

**SIMPLE SOLUTIONS FOR UGLY ROOF STAINS**

# family handyman

SMART HOME IMPROVEMENT

**INSTANT IMPACT**

**BEST  
WI-FI  
YOU CAN  
GET**

## CURB APPEAL

**DIY PROJECTS  
THAT PAY OFF BIG!**

**WINDOW  
REPLACEMENT**  
IT'S EASIER THAN  
YOU THINK

**PRO TIPS FOR  
LANDSCAPING**

**HOW A  
HUMIDIFIER  
CAN WRECK YOUR  
HOME** p. 73

**A NEW  
DOOR**  
THE EASY  
WAY

**STAMPED  
SIDEWALK  
OVERLAY**  
THE LOOK OF  
STONE IN A  
WEEKEND



**BEFORE!**

**MARCH 2020**  
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<sup>1</sup> Read the vehicle Owner's Manual for important feature limitations and information. Some camera views require available accessory camera and installation. Not compatible with all trailers. See your dealer for details. <sup>2</sup> Excludes other GM vehicles.





CHEVROLET





# CURB APPEAL ECONOMICS

DIY changes the equation

**We** all want a home with strong curb appeal; it just feels good to come home to an attractive house. And according to lots of studies, adding curb appeal is also a smart investment that increases a home's value. You get a nicer home now and a nice return on investment (ROI) when you sell. Win-win.

Still, every neighborhood, every house and every project will yield different results, and I wondered about the return on investment for the projects in this issue of *Family Handyman*. So I gathered up all the pro bids, tallied our actual DIY costs and got value estimates from a few local real estate agents. Then I did some rough math. The numbers were striking.

**GARY WENTZ**  
EDITOR-IN-CHIEF



## PROJECTS WANTED!

Do you have a curb appeal project you're proud of? Drop me a line at [feedback@familyhandyman.com](mailto:feedback@familyhandyman.com)



## DIY Boosts ROI

### PROJECT COSTS—AND SAVINGS!

We got pro bids for the projects you'll see in this issue. The pro bids include labor and materials; our DIY costs are for materials only.

#### KITCHEN WINDOW



#### FRONT DOOR



#### LANDSCAPING



#### ROOF CLEANING



#### SIDEWALK



**\$7,000**

**TOTAL DIY COST**

Mostly materials, but also a few rental tools.



**\$20,000**

**TOTAL PRO COST**

Contractor bids included all materials and labor.

**\$13,000**

**DIY SAVINGS**

Eliminating labor costs is huge!

**\$81**

**DIY SAVINGS PER HOUR**

We spent about 160 hours on various projects. Whew.

**\$21,000**

**INCREASE IN HOME VALUE**

This is an average of estimates from local real estate agents.

**300%**

**DIY ROI**

Cutting the total cost to \$7,000 yields a profit of \$14,000. Warren Buffett can't beat that.

**5%**

**PRO COST ROI**

Spending \$20,000 might have returned us \$21,000 upon sale, for a profit of \$1,000.





# YOUR PROJECTS ARE WAITING.

**Start building today!** Become a Family Handyman Insider and get access to 100+ project plans, 60+ quick classes, and so much more. You can build a shed or workbench, add storage to your home or garage, design a deck or patio, and more. Plus, you can take advantage of new project plans and online quick classes monthly. Unlock your Family Handyman Insider access and discover what you can build.

**family  
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# Contents

## MARCH 2020

family  
**handyman**

**EXPERT  
DIY ADVICE**  
SINCE 1951

### FEATURES

**32**

#### **A New Window in One Day**

It's easier than you think! We'll walk you through the steps.

**38**

#### **Front Entry Face-Lift**

Add fresh curb appeal with a new front door.

**44**

#### **Transform Your Sidewalk**

Give plain old concrete the look of stone pavers.

**50**

#### **Solutions for Roof Stains**

Algae on your roof? We'll show you how to remove and prevent it.

**59**

#### **Decorative Shutters**

Why go with plastic? Make your own custom shutters for less.

**62**

#### **Workshop Storage**

Easy ways to organize your favorite space.

**64**

#### **Clamping Tips**

Get just the right grip on all your projects.

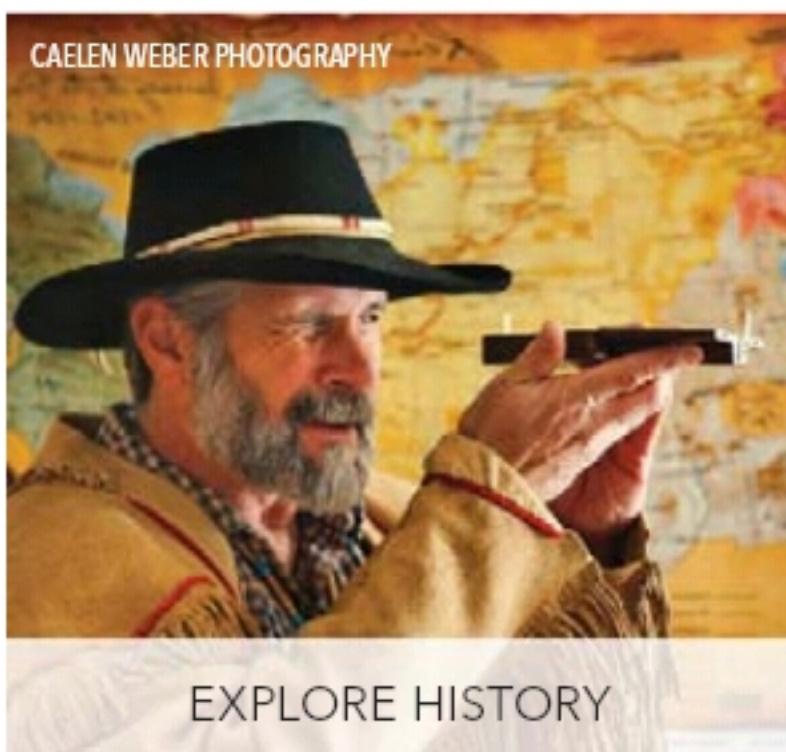






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## DEPARTMENTS

### 11 Stuff We Love

A crevice-cleaning broom, smart dead bolts, and no-glue plumbing fittings.

### 16 Handy Hints®

Magnets for clean drilling, a phone stand on the fly, and easy sticker removal.

### 22 homeLAB

We test Alexa's home security features and compare "one-coat" paints.

### 54 Best Pro Tips

Need more curb appeal? 12 simple ways to take your landscaping to a whole new level.

### 68 Home Care

The trouble with whole-house humidifiers; the facts about antimicrobial products; and more.

### 82 Reader Info

Want to know how to subscribe, renew, share a hint, and more? Check out this page.

### 84 Great Goofs®

The leak before the flood, and a shocking way to check an outlet for power.







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# MORE **family handyman**

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pinterest.com/family\_handyman  
youtube.com/thefamilyhandyman  
instagram.com/familyhandyman

## WOMEN IN THE SPOTLIGHT

March 8 is International Women's Day, making this the perfect time to recognize the hardworking handywomen we all know and love. Our mothers, grandmothers, aunts and daughters. And a growing number of our readers, too.

As times have changed, so have the faces behind many DIY projects at home. We, the dedicated women of *Family Handyman*, are a reflection of that. We are a reflection of you. Cheers to the women who inspire us all!



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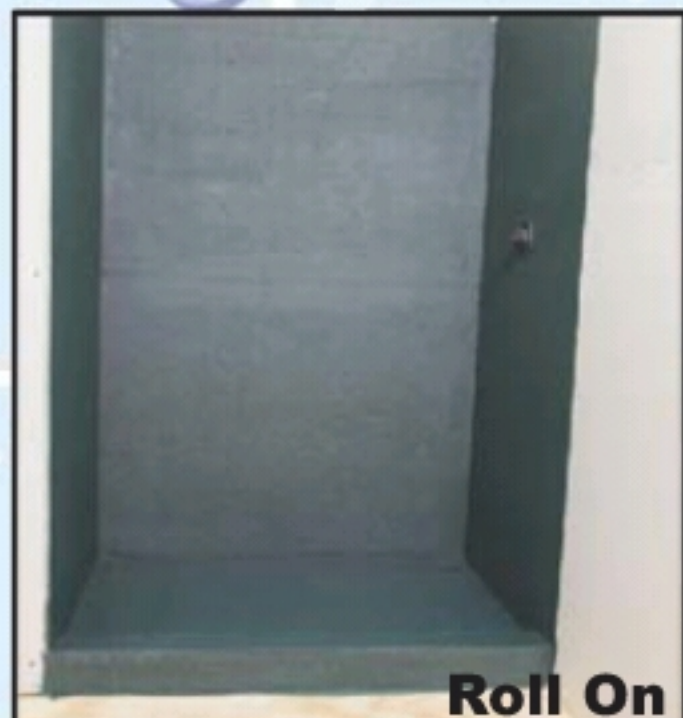
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Sheet Membrane

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# FLAKY OR CRACKED CONCRETE STEPS?

## HERE'S WHAT TO DO



Spring is around the corner and it's time to evaluate whether the harsh winter weather and constant foot traffic may have damaged your concrete steps. For construction professionals and homeowners alike, concrete has always been appealing due to its superior durability, but continuous exposure to harsh elements can slowly weaken the concrete.

A good maintenance practice is to take a few minutes to evaluate your outdoor steps every Spring, as you may not realize that the concrete could be suffering from superficial to widespread structural damage. With quick attention to any concrete imperfections, you can reverse the damage and keep your stairs looking as good as new.

### FIX SUPERFICIAL FLAWS

When you first spot imperfections, they may be cosmetic, such as light flaking or spalling, staining and craze cracking. Fortunately, these are easy to repair if you correct them before they become a serious problem. Superficial concrete flaws can result from weathering, foot traffic wear, or even poor installation.

Fortunately, cosmetic concrete flaws are now easier to fix. You can tackle the repairs yourself by using a high-performance concrete resurfacer, such as Rapid Set® NewCrete. It resurfaces imperfect or worn concrete and gives your concrete a like-new look and a renewed lease on life. Then, after just two to three hours, your concrete will be smooth, blemish-free and ready for foot traffic.

### REPAIR EXTENSIVE DAMAGE

If the damage to your concrete is more severe and widespread, make repairs a top priority. Structural damage should be repaired sooner rather than later. Harsh weather can accelerate the condition of deep chipping, wide cracking, and crumbling sections. Don't delay – if ignored, these areas can deteriorate to the point where repairs are not possible and a total replacement would be the only option.

When you have more severe damage, look for a material meant for extensive repairs. Rapid Set® Cement All® is a multipurpose construction material that will provide superior adhesion to your damaged concrete and can be used whether your repair requires a skim coat or a four-inch-thick application. It allows you to shore up failing concrete on your own, and to do so easily and quickly. Cement All sets in 15 minutes and is ready for traffic in one hour.

Additionally, you can always use Cement All and NewCrete as a tag-team remedy to repair all the defects in your concrete steps.

### WHERE TO FIND THESE PRODUCTS

Rapid Set Cement All and Rapid Set NewCrete can be found at The Home Depot.

## SIGNS THAT YOUR CONCRETE STEPS NEED REPAIR

### WHEN YOU HAVE SUPERFICIAL FLAWS, SUCH AS:

- Light flaking/spalling
- Staining
- Craze cracking

The best solution is a high-performance concrete resurfacer that results in a smooth, new concrete surface, as found with Rapid Set® NewCrete Concrete Resurfacer.

### WHEN YOU HAVE EXTENSIVE DAMAGE, SUCH AS:

- Deep chipping
- Wide cracks
- Crumbling sections

The best solution is a multipurpose construction material, such as Rapid Set Cement All, which will provide superior adhesion to your damaged concrete. Rapid Set Cement All enables you to shore up failing concrete on your own, and to do so easily and quickly.



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# Stuff We Love

Our favorite DIY tools, materials + gear

## Simply smart dead bolt

**R**ight from the start, the Schlage Encode Smart Wi-Fi dead bolt is as simple to use as an ordinary dead bolt. Even the installation is easy! But its tech smarts make it far more convenient.

My wife and I love the backlit touch keypad—we no longer need a key to unlock the door. It's very easy to change and monitor codes when you have visitors, check the status of the lock and lock/unlock your door remotely from your smartphone.

We also like the auto-lock setting that will lock the door after a pre-determined amount of time, and the simple lock button so you don't have to enter your code each time you lock your door. This has become a life-saver for getting the kids to preschool and day care when we're crunched for time and have our hands full.

My wife is wary of relying on Wi-Fi and batteries for the lock to operate, but there is a keyhole in case you ignore the low battery warning. These dead bolts are available for \$250 online and at home centers.

**MIKE BERNER**  
ASSOCIATE EDITOR



Inside



Outside





## STUFF WE LOVE



### NONGREASY DASH WIPES

These Matte Finish Protectant Wipes by Armor All have found a home under the seat of my truck. Unlike other wipes I've used, they don't leave a greasy sheen on my dash. In addition to providing a clean, matte finish, they help keep plastic, vinyl and rubber from fading. I'm not too worried about that with my 15-year-old truck, but you might care more about yours! You can find a tub at auto stores and home centers for about \$5.

**BRAD HOLDEN**  
SENIOR EDITOR



### TIME- SAVING FOAM DISPENSER

**If** you use expanding foam often, a dispensing gun is a good investment.

Controlling the foam is a whole lot easier with a gun than with a bendable straw applicator. The gun comes with a few fine-point disposable tips that let you get into crevices.

The best part is that if you finish a job before the can runs out, the rest of the foam won't be ruined. You can remove the can and clean the gun, or you can leave it in the gun without cleaning it and the foam will be usable up to 30 days. A dispensing gun will save you time, mess and money. You can find one at home centers for about \$47.

### No glue and easy to undo

ConnecTite push fittings for plumbing don't require gluing, but they cost at least three times as much as standard fittings that do. Sure, gluing PVC and ABS is easy enough. But I'm prone to mistakes when it comes to plumbing, and being able to twist off a fitting or two is sometimes worth the higher price. And when I'm in a rush or don't want to make a mess, no-glue convenience matters more than cost. You can find them at Lowe's in plenty of sizes and bends starting at \$7 for a 1-1/2-in. coupling.

**JAY CORK**  
ASSOCIATE EDITOR





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For more information





## Crevice-cleaning broom

If you have a paver patio or any grooved surface (like a sidewalk or a truck bed), you know how debris stays stuck in the crevices. The 18-in. Renegade broom is made for this job. Its arched bristles reach into crevices and scoop out the debris, and it can move heavy piles of wet leaves and dirt. This broom may seem a bit pricey (\$37 online), but it's a great tool for outdoor cleanup.

**KEVIN ESPIRITU**  
EPIC GARDENING

## MY FAVORITE TRIM

I recently tried Boral Building Products' TruExterior trim, a composite trim made from fly ash, a byproduct of coal burning. It won't swell and rot from water exposure, and it's approved for ground contact and contact with masonry and brick. It cuts with a standard saw blade and shapes easily with a router. (I suggest dedicating a blade to this stuff; mine went through lots of TruExterior trim, but it wouldn't cut anything else cleanly afterward.)

The trim comes preprimed and ready for paint. I even stained a piece out of curiosity, and it took gel stain great! It expands and contracts much less than wood or vinyl, has the best simulated wood grain texture I've seen, and resists splitting even when you drive a screw without a pilot hole close to the edge. This is my new favorite engineered trim product. The 5/4 x 4 x 16-ft. sticks cost \$39 each at my local lumberyard.

**MIKE BERNER**  
ASSOCIATE EDITOR

## CORNER-KEY DOWELING JIG

Rockler is making it easy to break away from using traditional miter keys and splines to reinforce miter joints. Its corner-key doweling jig is a breeze to set up and allows you to drill three different-size holes (1/8 in., 1/4 in. and 3/8 in.) through the joint, adding strength and a unique design feature. The jig adjusts to let you drill closer or farther from the mitered corner, which helps match material thickness and gives you more freedom with your dowel placement. It's available at Rockler Woodworking for \$36.



