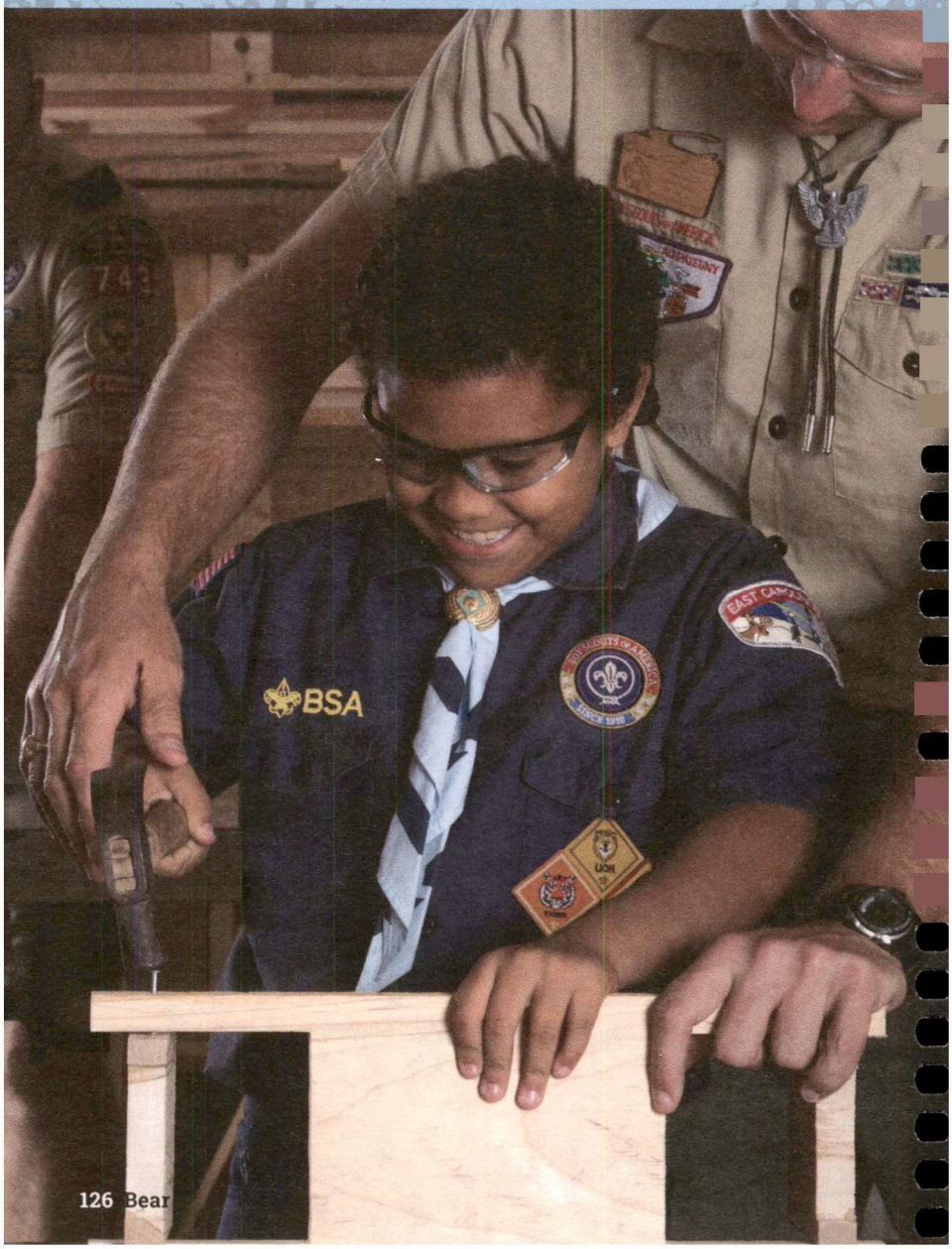
BALOO THE BUILDER

ELECTIVE ADVENTURE



SNAPSHOT OF ADVENTURE

Learning to build things that are useful or fun is an important skill. You might grow up to build houses as a career or models as a hobby. Or you might just learn some skills that will help you in everyday life.

Building materials may include wood, cement, plastic, steel, or a combination of all these things. For this Adventure, we will focus on wood. You will learn about hand tools and how to use them safely. You will learn how to choose the right type of wood for a project and follow project instructions. And before you're finished, you will use your new skills to make two projects from wood.

If your project requires the use of a pocketknife, you must first earn the Whittling Adventure before using a pocketknife.

REQUIREMENTS

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. Practice using four of the tools you learned about in requirement 1.
3. Choose a project to build.
4. Determine the tools and materials needed to build your project in requirement 3.
5. Build your project.

- 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.

Safety: Cub Scouts are not allowed to use power tools. Safety is the primary concern as Bear Scouts learn to use woodworking tools.

