you designed size and finish
5. Drill your hole first if possible; as there is more wood to hold onto, also a rasp or file might come in handy at this point
6. Cut out around the outline of your design leaving at least **3 mm** clearance
7. Use the disk sander to take it down to about **1 mm** to your design, then use sand paper to refine edges
8. Rasp (rough) and/or file (fine) can also be used to shape edges effectively by hand
9. Use a course grade of sand paper first such as 60 grit, then move up to a 80 grit for fine smooth edges and top surface result

Painting/finishing Stage (see page 13 for more info)

1. Once everything is smooth and accurate you are ready to apply finish
2. Pick your paint colour or possible stain and clear coat (Varathane)
3. When painting make sure to not put too much paint on in one coat, as it will run afterward, take a very long time to dry and leave a poor finish
4. After it has dried overnight, you sand down with fine sand paper 100-120 grit and put a second coat to create a smoother finer finish

Key Points on Drawings

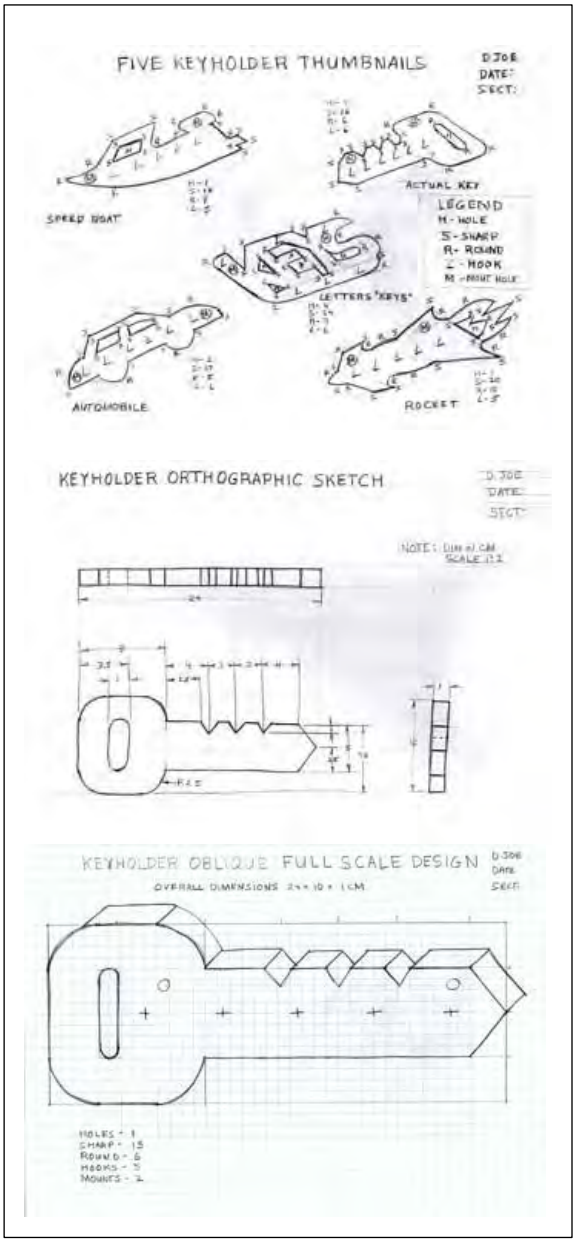
Thumbnails will have to be done by hand, but the orthographic and oblique can be done either by hand or by computer. Using Illustrator or similar vector type drawing program, or even a CAD program if familiar could be used to create your design of your key ring holder.

Orthographic by Hand

Quick instructions below:

1. Figure out which scale to use. For example, if you want a 1:2 scale, divide all of your measurements by 2 to use on sizing up you drawing
2. Choose the front view
3. Centre your "Envelope" within the boarders
4. Use light construction lines to start building your object on paper (2h lead weight)
5. Darken object lines and fill in notes and labels in gothic font
6. Make and Fill in the information block in gothic font
7. Remember to keep X-axis and Y-axis spacing between object views the same for all three views

Instructor can do a review/demo on these steps for those needing a refresher on this.



