

BUILD IT

ELECTIVE ADVENTURE



SNAPSHOT OF ADVENTURE



If you visit a lumber store, you'll see rows and rows of all sorts of wood: boards, dowel rods, sheets of plywood, cedar shingles, and more. With some tools and time, a skilled craftsman can turn that wood into toys, bookcases, or even an entire house. You won't build a house in this Adventure, but you will build a smaller carpentry project. You'll also learn about the tools you could use to build just about anything you can dream up. So, grab your tool belt, and let's get started.

REQUIREMENTS

Approved by _____

1. Learn about some basic tools and the proper use of each tool. Learn about and understand the need for safety when you work with tools. _____
2. Demonstrate how to check for plumb, level, and square when building. _____
3. With the guidance of your Webelos den leader, parent, or legal guardian, select a carpentry project that requires it to be either plumb, level, and/or square. Create a list of materials and tools you will need to complete the project. _____
4. Build your carpentry project. _____

The Boy Scouts of America does not authorize Webelos Scouts to use power tools as part of the Webelos program.



- Elective Adventure
- Scan for this Adventure page

REQUIREMENT 1

Learn about some basic tools and the proper use of each tool. Learn about and understand the need for safety when you work with tools.

When you are building something, it's important to have the right tools. Imagine trying to cut a board in half with a pocketknife or pounding a nail with a rock. You might get the job done, but it would take a long time, and you could easily hurt yourself. With the right tools, those jobs are much easier and safer to do.

Basic Tools and Their Uses

Skilled tradesmen, including carpenters, plumbers, electricians, and bricklayers, use tools that are designed for their specific trades. For carpenters, those tools include hammers, saws, screwdrivers, and more.

Hammer — A hammer drives and pulls nails. A common hammer weighs 12 to 16 ounces and has a curved claw for pulling nails.



Screwdrivers — Screwdrivers drive screws into wood. You'll probably need small, medium, and large screwdrivers for both slotted screws, which have straight slots on their heads, and Phillips screws, which have X-shaped slots.



Allen wrenches — Some screws have six-sided holes on top. To drive one of those screws, you need an L-shaped metal tool called an Allen wrench. Allen wrenches come in various sizes, and you have to use exactly the right size. Hardware stores sell Allen wrenches separately and in a tool that looks like a jackknife.

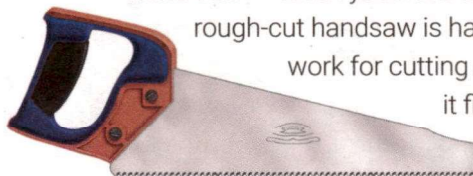


Chisel — A chisel looks somewhat like a flathead screwdriver. It has a sharper tip, however, and is used for shaving away small amounts of wood. To use it, you hold it against the wood and hit the end of the handle with a mallet.

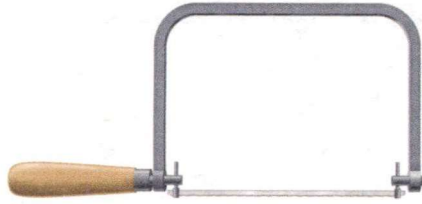


Awl — An awl is a tool used for making small holes in wood and leather. It has a wooden handle and a thin, sharp metal point.

Pliers — Pliers are versatile tools that let you grip and twist things, bend and snip wire, and do other tasks that require strength. Pliers come in many types, including needle-nose pliers, standard/slip-joint pliers, locking pliers, and wire-cutter pliers. It's useful to have several sizes and types in your toolbox.



Hand saw — When you need to cut a board in half, a 14-inch rough-cut handsaw is handy to have. It will certainly work for cutting smaller pieces of wood. Since it fits into your toolbox, it will always be close at hand.



Coping saw — When you want to make detailed or curved cuts in wood, plastic, or foam, you will need a coping saw.

Sanding block — A sanding block is a tool that you attach sandpaper to. (You can also use soft foam sanding blocks that allow you to sand curved or contoured objects.) Sandpaper comes in various grit sizes. The smaller the number, the coarser the sandpaper. You might use 50-grit sandpaper to shape a piece of wood and then 150-grit sandpaper to smooth the wood before you paint it.



