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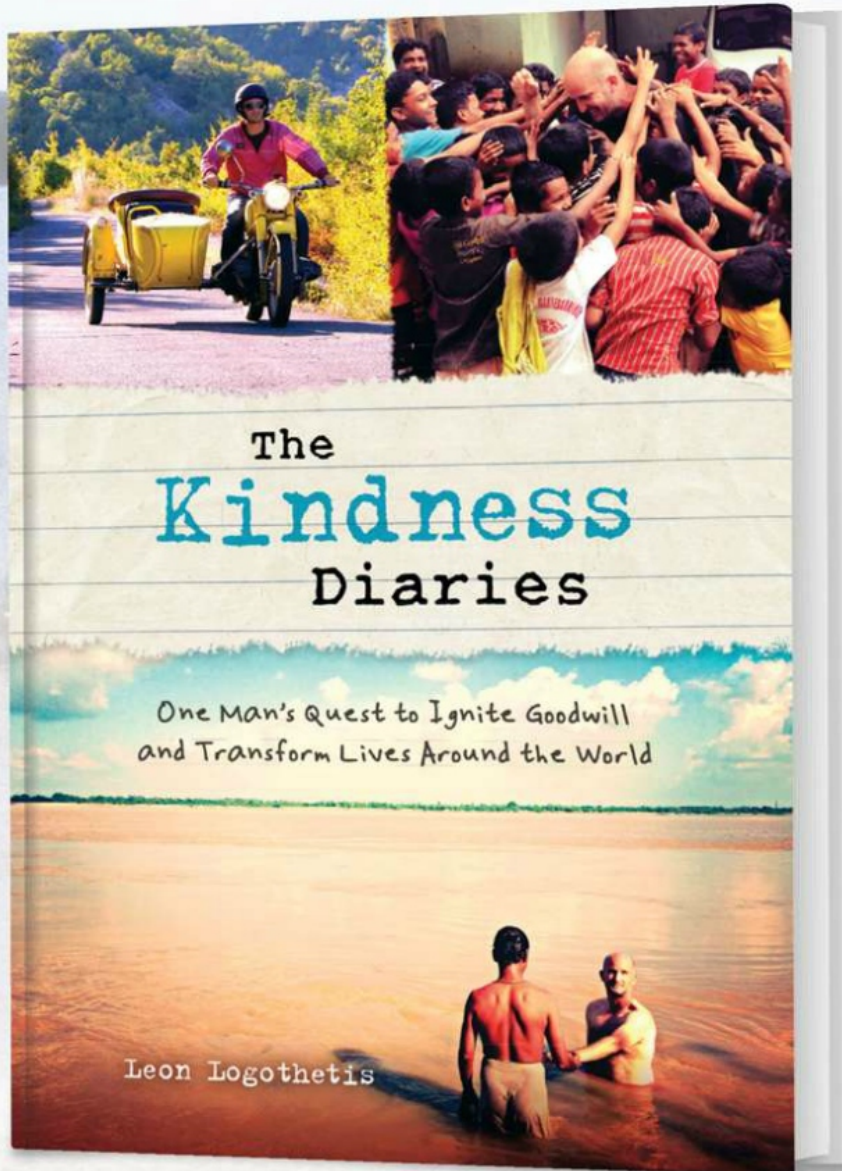
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GOT A DIY QUESTION?

Finding answers is easy at familyhandyman.com. Just use the search box at the top of the page to get expert step-by-step help with your project. Or register on the site and join our DIY Forum, where you can ask questions or give advice.

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STUFF we love

BY TRAVIS LARSON

editors@thefamilyhandyman.com



BIG CUTS, SMALL FOOTPRINT

Every toolmaker makes a version of the 10-in. sliding miter saw. What makes Craftsman's saw unique is its ingenious offset rail system. The sliding bars on most sliding miter saws take up a lot of room—in your shop and in your pickup.

This saw takes up no more room than a conventional miter saw but has all the advantages of a slider. I used it to trim out an entire room, and it performed just as well as the \$500 slider I have at home. The detents are firm, the levers and

locks are convenient and intuitive, and the pivoting action is smooth as butter.

Because it's compact and lightweight, it doesn't have the solid feel and heft of a \$500 saw, but at \$230, it's less than half the price. It's a great saw for weekend warriors and pros alike. Find one at craftsman.com or at Sears or other Craftsman retailers.

Travis Larson, Senior Editor

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DIY WORK WEAR

My new work jacket

I wear my work jackets until they're absolutely falling apart (about four years) because the more worn they get, the better they feel. I always look for a canvas shell, a fleece or quilted lining, and big pockets. I like a medium-weight jacket best so it will be comfortable in cool weather but can be worn with layers for way-cold weather.

My wife just got me a replacement for my birthday, and it's my favorite to date. It's the Duluth Trading Co. Flannel-Lined Action Jacket, No. 32526. It's made from the ultra-durable "Fire Hose" fabric and has all the other stuff I like too: attached hood (no zippers or snaps), under arms and shoulders designed for non-binding movement, and best of all, the rugged zipper that I expect to last the life of the coat. Plus, it has more pockets than a billiard hall! Check it out at duluthtrading.com for \$130.

Travis Larson, Senior Editor

PRO TOOLS + GEAR

A backpack for job sites

For thousands of years, tradespeople have been climbing ladders and scampering around on scaffold platforms with only one hand on the railing because the other held the toolbox. And sustaining millions of injuries in the process.

The solution, of course, is to use both hands for scampering. Milwaukee's Jobsite Backpack makes that possible. It has tons of tool storage space, a laptop compartment, a molded base to keep it upright on the ground and a handle on top to make it easy to move short distances. This is the perfect solution for you folks who regularly work on roofs, off scaffolds, or at any job where climbing is part of the daily routine. It could also come in handy for maintenance workers who have to lug their tools around huge facilities. The Milwaukee Jobsite Backpack costs \$99 at stores where Milwaukee tools are sold.



A SKELETON IN MY TOOLBOX

I use my jigsaw a lot, with mostly favorable results, but every once in a while they're less than perfect when I make a curved cut in hardwood. The cut will have burn marks or be slightly beveled from the blade overheating and distorting. Always on the lookout for better tools, I ran across the Spyder Skeleton Jigsaw Blades at my local Lowe's store. They're only \$6 a pair, so I thought I'd give them a try.

After a few tests in known problem situations, I have to say the blades performed really well. They cut with less friction because of the cutout design and seem to last longer too. There are a variety of blade tooth options for all types of wood and sheet goods. My favorite is the No. 300022 blade, which cuts super-clean, splinter-free cuts in plywood. As the old Monkees song goes, "Now I'm a believer!"

David Radtke, Contributing Editor

PRO TOOLS + GEAR

Attention basement remodelers...

And anyone else who drives lots of concrete screws. You might want to throw 55 bucks at the Irwin 1881131 Impact Performance Series Concrete Screw Drill-Drive Installation Set. (If you shop around online, you can find it for \$40 or so.)

This nine-piece set contains everything you need to drive the most common concrete screw sizes: four drill bits, a drive sleeve, two hex drive bits and two Phillips drive bits. The drive sleeve makes it simple to shift from drilling to driving in seconds. Check it out and find a retailer at irwin.com.



Cramped quarters? No problem!

I have to admit that when it comes to swinging a hammer, I'm a bit out of practice these days. With air nail guns designed for every task, my hammer gets very little use. And since buying a Porter Cable Mini Impact Palm Nailer (model No. PN350), I use my hammer even less.

This air nailer is small enough to fit into my nail apron and powerful enough to drive an 8d sinker nail in less than two seconds. The compact design gets it into corners and spaces where my gun nailer or hammer can't go. It's available at The Home Depot and other tool supply stores for \$40.

David Radtke, Contributing Editor



ON YOUR MARK: READY, SET, FASTEN!

I assemble a lot of cabinet boxes, and the key to good results is lining up the parts perfectly before you drive a single fastener. Using the right clamp matters. I found ratcheting clamps awkward for some assemblies, so when I came across the Wolfcraft Right Angle Clamp (model No. 3415405), I gave it a try. Now I'm hooked! I can use it flat on my assembly bench or move it onto a partially assembled cabinet to align shelving or braces for fastening. I like the light weight—and the light \$23 price tag, too. Available at home centers and amazon.com.

David Radtke, Contributing Editor



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FROM OUR READERS

handyhints@thefamilyhandyman.com

EDITOR DAVID RADTKE • ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY TOM FENENGA



ELEVATED DOG DISH

I read in an article not long ago that some larger dogs have difficulty eating from dishes that are on the floor. To give my dog a break, I cut a plastic pail in half and then glued her dish to the bottom of it with adhesive caulk. She seems even more enthusiastic about eating than ever.

Randy Roush



STAIR GAUGE SUBSTITUTE

Awhile back, I had to cut a stair skirt to trim the outer edge of my deck stairs, but I didn't have the stair gauge buttons that I usually attach to my framing square to set the repeated angles. The binder clips from my briefcase did the job nicely!

Rick Wilson



Pet collar cord hanger

A few weeks ago while I was at the pet outlet store getting food and treats, I noticed the display of collars for dogs and cats. They looked like the perfect strap to keep my electrical cords organized in the shop. I bought several, and now I use them for air hoses too. The leash ring is perfect for hanging the cords on the hooks, and the quick-release fastener makes for fast strapping and unstrapping.

Chris Neely



Check out our iPad edition for a whole lot of bonus Handy Hints. It's available at the App Store.

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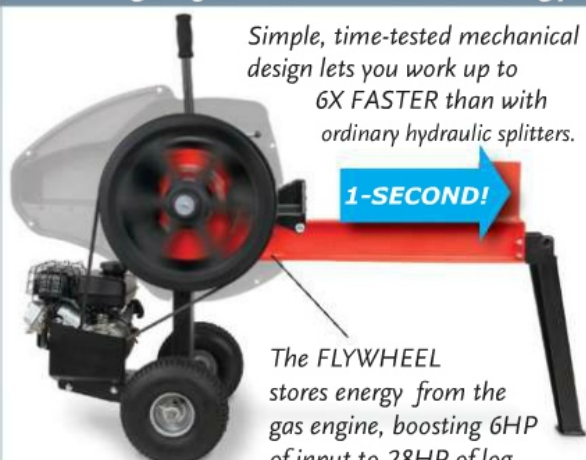
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CUSTOMIZED TOTE

As a carpenter, I need to bring certain items with me every day. I bought a cheap plastic tote in the tool storage area at a home center and modified it for my needs. I made a small plywood deck, drilled a couple of 3-in. holes for coffee cups or glue bottles and then fastened it to the tote. Another piece of plywood has holes to keep pencils upright and organized. My tote sits nicely on my bench seat, but it could also be attached to the floor with hook-and-loop fasteners. You could easily customize these totes for plumbing, garden or painting tools, electrical supplies—what have you.

Don Simms

Get \$100 for your Handy Hint! See p. 4 for details.



Spring-loaded hinge pin remover

I've messed up the trim around my doors a number of times by using a screwdriver and a hammer to pound out stubborn door hinge pins. I now use my spring-loaded nail set to do the job with perfect results. It takes about three shots and the pin is out. You can find a spring-loaded nail set for about \$35 at rockler.com.

Matt Seery



Stand-at-attention screws

When I need to insert small screws and bolts and keep them positioned until they find their place, I use a rare earth magnet attached to the shaft of the screwdriver. It holds better than the usual magnetized tip. I just keep the magnet stuck inside my tool chest and use it with any size screwdriver. It's also great for picking up dropped nuts and screws in tight spaces.



Robert Slunaker



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SAME SPACE, MORE STORAGE

**5 simple projects that turn
wasted space into storage space**

by Spike Carlsen
editors@thefamilyhandyman.com

Our house is done growing—no more additions, remodeling projects or storage sheds for this old girl. So when we need more storage space, we have to find it within the existing structure. I started snooping around and came up with five simple storage projects that can be carved out of—well—almost nothing. And every single one is inexpensive and buildable in an afternoon. It's what I call “bonus storage space.”



**TWIN CLOSET
SHELVES**



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**DOUBLE-DECKER
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**YARD TOOL
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**ABOVE-DOOR
DISPLAY SHELF**

“We were out of garage floor space—so I tried looking up.”



DOUBLE-DECKER GARAGE SHELF

Floor space in most garages is hard to come by—so the best place to find storage space is overhead. This project has a 16-in. top shelf for big items, a 5-in. lower shelf and plenty of hook space. Need different size shelves or more space between them? It's easy to modify this basic design. To build a saw guide like ours, search for “saw cutting guides” at familyhandyman.com.

WHAT IT TAKES

TIME: 3 hours (per 8-ft. shelf)

COST: \$30

SKILL: Beginner

TOOLS: Table saw (or a circular saw and a straight-cut jig), drill, circular saw



1 RIP THE PLYWOOD TOP TO WIDTH

Use a homemade saw guide and a circular saw, or a table saw, to cut the plywood for the 16-in.-wide top shelf.



2 SCREW THE FRAMEWORK TOGETHER

Use all-purpose screws to secure the 1x8 back rim and 1x2 front rim to the 2x8 support block. Space the support blocks every 32 in.

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3 COMPLETE ASSEMBLING THE SHELF
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4 SECURE THE SHELF TO THE WALL
Use 4-in. lag or construction screws to secure the 1x8 back rim to the wall studs. Drive two screws into each stud—one high, one low.