Creating an Oblique by Hand

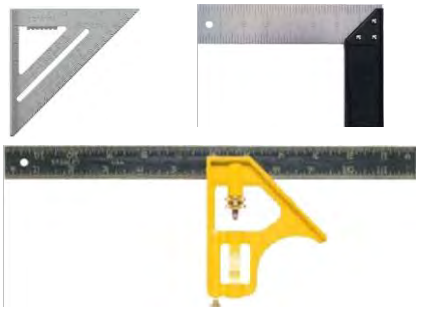
1. Start with a rectangle box in an oblique format
2. Draw your object on the face
3. Extend thickness line straight down at major features
4. Close bottom of object

Creating an Oblique by Computer

1. Create your orthographic first, and then copy the front view
2. Duplicate the object directly above original at a height of the thickness of key holder
3. Connect similar object features on the front view with straight lines

Instructor can do a review/demo on these steps for those needing a refresher on this.

Hand Tools in the Shop



There are a number of tools that you may need during your key holder construction. The following is just a few that you need to be familiar with.

Layout Tools:

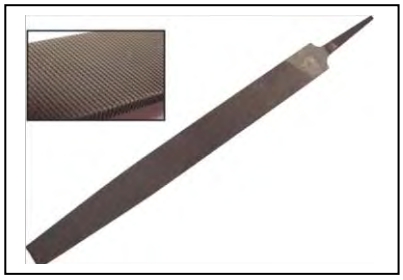
Use only a **pencil** to mark wood appropriately.
The **framing squares, carpenter,** and **combination** are used to line up and layout your designs and design features, such as your shape design and key holder hook alignment.

Sanding Tools:

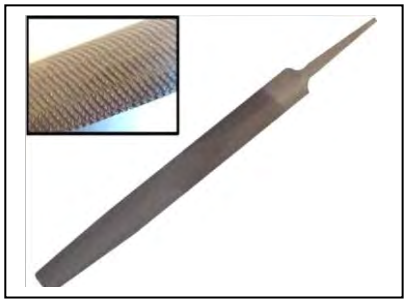
Rasp: are used to take a lot of wood material off quickly, leaving a very rough surface which comes usually in the flat/half round shape.

Files: take off small amounts of wood in a consistent format according to their shape. Common shapes include:

- Round
- Half round
- Flat

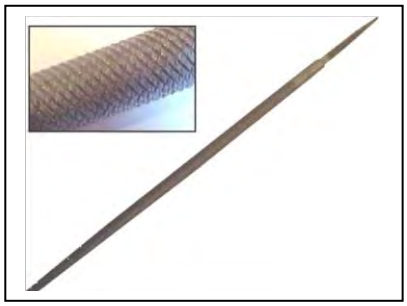


Sand paper is used to finish-off and customize specific areas of wood object. A sanding block may be used to keep sanding straight and consistent.