A woodworker may have dozens — or even hundreds — of tools. You will need only a few tools to complete this Adventure. Using the right tool for the job is very important. This keeps your tools in good working order. It also keeps you safe. It is a good idea to inspect your tools before using them to be certain they are in good condition.

Here are some tools you might want in your toolbox. You may borrow these tools from your parent, neighbor, or den leader, but always ask permission first. When you have finished learning about these tools and how to use them safely, practice using them on pieces of scrap wood.

SAFETY EQUIPMENT

Safety glasses aren't really tools, but they can help keep you safe when you're using tools. It is extremely important that you protect your eyes when working with tools and wood. You will need a good pair of safety glasses that are kid-sized.

Safety glasses are different from regular glasses or sunglasses. They are designed not to break when something hits them. They also cover a larger area around your eyes to keep sawdust and other construction debris out. Keep them clean with a soft cloth and store them in a safe spot.

SMALL FIRST-AID KIT

When working with tools, it's always a good idea to have a small first-aid kit nearby. It should include adhesive bandages in case you cut yourself, tweezers, a small magnifying glass, and some first-aid cream, in case you get a splinter.

HAMMER

A hammer is used to drive nails into wood. There are many different kinds of hammers. The best one for a Cub Scout is an 8- to 10-ounce claw hammer like the one shown here.

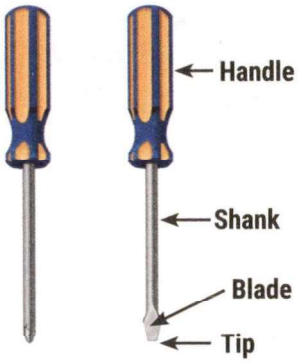
To drive a nail, hold it in place with one hand and tap it in gently with the hammer in your other hand. When the nail stands by itself, move your hand out of the way, and give the nail several firm hits with the hammer. For the most force, hold the handle near the end, not near the head.

If a nail bends, pull it out with the hammer's claws. Set a small block of wood next to the nail. Place the head of the hammer on the block of wood and slide the claws under the head of the nail. That creates a lever that helps you easily pull the nail out. Start over with a new nail.

Safety: Do not use a hammer that is too large or heavy for you. Grip the hammer tightly so it does not slip from your hand. Be careful of the fingers on your other hand. If they get in the way, it will hurt!

SCREWDRIVER

A screwdriver puts a screw into a piece of wood. Screws do a better job than nails of holding projects together when the pieces will be under strain. There are two main kinds of screwdrivers: flathead and Phillips head. Pick the one with a tip that matches the screw you want to drive. A flathead screwdriver is used for a screw with a single slot across its head. A Phillips screw has a "+" design.

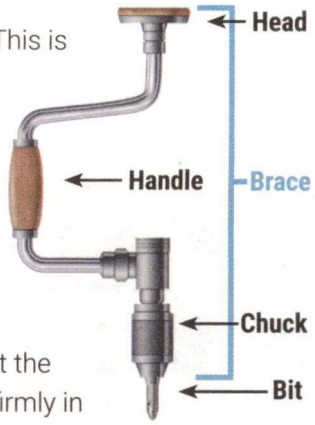


Screws go in more easily if you first make a pilot hole with a brace and bit (see the following page). The pilot hole should be smaller in diameter than the screw. It can also help to rub a little soap on the threads, or ridges, of the screw.

Safety: Use the longest screwdriver you can handle that is practical for your job. Pick the screwdriver that best fits the type of screw you are using. Only use a screwdriver to drive screws.

BRACE AND BIT

A brace and bit is used to drill holes. This is a two-part tool. The bit does the drilling, and the brace turns the bit. There are many kinds and sizes of bits depending on the material and size of hole needed. All bits for wood have a spiral edge that digs out small pieces of wood as you turn it.



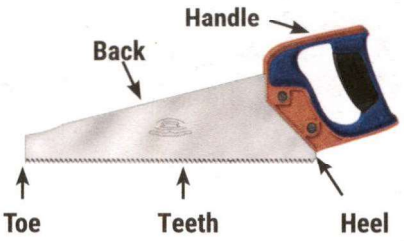
The brace has a hole where you insert the bit. Tighten the chuck so the bit is held firmly in place while you're working with it.

To use the tool, guide the bit into place with one hand. Press down firmly with one hand on the head to keep the bit in place. Turn the handle clockwise with your other hand to drill your hole. Before you drill all the way through the wood, turn the wood over, and finish your hole from the other side. This step will keep the wood from splintering.

Safety: The bit has a sharp point, so be careful when handling it. Use two hands. You may need an adult's help to get the hole started. Put on safety glasses before you begin.

HAND SAW

A hand saw lets you cut boards along straight lines. A 20-inch hand saw is best for Scouts your age.



