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BBQ & Grilled Chicken Made Easy

Everything You Need To Know About Amazing Chicken On The Grill & Smoker With More Than 20 Great Tested Recipes

version 2.0

By Meathead & Brigit Binns

A DEEP DIVE GUIDE FROM
Meathead's AmazingRibs.com

BBQ & GRILLED CHICKEN MADE EASY

EVERYTHING YOU NEED TO KNOW ABOUT AMAZING CHICKEN ON THE GRILL & SMOKER

MEATHEAD

with

BRIGIT BINNS

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ABOUT DEEP DIVE GUIDES

"This is my invariable advice to people: Learn how to cook – try new recipes, learn from your mistakes, be fearless, and above all have fun!"

— JULIA CHILD

Deep Dive Guides is the ebook imprimatur of Meathead's AmazingRibs.com. It is a growing series of ebooks in which

we have attempted to share our breadth and depth of experience on a culinary topic. They are designed to give you an inexpensive deep dive into a topic so you come away knowledgeable and confident. They contain numerous links to pages on the internet and videos. You will enjoy this book best if you read it while you are connected to the internet.

Some of this content is scattered among the 2,000+ pages on Meathead's AmazingRibs.com. Although websites are great references, they are not great learning environments, not nearly as good as books. We think that binding together carefully edited articles in an organized flow from start to finish in book format, is a far better way to learn than from articles scattered around on a website.

Some of this info appears in other Deep Dive guides because we think that it is important that they all contain foundational info on such things as meat science, safety, tools, etc. So we have included the most important info within these pages, and written new, previously unpublished, related info. Enjoy!

PART II
INTRODUCTION

Flavorful, moist, buxom chicken breasts. Juicy and seductively smoked chicken thighs. Spicy hot wings. Chicken is a culinary artist's blank canvas, just awaiting your creativity. It's bland on its own, but paint chicken with the complex flavors imparted by grilling and/or smoking, and you are looking at a masterpiece. If you do it right. Everyone who has suffered through undercooked chicken with a bitter crust of burnt-on BBQ sauce knows there is far more to cooking this bird outdoors than simply firing up the grill. Bring in the flavors of the world and learn to play with them like you would a musical instrument. Learn a few simple techniques, like reverse searing, smoke-roasting, spatchcocking, and dry-brining, and you will up your game substantially. One taste and your neighbors will be scaling your backyard fence like foxes to the henhouse.

The good news is that you don't need anything fancy like a smoker (although having one helps). You can become a

Chicken Zen Master on any old backyard grill, or even in your indoor oven with these techniques. But remember, when you cook the bird outdoors, you not only get great flavor, you free up the indoor oven for other dishes, like scalloped potatoes or apple pie.

We begin this Deep Dive with a summary of general concepts then get into the details of how to prep chicken properly and cook it safely. Say goodbye to dry, stringy, cardboardy, boring birds and hello to most tender, flavorful, juicy chicken you ever tasted.

ABOUT MEATHEAD

Meathead points at baby front ribs

Meathead is the barbecue whisperer, hedonism evangelist, and mythbuster who founded Meathead's AmazingRibs.com, by far the world's most popular outdoor cooking website. He is a BBQ Hall of Famer and the author of "Meathead, The Science of Great Barbecue and Grilling", a *New York Times* Best Seller that was also named "One of the 100 Best Cookbooks of All Time" by *Southern Living* magazine, one of "22 Essential Cookbooks for Every Kitchen" By SeriousEats.com, and one of the "25 Favorite Cookbooks of All Time" By Christopher Kimball's Milk Street.

He was previously a syndicated wine critic for the *Washington Post* and *Chicago Tribune*. He has taught at Cornell University's School of Hotel Administration in Ithaca, NY, and Le Cordon Bleu in Chicago, and he has judged food, wine, beer, and spirits around the world. He lives in the Chicago area with his wife, a PhD microbiologist and a food safety expert, so if you dine at his house you will eat and drink well, and safely.

ABOUT BRIGIT BINNS

Brigit Binns is Meathead's culinary consultant, advisor, and confidant. She and Meathead are also collaborating on the hardcover book: *"The Meathead Method, Barbecue Science Meets Art"* for publication in spring 2023. She is the author of **more than two dozen cookbooks**, many

for Williams-Sonoma. Brigit and her husband, the actor **Casey Biggs**, run a B&B (Bed and Bottle), named **Refugio**, in the wine country of Paso Robles, California, where she also teaches private cooking classes. Meathead says “She has taught me much, corrected my stupidities, and the recipes that we have developed together always bowl me over.”

SPECIAL THANKS TO

Clint Cantwell, Senior VP and author of some of our favorite recipes, a few of which are on these pages

David Joachim, Former Executive Editor of Meathead's AmazingRibs.com

Prof. Greg Blonder, Science Editor of Meathead's AmazingRibs.com

And the rest of the team

ABOUT MEATHEAD'S AMAZINGRIBS.COM

Called "*By far the leading resource for BBQ and grilling information*" by Forbes, Meathead's AmazingRibs.com is all about the science and art of barbecue, grilling, and all forms of outdoor cooking. With more than 2,000 pages of free information, the site offers countless thoroughly tested recipes, tips on technique, original science research, myth-busting, and unbiased equipment reviews.

The site ranks among the most popular food websites in the US and is one of only a small number of sites in the Library of Congress' Food and Foodways Web Archive. Other sites in the archive include the Food and Agriculture Organization of the United Nations, James Beard Foundation, Southern Foodways Alliance, Jose Andres, US Food & Drug Administration, Oxford Symposium on Food & Cookery, and Seafood Watch. We are in good company!

The site has numerous extraordinary features, among them the world's largest collection of grill and smoker reviews by the world's only full-time grill and smoker tester, the

world’s largest collection of thermometer reviews and test results by an electrical engineer, a unique curing calculator, a salt conversion calculator, and it specializes in using science to bust scores of barbecue and grilling myths.

ABOUT THE AMAZINGRIBS.COM PITMASTER CLUB

The **AmazingRibs.com Pitmaster Club** is the world's largest barbecue association with more than 17,000 paid members who enjoy a lively community forum and more than 20 cool benefits to membership including monthly drawings with prizes worth up to $2,000. You are invited to take a free 30-day trial membership. No credit card necessary. Click here **https://AmazingRibs.com/pitmaster**

Here are some of the 20+ benefits to membership:

- You support **AmazingRibs.com** and help us grow
- We block all third party ads from members
- Free $9.95 Food Temperature Guide Magnet with 80+ benchmark temps
- Free ebooks
- Free sneak preview of **The Meathead Method**, Meathead's next book in progress
- Free **Barbecue News** magazine every month
- Free **Tailgater** magazine
- Exclusive recipes, recipes, recipes
- 3 monthly giveaways worth up to $3,000
- Exclusive audio and video content
- Cartoons
- Great discussions and debates with knowledgeable moderators and no race, religion, or politics flamewars allowed
- 3 informative monthly email newsletters
- Meat-Ups
- Discounts on products we love
- Members can buy cool embroidered Pitmaster Club bowling shirts or inexpensive T-shirts
- Membership certificate
- Support for Operation BBQ Relief
- Support for Global Alliance for Clean Cookstoves
- Easy Autorenewal

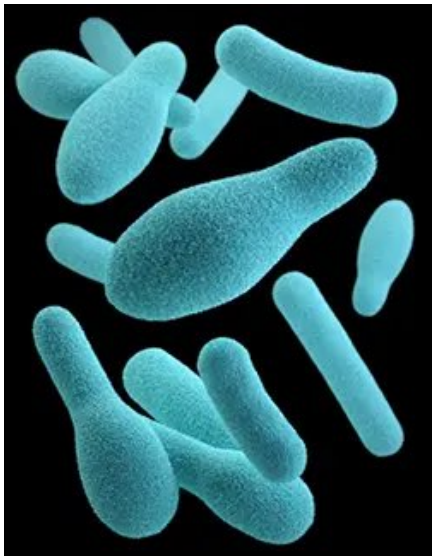
STAY IN TOUCH

Have a question? Meathead and the site's knowledgeable moderators answer reader questions promptly. Just go to Meathead's AmazingRibs.com and post your question on any page at the bottom where it says "Click for comments..."

If you find an error or a broken link in this book, please let us know here.

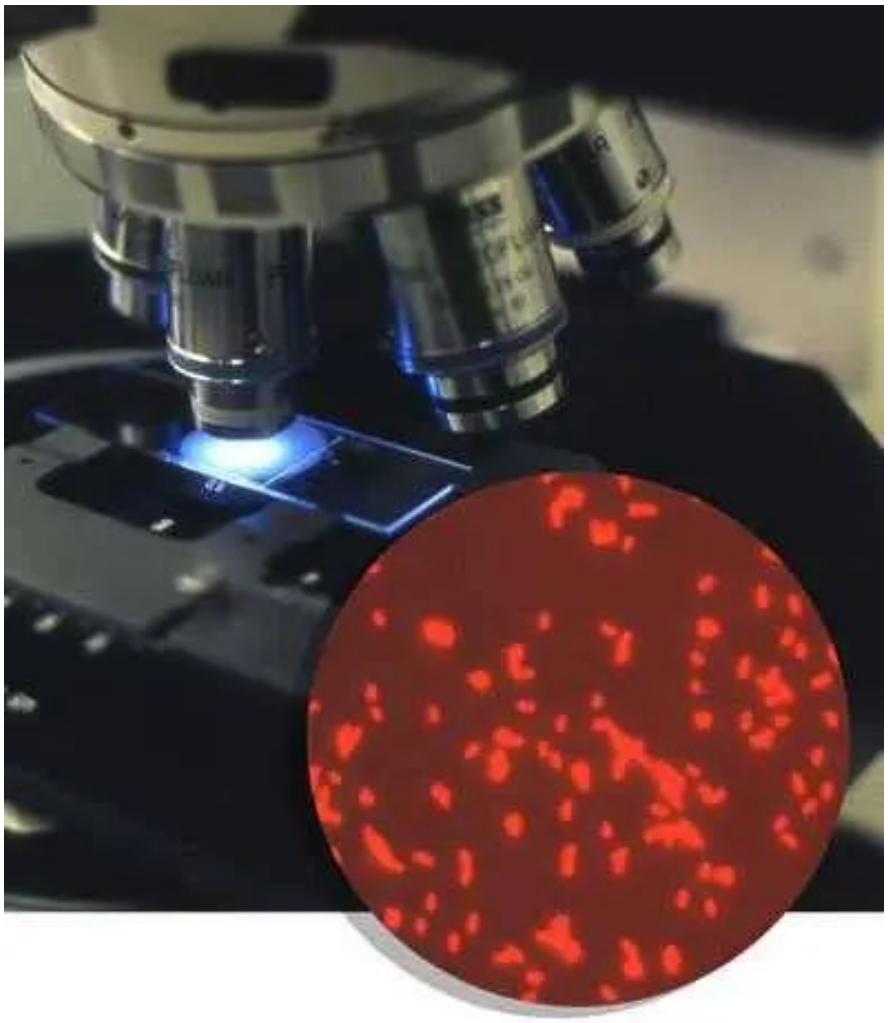
And be sure to subscribe to Smoke Signals, our free monthly email newsletter with links to new articles and reviews and more.

PART III
SAFETY FIRST



Fire, knives, pathogens, oh my! People can die from improper cooking. But the risk is very low with a little common sense and an ounce of prevention.

SPOILAGE



here are two types of spoilage: Oxidation and Microbial.

Oxidation is caused by compounds in meat, especially animal fats, combining with oxygen and changing the meat's smell, flavor, and color. Badly oxidized meat is called rancid. The good news is that oxidized meat is usually not dangerous.

Microbial spoilage is the other type of spoilage, and it is very dangerous. There are several commonly occurring *bacteria* and *viruses* in food that can spoil it. Some of these bad guys will merely have you kneeling before the porcelain god, but others can maim or kill you. The goal is to pasteurize the food, i.e. kill as many bugs as possible so that it is safe. That's different than sterilizing which kills every single microbes. We can easily *pasteurize* at home. *Sterilization* is a method that kills or removes all microbes and their spores by using one or more of the following: Heat, irradiation, chemicals, pressure, or filtration.

You can pasteurize most meats by cooking them to 131°F interior temp and holding it for two hours. At 165°F interior, bacteria are killed instantly. **For more on bacterial kill temps, click here and scroll down**.

BACTERIA

The Center for Disease Control (CDC) estimates that in one recent year roughly one in six Americans got sick from food, 128,000 were hospitalized, and 3,000 died. *The bad guys are certain types of bacteria, viruses, and parasites.* If you don't want the details, let's make it easy:

Cooking kills the bad guys. Cook food properly and you have nothing to worry about. Raw food is just plain riskier. All raw food and that includes salads.

Bacteria are everywhere. There are more microbes in your body than all other cells combined and they may weigh up to three pounds. **The biggest risks in food come from bacteria you ingest.** Most bacteria are friendly and many, called *probiotics*, are beneficial. Alas, some of them, called *pathogens*, are not so friendly, especially *Bacillus cereus, Campylobacter jejuni*, *Clostridium botulinum*, *Listeria monocytogenes, Salmonella*, *STEC* (*Shiga toxin* producing *E-coli*), *Shigella, Staphylococcus aureus*, and *Vibrio*. They are hard to trace because they can often take a day or more to grow in your gut before they knock you down, so figuring out what it was in the fridge or if it was the restaurant lunch is hard to do.

VIRUSES

Viruses are not a major threat in food with one notable exception: *Hepatitis A* virus (HAV) a.k.a. *norovirus* usually comes from human fecal matter, often as a result of poor hand washing.

Coronavirus/COVID-19 is primarily a respiratory virus. It mostly infects the nose, throat, and lungs. Almost all

infections come by inhaling droplets of moisture from the breath of other people who have been infected. The risk is greater the more viruses you inhale. The risk can be lowered by limiting your proximity to other people and by using a mask. Normal painter's masks can prevent you from spraying and can reduce the amount of spray you inhale, but they can't stop all the viruses. Masks labeled N95 are much more effective. That's what doctors prefer.

You can get sick by touching something that has the virus on it such as a grocery cart or an apple, and then transferring it to your respiratory system by touching your eye or the inside of your nose or mouth, or by eating food handled by someone who has the virus. The data says the risk of getting sick is low from touching things, especially if you wash your hands often, and keep them out of your eyes, nose, and mouth.

Food is not a likely carrier even if you eat with your hands. If the preparer is sick and washed his or her hands and didn't sneeze or cough on the food, there is likely to be no viruses or at worst a very small load (quantity of bugs). Keep in mind that food goes down one pipe and air down another so if the food is contaminated, it is possible it could get into your lungs because you breathe when you eat, but the risk is considered to be very very low.

PARASITES

Raw food can harbor parasites, most commonly adult tapeworm, tapeworm eggs, tapeworm larvae, and

toxoplasma. Tapeworms are most commonly found in seafood. Cooking to 145°F will kill adult tapeworms as well as larvae and eggs. That is hotter than most chefs like to cook fish, even with conventional cooking. Fortunately, most parasites can be killed by freezing for 7 days at -4°F or for 15 hours at -35°F. Commercially frozen fish are often taken to these low temperatures. Alas, most home freezers are set to 0°F. So if you wish to cook fish to 131°F or below, you should consider buying commercially frozen fish.

Toxoplasma is found in shellfish and some mammals as well as contaminated water and cat litter. Fortunately toxoplasma is killed by freezing or cooking.

HOW DO FOODS GET CONTAMINATED?

That's quite a rogues gallery of potential contaminants. If you ingest enough bacteria, they can leave you sitting on the toilet for hours, plant you on your knees in front of the porcelain god, send you to bed in a sweat and writhing in pain for months, propel you to the emergency room, or even the cemetery. Children and elderly are especially at risk.

It is helpful to think of all raw food as kryptonite. Of course most is perfectly safe, but you never know, and trusting your butcher is no guarantee because most contamination happens long before it hits his loading dock. And although fruits and veggies are not as frequently contaminated, if you pay attention to the news, you will know that recalls of lettuce, spinach, chili peppers, melons, sprouts, and strawberries are frequent because we eat them raw.

Contaminated meats are decontaminated when we cook them properly.

The most common source of contamination is animal waste, and that includes human animals. If the bad breeds of E-coli get into water that is used for irrigation, if organic fertilizer is not sterilized properly, if Bambi or Thumper have lunch in a field of lettuce, if a steer's intestines are accidentally sliced open in the slaughterhouse, or if your butcher didn't wash his hands after using the toilet, we have a problem.

If a bluebird bombs a strawberry, if the henhouse isn't cleaned properly by a minimum wage teenager, if the water bath used to remove the feathers from chickens isn't disinfected, we have a problem.

Egg shells may look impervious, but if the hen has salmonella, it can get into the ovum before the shell hardens.

Raw fish sushi is silky and elegant, unless tapeworm eggs from seals, walruses, or whales get into your salmon. They can grow up to 60 feet inside a human.

Raw sprouts might seem like health food, but if Tweety decides to visit the alfalfa seeds or if rodents and insects nibble through the burlap shipping bags in the hold of a ship or warehouse, when we soak and warm the seeds to sprout them, we also water and warm the pathogens. **That makes sprouts the most dangerous food in the super market.**

Improper food handling also makes contamination from your hands, cutting boards, and knives a major problem.

MAKING FOOD SAFE

The most effective way to make food safe is to cook it properly. Raw food, of any kind, is always a risk. In the language of food safety scientists, you need a “kill step” in the process. Lemon juice, vinegar, alcohol, salt, and freezing will not pasteurize food. They may kill a few bad guys and hamper their growth, but they absolutely positively cannot be trusted to make food safe. Sorry, but they just don’t get the job done. Acid and salt might inhibit growth, but they won’t make your food or countertop safe. Remember, when research labs want to store their microbes, they freeze them.

To cook foods properly you must use a digital thermometer. Cooking without it is like driving at night without headlights. AmazingRibs.com has an electrical engineer who tests, reviews, and rates thermometers. His database of more than 200 is a valuable shopping guide. We do not sell any.

The excellent thermometer shown here, the Thermoworks Thermopop reads accurately in 5 seconds and sells for less than $30. **Click here to order it**.

A hot dishwasher and its detergent will make dishes and utensils safe. For countertops, cutting boards, knives, meat grinders, and other things that can't go in the dishwasher, chlorine bleach is your go-to sanitizer. That's why they put it in swimming pools.

You don't want to wash down your carrots with a poison. But chlorine is an excellent disinfectant for cutting boards, countertops, knobs, and handles. Buy an empty spray bottle at the drug store and fill it with a dilute solution of household bleach.

~

USDA recommends a solution of one tablespoon of 5% unscented, liquid chlorine bleach per gallon of water. After washing with warm soapy water, sanitize with bleach. Wet the surface with the bleach solution and allow it to stand for several minutes. Rinse with clear water and air or pat dry with clean paper towels. Store the solution in the bottle, tightly sealed, and use it often.

STORING RAW MEATS

Can you imagine life without refrigeration? We would eat only what we killed today, or we would all be vegetarians, or we would all be experts on pickling and canning.

But you cannot keep meat in the fridge or freezer forever. Even at standard refrigerator temp, 40°F, 3 to 5 days is the longest you should keep raw meat. Keep in mind, many meats you buy may have already been stored in grocery for several days. So it is best to cook meats soon after you get them home or freeze them. Meat kept in the fridge can still host and grow dangerous microbes, so just because it is chilled doesn't mean it is safe. Cooked meats, if wrapped well, can be kept for up to a week in the fridge before they get risky.

Frozen meats stay good longer. At standard freezer temperature, 0°F, most dangerous microbes cannot grow, so frozen meat can be safe for many months. But remember, freezing does not kill microbes. Oxygen in the packaging can change the flavor and texture of the meat, and the cold can

freeze dry it. When wrapping meat for the freezer, get out as much air as possible wrapping it first with form fitting plastic wrap. If you can, use a vacuum system to suck out the air.

Ground meats have more oxygen mixed in so they start tasting funny sooner than steaks. Pork gets funky faster than lamb which gets funky faster than chicken or turkey, and beef is the last to go.

In general, the bigger the hunk of meat, the longer it will keep. Here's a rough guide that can vary depending on how well you have wrapped the meat:

- **Ground pork and sausage:** 2 months
- **Ground beef or lamb:** 4 months
- **Pork chops:** 4 months
- **Pork roasts:** 5 months
- **Lamb chops:** 5 months
- **Steaks:** 6 months
- **Beef roasts:** 8 months

Why is meat in my fridge turning brown?

At first, oxygen reacts with pigments to turn meat red. After a while, the meat starts to oxidize, which turns it brown, the same way an apple or potato turn brown.

Why does my meat shine like a rainbow?

It is simply a fluke of lighting that strikes the surface just the right way when the surface has been cut on a certain angle. Strictly refraction, not bacteria or an oil slick.

Why is my meat green?

Bad bacteria. Throw it out.

Why are there are dry white spots on my meat from the freezer?

That's freezer burn. It's like frostbite. The meat has probably been in the freezer too long and/or it was not wrapped tight. It is still safe, but the burned parts will probably be dry and bland. Trim it off and cook it, but don't serve it to Mom or the boss.

My meat smells funny, what should I do?

Sometimes meat will smell a bit odd when you take it out of a vacuum sealed plastic bag, but the smell should dissipate within a few minutes. If it still smells funny, then chances are it is funny. Throw it out. Remember: when in doubt, throw it out!

What are those boogers coming out of my burgers and my salmon?

According to the AmazingRibs.com meat scientist, **Dr. Antonio Mata**, hamburger exudates (I call them boogers) are proteins dissolved in water, mostly myoglobin. When burgers are ground, plump muscle fibers are sheared open. As the meat begins to heat, protein and collagen shrink and squeeze out the proteinaceous fluids, which are pink at first, and then they gel and turn tan just like the meat.

In salmon, boogers consist of another group of proteins dissolved in water called *albumin*. The albumin is pushed to the surface by shrinkage caused by heat. Brining helps minimize it, but not always. Salmon boogers can usually be wiped off with a paper towel or a brush. Another good technique is to paint the surface with a simple wash of sweet wine, mirin, or a glaze.

WASHING FOOD AND CUTTING BOARDS

Rinsing meat can remove slimy fluids on the surface, but these are really nothing much to worry about. To be sure there are bacteria in them, but they will be killed instantly when heated. Rinsing is helpful to remove bone chips that might be on the surface from the butchering process because many cuts through bone are made with band saws.

Unfortunately, rinsing meat in the sink cannot remove bacteria which are embedded in the pores and cracks in the muscle surfaces. In fact, rinsing can make things worse by splattering microscopic contaminated droplets onto the sink and counters.

Jennifer Quinlan a food safety scientist at Drexel University in Philadelphia did some famous research in which she showed that rinsing meat aerosolizes tiny droplets of juices laden with bacteria all over the sink, faucet, surrounding counters, dish drains, and yourself.

Although she doesn't discuss it, the problem also arises in washing your cutting board.

She recommends you do not wash meats. But we know you want to. The solution is to turn down the water pressure and be careful not to splash. Or submerge the meat or cutting board in water.

CHICKEN SAFETY

In general, the goal of chicken cookery is to serve safe, tender, moist meat and crispy golden skin without masking the natural flavors. Here is an overview of some techniques we recommend.

Let's start with what you need to know to make sure nobody gets sick when you cook chicken.

A USDA inspector told us, confidentially, that in the plant she is assigned to, the birds are hung by their ankles and the throats are slit within 30 seconds.

Death is said to be painless and instant. *Exsanguination*, the process of draining all blood, takes about a minute. Within 17 minutes they are gutted, defeathered, and dropped into a water chiller for rapid cooling. She “inspects” 35 birds per minute: That’s about one every 2 seconds. It is all no-touch and all the inspectors can see is one side of the bird. All they can catch is something obvious.

After that, the birds may be packaged for sale or butchered to be sold as parts. Nothing is wasted. If the breasts are

removed, the bones are processed to remove any bits of meat and the bones are simmered to make stock.

Obviously the inspectors cannot see bacteria. Research shows that about two-thirds of modern poultry is contaminated with *Salmonella*, *Campylobacter*, or some other pathogenic bacteria. One research project by Consumer Reports found 97% had pathogens and half of them had antibiotic resistant bacteria. But not to worry. Cooking kills bacteria. If you cook poultry properly, you are perfectly safe.