File — A file is a metal tool used for making wood or metal smooth. It can also be used to sharpen metal blades and tools.



Rasp — A rasp is a metal tool with a rough surface that is used to shape or remove excess material from wood or metal.



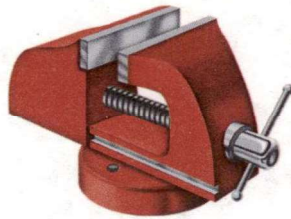
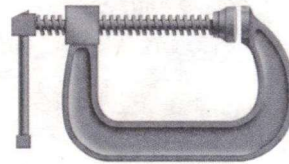
Tape measure — A tape measure lets you accurately measure pieces of wood up to several feet long. A 12- or 16-foot retractable tape measure will handle most jobs around the home. Most retract automatically and have a locking mechanism to keep the tape from recoiling (rolling up inside the case) before you're ready.

Carpenter's square — A carpenter's square helps you make perpendicular (right-angle) cuts. A 6-inch quick square will handle most small jobs.



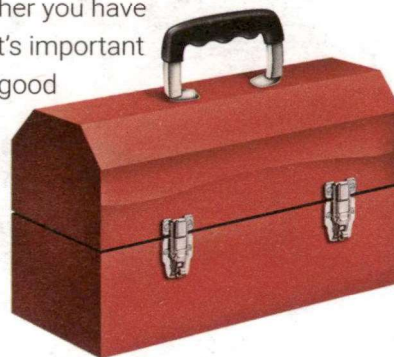
Level — When you need to hang something, such as a picture, a level helps you make sure it doesn't tilt to one side. For most small jobs, a 9-inch torpedo level works fine.

Clamp — A clamp is used to hold pieces of wood together firmly for cutting or gluing. C-clamps are common and come in many sizes. You will also find clamps that look somewhat like giant (and really strong) clothespins.



Vise — A vise does much of the same job as a wood clamp. The main difference is that it is mounted to a workbench.

Toolbox or tool bag — Whether you have a few tools or a few dozen, it's important to keep them all together. A good place to store them is in a latching toolbox or tool bag that you can carry to wherever you are working.



Taking Care of Your Tools

Your tools will last longer if you take care of them. Here are some things you can do:

- ▶ When you're done working, wipe off your tools with a rag. You might also apply a little machine oil to prevent rusting.
- ▶ Dry your tools if they get wet.
- ▶ Use tools only for their intended purpose. For example, don't use a screwdriver as a chisel or pry bar.
- ▶ Put your tools back in your toolbox or tool bag when you're done with each one. That way, you won't lose your tools, and they won't be in your way as you continue working.

Tool Safety

You already know that certain tools, such as saws, can be dangerous, but you can actually hurt yourself with any tool if you aren't careful. One way to keep yourself safe is to use protective gear.



Here's some important gear to use:

Hand protection — Wear gloves when handling lumber, carrying boxes of nails, and using saws. Even with gloves on, always know where all your fingers are when you are cutting and hammering.



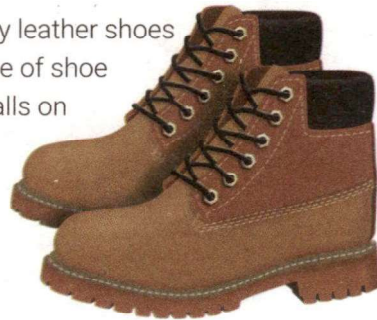
Head protection — Always wear a hardhat when you are working in an area that may have falling items or debris.

Ear protection — Your hearing can be damaged very easily. Be certain to wear good quality ear protection when you are in an area that may have construction noise.



Eye protection — Safety glasses are a must on every project. If you wear prescription glasses, you can get safety glasses that fit over your glasses, or you can buy side shields that slip onto the earpiece of your glasses. Safety glasses prevent debris and dust from entering your eyes.

Foot protection — Wear good quality leather shoes with thick soles, if possible. This type of shoe will protect your foot if something falls on it and will prevent a puncture if you step on a nail. Never wear sandals, flip-flops, or open-toed shoes when working with tools.