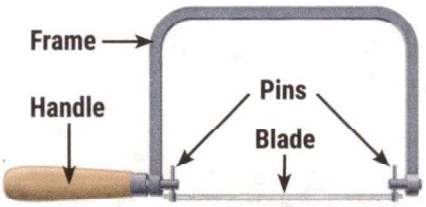
Before you begin sawing, draw a pencil mark on the board where you want to make your cut. Start the cut by making a notch on the mark at the edge of the board. This notch will act as a track for the blade to sit in. Steady the blade with your thumb well above the cutting edge, and then draw back gently to create the notch.

Now, remove your thumb, and begin sawing down the pencil mark. Be sure to tilt the saw at a 45-degree angle to the board.

Cutting the wood is a simple action of pushing the saw away from you at a downward angle, then pulling it back toward you. Each time you do this, the sharp teeth of the saw will cut deeper into the wood. You may need to straighten the saw handle to correct the direction of the cut, but be careful not to pinch the saw. If this happens, gently work the saw back and forth to release the blade.

Safety: A saw has sharp teeth. Be careful when you carry it and when you lay it down. It is a good idea to keep your saw hanging up when not in use so you don't brush up against the teeth. Always know where all your fingers are when using a saw. This tool will create sawdust, so safety glasses are a must.

COPING SAW



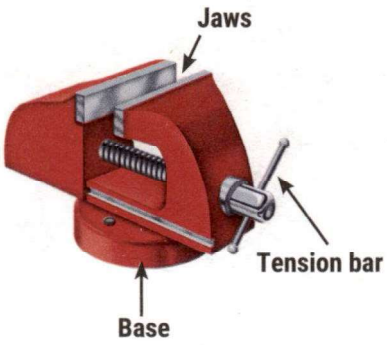
A coping saw lets you cut curves and odd shapes in wood. Hold the wood securely with a vise or C-clamp (see below) so it can't move. Mark the curve you want to cut, then follow it with the saw, making long back-and-forth strokes. A heavy blade is a good idea.

Safety: Like a hand saw, a coping saw has lots of sharp teeth. Be careful with your fingers, and wear safety glasses.

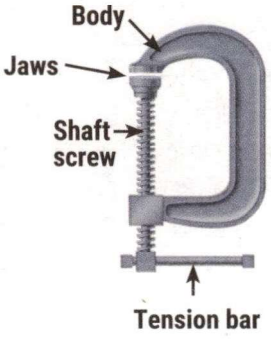
VISE OR CLAMP

At times, you may feel like you need a third hand to hold the wood you're cutting or drilling. Using a vise or clamp is like having that third hand. To use a vise or clamp, place the wood between the jaws, then tighten the tension bar to hold the wood in place.

VISE



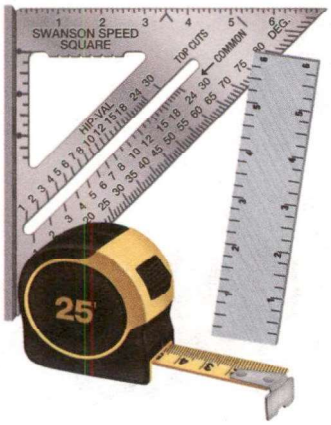
CLAMP



Safety: Vises and clamps can pinch fingers and hands, so be careful as you tighten them. If you're using a vise, make sure it's properly secured to a table.

MEASURING DEVICE

Carpenters have a favorite saying: "Measure twice and cut once." To measure things you're cutting, you can use a measuring tape, a ruler, or a speed square. A speed square rests on the straight edge of a board to help you mark a straight line across it. A measuring tape or ruler lets you measure the length of a board you want to cut.



SANDPAPER

Sandpaper is just what it sounds like: a piece of heavy-duty paper that has a scratchy surface on one side. Sandpaper is used to rub off any rough edges on your project. It comes in grades called "grit" ranging from 60, very coarse (very scratchy) to 7,000, extremely fine (almost smooth). Most of the time, you'll shape the wood with a coarse sandpaper (60-80 grit) first. Then change to a finer sandpaper (100-150 grit) to make a smooth surface. You would use a fine sandpaper, 220 grit or higher, to sand a surface in between coats of paint.

Date _____

Adult's Signature _____

REQUIREMENT 2

Practice using four of the tools you learned about in requirement 1.

PRACTICING WITH TOOLS

Here are some ways you can practice using your tools:

- With a hammer, see how many hits it takes you to drive a nail into a piece of wood, or see how many nails you can drive in five minutes.
- With a screwdriver, see how long it takes you to place one screw through two small pieces of wood. You could also use a vise or a clamp with this, which is using two tools at one time.
- With a saw, see how well you cut using different thicknesses of wood. Check your cuts to make sure they are straight down, not slanted.

I practiced using the following tools:

1. _____
2. _____
3. _____
4. _____

Once you have finished with your tools, wipe them off with an old cloth or rag — being careful not to touch blades or sharp edges — and place them back where they belong. This will help your tools last longer. It will also help you find them the next time you need them.

_____ _____

Date **Adult's Signature**

REQUIREMENT 3

Choose a project to build.

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 to use the tools you're using?
- If you can't finish your project right away, is there a safe place to keep it until you can finish it?