TOP LEFT: THE HANDY CAMEL BOTTOM: ROCKLER

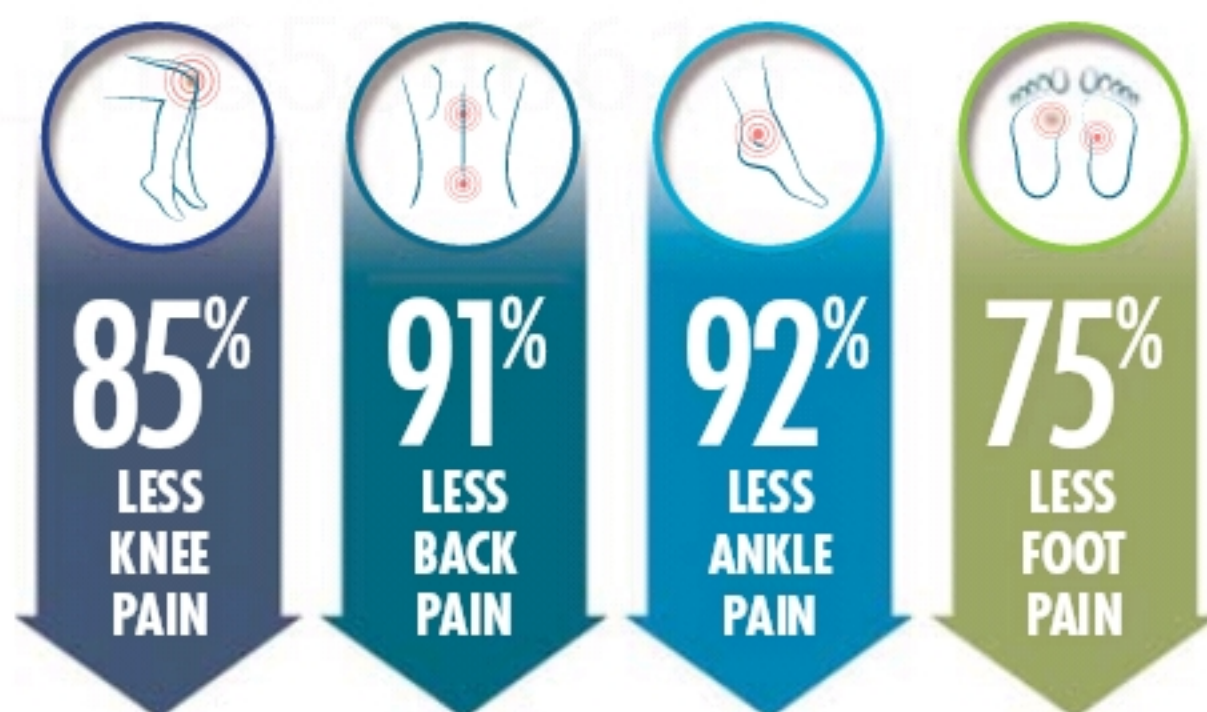


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magnets

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**W**hen you're drilling holes in ferrous metals, stick a rare earth magnet or two next to the hole you're drilling. The magnets catch the shavings, keeping the waste off the bit, the floor, your clothes and your project. When you're done, use a rag to wipe the shavings off the magnet and into the trash.

**MANNY DAVIDSON**



# The Invention of the Year

## The world's lightest and most portable mobility device

*Once in a lifetime, a product comes along that truly moves people. Introducing the future of personal transportation... The Zinger.*

Throughout the ages, there have been many important advances in mobility. Canes, walkers, rollators, and scooters were created to help people with mobility issues get around and retain their independence. Lately, however, there haven't been any new improvements to these existing products or developments in this field. Until now. Recently, an innovative design engineer who's developed one of the world's most popular products created a completely new breakthrough... a personal electric vehicle. It's called the **Zinger**, and there is nothing out there quite like it.

*"I can now go places and do things that I wasn't able to go or do before. It has given me a new lease on life and I am so happy I found it!"*

*—Dana S., Texas*

The first thing you'll notice about the **Zinger** is its unique look. It doesn't look like a scooter. It's sleek, lightweight yet durable frame is made with aircraft grade aluminum. It weighs only 47.2 lbs but can handle a passenger that's up to 275 lbs! It features one-touch folding and unfolding—when folded it can be wheeled around like a suitcase and fits easily into a backseat or trunk. Then, there are the steering levers. They enable the **Zinger** to move forward, backward, turn on a dime and even pull right up to a table or desk. With its compact yet powerful



Available in Green,  
Black and Blue (shown)



The Zinger folds to a mere 10 inches.

motor it can go up to 6 miles an hour and its rechargeable battery

can go up to 8 miles on a single charge. With its low center of gravity and inflatable tires it can handle rugged terrain and is virtually tip-proof. Think about it, you can take your **Zinger** almost anywhere, so you don't have to let mobility issues rule your life. You can even gate check it at the airport like a stroller.

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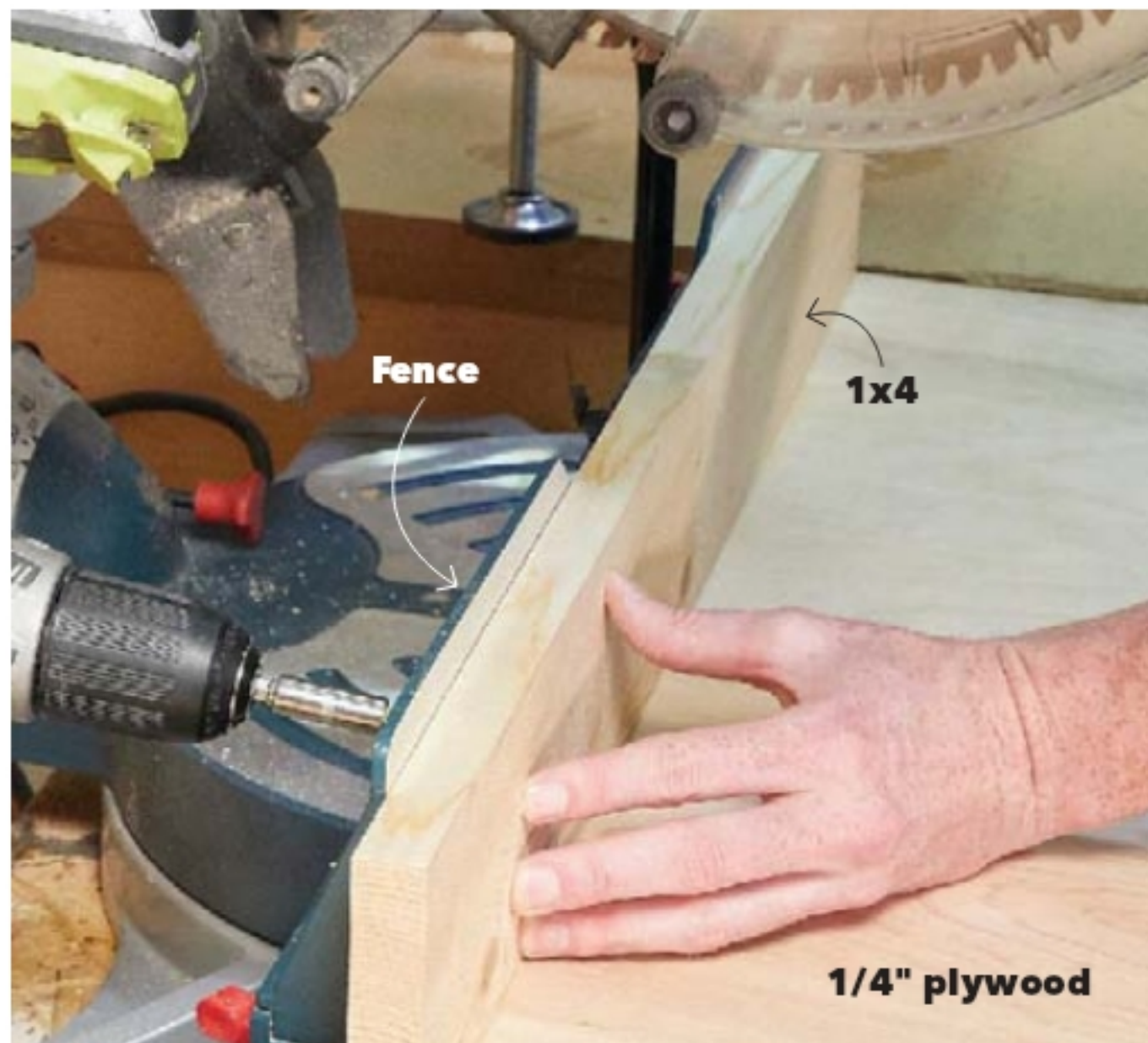




## DEFUZZ YOUR ROLLER

New roller covers have lint on them that will end up on your wall when you start to paint. To avoid this, roll the cover over a strip of tape before painting.

**MATT HAUSER**



## SAFER SAW FENCE

Cutting small parts on a miter saw is dangerous. There's typically a wide gap between the fence halves and another in the throat plate. Without full support for the workpiece, small offcuts can (and will) go airborne. To solve this problem, attach a sacrificial fence.

Make the fence by gluing and nailing a length of 1x4 to a piece of 1/4-in. plywood. Attach the 1x4 to your saw's fence. Miter saw fences usually have holes predrilled, but if yours doesn't, just drill a few. Two holes on each fence section is sufficient. The fence greatly increases safety and makes it super easy to get accurate cuts. After you've made one cut, the kerf tells you exactly where your saw will cut. Just mark a cutting line on your workpiece and line it up with the kerf.

**BRAD HOLDEN**

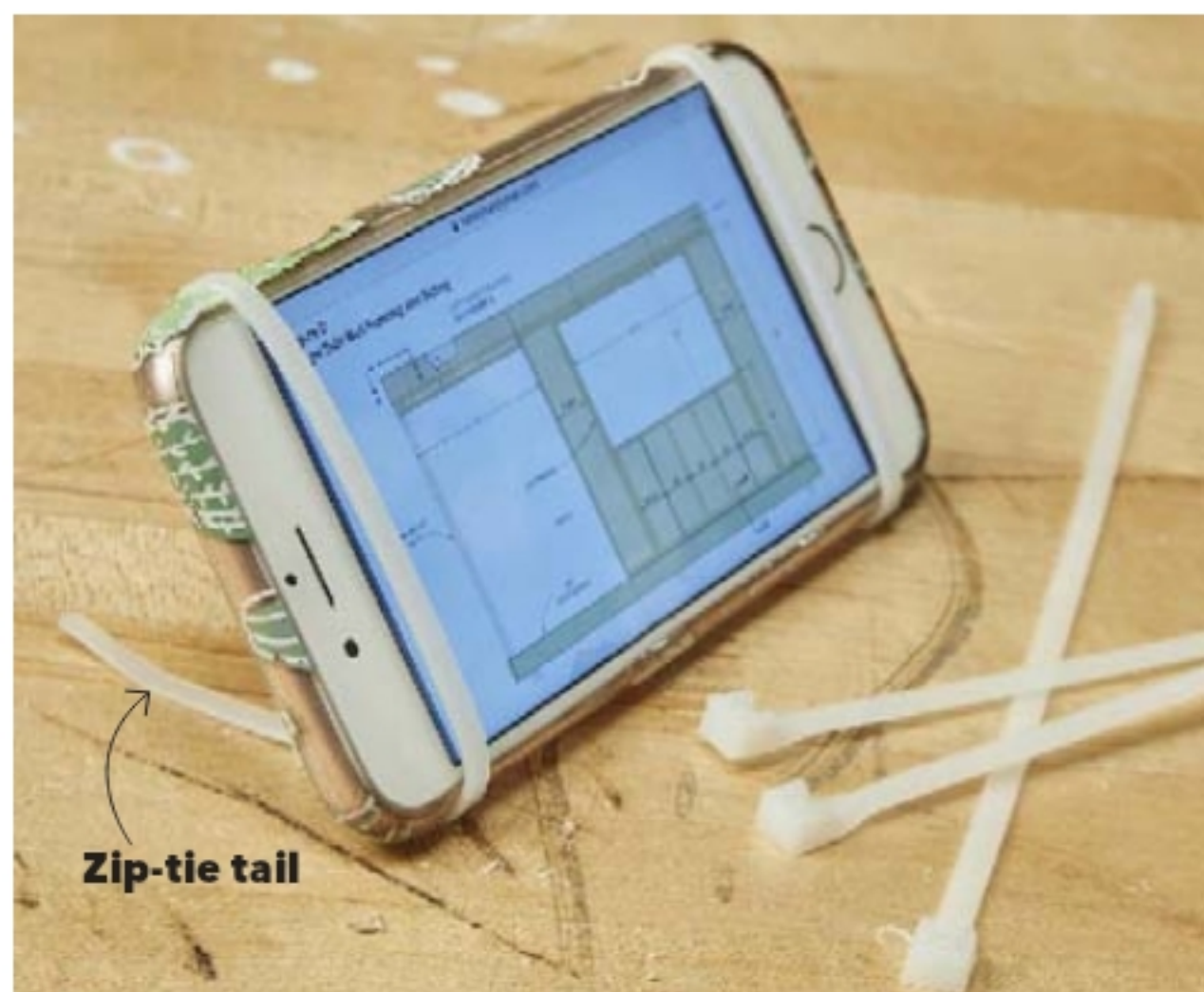


## LESS-MESS FOOD FUNNEL

Avoid spilling food after chopping by funneling it through the handle of the cutting board into the bowl. Just set the handle hole over the bowl and scrape the food into the hole.

**MELANIE KLUZ**





## INSTANT PHONE STAND

Need to prop up your phone to watch a video or look at project plans? A couple of zip ties are all you need. Secure one zip tie around each end of your phone, using the excess "tail" to keep the phone upright.

**ERNIE COYLE**



## EASY STICKER REMOVAL

My son plastered his bedroom furniture with stickers. Once he moved out, I turned his bedroom into the guest room. To remove the stickers, I softened the adhesive with a blow dryer and scraped them off with a plastic putty knife.

**STEVE WINTER**



## Paint Preservers

Save leftover paint in mason jars for future touch-ups. A well-sealed jar keeps the paint usable longer than the can does, and it's easier to store. Label the jar with the room the paint was used in.

**BERIT THORKELSON**





### DUST CATCHER

Drilling holes in drywall is messy. The dust floats all over and is a pain to clean up. To contain the dust when you're drilling into a ceiling, poke the shaft of the drill bit through a box before chucking it into your drill.

**TONY RISBERG**



### Measuring Tape Notes

I never seemed to have a notepad handy when I needed to jot down a measurement. So I turned my tape measure into a notepad. I peeled off the label and removed the residue with mineral spirits. Then I roughened the plastic face with 220-grit sandpaper. If you use a pencil, the sanded surface is easy to both write on and erase.

**JAMAL YUSSUF**



### EFFORTLESS WRINKLE REMOVAL

Don't like ironing? Or often forget to take your clothes out of the dryer? No problem! To remove the wrinkles, throw a few ice cubes or a wet washcloth in with your dry clothes and run the dryer again for about 10 minutes. The added dampness steams out the wrinkles without effort on your part. This trick is most effective on lighter-weight fabrics.

**JIM DUOOS**



### NO MORE LOOSE SCREWS

The tiny screws in my glasses used to back themselves out over time. I didn't have a thread-locking product, so I decided to try clear nail polish instead. Worked like a charm!

**SARAH HYSER**



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# homeLAB

A TESTING ZONE FOR *INNOVATIONS*

## 5 AMAZON ECHO SECURITY FEATURES, TESTED

BY JASON INGOLFSLAND

**F**rom monitoring the weather to controlling your smart home, Amazon Echo has hundreds of different skills. One that piqued my interest is Alexa Guard, a home security feature built right into the speaker. Say “Alexa, I’m leaving” to your Amazon Echo and it will activate guard mode, listening for breaking glass and smoke and carbon monoxide alarms. Upon detection, it will activate lights and integrate with select security systems, like ADT. You can even have your Amazon Echo make guard dog sounds to deter intruders. These seemed like handy security features, but I really wanted to test them in homeLAB and see if they held up to scrutiny. Here’s what I found.







## Breaking Glass Detection

Amazon Echo claims to be able to hear breaking glass. Presumably, if someone broke glass to enter your house, your Amazon Echo would hear it and send a notification to your phone. That sounds like a great feature, but does it really work?

In the homeLAB, I activated Amazon Echo's guard mode and smashed small pieces of glass before shattering much larger pieces. I was roughly 3 ft. away from the Echo, and yet, no matter how much glass I broke, it didn't detect anything. I tried to make the glass breaking sounds louder, but that didn't work, either. Eventually, I put shards of glass in a bag and shook it rapidly. Still nothing. In fact, the only way I could get the Echo to recognize breaking glass was to play glass-breaking sound effects on my smartphone.

## Security System Sync

Amazon Echo works with ADT Pulse, ADT Control and the Ring Alarm security systems. With ADT, Alexa guard mode will arm the security system and also send audio clips of a disturbance, like a triggered smoke alarm, to ADT's monitoring agents to review and verify whether emergency services should be called.

I wasn't able to test this with ADT, but I connected the homeLAB's Ring doorbell to the Echo for some tests. The first time I walked in front of the Ring doorbell, its sensor told Alexa someone had come by, which then sent a notification to my tablet. Subsequent tests, however, weren't as successful; the Ring sensor only notified Alexa about half the time that motion was detected.

## Barking Dog Sounds

Amazon Echo can learn "skills," which are small programs you can download from your Alexa app. Several promise to deter burglars by making the sounds of dogs barking. I used a few of these skills. While none were very realistic, one called "Burglar Deterrent" had the most convincing bark, playing a variety of barking sounds rather than a rhythmic loop. But the noise level will be affected by both the Echo's distance from the intruder's possible entry point and the Echo's volume setting. Even if it's loud enough, I wasn't convinced this would scare off an intruder. Of course, it doesn't hurt to use it, and if anything, you might scare off those pesky relatives who like to stop by.