Lung protection — Cutting, drilling, and especially sanding creates small dust particles that can irritate your lungs if you breathe them in. You can protect yourself by wearing a dust mask (preferred) or by tying a bandanna or neckerchief around the lower part of your face.



How you use and care for your tools is also important:

- ▶ Tools that cut — such as saws, knives, and shears — should be kept sharp. If they are dull, you will have to use too much force, and they may slip and cut you.
- ▶ Keep your hands away from saw teeth and knife blades so that if the tool slips, you won't get hurt.
- ▶ When using a saw, make sure that the item you are cutting is held securely. If it slips while you are cutting it, you could accidentally cut yourself.
- ▶ Be careful when you are hammering. If you miss the nail head, you don't want to hit your thumb. Ouch!
- ▶ Practice using your tools with an adult until you know how to handle them well.

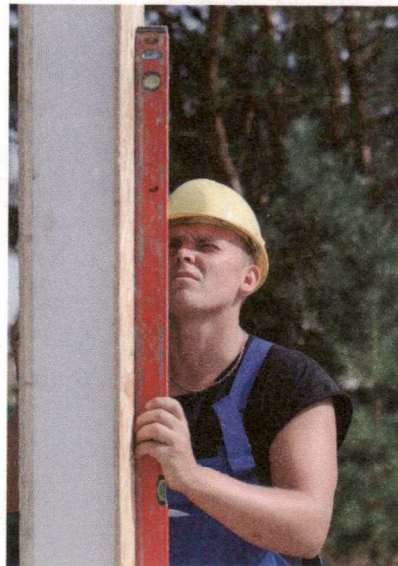
REQUIREMENT 2

Demonstrate how to check for plumb, level, and square when building.

When you use a standard door, you expect the door will work in a certain way. You expect the door to open easily, you expect when you open it that it will stay open, and you expect the door will not hit the floor when you open or close it. If you have ever used a door that didn't work right, chances are it wasn't plumb, level, and/or square.

Plumb

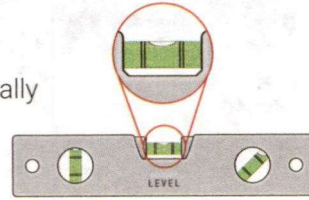
Plumb means that something is straight vertically (up and down). You expect the walls of a building to be plumb as it makes a right angle (90 degrees) with the ceiling and floor. If a wall isn't plumb, a standard window or door will not fit correctly into the wall.



Checking to see if something is plumb is simple. Take a string and attach a weight to it. Attach the free end of the string to the top of the item you're checking, and let the weight pull the string down. Make sure the weight doesn't touch the ground. This string is plumb and can be used as a guide.

Level

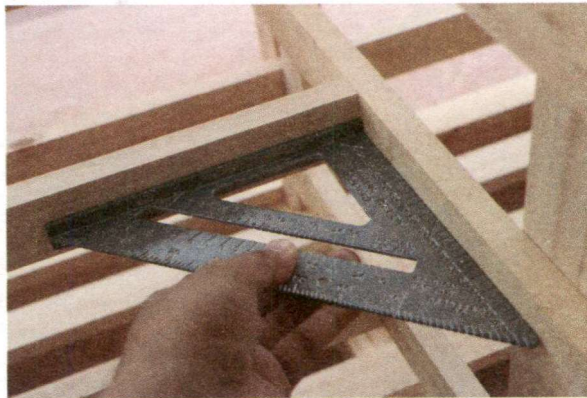
Level means something is flat horizontally (side to side). You expect tables and shelves to be level so that when you place an object on them, it doesn't roll or slide off.



To check to see if something is level, we use a tool called a level. There are several different types of levels, but they all have a small tube of colored water that has a bubble in it. When the level is placed on a flat surface, the bubble will be in the center of the tube. If something is not level, the bubble will float to the side that is too high.

Square

You may have learned in school that a square has four 90-degree angles and four equal sides. When something is square in carpentry, it means that the corners are at 90-degree angles.



To check for square, we use a tool called a square. It is a right triangle (a triangle with a 90-degree angle) made from metal

or plastic. You place the corner of the square against what you're checking to see if it lines up. You can also use a square to help you cut at a 90-degree right angle or at a 45-degree angle. Make a mark on the item you want to cut.