What type of wood will you use?

If your instructions do not 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 woods might hold paint better than stain. Also, you may want to paint an inexpensive wood that has some flaws. But you may choose to stain one that has lots of 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 will stay 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.

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 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.

3

Date _____ Adult's Signature _____

REQUIREMENT 4

Determine the tools and materials needed to build your project in requirement 3.

Once you have picked a project that is right for you, review the instructions and write down the tools, materials, and safety equipment you need. If you're going to paint or put a stain on your project, remember to include paintbrushes and cleaning supplies.

Here is the safety equipment needed for my project:

_____ _____

Here are the tools needed for my project:

_____ _____

_____ _____

_____ _____

Here are the supplies needed for my project:

_____ _____

_____ _____

_____ _____

_____ _____

Date **Adult's Signature**

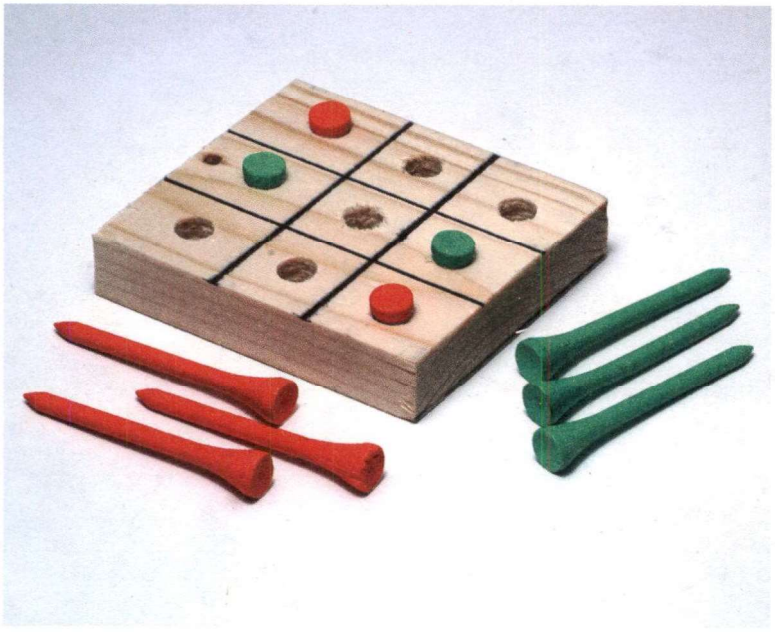
REQUIREMENT 5

Build your project.

Here are some projects you may want to build with adult supervision.

TIC-TAC-TOE BOARD

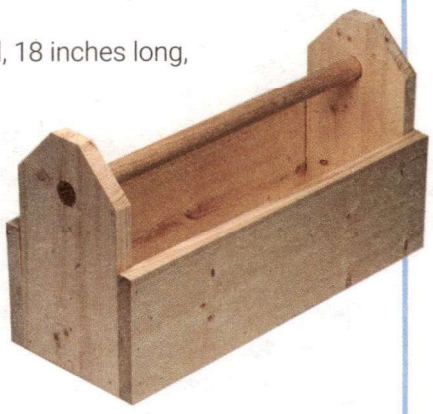
Cut a block of wood so it's 4 inches by 4 inches by 1 inch. Mark evenly spaced holes, and drill. Paint golf tees — five of one color for "X" and five of another color for "O." Saw golf tees to length to fit in holes.



TOOLBOX OR ART CADDY

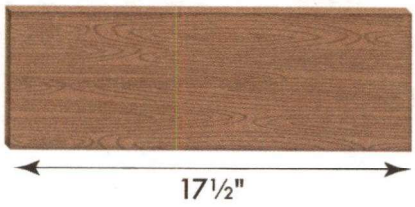
Materials and Tools

- Five 1-by-6-inch pieces of wood to be cut to various lengths
- Broomstick piece or dowel, 18 inches long, for the handle
- Wood screws
- Wood glue
- Hand saw
- Brace and bit
- Screwdriver
- Measuring tape

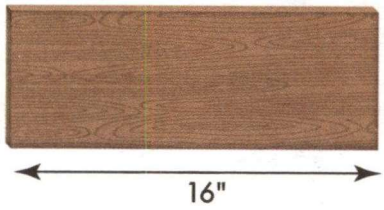


Instructions

1. Cut two pieces of wood 17½ inches long for the two long sides.

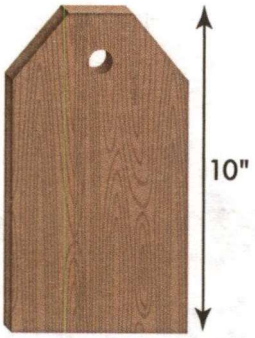


2. Cut one piece of wood 16 inches long for the bottom.



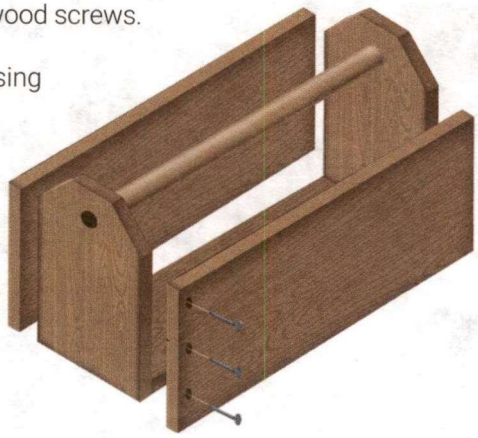
3. Cut two pieces of wood 10 inches long for the ends.