## "Away" Lighting

With smart lightbulbs, the Echo will turn your lights off and on while in guard mode. It uses machine learning and your zip code to know when to turn on your lights while you're away, making it look like you're home.

I tested this in the homeLAB using Philips Hue smart lights. When I told the Echo I was leaving, it turned on the lights. When I came back later, the smart lights had turned off. This feature works more conveniently than any automatic lighting timer.

## Smoke or Carbon Monoxide Alarm Detection

Amazon Echo can send a notification to your phone if it hears smoke or carbon monoxide alarms. I first tested a smoke alarm about a foot away from the Echo. Within roughly five seconds, it detected the sound and sent a notification and included a sound clip in the Alexa app. I did several tests, each time moving roughly 10 ft. away from Echo to see how far it could hear the alarm. The Echo passed every test, hearing the slightest chirp from 65 ft. away and immediately sending a notification to my tablet. This is an awesome feature!







## One-Coat Paint Test

**F**ew people want to mess around applying more than one coat of paint, but more often than not, you need to put on that second coat. Several paint brands, however, have high-end products that claim one-coat coverage. It seemed to us a little too good to be true, so we bought a gallon of Behr Marquee (\$38), Sherwin-Williams Infinity (\$44) and Benjamin Moore Aura (\$72) to see how well they covered in one coat.

### How we tested them

We painted the entire wall gray, but to see how the one-coat performs on darker and lighter paints, we also painted three white and black squares. We used a roller with a 3/8-in. nap for each paint.

### Coat thickness makes a difference

How much paint you apply with your first roll makes a big difference. At first, we used a light amount of paint to test the one-coat claim and realized that for one-coat coverage, the coat needs to be a thick one. And it's also important to consider other factors, like color, shade, quality and the roller you use.

### One-coat paint is pretty great

We were impressed by how well the one-coat paint in the color we chose covered the black and white squares. The paints differed subtly, but all three brands covered the white and black squares well. We liked Benjamin Moore Aura for its ease of application, but they all completely covered the underlying color in one coat.



**Sherwin-Williams Infinity**



**Benjamin Moore Aura**



**Behr Marquee**







## Marvin Windows Lock Status Sensor

With most windows, security systems require you to install sensors to detect motion, letting you know if they're open or closed. Marvin Windows bypasses this problem with its "Lock Status Sensor" built into their windows, giving it a cleaner look. They work with an existing or new security system through a wired or wireless connection.

We installed these windows in the homeLAB and connected them to our security system panel. We loved how seamlessly our security panel told us when the windows were opened. Prices start at about \$2,500. To find a local dealer, go to [marvin.com/find-a-dealer](http://marvin.com/find-a-dealer).

## Smart Bridges

**W**e've installed several smart home products in the homeLAB and one thing quickly has become clear: Smart home bridges—small electronic boxes that connect your smart device to your Wi-Fi and smart assistant—are a nuisance and will quickly clutter your home. From the Philips Hue lightbulbs bridge to the Wemo bridge to the bridge that connects to our smart ceiling fan, these small plastic boxes stack up fast. Several don't install or program easily, or work nicely with a smart assistant. So what's the deal? Do you need these things?

### *How they work*

Some smart devices, like a smart ceiling fan, aren't designed to work directly with your home network. The bridges act as an intermediary, providing a path between your smart device, your Wi-Fi and your smart home assistant, like the Amazon Echo.

### *Bridge or hub?*

Not all smart products call them bridges; some might call them "hubs," muddying the waters. Whether a smart home device includes a bridge or a hub, know that they're the same thing.

### *Avoid bridges if you can*

Since many alternative smart home devices don't require bridges, it's best to avoid bridges so you won't clutter your house or get stuck with one brand. If you're concerned about Wi-Fi dead spots and too many devices slowing down your Wi-Fi, consider installing a mesh network (see p. 72).



**Amazon Echo or other smart assistant**



**Philips Hue Bridge connected to Wi-Fi**



**Philips Hue Smart Light**

**A BRIDGE** is simply a go-between for your smart device and your home network.





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# LED Lightbulb Brightness Test

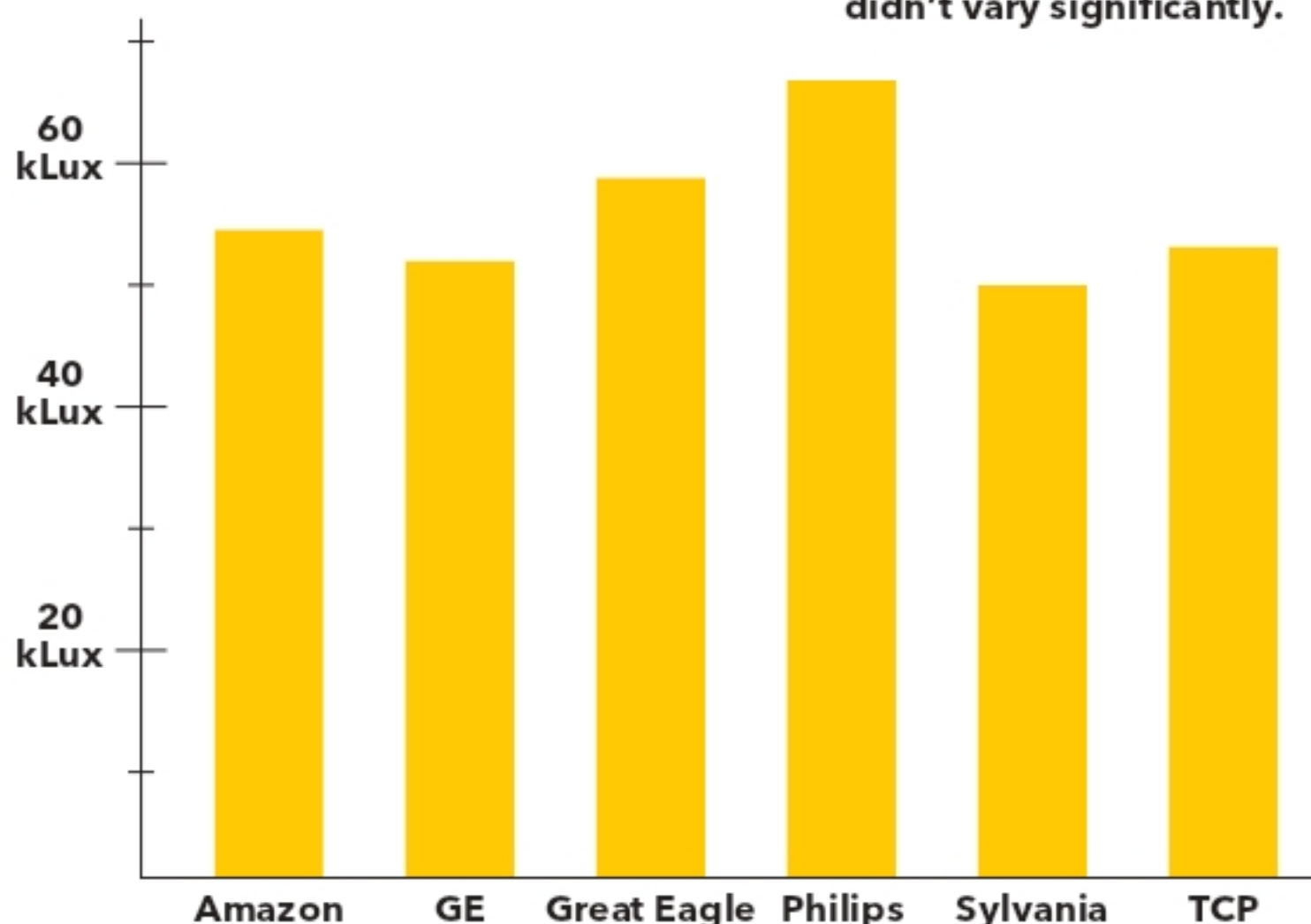
We had two theories about LED lightbulbs: that some bulbs with the same lumen rating are brighter than others, and that some fade very quickly. So, we bought six 800-lumen bulbs online and put them to the test by measuring their brightness over one month of constant use.

## Not all bulbs shine equally

As expected, some of the lightbulbs burned brighter than the others right out of the box, with the Philips (\$12 for a four-pack) being brightest. But our second theory didn't pan out. None of the bulbs dimmed significantly—at least not in their first 750 hours of use. We'll continue to monitor them over the coming months.

## BULB BRIGHTNESS

These readings were taken immediately after installing the bulbs. Later readings didn't vary significantly.



### HOW WE TESTED THEM

We inserted six 800-lumen LED lightbulbs into a light bar. We left them on all day and night and tested their brightness by placing the light meter against each bulb.



# AHEAD OF THE CURVE



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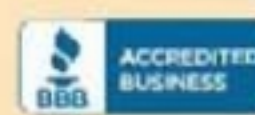
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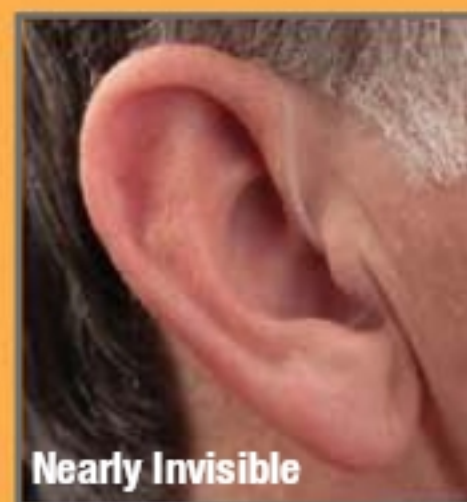
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# DIY CURB APPEAL



**M**ike and Steph Berner are busy people. Aside from full-time jobs, they have two preschool kids, a baby on the way and a new home. It's a good house—no serious problems. But like most older homes, it needed updates, especially for curb appeal. Since Mike is an editor at *Family Handyman*, the whole crew saw an opportunity to get outside and show what we can do. On the following pages, you can see the projects that made Mike and Steph's house look better than new.

MAKE  
YOUR ROOF  
LOOK LIKE  
NEW  
P. 50

REPLACE  
YOUR OWN  
WINDOWS  
AND SAVE  
P. 32

CUSTOM  
SHUTTERS  
THAT COST  
LESS  
P. 59

A BOLD,  
UPDATED  
FRONT  
DOOR  
P. 38

LANDSCAPE  
LIKE A PRO  
P. 54

BEAUTIFUL  
OVERLAY  
FOR BLAND  
CONCRETE  
P. 44

BEFORE!

AFTER!



# A NEW WINDOW IN ONE DAY

It can be intimidating, but replacing a window is just a series of simple steps

BY MIKE BERNER

**T**he kitchen in our new house featured a garden window that was stealing useful cabinet and countertop space. We didn't like its exterior look either, and ultimately my wife, Steph, decided to take the lead on replacing it. Doing it herself saved our family about \$1,200, and with my help she got it done in just a day. At first she thought she was biting off more than she could chew, but she quickly realized that—like most carpentry jobs—window replacement is just a matter of following simple steps. Here's how to do it:





## WHERE TO START

Before you can shop for a new window, you need to know the size of the “rough opening,” the framed opening the window jamb sits inside. So your first step is to remove the window’s trim on the inside of the house and measure the opening.

You could take those measurements to a lumberyard or home center and order a custom window or a replacement window that fits inside the existing window jamb. But we went with a simple stock window, one that was available on a shelf at the home center.

With a stock window, we were limited by size and style options, but for us, that wasn’t a problem. We wanted a smaller window for space to install more counter-tops and cabinets when we remodel the kitchen. There’s some extra work involved in adjusting the opening, but we took this path for a few reasons:

■ **Save Money:** We found a good-quality window for \$200. A similar custom-sized window would have cost us twice as much.

■ **Save Time:** The last time I ordered custom-sized windows, it took six weeks to get my hands on them. We chose our window, took it home and got to work, all on the same day.

## WHAT IT TAKES

| TIME  | COST  | SKILL LEVEL  |
|-------|-------|--------------|
| 1 day | \$350 | Intermediate |

### TOOLS

Standard carpentry tools, circular saw, miter saw, drill/driver, J-roller

### MATERIALS

Window, sheathing, Z-flashing, nails, caulk, cedar lap siding, flashing tape, flexible flashing tape, shims, tar paper, 2x4s, coated construction screws, roofing nails





1



2

## 1 REMOVE THE TRIM

Cut the caulk around the trim and the window. Pry the trim away from the window and the siding. Remove the trim from the inside of the house as well.

## 2 PULL OUT THE OLD WINDOW

Remove the screws or nails that hold the window in the opening. If the window still doesn't budge, there may be foam, more caulk or hidden screws keeping it in place. Work a reciprocating saw blade between the window and the framing and cut around the window, then wiggle the window out of the opening.

## 3 FRAME THE NEW ROUGH OPENING

The new rough opening needs to be 1 in. wider and 1 in. taller than the new window. That allows space for leveling the window and insulating around it. We first raised and leveled the sill and added cripple studs. Then we added trimmer studs to make the rough opening the size we needed. Make sure the trimmers are plumb and there's enough blocking for sheathing.

## 4 PATCH IN THE SHEATHING

Cover the framing with exterior-rated plywood or OSB. Our job required only a 2 x 4-ft. sheet of 3/4-in. CDX plywood. Steph cut it to size and screwed it into the framing with 2-in. coated screws. Then she capped the sill by nailing on a piece of cedar siding (**Photo 5**), giving it an outward slope. If any water gets in, the slope will send it back out.



3

Trimmer  
Blocking

1" wider  
than window

1" taller  
than  
window

Sill

Cripple



4

Sheathing





## 5 TUCK IN TAR PAPER

We used tar paper as a water-resistant barrier (WRB). Newer houses might have house wrap material, which will work the same way. Start at the bottom and overlap the existing WRB. Then cover the sides, followed by the top, always overlapping the previous layer and tucking the WRB underneath the siding as best you can.

## 6 FORM THE WINDOW PAN

The window pan protects wood from any water that might enter around the window. Cut flexible flashing tape 12 in. wider than the window opening, peel off the backing and lay the tape on the sill without stretching it. Starting from the middle, press the tape into the corners then up the sides. Fold it over the sill and stretch the tape around the corner. Many window installers don't cover the side or top corners with flashing tape, but I always add the extra layer of protection. I wrap 4-in.-wide flashing tape over the side corners, then the top. When all the tape is on, roll over it with a J-roller.



## 7 APPLY SEALANT TO THE WINDOW

To make the connection watertight, apply a continuous bead of sealant along the side and top flanges. Be sure the bead goes right over the nail holes; penetrations through the tape must be sealed well. Don't seal the bottom flange; if water gets in, it must have a way out.







## 8 PLACE THE WINDOW

Rest the bottom of the window on the sill, then tilt the window up and into place. You'll need a helper waiting inside to center the window. Next, the helper will raise the window with a few shims and adjust them to make sure the bottom of the window is level. When it's level and centered, drive a nail in the very bottom hole on each side flange.

## 9 PLUMB AND SQUARE THE WINDOW

Hold the window in place with a few sets of shims on both sides of the window, a pair that holds the top and one toward the bottom. Adjust the shims so the sides of the window are plumb. Once the bottom is level and the sides are plumb, drive a nail into the top hole of each side flange. The real test is how the window operates; don't nail it off until it operates smoothly.



## 10 NAIL THE FLANGE

When you've centered the window and it's level and plumb and operates smoothly, drive nails in all the holes on the top and sides. Don't nail the bottom flange. Then install the drip cap that came with the window.





## 11 COVER NAIL PENETRATIONS

As an added measure against water intrusion, cover nails in the flange with flashing tape. Start with the sides and extend the tape a few inches past the bottom and top nail flanges. Then cover the top flange, making sure it overlaps the tape covering the sides.

## 12 INSTALL Z-FLASHING AND TRIM

Install Z-flashing above the top piece of trim. It should be cut to the same length and tucked under the water-resistant barrier (tar paper or house wrap) and will shed water over the trim. Then install the trim using coated trim screws.

## 13 REPLACE THE SIDING

Our siding is double-course cedar shakes, which we were able to match easily. Caulk around the window and trim using a high-quality exterior sealant. Then paint the siding.





# FRONT ENTRY FACE-LIFT

Update your front door  
the easy way

BY MIKE BERNER

**T**he usual way to replace a door is to tear out the old jamb and install a new “prehung” door. Often that’s a good way to go. But in my older house, that would have meant ordering a custom jamb width, fussing with tricky interior trim for hours and cutting back the hardwood flooring. So I chose to put a new door in the old jamb. This did require some extra work; I had to move hinges and strike plates for the latch and dead bolt. But I still think it was faster and easier.

You can skip those steps if you’re lucky when you hang your new door and the new hardware locations match the old. I’ll show you how to change out a door slab and trim and how to solve problems along the way.



To complete the new look, we replaced the dated light fixture, house numbers and mailbox with modern matte black options.