REQUIREMENT 3

With the guidance of your Webelos den leader, parent, or legal guardian, select a carpentry project that requires it to be either plumb, level, and/or square. Create a list of materials and tools you will need to complete the project.

The best way to learn how to use tools is to actually use them on a project. For requirements 2 and 3, pick a carpentry project and build it. When you're finished, update the list on the next page to include all the tools you used. Put a checkmark next to those that you used safely and those that you used for the first time.

When choosing a project to build, you should first look at the instructions and consider the following.

Who will be with you when building the project? An adult is to be with you the whole time.

- ▶ Do you have the right tools to make the project? If you don't, how will you get them?
- ▶ Do you have the materials needed to make the project? If you don't, how will you get them?
- ▶ How much time will it take to complete the project? Does it require time for glue or paint to dry?
- ▶ Where will you build your project?
- ▶ Is the location safe for the tools you are using?
- ▶ If you can't finish your project right away, is there a safe place to keep it until you can finish it?

My carpentry project is

MY TOOL LIST

Tool	Used Safely	Used for the First Time
Hammer		
Chisel		
Allen wrench		
Pliers		
Hand saw		
Coping saw		
Awl		
Sanding block or sanding sponge		
File		
Rasp		
Carpenter's square		
Level		
Clamp		
Vise		

What type of wood will you use?

If your instructions don't tell you the type of wood you need for your project, you can decide this by asking yourself some questions.

- ▶ Do I want to paint or stain my project? Some wood might hold paint better than stain. Also, you may want to paint inexpensive wood that has a few flaws. You may choose to stain one that has a color or pattern.
- ▶ Does my project need sturdy wood to hold it up (like a stool, chair, or a table)?
- ▶ Is my project a showpiece (like a stand for a Pinewood Derby car) that will show off a pretty color or pattern of wood? Using wood with a pretty color or an interesting pattern is a fun way to make the project more attractive.
- ▶ Will my project ever be outside? If your project stays outside (like a flower box), use a strong wood that takes paint well. Also use a good sealant so the weather won't damage it. Or you may choose to use a pressure-treated wood that is designed to be outdoors.

Here are common types of wood you might use:

- ▶ Pine, cedar, fir, cypress, and spruce are soft and easy to work with.
- ▶ Oak, walnut, hickory, maple, birch, and elm are hard and sturdier.
- ▶ Oak and walnut have interesting grains.
- ▶ Cedar has pretty colors and a nice smell.

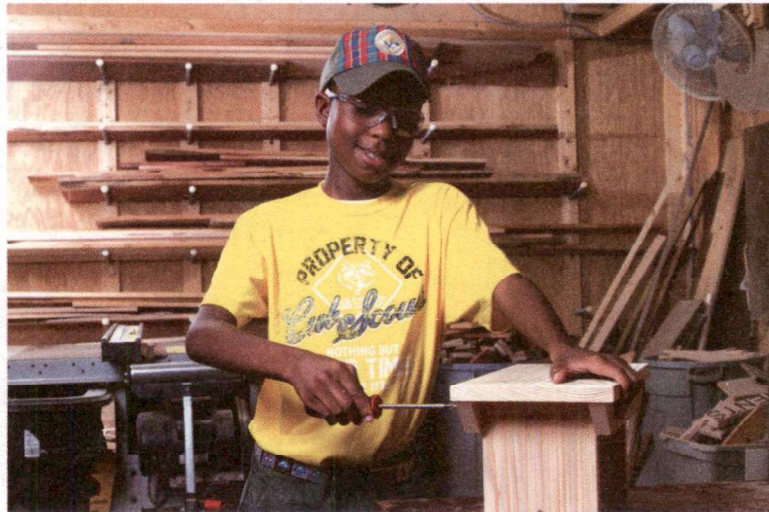
If the type of wood you want to use is not important, think about finding wood that has been recycled. Your parent, legal guardian, or den leader can help you locate a place to find recycled wood. Some ideas are reclaimed building supply stores, cabinet shops, or wooden pallet companies.

REQUIREMENT 4

Build your carpentry project.