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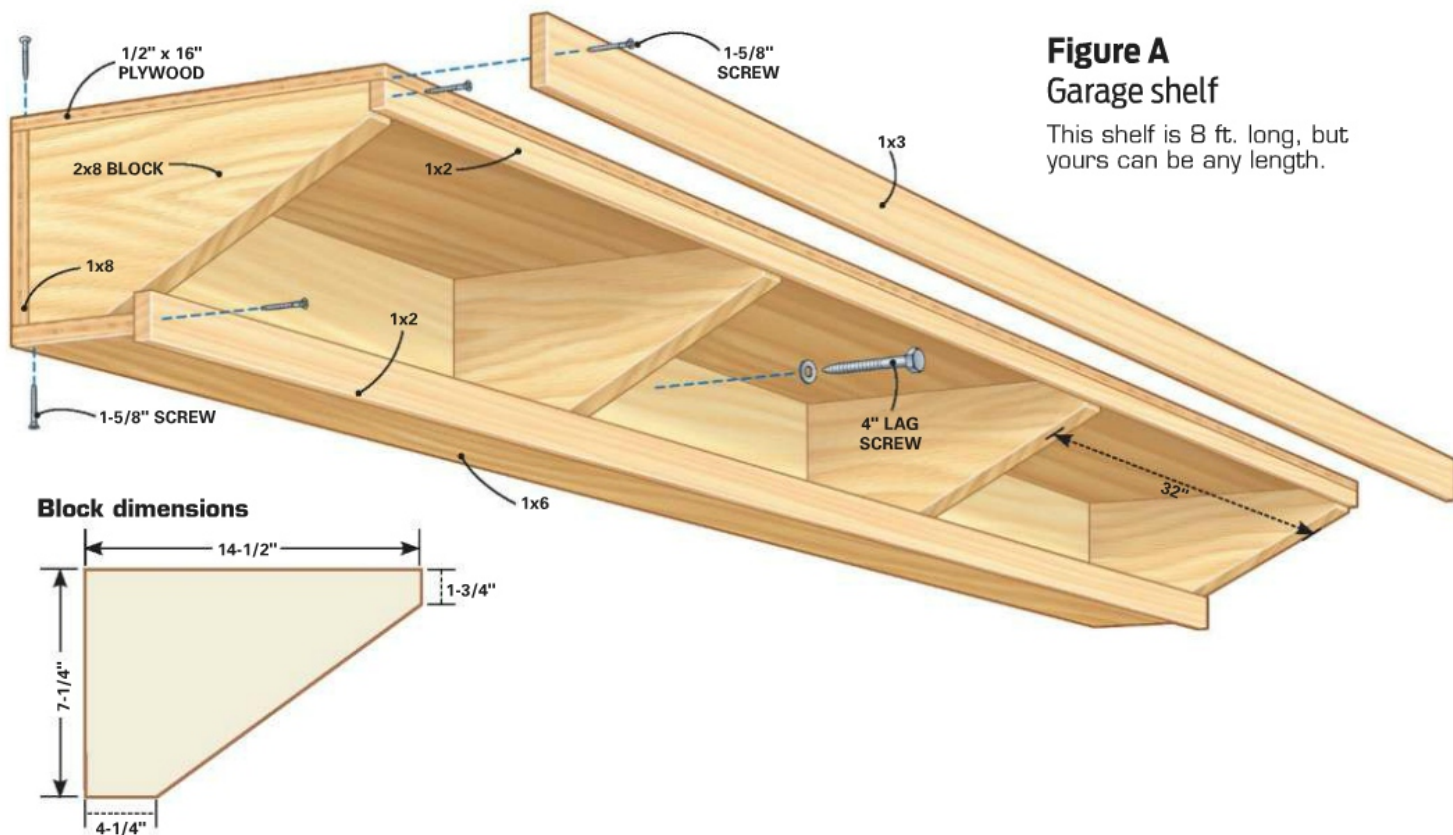


Figure A
Garage shelf

This shelf is 8 ft. long, but yours can be any length.

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ABOVE-DOOR DISPLAY SHELF

Your house has a couple dozen windows and doors. Which means you have a couple dozen places for installing display shelves.

As a bonus, if you increase the height and depth of the “box” that forms the core of each shelf, these shelves can double as valances for window curtains or blinds.

Your materials will vary based on the size of your window or door. There are a few key measurements to keep in mind as you customize this design to fit:

- Make the inside of the box 1/8 in. longer than the door or window trim. That way, the box will easily fit over the trim.
- The height of the box should be about the same as the width of the window or door trim (or you risk having the door hit the shelf when it opens). If this is doubling as a valance, the box can hang below the trim.
- The top shelf should overhang the three edges (the front and the two sides) of the box equally so the crown molding fits symmetrically.

Crown molding comes in a variety of styles and widths (from 2-1/4 in. to 6 in. and larger.) Mock up a small section of shelf to determine the best size and proportion of molding for your project.

Mount the completed shelf to the wall above the window or door. In most cases you'll be able to secure the shelf to the trim and framing along the sides and top of the opening. If not, use L-brackets mounted to the top of the shelf. **Note:** Use extra care if you mount this over an entry door (or one that your teenager slams a lot). Be sure all the displayed items are arranged securely behind the “lip” created by the cove molding.

WHAT IT TAKES

TIME: 3 hours

COST: \$20 to \$25

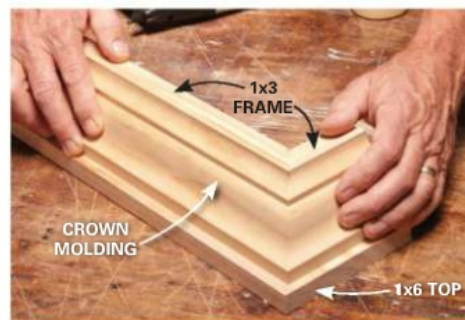
SKILL: Intermediate

TOOLS: Miter saw, finish nailer, drill



1 BUILD THE CORE OF THE SHELF

Build the three-sided 1x3 box so it fits over your door trim. The 1x6 shelf should overhang the ends the same amount as it does the front.



2 INSTALL THE CROWN MOLDING

Cut and install the crown molding. Install the 3/4-in. cove molding along the edge of the top shelf, letting it protrude 1/4 in. upward to create a lip.

“Our house has a couple dozen windows and doors—which means we have a couple dozen places for display shelves.”

Figure B
Display shelf





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"If one closet shelf is good, two must be better."



TWIN CLOSET SHELVES

I tossed my hat onto the closet shelf the other day and discovered a whole lot of unused real estate up there. Made me think, if one shelf is good, two would be better. And the upper shelf could be 15 in. deep instead of 12 in. because there's no closet rod hanging out below. The deep baskets (I bought these at Michaels; michaels.com) help with the organization; cabinet knobs make for easier access. We show a two-tier shelf; you can install three if your closets (and you) are tall enough.

WHAT IT TAKES

TIME: 1 hour

COST: \$25 (including baskets)

SKILL: Beginner

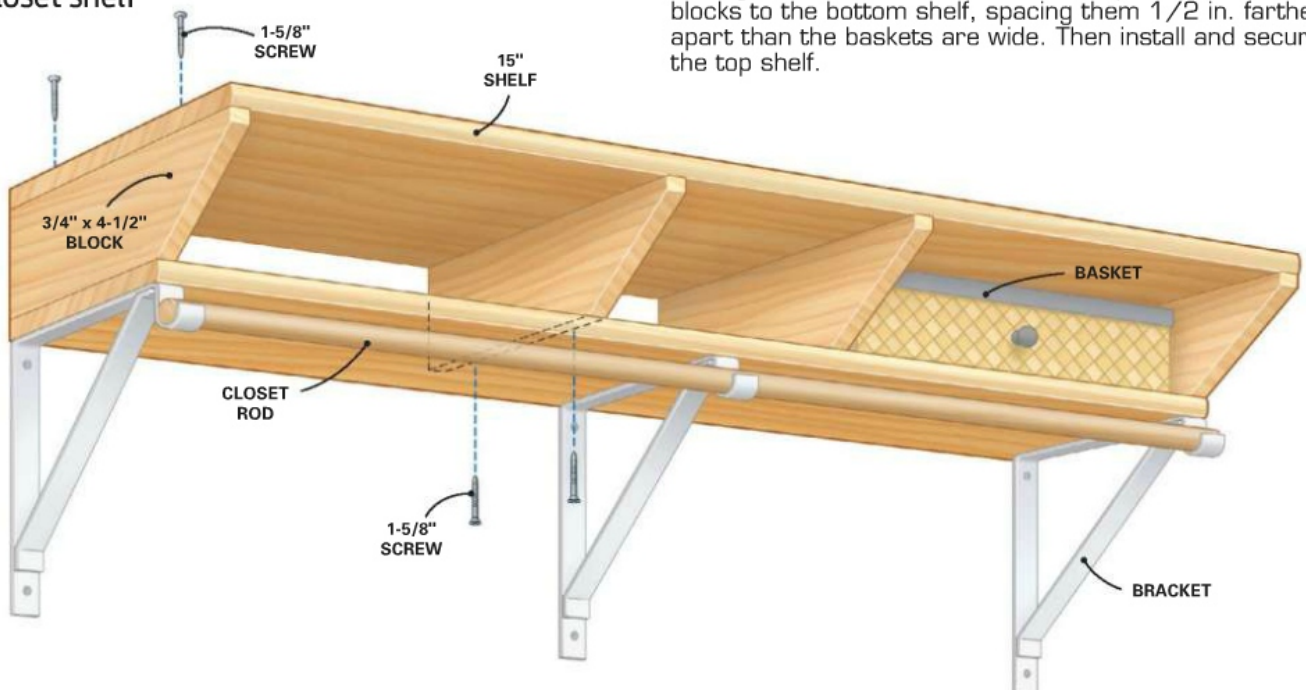
TOOLS: Circular saw, drill



SECURE BLOCKING TO THE EXISTING SHELF

Buy your baskets, then cut spacer blocks $\frac{1}{2}$ in. wider than the baskets are tall. Cut the ends of the blocks at an angle to accommodate the wider top shelf. Screw blocks to the bottom shelf, spacing them $\frac{1}{2}$ in. farther apart than the baskets are wide. Then install and secure the top shelf.

Figure C
Closet shelf



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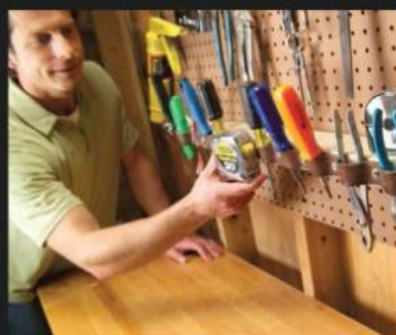
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YARD TOOL SLANT RACK

Stashing stuff in the unused spaces between studs is a smart move; adding these slant boxes to expand the space is smarter yet. They give your tools more “headroom” and give you easier access to long- and short-handled tools.

For the tall unit, use the bottom wall plate for the bottom of your box. Attach the plywood to create a 1-in. gap at the bottom for removing dirt or dropped items. For the shorter slant boxes, install your own blocking to create the bottom; leave a gap at the bottom of the plywood for those, too. We show 48-in. and 16-in. versions; you can make yours any depth or length you want.

Note: If your garage has a short ceiling (or your tools have extra-long handles), create a cutout in the top of the plywood face, as shown in **Figure D**, to allow more entrance and exit leeway for your tools.

WHAT IT TAKES

TIME: 1 hour

COST: \$8

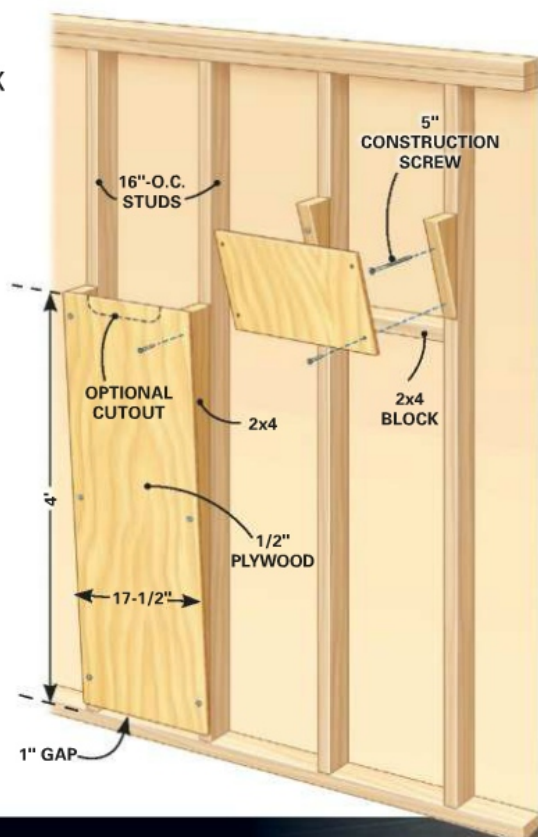
SKILL: Beginner

TOOLS: Circular saw, drill



RIP A 2x4 DIAGONALLY TO CREATE THE SIDES
Screw each wedge to the face of a stud. Install a plywood face and you're ready to store stuff.

Figure D
Slant rack



“This may take the record for the world’s simplest storage project.”

This Necklace is NOT for Sale...

...It's yours for **FREE***

*No kidding. Only Stauer can give you 200 carats of genuine amethyst for **NOTHING**.*

You may think you understood the concept of "priceless" jewelry. For years, "priceless" meant "astronomically expensive." Owning "priceless" treasures was a rare privilege reserved for celebrities, billionaires, and royalty. The best most of us could do was dream. Until now...

Stauer smashes the luxury status quo with the release of our **FREE* 200-Carat Lusso Amethyst Necklace**. That's right, we said **FREE**... as in "priceless." No charge.* **ZERO** dollars.* Call now and we'll send you this impressive helping of genuine amethyst (independently appraised at \$295) for **FREE**. We cut the price 100% and you pay only \$19.95, our charge for shipping, processing and insurance. There are no tricks or gimmicks. You aren't obligated to spend another dime or dollar with us... although we make it **VERY** hard to resist.

Why give away jewelry? We want your attention. Once you get a closer look at our rare gemstone treasures and vintage-inspired watches, and once you discover the guilt-free fun of getting "Luxury for Less," we're betting that you'll fall in love with Stauer. If not? Keep your **FREE Lusso Amethyst Necklace** anyway. No hard feelings.

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One more surprise... If we had our way, we'd send your **Lusso Amethyst Necklace** with no shipping charge. Unfortunately, the rising cost of gas and freight makes that impossible. But, to sweeten the deal, we'll include a **\$20 Stauer Gift Coupon** with your **FREE** necklace. Amethyst is one of the world's most coveted gemstones and our supply is extremely limited. An offer this good will not last very long. Call to reserve your **FREE Lusso Amethyst Necklace** today and treat yourself (or someone you love) to a brilliant new definition of priceless luxury!

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Smart Luxuries—Surprising Prices™

**“We doubled our
spice and utensil
storage in a couple
of hours.”**

WHAT IT TAKES

TIME: 3 hours
COST: \$20
SKILL: Seasoned
beginner
TOOLS: Jigsaw,
miter saw, finish
nailer, drill

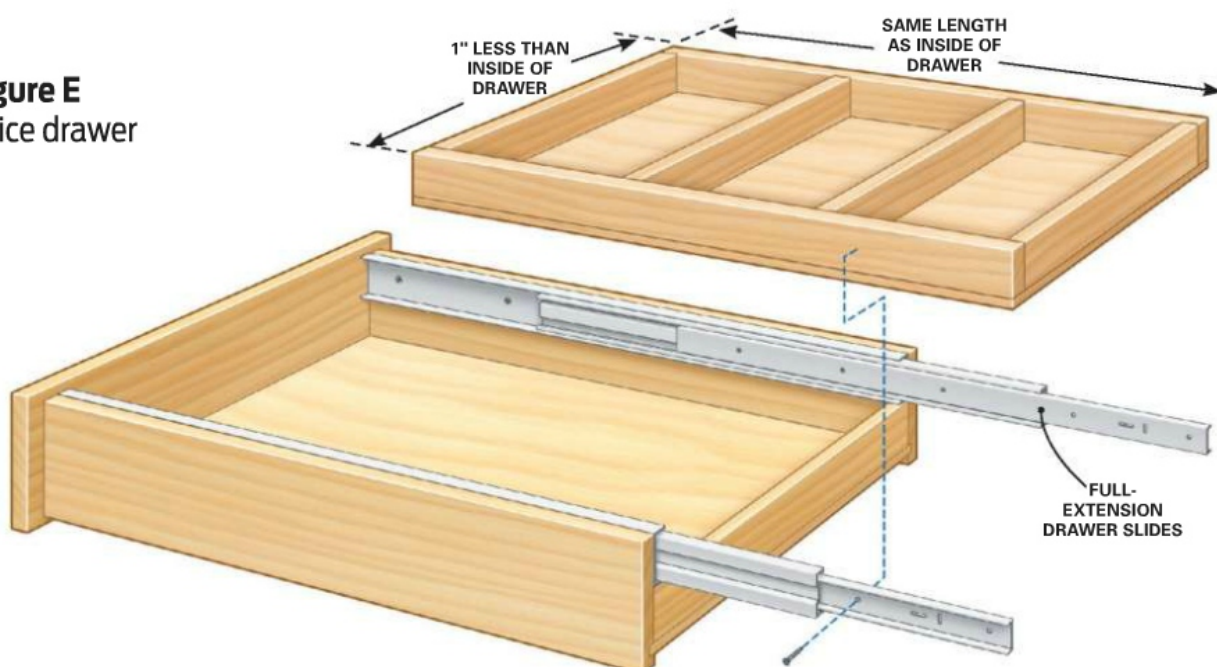
TWO-TIER SPICE DRAWER

Recently we remodeled our kitchen: new cabinets, counter-tops, appliances, the works. Yet the first thing we show off when people visit isn't the fancy new stove, but the \$20 two-tier spice tray. When we open the drawer, we can slide the top tray all the way back into the cabinet to access the entire bottom layer; no need to lift out a separate tray or sort through layers of stuff. It's not only a space-saver but also a smart organizer since all the spices are in one place,

face up. We used the same basic design to make a two-tier utensil drawer too.