## 4 things to know before you buy a door

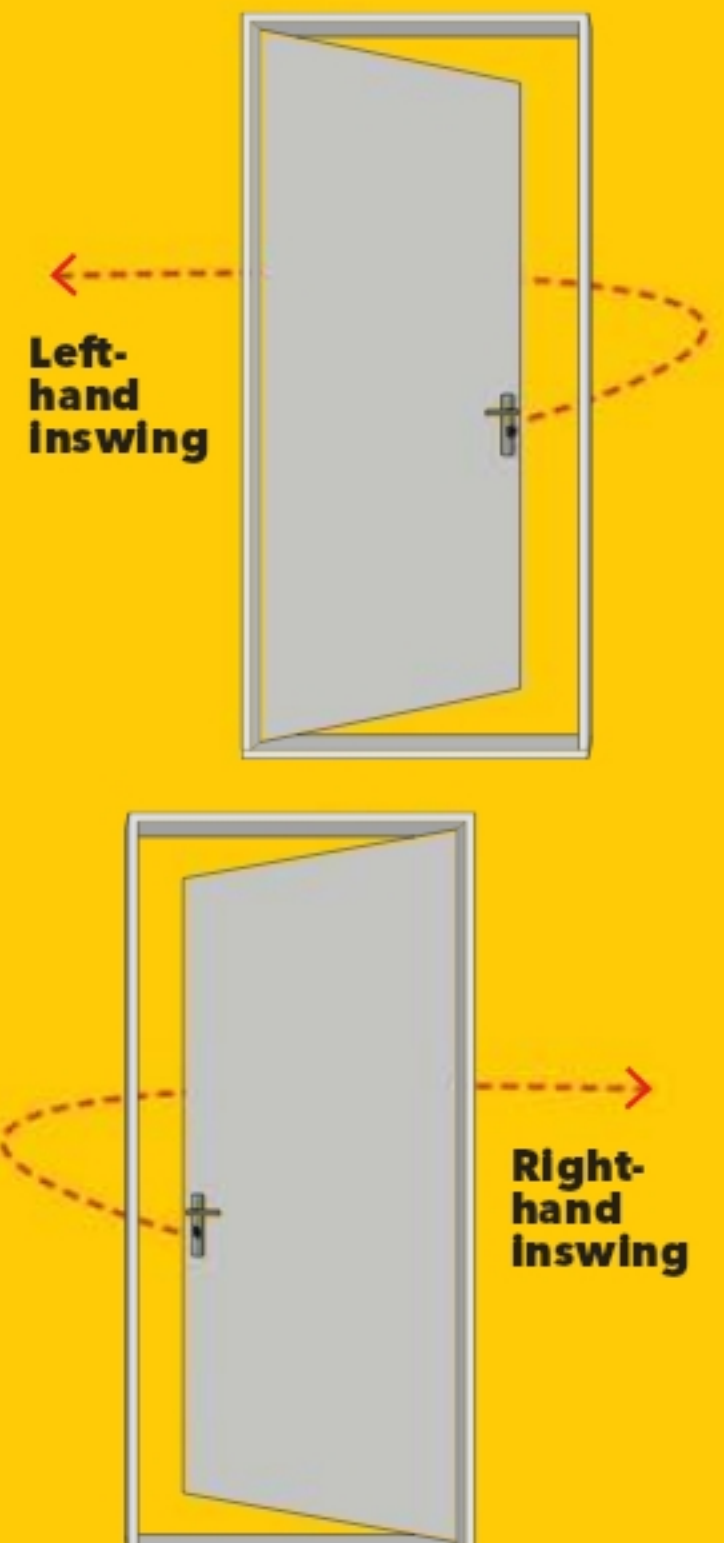
Purchasing a door isn't an open-and-shut decision; there are many things to consider before opening your wallet. Here's how I break it down:

**1** Most doors are sold "pre-hung," which means they come attached to a doorjamb. The hinges are installed and the dead bolt/latch holes are bored. Because pre-hung doors are readily available, it might be easiest to buy one and scrap the jamb.

**2** Less common are slab-only doors. They require boring holes for hardware and cutting mortises for new hinges.

**3** Measure your existing door—height, width and thickness—and buy one to match.

**4** Door swing is important. Most doors swing inward; a left-hand inswing door has hinges on the left and opens to the left. A right-hand inswing door has hinges on the right and opens to the right.







## 1 REMOVE THE OLD DOOR

Unscrew the hinges from both the new door and the existing door, then set the new door in place to find out if the strike plates and hinges line up with the old ones. If they do, screw the hinges into the jamb and consider yourself lucky—and skip to **Photo 6**. If the new hinges don't line up, draw a line from the bottom hinge to the top that connects the back edges of the hinges. It will help you place the new hinges later.

## 2 PLUG THE HOLES

Glue pine blocks into the latch and dead bolt holes. When the glue sets, cut the blocks flush with a chisel. Glue thin strips of pine into the hinge mortises.



### WHAT IT TAKES

#### TIME

1 day

#### COST

\$350 and up

#### SKILL LEVEL

Intermediate

#### TOOLS

Drill, pry bar, oscillating tool, router plus a bit/sharp chisel, circular saw or miter saw

#### MATERIALS

All-purpose wood filler, two 8-ft. 1x2s (plugs plus jamb extensions), Z-flashing



### 3 FILL THE GAPS

Smooth over the plugs with auto body filler. The filler hardens fast; you can apply two coats if needed and sand it flat, all in about 30 minutes.

### 4 MARK THE HINGE LOCATIONS

Cut two blocks of scrap wood to the height of the threshold plus 1/8 in. Set the door onto the blocks and move the door into position. Make sure the new hinges are on the line you drew along the old hinges. Then temporarily attach the door with one screw in each hinge. Trace the hinges with a sharp pencil and remove the door. Trace the hinges with a sharp pencil and remove the door.

### 5 CUT MORTISES

Follow the traced line with a utility blade, making this cut as deep as the hinge is thick. Then, with a chisel at the edge of the jamb, establish the depth of the mortise and work your way from the top down. Cut with the bevel of the chisel down to keep the blade from digging in. When you reach the knife line, the chips should fall away. Hinge-mortising router jigs make this job easy and fast, but if I have only one door to do, I cut the mortises by hand.







6



## 6 INSTALL THE DOOR AND ADJUST THE THRESHOLD

Place the door back on the blocks, predrill and screw the hinges in the new mortises. To make the fit airtight, turn the adjustment screws to move the threshold up or down. You want the door sweep to be pinched slightly when the door is closed.

## 7 LINE UP THE DEAD BOLT AND LATCH

Use chalk or lipstick to coat the ends of the dead bolt and door latch. Retract the dead bolt and latch as you close the door all the way, then turn the handles to let them contact the jamb. Use a 7/8-in. Forstner bit to drill holes where the latch and dead bolt touched the jamb. Place the strike plate over the hole and trace and cut mortises as you did for the hinges.

## 8 REMOVE THE OLD TRIM

Cut any caulking between the trim and the siding with a utility knife. Otherwise, you might lift the siding as you pull off the trim. Take care to not dent the doorjamb as you pry the trim away.



8

## UPGRADE YOUR TRIM

One advantage of putting a new door in an existing jamb is that you don't have to fuss with the trim. But, I didn't think the old brickmold trim fit the sleek style of the new door. So I replaced the old trim with Boral TruExterior trim (see p. 14). Here's how I did it.





## 9 CUT THE SIDING

If your new trim is wider than the old, you'll need to cut back the siding. I used 3-1/2-in.-wide trim and wanted a 1/4-in. reveal on the doorjamb as well as some wiggle room for caulking, so I traced a line 3-7/8 in. in from the doorjamb. An oscillating tool worked well to cut my cedar shake siding.

## 10 INSTALL NEW TRIM

Cut a length of Z-flashing 1/4 in. wider than the top piece of trim. Tuck the flashing under the existing tar paper or house wrap. The sheathing on my house was about 1/4 in. proud of the jamb, so I cut a 1/4-in. jamb extension to let the trim sit flat. I tacked the extension 1/8 in. from the edge of the jamb.

## 11 FASTEN THE TRIM

Screw the trim to the sheathing and doorjamb with trim-head screws every 24 in. Since my trim is wider than the sill, I cut a notch around the sill. To finish up, caulk along the siding, fill the screw holes and paint.





# SIDEWALK TRANSFORMATION

The look of stone—  
without the extra  
labor or expense



#### MEET THE EXPERT

Doug Kraushaar, owner of StampCrete MN, has been selling products, as well as supporting and training customers in the decorative concrete business for 15 years.





## BY BRAD HOLDEN

**T**his sidewalk was just your basic concrete—in pretty good shape but with zero curb appeal. To change that, I considered tile, stone and even complete replacement. Then I discovered “overlay,” a cement-based topping for existing concrete. It’s used mostly by pros, but I found a supplier who provided materials and rental tools and encouraged me to do it myself. I’m glad I did! With a helper, it’s a manageable process, and the total cost was about \$800, less than one-fifth of the pro bid I got.

### Prep your sidewalk

Old sidewalks are seldom perfect, but this one was in decent shape, without any cracks. If yours has cracks, you’ll need to properly repair them before applying an overlay. If you don’t, those cracks will promptly transfer to your new overlay. If your sidewalk has some heaves or uneven sections, you’ll need to grind them reasonably level before applying an overlay. In this case, I just needed to thoroughly clean the sidewalk. This included edging it to remove any overgrowth, sweeping off debris and pressure-washing with a degreasing detergent.

**STAMPABLE OVERLAY** is a high-strength polymer-modified cement.

**BOND COAT** is an acrylic primer that helps the overlay stick to the old concrete.

**LIQUID RELEASE** is typically a petroleum-based liquid that helps prevent stamps from sticking to the overlay.

#### SLED-STYLE GAUGE RAKE

This rake lets you skip filling control joints but leaves larger tracks to smooth out.

#### CAM-STYLE GAUGE RAKE

Small cams on the ends of this rake leave a relatively track-free surface, but the cams will dip into the control joints if they’re not filled.



### WHAT IT TAKES

| TIME   | COST                       | SKILL LEVEL  |
|--------|----------------------------|--------------|
| 3 days | \$3 to \$4 per square foot | Intermediate |

**TOOLS** Pressure washer, heavy-duty drill, squeegee, gauge rake, concrete stamps, brick jointer, grout line roller

#### STAMPING MATS

We used three flexible stamping mats with an ashlar pattern, and a thinner, more flexible texture mat. The texture mat has no grout lines, so it works well for vertical surfaces and applying texture in areas where the standard stamps don’t go quite deep enough. Some home centers stock them, or you can rent them from a local rental center.





## 1 FILL THE JOINTS

Fill the control joints to create a flat surface for the gauge rake to follow (Photo 1). Otherwise you'll end up with dips in the overlay. The concrete mix I had on hand filled the joints, but mortar mix would have been easier to work with. I marked the joint locations with garden tags so I could recut them later (see Photo 2 inset).

## 2 PRIME THE CONCRETE

For a strong bond, the overlay requires a special primer that must be covered with overlay within two hours. At first, my helper and I primed only a few feet of sidewalk. But after mixing and pouring our first bag of overlay, we realized we'd be able to move pretty quickly, so we primed the whole sidewalk.

## 3 ADD COLOR

We wanted to darken our overlay a little, so we added powdered pigment to the water and thoroughly mixed it before adding the overlay mix.

## 4 MIX THE OVERLAY

Thorough mixing is a must. Use a heavy-duty corded drill with a 1/2-in. chuck and a mixing paddle. If you don't have a heavy-duty drill, get one. (I burned up a standard drill while mixing this stuff!) With the Brickform product, after initial mixing, allow it to set, or "slake," for three to five minutes, and then mix again.







**5 SPREAD THE OVERLAY** Pour the overlay onto the primed surface. This product required a thickness of  $\frac{3}{8}$  in., so I used a gauge rake in order to get a consistent depth. A gauge rake has an adjustable cam or foot on each end, allowing you to set the depth you need. Rake carefully, pulling and pushing the product for even coverage. Don't let the cams slip off the edge of the sidewalk.

**6 SMOOTH THE OVERLAY** After raking, smooth the overlay with a standard floor squeegee. At first I found the squeegee a little difficult to control because the edge wanted to dig into the overlay. But I got better with practice!

**7 COAT THE STAMPS** Spray each stamp with a liquid release to keep the overlay from sticking to the stamp. We used a garden pump sprayer, which proved easier than a trigger-type spray bottle.

**8 STAMP THE OVERLAY** Set each stamp down carefully, the whole stamp at once. Don't slide them, drag them or set one corner down first. Walk on each stamp to ensure a full, deep texture. If necessary, use a tamping tool to force the stamp down. Don't use a cast iron tamper, though. The hard edges can dent the texture. Instead, use a soft-faced tamper.







## 9 LIFT THE STAMPS

After a stamp is fully imprinted, set the next stamp and then lift the previous one. When you lift a stamp, lift straight upward so you don't mess up the texture.

## 10 TOOL GROUT LINES

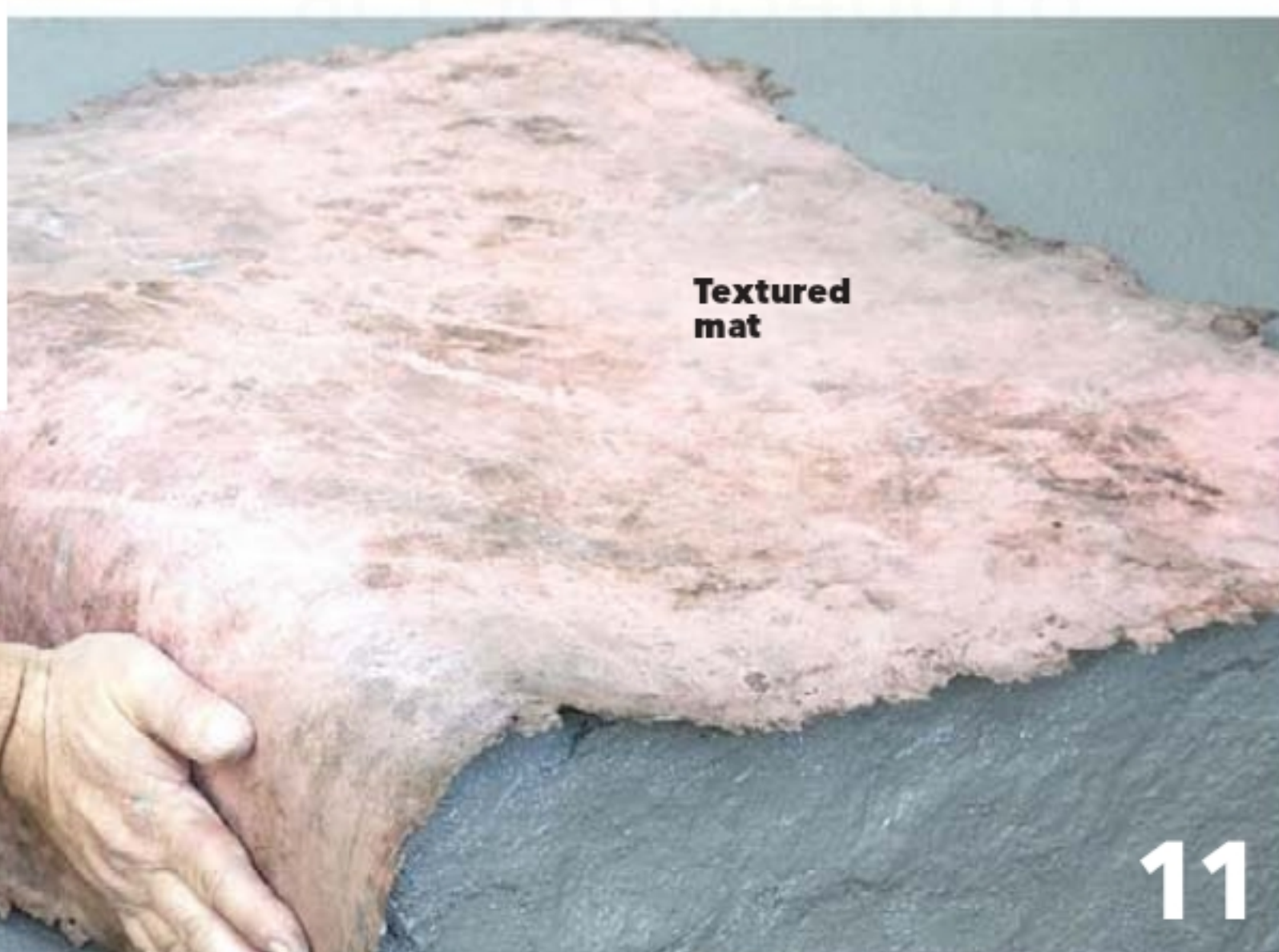
After lifting the stamps, you may have to tidy up some grout lines. A roller tool like the one shown works well for this; it creates the grout lines and adds texture to the edge of the stamped area.

## 11 TEXTURE VERTICAL SURFACES

We applied the overlay to the steps as well. The horizontal surfaces are done exactly like the sidewalk. For vertical surfaces, we applied a thinner overlay—about 1/4 in. thick—and then used a texture mat to stamp them. This flexible mat also proved indispensable for getting texture right up to the house.