How do so many birds get so yucky? Pathogens are in the soil and in the air. Even in your home. They are everywhere. But there are a lot more on a farm or in a chicken coop. Even free range and organic birds are easily contaminated because

they scratch and peck in dirt and grass that is teeming with bacteria, and because they eat insects, worms, larvae, seeds, etc. They often step in each other's poop and they peck in it, especially in crowded henhouses. You can't prevent it unless you put them in diapers.

Most poultry is grown by “independent” farmers who work under contract to big brand marketers like Perdue or Butterball. They are highly competitive because they know that we shop for bargains so the big brands use efficient, inexpensive, mass production factory farming methods. These concentrated animal feeding operations (CAFOs) are designed to deliver low priced big breasted birds grown to market size in a hurry. Birds are then processed in slaughterhouses and high-speed disassembly lines. During the process, poop can get on the skin of the birds, on the gloves of the workers, on the conveyor belts, and in the water baths that are used to remove feathers and rinse the meat. It is practically impossible to prevent contamination, and, yes, it happens on small organic farms, too.

That’s why you should handle raw chicken like kryptonite. For safety when handling chicken at home, thoroughly wash your hands, tools, counter tops, cutting boards, sink, platters, and anything that contacts uncooked poultry. The best solution, pun intended, is to buy an empty spray bottle at the drug store and fill it with a dilute solution of water and household bleach. Bleach is a powerful sanitizer. That's why they put it in swimming pools. The USDA recommends one tablespoon of good old fashioned 5% unscented, liquid chlorine bleach per gallon of water. Store the bleach solution

in the bottle, tightly sealed, and use it often. It will remain potent for months. Interestingly, undiluted bleach can lose potency with age, so use fresh bleach. And just out of an abundance of caution, we'll often double or triple that one tablespoon. Lastly, regardless of what you've read, vinegar, acids, and other compounds do not work. Ask a microbiologist. We did.

After washing your cutting board, knives, meat grinder, counters, and sink, thoroughly wet their surfaces with the bleach solution and allow it to stand for several minutes. Rinse with clear water and air dry or pat dry with clean paper towels that can be discarded. Cloth towels are germ carriers. Sponges are nurseries for germs.

But don't wash poultry itself. Rinsing poultry in the sink cannot remove pathogens that are often embedded in the muscle. Jennifer Quinlan, a food safety scientist at Drexel University in Philadelphia said in an interview on NPR "If you wash it, you're more likely to spray bacteria all over the kitchen and yourself." Then you have contamination in the sink and probably on the dishes in the dish drain next to the sink as well as the faucet.

Cooking will pasteurize the meat (pasteurization is not just a term used for milk: It means that you have killed enough bacteria to make any food safe). Neither a clock nor a visual inspection can tell you when food is safe. Only a digital thermometer can do this. Always use a digital thermometer to monitor a bird's doneness temperature.

Your target temperature is 160°F in the deepest part of the breast and 170 to 175°F in the thigh. Once upon a time the USDA said a minimum to shoot for a minimum of 175°F in the breast, but it revised its guidelines in 2006 to 165°F, so older cookbooks are now out of date.

What the USDA doesn't tell you, because they don't want to confuse you, is that pasteurizing meat is not just a matter of temperature. Pasteurization is a combination of temperature and time. In other words, according to USDA figures, you can make chicken safe by cooking it to

- **165°F for seven seconds**
- **160°F for 12 seconds**
- **154°F for 2 minutes**
- **150°F for 5 minutes**
- **140°F for 35 minutes**

The lower the temperature the moister the meat. The texture is also different.

Chicken is more moist at 160°F than 165°F. So we recommend 160°F for 12 seconds for a finished temperature.

And yes, you can poke it many times with a thermometer and it will not dry out. Meat is about 75% water, so a 4-pound bird is about 3 pounds of water. A few drops escaping from poking a thermometer into the meat will not make your bird dry.

THE MYTH OF PINK JUICES AND PINK MEAT

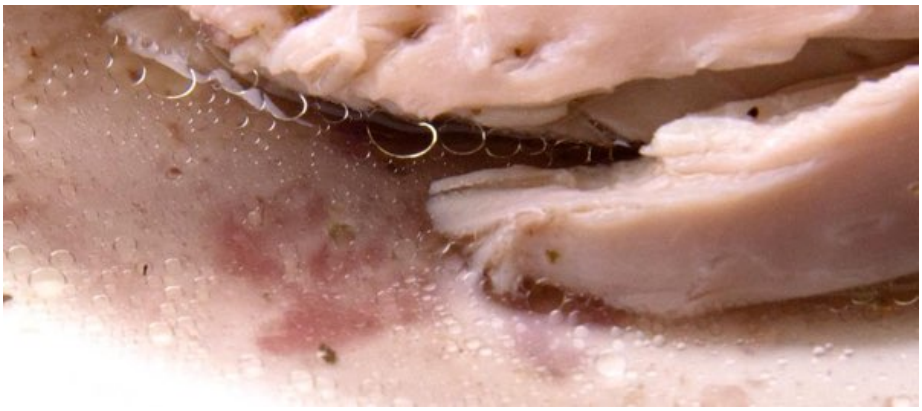
How many times have you read "cook chicken until the juices run clear?" It's a myth and it lives in hundreds of cookbooks and thousands of websites.

Nothing is more embarrassing than having to take pink meat off a guests' plates and run it back out to the grill while they discard the "contaminated" side dishes and get clean plates. Been there done that?

Lately we have noticed that this mishap happens even though the meat is cooked to a safe temperature. What is going on here? Two separate phenomena: Pink juices and pink meat.

PINK JUICES

Once upon a time clear juices may have correlated with safe meat. Sadly, nowadays, following this morsel of common wisdom can result in either illness or badly overcooked meat.



Pink meat and thin pink juice is due to a pink protein called *myoglobin*. When myoglobin is cooked the color changes, and meat and juices lose their pink tint. So the question is, at what temperature does myoglobin change color? It turns out that there is no fixed temperature at which this happens because other factors come into play.

We spoke to a research scientist at a major chicken processor who prefers that we not use his name. He explained that the acidity (pH) of the meat is a major factor. “When the muscle is high in pH [low in acid] it takes a much higher temperature to denature the myoglobin. The meat may need to be 170 to 180°F before the myoglobin in breasts is denatured sufficiently to see clear juices. The drumstick and thigh have higher levels of myoglobin and they require an even higher internal temperature to denature it. Typically we cook drums or thighs to 175 to 180°F in our plant to make sure no pink remains.”

Conversely, if the muscle pH is low then the myoglobin is denatured at a lower cooked temperature. This means that one might potentially see clear juices at 150°F and this is not safe.

What causes the pH to be high or low? “Muscle pH fluctuations are typically a function of genes and pre-slaughter stress conditions. Stress may occur during catching, transportation, holding at the plant and unloading the birds. Climatic conditions can also have an impact. These are all things we try to control since meat [from these animals] will not retain moisture during further processing. This leads to a less juicy product for the consumer, and yield loss, which is money to us.”

PINK MEAT

The chicken thigh with the purple bone below was cooked to 180°F. It is well past safe. It is also scary. Dr. O. Peter Snyder the Hospitality Institute of Technology and Management reports that red or purple bones are more common because “Chicken is so young [at slaughter] and the bones are too porous.”

Red or purple is the color of bone marrow because that's where blood is made. As birds age, more calcium is deposited on the exterior of bones so the blood in the marrow becomes less visible. According to Dr. John Marcy, Professor and Poultry Processing Specialist at the University of Arkansas "The dark color next to the bone is even more pronounced in chicken that has been frozen." The USDA says "This is an aesthetic issue and not a safety one."

Sometimes the purple in bones can discolor the meat touching them and the meat remains pink even though it is safely cooked.

Sometimes the pink color can come from nitric oxide (NO) or carbon monoxide (CO) produced by the cooker. NO and CO can be byproducts of combustion in gas ovens and grills, as well as charcoal and wood grills. The USDA says "Often meat of younger birds [can be] pink because their thinner skins permit oven gases to reach the flesh. Older animals have a fat layer under their skin, giving the flesh added protection from the gases. Older poultry may be pink in spots where fat is absent from the skin."

Pink meat can take the form of a distinctive band called a smoke ring right below the surface. It is caused by NO and CO in smoke locking in the pink color of myglobin near the surface when the meat is smoked. Because these gases cannot penetrate far there is a pink layer beneath the skin. Every barbecue restaurant can tell you about customers who send smoked chicken back because of the smoke ring and they think it is raw. Of course, if it was undercooked the pink

would be in the center, not on the surface. Click here to read more about smoke rings and what causes them.

Another way meat can be pink is from nitrates and nitrites used when curing meats. That's why hot dogs, bacon, corned beef, and Disney turkey legs are pink. These compounds can occur naturally in feed or water, causing a pink color.

The clear juices and pink meat rules may have been true once upon a time, but (ahem) clearly they are not true any longer! You cannot tell if poultry is safe by merely looking at the meat, at the bones, or at the juices as is said in most cookbooks. You must get a good digital thermocouple thermometer.

This myth is thoroughly busted.

HAZARDOUS FOODS

FOOD ALLERGIES

The Food Allergen Labeling and Consumer Protection Act requires that food packaging must declare prominently if it contains any of the eight most common food allergens: Milk, eggs, peanuts, tree nuts, fish, shellfish, soy, and wheat.

A good host will always ask guests in advance if they have any food allergies and either plan a menu that omits them, or plan a special dish for the guest with the allergy. Of course it is also the guest's obligation to inform the host so when dinner is served the host doesn't feel bad that the guest pushes away the plate.

The whole thing gets a bit complicated when people who don't have an allergy or celiac disease, but they have decided to avoid gluten or another food that they think is bad for them.

Common sense, courtesy, tolerance, and communications need to be the watchwords.

OTHER HAZARDOUS FOODS

So a food safety expert from the FDA was giving a seminar on food safety at a culinary school. Near the end of the talk she touched on the fact that some foods have effects that are cumulative and the hazard might not be evident for decades. She asked the audience if they could think of an example. After a few moments of silence an old codger in the front row raised his hand and mumbled “wedding cake.”

KNIFE SAFETY

Be alert and focused when using knives and sharp objects. Beverage alcohol and knives is a dangerous combo.

- Use sharp knives.
- Do not gesture and waive with knives in your hands.
- Always use a cutting board. Never cut anything in your hand.
- A damp towel or paper towel under a cutting board can help keep it from shifting.
- Make sure you have plenty of elbow room when cutting.
- If you drop a knife, get your feet out of the way and don’t try to catch it! Wait for the knife to stop moving before trying to pick it up.
- Never open cans with a knife. I don’t care what you saw on Iron Chef.
- Never use a knife as a screwdriver.

GRILL, SMOKER, OVEN, AND STOVETOP SAFETY

Grills, smokers, sideburners, and indoor ovens and stovetops can do massive damage to property and life if not treated with respect

- Never cook with grills or smokers indoors or in garages. They produce invisible carbon monoxide and smoke that can kill you.
- Don't keep your grill next to a furnace air inlet or even a window. The house is often under a negative pressure, and can suck in these killing gases.
- Don't keep your grill close to your house or deck railings. Beware of overhanging roof lines or trees.
- Never use gas, paint thinner, solvents, or kerosene to start your charcoal. **Chimneys or electric coil starters are the best way to start coals**, but if you use charcoal starter fluid, once the coals are smoldering never squirt them with more fluid. The flame can climb up the stream and set you on fire.
- Don't cook near gasoline or other flammables. Keep propane tanks at least two feet from the burners

unless there is shielding.

- On gas grills, always lift the lid when you ignite the burners. If you have one burner lit and want to add others, it is safe, just open the lid. A gas buildup under the hood could blow it open and flash in your face.
- On kamados and eggs, the lid seal is very tight so when you open it, air rushes in and it can flash flame in your face. Stand back and open the lid slowly.
- Store propane cylinders outdoors in an upright position.
- If you smell gas, turn off the grill immediately. On New Year's Day 2013 ESPN host Hannah Storm returned to the air with a bandaged hand, a wig, false eyelashes and eyebrows. She was injured when trying to ignite her propane grill after the wind blew the flame out. Unbeknownst to her, the gas continued to course through the jets and pooled in the lower chamber because it is heavier than air.
- Handle hot grills, coals, and hot liquids with respect. Be alert. No horseplay near cookers.
- Keep children and pets away from grills and smokers, uncooked meat, hot liquids, and sharp objects.
- Use potholders and/or insulated gloves.
- Do not discard ash until the coals are thoroughly dead. Let them sit overnight or dump water on them before you put them in your trash can.
- Bare feet, sandals, flip-flops, and loose clothes are dangerous around grills.

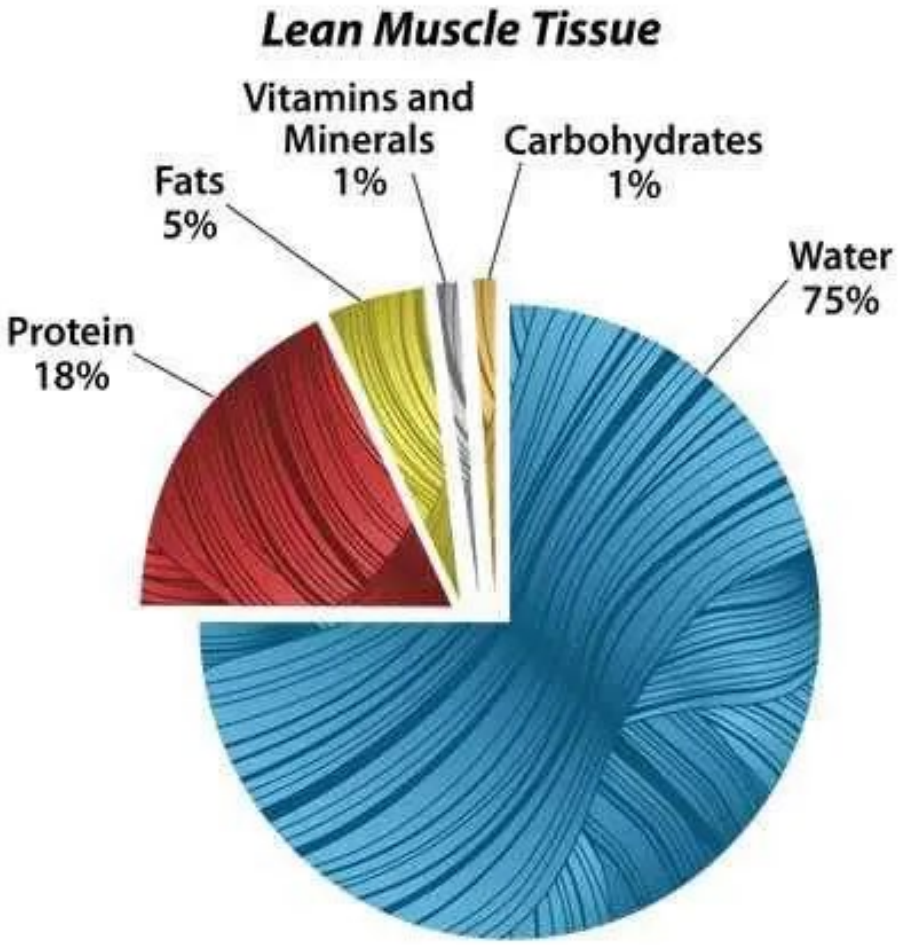
- Don’t put small grills on flammable surfaces or glass tables.
- Before you use a new grill or smoker, fire it up on high and let it run for about 30 minutes to burn off any oil or grease or packing materials from the manufacturing process or from shipping. Click here to read more about **Seasoning and Calibrating a New Grill or Smoker.**
- Save the grill manual and remember where you put it.
- If you have long hair, tie it in a pony tail. And grilling is yet another great excuse to not wear a tie.
- If you pour water over hot coals, it will produce enough steam to melt your nose, and enough hot water will come out of the bottom to melt your toes.
- Heat the grates to high before cooking and carbonize grease and scraps from your last cook. Then scrub them off (read **more about grate cleaning**). If you use a wire brush, beware that bristles can come out and people have died from wire bristles that lodge in their digestive system. Before the food goes on, use a damp cloth and tongs to wipe off the grates and visually inspect them.
- Make sure handles of pots and pans are not sticking out over the edge of a table or counter where people walking by can bump them.
- Do not fill pots to the brim. Liquids expand when they are heated.
- If you put a wet liquid into hot oil it will spit hot oil at high velocity right at your eyes with deadly accuracy.
- Keep pets away from the front of the stove.

PART IV
SCIENCE

Whenever you set foot in the kitchen or sidle up to the grill or smoker, you commence a chemistry and physics experiment. Food is a complex chemical compound and when you apply energy in the form of heat you are using physics to alter its chemistry. As scientific as these processes are, they are also magical!

We could just feed you a bunch of recipes and techniques, but if you understand the chemistry and physics, well, you really don’t need any recipes!

MEAT SCIENCE



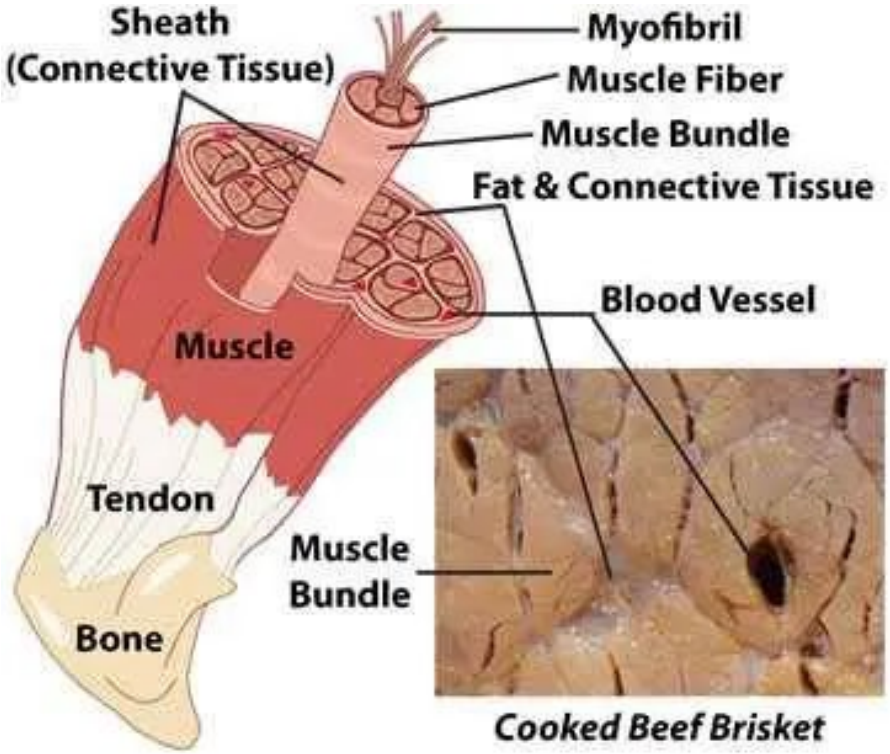
Meat is cut from the muscles of mammals and birds. For some reason, fish muscle is not

considered meat by some people, but it should be. It is fish muscle tissue.

On average, lean muscle tissue of mammals typically breaks down like this: Water (about 75%), protein (18%), fats (5%), carbohydrates, salt, vitamins, sugars, and minerals (2%).

MUSCLE CELLS

Muscle cells are more frequently called *muscle fibers* because they are shaped like tubes. Muscle fibers bundled together are called *sheaths*, and sheaths bundled together are called *muscle or meat.*



The fibers, about the thickness of a human hair, contain several types of protein, among them *myosin* and *actin* which

bind up water and act like living motors by contracting and relaxing on command by nerves. As an animal ages, grows, and exercises, its muscle fibers get thicker and tougher.

Myoglobin is another important protein in muscle fibers. Myoglobin receives oxygen and iron from *hemoglobin* in blood, fuel necessary for muscles to function. Myosin and actin are not water soluble, but myoglobin is water soluble, and myoglobin is the protein in meat that makes it appear red.

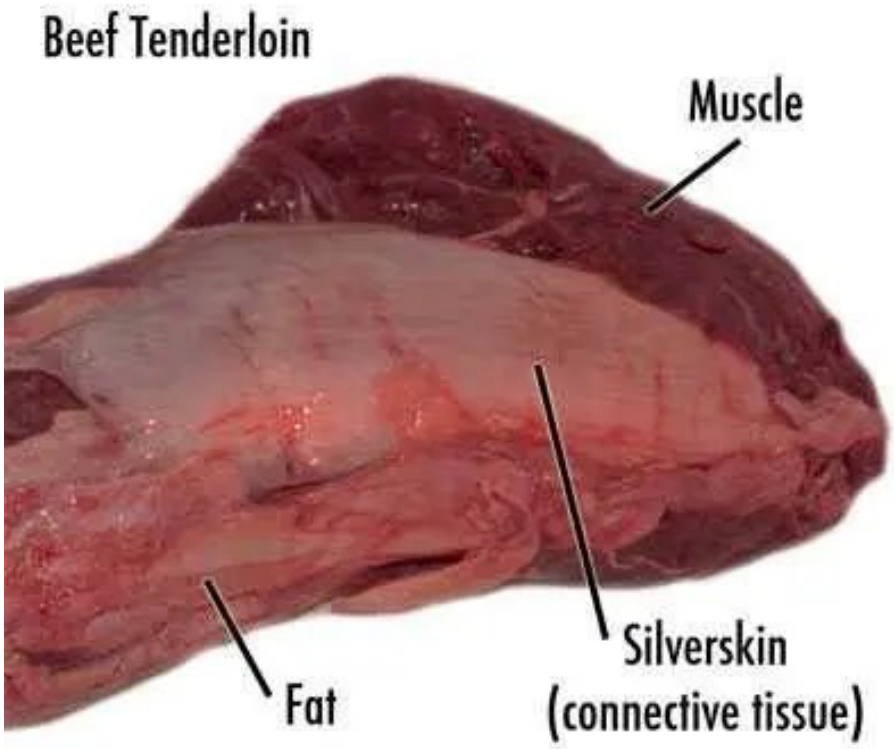
That's right, the reddish color in meat and its juices *is not caused by blood.* It is myoglobin dissolved in water, called *myowater*. Myoglobin is found only in muscle, not in the blood stream. The blood is pretty much all drained out in the slaughter house. If the stuff on your plate when you sliced a

steak was blood, it would be much darker, like human blood, and it would coagulate, like human blood. If the fluids were blood, then pork and chicken would be dark red. It's mostly just water, so let's stop grossing out our kids, and just call it juice. OK? **Every time you call meat juices blood, a bell rings and a teenager becomes a vegan.**

On average, beef has 8 milligrams of myoglobin per gram of meat, **according to the meat scientists at Texas A&M University's Department of Animal Science**, making it one of the darkest red meats. Lamb has about 6 milligrams per gram, pork about 2 mg/g, and chicken breast about 0.5 mg/g. If pork is the other white meat, lamb is the other red meat. When warmed, meat juices containing myoglobin lose their red color, become lighter pink, and eventually tan or gray.

Most of the liquid in meat is water. When animals are alive, the pH of the muscle fibers is about 6.8 on a scale of 14. The lower the number, the higher the acidity. The higher the number, the more alkalinity and less acidic. At 6.8, living muscle is just about neutral. When the animal dies, the pH declines to about 5.5, making it acidic. At this pH, muscle fibers form bunches and squeeze out juice, called purge, and that is the juice you see in packages of meat that is absorbed by the diapers that butchers put under the meat.

Muscle fibers also contain other proteins, notably, enzymes. **Enzymes play an important role in aging meat**.



CONNECTIVE TISSUE

Connective tissue is most obvious in the form of tendons that connect muscles to bones and in ligaments that connect bones to other bones. It is also visible as the thin shiny sheathing that wraps around muscles called silverskin or fascia. These tougher, chewier, rubberband-like connective tissues are mostly *collagen* and *elastin* (as opposed to the muscle, which is mostly *myosin*.) We call them gristle and they shrink when heated and become hard to chew. As with muscle fibers, connective tissues thicken and toughen as an animal exercises and ages.

A softer connective tissue called *collagen* is scattered throughout the muscle, often surrounding fibers and sheaths

holding them together. And yes, this is pretty much the same stuff the Hollywood wives have injected into their faces to get rid of wrinkles.