4. Cut off the corners of the end pieces at an angle, then drill a hole in each large enough for the handle. The center of each hole should be 1¾ inch from the top and centered between the edges of the piece.



5. Insert the handle. Then, put your toolbox together with wood screws. If you wish, you may put wood glue on the joints and let it dry before using the wood screws.

6. Finish your toolbox using one of the methods described later in this chapter.



CANDY DISPENSER

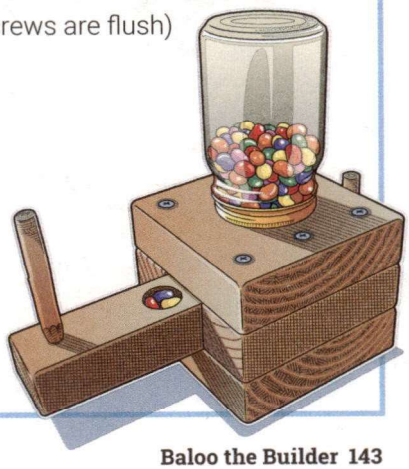
You can make this dispenser for jelly beans, gumballs, or any other hard candy that will fit in it.

Materials and Tools

- One 2-by-6-inch board, 24 inches long (The actual size of a 2-by-6-inch board is 1½ by 5½ inches.)

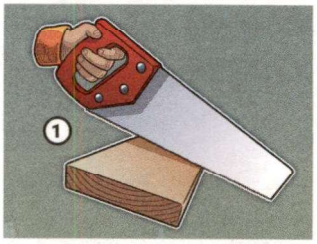
  Cut the board as follows:

  Two 1½-by-5½-by-5½-inch boards (top and base)
  Two 1½-by-1¾-by-5½-inch boards (sides)
  1-by-1⅞-by-11-inch board (slide)
- 1 dowel or peg about ¼ inch in diameter, 4 inches long
- 1 dowel or peg about ¼ inch in diameter, 2 inches long
- A clean quart or pint canning jar with its metal ring
- Crosscut saw for sawing across the grain
- Ripsaw for sawing with the grain
- 12 wood screws, 2½ inches long
- 4 flathead brads for nailing jar ring to top of dispenser
- Drill **(Only adults may use a power drill)**
- Drill bit, sized for pre-drilling 2½-inch holes
- Small drill bit for pre-drilling brad holes in jar ring
- Countersink bit (so driven screws are flush)
- ⅞-inch spade bit
- Screwdriver
- Tape measure
- Pencil
- Pocketknife
- Sandpaper
- Wood glue
- Jelly beans or gumballs

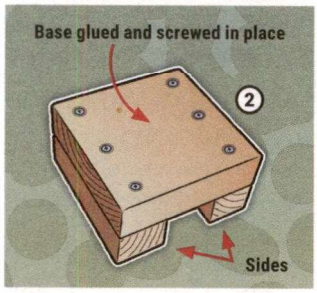


Instructions

1. Cut all the boards to size and sand smooth.

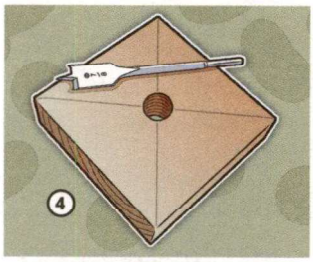


2. Glue and screw the base onto the sides.

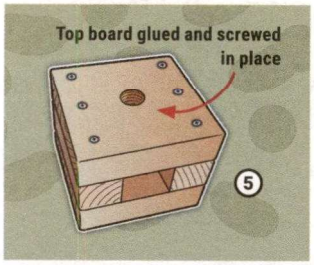


3. Pencil an X from corner to corner on the top board.

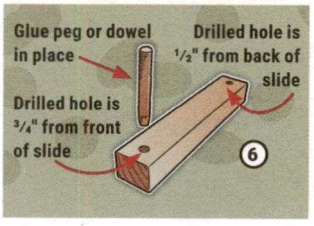
4. Have an adult drill a ⅞-inch hole through the center of the top board.



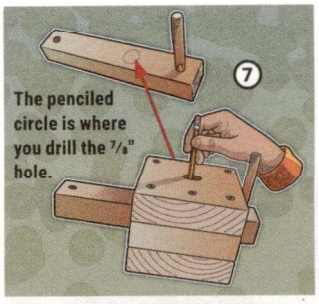
5. Glue and screw the top board onto the sides and base. Sand the slide until it moves smoothly in the square hole in the center of the dispenser.