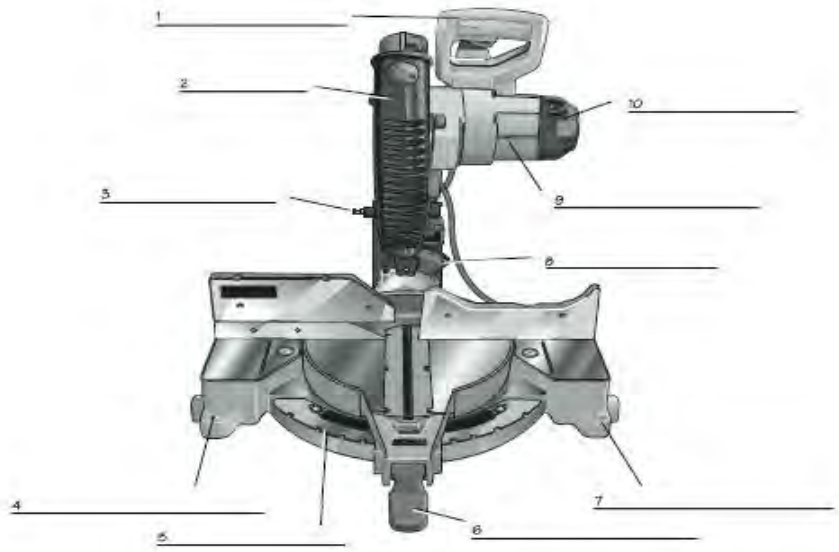


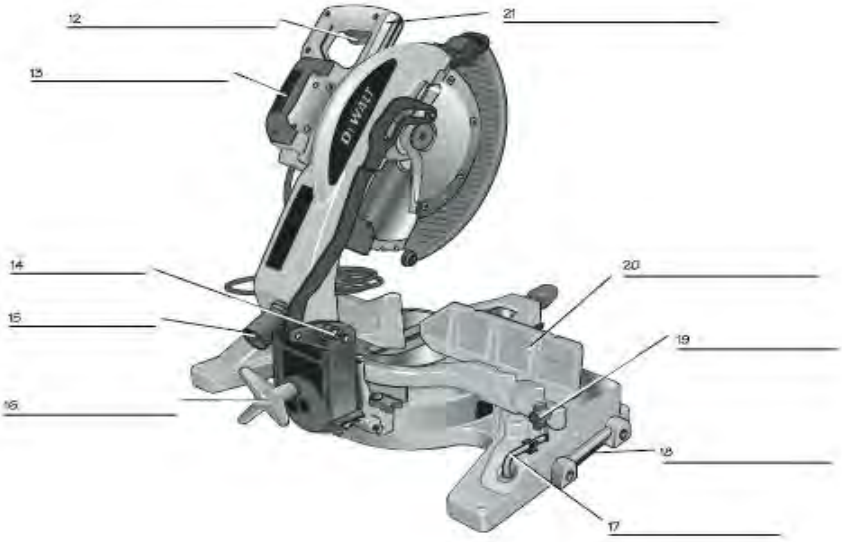
When Filing your work, it is important to keep the following in mind:

- Clamp your work when hand shaping it, preferably to a table vice
- Using a table vice, you may need to put some scrap wood or cardboard to protect your soft wood surface from being damaged from the clamp/vice teeth
- Proper filing requires you to stand (not sit) while filing, and use two hands moving both your arms and shoulders in a smooth horizontal movement



Mitre Saw General Safety and Operation





Description:

The Mitre saw, sometimes referred to as a ~~chop saw~~ is used to make three cuts: cross cut, bevel cuts and compound cuts. Some of these saws also come with an adjustable arm allowing for wider cuts. This tool is very common and a valuable asset to carpenters for its quick accurate cross-cutting action.

Operation:

Place your wood up to the fence, bring the saw down to the line you need to cut, adjust the wood to line up to the cut line, then holding the wood with your left hand, use your right hand release the safety, press the power trigger, and pull down on the handle to cut into the wood.

Things to Remember:

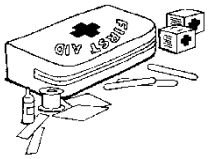
+ Never cross arms to hold the wood and the saw handle when cutting material
+ Always double check settings and angles and make sure the safety guard is in working condition

Extra Notes:

Name:

Date:

Safety Contract for the Mitre Saw



Rules to remember

1. Wear safety glasses!
2. Connect and turn on the dust collection system for reduced sawdust spread
3. Keep hands away from blade and blade cutting pathway
4. Clamp small pieces of wood that close to the blade, to keep hands away from blade
5. Do not have another person support the far end of your wood, as wood could bind against blade
6. Make sure wood is tightly held against the fence when cutting
7. Remove scrap pieces of wood and keep saw area clean
8. Release trigger once wood has been cut
9. Before replacing blade, be sure that power is disconnected

+ Look at yourself; if you have all your body parts and you're not bleeding, then you can appreciate the benefits of safety in the shop.

I was **present** for the instruction on the safe use of the **Mitre saw** and I understand its use and will operate this machine in a safe method as described. I feel comfortable in the operation of the Mitre saw and if in any doubt will ask for help from an Instructor.

Fill in below, the lesson date (year/month/day), check off that you have seen the instructor's parts, safety, and operation demonstration, your name, check off your completions, signature and then have your instructor sign-off for your contract to be allowed to use the machine.

Students to fill in all column boxes below once completed, then sign.						**Teacher**
Lesson Date	**Demo ✓**	**Last Initial, First Name**	**HO Done ✓**	**Demonstrated ✓**	**Signature**	**Safe to Use**

Band Saw General Safety and Operation

Description:

The band saw is a powerful motor-driven cutting tool. The saw's **blade is a continuous, flexible band of steel with rip-cut teeth filed on one edge.** It has a tilting table for cutting on an angle. The size of a band saw is determined by the diameter of the wheels that drive and guide the blade. The distance between the table and the blade guard limits the depth of cut.