When you cook, collagen melts and turns to a rich liquid called *gelatin*, similar to the stuff Jell-O is made from. Cooked muscle fibers, no longer bound together by collagen, are now uniformly coated with a soft, gelatinous lubricant. This smooth and sensual substance enrobes meat in a wonderfully silken texture and adds moisture.

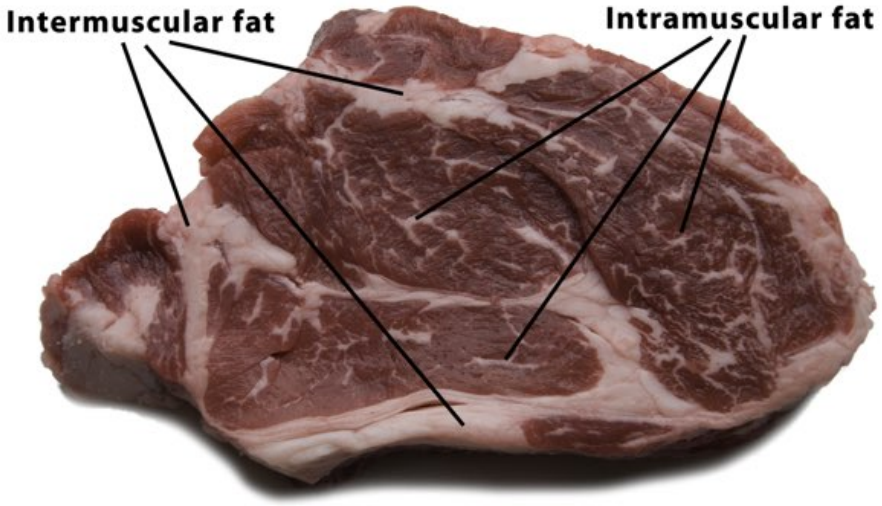
Lean meats such as beef or pork tenderloin, as well as most chicken and turkey, don't have much collagen. When cooking tough cuts of meat with lots of connective tissue, like ribs, brisket, and shoulder, it is important to liquefy the meat's connective tissue into gelatin: that's what makes these tough meats taste tender. This takes time. That's why these cuts are often cooked low and slow.

Muscle fibers start seizing up around 125°F to 140°F if heated quickly. But when heated slowly, the rubber band-like connective tissues have time to relax and do not squeeze tightly. In general, we believe it is best to cook all meats at about 225°F. Slow roasting does wonders for meat. The AmazingRibs.com science advisor **Prof. Greg Blonder** says "Think of silly putty. Pressed hard and quickly, it acts like a rigid solid. Pressed slowly, it flows." When heated slowly, the muscle fibers, instead of wringing out moisture, relax and simply let water linger inside until evaporation drives it out.

After it melts, as it chills, gelatin can solidify into that jiggly stuff which, with a little filtering, can then be called aspic and served at bridge clubs. Here's a pot of the stuff made simply by boiling a couple of chicken carcasses in water after I ate the meat, discarded the bones, and chilled the liquid. The white is fat, most of which I have removed, and the tan is jiggly gelatin.

FATS

Fats (*lipids*) and oxygen are the main fuels that power muscles. Fats are packed with calories, which are potential energy released when the chemical bonds are broken. From a culinary standpoint, fat comes in three types:



- **Subcutaneous** fats are the thick hard layers beneath the skin.
- **Intermuscular** fats are layers between muscle groups.
- **Intramuscular** fats woven amongst the muscle fibers and sheaths improve meat's moisture, texture, and flavor when cooked. These threads of intramuscular fat are called marbling because they have a striated look similar to marble.

Large fat deposits can also be found around organs, especially kidneys. On hogs, the best fat of this type, at least from a culinary standpoint, especially if you make pie crusts, is called leaf lard, and it comes from around the kidneys.

Fats are crucial to meat texture. Waxy when cold, fats start to melt around 130°F to 140°F, lubricating muscle fibers just as they are getting tougher and drier from the heat. Fat does not evaporate like water when you are cooking.

Fat also provides much of the flavor in meat. It absorbs and stores many of the aromatic compounds in the animal's food. As the animal ages, those flavor compounds build up and get more noticeable. After the animal is slaughtered, the fat can turn rancid if stored too warm, too long, or in contact with oxygen. So we have a tradeoff. The muscle fibers and connective tissues get tougher as the animal ages and exercises, while the fat accumulates and builds flavor.

Fats, especially animal fats, are the subject of great debate among scientists, doctors, dietitians, and health faddists. For many years, animal fats were thought to be dangerous and avoided. It is now thought that fats, even animal fats, contain many beneficial components, and current science argues that, in moderation, they are essential for health. A great deal of interesting research on the subject is going on as we write this. A great deal of research is contradictory. **Read more about what we have learned about food and health in this article**.

SLOW TWITCH VS. FAST TWITCH MUSCLES

Muscle fibers need fat and oxygen for fuel. Fat comes from fatty acids in the animal's blood that were created by digestion of its food. Oxygen is carried by the protein *hemoglobin* in the bloodstream, and it hands the oxygen to myoglobin within the muscles.

In general, the more exercise a muscle gets, the tougher it is, and the more oxygen-laden myoglobin it needs. Myoglobin turns meat darker and makes it more flavorful. Dark meats,

like beef, lamb, duck, and goose, are made of “slow twitch” muscles that have evolved to endure slow, steady movement, and they are loaded with juicy myoglobin. Dark meats also have more fat for energy.

White meats, like chicken breasts, are mostly “fast twitch” muscles, which are better suited to brief bursts of energy, and they have less myoglobin. Chicken legs are slow twitch, and even though they are not red, they are darker than breasts. When cooked, the slow twitch muscles in dark meat have more moisture and fat and are more flavorful than white meat. White meats contains less moisture and fat, and they dry out more easily when cooked. Poultry gets more exercise standing and walking than flying, so the legs and thighs have lots of slow-twitch muscles, more pigment, more juice, more fat, and more flavor. They are also slightly more forgiving when cooked. Modern chickens and turkeys have been bred for large breasts because white meat is more popular in this country (and we can’t understand why). We’ll take tough and flavorful over tender and mild any day.

Ducks and geese excel at flying and swimming, and they get more exercise than chickens and turkeys, so these birds have more dark meat. Duck and goose breasts are deep purple, almost the same color as lamb or beef.

When the conventional wisdom was that dietary fat could cause heart and arterial problems, domestic pigs were bred to have less intramuscular fat. The modern pig does not get much exercise due to its transmogrification into “the other white meat.” In recent years, research has questioned the

relationship between dietary fat and health, and many experts now extol fat's benefits.

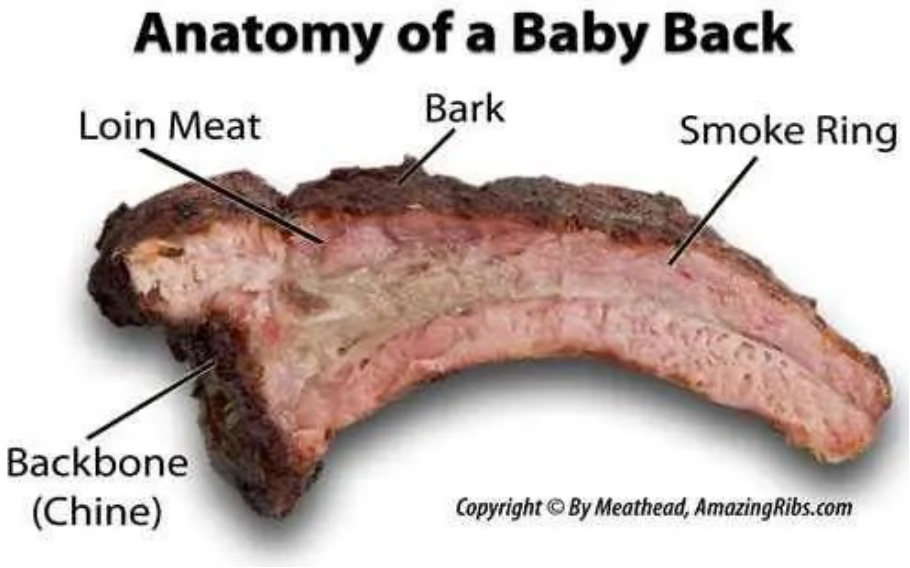
Beef is all pretty much the same color, but slow twitch muscles like flank steak have bigger, richer flavor than some of the lesser used muscles like tenderloin.

Fish live in a practically weightless environment, so their muscles are very different. Fish muscles have very little connective tissue, and that's one reason why fish never gets as tough as pork when cooked. But fish can dry out because there is not much collagen to moisturize the muscle fibers. The color and texture of fish varies depending on the life it leads. Small fish that swim with quick darting motions have mostly fast-twitch muscles and white meat, while flounder, which lives on the sea floor, has delicate flaky flesh. Torpedos like tuna and swordfish swim long distances with slow steady tail movements, so they have have firmer, darker, sometimes even red flesh. For these reasons and others, fish can spoil within days of being caught, while red meats keep much longer.

BROWN IS BEAUTIFUL, BLACK IS BAD

As meat cooks, the most magical transformation that occurs is the *Maillard reaction*. It is named for a French scientist who discovered the phenomenon in the early 1900s. The surface turns brown and crunchy and gets ambrosial in aroma. Who doesn't love the crispy exterior of a slice of roast beef, the browned crust on freshly baked bread? We don't think twice about it, but that brown color on the surface is the mark of hundreds of compounds created when heat starts changing the shape and chemical structure of the amino acids, carbohydrates, and sugars on the surface of the meat. If there is sugar in the rub or marinade it can undergo a flavorful transformation called *caramelization*. Click here to learn more about the **Maillard reaction and caramelization**.

What you don't want is black meat. Let it go too far and it turns to carbon. **Carbonized meat may be unhealthy**.



There's another color you may notice in cooked meat: Pink. Many smoked meats turn bright pink just under the surface. Some people think that pink color means that meat is raw, but not in this case. If the meat were undercooked, the pink would be in the center, not just below the surface. Pink meat near the surface is a common phenomenon called the *smoke ring* and it is caused by gases in smoke preserving the color of myoglobin. Some people think the smoke ring improves taste. That's a myth too. **Click here to read more about the smoke ring and what causes it**.

WHAT HAPPENS WHEN YOU COOK?

Hot air cooks the surface of meat, but it cannot penetrate, so the energy built up on the outside of the meat moves slowly towards the center, eventually cooking the meat throughout. As the internal temp of your meat rises, its color is not the only thing that changes. A number of chemical and physical reactions take place, as the molecular structure of proteins

and fats are altered by heat. Different reactions kick in at different temperatures.

Here's a general guide to temperatures organized from cold to hot. The meat temps shown here are approximate because other variables come into play such as the age of the animal, acidity, salt content, type of heat, humidity, etc. This info has been gathered from multiple sources, including meat science research papers, textbooks, and **Harold McGee's important book, On Food And Cooking**. Click here for a **complete guide to target cooking temperatures**.

25°F (-4°C). Meat freezes. Meat starts to freeze at a lower temperature than water because water in meat is combined with proteins. Water expands as it freezes and sharp-edged crystals form that can rupture cell walls, creating "purge" when the meat is thawed, which is a spilling of liquid, mostly the pink fluid protein called myoglobin. Faster freezing makes smaller crystals, resulting in less purge.

34-39°F (1-4°C). Ideal refrigerator temperature. Water is not frozen, and microbial growth is minimized. You do have **a good refrigerator thermometer don't you**?

41-135°F (5-57°C). The "USDA Danger Zone," in which many pathogenic bacteria grow, sometimes doubling in number in as little as 20 minutes. According to the USDA, cold foods must be stored below 41°F (5°C), and hot foods above 135°F (57°C). **That's why we don't leave meats sitting around to come to room temp**.

60°F (15°C). When chilling cooked meat, liquid gelatin forms a solid gel called aspic. Gelatin happens when connective

tissues that wrap muscle fibers and connect them to bones, called collagen, melt. Yep, it's the same stuff they inject under your skin to hide wrinkles.

95-130°F (35-54°C). Animal fats start to soften and melt.

114°F (46°C). Myofibrillar proteins begin to gel, changing meat texture.

120°F (49°C). Myosin, a protein involved in muscle contraction within fibers, begins to lose its natural structure. It unwinds or unfolds, a process called denaturing. It starts to clump, gets milky, and begins firming up the muscle fibers. Purple meats, called "rare," start turning red. Fish begins to flake, and parasites begin to die.

130°F (54°C). Many pathogenic bacteria begin to die, slowly at first, but as the temp rises, they croak more rapidly. At this temp, it takes more than two hours to pasteurize meat. At 165°F (74°C), it takes just seconds.

130-135°F (54-57°C). Medium rare. Most mammal meats are at optimum tenderness, flavor, juiciness. If you eat your meat well-done, you need to snap out of it.

130-140°F (54-60°C). Fats begin to liquefy, a process called rendering. This is a slow process and can take hours if meat is held at this temp.

140°F (60°C). Connective tissues called collagens begin to contract and squeeze out pink juice from within muscle fibers into the spaces between the fibers and out to the surface. Meat begins to get dry. Myoglobin, the pink protein liquid within muscle cells, denatures rapidly and red or pink

juices begin to turn clear or tan and bead up on the surface. It is not blood!

150°F (66°C). Actin, another protein important to muscle contraction in live animals, begins to denature, making meat tougher and drier still.

150-165°F (66-74°C). This is "**the stall zone**," in which large cuts such as pork butt and beef brisket seem to get stuck for hours when cooked at low temperatures like 225°F (107°C). In this range, moisture evaporates and cools the meat like sweat on an athlete. Inexperienced cooks panic. Eventually, temps start rising again. Whew!

155°F (68°C). Known as "well done," meats are overcooked at this internal temperature. Much moisture has been squeezed out, and fibers have become tough. Bacteria are killed in less than 30 seconds, but spores can survive to much higher temps.

160-165°F (71-74°C). The "instant kill zone." Normal cooking temps kill microbes on the outside of meats rapidly, so solid muscle meats are not likely dangerous since contamination is almost always on the surface. But ground meats and poultry often have bad guys beyond the surface, so you must cook these meats beyond the instant kill zone. That's why the recommended internal temp for ground meats is 160°F (71°C) and for poultry is 165°F (74°C). When you reheat foods, you should take them up to 165°F 75°C).

160-205°F (71-96°C). Tough collagens melt and form luscious gelatin. The process can take hours, so low and slow cooking creates the most gelatin. Dehydrated muscle fibers

begin to fall apart and release from the bones. Meat becomes easy to shred. Even though the fibers have lost a lot of water, melted collagen and fat make the meat succulent.

212°F (100°C). Water boils at sea level. Boiling point declines about 2°F for every 1000′ above sea level.

225°F (107°C). Ideal air temperature for "low & slow" cooking of meats high in connective tissue. It is high enough so water evaporates from the surface to help form the desired crust called "**bark**," but low enough to get the most out of enzymes, collagen melting, and fat rendering.

310°F (154°C). The **Maillard reaction** accelerates surface browning, which is caused by chemical changes in proteins and sugars and results in thousands of delicious new molecules. The Maillard reaction begins at lower temps, but really takes off at 310°F (154°C).

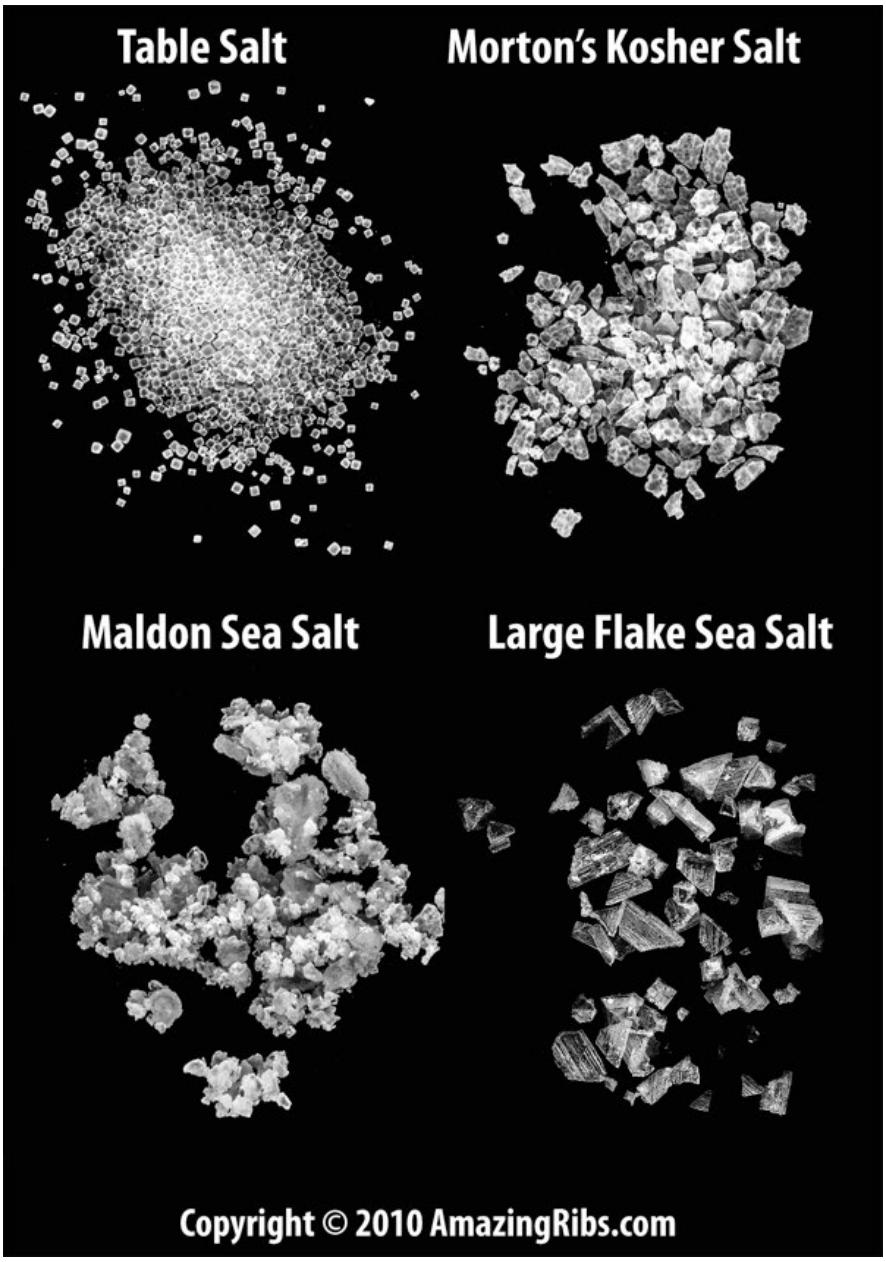
325°F (163°C). Ideal air temperature for cooking chicken and turkey so skin browns and fat renders.

361°F (183°C). Some animal fats begins to smoke.

570-750°F (299-399°C). Primary combustion temperature of hardwood, wherein it smolders and releases large quantities of unburned gases, including microscopic particles called smoke.

600-700°F (316-371°C). Flash point or fire point, the temperature at which smoke from burning fat can burst into flame. Never use water to extinguish burning fat. Smothering it works better.

SALT: THE MAGIC ROCK!



"One thing I like about Argentina, they only cook with salt. That's it."

— ROBERT DUVALL

If you like your meat juicy, tender, and flavorful, (and who doesn't?) salting, also called brining,

before you cook can improve it on all three fronts.

Salt does several things to the food. First of all, it amps up the taste because salt is a flavor enhancer. It does this without altering the flavor. Sugar, pepper, garlic, all the other spices and herbs change the flavor. But not salt. Salt turns the amp up to 11. And if you do it properly, it doesn't make the food taste salty.

First, it is important to know that all salt is not the same. The below quantities by volume have the same salinity because the grain sizes are different.

- **1 part Table Salt**
- **1 part Morton's Picking Salt**
- **1.3 parts Morton's Coarse Kosher Salt**
- **1.3 parts Windsor Kosher Salt**
- **2.1 parts Maldon Sea Salt**
- **2.3 parts Diamond Crystal Kosher Salt**

For more on the subject of how salt impacts food, read Meathead's article on The Science of Salt. It contains an interactive salt calculator and much more info about the different kinds of salt.

Something else happens because of salt. When meat cooks, a significant amount of water evaporates from the surface and some gets squeezed out from muscle fibers that contract when exposed to heat. This water is called drip loss or purge. Lean cuts like chicken breasts can dry out easily. How do you cook these cuts to safe temperatures without turning them

into shoe leather? Surprisingly, salt can help because it helps protein glom onto water.

Salt (NaCl) is made of sodium (Na) and chloride (Cl) ions that carry electrical charges. These ions attack the proteins, causing them to unwind a bit, a process called denaturing. These altered proteins have a greater ability to retain water, so meats that have been pre-salted remain moister throughout the cooking process.

Researchers at *Cooks Illustrated* discovered that a chicken soaked in plain water and another soaked in a brine, a mix of salt and water, each gained about 6% by weight. They cooked both birds, as well as an unsoaked bird straight from the packaging. Weighed after cooking, the unsoaked chicken lost 18% of its original weight, while the chicken soaked it water lost 12% of its original weight, and the brined chicken lost 7% of its weight. Thus, brining counteracts one of the biggest problems of grilling by helping hold moisture that is near the surface, which almost always dries out by the time the center is properly cooked.

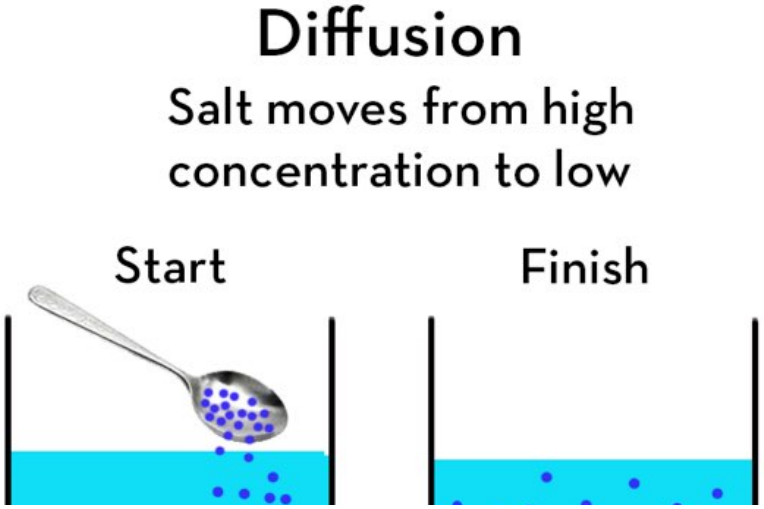
So salting before cooking, brining, has real benefits. And you need less than if you salt after cooking. And the amount of salt is small, not likely a risk to people on salt restricted diets.

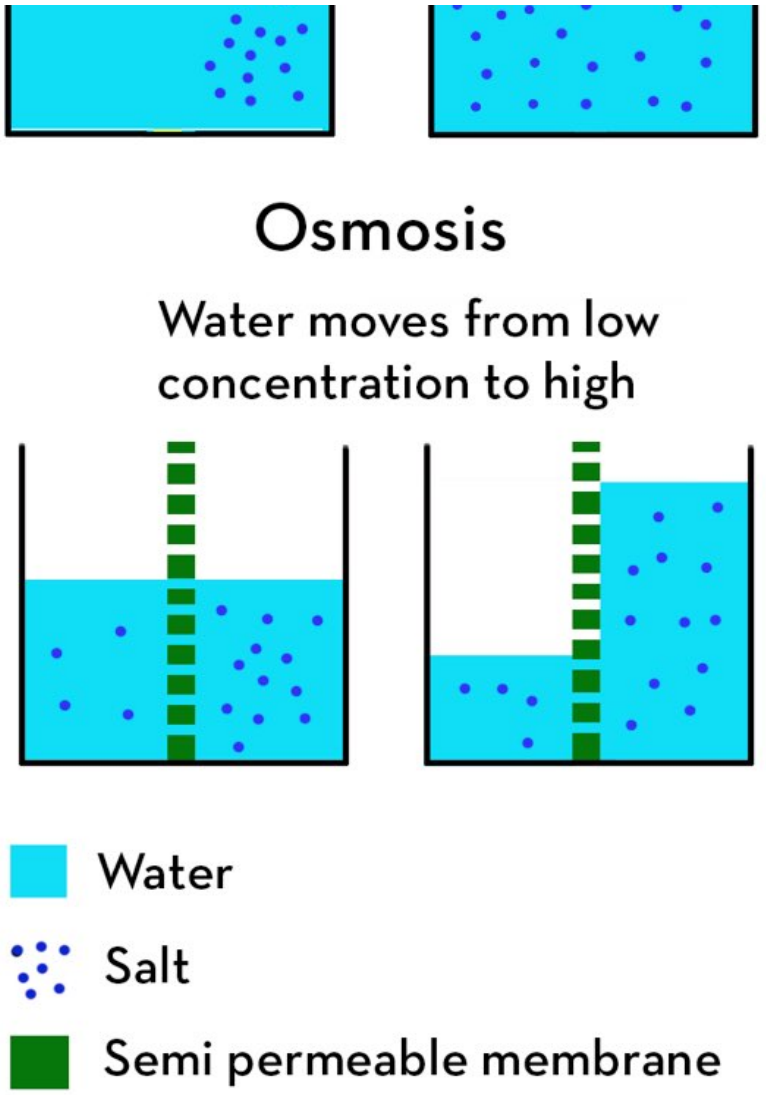
There are four ways to brine: Wet brine, dry brine, brinerade, and injection. Here they all are defined.