Do a little measuring before diving into this project. You can install the 1-3/4-in.-thick tray (like ours) if your drawer is at least 4 in. deep on the inside. Also, these trays are most useful if your existing drawers have (or you install) full-extension slides on the main drawer.

Figure E
Spice drawer





1 CUT AWAY THE TOP HALF OF THE DRAWER BACK

Use a jigsaw to cut away a little more than half of the drawer back.

DRAWER BACK



2 INSTALL THE TRAY SLIDES

Secure full-extension drawer slides to the top inside edges of the drawer. Install them "backward" so they extend toward the back of the drawer. It's OK if they run an inch or so beyond the back of the drawer; most cabinets have extra space in back.

MOUNT SLIDE FLUSH TO DRAWER TOP



3 BUILD THE UPPER TRAY

Since most standard drawer glides are 1/2 in. wide, build your tray 1 in. narrower (or a hair less) than the inside width of the drawer. Build your tray the same length as the inside drawer length. Install partitions according to your needs.



4 INSTALL THE TRAY

Attach the plywood bottom to the tray with nails or brads. Screw the tray to the drawer slides so the top of the tray is flush with the top of the drawer. Then reinstall the drawer.

1/4" PLYWOOD BOTTOM



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OUTDOOR



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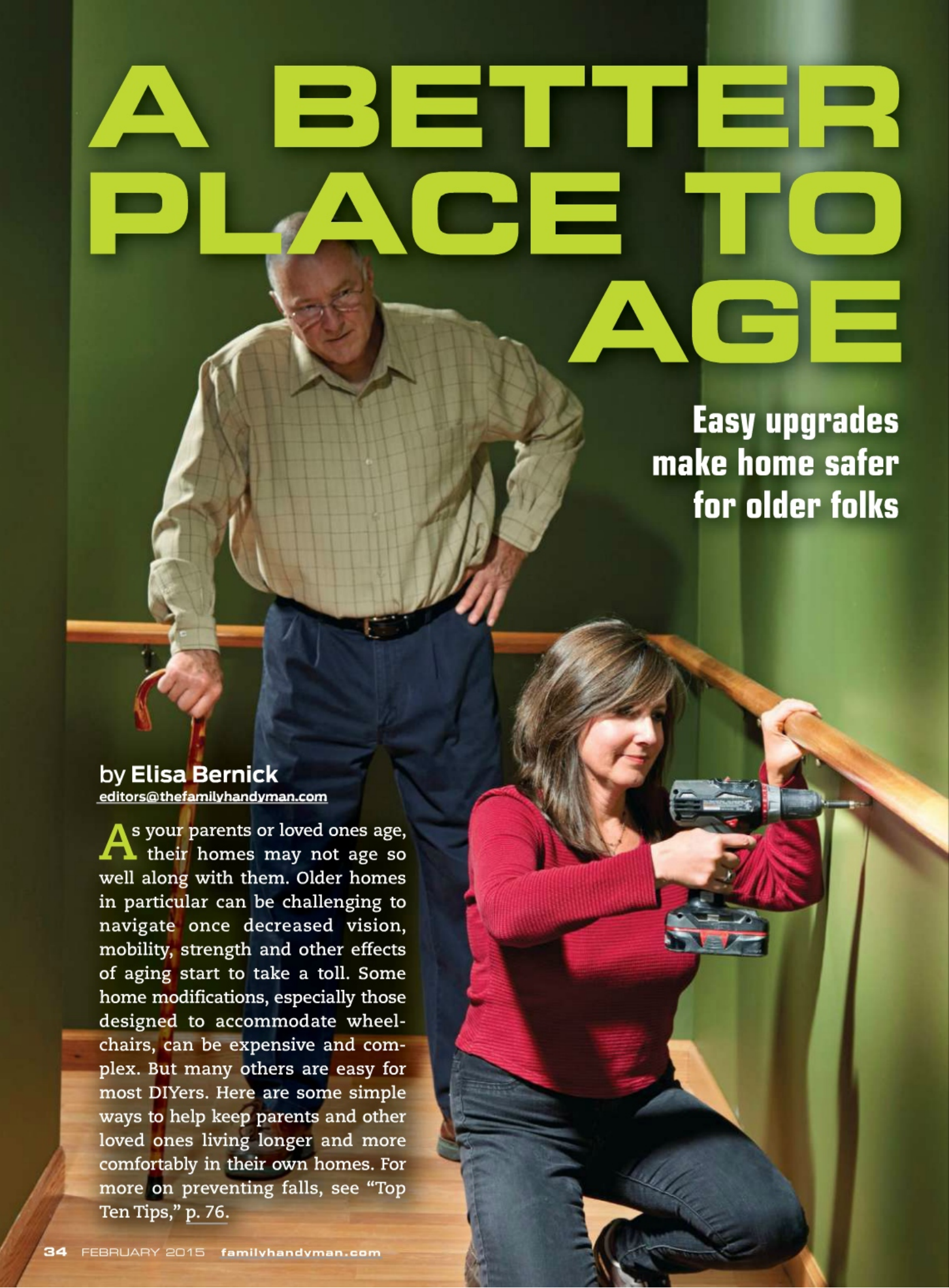
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A BETTER PLACE TO AGE

A man with glasses and a light-colored button-down shirt stands on a wooden staircase, holding a cane. A woman in a red sweater is kneeling on the stairs, using a power drill to work on the wooden railing. The background is a solid green wall.

Easy upgrades
make home safer
for older folks

by **Elisa Bernick**
editors@thefamilyhandyman.com

As your parents or loved ones age, their homes may not age so well along with them. Older homes in particular can be challenging to navigate once decreased vision, mobility, strength and other effects of aging start to take a toll. Some home modifications, especially those designed to accommodate wheelchairs, can be expensive and complex. But many others are easy for most DIYers. Here are some simple ways to help keep parents and other loved ones living longer and more comfortably in their own homes. For more on preventing falls, see “Top Ten Tips,” p. 76.



MEET THE EXPERT

Louis Tenenbaum is a carpenter and former contractor. He is the founder of the Aging in Place Institute and one of the nation's leading speakers and consultants on aging in place. You can visit his website at louistenenbaum.com.

"We age most happily and inexpensively in the comfort and dignity of our own homes."

— Louis Tenenbaum



EXPERT TIP:

Find out how it feels to have an old hand

Want to know what it's like to have stiff or arthritic joints? Hold a tennis ball in the palm of your hand and stick your hand inside a sock. Now walk around and try to manipulate the switches, doorknobs and cabinet pulls in your house.



Widen doorways with offset hinges

Navigating narrow doorways is tough for someone using a wheelchair or walker. Doorways can be widened, but it's a complex and costly job. An easier solution is to replace the existing hinges with expandable offset door hinges. These special hinges are designed to swing the door clear of the opening and add 2 in. of clearance. The hinge measures 2 in. x 3-1/2 in. and wraps around the door trim. You need at least 3 in. between the inside of the doorjamb and the adjoining wall for the hinges to fit. They use the existing holes and screws and come in a variety of finishes. Available online and at many home centers for about \$5 per hinge.

Replace toggle switches with rocker switches

It's easier for stiff or arthritic hands to press flat, rocker-style switches than to manipulate toggles. Rocker switches feature a big on/off plate that you can operate with a finger, a knuckle or even an elbow. Some rocker switches are illuminated to make them easy to find day or night. These great little inventions use a tiny bit of electricity from the circuit they're on to light a small LED or neon bulb, and they install as easily as regular switches. For a broad selection of illuminated switches, visit kyleswitchplates.com. Prices range from \$7 to \$40.



LUTRON

REMODEL WITH AGING IN MIND

A kitchen remodel is the perfect opportunity to build in "universal design" components that will look great and allow the room to work well as you age in your own home. Consider incorporating:

- Rollout drawers and pull-down shelf inserts
- Appliances with touch-pad controls, not knobs
- A shallow (6-in.-deep) sink, which is easier to use than a deep one
- Countertops at different levels so someone seated can work comfortably
- A side-by-side refrigerator with a long, continuous handle that can be opened by someone who is seated
- Under-cabinet task lighting
- Drawer storage rather than upper cabinetry



Replace cabinet knobs with handles

Arthritis and stiff joints make grabbing small round knobs on cabinet drawers and doors difficult too. Replace these small knobs with C- or D-shaped pulls, which let you tuck your fingers around them, making it easier to open the door or drawer. Consider this for your own kitchen too. Adding new pulls and handles is a quick, inexpensive way to update a kitchen while making it more comfortable and convenient to use over the long term.



MAYTAG

Raise your washer and dryer

To make it easier on aging backs and knees, set your front-loading washing machines and dryers on pedestals 12 to 15 in. above the floor. To find out how to build a simple washer/dryer pedestal, visit familyhandyman.com and search "DIY washer pedestal."



SIMPLIFIED BUILDING

SCARY!

One in three seniors will fall this year and 20 percent of those falls will contribute to their deaths.

Extend stair rails

The handrails for exterior stairs typically end at the bottom step. But stepping off the bottom step (or preparing to step up on it) is actually when someone is the most off balance and likely to fall. Simple Rail handrail kits from Simplified Building make it easy for DIYers to build an extended handrail that fits any stairway. The kits use Kee Klamp pipe fittings and come with all the components you need (such as fittings, pipe, connectors and railings) at reasonable prices. Visit simplifiedbuilding.com to see exactly what you need to accomplish your project and a gallery showing hundreds of customer-built projects.



Install "invisible" grab bars

Sometimes people are reluctant to add grab bars because they think it will make their home look institutional. But you can find stylish and sturdy grab bars in many shapes, sizes and finishes, and some, like those in the elegant Invisia Collection, serve double duty as towel racks, toilet paper holders, corner shelves and more. Visit invisiacollection.com or search "designer grab bars" and "specialty grab bars" in your browser.



READER PHOTO

IT HELPS TO PLAN AHEAD

"Some years ago, I had the foresight to build two railings—one leading to the side yard and the other to the front steps of my home. Now I need and use them daily."



Richard Vasek, Field Editor

PUT A BENCH NEAR STEPS

This allows people to steady themselves after they climb up or down. It's also a good idea to set a chair at the end of a long hallway for resting. Just make sure it's placed so that it's not a tripping hazard.



Add shower grab bars and do the yank test

A securely fastened grab bar can be the difference between a momentary slip and a hip-breaking fall. The best location for grab bars depends on the needs of the person who'll be using them, so ask before you install them. General guidelines call for a vertical bar at the tub edge and an angled bar on the long back wall of the tub.

A 24-in. grab bar positioned at a 45-degree angle will attach easily to wall studs. If you can't anchor to a stud, you can secure wood blocking between the studs. If you're lucky, you'll be able to go through a closet or storage area behind the tub so the wall patch won't have to be perfect.

After you're done installing a grab bar, do the yank test by pulling on the bar with all your strength. Make sure the bar will hold up when it's really needed. For detailed grab bar installation instructions, search "install grab bars" at familyhandyman.com.



Replace doorknobs with levers

Gripping and twisting a doorknob can be hard for people with arthritis or a loss of dexterity in their hands. Lever handles solve that problem. You simply press down on the lever to release the door latch without gripping anything. In fact, an elbow or forearm will work too, which is nice when you're carrying things. Many lever handles are reversible, which means they'll fit both a right-handed or left-handed door. (Handedness is determined by which side the door hinges are on when you stand outside the door as it swings away from you into the room.) But check the handle requirements before you buy so you get the right handle for your situation.



JOHN BOOS

Add a rolling cart to the kitchen

A rolling cart is helpful in any kitchen, but it's especially helpful for older cooks. It's a convenient prep center, and models with drawers or shelves allow someone to store frequently used items and roll it around so their tools are always close at hand. And it can be extremely useful for someone with diminished strength or dexterity to ferry items to and from the table without the risk of dropping things or injuring themselves.

Install low-pile carpet



Thick carpet pile over a thick pad is the worst for anyone who is unstable walking—it increases the likelihood of tripping and falling. It also makes it more difficult to push and maneuver wheelchairs and walkers. To make getting around easier, consider installing a low-profile commercial-grade "level loop" or "cut pile" carpet with a pile height of no more than 1/2 in. and a 1/4-in. (10-lb. density) pad.

Add grab bars near exterior doors

Grab bars aren't just helpful in the bathroom; they're also useful near exterior doors, inside and out. For people who are unsteady on their feet, the simple act of opening a door can be difficult. A grab bar gives them something to hang on to near house and garage entrances and steps. The Prima Outdoor Grab Bar is made of weatherproof plastic with an aluminum core and special soft grip moldings that reduce the risk of a user's hands slipping even when it's wet. It can be mounted horizontally, vertically or diagonally and costs \$40 at elderstore.com.



PRIMA

Install handrails in hallways

Long hallways can be tough on people with limited mobility, which is the reason so many senior care centers have continuous handrail systems. Consider adding the same safety feature at home. You can install a simple wooden railing (see photo, p. 34) or consider the PromenAid handrail system, a problem-solving product that has a unique bracket that slides along an open channel in the bottom of the handrail. This lets you locate the handrail anywhere and slide the brackets to wherever studs are located without adding extra blocking. The brackets also pivot so you can install the handrail vertically or at an angle. These elegant handrails have snap-on end caps and returns, and the articulating joints allow them to go around corners or along stairs. You can buy complete kits or individual components at promenaid.com. Just make sure any handrail you install has returns.



Get LED lightbulbs

The average home has 40 lightbulbs. Changing a burnt-out bulb often involves climbing a ladder or step stool and risking a nasty fall. If you replace those lightbulbs with CFLs, or even better, LEDs, there's a good chance they'll never have to be changed again in that homeowner's lifetime.