Operation:

The band saw blade travels in a clockwise direction forcing the stock that is being cut down against the table. Although the band saw is an excellent machine for cutting curves, it can also rip, crosscut, and re-saw stock. Because of its powerful motor and deep depth of cut the band saw can cut large pieces of wood and also odd pieces of wood. The blade must be under tension to maintain a straight cut.

Things to Remember:

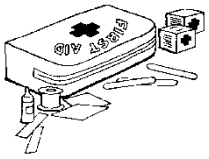
+ Wait for the band saw to come up to **full speed before starting to cut**
+ Do not cut **curves that are too tight** for the width of the band saw blade, use relief cuts first
+ Do not force a cut, always use a **smooth, slow feed** into the blade

Extra Notes:

Name:

Date:

Safety Contract for the Band Saw



Rules to remember

1. Wear **safety glasses!**
2. Be sure that all **guards/covers** are in place and dust collector system is connected and on
3. The **blade guard clearance** must not be more than 25 mm. above work
4. Keep **hands to the sides of the blade**, never in front of the blade
5. Keep work flat on the table for **work piece stability** and support while cutting
6. Use a **push stick** to move scrap pieces of wood away from the blade
7. Do not cut **too small radius cuts**, if necessary, make relief cuts first, ninety degrees to your cut
8. **One person at a time** operating the machine
9. If the **blade breaks**, shut off the power and stand clear until the wheels have stopped turning
10. When backing out of a cut, **do so with extreme caution** so as not to catch the blade and pull it off the wheels, otherwise you must **stop the machine first**
11. **When finished**, turn machine off and use the brake to stop the blade

\+ Look at yourself; if you have **all** your body parts and you're not bleeding, then you can appreciate the benefits of safety in the shop.

I was **present** for the instruction on the safe use of the **Band Saw** and I understand its meaning and will operate this machine in a safe method as described. I feel comfortable in the operation of the Drill Press and if in any doubt will ask for help from an Instructor.

Fill in below, the lesson date (year/month/day), check off that you have seen the instructor's parts, safety, and operation demonstration, your name, check off your completions, signature and then have your instructor sign-off for your contract to be allowed to use the machine.

Students to fill in all column boxes below once completed, then sign.						**Teacher**
Lesson Date	**Demo ✓**	**Last Initial, First Name**	**HO Done ✓**	**Demonstrated ✓**	**Signature**	**Safe to Use**

Name:

Date:

Drill Press General Safety and Operation

Description:

The drill press is an accurate, **vertical boring or drilling machine.** It is also capable of many other operations such as mortising, routing, sanding and shaping using a variety of attachments.

Operations:

Stock is held by hand, jig or Clamp on the Drill press table and the chuck is brought down to the work using the feed wheel. The speed can be adjusted for different materials, faster for soft, slower for hard.

Things to Remember:

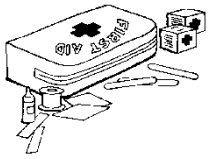
+ **Do not force** the bit into the work
+ Use a **slow, steady, even feed rate** into the work
+ The **depth guide** is used to make multiple, same depth holes

Extra Notes:

Name:

Date:

Safety Contract for the Drill Press



Rules to remember

1. Wear **safety glasses!**
2. Long hair **must be enclosed** in a hair net or be tied up and no loose clothing/jewelry
3. When boring small pieces **hold them securely** with a clamp
4. **Be sure** to use a bottoming piece (scrap) under the work for clean back cut/not drill into the table
5. Operate the drill at the **correct speed** for material drilling
6. Make sure the **drill bit is tight** in the chuck (leave gap space at top of chuck prior to tightening)
7. **Never** leave the chuck key in the chuck
8. Be sure you have the **right type of drill bit** for the job
9. One person operating the machine at a time
10. Turn off drill press when finished and clean off table for next user

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+ Look at yourself, if you have all your body parts and you're not bleeding, then you can appreciate the benefits of safety in the shop.

I was **present** for the instruction on the safe use of the **Drill Press** and I understand its meaning and will operate this machine in a safe method as described. I feel comfortable in the operation of the Drill Press and if in any doubt will ask for help from an Instructor.