WET BRINE

This is the traditional method of salting meat, submerging it in a solution of 5 to 10% salinity (the ocean is about 3.5% salinity). To wet-brine, you need to calculate the amount of water and the amount of salt, and after that you have a potentially large container that must be fit into the fridge.

Cookbooks tell us that salt is pulled out of the brine and into the meat by osmosis. Not true. The process is actually called diffusion. Take a look at this illustration.





When salt is added to a solution, like a piece of chicken which is about 75% water, the salt diffuses or spreads out and seeks equilibrium. Osmosis is when the water moves into salty places through semi-permeable membranes in an attempt to achieve equilibrium.

The problem with wet brining poultry is that it can make the skin soggy and harder to crisp. That's why wet brining works best on boneless, skinless breasts—food that cooks so

quickly that the absorbed moisture doesn't have time to drip out. Chicken thighs, on the other hand, are moist enough from fat that they really don't need wet brines.

If you decide to wet brine, the brine should contain 5 to 10% salt by weight. Here's a simple formula. Add one cup of hot water to a two-cup measuring cup. Then pour in salt, any salt, until the water line reaches 1 ½ cups. That will be *about* 1/2 pound of salt by weight. Stir to dissolve then dump the solution into 1 gallon of cold water. This recipe results in a 6.4% brine regardless of the grain size of the salt.

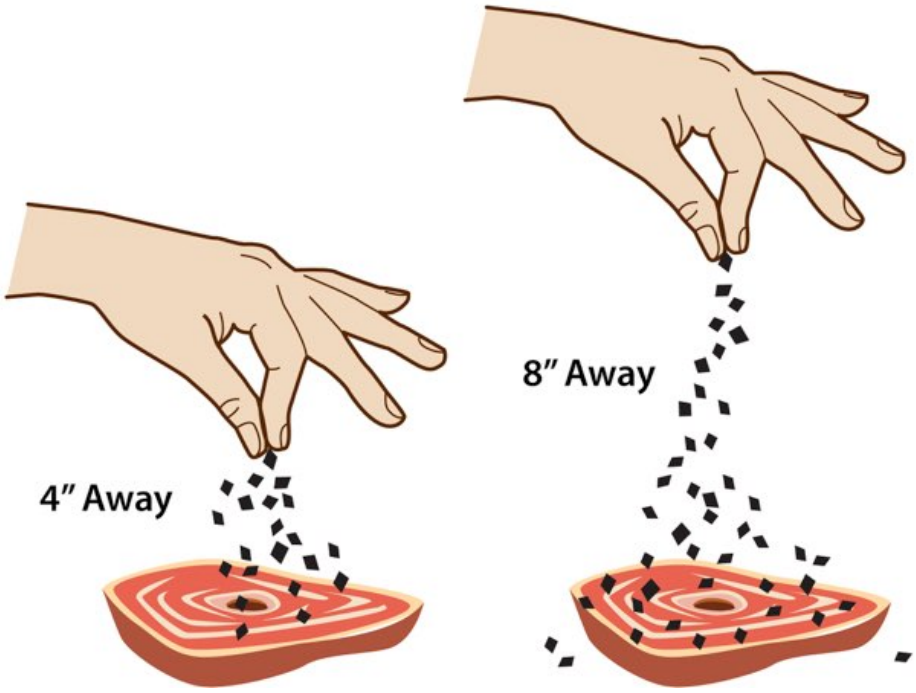
How do we know? Because a unit of salt by weight delivers the same salinity regardless of the grain size. A unit of salt by volume delivers different salinity because large grains have more air between them. In this recipe, the water infiltrates the voids between the grains of salt, compensating for the lower density.

Making brines is also easy with metric weight measurements, which are simple to scale up or down. Since 1 liter water = 1000 grams:

- **6% brine = 1 liter water with 60 grams any salt**
- **5% brine = 1 liter water with 50 grams any salt**
- **4% brine = 1 liter water with 40 grams any salt**

What's the right ratio of meat to brine? In general, soak 1 part meat in 2.5 parts brine. So for a 3 pound chicken (about 1.4 kg) use 3.5 kg of wet brine.

DRY BRINE



Dry brining is simpler and equally effective, plus it takes up less fridge space. Just skip the water. The late, great chef Judy Rodgers of Zuni Cafe. in San Francisco brought the technique of dry-brining into the mainstream, and since discovering her process, which Meathead named dry brining, we almost never wet brine anymore.

To dry brine, you simply salt the meat before cooking. How much salt? Salt tolerance is so personal that it's nearly impossible to give an exact amount.

A good rule of thumb is ½ teaspoon of Morton Coarse Kosher Salt per pound of trimmed meat.

Please note that the saltiness of different types of salt varies significantly due to the size and shape of the grains. Our standard is Morton kosher salt, but if you want to use table salt instead, use half as much. Click here to learn more about salt.

If dry-brining a whole bird or a roast, concentrate more salt on the thicker parts, like the breasts. Bonus: Dry-brining helps poultry skin crisp.

How long do you need to brine? Salt is a slow poke and creeps slowly through the thicket of muscle fibers. How long should the meat be in the brine? Here are some rules of thumb, not precise. Use them for wet or dry brining, and always brine in the refrigerator.

- **½ inch thick meat: about ½ hour**
- **1 inch thick meat: about 1 hour**
- **2 inch thick meat: about 4 hours**
- **3 inch thick meat: about 12 hours**

You want to salt your foods early. If you only have 30 minutes, fine. If you have 2 hours, that's even better. Got 24 hours? That's better still. The good news is that salt

continues to migrate throughout the meat during cooking and does so slightly faster due to the heat.

Leave the meat uncovered on a rack in a pan. This is especially important for poultry because we want the skin to dry out a bit. Just be careful that vegetables and other raw foods do not come in contact with raw meat. And don't rinse it off before cooking. After a few hours most of it has gone in and is well past the surface anyhow.

Whether it's for 30 minutes or 24 hours, pre-salting gives you a better tasting, juicier meat because salt penetrates and helps meat hold onto its juices. Just sprinkle a generous amount of salt all over, about 1/2 teaspoon Morton kosher salt per pound of meat. What about marinating? Forget it. Marinating steaks is a useless technique because marinades don't penetrate the meat much and you end up throwing away most of the flavor when you throw away the marinade.

With dry brining we simply sprinkle plain old salt on the meat a few hours before cooking. No more than you would use at the table.

Sounds simple, but something complex and wonderful happens. You can see it working in the pictures here. In the first picture above the meat has been sprinkled with Morton Coarse Kosher Salt. The salt draws water out of the meat. The water dissolves the salt. See how the meat has become shiny with moisture and the fat has become splotchy?

Then, in the next picture, the meat re-absorbs the moisture (and much of the juices that have leaked out) bringing the salt in with it. Notice how the color of the fat has changed where the salt has soaked in. Here's a slo-mo video of the process.

When it is time to cook there is no need to rinse off the salt. It should all be inside the meat.

Once inside the meat, it doesn't go far. As with wet brining, it stays near the surface, but that's where the moisture is needed because that's where we apply the most heat.

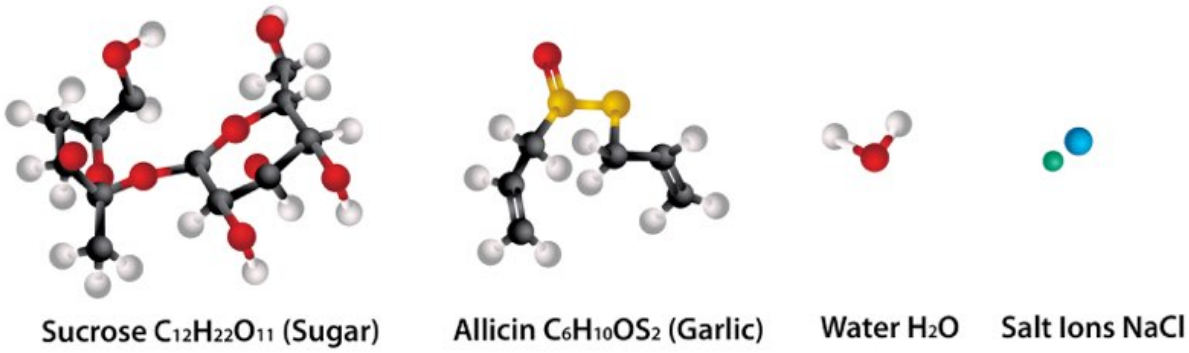
How does this work? The AmazingRibs.com Science Advisor, Prof. Greg Blonder, explains: "Salt is hygroscopic, which is a fancy way to say it absorbs moisture from the environment. Water is a 'V' shaped molecule. It has two positively charged hydrogen atoms on one tip of the V and one negatively charged oxygen on the other making H_2O. This asymmetry creates an electric field, kind of like a small magnet. The polar nature of water is why it's practically a universal solvent.

"When water in the air stumbles in very close to the NaCl crystal, the salt feels the attraction of the water's weak electric field, grabs it, and then breaks apart into a positively

charged sodium ion and a negatively charged chloride ion. When we sprinkle salt on a steak, water molecules, some from the air, but most from the meat, are captured on the surface of the salt crystal, and eventually, accumulate into a pool of briny liquid. Then, as the salty slurry diffuses into the meat, there is less salt on the surface to attract moisture, and the juices return to whence they came. Contrary to popular myth, there is no osmosis or cells breaking."

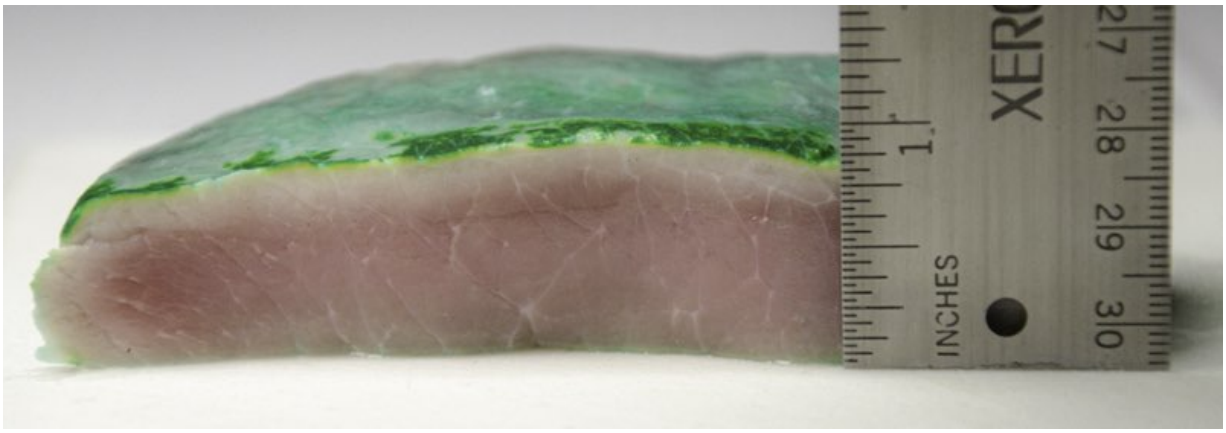
BRINERADES AND THE TRUTH ABOUT MARINADES

This fact always shocks people: Marinades rarely penetrate meat more than 1/8 inch. The molecules are just too large. Salt is only two atoms (NaCl), but sucrose (sugar) is 43 atoms ($C_{12}H_{22}O_{11}$). Likewise, garlic, onion, pepper, and all your other spices and herbs are all too large.



And for sure, oil in a marinade doesn't penetrate because meat is mostly water and oil and water don't mix. Here's a piece of chicken marinated for hours with a typical oil and vinegar marinade with some spices, herbs, salt, and some green food coloring to help us prove the point. As you can

see, there is no penetration (look at the bottom) except for salt, the slightly milky color about ¼ inch below the surface.



If you add salt to your marinade, it will find its way into the food. We call that a brinerade. How to make it? Prepare your marinade (skip the oil) and add the same amount of salt you would if you were making a wet brine.

- **6% brine = 1 liter water with 60 grams any salt**
- **5% brine = 1 liter water with 50 grams any salt**
- **4% brine = 1 liter water with 40 grams any salt**

So why marinate? Because marinades *can flavor the surface*, and if there is acid in the blend, it can tenderize the surface. And if there is salt it can brine. On the downside, a marinade can make poultry skin soggy and prevent it from crisping, and wet surfaces don't brown as well as dry ones. Remember: Brown is beautiful. Here's a way to improve marinades. Add salt to a marinade and it becomes a brinerade. The salt penetrates and helps retain moisture,

sugars help with browning, and everything else flavors the surface.

INJECTING

“I think everybody should have a great Wonderbra. There's so many ways to enhance.”

— CHRISTINA AGUILERA

ou don’t need a Wonderbra to enhance chicken and turkey breasts. Or, for that matter pork butt or beef pectorals. The

Y truth is that rubs, mops, marinating, brining, and sauces can deliver a lot of flavor to the *surface of meat*, but if you really want to get salt or flavor deep into meat, the solution is injecting.

Having an injector also opens up other fun possibilities: stuffing jam into donuts, syrup into ice-cream, and melted butter into squash.

Many meat processors routinely inject meats like turkey, chicken, and pork at the factory. Injecting, or enhancing as food processors call it, is a sure fire way to get the flavor and juiciness down deep. And it is the only way to get fats, herbs, spices and other large molecules deep into meat. You don't have to worry about oversalting, there's no waiting — you can do it at the last minute, you have less waste, no huge containers are needed, there are no refrigerator space problems, and there are few safety issues.

The secret to injecting is to go easy. A good guideline is to shoot for 1 to 2% salt. It is like brining and the salt helps retain moisture as well as enhances flavor. I skip the big flavors like garlic, pepper, and herbs that mask the natural flavor of the meat. I have judged pulled pork and brisket at barbecue competitions where the meat was gushing juice, but it didn't taste like meat. It tasted like apple juice and garlic. I want pork that tastes like pork, beef that tastes like beef, and turkey that tastes like turkey.

The best solutions are salt water, salted butter, or stock. And you don't need much. Muscle is 75% water and it is saturated. There isn't much room in there for more liquid.

Your injection will go in between the muscle fibers and bundles, not within the fibers, so you won't need much. Check out my recipes here.

Many competition cooks like to inject with a product called Fab B Light or Butcher BBQ Brisket Marinade, both moisturizers, tenderizers, and flavor enhancers. Fab B contains hydrolyzed soy protein, vegetable oil, sodium phosphates, monosodium glutamate, autolyzed yeast extract, xanthan gum, disodium inosinate, and guanylate. Butcher contains hydrolyzed vegetable protein (hydrolyzed soy and corn protein and salt, with partially hydrogenated vegetable oil [cottonseed, soybean] added), monosodium glutamate, sodium phosphate, and xanthan gum. Some traditionalists think this is way too Barry Bonds and are repulsed by the idea. The results speak for themselves. They are winning. A lot.

To inject, you need a gizmo, and something to put in it. Click here for our reviews of injection gizmos.

SEASONINGS AND RUBS

Meats are blank canvases to be painted with herbs, spices, and flavorful liquids. Rubs are simply spice blends that are sprinkled or rubbed onto meat before cooking. The rub should fuse onto the meat's surface and enhance the meat, but not overwhelm it.

It is helpful to think of salt as a treatment for the interior of a food, and herbs and spices, as a treatment for the exterior.

Every good barbecue cook should have a signature rub to brag about. In the recipe section of this book (below) there are a few rubs to get you started, then you can start riffing and invent your own. Once you find a rub recipe you like, make a batch and put it in a large spice shaker with a lid. If it clumps or cakes, take a tip from diner waitresses: Take some uncooked rice, place it in the oven at the lowest temperature to dry it out, and add it to the jar to absorb excess moisture.

Compared to salt, spices and herbs are huge molecules that just don't get more than a fraction of an inch past the surface. Think of salt as a treatment for the interior of the meat, and spices and herbs as an exterior treatment, like a sauce. The juices of the meat mix with the herbs and spices and they develop flavor during chemical reactions catalyzed by the heat of the fire. The form the flavorful crust.

Adding sugar to a rub or brinerade has some benefits. It aids in browning, especially at lower temperatures. Be aware:

Sugar burns easily, so you have to be really careful about temperature control and watch the cook very carefully. Also, if you smoke a wet brined meat that had sugar in the brine, it can get a slight hammy taste.

Beware: Some commercial rubs can be half salt. That's some expensive salt! But salt and spices should be applied differently. Because salt penetrates the meat, you need to apply it based on the weight of the meat. Because spices sit on the surface you apply them based on the surface area. For example: A slab of ribs and a hunk of pork shoulder might have the same amount of surface area but the shoulder can weigh 2 to 3 times the ribs and be many times thicker. So you need more salt on the shoulder but the same amount of spices. For this reason (and others) you should consider making your own rubs sans salt. We have rub recipes on AmazingRibs.com for pork, poultry, beef, lamb, seafood, and more. But if you don't want to bother, we have bottled rubs with salt for sale on our site. And yes, there is salt in them. Consumers expect rubs to contain salt and there just isn't room on the label to explain why it should be applied separately. Besides, if we left out the salt we would be priced out of the market.

Before sprinkling on the rub, many cooks like to coat the meat with a layer of mustard, ketchup, mayo, or water as a glue to hold onto the rub. These "slathers" have almost zero impact on flavor because they drip off and dry up during the cook. But they do work as a glue. Clint is partial to mayo because it is mostly oil and fat is flavor. Meathead just wets his hands and pats the meat to moisten it.

Don’t be stingy with the rub. With a spice shaker with large holes, sprinkle on enough to coat the surface but not so much that you can’t see the meat below. About 1 teaspoon for every 4 x 4-inch square is a good rule of thumb to start.

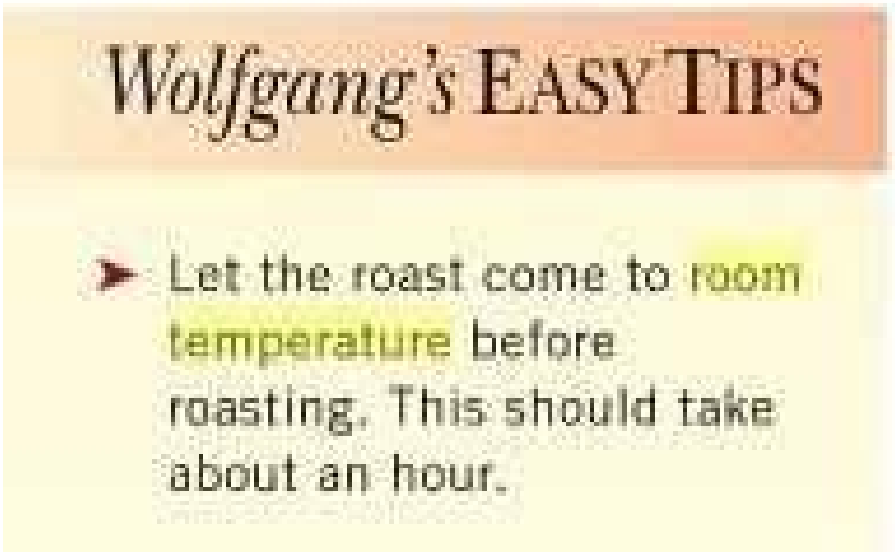
DON'T TRY TO BRING IT TO ROOM TEMPERATURE

A lot of recipes, including steak recipes, say that you should take the meat out of the fridge an hour or two before cooking and "let it come up to room temp."

Here's the theory: Say you want a steak to be served medium rare, about 130°F. If your fridge is 38°F, then the meat must climb 92°F. But if it is room temp, 72°F, then it needs to

climb only 58°F. It will cook faster and there will be less overcooked meat just below the surface.

Here's a picture of a page from a cookbook by Wolfgang Puck, a brilliant and famous TV chef with many restaurants. He says a big old roast should come to room temp in about an hour.



We tried it with a 3/4 inch steak and a really accurate thermocouple. It took just over an hour for the center to come to room temp. A 1 1/2 inch steak took just over two hours for the center to come to room temp. A 4 1/2 pound pork shoulder 3 1/2 inches thick took, are you ready for this, 10 hours! After two hours, the pork shoulder was only 49°F in the center, and after four hours it was only 56°F. Just a bit longer than Chef Puck thinks. Worse, after five hours it began to smell funny.

Why so long? Remember, meat is about 75% water, and most of it is trapped in cell fibers. This makes it a great insulator. So even though the center of a pork butt is only 1 3/4 inches from the surface, it takes 10 hours for the 72°F heat to penetrate. A mere 30 minutes in the oven at 225 to 325°F will warm the meat as much as an hour at a room temp of 72°F.

Now we know that, in theory, all contamination on whole muscle meats like steaks and roasts will be on the surface and not deep into the meat. We understand that within a minute on a hot grill all of the surface microbes will be dead. But we also know that the population can double in 20 minutes at room temp. So the idea of leaving a steak at room temp for more than 30 minutes or so gives us the creeps, especially if there are cracks and pits in which microbes can hide. Especially knowing that some processors use blade tenderizers, tiny knives that cut into the muscle to soften it, but in the process push surface contamination deep into the center. This is a practice that should be banned. Especially

since we will be cooking the steak to only 130°F, a temp that can kill microbes, but it can take hours to kill them all. But more important, over extended periods of time, putrefaction and rancidity set in, the meat starts to smell bad, and the entire flavor profile can change.

And it should go without saying, never leave poultry, burgers, or ground meat at room temp for more than a few minutes. They are susceptible to contamination within the meat and sitting around can really mess up these meats.

Think of letting cold meat sit at room temp as cooking it in a 72°F oven and then moving it to a hotter oven. It will take much longer than if you just put it in the hotter oven to begin with. But the reverse sear theory comes into play. Gentle heating helps ensure that the meat's internal temperature is more even from top to bottom than if it is exposed to high heat right away. But the microbial danger zone is in play as well. At 72°F, microbes are very happy and reproduce with abandon.

A steak cooked reverse sear. In the reverse sear process you are heating gently in a 225°F oven during the initial stage and then searing at very high "Warp 10" temperatures at the end. As we have shown, it can take two hours for a steak to get to room temp and in the oven/grill/pit it gets there in about 15 minutes. It is actually faster to go directly to the grill from the fridge.

A steak seared at Warp 10 first. You are clobbering the meat with a lot of heat and if you want to serve the meat at optimal medium rare, 130°F, you want the interior to remain

relatively cool so it doesn't overcook. Letting the meat come to room temp is actually self-defeating in this scenario. In fact, you are better off cooling it down in the freezer a few minutes.

Also, we now know thanks to the AmazingRibs.com science advisor, Prof. Greg Blonder, smoke sticks better to cold surfaces. So if you want a smokier tasting steak, take it straight from the fridge to the grill.

Here are three beer cans. The one on the right sat on a desk during Blonder's experiment. The one on the left was filled with ice water and placed in a smoker. The one in the middle was empty and placed in the smoker. You can see that the cold wet surface of the one on the left attracted more smoke and thus more flavor.

So in our homes, it's out of the fridge and onto the grill or oven.