✓Yes



✓Yes



✗No



✓Yes



✓Yes



✓Yes



✓Yes



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A showerhead grab bar is a big help

For people with limited mobility or who prefer to shower while seated, a handheld showerhead is a terrific help. And even better is a handheld showerhead on a sliding rail that allows for individual adjustment. But because those rails are often flimsy, grabbing one could be a disaster. Delta's Adjustable Hand Shower Grab Bar Shower Head is the best of both worlds. It's an ADA-compliant grab bar with a sliding handheld showerhead in one attractive package (\$110 and up at amazon.com and other online retailers).

A BARGAIN?

Aging-in-place modifications can be pricey. Installing an elevator can run \$35,000, a chair lift \$6,000, and adding a bedroom or bath to the main floor can be costly. But consider the alternative: A nursing home averages \$90,000 a year for a private room, and assisted living runs about \$45,000 a year.

Resources:

For more information about aging in place, including helpful products, safety checklists and resources to help you pay for home modifications, visit:

- rebuildingtogether.org/wp-content/uploads/2012/06/RT-Aging-in-Place-Safe-at-Home-Checklist.pdf
- homemods.org
- livablehomes.org/checklist.html
- abledata.com
- nahb.org
- hownow.com/foreverhome/Aging-In-Place-Remodeling-FAQ.pdf
- ageinplace.com/aging-in-place-basics/home-remodeling-basics/
- aarp.org
- ncoa.org

Add keyhole lights

It's no fun to fumble for your keys, but for people with diminished sight, finding a keyhole at night is extremely difficult. And there's an element of added safety when you can unlock and enter your home at night without delay. A motion-activated keyhole lights turns on when you reach to put your key in the lock. There are different models, including solar-powered versions for doors in full sun. The one pictured has four bright LEDs and requires one "AA" battery. It's \$20 at firststreetonline.com.

FIRSTSTREETONLINE.COM



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Tips for **WEEKEND PLUMBERS**



More than any other type of home improvement job, plumbing can drive a DIYer crazy. Problems arise, projects grow, frustrations multiply. Even pros are not immune. But one way to manage the frustrations and achieve a successful plumbing project is to allow plenty of time—at least twice as much time as you think the project should take. Another smart step is to learn some tricks of the trade. Here are a few of our favorites.

by Gary Wentz
editors@thefamilyhandyman.com

U.S. GOV'T GOLD AT-COST

TODAY - U.S. Money Reserve has scheduled what could be the final release of U.S. government-issued \$5 gold coins previously held at the U.S. Mint at West Point. These government-issued gold coins are being released on a first-come, first-served basis for the incredible markup-free price of only \$134 per coin. Please be advised: Our at-cost U.S. government gold inventory will be available at this special price while supplies last or for up to 30 days. Do not delay. Call a Senior Gold Specialist today.

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'UN-SOLDER' CONNECTIONS— BUT ONLY WHEN YOU HAVE TO

The best way to disconnect a soldered pipe is to cut it. But sometimes you can't—either because you can't get a cutting tool into the space or because cutting would leave the pipe too short to make a new connection. The solution is to heat the joint and pull off the fitting as the solder melts.

Have a wet rag handy and immediately wipe away the molten solder before it hardens. (Wear gloves to prevent burning your fingers!) Sometimes a quick wipe will leave the pipe ready for a new fitting. More likely, you'll have to scour off some excess solder with sandpaper or emery cloth before you can slip on a new fitting.



CHOOSE CAULK, NOT PUTTY

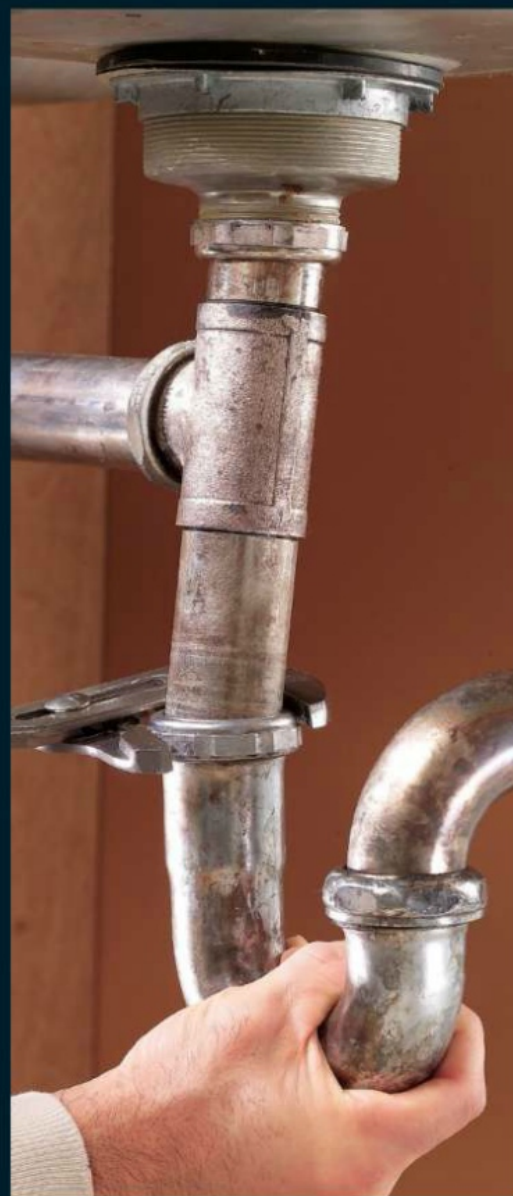
Despite the name, lots of plumbers never use plumber's putty. It damages some types of plastic and stains surfaces such as natural stone. Plus, it tends to dry out, crack and allow leaks. Silicone caulk is a safer, longer-lasting sealant in most areas where you might use plumber's putty.

For more tips & goofs,
download our FREE
mobile app!

DIY TIP GENIUS

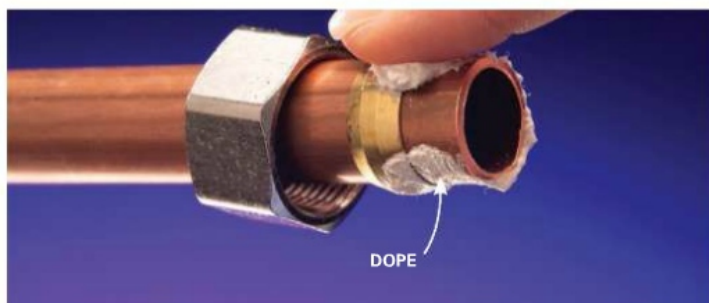


ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY HSP



DON'T FIGHT WITH METAL DRAIN LINES

Metal drain lines under sinks look a lot more reliable than plastic. But plastic is better in almost every way. It's cheaper, easier to install, and easier to adjust or tighten if a leak develops. And unlike metal, plastic won't corrode. So when a metal drain leaks, often the smartest move is to replace the entire assembly with plastic. To see how, go to familyhandyman.com and search for "stop leaks under sink."



DOPE EVERYTHING

Thread sealant (aka “pipe dope”) is formulated to seal threads. But it’s great for almost any connection, even if the threads don’t form the seal. Use it on compression fittings, ground fittings and rubber seals. Because it’s slippery, it allows connections to slide together correctly for a good seal. And, if you use a type that doesn’t harden, disassembly and repair will be easier years later. Some types of dope harm plastic parts, so check the label.



LOOSEN STUCK PIPES WITH HEAT

When a threaded connection won’t budge, heat sometimes does the trick, especially on ancient connections that were sealed with pipe dope that hardened over time. Be patient. Getting the metal hot enough can take a couple of minutes. Protect nearby surfaces with a flame-resistant cloth (\$10 at home centers). This method is for water and waste pipes only, never for gas or fuel lines.



FIX A CLOG IN SECONDS

Before you run a drain snake into a clogged pipe or disassemble the trap, there are a few other tricks worth trying: Often, you can yank out a clog with a flexible-shaft pick-up tool (shown above) or a Zip-It (below; \$3 at home centers). Likewise, a wet/dry vacuum just might suck out the clog.



PIGGYBACK STUBBORN SHUTOFFS

Shutoff valves under sinks and toilets have a rotten reliability record. Sometimes they won’t close completely; sometimes they won’t close at all. In either case, there’s an alternative to replacing the shutoff. Most home centers carry “piggyback” shutoff valves (\$10) that connect to existing shutoffs. Just disconnect the supply line and install the new valve (a new supply line is a good idea, too). If the old shutoff closes most of the way, you won’t even have to turn off the main water valve; just set a container under the valve to catch the trickle while you work.

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DON'T OVERTIGHTEN SUPPLY LINES

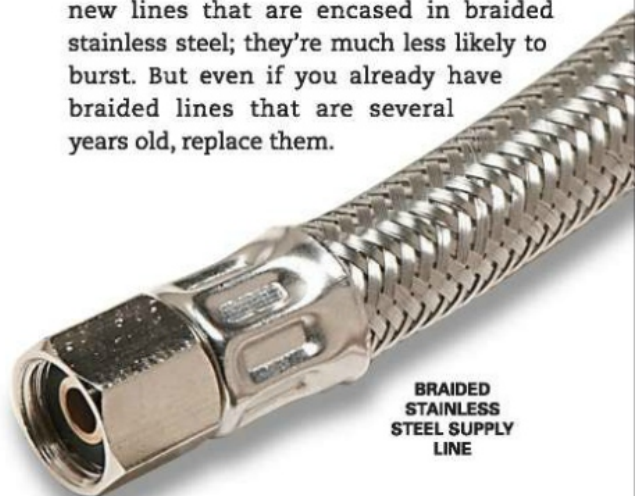
It's tempting to crank supply lines on tight, just to be safe. But overtightening supply lines is actually riskier than undertightening. A loose connection that leaks is easy to tighten, but overtightening can wreck rubber seals and crack the threaded nuts. So get into this habit: Make the connections at both ends of the supply line finger-tight, then give them another one-eighth to one-quarter turn with pliers. If they leak, snug them up a little more.

BUY MORE STUFF!

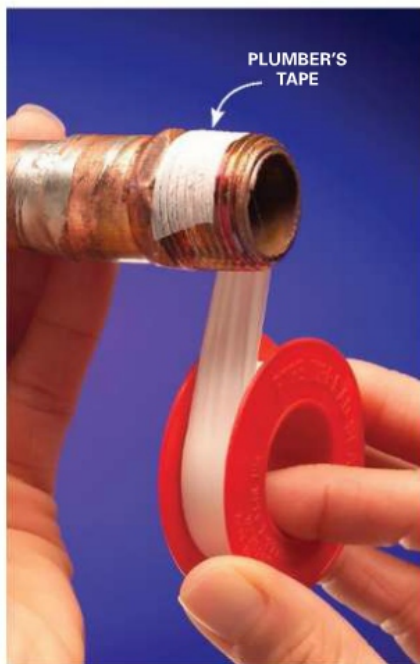
Weekend plumbers often spend more time driving back and forth to the home center than actually working on the project. So before you go shopping, think through each step and try to anticipate problems. Make a list of everything you might need and buy it all. One trip to the return counter is better than three trips back to the store (while your family waits for you to turn the water back on).

DON'T REUSE SUPPLY LINES

When you're replacing a toilet or a faucet, you can save 10 bucks by reusing the old flexible supply lines. But don't. Plastic degrades over time, and even a small leak can lead to catastrophic water damage. It's a small risk, but not one worth taking. Buy new lines that are encased in braided stainless steel; they're much less likely to burst. But even if you already have braided lines that are several years old, replace them.



BRAIDED
STAINLESS
STEEL SUPPLY
LINE



TIPS FOR USING THREAD TAPE

Tape and dope are equally reliable for sealing pipe threads. The main advantage of tape is that it won't smear onto your hands or tools and end up on the carpet. Here are some tips for tape:

- Cheap tape works fine, but the thicker stuff (often pink for water, yellow for gas) is easier to handle and tears more neatly.
- Unlike dope, tape is for pipe threads only. Don't use it on compression or other connections.
- How many times should you wrap around the pipe? There are no rules, but the most common answer we got from pro plumbers was three.
- Always wrap the tape clockwise around the threads. Otherwise, the tape will unwrap as you screw the joint together.



CUT STUBBORN PARTS

Corrosion and mineral deposits have an amazing power to lock parts together, making them almost impossible to disconnect. Often, the best solution is to cut the stubborn part. Either slice it off or cut kerfs in the part so you can break it off. A hacksaw blade works well. Oscillating or rotary tools work even better.



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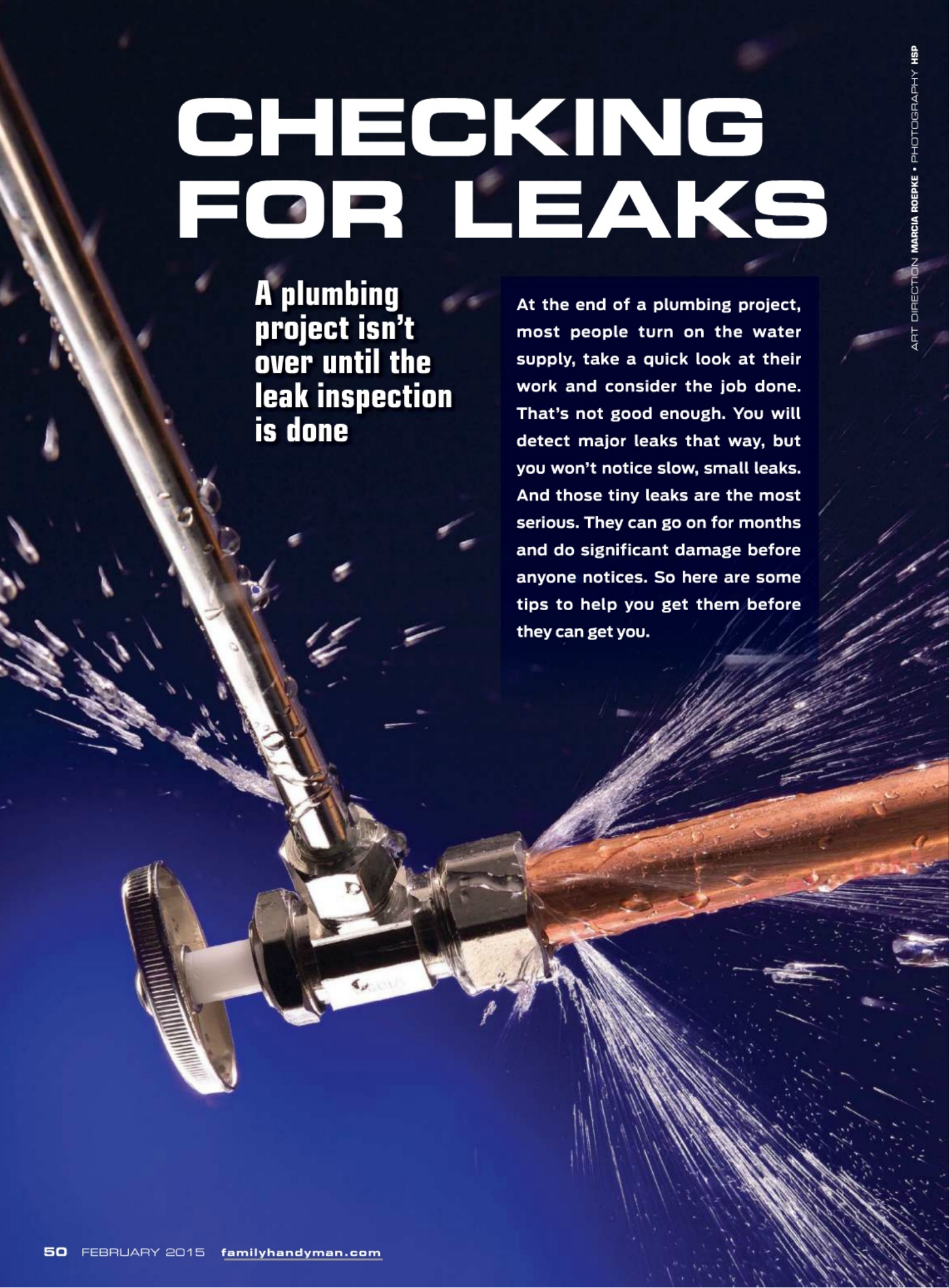
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CHECKING FOR LEAKS

A plumbing project isn't over until the leak inspection is done

At the end of a plumbing project, most people turn on the water supply, take a quick look at their work and consider the job done. That's not good enough. You will detect major leaks that way, but you won't notice slow, small leaks. And those tiny leaks are the most serious. They can go on for months and do significant damage before anyone notices. So here are some tips to help you get them before they can get you.