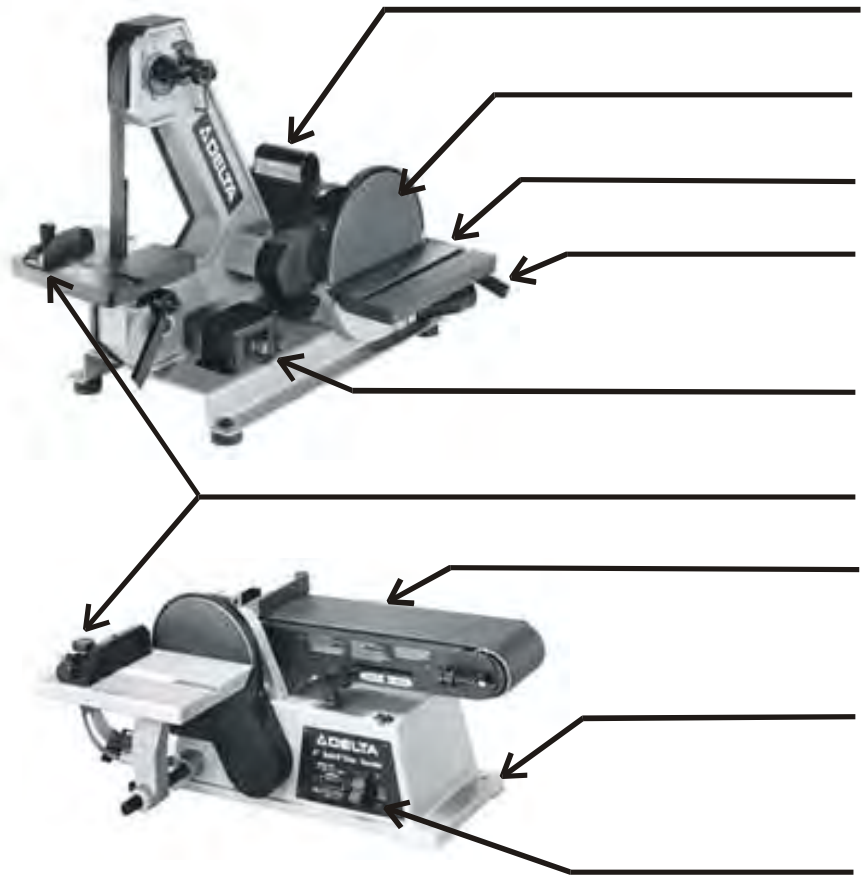
Fill in below, the lesson date (year/month/day), check off that you have seen the instructor's parts, safety, and operation demonstration, your name, check off your completions, signature and then have your instructor sign-off for your contract to be allowed to use the machine.

Students to fill in all column boxes below once completed, then sign.						**Teacher**
Lesson Date	**Demo ✓**	**Last Initial, First Name**	**HO Done ✓**	**Demonstrated ✓**	**Signature**	**Safe to Use**

Name:

Date:

Combination Disk/Belt Sander General Safety and Operation



Safety First

Description:

The combination disk sander is extremely useful for **sanding end grain and outside curves** of wooden projects. When it is properly setup, it can be very accurate.

Operation:

The table can be adjusted for angles or to have a larger gap between the table and disk to compensate for different shaped projects. When starting let the belt/disk come up to full speed before using. On disk part, ensure you are using the down turn towards the table to remove material.

Things to Remember:

+ After the machine has been turned off remember the disk takes time to stop turning
+ Always work on the downward turning side of the disk so that the stock is pushed down onto the table

Extra Notes:

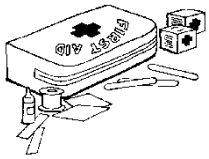
_____

_____

Name:

Date:

Safety Contract for the Combination Disk/Belt Sander



Rules to remember

1. Wear **safety glasses!**
2. Connect and turn on the dust collection system for reduced sawdust spread
3. Do not **touch the disk/belt abrasive** when it is turning
4. Do not sand pieces of wood that are **too small to hold** safely
5. Do not try to sand off **large amounts of stock**, remove excess with a cutting tool first
6. Do not apply **too much pressure** on stock when sanding or else it will burn
7. If sandpaper is **dull, ripped, or wrinkled, do not use** until abrasive sandpaper is replaced
8. Turn **machine off** when finished, needs some time to actually stop and **clean area**
9. Before replacing paper, **be sure that power is disconnected**

+ Look at yourself; if you have all your body parts and you're not bleeding, then you can appreciate the benefits of safety in the shop.