The next few pages show three projects you can build. You can find many more ideas in books or, with your parent's help, on the internet. Your parent, legal guardian, or den leader can also give you some ideas, or you can try making your own plans. Think about what you want to make, then draw a simple picture of each separate piece and of the completed project. Decide how big the pieces should be and write the dimensions on your drawing. Review your drawing with an adult to be certain your measuring is accurate, then go to work.

Building a project can sometimes be expensive. If possible, reuse wood from construction sites or previous projects. (Be sure to get an adult's permission before visiting a construction site and ask the construction workers if you can have the wood.) Your parent, legal guardian, or den leader can help you find the materials you need.



STEP STOOL

Materials and Tools

- ▶ A piece of wood that is 12 inches wide and 36 inches long, cut from a 1-by-12-inch board or $\frac{3}{4}$ -inch plywood
- ▶ Clamp
- ▶ Finishing nails
- ▶ Wood putty
- ▶ Sandpaper
- ▶ Rag
- ▶ Paint or stain
- ▶ Paintbrush



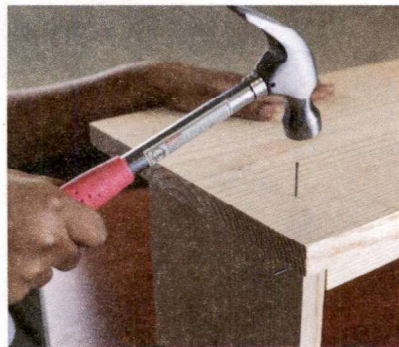
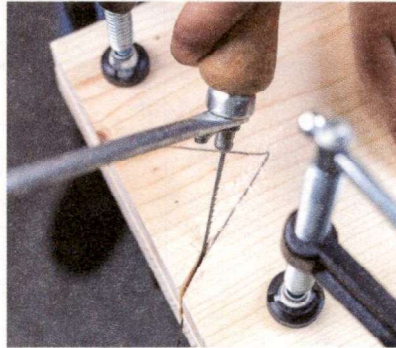
Measure carefully so you don't waste any of the wood.
Always remember to measure twice and cut once.

Instructions

1. Cut a piece of wood 18 inches long for the top of the stool.
2. Cut two 8-by-8-inch pieces for the legs.



3. Clamp the two leg pieces together, and mark where you will cut the notches shown in the picture.
4. Saw the notches out while the legs are clamped together. This will make the legs exactly the same.

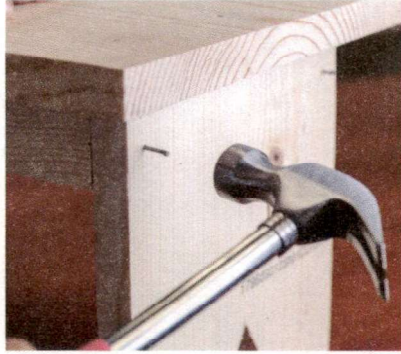


5. Cut two $\frac{3}{4}$ -by-2-by-14-inch pieces for the side braces.
6. Using finishing nails, nail the legs to the top piece 2 inches from each end. Measure carefully before you drive the nails to be sure they go into the legs.

7. Countersink each nail. To do this, place another nail on top of the nail you've already driven, then tap it with your hammer until the first nail is completely below the surface of the wood.

8. Fill the nail holes with wood putty.



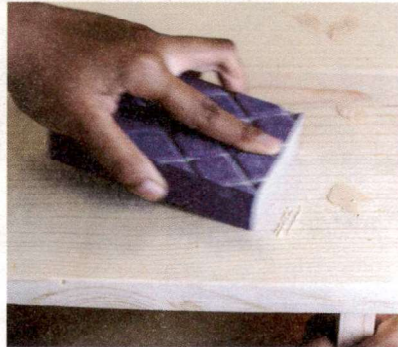


9. Nail the side braces to the legs. Fit them just under the top of the stool and inside the legs. The braces will keep your stool stable.