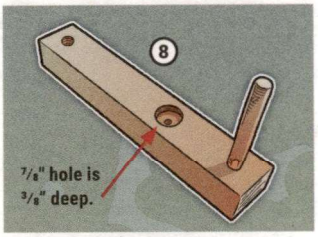
6. Have an adult drill a hole ¾ inch from the front of the slide. This is for the 4-inch peg or dowel. Have an adult drill a hole ½ inch from the back of the slide. This is for the 2-inch peg or dowel. Glue the 4-inch peg or dowel in the front hole on the slide.



7. Push the slide into place until it stops at the 4-inch peg. Draw a circle through the ⅞-inch hole on the top board onto the slide.

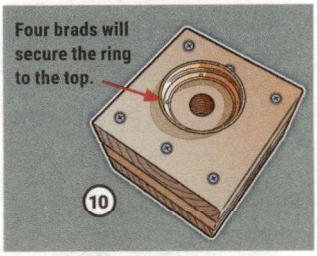


8. Have an adult drill a ⅞-inch hole ⅜ inch deep into the slide as shown.

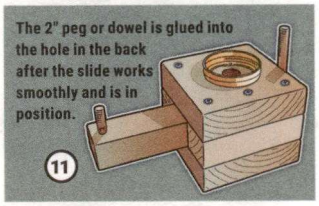


9. Bevel the ⅞-inch slide hole with the pocketknife and sand smooth.

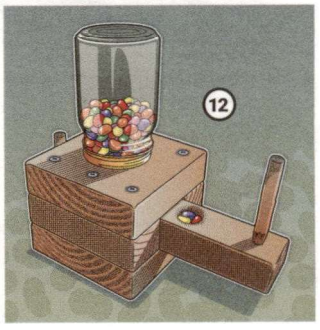
10. Have an adult drill and nail the jar ring onto the top board.



11. Push the slide into place. When the slide is pushed in all the way, the hole in the top and the hole in the slide should line up. Glue the 2-inch peg or dowel onto the back of the slide.



12. Fill the jar with candy, screw it onto the ring and your dispenser is complete.

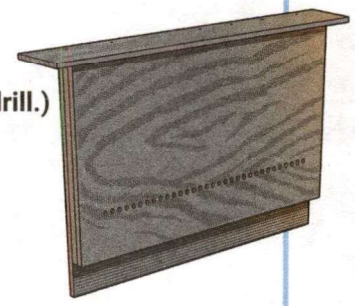


BAT HOUSE

This simple one-chamber house will give those beneficial bug-eaters a much-needed roost. Here's how to build a simple bat house.

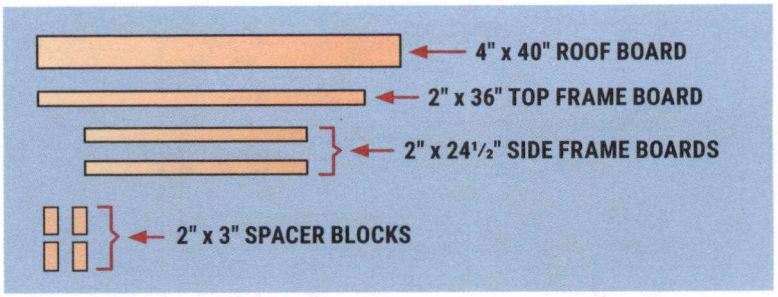
Materials and Tools

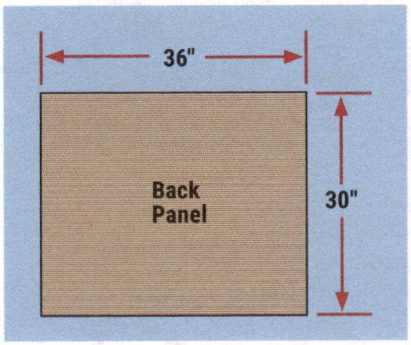
- ½-by-30-by-36-inch sheet of exterior plywood (Don't use pressure-treated plywood; it's toxic to bats.)
- ½-by-26-by-36-inch sheet of exterior plywood
- 1-by-4-by-40-inch board for the roof
- Two 1-by-2-by-24½-inch boards for interior frame
- 1-by-2-by-36-inch board for interior frame
- Four 1-by-2-by-3-inch wood spacer blocks
- One quart of dark exterior water-based stain
- 53 1-inch exterior wood screws
- Seven 1⅝-inch exterior wood screws for the roof
- Crosscut saw
- Pocketknife **(To use a pocketknife you must first earn the Whittling Adventure.)**
- Paintbrushes
- Drill **(Only adults may use a power drill.)**
- ½-inch drill bit for vent holes
- 3/32-inch drill bit for screw pilot holes
- Countersink bit so screws are flush
- Phillips screwdriving bit
- Two squeeze tubes of exterior, paintable caulking
- One quart of exterior water-based primer
- Two quarts of exterior black or gray water-based paint



Instructions

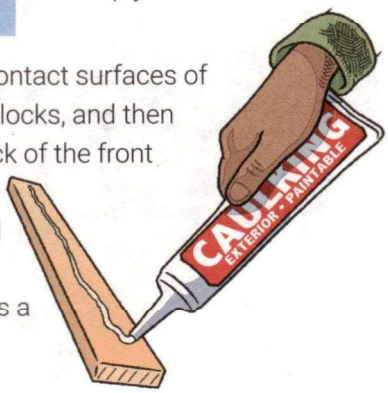
1. Cut out all the bat house boards.