I was **present** for the instruction on the safe use of the **Disk Sander** and I understand its meaning and will operate this machine in a safe method as described. I feel comfortable in the operation of the Drill Press and if in any doubt will ask for help from an Instructor.

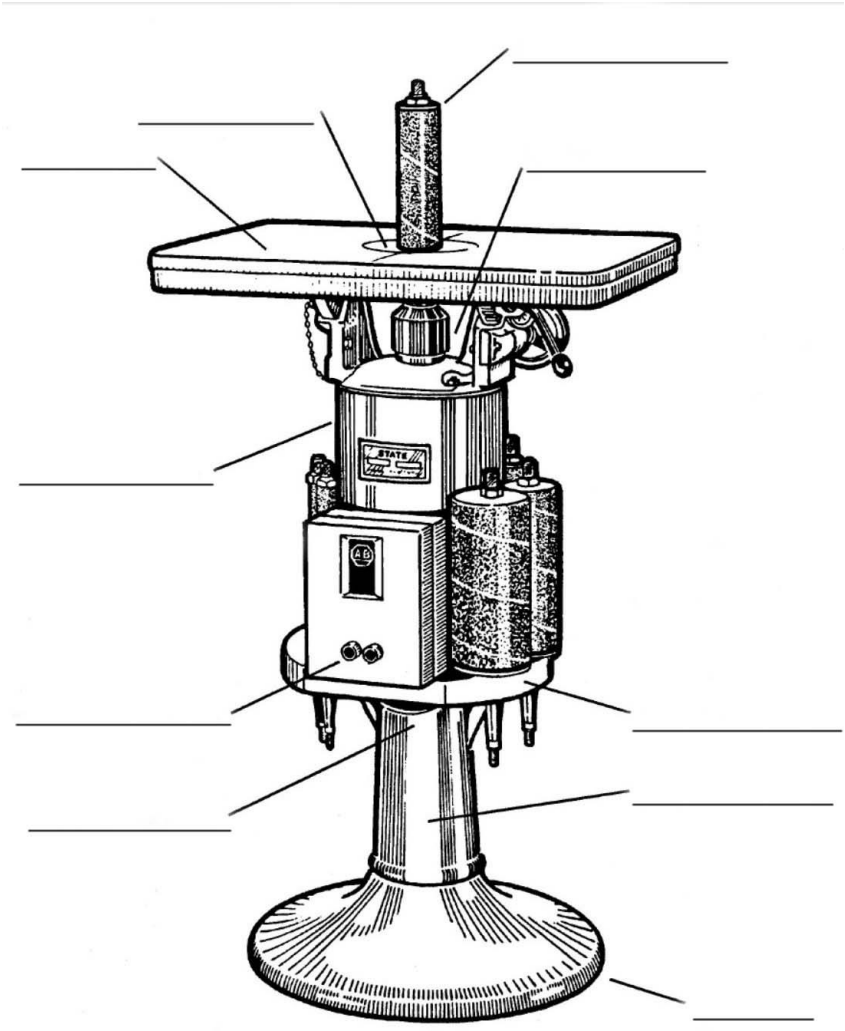
Fill in below, the lesson date (year/month/day), check off that you have seen the instructor's parts, safety, and operation demonstration, your name, check off your completions, signature and then have your instructor sign-off for your contract to be allowed to use the machine.

Students to fill in all column boxes below once completed, then sign.						**Teacher**
Lesson Date	**Demo ✓**	**Last Initial, First Name**	**HO Done ✓**	**Demonstrated ✓**	**Signature**	**Safe to Use**

Name:

Date:

Oscillating Spindle Sander General Safety and Operation



Safety First

Description:

The oscillating spindle sander is extremely useful for **sanding inside curves** of wooden projects. The sanding spindle moves up and down (oscillates) to spread wear and use more of the sander roll.

Operation:

The table can be adjusted for angles but commonly used flat. Ensure clean area, project area marked and hold work securely on table and slide work piece slowly to remove inside curve area.