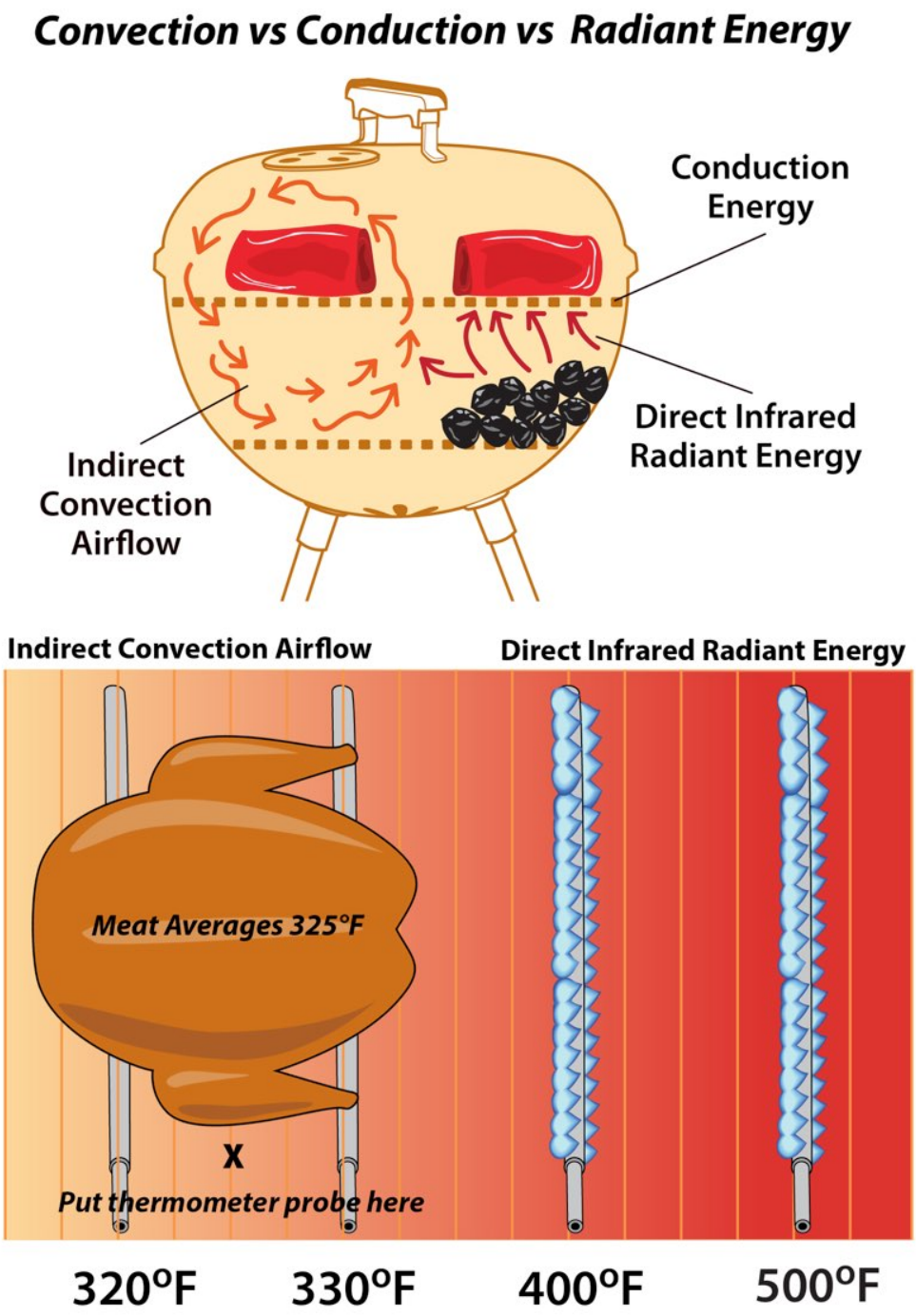
NO RESTING

Do not tent chicken with foil when it is finished cooking because the steam trapped under the foil softens the skin. Resting does not redistribute juices (that's a myth). And while it is resting, see all that steam? It is moisture that you want in the meat! Serve it hot and moist. Don't let it sit around cooling and drying out and overcooking via carryover.

3 TYPES OF ENERGY AND 2-ZONE COOKING

THE 3 TYPES OF ENERGY

Inside a grill there are three types of energy: Conduction, infrared radiation, and convection airflow. It is important to think of these as energy rather than temperature. As an example, turn your indoor oven to 200°F and stick your arm in there. You can do this. It won't burn your hair off. Now touch the metal grates. When you get back from the hospital you will understand that, although the air and the grates were both 200°F, they held and delivered vastly different levels of energy. That's why thermometers are important in measuring energy in a grill but they don't tell the whole story.



Conduction is the most concentrated energy and a basic example is food in contact with hot metal. Conduction from hot metal is what creates grill marks on the food.

Infrared radiation (IR) usually comes from flame or glowing embers directly below the food. This concentrated form of energy packs a wallop and helps sear foods and get dark crusts in a hurry. When you stand in the sun, you are getting bombarded by IR. Yes, there is ultraviolet (UV) that causes sunburn, but there is much less UV that IR. When you place food directly above hot coals or gas flames, you are subjecting it to IR. It is like putting it in the sun.

Both IR and conduction produce enough energy to sear foods. Searing is when food turns brown as a result of two a chemical reactions called the Maillard reaction and caramelization. That brown is flavor.

You can put a thermometer in a grill but it can be misleading because conduction and radiant energy are best measured in calories, not degrees of temperature. That's why we often refer to IR on as Warp 10 rather than measuring the air temp, a dumb Star Trek reference.

Convection airflow is the warm air circulating inside the grill, especially when the lid is down. Convection is not very good at searing. People often brag that their Big Green Avocado can hit 600°F or more, and although that is great for cooking food, it is not as good at browning it as conduction or radiation. Cooking with convection energy is best called roasting.

Once you understand these basics of energy transference you can use them to your advantage. And you thought you left physics behind in high school.

THE IMPORTANCE OF 2-ZONE COOKING

Cooking, indoors or out, is all about controlling energy and the way to do that is with 2-zone cooking. The concept is simple. You divide your grill in half. One side has IR from glowing coals or flame, the other side has no energy source beneath it and is warmed only by convection airflow. With this setup you can move food from gentle low energy that slowly warms the food and doesn't shrink the proteins and squeeze out juices, to rip snorting high energy that can sear the exterior.

For this reason we are not big fans of egg shaped kamados. Most of them are not easily set up in 2 zones.

PART V
TOOLS

You don't need a lot of fancy expensive tools to get started. You can accomplish wonders with a simple kettle grill or a two burner gas grill, a pair of tongs, a brush, and a digital thermometer.

That said, there are some great upgrades and enhancements that come in handy if you can afford them. Here are some of our recommendations.

At AmazingRibs.com we employ the world's only full-time grill and smoker tester and he maintains a database of detailed reviews and ratings of hundreds of cookers.

We also have an electrical engineer outfitted with special equipment to test and rate and review thermometers, the single most important tool for making safe and tasty food.

In addition, our experienced team tests and reviews everything from pizza ovens, to tongs, to spatulas, grill grates, knives, knife sharpeners, gloves, coolers, scales, pots and pans, kitchen equipment, all manner of accessories, and every year we pull together a list of the best new products and a great gift guide.

Click here to check out our Product Reviews section.

CHARCOAL GRILLS

Charcoal grills are the most versatile all-purpose outdoor cooker. When set up properly, the good ones can do both high energy infrared searing and low energy convection air roasting, as well as smoking. Their main advantages are that charcoal generates more energy than most gas burners and you can capture more smoke because the best charcoal grills allow you to control airflow. Gas grills have large permanently open vents so you can't easily contain the smoke, but they can do a respectable job. You just need to burn through a lot more wood.

Here is a picture of two slabs of ribs, one cooked on charcoal, one on gas. You can see the difference in color caused by the differences in the smoke.

To set up your grill for 2-zone cooking, simply pile lit charcoal briquets on one side of your grill's charcoal grate to create a hot (direct) infrared heat zone and a cool (indirect) convection airflow zone. You can also add a water/drip pan on the empty side of the charcoal grate and/or a second one directly above the charcoal on the main cooking grate if you wish. If you add water pan(s) you are adding moisture to the atmosphere, and if the water pan is above the heat source you are further protecting the meat from direct heat; the water absorbs heat, helping to keep the temperature down but does not steam the meat which will make it mushy. If you keep the oven temp at 225°F, the water should not boil because the surface area will allow evaporation that will cool the water keeping it below 212°F. Hard to believe, but true. If the water is boiling, you are running hot.

Intake dampers (on the bottom) are more effective at controlling the temperature than the exhaust dampers at the top of the grill because they reduce the supply of oxygen to the coals. So monkey with the intake dampers to control temperatures. Take your time getting the temperature right and try to maintain it throughout the cooking process.

Another reason for water pans is because water condenses on the relatively cool meat and keeps it cool, slowing the cook. Furthermore, smoke particles stick to the wet surface better than dry surfaces.

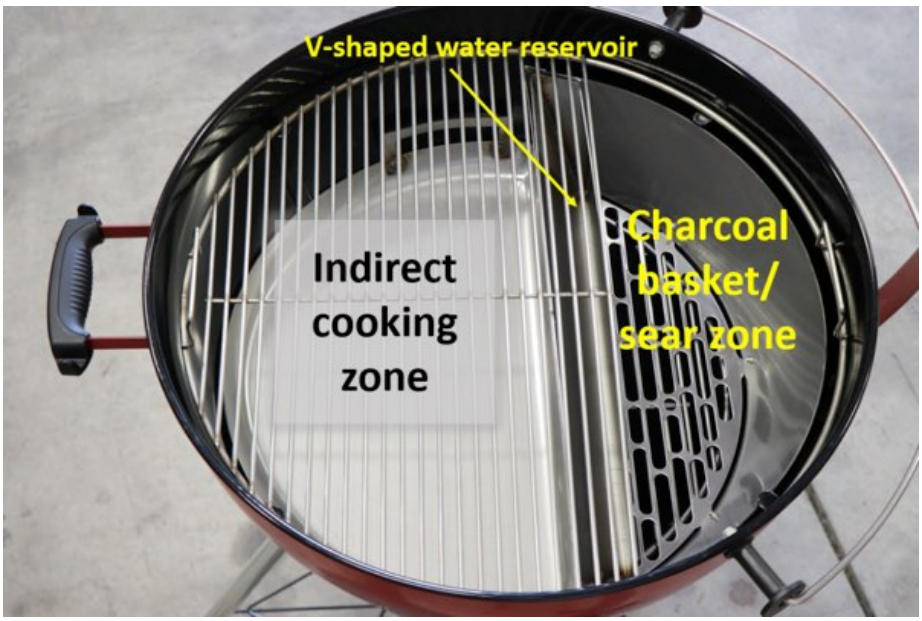
Cooking at 225°F will allow the meat to roast low and slow, liquefying the collagen in connective tissues and melting fats without getting the proteins knotted in a bunch. It's a magic temperature that creates silky texture, adds moisture, and

keeps the meat tender. If you can't hit 225°F, get as close as you can. Practice without food. Click here for more about how to calibrate your grill.

While lump charcoal is an option, we prefer briquets because they give us more control and we are control freaks (read our article on charcoal to see details). Absolutely do not use the instant igniting stuff that has solvent in it.

Chimney starters are by far the best way to start charcoal, especially for long slow cooking where the smell of the solvent in charcoal starter fluid can ruin the taste of the meat. Read how to start a charcoal fire here.

If you are using a charcoal grill or smoker, wait until the coals are white. The emit less smoke and the smoke from charcoal is not as good tasting as the smoke from wood. Then add about four ounces of dry hardwood or fruitwood to the fuel for at least the first hour of cooking. Do not overdo it on the wood as too much can result in a bitter and overpowering smoke flavor in the end product. If the result isn't smoky enough, add more the next time you cook.



If you are shopping for a grill that can also smoke, a great inexpensive solution is the good old fashioned Kettle. A stripped down model of the venerable Weber Kettle is still less than $200, and with the addition of a device called the Slow 'N Sear (above) for about another $100, you get a system that can both grill and smoke superbly, albeit with limited capacity. On one side it corrals all the coals behind a water reservoir; the food goes on the indirect side to smoke-roast at the perfect temperature. When you want to sizzle on the sauce (or sear a steak) you place it right above the glowing coals.

Another option are the Slow 'N Sear Kettle Grills. Similar to the Weber, it has several modernizations not the least of which, the two-zone insert is included. It has four legs, a thermometer port, and a side shelf.

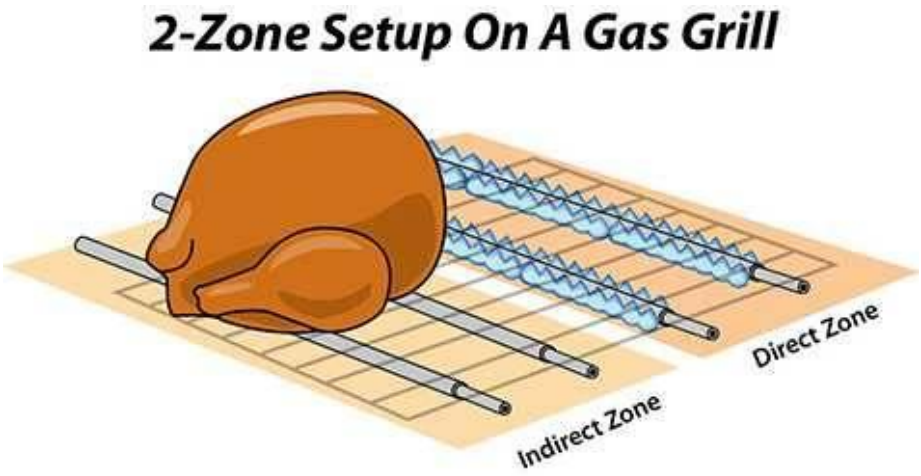
One of our favorite charcoal grills is the Portable Kitchen 360 (a.k.a. PK 360) for about $800 (above). Its rectangular shape makes it easy to set up in 2 zones and the coals are close to the cooking grate, making it superb for searing steaks.

Our all-time favorite is the Hasty Bake 357 (above) for about $3,600. It has all the bells and whistles and best of all, you can raise and lower the charcoal grate to control heat. Hasty Bake makes less expensive models you should consider if you fainted when you saw that number.

Click here to see our favorite charcoal grills.

GAS GRILLS

If you are using a gas grill you can easily create a 2-zone set-up and we think 2-zone is crucial for almost anything you are grilling. Most gas grills come with more than one burner nowadays because the concept of indirect cooking is becoming better known. When shopping for a gas grill, the more burners the better. Two is the minimum, three is better, four is best. You will appreciate the real estate and the ability to control temperature. Since law requires gas grills to have open vents, none of them allow you to control airflow, so there isn't a real significant difference between gas grills when it comes to smoking.

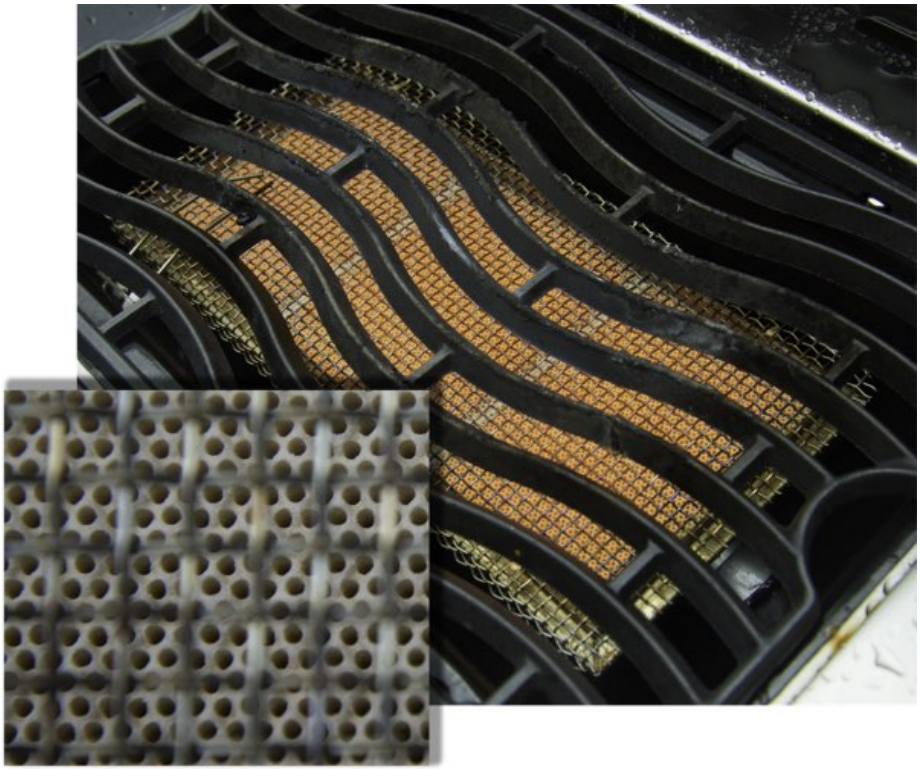


If you have a grill with only one burner, or if you have more meat than will fit in the indirect zone, try this technique. Put the wood as close to the flame as possible.

Regardless of how many burners you have, if you are going to smoke, put a pan of water between the burner and the food. The water absorbs heat and helps minimize fluctuations in temperature. The moisture also mixes with the smoke and propane combustion gases and creates flavors you cannot get with smoke alone. It also condenses on the meat cooling it and making a sticky surface for smoke to stick to.

The big difference among gas grills is their ability to sear at high temperatures. Unfortunately, most gassers just don’t generate enough IR to do a great job of searing. A few come with sear burner tubes, but even they are usually anemic.

The best sear burners are made of ceramic honeycombs like this one:



For a propane grill, make sure you always have a spare tank. Don't risk running out. Natural gas grills never run out because they are connected to the household gas supply.

Now that you have set up your grill for indirect cooking, throw some wood on the flames or the deflector right above the flames, place the meat as far from the heat source as possible, close the lid, and let the convection airflow, smoke, and seasoning do their jobs!

Click here for a look at our top rated gas grills.

SMOKERS

Steak likes a little smoke but not a lot. So usually we don't smoke them.

But if you want to, the best way to smoke is a dedicated smoker, but it is not hard to convince a charcoal or gas grill to do it very well, thank you. There are many different types of smokers ranging from about $200 to $20,000+. Selecting one is a whole 'nother book so let us refer you to some articles and videos on AmazingRibs.com, and our searchable database of hundreds of smokers tested by the world's only full-time grill and smoker tester, our very own Max Good. (We don't sell anything, but we do link you to places to buy.)

Most smokers cook food entirely with indirect convection airflow. The fire is away from the food. A few smokers use direct heat but the coals are kept at a distance.

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smoker tester, our very own Max Good. (We don’t sell anything, but we do link you to places to buy.)

If you are just getting started and have a limited budget, we recommend the charcoal burning Pit Barrel Cooker (above) for about $350 delivered to your door fully assembled and ready to go.

The 18 inch Weber Smokey Mountain (above) is another great choice for about $330.

An excellent choice, but a bit more expensive, would be one of the many high-tech pellet smokers with precision digital temperature controls. They burn small pure sawdust pellets about the diameter of a pencil and function as thermostatically controlled outdoor ovens with smoke. Just set the temperature and walk away.

Small portable pellet smokers start at about $400, and full-size smokers about the size of a gas grill start at about $700. We gave high marks to the Grilla Silverbac Alpha (below).

Here's a list of all our top-rated pellet smoker models.

For the very best smoke flavor, we are partial to log burners. The good ones are not cheap. They start at about $800, so please don't be suckered into buying the cheap offset smokers at the big box hardware stores. Beware, log burners require constant tending and skill. Beginners will make mistakes and ruin a few meals. Below is a Lang reverse-flow offset smoker which is highly recommended. Click here to learn more about offset smokers.

The odd looking thing below is a Karubecue. It employs a number of brilliant innovations that make it the best

backyard log burner on the market. It costs about $1,440 at press time.

There are gas smokers and we like them because you can set em and forget em. They don't require the vigilance that charcoal and log burners demand. And they are inexpensive. Alas, some make temp control difficult, so be sure to check our reviews before buying.

There are electric smokers, but the wood smolders and does not burn in them. Burning wood produces better tasting smoke than smoldering wood so for that reason we are not fans of electric smokers.

Looking for a new outdoor cooking rig? Here's a web page with a lot of info, videos, and links on how to select a grill or smoker.

ABOUT WOOD

Then there is smoke, which we think of as a spice or flavoring element. Some of it comes from charcoal (gas has no flavor), some of it comes from vaporized drippings of juices, fat, and spices. But the best smoke flavor comes from burning wood.

Charcoal is not a very good source of smoke. When you first light charcoal it produces an acrid smoke. When it is fully ignited and has a thin coat of white ash, charcoal produces very little smoke. That is when you add real wood.

The best smoker is a dedicated smoker, but it is not hard to convince a charcoal or gas grill to do it very well, thank you. All you need to do is use a 2-zone set-up and throw hardwood, fruitwood, or nutwood on the flames and let it burn. That's right, let it catch fire and burn. You won't see a lot of smoke, but that's what you want. The truth is that billowing white smoke from smoldering wood does not taste as good as "blue smoke," smoke whose particles are so small they don't diffract much light, so the smoke is thin, pale blue, and practically invisible. Those flames you see are combusting impurities that impart undesirable flavors. So let it burn!

Never use any kind of pine or sappy, soft wood unless you want meat that tastes like turpentine. Never use construction lumber because it is often treated with poisonous chemicals to discourage rot and termites.

Charcoal is not a good source of smoke. When you first light charcoal it produces an acrid smoke. When it is fully ignited and has a thin coat of white ash charcoal and produces little smoke. That is when you add real wood.

We don't care what you have read, there is no need to soak wood before adding it. First of all, wood doesn't absorb much water. That's why they build boats from wood! We have soaked wood and cut it open and the interior is bone dry.

There is only a little moisture captured on the surface. When we weigh wood soaked overnight it gains less than 5% of its original weight.

Secondly, all that billowy white smoke from smoked wood is really steam because the wood cannot combust until the water on the surface of the wood evaporates at 212°F. Then the wood can go up in temperature to 500°F+ where it can combust. At that point, it burns with a bright blue and orange flame, making clean blue smoke with few impurities.

Don’t obsess over which wood to use . The differences are subtle and you should concentrate first on getting quality meat, trimming it, salting it, rubbing it, temperature control, and sauce management. Wood theory is a book length topic unto itself, so if you want to know more and learn why we tell you not to obsess over wood types, click here to learn about combustion and the different kinds of wood and smoke.

Do not overdo it on the wood as too much can result in an overpowering ash flavor in your food. Go easy the first few cooks and add more as you gain experience.

On charcoal or gas cookers, start with 4 to 8 ounces by weight of chunks, chips, or pellets for a mild smoke flavor that complements the meat and seasoning without overwhelming. No matter how much food you are cooking, 8 ounces should be enough. You don't have to be precise, just measure it in some fashion so you have a baseline for your next cook. Then you can add or subtract if you wish.

THE ABCS OF FIRE EXTINGUISHERS

Always keep a fire extinguisher near your grill, smoker, and in your kitchen. Water will only spread grease fires. The best extinguisher is rated ABC.

- **Class A** fire extinguishers are for paper, wood, cardboard, and most plastics.
- **Class B** fire extinguishers are for flammable liquids such as gasoline, kerosene, oil, and grease.
- **Class C** fire extinguishers are for electrical equipment and wiring.
- **Class D** fire extinguishers are for combustible metals including magnesium, titanium, potassium, sodium, and some other chemicals.
- **Class ABC** fire extinguishers can handle most everything except some class D materials. This is the one you want. Beware, they contain a yellow powder that can damage electrical devices.

COOK WITH A THERMOMETER, NOT A CLOCK

COOK WITH A THERMOMETER, NOT A CLOCK

Different cuts of meat vary significantly in tenderness, fat content, and collagen content. Some are best cooked hot and fast, some better cooked low and slow, and some must be cooked with a combination of hot and slow to reach their optimal taste and texture. Click here to read an article on the subject of cooking temps and info on how to get this food temperature guide with more than 80 benchmark temperatures.

This is why cooking times in recipes are guesstimates at best. Think about the absurdity of a recipe that says, "cook the steak for six minutes on the first side and then four minutes on the second side." How long it takes to cook depends on how hot the air is, how hot the cooking surface is, how thick the meat is, and your target temp.

Depending on the grill, cooking steaks could take twice as long or half as long. Thick steaks take more time, and if you want them rare, they'll take less time than in if you want them well done. Click here for more on cooking times and what controls them.