The tissue test

Don't search for leaks by just looking at or touching pipes. Instead, wipe each connection with a dry tissue. Any moisture on the tissue will be easy to see. If you want to be super certain you don't have any leaks, spread newspaper under the plumbing and check for wet spots later.



Sink rim leaks

Leaky seals around faucets or sink rims lead to slow-but-severe damage. (They can destroy a countertop, for example.) So after installing a new sink or faucet, dribble water around the area and wait a few minutes. Then get under the sink and look for leaks.

Wait a few minutes

Of course you're anxious to declare the job done. But tiny leaks may not be detectable right away. Give the droplets at least 15 minutes to form before you do the tissue test.



Check shutoff valves

Shutoff valves go unused and stay leak-free for years. Then, when you finally use them during a plumbing project, they often leak around the valve stem. The solution is simple and almost always works: Just tighten the packing nut, which seals around the stem. A slight turn is all it takes.

Check drain lines

Unlike water supply lines, drain lines leak only when waste is running through them. So you'll have to flush toilets, run the dishwasher and turn on faucets to check for leaks.

To check the drain assembly under a sink, don't just run the faucet. Instead, fill the sink with lukewarm water. Then open the drain to release a strong, worst-case-scenario flow and do the tissue test.



Don't get fooled by condensation

Cold water inside pipes makes condensation droplets form on the outside. And that can make finding leaks impossible. When checking drain lines, you can prevent condensation by running lukewarm water down drains. With cold water supply lines, all you can do is wait for the water in the pipes to warm up, wipe off the condensation and then check for leaks.

DIY Quiz

BY TRAVIS LARSON

editors@thefamilyhandyman.com

Put on your thinking cap and take this month's quiz to see just how smart you are when it comes to DIY. Here's how it works:

- There are easy, intermediate and really tough questions all mixed together.
- There may be more than one correct answer!
- Find the answers and get your DIY rating on p. 56. Good luck!

1. When you're getting bids for a new asphalt driveway, only consider the bids that include:

- A. An asphalt surface that's 2 to 3 in. thick.
- B. A compacted clay base that's at least 4 in. thick.
- C. Use of a 1- to 3-ton roller for compaction.
- D. A final "topping" of a high-quality seal coat.

2. A saw "kerf" is:

- A. The set (or angle) of the teeth on the blade.
- B. The gap in the wood that the blade creates.
- C. A term that defines the depth of the cut.
- D. Another term for a dado, or a groove, of varying depth and width.

3. Heating and cooling are the largest part of a homeowner's energy bill. What's second for most homes?

- A. Lighting
- B. Water heater
- C. Appliances
- D. Electronics



4. True or False? A blackened end on a fluorescent bulb means that the bulb should be replaced immediately.



5. Another name for the aromatic cedar used for closets, shoe trees, blanket chests and pencils is:

- A. Red cedar
- B. Pencil cedar
- C. Eastern juniper
- D. All of the above



6. True or False? The secret to a long-lasting asphalt driveway is to apply a high-quality sealant every year.

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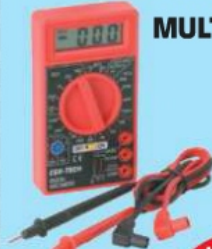


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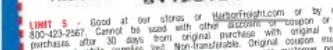
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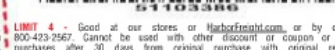
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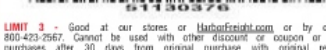
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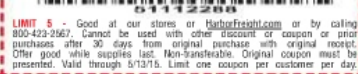
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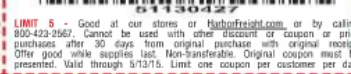
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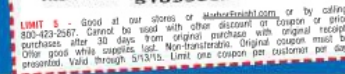
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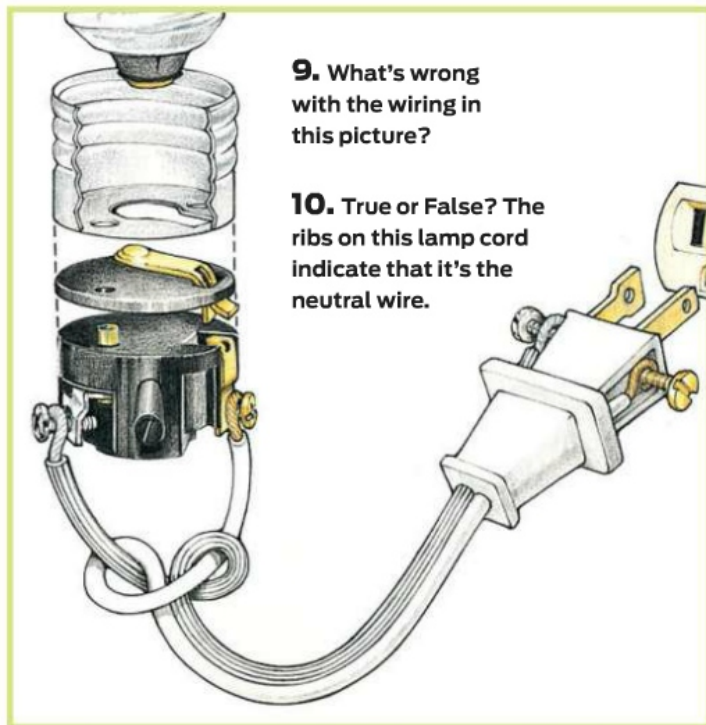
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7. What is the No. 1 reason for pressure washer failure?

- A. Leaving untreated gas in the tank for long periods.
- B. Neglecting to drain the pump for winter storage (in freezing conditions).
- C. Letting the engine idle for long periods without using the wand.
- D. Running the wand for extended periods without letting the pump or engine "take a break."

8. What's the best way to speed up soldering copper fittings?

- A. Skip the flux.
- B. Preheat fittings in the microwave.
- C. Use MAPP gas.
- D. Use propane gas.



9. What's wrong with the wiring in this picture?

10. True or False? The ribs on this lamp cord indicate that it's the neutral wire.



11. What makes the action shown a bad idea?

- A. The drill bit can grab the metal and slice your hand open.
- B. This drill bit is for wood, not metal.
- C. Drilling a hole through metal with a wood backing is a fire hazard.
- D. All of the above.

12. True or False? The most common cause of premature tire failure is catastrophic damage from potholes or road debris.



13. What is the primary purpose of the upturned portion of this lawn mower blade?

- A. It flattens the grass blades for more complete mulching.
- B. It creates an updraft to lift the grass blades vertically for cutting.
- C. It's to counterbalance the cutting edge.
- D. It strengthens the blade to keep it from flexing.



14. This plumbing fitting is called a:

- A. No-stop coupling.
- B. Stop coupling.
- C. Transition coupling.
- D. Slip coupling.

15. In the concrete industry, "air entrainment" refers to:

- A. The process of increasing the durability of concrete by introducing air bubbles into the cement during mixing.
- B. The introduction of air bubbles and weakening of the concrete caused by overmixing fresh cement.
- C. A finishing technique accomplished by injecting compressed air into freshly poured concrete.
- D. Large pockets of air that are trapped in thick pours of concrete. (Cement workers generally vibrate concrete forms to eliminate the air pockets.)

Find the DIY Quiz answers on p. 56.

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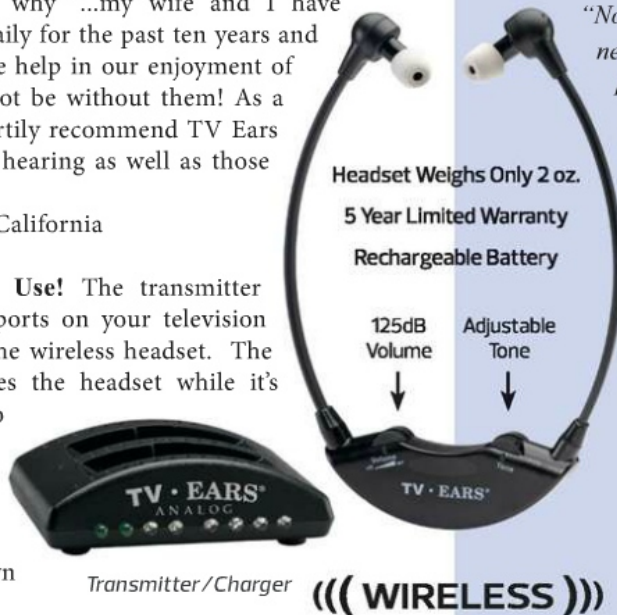
- Darlene and Jack B., CA

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DIY Quiz Answers

1. (A & B) The asphalt should be about 3 in. thick. Too thin (common with fly-by-night contractors) and the driveway won't last long. If the contractor doesn't have a heavy roller, the asphalt won't get enough compaction to hold up.

The base is critical. Not clay, but a granular porous compacted base. It should be at least 4 in. thick over sandy soil and 8 in. over poorly draining soils like heavy clay. Too thin and the asphalt will sag under vehicle weights. A poorly drained base will trap water just under the asphalt, and in freezing climates, that water will expand and break up the overlying asphalt. A new driveway doesn't need to be seal coated.



2. (B) The gap in the wood. A series of saw kerfs can be useful for chiseling out rabbets or dados for joints or for making wood more bendable.

3. (B) In most homes, the water heater is the second biggest energy hog, accounting for 22 percent of your total energy bill on average.

4. False, although the bulb is nearing the end of its life. But when it begins to flicker, change it right away. That flickering means the ballast is trying to fire up the bulb, but the bulb isn't cooperating. If

you let it continue, the ballast will become the victim.

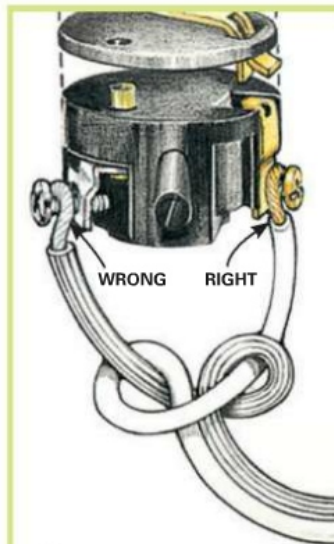
5. (D) All of the above. The truth is that aromatic cedar isn't cedar at all. It's a member of the juniper family with the scientific name *Juniperus virginiana*. In addition to its aroma, it has high rot resistance, making it useful for fence posts. And juniper berries add the flavor to gin, yielding its evergreen taste and aroma.

6. False. A properly installed seal coat of quality materials should last three years or so. If you apply unnecessary coats, you're asking for peeling. By the way, the biggest mistake people make is the failure to degrease oil spots before application.

7. (C) Letting the engine idle for long periods without using the wand. Here's what happens. When you're not running fresh water through the pump, the impeller is still spinning. That creates an incredible amount of heat, which can fry the pump. You shouldn't let more than two to three minutes pass without pulling the trigger to introduce cool water into the pump. Other frequent causes of failure are old gas and leaving water inside the pump in freezing climates.

8. (C) MAPP gas (a mixture of methyl acetylene and propadiene) burns much hotter than ordinary propane and is the go-to choice (along with acetylene) for most pro plumbers. Don't even try soldering without flux. And

don't put copper in your microwave! Another trick, good for large fittings, is to use a second torch on the other side.



9. Wires should always be run in a clockwise direction around terminal screws. That way they'll be drawn into the connection rather than forced away.

10. True. But ribs are just one of the ways neutral wires on polarized cords (lamp and two-wire extension cords) are marked. The neutral wire can also be indicated by white sheathing, lettering, a white stripe or a raised ridge. To prevent shock hazards, the neutral wire should always feed the wide prong on replacement plugs and the outer body of lamp harps.

11. (A) Hand-holding metal while you drill it is a ticket to the emergency room. That razor-sharp edge can get caught and slice through the thickest of gloves! Always use clamps when you drill metal.

12. False. Underinflation causes excessive heat buildup, which leads to premature wear and tire blow-outs. It's also one of the biggest contributors to poor fuel mileage. And when you hit that pothole, the risk of destroying the tire (and wheel) goes up dramatically.

13. (B) Tall grass tends to lie flat. So the mower blade is designed to create an updraft to lift the grass for cutting.



14. (A & D) A no-stop coupling, or slip coupling, doesn't have the crimped middle that normal couplings have. That enables you to slide it out of the way to line up pipes during repairs, then slide it back over the ends to get on with the soldering.

15. (A) "Air-entrained" concrete contains billions of microscopic air bubbles per cubic foot. The bubbles act as tiny shock absorbers to help prevent cracks and spalling caused by freeze-thaw cycles.

WHAT'S YOUR LEVEL OF EXPERTISE?

Beginner: 0 – 5 correct

Intermediate: 6 – 12 correct

DIY Guru: 13 – 15 correct

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PRO tips

BY MARK PETERSEN

editors@thefamilyhandyman.com



ART DIRECTION ELLEN THOMSON • PHOTOGRAPHY TOM FENENGA

Get out of plumbing jams

Sometimes the best-laid plumbing plans go awry. Your project can come to a screeching halt when a vital piece breaks off, gets stuck or is too rotten to work with. Then what? Sure, cursing makes you feel better, but you need a real solution. We tapped our plumbing guru, Les Zell, to show us cool tools and tips to get you out of your next plumbing jam.



MEET THE PRO

Les Zell has been a plumber for almost 30 years and an invaluable resource to The Family Handyman for the past decade. He's the owner/operator of Zell Plumbing & Heating.