Things to Remember:

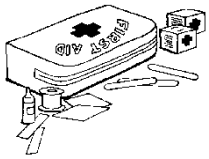
+ After the machine has been turned off remember the disk takes time to stop turning
+ Hold work piece securely on table and feed into oscillating spindle sander slowly

Extra Notes:

Name:

Date:

Safety Contract for the Oscillating Spindle Sander



Rules to remember

1. Wear **safety glasses!**
2. Connect and turn on the dust collection system for reduced sawdust spread
3. Do not **touch the spindle sander abrasive** when it is turning
4. Do not sand pieces of wood that are **too small to hold** safely
5. Do not try to sand off **large amounts of stock**, remove excess with a cutting tool first
6. Do not apply **too much pressure** on stock when sanding or else it will burn
7. If sandpaper is **dull, ripped, or wrinkled, do not use** until abrasive sandpaper is replaced
8. Turn machine **off** when finished, needs some time to actually stop and **clean area**
9. Before replacing spindle sandpaper, **be sure that power is disconnected**

\+ Look at yourself; if you have all your body parts and you're not bleeding, then you can appreciate the benefits of safety in the shop.

I was **present** for the instruction on the safe use of the **Oscillating Spindle Sander** and I understand its meaning and will operate this machine in a safe method as described. I feel comfortable in the operation of the Drill Press and if in any doubt will ask for help from an Instructor.

Fill in below, the lesson date (year/month/day), check off that you have seen the instructor's parts, safety, and operation demonstration, your name, check off your completions, signature and then have your instructor sign-off for your contract to be allowed to use the machine.

Students to fill in all column boxes below once completed, then sign.						**Teacher**
Lesson Date	**Demo ✓**	**Last Initial, First Name**	**HO Done ✓**	**Demonstrated ✓**	**Signature**	**Safe to Use**

Finishing Your Key Holder

When you have completed your key holder to your satisfaction… hint check with teacher to make sure you are on the right track… i.e. to make sure you are ready to paint, you should also have some paint colour ideas ready to show the teacher. One of those ideas you will have to choose in order finish the work.

It is important to finish your key holder to:

1. Protect and harden your surface
2. Make it look attractive
3. Seal, and preserve the wood

Surface Preparation and Finish Types

There are two major ways to go about finishing the surface of your wood:

- Stain and/or clear coat
- Primer and coloured paint

Both are water-base and recommend that shop aprons be worn just in case. Clean up of brushes, and paint area are to be cleaned up after use. Paint brushes are to be returned to the paint bath tubs, once finished. All painting is to be done using Kraft paper and/or newspaper under your work, and paint near the exhaust fan area of the shop. This area is only for students that are completely ready to paint at that time.

Stain and Clear Coat

Stains will darken and bring out the grain in the wood in an attractive manner by **high-lighting the wood grains and density areas**. Stain is just a cosmetic look, but still needs to be coated with at least 2 coats of clear coat of Varathane. After the stain, you must let dry, then put a **first coat of Varathane on, which will soak into the wood** leaving a rough some-what flat appearance once dry. **A second coat is needed**, after a fine sanding with +100 grit sand paper in order complete the seal properly. If you wish to put more coats on, you may do so as to make a finer and smoother finish.

Primer and Coloured Paint

The object must have a minimum of one coat of primer for the following reasons:

1. Prepare surface for colour coat to stick to
2. Seal in small holes and…
3. Minimize surface absorption

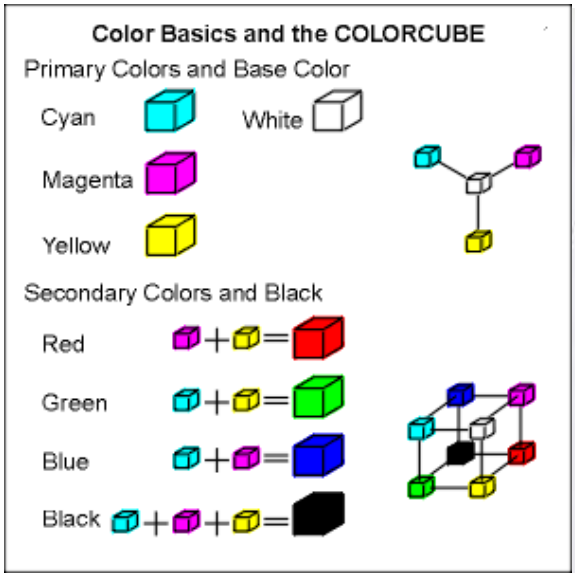
Once this is done and primer is dry, it needs to be sanded lightly. Note: if wood was poorly prepared, you will most likely have to put another coat of primer on, as you do not want any wood showing through the primer.