You cannot tell if meat is safe or cooked to the proper temp by looking at it. When you cut into meat to look at it, it can change in a few minutes after it has been exposed to oxygen. Compounds in marinades and brines can impact color. Sometimes vegetables in the grill can produce gases that alter meat color. It has long been thought that when chicken juices run clear the meat is safe, but modern chicken farming has changed that. Click here to read how we bust the myth of clear chicken juices.

The truth is, meat can go from succulent to sucky in just a few minutes. The only way to be sure about doneness is to use a digital thermometer. Overcook meat and you've wasted your money. Undercook it, and you could give someone a tummy ache or much worse. That is why you ALWAYS cook with a thermometer, not a clock. This is the 21st century. The digital age. Stop using 19th century technology. Ditch your dial telephone and your dial thermometer.


DIGITAL THERMOMETER
ON
OFF
224.9
50F Low


ThermoWorks
OL
259.8
100F Low


50F Low


60F High
BRINKMANN
237
REMOTE RECEIVER


45F Low
BEEF
235
344


236
REMOTE RECEIVER
BBQ
56F Low


226
REMOTE RECEIVER
BBQ
25F Low


ThermoWorks
602
TEL-TRU
40F High

And while you are at it, get a digital oven thermometer. The cheap dial thermometer that came on your grill or smoker is probably off by 25 to 50°F like the one above. I have seen them off by 100°F!

Click this link for a buying guide to thermometers with more than 150 test results from our on-staff electrical engineer.

As the internal temp of meat climbs, more water gets squeezed out, and the meat becomes drier. In general, most meats are juiciest when cooked to medium rare, 130 to 135°F internal temperature.

But that's not hot enough for safety in some meats. Ground meats and poultry are health risks at those temps. Ground meats need to be cooked to 160°F, and poultry needs to go to 165°F to kill pathogenic bacteria. But there's more to the story than that. You can actually serve these meats at lower temps if you know the rules. Read my article on meat temperatures.

Meats with a lot of connective tissue such as beef and pork ribs, pork shoulder, and beef brisket, are too tough at these lower temps. They need to go up to 200 to 205°F in order to gelatinize collagens and melt fats. That's well past well done, and yes, water is lost, but the gelatin and melted fats lube the meat and make it taste tender and juicy.

Be aware that if you let meat sit around after you remove it from the heat, the heat built up in the outer layers will push down to the center and overcook the meat, a process called carryover cooking. The good news is that resting meat

is probably not necessary, despite what all the TV chefs say. For more about ideal serving temps, read my detailed Food Temperature Guide, which has a handy printout for your fridge.

A good digital thermometer is the most important tool you can own. As for monitoring and maintaining the desired grill/smoker temperature, the built-in thermometers are generally worthless. They are called bi-metal thermometers and most are slow and inaccurate. To become master of your instrument, you need a good *digital* oven thermometer to measure the air temp.

You also want a thermometer that can measure food temperature in 5 seconds or less. Here is the Thermoworks Dot for about $40, the best all-purpose thermometer going for the price. The probe can be clipped to the cooking grates to measure oven air temperature, inserted into meat to provide constant readings throughout a long cook, or inserted in meat for rapid spot readings.

For other options, go to AmazingRibs.com and click on Ratings & Reviews and then thermometers. We have an electrical engineer equipped with special equipment to measure accuracy and speed. He has tested and reviewed hundreds.

They range from $20 to $200 and can have as many a six probes. Several have two monitors, one attached to a probe on a cable like the Dot And the other that it talks to with wireless tech so you can carry a monitor in your pocket while you cut the lawn or watch the game. There are even thermostats that can control the temperature of your charcoal grill.

SOUS VIDE QUE

The ultimate solution to preventing dry meat is cooking with a technique called *sous vide* and then finishing it on the grill. We call this *sous vide que* and we discuss this marvelous method, with videos on this page on our website. For a Deep Dive on the subject, we have written an ebook called "Sous Vide Que Made Easy: How To Deliciously Marry The Grill And Smoker With Sous Vide" .

When cooking sous vide you first salt the meat then put it in a plastic bag, squeeze the air out of the bag, and submerge it in water that is heated with an “immersion circulator.” It can hold the temperature precisely and consistently at, let’s say, 131°F for red meats and 154°F for poultry. You wait for the center of the meat to reach the target temp, and hold it there long enough to make it tender and pasteurized, about two hours. It is impossible to overcook this way.

The problem with sous vide is that, although the meat comes out tender and juicy, red meat surface is ugly grey and poultry the skin is flabby and bland. That's where the "Que" comes in. You finish it by adding the rub and placing the meat over a hot grill for a few minutes to create the Maillard reaction crust and flavors of browning. Another option after the sous vide step is to put the meat in a smoker at 225-325°F for 30 minutes. The results are extremely tender and tasty.

ADDITIONAL TOOLS

In addition to the smoker/grill and fuel, there are a few other tools that you will want to have on hand before you start cooking, including:

TONGS

These 12-inch tongs from OXO make it simple to move chicken parts around your grill. They also lock closed for easy storage.

A SILICONE SAUCE BRUSH

When it comes to saucing, bristle brushes are really hard to clean and can harbor pathogenic bacteria. Throw them out and get a good silicone sauce brush. They are easy to clean, they're dishwasher safe, and they load up with a lot of sauce.

A GOOD CUTTING BOARD

We are partial to plastic cutting boards because they can be cleaned in the dishwasher and if they get gouged you can sand them smooth. This double sided one from OXO has grips so it doesn't slide around on the counter and gutters along the edges to capture juices. It is under $20.

A FILLET KNIFE

These cheapo filleting knives from Rapala are beloved by fishermen. They have thin flexible blades with a dangerously sharp edge and a wicked sharp tip and soft handle. The 9-inch model costs less than $30. It's great for separating ribs, slicing tomatoes, removing silverskin/membrane on meat, boning, slicing the ribs and seeds out of hot peppers, and, of course, filleting. It is not strong enough for cutting through bone, but there is nothing better for cutting meat *off* the bone. When it is dirty, it goes in the dishwasher. When it's

dull, we sharpen it. When we can't get it as sharp as new, we get a new one.

A RIB HOLDER

If you are hosting Fourth of July and have a crowd coming and limited grill space, a wire rib holder like this one for less than $20 can handle five slabs. Just beware, because the slabs are close together airflow and smoke-flow are hampered, so cooking time can be significantly longer.

18-INCH WIDE HEAVY DUTY ALUMINUM FOIL

Essential if you opt for the Texas crutch. We prefer it to butcher paper because it is easier to get a good seal.

A LOUNGE CHAIR

Once you settle into a La Fuma lounge chair or one of its imitators, you will not want to get up.

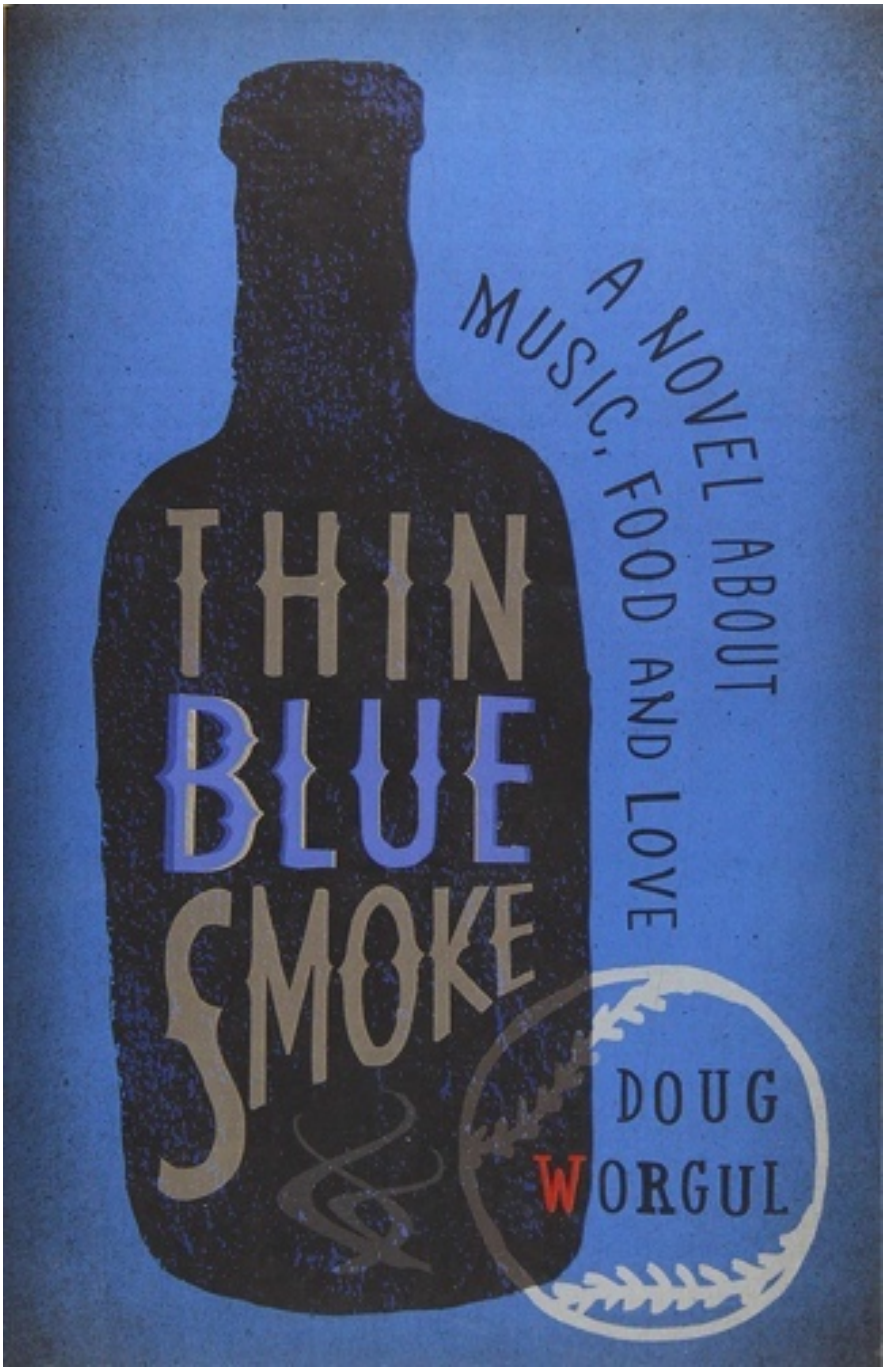
A SIX-PACK OF BEER

For the cook, not the meat.

A GOOD BOOK

A darn good read, *Thin Blue Smoke: A Novel About Music, Food, And Love* by Doug Worgul is well worth your attention. And not just because it has barbecue at its core. *Thin Blue Smoke* comes to life with some fascinating characters whose stories intersect with those of the main character, LaVerne Williams, a former major league baseball player who has an attitude, a rap sheet, and a Kansas City barbecue joint called "Smoke Meat." The writer, Doug Worgul, has a day job as marketing director for one of the nation's best barbecue joints, Joe's Kansas City Bar-B-Que in KC, so this storyteller knows the turf. In Worgul's hands, the travails of a small-

time black restaurateur in the barbecue capital of the world ring true. Of course, Worgul's tale also weaves in music, whiskey, religion, profanity, love, lies, and laughter.



TUNES

Start with the great Louis Armstrong's "Struttin With Some Barbecue" (it's not really about barbecue, click here to read the backstory). To get you in the groove, we have a playlist of our favorite food tunes.

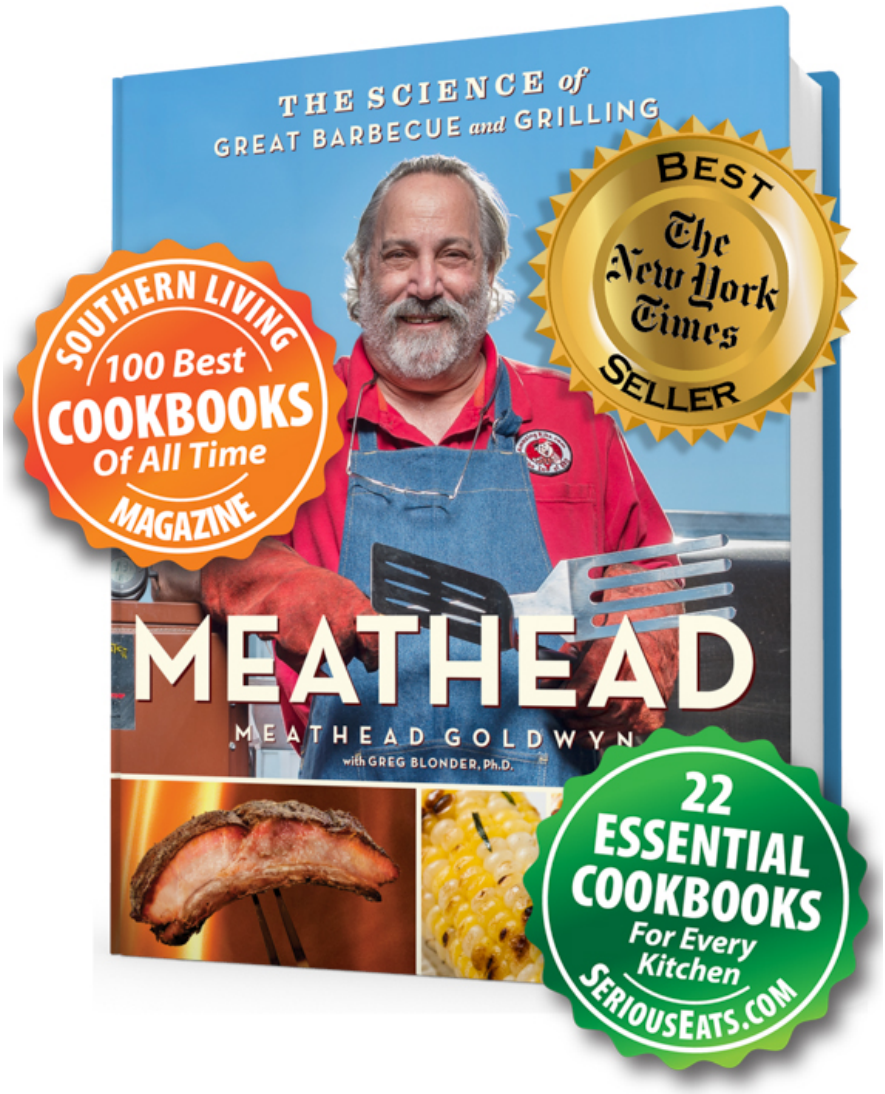
PART VI
THE MEATHEAD METHOD

“Always remember, cooking for others is an act of love, and the most important part of the meal is not what's on the plate, but who's in the chairs.”

— *MEATHEAD*

Just what the heck is the Meathead Method?

It is the melding of science and art to create deliciousness and to nourish the soul as well as the body. It is a suite of science-based techniques that form the toolbox with which you can elevate your cooking, and hopefully gain creative inspiration.



I am honored that my hardbound book, ***Meathead, The Science Of Great Barbecue And Grilling***, made a lot of best cookbook lists including "The 100 Best Cookbooks of All Time" by Southern Living and that many cooks now employ my concepts. The reason for the accolades is simple, for years I have been questioning conventional wisdom and testing what I call "Old Husbands' Tales." When the lessons I have learned are woven together they comprise a comprehensive philosophy and approach to culinary arts

that have form The Meathead Method. I believe the Meathead Method can change your life like it changed mine.

I have written about the Meathead Method on Meathead's AmazingRibs.com, but the web is not the best learning environment. A morsel of info here, click, jump, a snack there, click, jump a crumb next. A book, or in this case, two books, with a beginning, middle, and end is a far better way to get the big picture.

I am currently writing my next hardbound book not surprisingly named ***The Meathead Method, Barbecue Science Meets Culinary Art.*** I am very pleased with its progress. Be sure to subscribe to my email newsletter to hear about it when it is published.

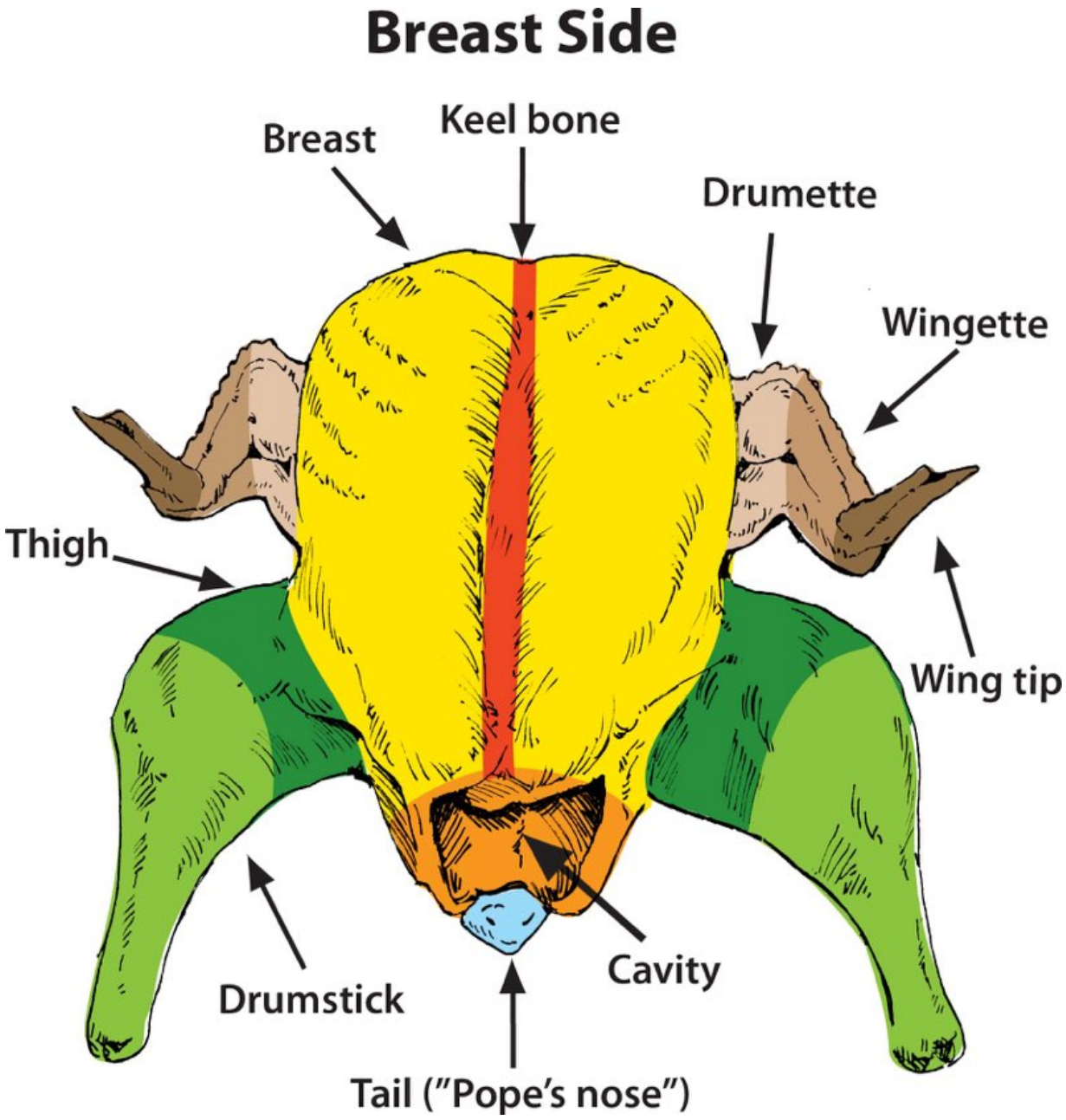
ANATOMY OF A BIRD

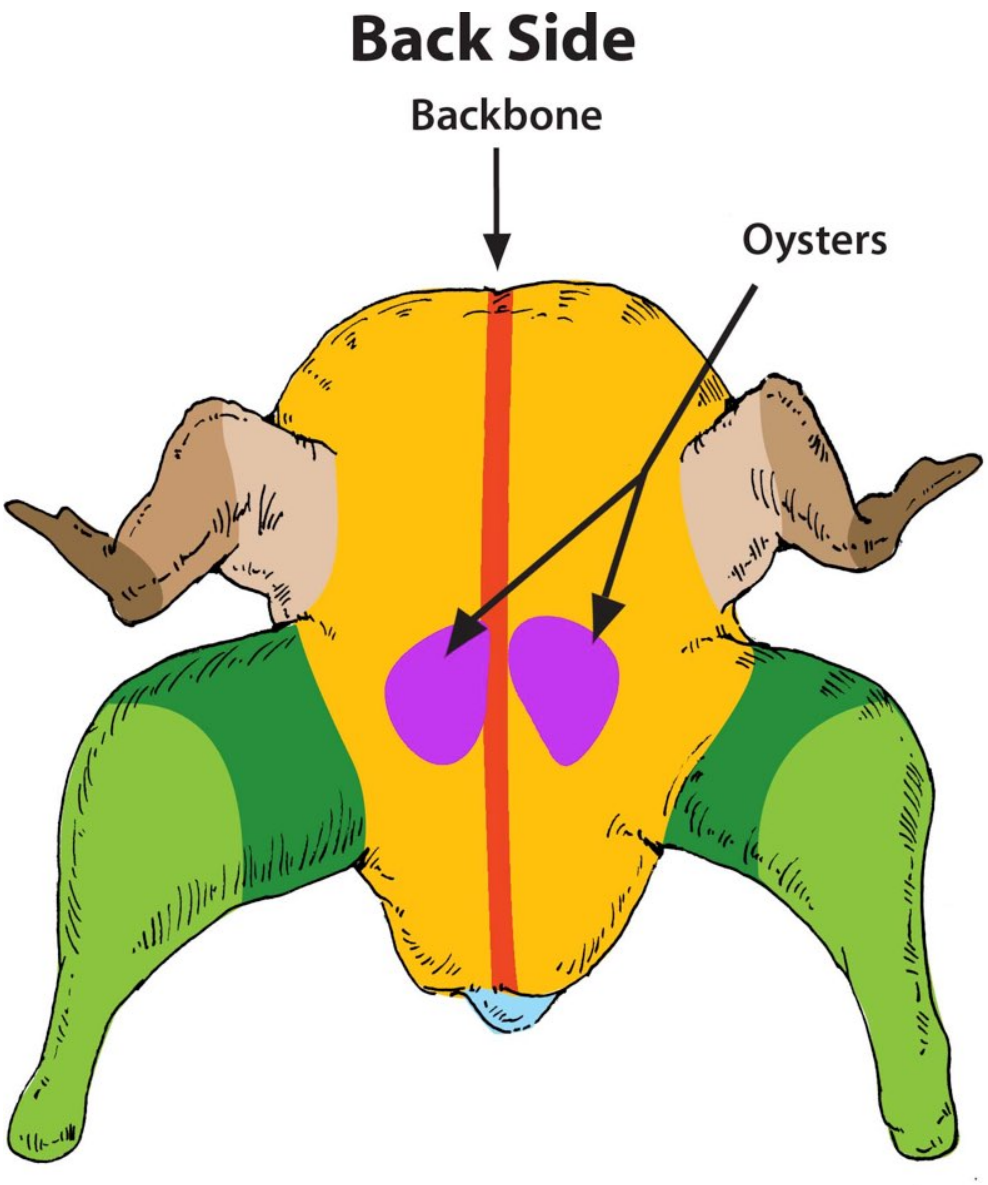
> "What is sauce for the goose may be sauce for the gander but is not necessarily sauce for the chicken, the duck, the turkey or the guinea hen."
>
> — ALICE B. TOKLAS

Modern American chickens are very different from the chickens of yesteryear and from many of the breeds popular in Europe.

Modern American chickens have been bred to have large breast lobes because most Americans prefer white meat and because boneless breasts make a nice neat single serving (usually 6 to 10 ounces) that is easy to cook for one and fits perfectly on a bun. The American chicken has also been bred to grow quickly, going from hatchling to 3 to 4 pounds on the grocery store shelf in just 10 weeks. The vast majority are grown in massive factory-like henhouses. But there are still a number of farmers who grow both modern and so-called "heritage" breeds in pastures for sale to restaurants, in farmer's markets, and online. Heritage chickens are breeds

that are no longer popular with most commercial operations for a variety of reasons, usually because they taste different, grow too slowly, or are susceptible to disease.