SUPER-FAST WATER HEATER CONNECTION

Most folks "can't live" without hot water, and when a water heater conks out, getting the new one installed is a high priority. There's no faster or easier way to install water heater supply lines than by using specially designed braided stainless steel water lines with a push-fitting shutoff valve on one end. All you need to do is apply a little pipe dope or plumbing tape to the water heater nipples, fasten the female ends to the water heater, and then just push the push fitting onto the water supply lines. But this convenience doesn't come without a price. The 3/4-in. x 18-in. ones shown here cost about \$30 each at a home center.



Sweat-free shutoff fitting for easier soldering

You know that it's nearly impossible to sweat (solder) joints when there's the least bit of water inside the lines. So don't sweat it (plumbers' humor). Install a compression fitting or a push fitting instead. Neither requires any heat, solder or flux. Compression fittings just tighten with a wrench; push fittings simply slide on and seal themselves. Neither is affected by a little water. When you're installing compression fittings, lubricate the ferrule with a bit of pipe dope so it slides in and seats straight into the nut. Mechanical (shutoff) fittings like this need to be accessible, so don't bury them behind drywall.

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USE A CARTRIDGE PULLER FOR STUCK CARTRIDGES

Some shower cartridges pull right out, but some need a little convincing with a cartridge puller (\$40), and there are others that need a puller *and* some heat to persuade them to break free. Heat expands the valve body, decreasing the pressure on the cartridge. Heat also softens the rubber seals. Hook up the cartridge puller and put the flame on the valve body of the cartridge. Add pressure to the puller as you apply the heat. Set a heat shield on the back of the cartridge so you don't burn down the house. And have a fire extinguisher at hand just in case. (Check out the Great Goof on p. 88!)



FLANGE SUPPORT BRACKET FOR ROTTED FLOORS

If the floor is too spongy to screw down a toilet flange, attach a flange support bracket to the floor and then secure the toilet flange to that. This fix will work only if the majority of the floor under the toilet is solid. Probe the floor by poking it with a screwdriver. If more than an inch or so around the flange is rotten, you'll need to repair the floor itself.

The bracket shown here is part of the QUIK-FIX Wobbly Toilet Repair Kit. You can find the kit at some home centers, plumbing suppliers or online for about \$15. Or go to quickfixplumbingproducts.com. It will also work over holes in the floor that have been cut a bit too large.



REAM OUT BROKEN HUBS

You can reuse an existing hub by reaming out the old pipe that's glued inside it. This PVC fitting saver will do the trick. It has a guide that rides inside the pipe you're removing so the hub won't get wrecked. Since replacing a hub can mean having to open up a finished wall—or worse, busting up concrete—this \$15 tool can save you a lot of time and money. The Socket Saver by Jones Stephens is available at home centers and online.



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Cut and pry broken threads

Pipes sometimes break off when you're trying to separate them, leaving the threads stuck inside the other pipe. When removing threads from steel pipes, carefully make two cuts with a hacksaw and then pry the piece loose with a screwdriver (**Photo A**). The top side of the pipe is subjected to much less water and is less likely to leak, so always make cuts on the top side of the pipe in case the steel threads get nicked a little. And make sure to use pipe dope or tape on the new pipe.



... or remove them with an internal pipe wrench

You can use an internal pipe wrench to remove small supply-line pipe threads (**Photo B**). A knurled cam slides out when the wrench is twisted, grabbing hold of the old threads from the inside. The one shown here costs \$10 at home centers. Another trick that *sometimes* works is to grab hold of the end of the thread with needle-nose pliers. Twist the pliers clockwise and the thread will wind out like a spring.



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Join incompatible pipes with a shielded coupling

If you need to tie into a white PVC pipe but the closest plumbing supplier carries only black ABS, you don't have to run all over town. Install a shielded rubber coupling between the two pipes. Shielded couplings are often referred to as "mission couplings," and they work great to connect other dissimilar pipes: galvanized steel to plastic, cast iron to plastic, ABS to PVC. Make sure you use a "fully banded" coupling because the couplings with just the two individual hose clamps may not be allowed in some situations.

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SMOOTH BOLTS WITH A ROTARY TOOL

Sometimes a toilet can be reset using the existing flange bolts, but often the ends of the soft brass bolts are damaged, making it difficult to get the nut started. Clean up the ends of the bolts with a rotary tool fitted with a grinding wheel. You can use the same tool to cut off new flange bolts to the proper height if they're too long. Clean up the ends of the bolts to ease future repairs.



Drop in a replacement closet flange

If the old toilet flange is broken beyond all hope of repair, drop in a replacement flange. Our expert prefers replacement flanges with a rubber compression gasket that expands. There are several styles, but the gasket on this one expands as you twist it into place. It's available for both 3-in. and 4-in. waste pipes at home centers and plumbing supply stores for \$15 to \$25.



Use double wax rings

The new bathroom floor looks great, but now the closet/toilet flange is 3/8 in. lower than the floor. Avoid leaks by installing two wax rings when you reset the toilet. Flange extenders are available, but some models are hard to seal properly. Our expert sets the wax rings on the floor instead of on the toilet. He installs a standard ring first, then sets a wax ring with a plastic gasket on top of that. If the new floor will be more than 1/2 in. higher than the flange, you'll need to remove the old flange, install the floor, then fasten the new flange on top of the flooring.

Busted dryer? Replace the motor



When a dryer motor goes bad, the loud grinding, rumbling from the worn-out bearings makes it seem like the dryer's going to blow up any second. It won't, but fairly soon after the noise starts it will stop dead in its tracks when the bearings seize. If you think the repair cost compares favorably with the cost of a new dryer, you might be right to hire a pro. But if you have basic mechanical skills and aren't afraid to dig in, buck up and deal with it yourself. You can replace a dryer motor in a morning and be back in business cheap. You can buy a genuine factory motor for about \$150 or an after-market motor for as little as \$60 (depending on the make and model).

Since you have to remove the drum to get to the motor, you may as well replace the belt, idler and drum rollers at the same time. That'll add about \$35 to the cost. But in the end, your dryer could last more years than you spent raising your kids.

The motor and blower wheel on our dryer were located at the back of the machine. But they may be near the front on other models. However, the motor replacement procedure is similar for both. You'll need nut drivers or sockets, screwdrivers, a shop vacuum, slip-joint pliers and two large adjustable wrenches.

Our appliance expert, Costas Stavrou, showed us how to replace a motor on a typical Whirlpool electric dryer. He showed us how to avoid damaging the blower wheel and how to remove the motor without special tools.

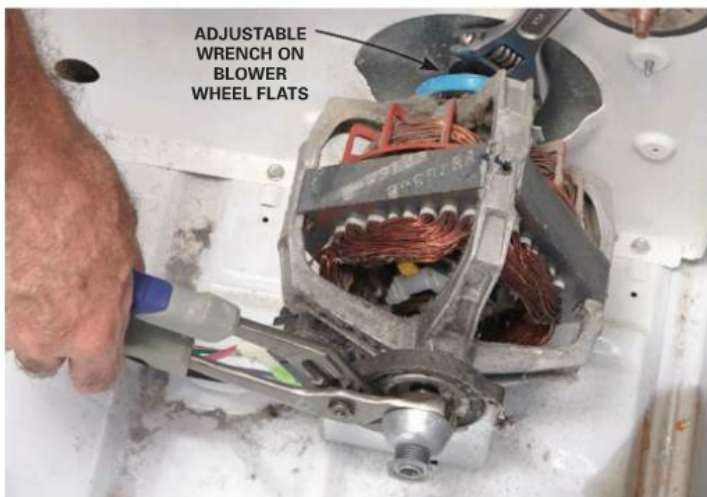
Pop the top and remove the front panel and drum

Unplug the dryer (and shut off the gas valve if you have a gas model). Then slide a putty knife between the front and the top panels to depress the latches located near the corners. Lift the top panel up and support it in the open position. Then disconnect the electrical connector to the door switch. Remove the screws that hold the front panel and pop it off. Disconnect the drive belt from the motor and lift out the drum (**Photo 1**). For more info on removing the top and front panels and the drum, search "clothes dryer repair guide" at familyhandyman.com.



1 REMOVE THE DRUM

Pop the lid and remove the front panel. Then disconnect the drive belt from the motor and lift the drum out the front of the machine.



2 CLAMP THE BLOWER WHEEL

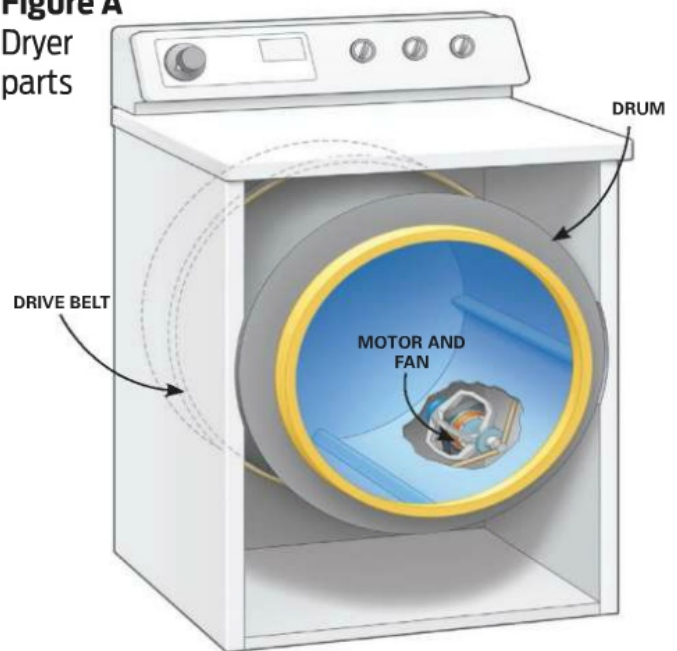
Rotate the adjustable wrench clockwise until it wedges against a drum roller or the side of the cabinet. Grab the flats on the other end of the motor shaft and turn it clockwise too. Don't grab the belt pulley—it'll break.



3 RELEASE THE MOTOR CLAMPS

Grab the bent tang on the motor clamp with slip-joint pliers. Then jam a flat-blade screwdriver between the clamp and the plier jaws and pry the clamp outward until it pops off. Repeat on the opposite end.

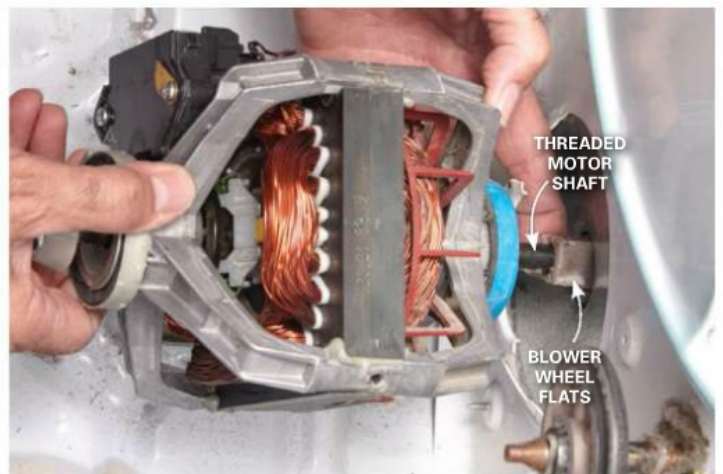
Figure A Dryer parts



Remove the blower wheel and swap in the new motor

Pay attention here: The blower wheel is screwed to the motor shaft with *left-hand* threads. To remove it, hold the wheel while you turn the motor clockwise—the opposite of what you'd normally do. Hold the blower wheel by sliding an adjustable wrench over the flats on the neck where it meets the motor shaft. Tighten the wrench jaws so they fit snugly. Then grab the other end of the shaft with a pump pliers and turn it to break it loose (**Photo 2**). Once you break it loose, spin the motor shaft clockwise with your hand until the blower wheel is loose. Then remove the motor clamps using the technique shown in **Photo 3**. Disconnect the electrical connector and lift out the old motor.

Slide the new motor into place and screw on the blower wheel (**Photo 4**). Then set the motor into the motor mount and install the clamps. Hook one end of the clamp to the base and force the other end over the catch using a flat-blade screwdriver.



4 CONNECT THE BLOWER WHEEL

Tilt the threaded portion of the motor shaft down to mate it to the blower wheel. Then spin the shaft counterclockwise until it's snug. Hold the blower wheel with the adjustable wrench and tighten by turning the opposite end with a pump pliers.



Less Pees, More Zzz's...

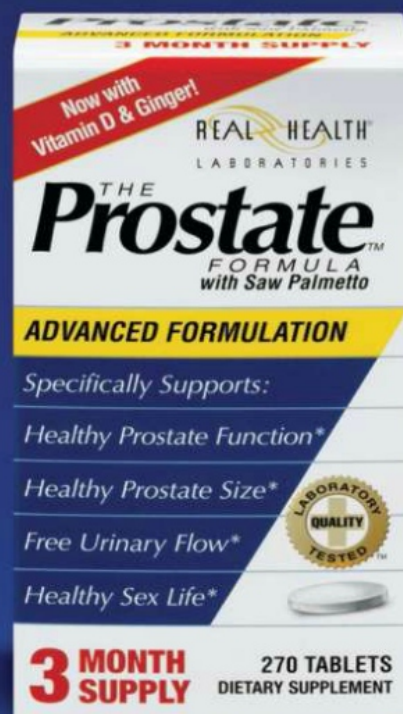
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PUT IN A DUCT BOOSTER FAN TO IMPROVE HEATING AND COOLING

If you have a room that's too cold in the winter and too hot in the summer, a booster fan can make the room more comfortable. There are three types of boosters. The simplest is a fan unit (about \$40 at home centers) that sits on top of the register. Another option is an in-line fan (\$30 and up) that you can install in the duct line. The third type, shown here, is a recessed fan that fits into the duct and is flush with the floor.

Recessed duct fans are sized to fit either a 4 x 10-in. or 4 x 12-in. floor duct. If you have either of these sizes, order the fan and install it in place of the register. Then plug it in and you're done (**Photos 1 and 2**). However, if your floor duct is smaller (like 2 x 10 in. or 2 x 12 in.) you'll have to cut out a section of the floor and install a larger boot (**photos below**). If the ceiling below the duct is open, you could do most of the work from below. If you have a hardwood, tile or other finished floor surface with a finished ceiling below, it may be

easier to open the ceiling below the duct and patch it when you're done.

Replace undersize boots

Buy a larger 4 x 10-in. or 4 x 12-in. right-angle boot (\$5 at home centers) and a matching recessed booster fan (one choice is the Tjernlund RB12; \$115 at smarthome.com). Pull up the carpet and padding around the duct to find and mark the joists on each side of the duct. Set the cutting depth to cut through the subflooring and any underlayment. Then cut and remove the flooring and the old duct boot. You may have to cut the old boot apart with a tin snips to get access to the old sheet metal screws.

Next, swap in the larger boot. Enlarge the duct opening in the cut flooring pieces to fit the new boot. Reinstall the flooring with screws and staple the padding back in place. Lay the carpet over the duct and cut the opening to match. Then tuck the carpeting back onto the tack strip. Insert the fan into the duct. Then install the register and cord and connect to a receptacle or an optional fan speed controller.

Standard installation



1 INSTALL THE FAN

If the duct is a standard size, remove the register and drop the fan into the boot. Secure it to the floor on each side with screws. If the duct is smaller than standard, see Photos 3 and 4.