## 12 GET UP CLOSE

We used stamps to get as close as possible to the house, but where we had to use the texture mat, we added the grout lines using a brick-jointing tool.



Textured mat







## 13 RECUT CONTROL JOINTS

Once the overlay has hardened, mark and recut the control joints. **Caution:** As we were stamping, a couple of our stamps didn't come out perfectly square with the control joints. So, when we recut those, we cheated them a little bit to keep the cuts square with the pattern. One of those cracked at the original control joint within a week. So, as you're applying the stamps, take care to keep the pattern square with the control joints.

## 14 APPLY STAIN

Mix the concentrated stain with water in a gallon jug, and then apply it using a hand sprayer. Apply generously, allowing the stain to pool in the low spots. Those pooled areas end up darker, giving a more natural stone look.

## 15 SEAL IT AND YOU'RE DONE!

When the stain is completely dry, use a paint roller to seal the overlay. Unlike applying the stain, don't allow the sealer to puddle, because it won't cure properly. We used a brush to fully coat the grout lines and also on the stoop to get up close to the house.





# *Roof Stain* SOLUTIONS

**Remove and prevent ugly roof algae**

BY JASON INGOLFSLAND

**R**oof stains make any house stand out—but not in a good way. Luckily, these stains aren't inevitable as a roof ages. They're caused by algae growth in humid, shaded areas, usually with lots of tree cover. While algae won't damage your roof, it will hurt your home's curb appeal.

Fortunately, it's easy and inexpensive to remove and prevent stubborn algae stains yourself. Here's how to clean your roof and make your home stand out in the best way.



## HOW TO REMOVE ROOF STAINS

To see an immediate improvement, you'll need to climb onto your roof, spray it with a cleaning solution and rinse with water. A cleaning solution and water will remove most algae stains right away, but some can be especially difficult. If you have a steep roof, it's best to call a pro. Here's how I cleaned my roof.

### 1. MIX A HOMEMADE SOLUTION

To save money, I opted to make my own solution. Commercial roof cleaners are available at most home centers, but they're expensive and won't work any better than a homemade solution. Plus, it's easy to make your own. Mix 15 oz. of an oxygen bleach powder (I used OxiClean Stain Remover, available at home centers for about \$12) with 2 gallons of warm tap water in a garden sprayer. Don't use chlorinated bleach; it'll kill the lawn and plants on the ground below.

### 2. SPRAY THE SHINGLES

Once you're on the roof, start at the edge and spray the shingles with your homemade solution, working your way up to the ridge. A wet roof is a slippery roof, so leave a dry path back to your ladder. Allow the solution to sit for 20 minutes before rinsing. Tough stains may require an additional application and a mild scrubbing with a stiff-bristle brush.

### 3. RINSE WITH A GARDEN HOSE

After you've waited for the solution to do its work, douse the roof with a garden hose, clearing suds and algae off the shingles. You'll see a big improvement unless your stains are especially stubborn. Never use a pressure washer to clean the algae; the roof will be clean, but its life will be shortened by the loss of granules.



#### BE SAFE!

Climbing a roof is dangerous. Use a safety harness, wear boots or shoes with good traction and consider installing a slide guard. For more information, search "roof safety" at [familyhandyman.com](http://familyhandyman.com).



#### MEET THE EXPERT

Andy Lodge has been in the industry since 1981 and has worked on hundreds of roofing projects around the world. He is now a consultant for IKO Industries.





## HOW TO PREVENT ROOF STAINS

A great way to tackle your roof algae problem is to install zinc strip. Zinc is toxic to algae. When rainwater hits the zinc strip, zinc ions run down the shingles, killing algae. It's easy to install and inexpensive, and it does most of the cleaning work for you. You can find a 50-ft. roll of zinc strip at home centers or online for about \$35. Here's how to install it.



You'll often see clean streaks in the shingles below galvanized flashing. That's because the flashing works just like zinc strips: The zinc on the flashing combines with rainwater to kill the algae.



## WHERE TO INSTALL ZINC STRIP

Zinc strips work only on areas directly downhill. So if you have dormers, ungalvanized roof vents, valleys, roofs under gables or any other sections that could obstruct the flow of zinc, install zinc strip in those locations too.



## HOW TO INSTALL IT



### 1. SLIDE IT UNDER THE SHINGLES

Start at the beginning of the ridge and gently pry up the cap shingles with a crowbar. Roll out 2 ft. of zinc strip and slide it no more than 1 in. under the cap shingles.



### 2. FASTEN UNDER THE SHINGLE

Fasten with galvanized rubber washer nails under the shingles. You can also use an exterior construction adhesive. Continue to fasten the zinc strip every 12 in. until you've reached the end of the ridge and then clip it to length with scissors. I found cutting the zinc strip at the end saved time and kept it from flapping around in the wind.

## Zinc strip test

Zinc strip is often marketed as a moss, fungus and algae preventer, but not as a remover. However, expert home inspector Reuben Saltzman installed zinc strip on a moss-covered roof to see if it would remove the moss over time. As you can see in the before and after photos, it significantly reduced the moss and algae. So, if you don't mind waiting, you can skip the cleaning and let zinc strip do the job.



## Replace your roof with algae-resistant shingles

If you're in the market to reshingle your roof, consider installing algae-resistant shingles. They'll keep your roof looking great and cost about the same as standard shingles.



# Best Pro Tips

Expert advice from the job site. By Jason Ingolfsland

## LANDSCAPE DESIGN

12 easy ways to improve curb appeal

**I** recently purchased a new home, and improving the landscape is high on my to-do list. Landscape design, however, isn't always straightforward, and achieving a great look requires a little nuance. The stakes are also high: If you get it wrong, you might end up with dead plants and an ugly yard for all your hard work. Still, DIYers can save roughly 40 to 60 percent of the cost of a professional landscaper and dramatically boost their house's curb appeal. So, to get it right, I spoke with a landscaping expert, who shared these quick tips.



### MEET THE EXPERT

John Moe has 35 years of landscaping experience and serves on the certification committee at the Minnesota Nursery and Landscape Association.

PHOTO: COURTESY OF PROVEN WINNERS. PROVENWINNERS.COM BOTTOM: JOHN MOE



## DEVISE A MASTER PLAN

Most people tackle landscaping headfirst without thinking about the grand picture. Eventually, they end up with a jumble of plants that don't look right with the house or one another. Start with the end goal in mind for the best look. If you don't feel up to the design task, get help. A landscape architect will typically charge \$600 to \$3,500 to visit your home and create a plan; costs vary by the size of your property and the work to be done. Many garden centers offer free design services if you purchase the materials from them.

### LEAVE A PATH TO THE BACKYARD

If there's an addition or new patio in your future, leave a path for machinery. You don't want to tear out shrubs or a retaining wall later so a skid steer can reach the backyard.



## PLAN FOR ALL-SEASON COLOR

You want your plants to bloom throughout the growing season. When you're developing a plan, know the bloom time for each plant, and choose coordinating colors for plants blossoming at the same time. Design your landscape to highlight different plants during each season. It's fun to see individual plants have their day in the sunlight.

SPRING TO EARLY SUMMER BLOOMS

LATE SUMMER TO FALL BLOOMS



Ninebark  
"Tiny Wine"



Weigela  
"Spilled Wine"



Hosta  
"Stained Glass"



Hydrangea  
"Bobo"



Reblooming Lilac  
"Bloomerang"





### COMMON SHRUB MISTAKES

#### ■ PLANTING TOO CLOSE TO THE HOUSE

It's common for homeowners to plant large shrubs and other plants too close to their house's foundation and siding. Then the owner prunes them back and they eventually become half a plant. For a better look, plant shrubs farther away from the house and give them room to grow. A general rule is to take the plant's mature width and put it at least half that distance away from the house.

#### ■ LETTING THEM GROW UNCHECKED

Because shrubs are relatively low maintenance, they're easy to neglect. Overlooked for years, they grow out of control and hide the house, crowd doorways and look ugly. Drastic trimming or removing them might be the best and easiest thing you could do for your front yard.



### FOR DRAMA, CHOOSE WHITE AND YELLOW

Red and purple are vivid colors, but in a landscape, yellow and white flowers are the real attention grabbers. They stand out more against green foliage while others tend to disappear. So, if you want an eye-catching landscape, use yellow and white flowers.



### TEST YOUR SOIL

Good soil is the key to healthy plants. A simple test will tell you whether you need to add lime, nitrogen, phosphorus or potassium to the soil. Dig 6 in. and scoop samples from 5 to 10 areas in your yard and mix them in a bucket. You can purchase an at-home soil testing kit at most home centers, but for best results, send your soil sample to a state-certified soil-testing lab or university extension service. To find yours, enter "university extension service" and your state in a search engine. Testing fees are usually \$15 to \$20, and results take one to two weeks.

LEFT: VERN JOHNSON TOP RIGHT: SHUTTERSTOCK/PATARA





## MAP OUT YOUR COLORS

Our pro recommends repeating your chosen colors in different sections of your landscape. For example, if you use red at your walkway, use red at the side of your house as well. This technique gives your design continuity and balance. Remember, foliage is color too!

## IF YOU PLAN TO SELL, START PLANTING NOW

Improving your landscaping is a great way to boost the curb appeal—and selling price—of a home. But remember that most plants take time to get established and look their best. If you hope to sell in midsummer, get started in early spring, or better yet, the year before you plan to sell.

## DON'T PUT POLY UNDER WOOD MULCH

Putting poly under wood mulch prevents the decomposing mulch from enriching the soil. Instead, place a 4-in. layer of wood mulch on the soil to block sunlight from reaching it. Like poly, this prevents weeds. But unlike poly, it will naturally decompose, providing nutrients to your plants. You'll have to add mulch as needed.



## PREVENT WEEDS WITH MASS PLANTING

Weeds will pop up wherever light reaches the soil. To make your landscaping low maintenance, place plants tightly together so weeds can't get started.



## MIX UP TEXTURES

Plant texture refers to the size and shape of the leaves. Don't make the mistake of choosing all the same textures for your landscape; it's dull and monotonous. For an appealing landscape, use plants with varying leaf shapes and sizes.



## PLAN FOR GROWTH

Before buying a plant, check the tag for its mature size. Keep in mind that many plants grow larger than the tag indicates. Knowing the maximum size—and allowing a little extra—helps you avoid a crowded, overgrown look later.



## PLANT IN RANDOM PATTERNS

In a formal garden, you may see plants all lined up, but most residential landscapes look best with a more casual design like the one shown here. Planting in random or zigzag patterns provides good ground coverage with fewer plants, and these arrangements are visually interesting too.



# CUSTOM SHUTTERS

The size, style and color you want—for less than the cost of plastic shutters

BY JEFF GORTON

**M**y hunt for manufactured decorative shutters got me nowhere—I found only very limited selections of sizes, styles and colors. Then it occurred to me that it would be simpler and quicker to build my own. Cheaper, too. My DIY shutters cost less than most of the plastic versions I saw.



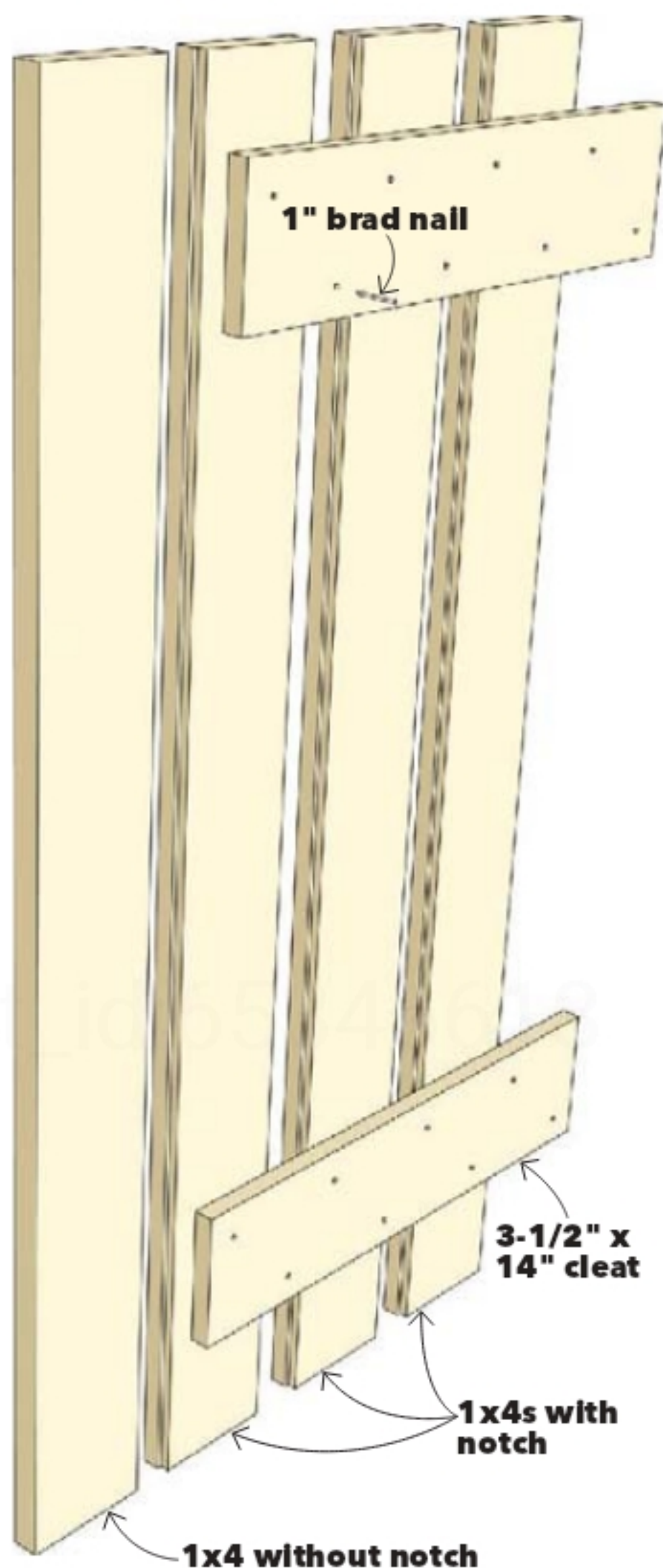
#### MEET THE EXPERT

Jeff Gorton is a carpenter, remodeler and former *Family Handyman* editor.



## Figure A Custom Shutter

EACH SHUTTER IS 14" WIDE.  
THE HEIGHT IS DETERMINED BY  
THE WINDOW HEIGHT.



My design is simple, just four 1x4 boards joined by a cleat. The details are what make the shutters special. I'll show you how to cut notches in the boards to create attractive shadow lines and how to reduce the thickness of the cleats for a refined appearance.

### Measure, then buy materials

Before going to the home center, measure your windows to determine the height of the shutters so you can figure out the length of boards you need. For the most authentic look, measure from the top of the window frame (not including the window trim) to the top of the windowsill and build your shutters this height. Use these measurements to make your lumber list. Each pair of shutters requires eight 1x4 boards and an additional 5 ft. of 1x4 for the cleats.

I chose Boral TruExterior trim boards for my shutters (see p. 14

for more information). Inexpensive pine boards would also be fine, but you'd have to be vigilant about repainting them in the future. Any moisture entering the wood would quickly lead to rot. If you prefer a rustic look, cedar with a transparent or semitransparent stain would be a good choice. Whatever you choose, be careful to pick out straight boards with undamaged edges.

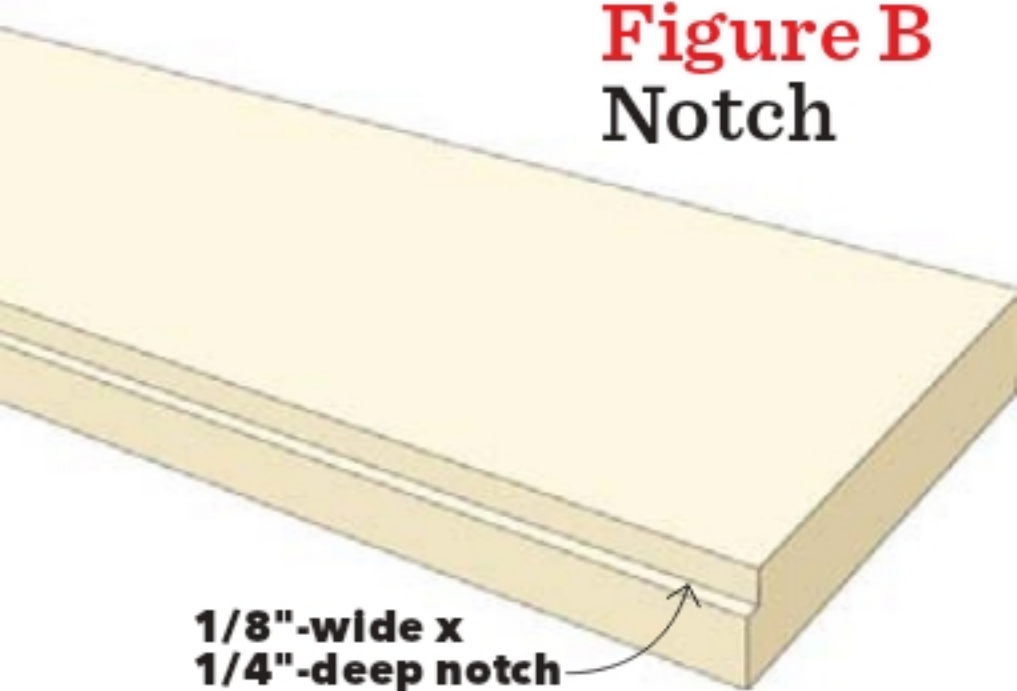
### Mounting the shutters

I used 2-in. exterior trim-head screws to mount my shutters (one screw in each corner). This approach will work with most wood, vinyl, aluminum and steel siding. If you have a stucco or masonry exterior, you'll have to mark the screw hole locations on the exterior and drill holes to accept plastic masonry anchors. Light-duty anchors are fine for this job. For more information, search for "masonry anchors" at [familyhandyman.com](http://familyhandyman.com).