After slaughter, most chickens in America are chilled in cold water, which causes them to absorb up to 12% of their weight in water, slightly diluting the flavor of the meat and bumping up the price per pound. In Europe, most birds are air-chilled instead, resulting in slightly less diluted meat and drier skin that crisps and browns more easily. Air-chilled birds are becoming increasingly available in North America.

Why does the bird have both white meat and dark meat (that really isn't very dark)? Meat is made from muscles and muscles burn fat and oxygen as fuel. A protein called myoglobin transports oxygen for release during exertion, and in general the more work a muscle does, the more oxygen-laden myoglobin and fat it needs. Myoglobin makes the muscle darker in color and richer in flavor. It also tints the juices pink.

White meat, i.e. chicken breasts and wings, are muscles that don't work hard because domestic chickens can't fly more than a few feet and in the typical confinement of a factory chicken coop, there is nowhere for them to fly anyway. Breasts are known as fast-twitch muscles because they provide brief bursts of energy, and they don't have much fat or myoglobin because they don't need much energy. The lack of fat in chicken breasts makes them notoriously dry when cooked to a safe temperature of 160 to 165°F.

Dark meat, i.e. chicken thighs and drumsticks (together called legs), are slow-twitch muscles designed for steady movement and endurance. Dark meat contains more fat, myoglobin, and iron and for this reason, dark meat tends to be more juicy and more flavorful. It is also more forgiving, remaining juicy even when cooked to 170 to 175°F or more. For these reasons, most chefs prefer it.

It must be said that, although there are often globs of fat under the skin, there isn't much fat in chicken meat overall. A boneless chicken breast is at most 5% fat and at most 300 calories for an eight-ounce portion. Lean cuts of beef tend to be 10% fat and 400 calories for the same portion. Ground

beef is typically 20% fat and almost 600 calories for an eight ounce steakburger. No wonder chicken is so popular in a weight conscious society!

And when you do the math, boneless chicken breasts cost twice as much per ounce of edible meat than legs.

Keep these differences in mind as you follow the techniques and recipes in this Deep Dive Guide.

MOST COMMON BIRD TYPES

Chicken is the most popular protein in the US. In 1960 Americans ate an estimated 28 pounds per capita per year and in 2019 it was up to 96 pounds. By comparison pork went from 59 pounds in 1960 to 50 pounds in 2019, and beef from 63 to 58.

There are hundreds of breeds of chicken around the world. The breed most common in the US is *Gallus gallus domesticus.* In captivity they eat mostly grain, but when allowed to graze, these omnivores will scratch for bugs and even eat lizards and mice. Here is a guide to chicken names you'll see in the marketplace:

Broiler or Fryer Chicken. Broiler and fryer are interchangeable terms used for the same type of bird although broiler is the more common name. This is the most common and the best all-purpose bird. It is younger than 10 weeks old, can be either sex, and has a carcass weight of 3 to 4 pounds. Now think about that. The chickens you buy in the grocery store go from egg to table in 10 weeks. Some organic broilers take longer to grow and will be as old as 14 weeks in the store. If you grew as fast as a commercial chicken, you'd weigh 350 pounds by age two!

Capon. A castrated male younger than four months, weighing about seven pounds, about twice the size of a normal broiler. Capons can be fatty since they don’t get much exercise chasing hens.

Hen. A female.

Layer. A female egg layer in her prime. Hens start laying at about 24 weeks old.

Poussin. Very young and small birds, usually less than a month and less than a pound, with very little fat.

Pullet. A hen designated for egg laying, but not yet old enough to lay, usually 15 to 22 weeks old.

Roaster or Roasting Chicken. Between 8 to 12 weeks old, of either sex, weighing five pounds or more.

Rock Cornish Game Hen or Cornish Game Hen. This is not a game bird or even a different breed. It is an immature *Gallus gallus domesticus* younger than five weeks, of either sex, with a ready-to-cook weight of two pounds or less.

Rooster or Cock. An intact male over 10 months old with a carcass weight of about seven pounds. These can be tough. For that reason most male chicks are castrated.

Stewing Hen or Baking Hen. These are usually laying chickens that are older and past their prime. The meat can be tougher and stringy.

OTHER BIRD WORDS

Cage Free. Commercial chicken are not kept in cages. Usually they are kept indoors in hen houses, crowded and stuffy, but safe from predators. They may be allowed into an outdoor pen.

Certified Humane Raised And Handled. This sticker on meat, eggs, pet food, and dairy products means that they meet standards set by Humane Farm Animal Care, a non-profit organization "dedicated to improving the lives of farm animals in food production from birth through slaughter." Endorsed by the Center for Food Safety and the American Society for the Prevention of Cruelty to Animals, they send veterinarians to do inspections to certify that the animals are never caged and have space to move around freely.

Enhanced, Basted, or Self Basting. The USDA allows producers to add up to 8% of the total weight with an injection of salt solution, flavorizers, and tenderizers. They improve water retention during cooking, taste, texture, and profits by about 8%. Do not brine these birds. They have enough salt.

Free Range or Free Roaming. This is another classic case of an industry bullying the USDA into allowing a highly misleading label term. Most poultry is raised in a row of connected “battery” cages in a hen house. They can be humane and safe for the birds if they are not overcrowded, but in reality, they are often crammed, leaving birds barely enough room to turn around. Free range animals may still be kept in battery cages or crowded coops most of the time, but they are “allowed” access to the outside through an open door to a fenced in yard. Now that doesn't mean they actually walk out the door. Often they don't. It is bright out there. There is no roof. It’s scary. But they can go for a short stroll if they want to.

Fresh. This term indicates that the bird has never been below 26°F. But at this temperature ice crystals can form and it can be as hard as a bowling ball. We have no idea how the USDA can consider this fresh, which, to most people, means “never frozen.” We would rather have a bird that was frozen soon after slaughter than one that was never frozen, shipped across country, sat on a loading dock for an hour, and then waited a week in the open top refrigerator case of the grocery store.

Kosher. These birds have been salted on the outside and inside the cavity because it was thought in ancient times that this would draw out the “unclean” blood. Nowadays there is little or no blood left in a bird after processing. Do not brine these birds.

Mechanically Separated Poultry. This is the term for meat-based products such as many types of chicken nuggets which

have no wing meat. After butchering, bones with meat attached are run through a device under high pressure to separate the bone from the edible tissue. The result is a paste or batter-like product, sometimes unfortunately called “pink slime,” that can be formed into nuggets or other shapes. We have really mixed emotions about this stuff. On one hand it is usually so heavily treated and flavored that it is unappealing. On the other hand we despise waste, especially of animals, so salvaging this meat is admirable.

Natural. This is strictly a marketing word. Legally, all meat labeled "natural" must be minimally processed with no artificial flavorings, colorings, or preservatives added after slaughter. But that definition makes almost all meat products "natural," so it's a fairly meaningless term.

No Antibiotics. The term “no antibiotics” may be used on labels for meat if sufficient documentation is provided by the producer to the USDA demonstrating that healthy animals were raised without antibiotics. Sick animals may still be treated with antibiotics. This is an important term, not for the quality of the product since evidence shows there is no residual drug left in the animal, but because the over use of antibiotics in farm animals encourages the breeding and spread of antibiotic resistant bacteria. This puts humans at risk as some of our most important disease fighting antibiotics become ineffective.

No Hormones. Hormones are not allowed to be given to hogs or poultry so the claim “no hormones” on a label is like saying “no milk added” on an orange juice bottle. If you see it on a chicken label, somebody is trying to bamboozle you.

Organic. In order to be labeled "USDA Organic" birds must meet a special regimen. The day after they escape the egg they can be given antibiotics and often are. After day one, they must be fed certified organic feeds. They cannot contain animal by-products, antibiotics, or genetically engineered grains, and they cannot be grown using persistent pesticides or chemical fertilizers. Notice the word persistent. This means pesticides can be used, but they must disappear before being fed to the birds. The birds cannot be given drugs, and they must have outdoor access. As with "free range," that doesn't mean they actually go outside. Organic birds are almost always more expensive. Blind tastings show that proper cooking influences the taste of a bird far more than how the bird is grown (and some tasters actually prefer conventional chicken). Nutritionally, organic and conventional birds are the same. While there may be environmental benefits, there is no evidence that organic birds are healthier for humans.

Oven Prepared. A chicken that is fully cooked and ready to eat.

Pasture Raised. Has no legal definition. Implies the bird was not raised indoors but in a pasture, but this is rarely the case. True pastured poultry is often raised in rotating outdoor pens on a diet high in natural forage of seeds and bugs, which tends to make the meat slightly firmer and may make it more flavorful in some cases.

Poulet de Bresse. A blue legged, white feathered, red-comb breed grown in the province of Bresse near Burgundy in Eastern France. It is widely praised as the best chicken in the

world. Most are slowly raised in flocks not exceeding 500 birds and killed at four months of age, twice the age of the typical American factory raised bird. At that point, Poulet de Bresse weight about 2 ½ to 3 pounds, smaller than the typical 3 to 4 pounds of American breeds. They are truly free-range foragers most of the time they are growing, which gives them well-developed muscles and full-flavored meat. In their last two weeks they are finished on corn and powdered milk. Poulet de Bresse are labeled AOC (Appellation d'Origine Contrôlée), the French certificate of origin and authenticity for wines, cheeses, and other foods produced in a traditional manner according to strict, time-honored methods. They are hard to find, even in the best restaurants in Paris, and because only about 10% of the production is exported they are very expensive. But they are definitely worth trying if you can find one.

Red label (label rouge). While not as prestigious as Poulet de Bresse, this French label for free-range chickens requires a particular slow-growing breed that is fed mostly grains and is raised in small flocks that are given outdoor access. Red-label chickens are matured about twice as long as henhouse chickens, and they are smaller than American chickens. The meat also tends to be moister, firmer and darker with a deep, nutty, almost gamey flavor. It is available from Allen Brothers Meats.

SHOPPING FOR CHICKENS

As with all cooking, the first step in making quality food is to buy quality ingredients. The old saying "garbage in garbage out" was never so true as in the kitchen.

The best birds we have tasted were "yardbirds," chickens that wandered around in a field scratching for worms and fed grains as a supplement. Their legs were a bit tougher but much more flavorful. When purchased within a week of killing, never frozen, they are a noticeable notch above average. You don't want them freshly killed because they need to go through 48 hours of rigor mortis and the enzymes need some time to begin tenderizing.

That said, we have nothing against fresh frozen birds, and most of the time they are better than so called "fresh" birds that have been in the chill chest at the grocery for a week or more after slaughter and shipping.

We must also confess a weakness for Cornish Game hens. A whole bird split in half cooks quickly and evenly because the breasts are not very thick, the meat is tender and juicy, and

the thin skin crisps beautifully. Half a Cornish Game Hen is a perfect portion for one.

Although chicken prices remain incredibly low, the least expensive approach is to buy a whole bird. You can roast it whole on the grill, on the smoker, or rotisserie, spatchcock, or break it down into pieces (more details on these techniques below). When you buy a whole bird you have all possibilities.

BREAKING DOWN A CHICKEN

Cooking whole chicken is our least favorite cooking technique. That's because when you roast a whole bird, the inside of the cavity remains pale. When you break down the bird you expose the cavity to heat and it can brown. Brown is beautiful. When proteins, amino acids, and sugars in meat turn brown, they develop more flavor. This is called the Maillard reaction, a chemical change in the meat that creates complex flavor molecules, especially when they mix with the seasonings in your spices.

Also, when you leave a bird whole it takes longer for heat to penetrate from the outside surfaces to the center, a recipe for crispy skin, but moisture loss in the outer layers which will overheat before the center heats to a safe temp.

We prefer to spatchcock, a naughty sounding word for butterflying the bird because it allows you to brown all surfaces and the bird cooks faster with less moisture loss.

We also like breaking the bird down into six pieces: Two breasts, two legs, and two wings. This allows us to cook each piece to optimum temperature and get crispy skin on all

sides of the wings. We can also offer guests their choice of cuts. Here's how to do it.

The first thing to do is look at the bird and remember who is winning this contest. You are smarter than a dead bird. Interestingly, the process of cutting up a bird is the same for a raw bird and a cooked bird. It is not hard once you understand the logic.

Start by removing the packet of neck, gizzard, heart, and liver from the cavity. Put the liver in a zipper bag and save up a bunch of livers to use for making Chopped Chicken Liver Paté. Put the rest in another bag and when you get a bunch of them and some bones, make stock.

SPATCHCOCKING

Burgers and steaks are easy to cook. They are flat on top and bottom, solid in the center, and pretty uniform in thickness. This allows heat to enter the meat evenly and steadily. But whole birds are fleshy tubes, hollow inside, and they have thick parts (breasts), medium thick

parts (thighs and drumsticks), and thin parts (wings). They also have all sorts of bones, some thick (leg bones), and some very thin (rib bones). Then there is the skin, whose chemistry is significantly different than the flesh, but it is all on one side.

A good solution is to spatchcock the bird. This is a giggle-inducing word for cutting it from tail to neck so you can open the bird up and brown the skin side as well as the cavity side. Because hot air circulates on all sides, a spatchcocked bird cooks faster and loses less moisture. It also looks impressive, and it is just plain fun to say “spatchcock.”

Begin by trimming off loose flaps of skin from both the front and rear cavities. This goes in the stock too. Sometimes we

lop off the wing tips and throw them in the stockpot too.

For spatchcocking and removing the backbone, the best tool is a pair of sturdy scissors. We like these spring loaded kitchen shears from OXO best. Whatever brand you buy, we strongly recommend you get some that come apart at the hinge like these do. This makes dishwasher cleaning and decontamination much easier.

The idea is to cut the backbone away from the ribs so you can remove the backbone. If you are lazy, you don't have to remove the backbone, just cut the ribs along one side of the backbone and spread open the carcass.

For a more thorough job, cut along both sides of the spine and remove it altogether. Discard the brown goop (kidneys) nestling close to the spine and toss the spine in a zipper bag in the freezer along with the gizzard, heart, and neck for making stock. You can save the liver too, but don't put it into

the stock. Put it into a separate bag for chicken liver pâté or for the dog.

Spread open the rib cage, lay the bird skin side up on a cutting board, and press down hard with both hands on the neck hole to break the collarbone (wishbone) so the bird lies flatter.

> "To succeed in life, you need three things: a wishbone, a backbone and a funny bone."
>
> — REBA MCENTIRE

Now, if you want to keep the wishbone in tact because you know it can bring you a winning lottery ticket, first place the chicken breast-side up with the neck cavity facing you. Work your fingers under the skin at the neck and locate the position of the wishbone with your fingers. With a paring knife, make two shallow cuts in the breast just above each of the longer bones of the wishbone. Push your fingers firmly through the cuts and work them around the long bones to loosen each side, then make a small horizontal cut directly above the very top of the wishbone to free it. Work your fingers all the way around the whole wishbone and pull it out of the meat. You can dry it and snap it with your favorite kitchen helper to see who gets the good luck.

We also like to snip off the wing tips because they are so thin that they burn easily. We toss them into the stock bag with the spine, neck, heart, and gizzard.

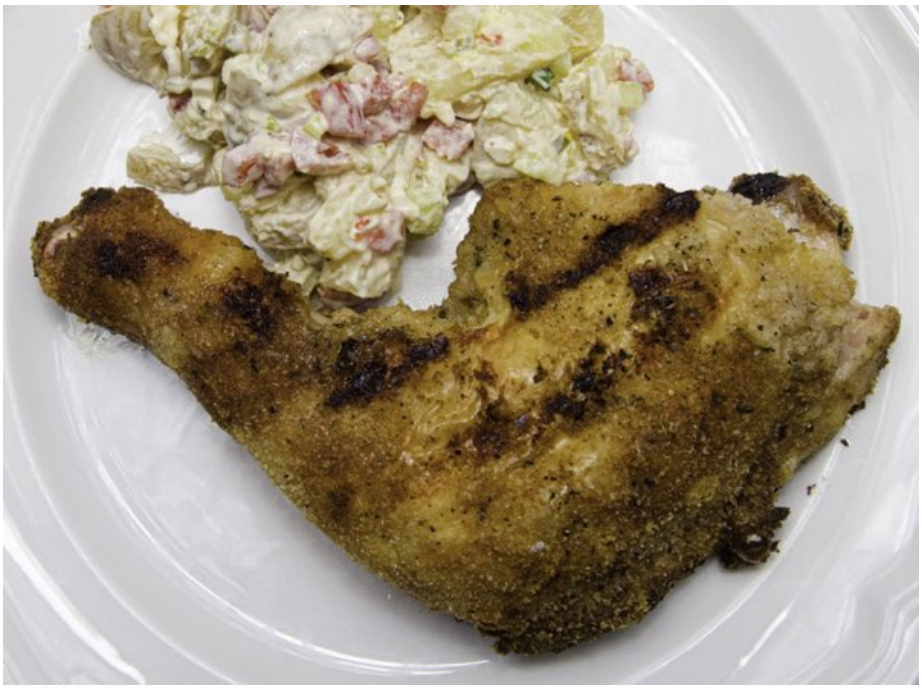
You now have a spatchcocked bird. Here's a short video of the entire process.

HALVING THE BIRD

One of the problems with spatchcocking is that the thighs are very loosely connected to the breasts and when you want to move the bird around or flip it during cooking, the thigh and drumstick easily tear off. A way to

make handling easier is to keep cutting the bird into two pieces. Flip the bird over and cut between the two lobes of the breast along one side of the keelbone (top of the sternum). Now you have two halves. Half a bird is a generous portion for a hungry person.

QUARTERING

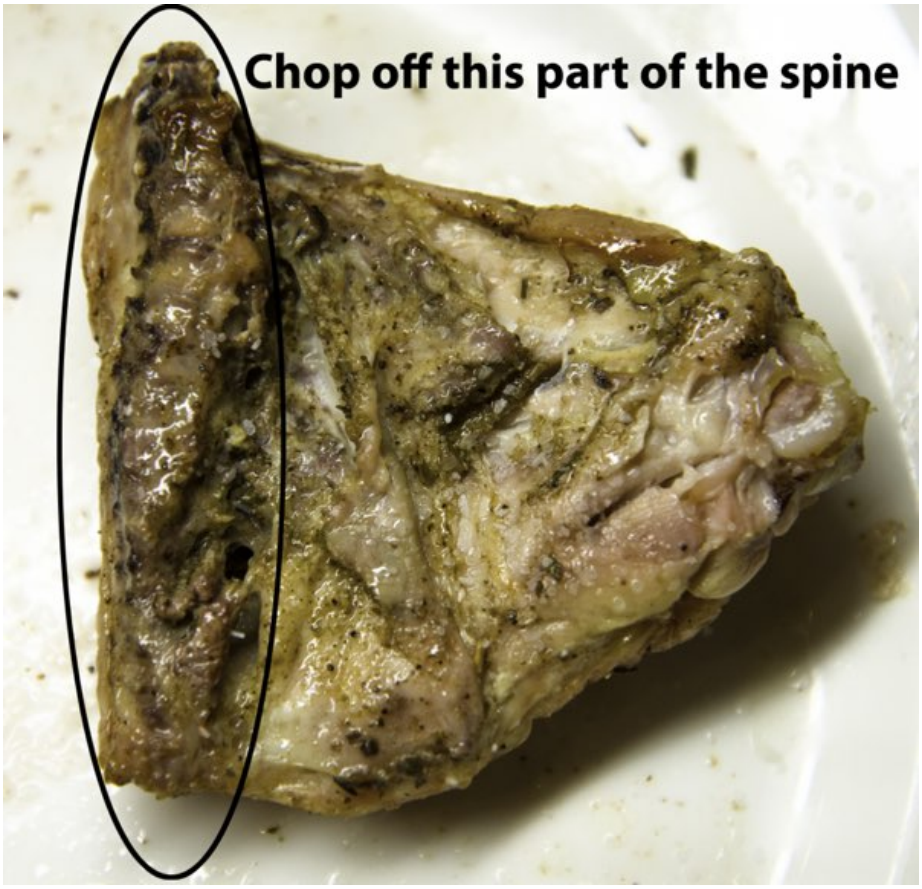


Quartering is the best way to make sure the dark meat and white meat eaters get what they want. We think cutting the bird into pieces gives you the best chance of cooking all pieces perfectly. If you cut the bird into parts you can use your trusty instant read thermometer and monitor doneness for each and every part and move them closer or further from the heat as needed. You will be

surprised at how two identical legs will cook at different rates!

Start by cutting the bird in half as in the previous chapter. Next, remove the legs by cutting the thigh away from the breast. It’s really easy. Just follow the contour of the thigh,

cutting between thigh and breast. The great advantage here is that you can now cook the white meat and dark meat to the optimum temperature for each.



There is usually brown goop (kidneys) along the spine and you'll find some on the end of the thigh. Cut it off.

The secret to cooking pieces is to reverse sear. Start on the indirect side skin up. At about 150°F, you move each piece skin side down to the direct heat, hot side and brown it, then flip, then brown the other side. When a piece is done just move it back to the indirect side. With the lid open it won't cook much.

Do it right and you will have tender, juicy pieces, brown all over, with each piece cooked to perfection, a feat impossible to achieve if the bird is whole. Best of all, you don't have to struggle carving up a whole hot chicken.

SIX OR EIGHT PIECES

The next logical step, and the method we recommend most often, is to go one step further and cut the bird into six or eight pieces. First, remove the wings. Removing them makes a lot of sense. The charm of the wings is that they are wrapped in skin that can be made crispy, and because they are so thin, they will easily overcook while attached to the breast.

Removing them is a bit tricky because the shoulder joint is buried into the breast. The way to do this is to grab the wing by the drumette near where it joins the body and wiggle it aggressively, pressing under until the ball and socket joint until it pops. You can then easily get a knife in between the joint and cut through any meat and skin. You can cook the wings alongside the other pieces. Just get them away from the heat sooner, or toss them on after the legs and breasts have been cooking for about 15 minutes.

If you want, you can remove the drumsticks from the thighs. We rarely bother because the thickness of the meat at the joint is about the same as the thigh so it will cook at about the same rate. Yes, it tapers towards the end and that part might overcook, but remember, dark meat is forgiving. We

only do this if we know there is someone at the able who likes to eat drums like Henry the Eighth.

To separate the thigh and drum, grab both parts and bend until the joint pops and finish the task with a knife.

SKINLESS

Yes, the skin is fatty and fat has calories, but it is also the tastiest part of the bird (well actually that title goes to the Pope's nose which is mostly skin and fat). But the good news is that the skin is easy to remove and skinless chicken, when seasoned and rubbed and cooked properly, is wonderful. We set the skin aside along with the backbone for stock. You can also slowly cook the chicken skin and any trimmed fat to render the schmaltz, which

makes a terrific frying fat. The crispy skin pieces (cracklins) make a wonderful snack when sprinkled with salt and our Poultry Seasoning. Once the skin is removed, you can reverse sear the boneless meat, and when searing you can get a nice crust.

BONELESS

"I love chicken. I would eat chicken fingers on Thanksgiving if it were socially acceptable."

— TODD BARRY

Now we get tricky. You can actually remove the bones from chicken parts. It is fairly easy to bone out the breasts and thighs. Drumsticks and wings? That's a job we leave for the pros.

Deboning the breast is simple. Slide the knife on one side of the breastbone and then down alongside the ribcage and

gently stroke back and forth angling the blade towards the rib cage. Keep blade against bone and with a few cuts, you have a boneless breast and a ribcage for your stock.

Now handle the breast carefully. There are actually two muscles: The bulk of the breast is the pectoral muscle (*pectoralis major*), but on the back side, where the ribs were attached, there is a thin strip of meat, called the chicken tender or chicken finger (*pectoralis minor*). It is also sometimes called the tenderloin, but it is not the same muscle as beef or pork tenderloin which lies along the backbone. It is, in fact, the same muscle as the “point” on the beef brisket. You should be able to keep it attached to the pectoralis major, but if it comes off, grill it alongside the rest of the bird. It will cook in minutes and you can snack on it when nobody is watching. Chef’s privilege!

Oh, and to keep a boneless, skinless chicken breast from shrinking and curling up during cooking, remove the tough white tendon that runs along its length.

Deboning the thigh isn’t hard either. If you flip it skin side down you will see the one bone, the femur. With a sharp tipped knife, carve it away from the meat and toss it into the stock (and yes, we know, that’s a picture of a turkey thigh).