2 CONNECT TO POWER

Plug the power cord into the fan and route to the nearest receptacle. Add an optional fan speed controller to adjust the fan speed to your liking.

Install a larger boot



FIRST CUT AN ACCESS PANEL

Pull out any nails on the cutting line. Plunge-cut down the centerline of the two joists next to the floor duct. Then make the bottom crosscut about 1 ft. from the wall. Cut out the corners with a reciprocating saw.



THEN INSTALL THE LARGER DUCT BOOT

Slide the new boot onto the round duct and secure it with sheet metal screws and aluminum duct tape. Attach the rectangular opening to the flooring with screws.

Cover-up for grungy grout

When cleaning isn't enough, the usual cure for grimy grout is to grind it out and regrout. But here's an easier approach: DAP Kwik Seal Grout Recolor Kit (\$16 at homedepot.com) lets you put a fresh coating over old grout in a few hours. It's a four-step process. First, you clean and prep the grout with DAP Pre-Treat. Next, apply the Color+Seal coating. Remove the excess and then buff off the haze. The kit contains everything you need and covers about 100 sq. ft. of 4-in. tile (smaller tile will have more grout lines and require more material). Learn more at dap.com.

1 PRETREAT THE GROUT

Sponge on the pre-treat solution and let it sit for five minutes. Then scrub the grout with the supplied brush. Wipe clean with the chamois.



2 APPLY COLORANT

Squirt a thin bead of colorant on the grout lines in a 2-sq.-ft. section. Then scrub the colorant with the grout brush included in the kit.



3 REMOVE EXCESS COLORANT

Wipe the excess colorant from the tile using the chamois. Wipe only the tile, not the grout lines. Let dry for 30 minutes.



4 BUFF TO REMOVE HAZE

Apply a light mist of glass cleaner and buff the tile with a clean rag or chamois. Let dry for a full 24 hours before exposing it to water.



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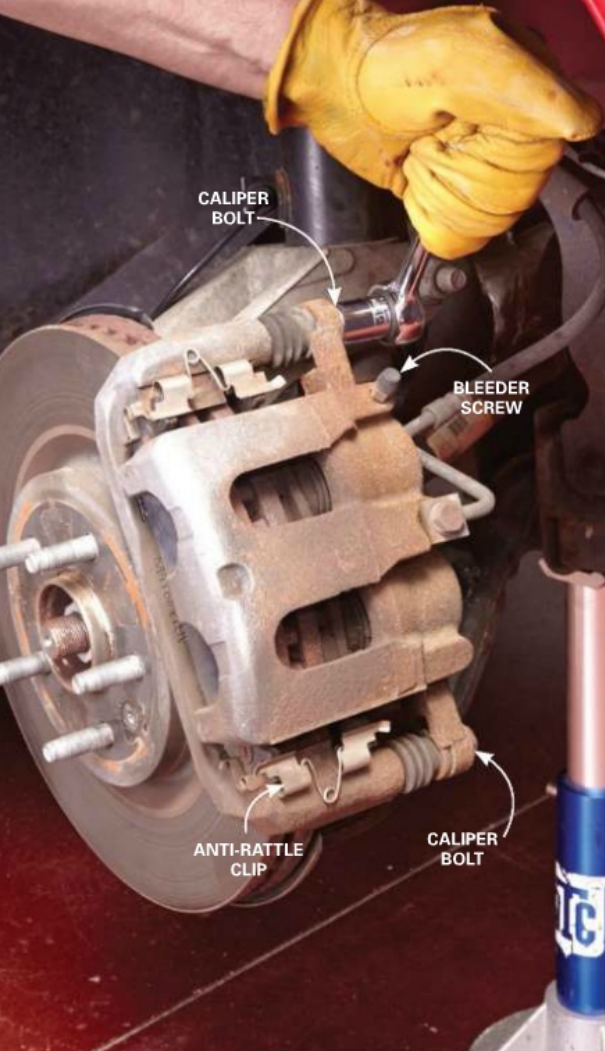
DIY front brake job— save a bundle!

If you've done some basic wrenching like replacing starter motors, alternators or even mufflers, you're completely capable of doing your own brake job. We'll show you how to do the front brakes on a late-model vehicle and get you up to speed on the newest techniques. The job takes about four hours and will save you about \$350 in shop labor.

Rear disc brakes are far more complex, so that's a job you should leave to the pros. (To learn how to tell whether your front or rear brakes need replacing, go to familyhandyman.com and search for "how to check your brakes.")

A car that's used mostly for city driving will need new front brakes and rotors about every 40,000 miles. But cars that are driven mostly on highways can go almost 80,000 miles before the front brakes wear out.

ART DIRECTION VERN JOHNSON • PHOTOGRAPHY TOM FENENGA



Get the parts and gather the tools

A shop can determine whether a rotor can be reused as is or resurfaced with an on-car brake lathe. Since you don't have access to an on-car lathe and probably don't own a brake micrometer, just plan on buying new rotors and brake pads. Choose the premium offerings from a name brand manufacturer to get the longest life and best service out of your new brakes. (Bendix, Raybestos, EBC, Wagner, Brembo and Akebono are examples of well respected brands.) Buy the same type of brake pad that was installed at the factory—the auto parts store has that information.

You'll also need a small packet of synthetic high-temperature brake grease, aerosol brake cleaner, polishing pads, a tube of nickel anti-seize and a packet of blue and red thread locker (Loctite is one brand).

Next, gather your socket set, torque wrench and screwdrivers, along with a drill and wire wheel, an 8-in. C-clamp, a small spool of mechanic's wire, 2 ft. of 1/4-in. vinyl tubing and a jar to hold the brake fluid that bleeds out as you compress the caliper piston.

Work on one side at a time

Brakes on late-model vehicles include clips and springs that must go back in exactly the same position. If you remove both brakes at the same time and forget how to reinstall the small parts, you won't have the other side to use as a reference (a common DIY mistake). So replace the brakes one side at a time.

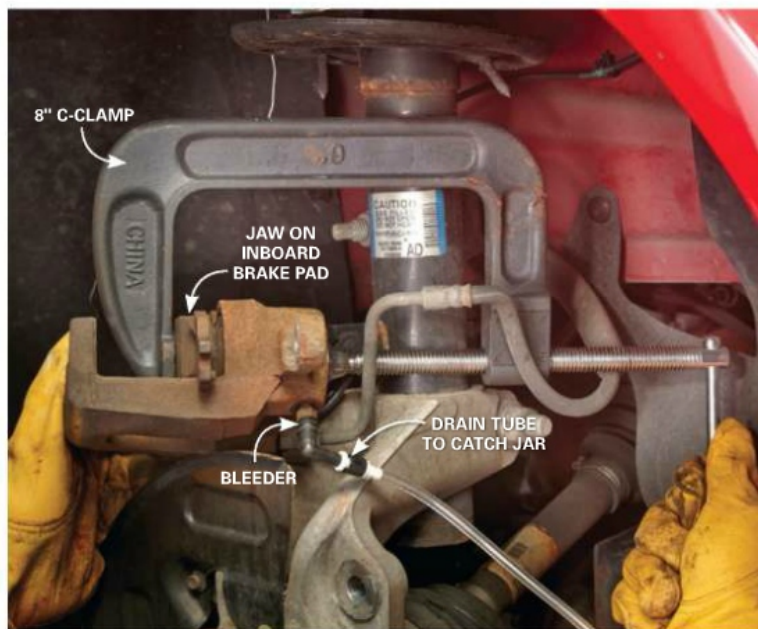
Start by loosening (not removing!) the lug nuts while the tire is on the ground. Raise one side of the vehicle with a floor jack or spare-tire jack. Then place a jack stand under the engine cradle for added safety. Then remove the tire and proceed with the brake job.

Unbolt the caliper

Remove the wheel. Then loosen the caliper retaining bolts with a socket and ratchet (**Photo 1**). Next, loosen the caliper bleeder screw and lightly reseal it. You'll loosen it again when you retract the caliper piston. Then lift the caliper off the rotor and set it on top of the caliper bracket.

1 REMOVE THE CALIPER

Loosen the caliper bolt heads with a ratchet. Then remove and store the rubber cap on the bleeder screw (if equipped) and loosen the bleeder screw with a box-end wrench. Reseat the bleeder screw and remove the caliper bolts.



2 RETRACT THE CALIPER PISTON

Place the inboard pad against the piston and center the C-clamp jaw on the pad. Locate the clamp screw on the back side of the caliper. Open the bleeder and retract the piston.

YOU MIGHT NEED HEX- OR STAR-SHAPED SOCKETS

The brake caliper bolts on older vehicles usually have an internal hex or internal star-shaped head. You won't have enough leverage to remove an internal hex-head caliper bolt with an ordinary L-shaped Allen wrench. So before you begin the job, turn the front wheels all the way to one side and crawl under the vehicle with a light. Check the caliper bolts to see if they're internal hex or internal star. Then buy a complete set of the correct sockets to have on hand when you start the job.



3 UNBOLT THE CALIPER BRACKET

Break the caliper bracket bolts loose with an impact wrench or a breaker bar. Store the bolts and lift the bracket off the steering knuckle.

Remove the caliper, retract the piston

Connect one end of the drain tube to the bleeder screw and place the other end in a catch jar. Then open the bleeder and force the caliper piston back into the bore with the C-clamp (**Photo 2**). When you're done, tighten the bleeder and disconnect the drain tube. Secure the caliper to the coil spring or strut with mechanic's wire while you complete the brake job. Never let the caliper dangle by its hose.

Next, remove the caliper bracket so you can replace the rotor. The caliper bracket bolts are quite large and are usually coated with thread locker. So you'll need a large ratchet or breaker bar or an impact wrench to remove them (**Photo 3**).

As you remove the bolts, note whether they've been coated with red or blue thread locker. Recoat the threads with the same type when you reinstall them.



4 REMOVE THE ROTOR HOLD-DOWN SCREW

Smack the rotor hold-down screw with a hammer to shock it. Then insert a Phillips or star socket. If the screw doesn't loosen, try tightening. Rock the socket back and forth until it comes out. Then wiggle the rotor to remove it from the hub.



5 CLEAN OFF THE RUST

Toss the old anti-rattle clips (see **Photo 1**). Remove all traces of surface rust in the pad slide areas using a wire brush or a drill with a wire wheel. Coat the areas with a light film of brake grease. Install new anti-rattle clips.

Remove the rotor

Many carmakers secure the rotor to the hub with a screw, and it rarely comes out without a fight. So assume it's rusted in place and soak it with spray rust penetrant before you try to remove it. Otherwise you can strip the head, and you'll be forced to drill it out. Let the penetrant work for about 15 minutes. Then remove the screw (**Photo 4**) and pull the rotor off the hub.

It's all about clean

Brake noise, vibration, harsh braking and brake pedal pulsation are the most common brake complaints, and they're all caused by improper cleaning and installation procedures. So trust us on this point and follow all of our cleaning and greasing instructions.

Remove the old anti-rattle clips and

toss them (they can't be reused). Then clean all the rust off the caliper bracket (**Photo 5**). Next, clean the caliper bolts with aerosol brake cleaner and check for corrosion. Replace the bolts if they're corroded. Install new anti-rattle clips (**Photo 6**). Then grease the bolts and install new rubber boots (**Photo 7**).

Then clean all the rust and debris from the wheel hub. All it takes is .003 in. of rust or crud on the hub to cause brake pedal pulsation and ruin a perfectly good brake job. So take this part seriously. Chuck a mildly abrasive polishing pad into your drill and clean the wheel hub (**Photo 8**).

Next, clean the new rotors. Use aerosol brake cleaner to remove the rust preventive coating. Then perform the second cleaning step shown here (**Photo 9**). It's a pain, but skipping this step can also ruin your brake job.

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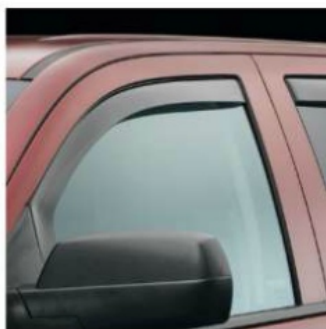
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6 ADD THE HARDWARE

Apply a very light coat of high-temperature synthetic brake grease to the caliper bracket. Then snap in the new anti-rattle clips.



7 LUBE AND INSTALL NEW BOOTS

Apply a coat of high-temperature synthetic brake grease to the bolt and the bores in the caliper bracket. Seat new boots into the caliper bracket and slide in the greased caliper bolts until the boots seat on the bolt recess.



8 POLISH THE HUB

Spin the polishing pad around the face of the wheel hub. Then clean the rust off the center of the hub. Wipe off the debris and apply a light coat of nickel anti-seize to the face to minimize future rust buildup. (Don't get anti-seize on the wheel studs.)



9 WASH THE ROTOR

Dunk the rotor into a tub of hot soapy water and scrub the entire surface with a stiff brush. Rinse with clear water and dry with paper towels.

Reassemble

Slide the rotor onto the hub, aligning the rotor retention screw hole with the threaded hole in the hub. Tighten the screw to specs. Next, apply the correct thread locker to the caliper bracket bolts and reinstall the caliper bracket. Apply a thin film of brake grease to the back side of the noise reduction shims, slide them into the caliper bracket and install the springs (Photo 10). Reinstall the caliper.

Install the wheel, torque the lug nuts, and test the brakes

Now that you've followed all the cleaning and greasing tips, don't wreck your work by using an impact wrench or ratchet to tighten the lug nuts. They must be tightened to the same torque to maintain the critical rotor-to-hub fit (Photo 11). If they're torqued unevenly, the rotor will cock slightly and you'll get pedal pulsation.

Caution! You won't have immediate braking at this point, so don't start the engine or put the car in gear until you perform this next step.

Depress the brake pedal several times with the engine off until you get a firm pedal. Then go for a test drive at slow speed to be sure the brake pads work. Finally, perform the "bedding" procedure recommended by the brake pad manufacturer (see "How to Break in Brake Pads").



10 ADD THE SPRINGS

Slide the pads into the anti-rattle clips. Squeeze the pads together as you install the drag reduction springs. Make sure they go back in the same way they came out. Continue squeezing the pads and slide the caliper over the pads.

11 TORQUE THE LUG NUTS

Remove the jack stand and lower the vehicle until the tire just touches the ground. Set the torque wrench to one-half the specified torque and tighten the lug nuts in a star pattern. Then set the wrench to the full torque and tighten again in the same star pattern. Lower the vehicle the rest of the way and remove the floor jack.

HOW TO BREAK IN BRAKE PADS

Brake pads must be correctly "burnished," or "bedded," for proper operation. This step transfers a thin film of friction material onto the rotor and polishes the face of the brake pad. Consult the brake pad package insert for the recommended procedure. Most manufacturers recommend this 30-30-30 method: You accelerate to 30 mph and gently brake to a complete stop. Wait 30 seconds for the brakes to cool. Then repeat the procedure 30 times. (Perform the break-in procedure in a quiet parking lot or on a traffic-free road!) If you skip this critical break-in step, you might experience shorter brake pad life, along with noise and vibration.