### WHAT IT TAKES

| TIME                                                          | COST                  | SKILL LEVEL  |
|---------------------------------------------------------------|-----------------------|--------------|
| 2 hours per pair of shutters                                  | \$25 to \$35 per pair | Intermediate |
| <b>TOOLS</b><br>Basic hand tools, drill, table saw, miter saw |                       |              |

## Figure B Notch

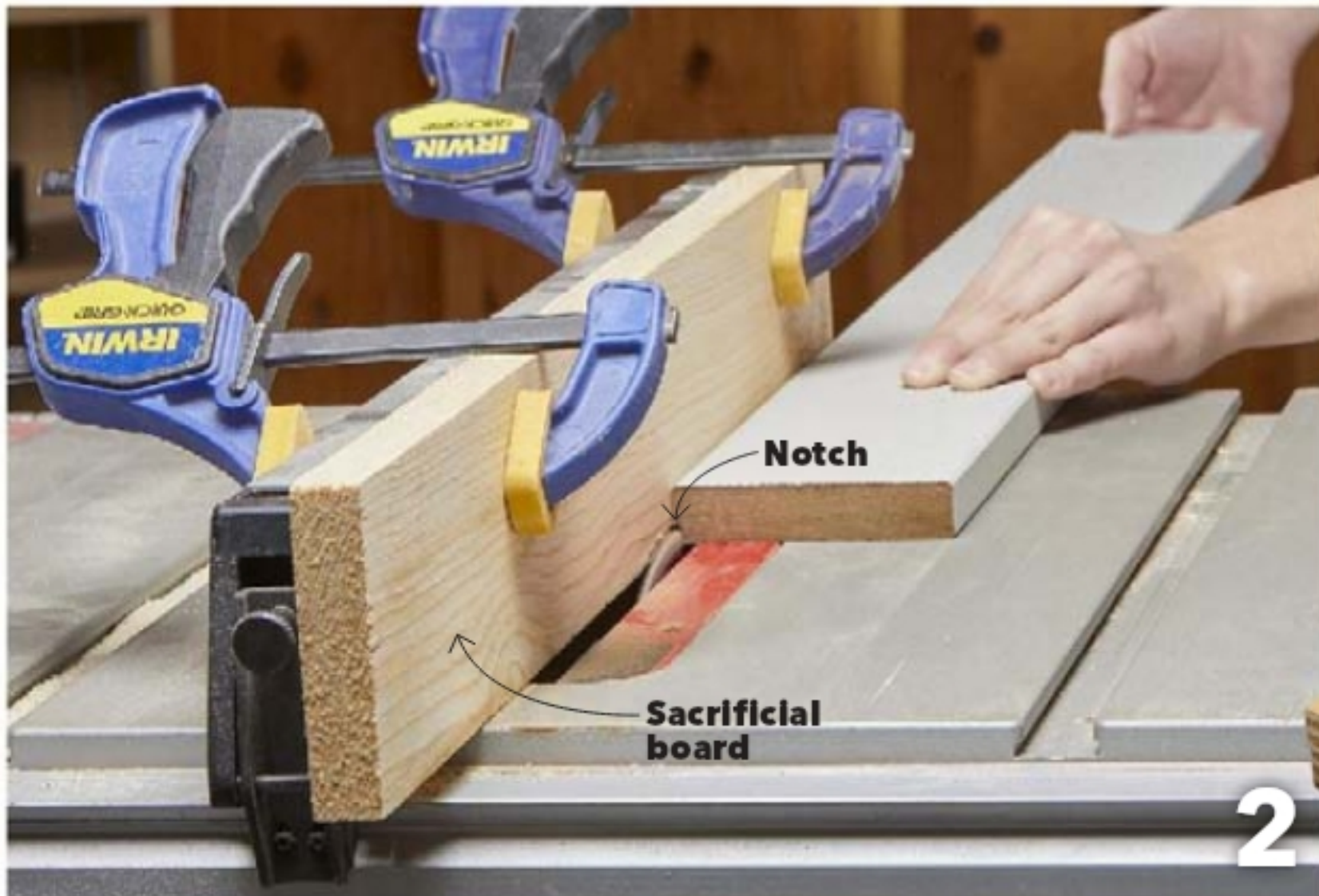


### Materials

In addition to 1x4 boards, you'll need 1-in. nails, 2-in. exterior screws, waterproof wood glue and painting or finishing supplies.







## RESAW SAFELY

You'll have to remove the blade guard to resaw boards, so it's essential that you use a push block to keep your fingers well away from the blade. Also mount a featherboard to the saw just in front of the blade. You can make a featherboard or buy one. This Kreg model (Photo 3) costs about \$25 online.



## 1 CUT BOARDS TO LENGTH

Every pair of shutters requires eight boards of the same length. For fast, accurate cuts, use a stop block. Screw the block to a board that's about 6 in. longer than your shutter height. Clamp the board to your miter saw fence so that the distance from the blade to the block equals the shutter height. Then simply slide the end of the board against the block and make your cut.

## 2 NOTCH THE BOARDS

Six of the eight boards are notched along one edge, creating an attractive shadow line between the boards. To cut the notches, clamp a sacrificial board to your table saw fence. Position the board against the blade and set the blade height at 1/4 in. Run the boards across the blade, move the fence slightly away from the blade and then run them across a second time to get a notch 1/8 in. wide.



## 3 RESAW THE CLEATS

You could use 3/4-in.-thick stock for the cleats, but I think thinner cleats look better. To "resaw" the cleats to 1/2 in. thick, set the blade height at 1-7/8 in. and the fence 1/2 in. from the blade. With the board on edge, make the first cut. Then turn the board over and make the second cut.

## 4 ASSEMBLE THE SHUTTERS

Arrange the boards on your workbench and clamp them together. Measure the width across the four boards and cut cleats to that length. Then, using one of the cleats as a guide, draw lines 3-1/2 in. from each end. Apply waterproof wood glue to the cleats and fasten them with 1-in. nails. Let the shutters rest for at least an hour before painting or finishing.





# Workshop STORAGE

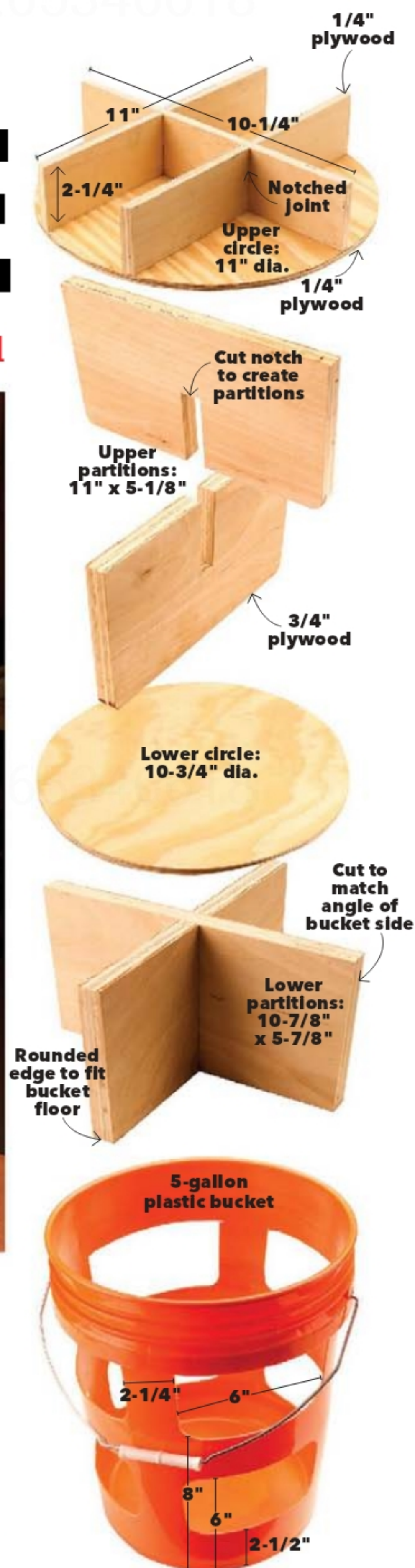
Quick and simple ways to get organized



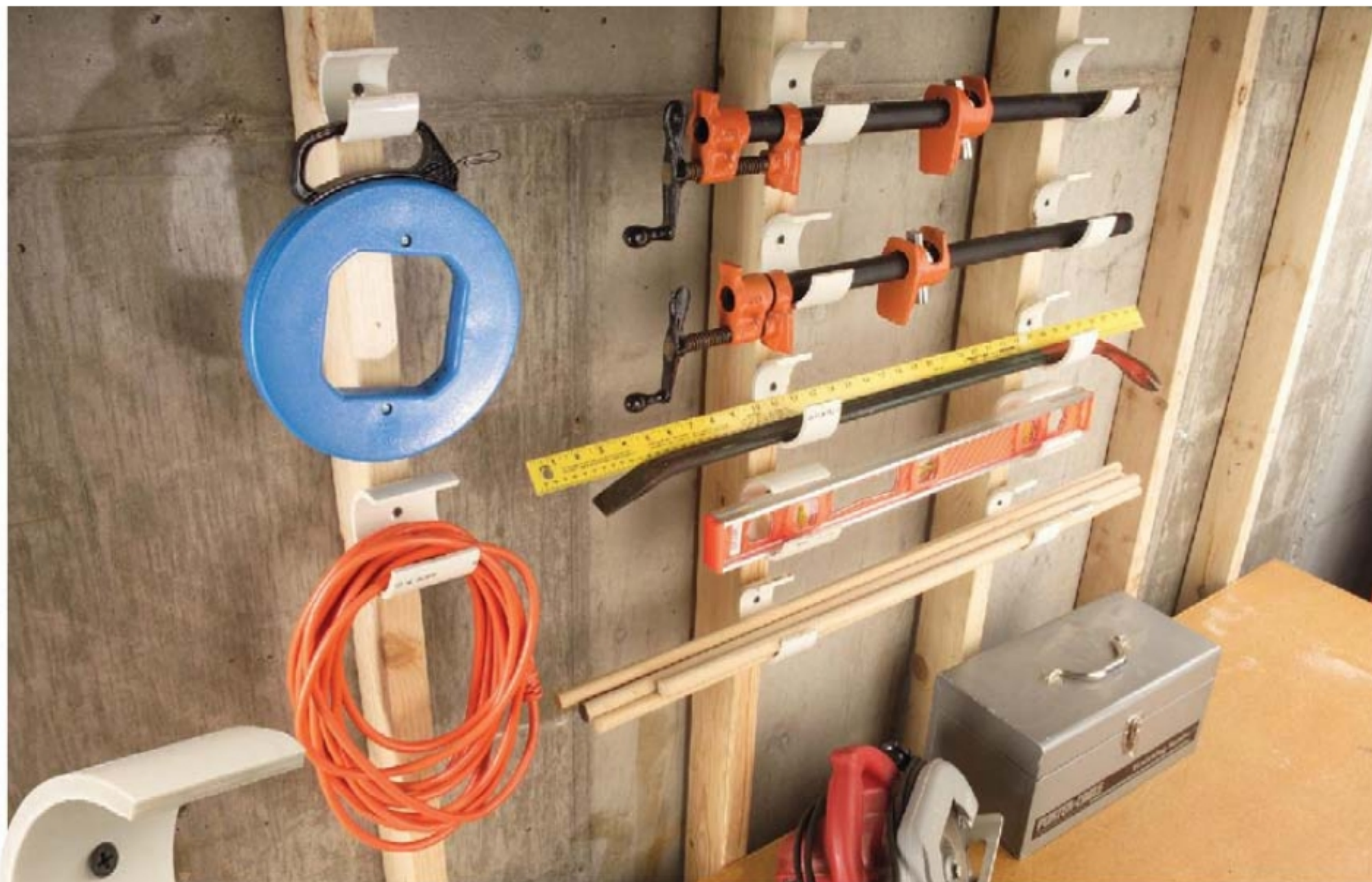
## Handy hardware bucket

Finding the right fastener will be a whole lot easier with this sectioned storage bucket. To make one, round up a plastic 5-gallon bucket (\$3 at a home center) and some scrap plywood.

Use a jigsaw to cut the bucket holes as shown, then saw the lower pair of partitions, slightly angling the ends to fit snugly against the bucket sides. Saw notches halfway down the center of the partitions so they can interlock. Set the pair in the bucket. Next, cut the lower circle and drop it into the bucket over the first pair of partitions. Cut the upper pair of partitions, put them in, and cut and add the upper circle. Create the "egg carton" partition to fit on top and screw or nail it to the upper circle.







## PVC storage hangers

We love PVC for the way it inspires ideas for storing tools and hardware. Here's how to use it to organize your shop. Cut 2-in. pieces of 3-in. PVC and saw away a 2-in. section so it looks like a "C." Drill screw holes and attach the hangers to studs or shop walls. Space pairs for convenient horizontal storage of longer tools such as levels and glue clamps, and use single segments for ropes, electrical cords or anything else that you want easily accessible.



## Lattice rack

Plastic lattice works well in the garage for storing long lengths of miscellaneous pipe, trim, flashing and conduit. Just cut matching pieces, then screw 2x4 cleats to the ceiling. Next, screw the lattice to the wall studs and cleats. Now you can quickly find those oddball leftovers instead of going to the hardware store and buying yet another piece.



## New angle on small tool storage

Find a bare spot on a wall or workbench and screw on a 2-ft. piece of 2-in.-wide slotted angle iron, available at home centers. It's the perfect hangout for screwdrivers, bits, safety glasses and sanding drums.



# clamping TIPS

## Clever solutions, better results

First things first. Here are three basic types of clamps that belong in any workshop:

**Pipe clamps** are the everyday high-pressure workhorses of woodworking. They cost just \$15 per set, plus a few bucks more for pipes. Because you can quickly screw the clamps onto different lengths of pipe, one set of pipe clamps does the same work as several lengths of bar clamps. Buy pipes in 2-, 3- and 4-ft. lengths and you'll be ready for most situations.

**Bar clamps** are quicker and easier to use than pipe clamps. Light-duty bar clamps are perfect when you need a long reach and moderate pressure. They cost \$10 and up.

**Spring clamps** are the fastest helpers for holding your work in place or doing light-pressure clamping. They're cheap, too: Most cost less than \$5.



## Prevent clamp stains with wax paper

The moisture in glue triggers a reaction between iron and chemicals in wood (called "tannins"). The result is black stains on the wood, especially with tannin-rich woods like oak or walnut. A strip of wax paper creates a barrier between the clamp and the wood. I also use wax paper to keep glue off my cauls.





## Long-jaw hand screw

Extend the reach of your hand screw clamps with a couple of lengths of scrap wood. Screw the jaw extensions to the side of your hand screw clamp and away you go. Works great and couldn't be easier.



## No-clamp veneer trick

Gluing down veneer is tough. You have to apply even pressure over every square inch. There are fancy tools for this, but for small veneer jobs, try this trick: Apply a thin coat of wood glue to both the substrate and the back of your veneer. Let the glue dry. Then position the veneer and use a hot iron (no steam) to reactivate the glue. Then press the veneer into place. The bond is almost instant and very strong.



## One caul replaces many clamps

Thin, flexible parts require lots of clamps to achieve a consistently tight fit. Or you can use a caul. This solid-wood edging on plywood would have required a clamp every few inches. But with a stiff caul to spread the clamping force, you can use fewer clamps, spaced far apart.

### WHAT'S A CAUL?

If it's designed to spread clamping pressure over a wide area, you can call it a caul.





## Cauls keep glue-ups flat and flush

As you squeeze boards together with pipe clamps, they sometimes arch or slip out of alignment. Pairs of upper and lower cauls are the solution. Lightly squeeze the cauls with bar clamps, then tighten the pipe clamps, then tighten the cauls a bit more. Repeat these adjustments until the boards are joined flush and flat.

Two-by-fours make great cauls. I carefully select ones that have a slight bend, or "crown," along the 1-1/2-in. edge—but no twist or warp. A crown is an advantage because it creates extra pressure in the middle of the caul. Label all your cauls with an arrow marking the direction of the crown and the length of the caul.