Colour Mixing

Colours will have to be mixed from primaries provided namely:

- Cyan,
- Magenta
- Yellow
- White to lighten
- Black to darken

By **using a mixing cup, you can use the cyan, magenta, and yellow to get your primary and secondary colour match**, then if you need **to darken, lighten or tint, you can use a bit of the white or black**. Mix only what you need and base that on how much you used when you primed your key holder. This colour system is known as the **CYMK system where K stands for black**. If you were to mix equal amounts of cyan, magenta and yellow together, theoretically you would get black, but actually what you get is a murky dark brown. For this reason, a separate black pigment colour is added to the system. Inkjet and laser printers generally use the same principle, with the assumption you are printing on white paper.



If you are planning on multiple colours, then you will require more time and have to plan your painting. You probably will go with your base colour first, then your secondary colours. Painters tape can assist with controlling where the paint is going and give a nice clean and sharp professional edge. Remember this will require more drying time to accomplish this.

Name:

Date:

Index of Key Terms and Phrases:

Find ten new key terms or phrases and include the page number in the table below:

#	New Key Term or Phrase	Page #
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Check List for Project Module

All work where possible must have a complete header, computer generated using previous made related templates with your logo. When handing in everything, double check prior to handing in by checking off the following items in chronological order.

Process Report in order:

- ☐ Duo-tang or report cover including:
- ☐ Title page
- ☐ Table of contents
- ☐ SPICE, steps you took, separate ½ a page typed
- ☐ *Five detailed thumbnail ideas, labels, full page, with symbol legend
- ☐ *Orthographic of key holder, 1:2 reduced scale – computer or hand
- ☐ *Oblique 1:1 full scale - computer or hand
- ☐ Conclusion reflection, separate ½ a page typed
- ☐ This check list- with items handed in, checked off
- ☐ Final self and peer evaluation paper

Finished Keyring Holder:

- ☐ Finished keyholder in project box along with above process report

*All due date components handed in will have already been checked with mark feedback and can be updated or redone and added to report for an improved mark.

You will be responsible for handing in a full report with a finished key holder in your project box

Name:

Date:

Key Holder is done!

The Key Holder is Made, Evaluation Sheet!

Peer Marker: _____

Activity Process and Product Steps	Total Marks	Self Mark	Peer Mark	Earned Marks
Problems identified and Requirements Met: Was the problem identified and understood? Does the key holder have 5 round corners, 5 sharp corners, one odd hole, 20 to 26 cm long, min 2 cm width, and a minimum of 9 mm thickness? Does it have a smooth finish/coating, 4-6 hooks, and shows mounting method? Finished with primer/paint or stain and/or clear coat properly? Does the report have all requirements completed (check list)?	5			
Research and Information: What ideas were found and implemented into the design Does the report show/document this research and investigation process well?	5			
Rough Ideas, Designs and Possible Solutions: Completed thumbnail sketches on a full page with legend and details? Sketches show **meaningful** practical possibilities? Do your sketched ideas, notes, support your final design?	10			
Final Design showing Solution: Did you use computer (preferred) or hand drawn final ideas? Orthographic 1:2 reduced scale drawn? Is your oblique view drawn well showing shape, size, and colour(s), full 1:1 scale, original wood size drawn?	20			
Workmanship: Construction: Product: Were the right tools used and shown in the workmanship? Is the key holder accurate to original plan (lay over ISO to check)? Is quality present, smoothness observed, and finish surface completed? Is the report generally well put together and complete?	20			
Finished Product: Solution: Colour(s), look good, interesting, would I hang this on my wall? Is the report done well, templates used, good reflection, and learning achieved? *If you could have done this project again what would you do differently or how would you improve the product or time taken to make the product?* _____ _____	40			
Final mark: Based on % finished and completion and fulfillment of requirements of the problem. **Peer and Self evaluation marks must be added up in this row!** →	**100**			

Teacher Comments: _____

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