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Top Ten TIPS

BY ELISA BERNICK

editors@thefamilyhandyman.com



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Prevent falls at home

Falls are the No. 1 cause of injuries at home, and they can happen to anyone at any age. They're the most common cause of visits to the emergency room for young children, the leading cause of nonfatal injuries in people ages 25 to 54, and the most common cause of injury in adults age 65 and older.

We used statistics to compile this top ten list to help protect you and your loved ones from falls, emergency room visits and even lawsuits. For more tips on preventing falls, see "A Better Place to Age," p. 34.

1 Keep emergency lights handy

Uneven or unfamiliar footing is a prime cause of falls in the dark, and during an emergency even familiar surfaces can become treacherous. Keep a flashlight with extra batteries near your bed in case of a power outage. Also carry a small LED flashlight on your key ring. It's perfect for walking to and from the garage as well as in unfamiliar places like hotels and city streets. If you have a smartphone that includes a flashlight, use it. If your phone doesn't, there are many free flashlight apps available (but read the fine print about whether these apps may be able to access data from your phone once downloaded).



2 Night-lights inside and out

Twenty percent of falls happen at night. Fatigue and alcohol can be contributing factors, but poor lighting also plays a role. You can easily make outdoor steps and walkways a lot safer by adding inexpensive solar-powered path, deck and porch lights.

Inside, line your hallway and stairs with LED battery-powered night-lights. The system shown is the PathLights Automatic Lighting System (\$40 at brookstone.com), which includes wireless LED lights that "communicate" with each other when they detect motion up to 6 ft. away. You can find a huge variety of LED battery-powered, motion-activated lights and solar-powered lights at home centers or by searching online.



3 Ice grips work...to a point

If you live in ice and snow country, get some ice grips for your boots and shoes. These cleats provide traction in mud, snow, ice and other conditions. They come in lightweight coil versions for paved roads and sidewalks, and heavy-duty spike models for hiking trails.

A word of caution: Don't ever rely completely on an antislip device to protect you from a fall. Feeling invincible in slippery conditions is never wise. And make sure you remove ice grips immediately when you step inside (even if you're only inside briefly). These products can be very slippery on tile and stone surfaces. Ice grips are available at sporting goods stores and online retailers.

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4 Add friction to slippery surfaces

Prevent outdoor falls by eliminating the slippery conditions on steps, ramps and decks. Temporary solutions include grit additives for paint and adhesive grip strips. These screw-on, durable aluminum plates, from Handi-Treads, are a more permanent option. They cost \$8 per foot at amazon.com. Learn more at handitreads.com.



5 Install hardware-mounted safety gates at the top of stairs

Every six minutes, a child under the age of 5 falls down the stairs and is rushed to the hospital—that's nearly 100,000 kids per year. Prevent this by using a hardware-mounted safety gate bolted to the wall studs at the top of the stairs. Just make sure it doesn't swing in both directions or have a trip bar at the bottom of the frame.

Pressure-mounted gates are more convenient, but they should be used only between two rooms, never to block off stairwells. Buy a safety gate certified by the Juvenile Products Manufacturers Association, which means it meets international safety standards. And be aware that nearly half of all injuries associated with safety gates happen when adults trip or fall trying to step over them. Buy a gate that's easy for you (but not your kid) to open so you won't be tempted to climb over it.



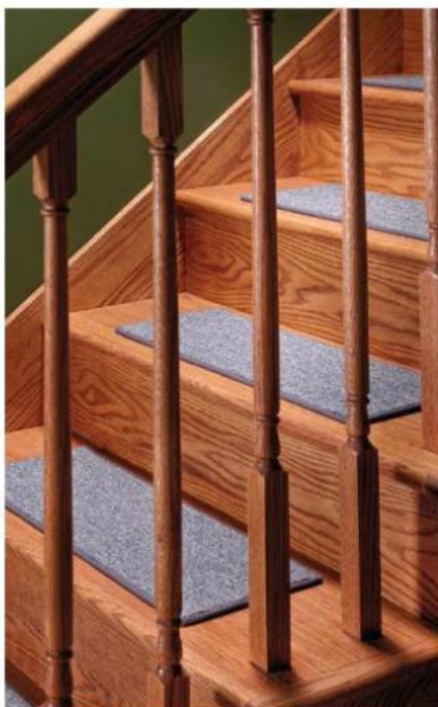
6 Ditch the clutter, especially on stairs

Nearly half of all falling deaths occur on steps and stairways. Keeping the steps clutter-free seems obvious, but take a look at your own steps (especially those leading down to the basement). Who hasn't set something on the top step "temporarily" with a plan to take it down on the next trip? It's easy to use the steps as semipermanent storage, but it's a very dangerous habit. Odds are that eventually someone is going to trip over something and break an arm or leg (or neck). Don't set anything on the steps. Ever.

7 Make your home a no-slip zone

According to the National Safety Council, there are 12,000 deaths each year from stairway accidents. Wooden stairways in particular can be very slippery. You can help prevent slips and falls by installing attractive skid-resistant carpet treads. These are available at carpet stores, online retailers and home centers in a variety of colors and styles.

Make sure to install the carpet treads using high-quality double-sided tape so they don't slide around even under heavy traffic. And get rid of small throw rugs that can easily bunch up and trip you. If you can't part with a favorite rug, put double-sided tape under it to keep it from sliding, and never put a rug at the top or bottom of stairs.



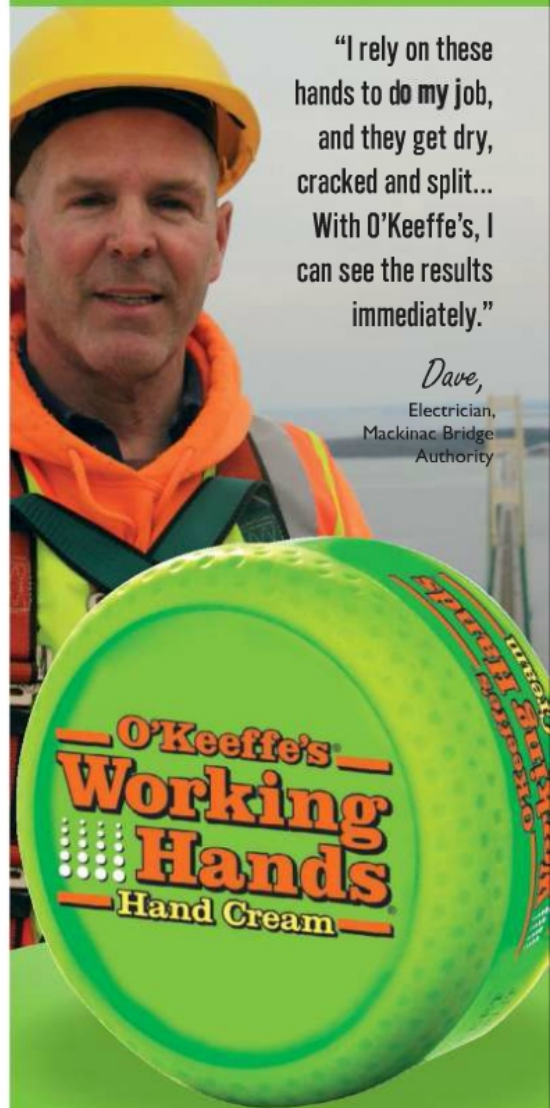
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8 Make windows safe for kids

Each year in the United States nearly 15,000 children are injured because of falls from windows. Window screens are not strong enough to prevent falls. In rooms on upper floors, install window guards with quick-release mechanisms (in case of fire) to prevent windows from opening more than a few inches. And keep furniture away from windows so kids aren't tempted to climb near them.

Window guards are available from safebeginnings.com and other online retailers, home centers and department stores. Prices range from \$30 to \$120.

Continued on p. 86



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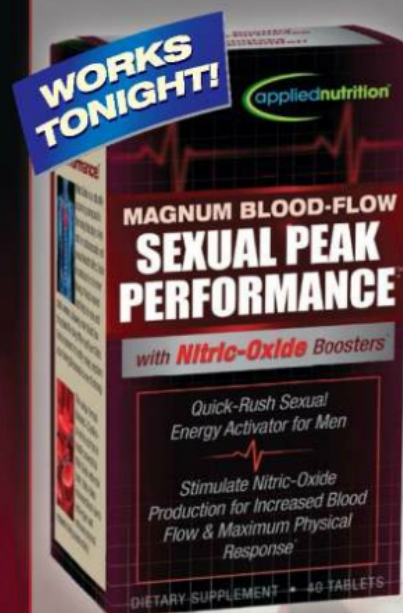
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9 Use a wall-mount soap dispenser

The bathroom can be a hazardous place for any age. According to the Centers for Disease Control and Prevention, injuries around the tub or shower are actually most common among those ages 15 to 24.

Believe it or not, many bath falls are caused by reaching for dropped soap! So do two things—use a slip-proof bath mat and install a wall-mounted soap and shampoo dispenser. There are many different models available, and most install quickly with adhesive strips and silicone glue. Look for models with easy to fill dispensers. Available at bath stores and online retailers for \$30 and up.

In 2012, the direct medical cost of falls, adjusted for inflation, was \$30 billion.

PETS CAN BE HAZARDOUS...

Tripping over the family pet causes more than 86,000 fall-related injuries each year. We're not suggesting you get rid of Rex or Patches, but keep them in mind when you're hoofing it around the house.

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HANDRAIL EXTENDS ABOVE THE TOP STEP



10 Use step stools safely

Step stools may seem innocent enough, but they cause 160,000 injuries each year. Some of these occur because the stool itself isn't safe; more than a million folding step stools have been recalled recently because of design flaws. Injuries happen when the stool collapses or tips over or when someone loses their balance because there's nothing to grab onto.

Avoid these sorts of falls by making sure your step stool is well designed with safety features that include deep, non-skid steps and a handrail that extends above the top step. You should be able to stand on the top step and still have a firm grasp on the handrail. When you use a step stool, make sure it's sitting on a flat surface and that it's tall enough and strong enough for the job. And even if your stool has a handrail, leaning too far in any direction is a good way to become a statistic. By the way, never use an upside-down 5-gallon pail for a step stool. You're bound to go down!

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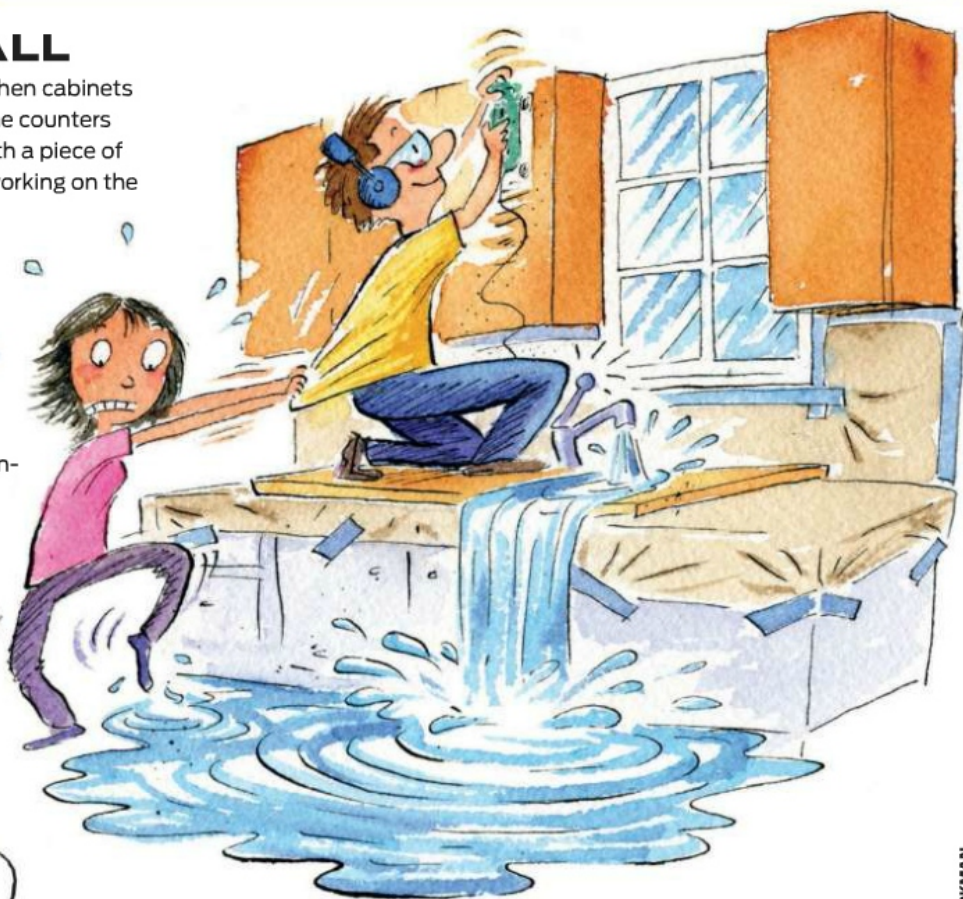
INDOOR WATERFALL

My wife and I decided to refinish our aging kitchen cabinets instead of getting new ones. We masked off the counters and the walls and spanned the double sink with a piece of plywood so we'd have a place to kneel while working on the upper cabinets. I put on my hearing protection and dust mask and started sanding. After several minutes I felt a tug on my shirt. I looked down and saw my wife motioning for me to stop.

I set the sander on the counter, and as the dust cleared, I could see water everywhere on the floor! My knee had bumped the sink faucet, turning it on, and the water was running onto the plywood, down to the floor and then even into the basement. Luckily our floor survived the soaking. We did finish the sanding that day—after we turned off the faucet valves below the sink!



Debra and Mark Pettijohn



Smoldering soldering

Growing up in a historical home was both a privilege and a challenge. My father, an avid DIYer, decided to take on a project installing new vertical bead board on the walls in the hallway and in the bathroom. The last step in the project was to install a new toilet, which involved sweating a new shutoff fitting for the supply line.

Well, as luck would have it, he started a fire inside the wall, meaning we couldn't douse it with water. We called the fire department and within minutes they arrived. To get at the fire, the firefighters hacked away at the new bead board and then sprayed water inside the wall. Finally, it was extinguished, and we stepped back to look at what had become a much larger project. A soldering shield was a nice addition to the old toolbox!

Robert R. Chapin

Dead center

Last summer I was installing wainscoting for customers in their newly remodeled basement. The wainscoting fit nicely into a groove in the base and then was held at the top by a grooved cap molding. To help secure the wainscoting, I'd angle a nail from my nail gun at intervals to hold the pieces while the glue dried.

The customers called a couple days later and said the carpeting below the new wainscoting had a wet spot. Well, the bathroom sink was located directly behind the wainscoted wall. I cut the drywall back under the sink and saw a nail from my nail gun directly centered in the cold water supply. The leak was very

slow as the nail was plugging the hole somewhat. We called the plumber to repair the pipe and then I fixed the drywall under the sink. Next time I'll check to see what's on the other side of the wall!



David Radtke

Got your own do-it-yourself mistake? **GET \$100 FOR YOUR GREAT GOOF!** See p. 4 for details.

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