10. Countersink the nails and fill the nail holes with putty.



11. Sand the stool all over. Use a damp rag to clean any grit from the stool before applying the finish.



12. Stain the stool to match other furniture or paint it any color you like.

PAPER TOWEL HOLDER

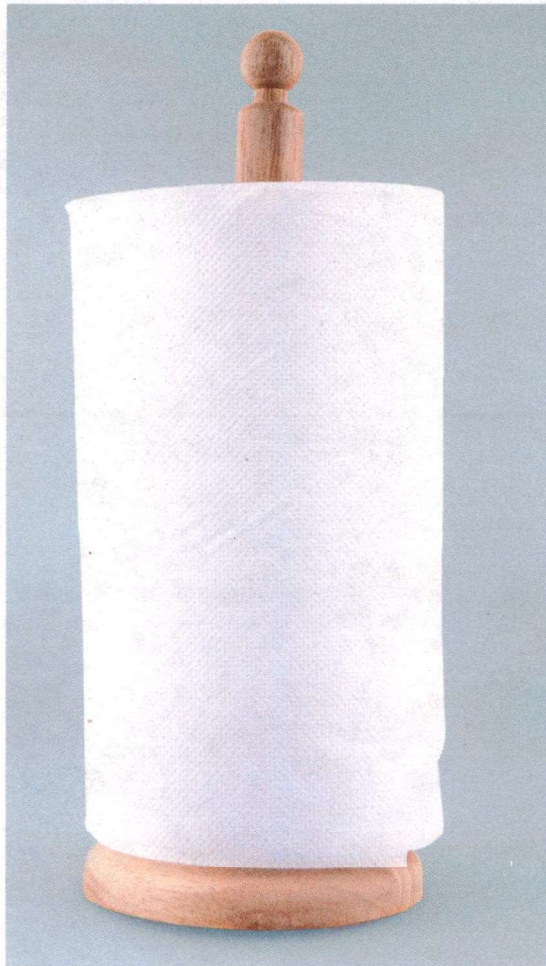
Materials and Tools

- ▶ Round or square base
- ▶ Dowel rod that measures 1¼ inches in diameter
- ▶ Sandpaper
- ▶ Measuring tape
- ▶ Pencil
- ▶ Screw
- ▶ Felt or pieces of cork, if desired
- ▶ Glue
- ▶ Decorative piece for the top of the dowel rod, if desired
- ▶ Paint or stain
- ▶ Paintbrush

Instructions

1. Cut the dowel rod to 14 inches.
2. Sand the dowel rod and base.
3. Using a measuring tape, find and mark the exact center of the base on both the top and the bottom.
4. Stand the dowel rod up and place the base on top of it. Make sure the dowel rod is in the center of the base.
5. Drive a screw through the center mark on the base into the dowel rod. This will be easier to do if an adult first drills a pilot hole with a power drill. (A pilot hole is a hole that is smaller than the screw.)

6. If desired, glue a decorative knob on the top of the dowel rod. Look for a knob that has a hole the same circumference as your dowel rod so it will slide onto the end. Make sure that the center of a paper towel roll will fit over the knob.
7. If desired, you may paint or stain the towel holder. You may then glue a square of felt or pieces of cork to the bottom of the towel holder. This will protect the countertop and keep the towel holder from sliding.



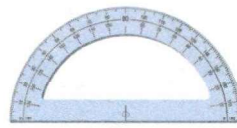
WALL SHELF

Materials and Tools

- ▶ 8-inch piece of 1-by-4-inch board
- ▶ 6-inch piece of 1-by-4-inch board
- ▶ Protractor
- ▶ Coping saw
- ▶ Pencil
- ▶ Sandpaper
- ▶ Glue
- ▶ Finishing nails
- ▶ 1-inch angle brackets, screws, and wall anchors
- ▶ Paint or stain
- ▶ Paintbrush
- ▶ Wall fasteners

Instructions

1. Using a protractor or a cooking pot as a guide, draw a half-circle on the 8-inch board. Make the shelf by carefully cutting along the line with a coping saw.
2. Draw a diagonal line on the 6-inch board. Make the brace by carefully cutting along the line with a coping saw.



Protractor



Coping saw

3. Sand all the edges smooth.
4. Paint or stain the shelf and brace as desired.
5. Use glue and finishing nails to attach the brace to the bottom of the shelf.
6. Screw angle brackets to the bottom of the shelf at the back edge.
7. With an adult's help, use wall fasteners to attach your shelf to the wall. (You may need hollow wall anchors to attach the shelf securely to the wall.)