## Shift clamps to square

To check the squareness of a cabinet frame or box, take diagonal measurements. If the measurements aren't equal, shift the position of the clamps. In this photo, I exaggerated the shift for clarity. In most cases, a slight shift will do the trick. Sometimes, shifting just one clamp will pull the assembly into square.



## Water pressure

Some woodworkers keep a stack of bricks in the shop for those times when weight is better than clamps. But I think plastic buckets make the best weights. Filled with water, they provide a lot of weight. When empty, they're light, easy to store and handy for other jobs.



# FlexiPort fits!



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## ANTIMICROBIALS

*Do these products lead to better health?*

BY BRAD HOLDEN



## What are antimicrobials?

Antimicrobials are chemicals that kill certain organisms—bacteria, viruses, fungi or protozoa—collectively known as microbes. These microbes are often called germs because some can cause illnesses such as influenza. But not all of them cause illness, and some are actually beneficial to our health. In short, antimicrobials are designed to kill living organisms.

## What's the purpose of antimicrobials?

Antimicrobials came into use in building materials—paint, carpet, flooring, countertops, hardware—starting about 1994, initially in the health care market in an attempt to decrease hospital-acquired infections. Currently, we're seeing building materials for residential use as well as thousands of common household and personal care products infused with antimicrobials. Historically, antimicrobials were simply used as preservatives for the product itself, but now they're often added and advertised as also being beneficial to our health.

## Do they work?

Antimicrobials do kill microbes, both harmful and beneficial ones. However, studies by the CDC (Centers for Disease Control) have shown no evidence that they have any positive effect on our overall health. In fact, it's becoming clear that antimicrobials contribute to the development of "superbugs," which cause illnesses that are resistant to antibiotics.

Further, evidence is mounting that they may have unintended negative consequences for the environment because they leach into soil and water. In addition, there is no objective science showing that antimicrobials added to building products are having any beneficial impact at all. Coming full circle, hospitals are now moving away from products that contain antimicrobials.

## The bottom line

There's no evidence that household products containing antimicrobials are good for our health. So, if you're thinking that antimicrobial-infused products will help fend off illness, think again. The most effective way to prevent the spread of germs is still to thoroughly wash your hands with plain old soap and water.



### MEET THE EXPERT

Robin Guenther, FAIA (fellow of the American Institute of Architects), is principal of Perkins+Will and senior advisor to Health Care Without Harm.



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## QUICK FIX FOR A LEAKY PIPE

If you have a slight leak in a copper pipe joint, you might be able to fix it without disassembling and resoldering. First, shut off the water and drain the pipe. Start heating the joint, brush on some flux and continue applying heat until the solder melts and fills the gap. Let the joint cool, and then turn on the water to test the joint. If it still leaks, you'll have to disassemble and resolder, but you won't have lost much time trying this first. And if it does work, you'll have saved some time!



## Are Mothballs Safe?

Mothballs have long been used to deter insects and pests, especially to keep moths from destroying clothes. But mothballs contain naphthalene, a chemical known to irritate eyes and lungs. Upon exposure, some people report headaches, dizziness and nausea. Depending on an individual's sensitivity and the concentration of naphthalene, reactions can be severe.

We recommend avoiding mothballs and using other approaches to storing clothes. Vacuum bags, for example, keep moths at bay without the use of chemicals. A sachet of aromatic cedar chips works too, though people can also be sensitive to cedar. If you're determined to use mothballs, put them and the clothes together in a sealed bag to prevent inhalation, and wash all the clothes before wearing them. To keep out pests, seal your home's gaps and cracks with caulk or anti-pest expanding foam.

### MEET THE EXPERTS



**KELLY SMELTZER** is an indoor air quality specialist with the Minnesota Department of Health. She handles education and outreach on the topics of mold, carbon monoxide and healthy homes.



**SARAH PRILL** is an industrial hygienist in the Indoor Air Unit at the Minnesota Department of Health.



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# 7 Ways Our Amazoy™ Zoysia Lawn Saves You Time, Work and Money!

## 1 CUTS WATER BILLS AND MOWING BY AS MUCH AS 2/3

Would you believe a lawn could look perfect when watered just once? In Iowa, the state's biggest Men's Garden club picked a Zoysia lawn as "top lawn – nearly perfect." Yet, this lawn had been watered only once all summer to August!

In PA, Mrs. M.R. Mitter wrote, "I've never watered it, only when I put the plugs in...Last summer we had it mowed 2 times...When everybody's lawns here are brown from drought, ours stays as green as ever." *That's how Amazoy Zoysia lawns cut water bills and mowing! Now read on!*

## 2 NO NEED TO DIG UP OLD GRASS

Plant Amazoy *your way* in an old lawn or new ground. Set plugs into holes in the soil checkerboard style. Plugs spread to create a lush, thick lawn, driving out weeds and unwanted growth. Easy instructions included with every order.

## 3 ENVIRONMENTALLY FRIENDLY

No weeding means no costly chemicals. Since Amazoy Zoysia lawns naturally resist insects, you'll save money, while helping to protect the environment. You'll never have to expose your family and pets to the risk of weed killers and pesticide poisons.

## 4 FOR SLOPES, PLAY AREAS, BARE SPOTS AND PARTIAL SHADE

You can't beat Amazoy Zoysia as the low-cost answer for hard-to-cover spots, play-worn areas, places that have partial shade and erosion on slopes.

Meyer Zoysia Grass was perfected by the U.S. Gov't, released in cooperation with the U.S. Golf Association as a superior grass.

## 5 IT STAYS GREEN IN SPITE OF HEAT AND DROUGHT

"The hotter it gets, the better it grows!" Plug-in Zoysia thrives in blistering heat, yet it won't winter-kill to 30° below zero. It just goes off its green color after killing frosts, and begins regaining its green color as temperatures in the spring are consistently warm.



Thrives from partial shade to full sun.



Plant it from plugs.

### Your Assurance of Lawn **SUCCESS** Amazoy Zoysia Grass is **GUARANTEED**

Guaranteed to grow new green shoots within 45-60 days or we'll replace it FREE – for up to 1 year – just call us. Guarantee is valid on one order at a time, typically the most recent. We ONLY ship you hardy field grown genuine Amazoy Zoysia grass harvested direct from our farms. Easy planting and watering instructions are included with each order.

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## 6 CHOKES OUT CRABGRASS AND WEEDS ALL SUMMER

Your established Amazoy Zoysia lawn grows so thick, it simply stops crabgrass and most summer weeds from germinating!

## 7 NOW 3 WAYS TO START YOUR AMAZOY ZOYSIA LAWN!

1) **Freestyle plugs** come in uncut sheets containing a maximum of 150 - 1" plugs that can be planted up to 1 ft. apart. Freestyle plugs allow you to make each plug bigger and plant further apart – less cutting and planting – you decide.

2) **New Super Plugs** come pre-cut into individual 3"x3" plugs ready-to-plant (minimum 1 per 4 sq. ft.). They arrive in easy to handle trays of 15 Super Plugs. Save more time and get your new lawn even faster!

3) **Amazoy Approved Seed** - As The Zoysia Specialists for 60+ years, we finally have a Zoysia seed available that meets our standards and homeowners expectations.

Learn why at [zoysiafarms.com/mag](http://zoysiafarms.com/mag) or by phone at 410-756-2311.

**ORDER TODAY - GET UP TO 1000 FREESTYLE PLUGS - FREE!**

**Freestyle Plugs** You decide how big to cut the plugs. Each grass sheet can produce up to 150-1 in. plugs. Plant minimum 1 plug per sq. ft.

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| 300       | —          | 2            | \$29.95    | \$15.00    | —       |
| 500       | +100       | 4            | \$50.00    | \$17.00    | 25%     |
| 750       | +150       | 6            | \$66.00    | \$20.00    | 36%     |
| 1100      | +400       | 10           | \$95.00    | \$30.00    | 44%     |
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**Super Plugs** Precut plugs 3 inches by 3 inches READY TO PLANT Packed in trays of 15 Super Plugs. Plant minimum 1 plug per 4 sq. ft.

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## MESH NETWORK FOR STRONG WI-FI

### What is a mesh network?

A traditional router sends one signal that radiates out like ripples from a stone dropped in water. A mesh network has a main hub and several nodes placed around the house. The nodes receive the signal from the main hub, spreading coverage throughout your home. The nodes connect wirelessly, or you can hard-wire them using CAT 5 or 6. A mesh system costs about \$300 to \$400.

### What are the benefits?

#### TOTAL COVERAGE

The main benefit is reliable signal strength throughout your house. With a hard-wired mesh network, there is no drop-off in signal strength. Wireless has very minimal drop-off. Some nodes have a CAT 5 or 6 port, so you can connect your device directly. The signal improvements from a mesh network are most noticeable in homes larger than 2,000 sq. ft.

#### RELIABILITY

Unlike with a standard router, if one of the nodes breaks down, your network still functions. There may be a dip in efficiency, but you'll still have coverage.

#### THE ABILITY TO BYPASS OBSTACLES

A traditional router has to blast a signal through obstacles or rely on signals bouncing off walls to reach all corners of a home. A mesh router avoids obstacles by using multiple distribution points. Using several nodes, improving coverage is as simple as adjusting one node's position or adding another node. If you have masonry walls or many other electronics, a mesh network lets you boost the signal in key spots.

#### SOLID SECURITY

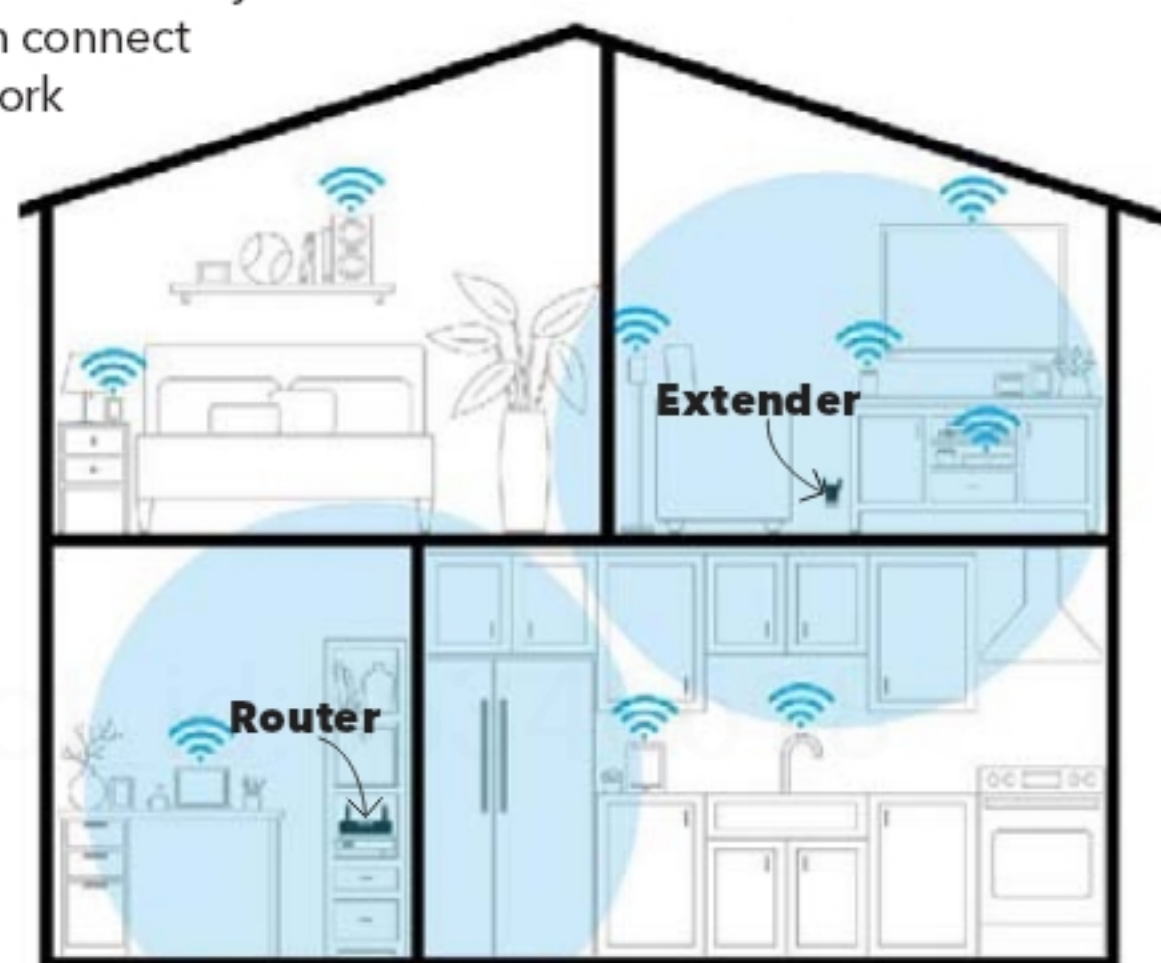
Mesh routers have excellent security support. They're easy to manage, so you're more likely to keep your network devices updated and secure. Many mesh routers update firmware automatically. Also, you can monitor which devices are using the signal, turn zones off completely or set hours when the network is active.

#### EASE OF SETUP

After the setup, any adjustments are typically done through a smartphone app.

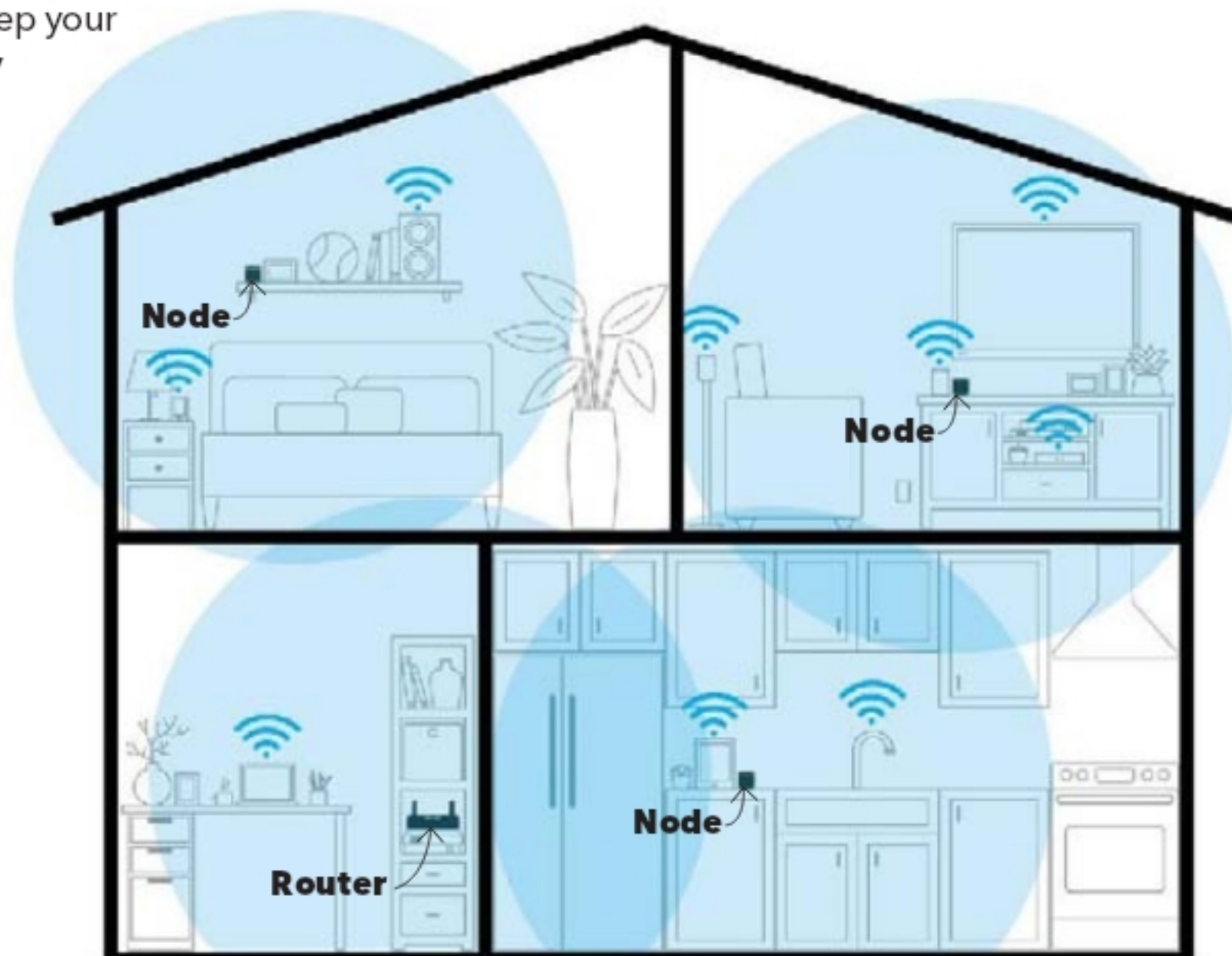
#### WHY NOT USE A WI-FI EXTENDER?

Extenders do help with coverage, but the signal strength is typically cut in half. Also, when using laptops or tablets in an area covered by the extender, you'll need to sign in to the extender.