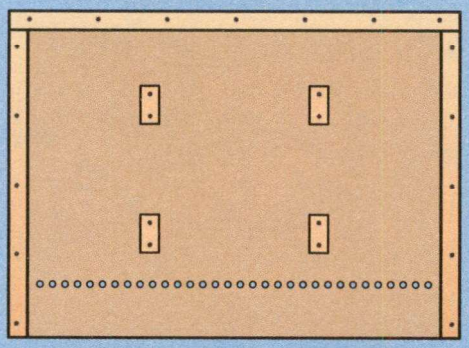


2. Use your pocketknife to scribe shallow grooves (less than 1/16 inch deep) across the inside of the back sheet of plywood, about ¼- to ½-inch apart. The grooves help bats grip the plywood.

3. Run a bead of caulk onto the contact surfaces of the interior frame and spacer blocks, and then screw them in place on the back of the front panel. All surfaces that are in contact with each other should be caulked before screwing them together. Caulking acts as a gasket, sealing out water.



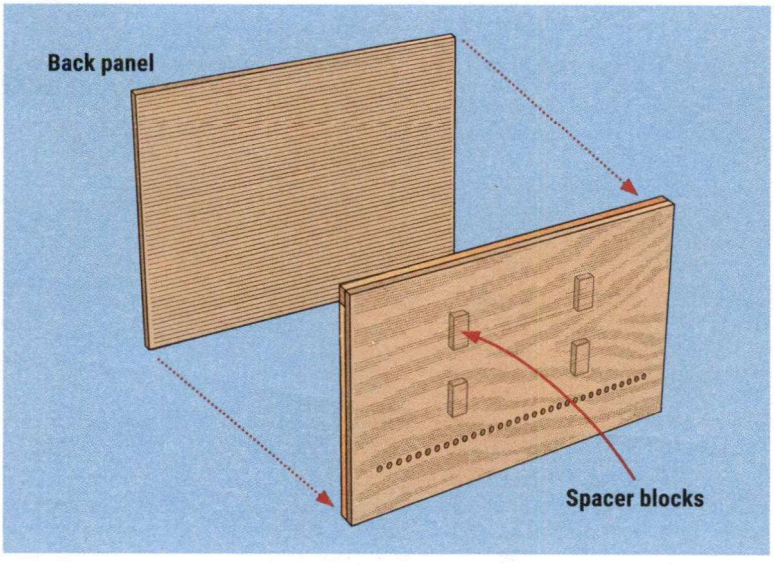
4. Have an adult drill ½-inch vent holes in the front panel. In cold climates, you need only three or four vent holes.



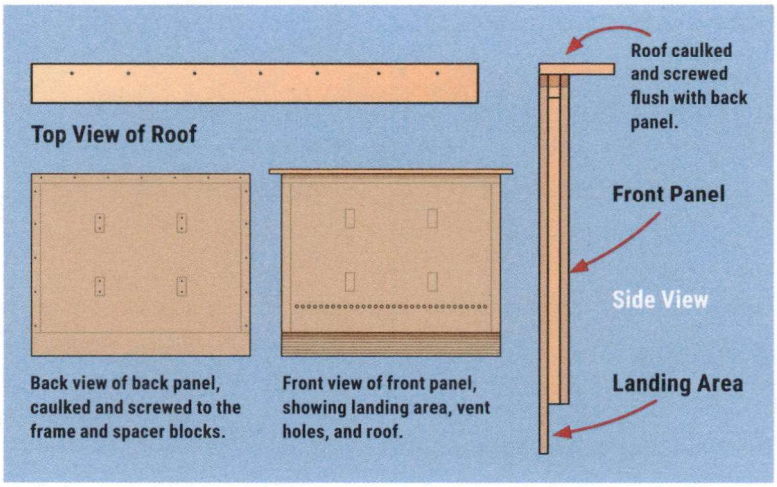
Back view of front panel, showing vent holes. Frame and spacers are caulked and screwed in place.

5. Stain the interior of the bat house, including the plywood, frame, and spacer blocks. Allow the stain to dry.

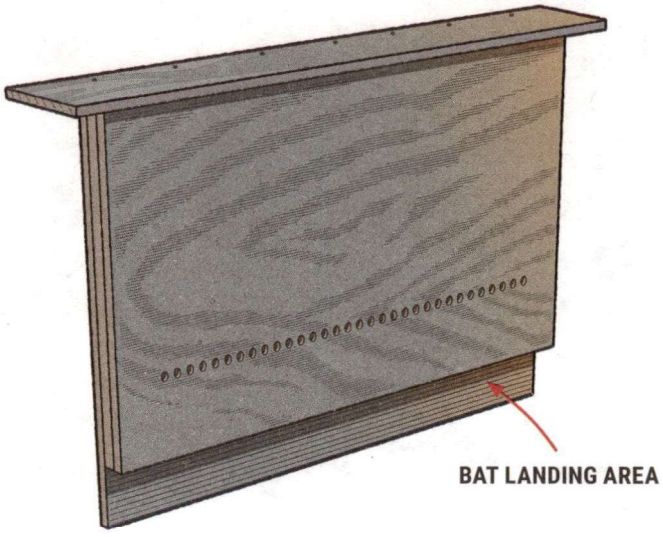
6. Caulk and screw the back panel to the frame and spacer blocks. Be sure to have an adult drill pilot holes to avoid splitting.



7. Caulk and screw on the roof. A drop of caulking in each screw pilot hole will help waterproof the bat house and keep the inside dry.



8. Paint the exterior with primer, then apply two coats of paint. Use black paint for colder climates and gray paint for warmer climates. Attach the bat house to a building or other structure. Face it south or east, about 10 to 12 feet off the ground.

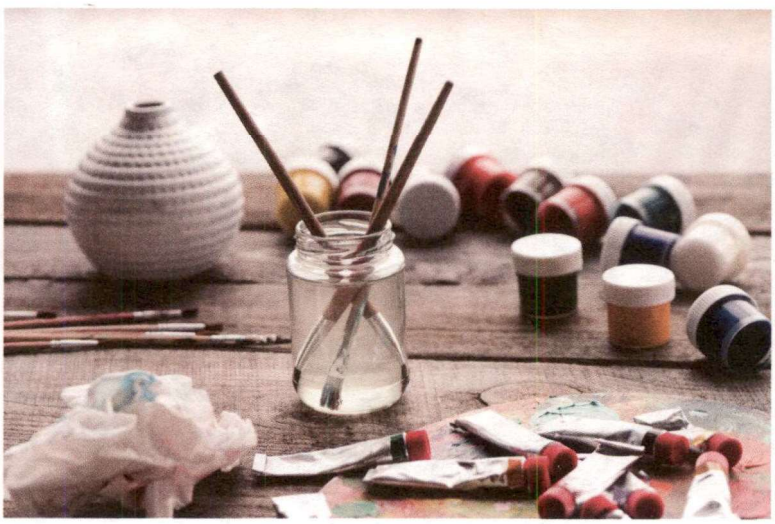


Once you have completed your project, you may want to put a finish on it. There are many ways to finish the wood. How you're going to use your project will help guide you in selecting the correct method of finishing it. Ask a parent or legal guardian to help with handling the finishes and cleaning fluids.

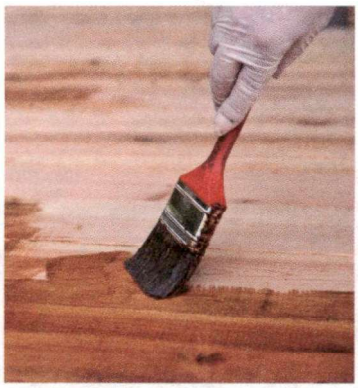
Always sand projects before you finish them. Sand the wood with the grain, never against it or in circles. To get the best results from sanding, use a wood filler for scratches and holes. When the filler dries, sand the project lightly again. You can use several finishes on wood projects: acrylics, varnish, enamel, and wood stains. Apply a clear wax polish to raw wood to emphasize the beauty of the natural wood grain.

Here are some things you should know about different finishes.

- **Acrylics:** Acrylic paint is nontoxic and good for painting almost anything, including wood projects. It can be thinned with water and doesn't need a finishing coat. Clean your brushes with water.



- **Varnish:** Prepare wood with one or two coats of thin shellac or wood sealer first, sanding between coats. This will fill the pores of the wood and prepare it for varnishing. Use shellac thinner or alcohol to clean the shellac brush, turpentine to clean the varnish brush.



- **Enamel paint:** Prepare wood in the same manner as for varnishing. Two thin coats of enamel produce a colorful finish. If it's too thick, it will leave brush strokes. Clean the brush with turpentine.

- **Wood stain:** To prepare the wood, moisten it with turpentine before applying the stain. Experiment on a scrap of wood to make sure the results please you. If it's too thick, it will leave brush strokes. Clean the brush with turpentine.

Remember to get help from your parent or den leader before you begin this part of your project. Always use finishes in a well-ventilated area and wear a paint mask and eye protection as well.

5

Date _____ Adult's Signature _____