#### ROUTER WITH EXTENDER

The router sends out the signal. The extender picks it up, but these extenders can cut the signal's power in half.



#### MESH NETWORK

The router sends out the signal, which is picked up by nodes throughout the house, with little to no drop in signal strength.



#### MEET THE EXPERT

Konrad Johnson is a Best Buy In-Home Advisor, providing personalized, in-home tech solutions.



## THE TROUBLE WITH WHOLE-HOUSE HUMIDIFIERS

Whole-house humidifiers make dry, brutal winters far more comfortable indoors. Unfortunately, if you have a manual humidifier, the problems might outweigh the benefits. With manual humidifiers, you need to know the outdoor temperature hours in advance and adjust the humidity accordingly, every day. Few people actually do this. Most people just select a middle setting and never touch it again. As a result, home inspectors regularly find frost- and mold-covered attics, damaged windows and ruined ceilings.

Automatic whole-house humidifiers, on the other hand, have an outdoor temperature sensor so they can adjust the humidity level for you. If you do have a manual humidifier, either leave it off or do the daily work of keeping it properly adjusted.

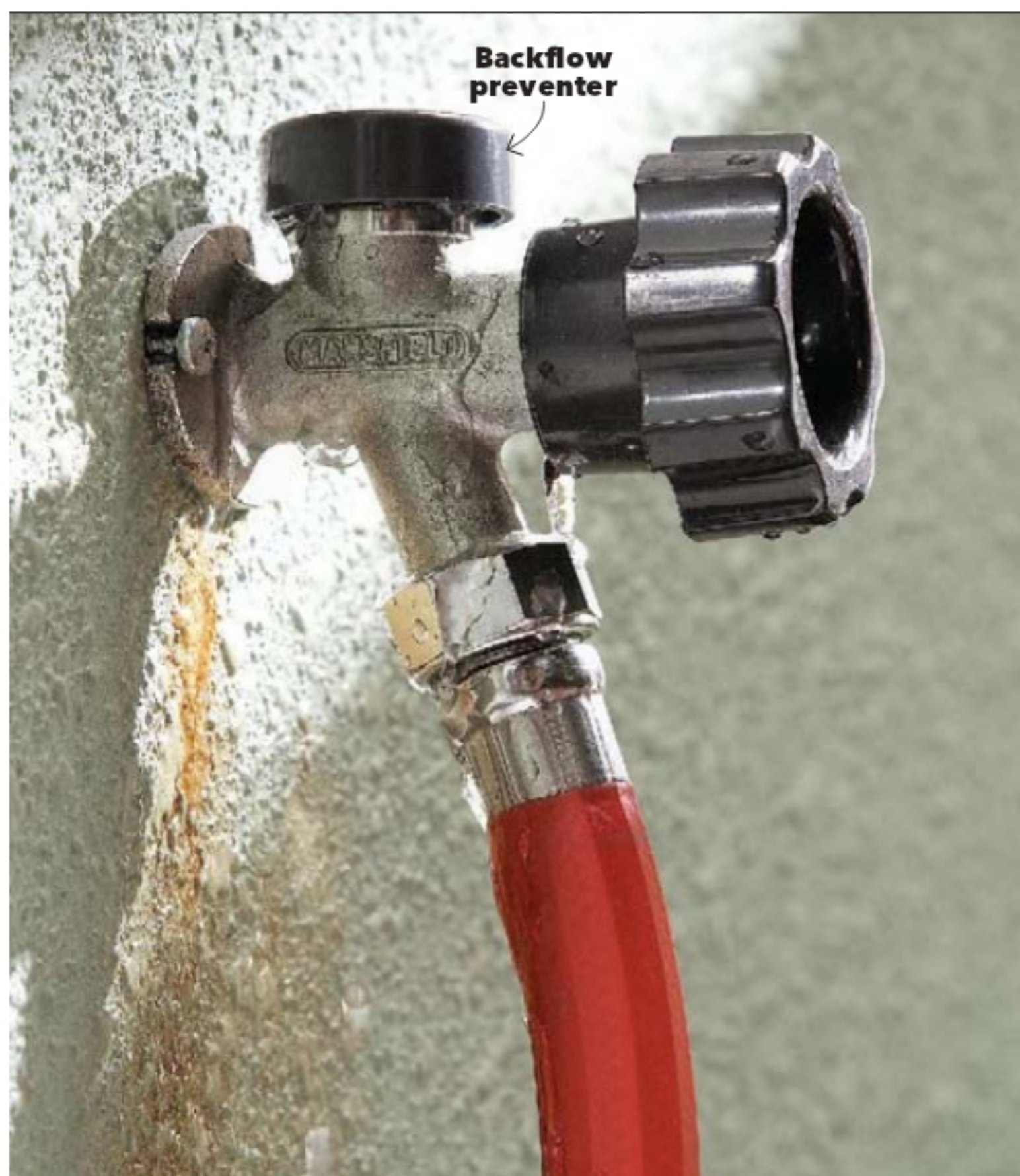
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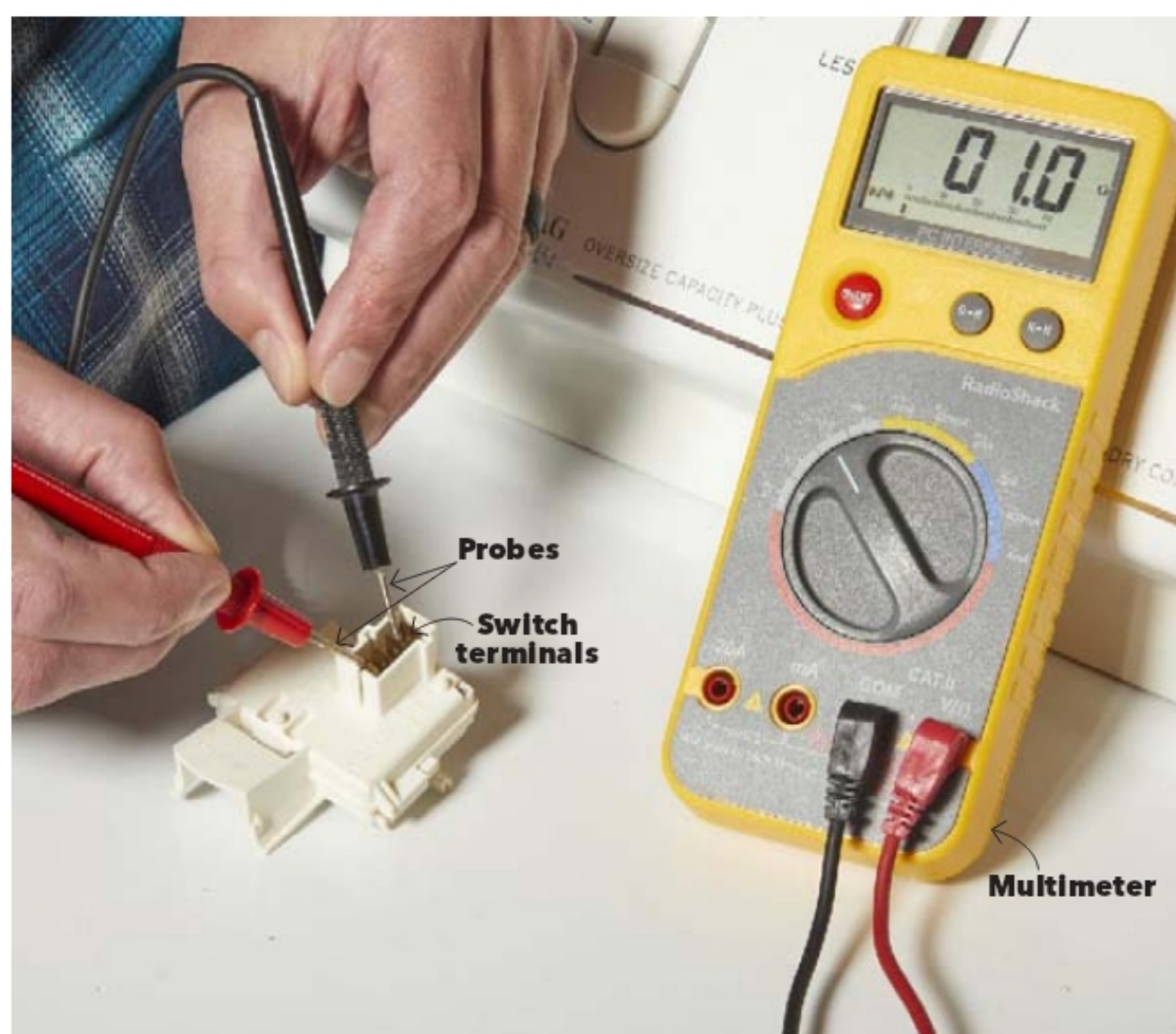
## What's the plastic cap on my hose bib?

Many building codes require house bibs, also called sillcocks, to include an anti-siphon feature. This feature prevents the formation of a vacuum that could pull water from the outside into the clean water supply. While you can retrofit backflow preventers to standard spigots, frost-proof hose bibs have one built in, and that's what you'll find beneath that plastic cap.

The two main components are a bonnet, or port, and a spring-loaded disc called a poppet. These are sealed with rubber gaskets. Over time, water can leak from under the cap, but the repair for that is simple. Just remove the cap, either by prying it off or unscrewing it, then remove the components inside. Flush the opening to eliminate any debris that could prevent the poppet from sealing tightly. If any parts are broken or missing, replace them using one of the repair kits offered by most manufacturers.







## Washing machine lid switch

If your washing machine fills but won't spin, check the lid switch. If the switch is bad, your machine won't spin. A new switch is less than \$20 and takes minutes to install.

If your switch has a wiring harness, unplug it and test the side of the harness that connects to the switch. If there's no wiring harness, test directly on the switch's terminals.

To test, move your multi-meter dial to the lowest ohms setting. Zero the meter, and then touch the probes to the "line" and "machine" terminals. The meter should read zero. Touch the probes to the "line" and "motor" terminals. The meter should again read zero. If it doesn't pass both tests, replace the switch.



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## Don't crowd YOUR ELECTRICAL PANEL

When you're remodeling, it's tempting to gain some living space by building walls close to the electrical panel. But that might come back to haunt you during an inspection or when you sell your home. Here are the space requirements as outlined by the NEC (National Electrical Code):

1. There must be 3 ft. of working clearance in front of the panel.
2. The width of the working space needs to be at least 30 in. (the panel isn't required to be centered on the 30-in. width).
3. The panel door must open at least 90 degrees.
4. For new construction, the height of the working space needs to be at least 6.5 ft. (there is an exception for existing homes).
5. The area above and below the panel is reserved for other electrical equipment, which can't extend more than 6 in. beyond the front of the panel.
6. Illumination is required for all working spaces at electrical panels.
7. The required working space cannot be used for storage.

Think of it this way: You should have a clear area about the size of a refrigerator in front of the electrical panel.



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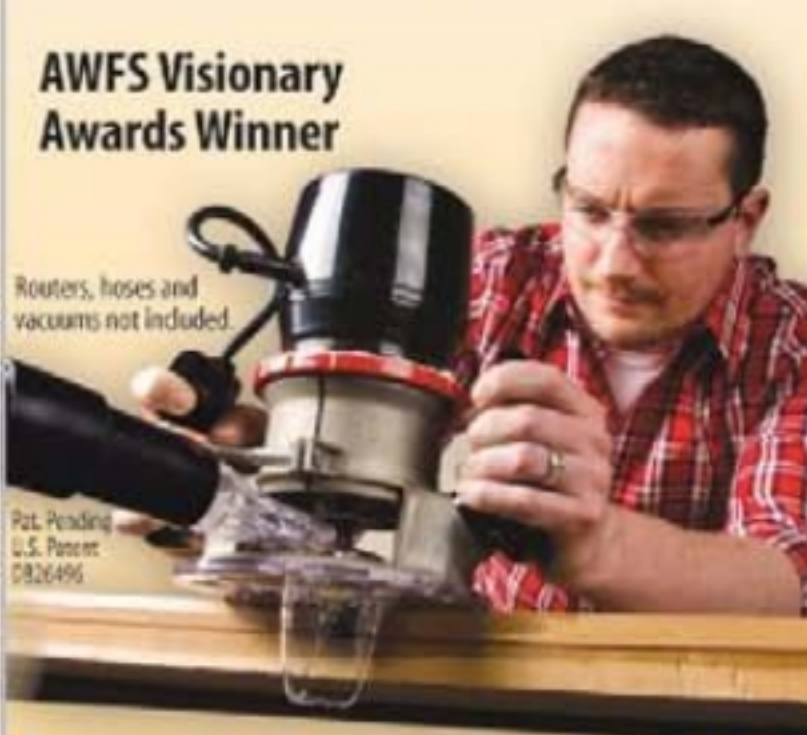
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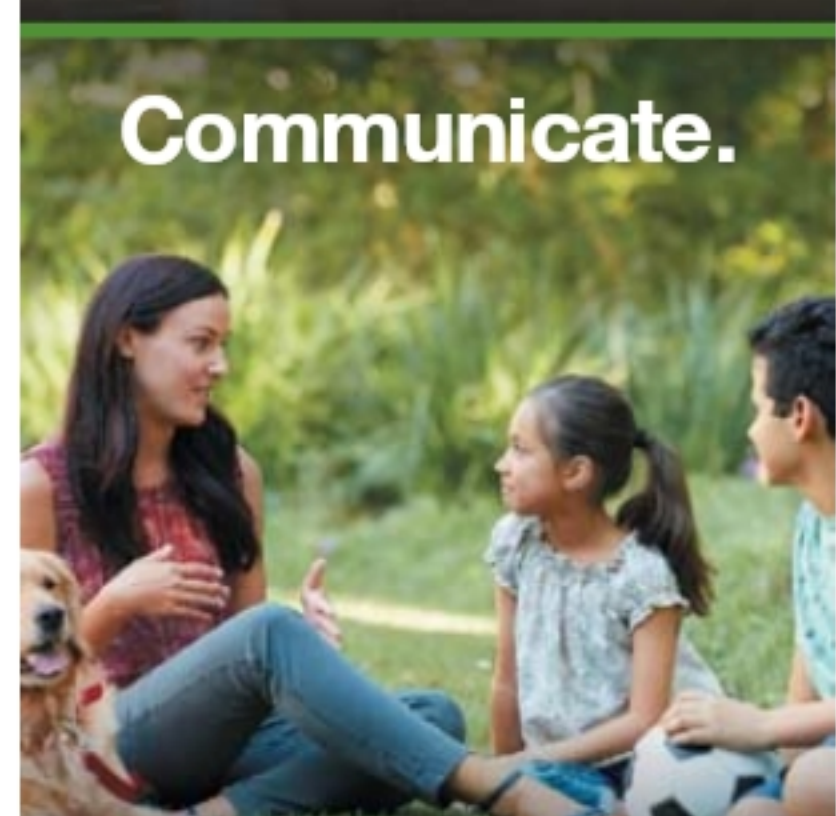
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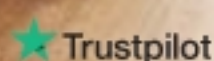


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Laughs and lessons from our readers

## TWO TIMES THE WATER DAMAGE

The toilet in the upstairs bathroom had been leaking for some time, which had rotted the floor. I removed the toilet, vanity and sink to replace the plywood. I laid the new vinyl floor and reinstalled the vanity, leaving off the sink to make it easier to solder on new shutoff valves.

With the main water supply to the house turned off, I installed the shutoff valves. Then I went downstairs to turn on the water supply and check the joints for leaks. As I walked back upstairs, fancying myself a master plumber, I heard the sound of gushing water. I had forgotten to turn off the shutoff valves! The bathroom was flooded and the ceiling below was ruined. But my soldering job held up perfectly.

GLENN McCOMAS

## BLINDSIDED BY THE LIGHT

My friend had installed a kitchen backsplash and asked me to help him change the wall outlets to match the new décor. Since I didn't have my voltage sniffer with me, I needed something to plug into the outlet so I'd know when the power was off. I found a clothes iron and plugged it in, and my friend flipped the circuit breakers until the iron light went off.

I changed the first two outlets and started on the third. Plugged in the iron—yup, the light was off. When I touched the wire, there was a flash of sparks and my arm went numb. I was floored—how could I get a shock when the iron showed the power was off? I learned the hard way that the light goes off when the iron reaches the right temperature. I think I'll stick with my voltage sniffer from now on.

SHAWN TOMBOLINI

## EMPTY INSIDE

When I was a teenager, my dad decided we were going to finish the basement. So we went to a home center, bought everything we needed and hauled it all home. But then my parents were called out of town, leaving me home alone. That's when I decided to surprise my dad by hanging the drywall myself.

After rocking the entire basement, I stood back, admired my work and congratulated myself for being so resourceful in using nearly all the small scraps. To my surprise, my dad wasn't nearly as impressed when he got home. He took me aside and explained that before the drywall goes up, you have to complete the wiring and insulation. Let's just say that I learned the proper steps to finishing a basement—and now I have to hang the drywall only once!

DERRYL CARSON







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