POUNDING CHICKEN BREASTS FOR EVEN COOKING

Full breast lobe on left, pounded on right.

Here's the problem with boneless, skinless chicken breasts. They don't like you. They are tear shaped for a reason. To make you cry. Take them much past 160°F in the center and they turn to cardboard. But if you cook the center of the bulge to 160°F, then the tapered edges will be dry.

And with that big bulge, they just don't fit on a sandwich properly, leaving no room for lettuce and tomato. Then there's the skin. It only covers part of the meat and it shrinks when it gets hot.

But there is a solution. Pound the meat out flat to about ¾ inch thick. Because it is thin it cooks fast! This technique comes in handy for many chicken dishes, indoor or out:

Chicken Rollups, Chicken Cordon Bleu, Chicken Marsala, Chicken Paillard, Chicken Cutlets, and Chicken Scaloppine. Here's how to do it:

1| Take the bones out. Just run a sharp knife over the rib cage trying to get as much meat as you can off. Freeze the bones for making stock.

2| Take the skins off. Set them aside and make cracklins or use them in your stock.

3| Cover up. You need to cover the meat before you beat it to keep the bodily fluids from flying around the room. Pull off a large sheet of plastic wrap. Lay it flat on a solid counter or table. Lay the meat on top of the plastic wrap just off center and fold the other half over the meat. Don't use waxed paper or foil, they tear easily. You can use a zipper bag, especially if you are going to marinate or brine. They are nice and sturdy and rarely tear or bunch.

4| Flatten the curve. Leave the tenderizer mallet and the rolling pin in the drawer. They tend to tear the meat. Use a skillet or sauce pan. They are large and flat. First look around to make sure nothing on the table will fall off when you start pounding. But don't haul off like you are pounding a nail. Thwack it gently and focus on the bulb end. Several whacks are better than a vicious spanking. Take it down to about ¾ inch all across the surface. Now you can grill the breast and it will cook evenly, and fit on a bun beautifully.

BUTTERFLYING CHICKEN BREASTS

Another way to prep a boneless, skinless chicken breast for even cooking is to butterfly it. Basically, you cut it open so it lays flat. Put your hand on the chicken breast, then position a sharp knife horizontally in the center of the thickest part of the meat. Slice horizontally into the meat, cutting it half, but stop about a half-inch from the opposite side. Then open up the chicken breast so it lays flat like a book.

GASHING

What marinades do best is find their way into cracks and crevices on the surface of meats producing a flavorful baked on seasoning. When they dry out during cooking, they leave behind the flavors.

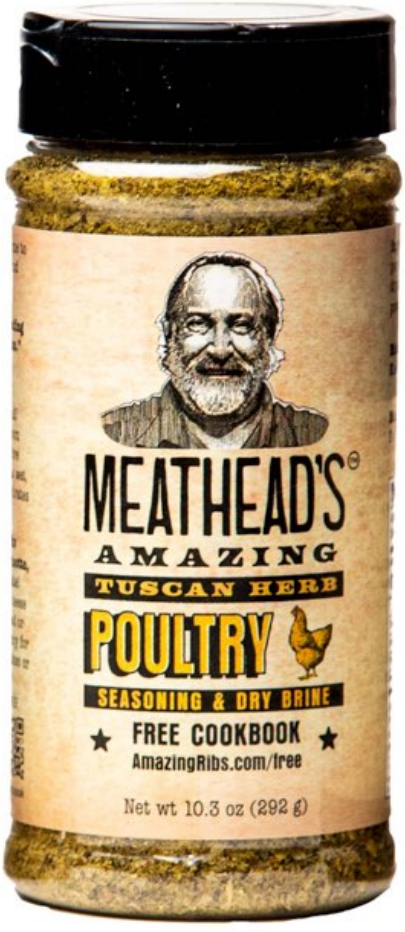
The advantage of marinades over spice rubs is that you can get diverse flavors not typically found on a spice rack. We're talking about all the complex flavors in liquids such as wine, fruit juice, coconut milk, soft drinks, liqueurs, and more.

Since marinades don't penetrate very far into most foods, give them a hand. Gash your food. Cut slices into the surface and rough it up a bit. Give the marinade slits, cracks, and pits to enter. Gashing creates more surface area to brown and more surface area coated with flavorful baked-on marinade.

The chicken breast above was gashed in a cross-hatch pattern with a sharp knife before marinating. As you can see,

the marinade has penetrated as deep as the gashes, making ½-inch cubes of flavored meat. (Gashing even works on veggies like zucchini.)

RUBS


MEATHEAD'S
AMAZING
TUSCAN HERB
POULTRY
SEASONING & DRY BRINE
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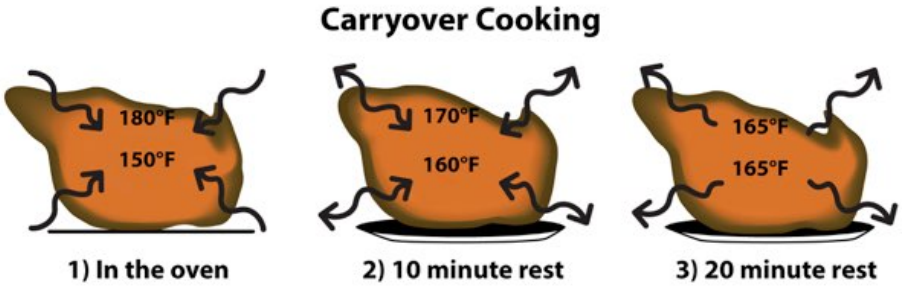
Net wt 10.3 oz (292 g)

Mild-tasting meats, like chicken, are blank canvases to be painted with herbs, spices, and flavorful liquids. We like to use a rub of aromatic herbs both on top of and occasionally under the skin to add more flavor to the skin and the surface of the meat. We are not big fans of sweet rubs on chicken.

COOKING AND DONENESS TEMPERATURES

When cooking chicken on a grill or smoker, in general, you want to cook skinless chicken parts at 225°F in indirect convection air. This low temperature helps hold in moisture and the slower cooking makes it easier for you to get it off the heat at the right temperature. For skin-on chicken, you can roast in the indirect convection zone at 325 to 350°F in order to render the fat under the skin and make the skin crispy.



To hit the target temperature you have to remove the bird from the heat when it is 5 to 10°F below target because cooking can continue for 20 minutes or so after you remove the bird from the heat. This “carryover” cooking can take a perfectly juicy chicken breast and turn it to cardboard.

Here's how carryover works: Hot air (convection) cooks the outside of the food. Then the outside of the food cooks the inside of the food by conduction. When we remove the meat from the heat, it continues to cook because some of the heat built up in the outer layers of the meat continues to be passed towards the center while some of it bleeds off into the atmosphere.

So it’s best to remove the bird at 155 to 160°F in the breast and 160 to 165°F in the thighs to allow for carry-over. It will be safe. And juicier.

How long does this take? Actual cooking time will vary depending on how well the chicken is defrosted, whether or not you brined or injected, what temperature your fridge is, if it sat at room temperature for a while, how close your bird is to the gravy pan, how well your cooker holds steady, the quality and accuracy of your thermometers, airflow within the cooker, humidity in the cooker, and the breast size of your bird. That's a lot of variables! We’ll give you estimates in our recipes, but remember, cook with a thermometer, not a watch.

COOKING SOUS VIDE QUE

We recommend cooking at about 154°F for two hours. By using a sous vide device, you can hold the chicken at that temperature for hours and it will never overcook because it can’t go higher than 154°F. You can cook at lower temperatures, but we think the texture is a bit slippery and

stringy, and mentally, people struggle with eating pink chicken even though it may be perfectly safe.

REVERSE SEAR

No matter how you butcher the bird, no matter how you flavor it, you should almost always reverse sear. Many steak lovers are familiar with the concept of reverse-searing, but when it comes to chicken this technique really shines. Reverse sear allows you to make sure the interior of the meat is safe and fully cooked without burning the outside. How many cookouts have you attended where you have been served beautiful looking chicken, amber skin with some char, and the inside is almost raw? Or worse still, the bird is immolated like this picture from a very famous cooking website:

Here’s how reverse sear works. If you sear first as sooooo many cookbooks recommend, you are loading up the exterior of the meat with energy. It then slowly works its way to the center so you have a dark brown and thoroughly cooked exterior, a layer of badly overcooked meat just below, a layer of slightly overcooked meat, and finally, in the center, a perfectly cooked layer. You have seen this in steaks no doubt, where almost half the meat was brown and only a sliver in the center was rosy.

When you reverse sear, you start by slowly roasting the meat at a low temperature, 225°F, in the indirect convection zone so the energy penetrates all the way to the center but it does not overcook the exterior. Then you move it to the high energy infrared zone with the lid open and pound one side with energy, browning it. You flip it often so much of the energy bleeds off into the air rather than pushing down into the meat. The result is a nice deep brown exterior and tender juicy center. Here's the technique:

First, you need to set up your grill in 2 zones. You should get in the habit of using the 2-zone setup for just about everything. To reverse chicken with this set up, dry brine the bird, then apply a rub and start the meat on the indirect side where it can gently roast at a low temperature. For most foods, we recommend 225°F on a grill. At this temperature the energy can work its way from the surface to the center so it is evenly cooked. At high temperatures, the exterior overcooks while waiting for the center to warm. If you wish, put some wood on the hot side to get a gentle smoke rolling.

When the meat hits about 150°F, lift the lid and move it to the direct infrared energy side, skin down, and crisp the skin. Stand right there and watch it because it can go from golden to black in a hurry. If there are flareups you can move it back to the indirect side. (Beware of flareups: They can set the skin on fire and deposit soot on the food.) Once the skin is crisp, flip the chicken over and brown the backsides. Boom! You have perfectly cooked, moist chicken with potato chip skins. The reverse-sear technique works on all poultry and most other meats more than 1-inch thick.

PAN ROASTING

A lot of chefs cook chicken parts by searing the exterior in a frying pan with a thin layer of oil, and then they pop the pan into the oven to finish cooking the inside. They call this pan roasting (first the pan, then the roasting). On a grill, you can replicate this process by searing the meat in a pan or on a griddle, closing the lid, and letting it roast. Simple!

Here you can see a fun variation. The chicken is searing and roasting while sandwiched between to scorching hot cast iron pans.

After pan roasting, there remain juices, herbs and spices, and brown bits in the pan. They can be the basis of a killer sauce.

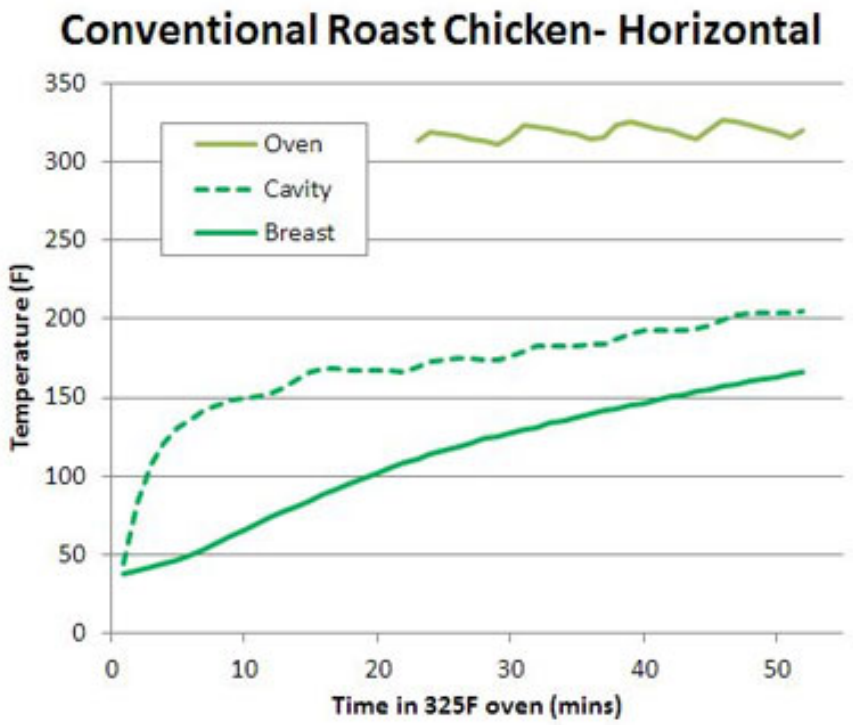
WHOLE BIRD ROASTING

Below is a picture that shows why cooking a whole bird is not ideal.

Notice one side is overcooked, one side is perfect, and the cavity remains badly undercooked and dangerous.

The AmazingRibs.com science advisor, Prof. Greg Blonder of Boston University, roasted a three-pound chicken at 325°F. He monitored the breast meat temperature and the air temperature in the cavity with highly accurate thermocouples.

It took the breast meat less than an hour to reach 160°F. By that time the air temperature in the cavity was about 212°F, boiling temperature for water. So by the time the bird was done, the air in the cavity was 113°F cooler than the air outside it in the oven.



If you must cook the bird whole, here's how: Throw a few tablespoons of seasoning into the cavity. Low and slow roast, lid down, in a 2-zone setup at about 325°F on the indirect side, away from direct flame. As the meat approaches 150°F, move it to the direct heat side, lift the lid, and roll it around over high heat for a few minutes to finish cooking to 160°F in the breast and to crisp the skin.

Never place a whole bird inside a roasting pan. Instead place on a rack above a roasting pan so air can flow all around it, cooking and browning it properly on the underside. Put some water in the pan so the drippings don't burn. We like to toss a few ingredients into the pan: A quartered onion, a quartered apple, a carrot and a celery stalk cut into 2 inch chunks, the neck, gizzard, heart (no liver), the wing tips, fat and skin trimmed from the cavity and neck openings, and a

palmful of herbs (mostly sage and thyme). Basically, you're making stock to turn into gravy.

Prevent the wing and drumstick ends from burning by covering their ends with foil for about 30 minutes. Do not cook breast side down as has become popular. It just doesn't help. There are no superhighways inside the bird for liquid to flow.

Do not baste during cooking. It does not make the meat juicier and it just makes the skin soft. You will still get a beautiful crisp brown skin without basting if you reverse sear.

VERTICAL ROASTER

If you have to serve a whole bird, here's how. Use a vertical roaster, not a beer can (that's a bad idea we debunk below).

There are a number of gadgets that hold chickens upright on a wire rack. They work reasonably well because air can enter the cavity and cook the meat on the inside. But the inside still doesn't brown because a bubble of air gets trapped in there.

Vertical roasters have two advantages: (1) They put the legs closer to the heat so they cook faster than the breasts, and (2) the bird just looks cool posing there like a supermodel after you've pinned one wing behind its "head" and put the other on its "hip" with its legs crossed.

If you use one of these, get a knife down into the neck cavity from above and open a “chimney” connecting to the abdominal cavity so hot air can travel through from bottom to top.

ROTISSERIE CHICKEN

If you must cook a bird whole, rotisserie is another great idea. Season the exterior and interior, and as the surface alternates between the hot burner and the cool "shady" side the skin crisps beautifully.

You should try to make sure the bird is evenly balanced. If you can find the basket type rotisserie like the one here, that's the best, but they are hard to find. Most use a spear

with a fork on each end. You will need to pin or tie the wings and legs to the body to keep them from flopping around. Also put foil on their tips to keep them from burning. The best rotisseries have a counterweight that balances the load sorta like the way they balance your car tires. If your grill doesn't have a special rotisserie burner, then set things up so the infrared radiation is not directly under the bird. Cook with indirect heat.

We like to put a pan under the bird with potatoes or veggies. The drippings take them to another planet. Read the recipe below for details on how to do this.

HALF CHICKEN

As we said before, the problem with spatchcocking is that the thighs easily tear off when you move the meat around since there is little other than skin holding it to the breasts. Cut the bird in half and it is a lot less floppy and easier to move around. In addition, fat drains easily through the cut surfaces. Besides, half a chicken is closer to a single serving.

CHICKEN PARTS

Remember, these are animals, not widgets, and they are unpredictable. We think cutting the bird into pieces gives you the best chance of cooking all pieces perfectly. If you cut the bird into parts you can use your trusty instant read thermometer and monitor doneness for each and every part and move them closer or further from

the heat as needed. You will be surprised at how two identical legs will cook at different rates!

The secret is to reverse sear. At about 150°F, you move each piece skin side down to the direct heat, hot side and brown it, then flip, then brown the other side. When a piece is done just move it back to the indirect side. With the lid open it won’t cook much.

Do it right and you will have tender, juicy pieces, brown all over, with each piece cooked to perfection, a feat impossible to achieve if the bird is whole. Best of all, you don't have to struggle carving up a whole hot chicken.

SMOKING

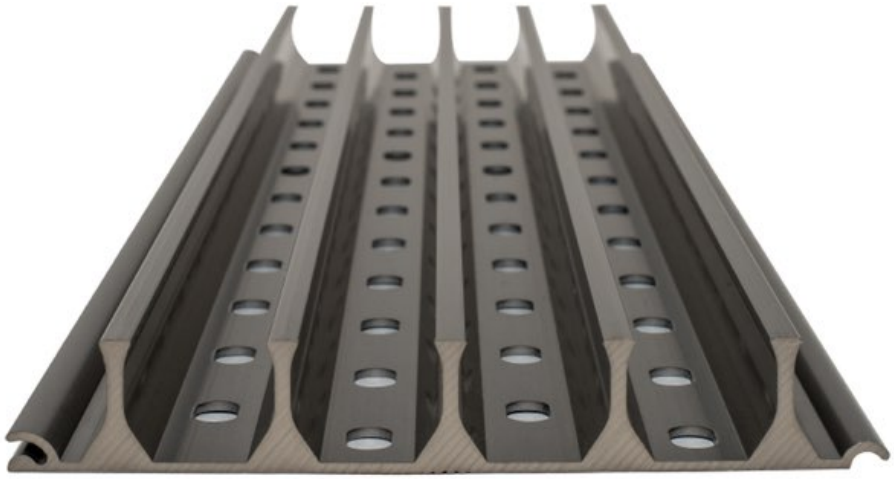
Chicken likes smoke. The question is, how much smoke do you like? It's like black pepper. Say when! It is not hard to over smoke chicken. You can smoke on a smoker or a grill, and there are a few tricks that ease the way.

On a smoker. Lean toward mild woods like oak or apple. For skin-on chicken, smoke at 325°F to get some crispness to the skin. If you're going skinless, smoke at 225°F to help you retain moisture. Better yet, reverse sear the meat whether skin-on or skinless: Smoke it at 225°F and then, when it hits 150°F internal temperature, move it to a gas grill on high, lift the lid, and sear the skin and back side.

On a grill. Preheat with a 2-zone setup and get the indirect convection side to 225°F. Throw wood chunks on the flame or coals and when there's a good cloud of smoke rolling, put the meat on the indirect convection side. When the smoke stops, resist the temptation to add more. Taste the finished bird first. If you think it is not smoky enough, next time add more wood when the first pieces die out. Don't just add more

at the start. Either way, when the meat hits 150°F, move it to the direct infrared heat side, lift the lid, and sear the skin and back side.

CLOSE SMOKING



Another technique we are fond of is called “close smoking” and it is perfect for sous vide que. We use a device called GrillGrates™. It has raised rails and sunken valleys, and we toss wood pellets, wood chips, or sawdust into the valleys and they create smoke just ½ inch below the meat, rapidly imparting smoke flavor and color.

After sous vide, the chicken breasts above went from ugly and colorless to golden and luscious in about 5 minutes with this technique. Here's a video that describes the method in more detail.

DEEP FRYING

"The best comfort food will always be greens, cornbread, and fried chicken."

— MAYA ANGELOU

We all love fried chicken but we don't make it often because it sets off the smoke alarms and

spatters making a mess of the stove and counters. Instead, we hit the grill.

Yes, we know deep frying on the grill sounds dangerous, but it is actually much safer than deep frying indoors. We do all our deep frying on our gas grills in a heavy Dutch oven with high sides. It is almost impossible to knock it over and with at most 2 inches of oil in a 6-inch deep pot, there is zero chance of it boiling over. If you should somehow manage to spill, the worst that can happen is you have a fire that damages your grill. If you have a fire indoors, kiss your house goodbye.

There is another advantage to deep frying on a gas grill. Frying temperature is generally about 375°F, but sometimes, when the crust is beautifully golden, when you stick it with a thermometer the center along the bone is still undercooked. Normally you have a choice: Leave it in the oil and overcook the crust, or pop it in the oven (pan-roasting of a sort). In restaurants they often put it under a heat lamp to continue cooking. On the grill, it's a cinch: when the meat is done frying, place it on the indirect side of the grill, close the lid and let it drip dry and carryover cook until it reaches a safe internal temperature of 160°F.

There are numerous options for preparing the meat. We always start with a dry brine although soaking in pickle juice (something that is rumored to be the secret to Chick-fil-A's fried chicken) imparts both the salt and flavor. When you finish that jar of dills (not sweet pickles), save the brine! If the pickle jar is big enough, you can put the chicken in it, put on the lid, and stick it back in the fridge.

A lot of recipes have you mix pepper and seasonings in with the flour and then roll the meat around in it, but that is not a measured way to flavor. We prefer to sprinkle our rub on the meat first.

As for the crust, simplest is one of our favorites: Moisten your hands, pat the surface of the meat to moisten it, roll the meat in all-purpose flour, and fry. It's surprisingly good.

For a thicker crunch, dunk in a batter. Or roll in flour, then in beaten egg and then in, your choice of:

- More flour
- Flour, then more egg, and then a third coat of flour
- Flour and cornstarch blend
- Other starches like potato flour
- Bread crumbs
- Panko
- Crumbled cornflakes

They all work! For more about the subject and for our fried chicken recipes, read Meathead's background article on frying here.

GRAVY

Instead of a gloppy starchy sauce, make a succulent *thin gravy*, with giblets and trimmings from the bird, onions, carrots, celery, and more. Put them in a pan under the bird to catch its sexy smoky drippings as it cooks. Then cook down the stock to concentrate it if you

wish. You can thicken the gravy with flour or cornstarch or let it remain thin so it can soak into the meat better.

THE MYTH OF BEER CAN CHICKEN

"I think Beer Can Chicken is a religion. We need a little separation of faith and science here."

— STERLING BALL OF BIGPOPPASMOKERS.COM

Yes, we know your Beer Can Chicken tastes wonderful. Yes, it is moist and flavorful. Yes, we know your neighbors and family think your Beer Can Chicken is fabulous. Yes, with the fowl perched comically on its legs seemingly guzzling brew through its posterior, Beer Can Chicken is a showstopper. And yes, it is absolutely moist and flavorful.

Why? Because it is roasted chicken! If you don't overcook it all roasted chicken is wonderful! Sorry, but the beer can has nothing to do with it. Beer Can Chicken is a gimmick, an inferior cooking technique, a waste of good beer, and is potentially hazardous.

Think about this: You've never seen a fine dining restaurant serve Beer Can Chicken, have you? That's because professional chefs know this is clearly not the best way to roast a chicken.

WHAT BEER CAN CHICKEN GETS RIGHT

The "recommended" procedure is to use room temperature beer, drink half the can, and punch holes in the top. Some folks put herbs and spices in the can. You fold back the wings so they don't burn, the can is inserted in the cavity and the whole apparatus sits on three points, the can and the two drumsticks. It is placed over indirect heat in a 2-zone system so it can cook by convection heat. Do it right, and when you are done you have a nice roast chicken. This means:

1| Crackly skin. Do it right and you'll always have crunchy, crackly, tasty skin, and the vertical orientation drains fat well.

2| Even exterior browning. Beer Can Chicken doesn't tie the legs together as is done in the classic French method, so the crotch area browns better than when the meat is trussed and the legs and breasts cook to the proper temperatures.

3| Major curb appeal. Beer Can Chicken is an impressive presentation having that little humanoid standing there in the middle of the table, legs splayed in a come hither look, and arms wide beckoning you. But....

WHAT BEER CAN CHICKEN GETS WRONG

Alas, many rookies make the mistake of placing it directly over the coals or flame and this inevitably results in cremated legs since fat drips out the bottom, creating flareups in the grill and leaving the breast undercooked.

There is no way on earth the beer can escape the can and contact the flesh because the metal can blocks sideways movement of the beer and the beer never gets hot enough to steam and come out the top. That means no steam. Zero. Zip. Nada.

Minutes	Grill	Beer	Breast	Thigh
00	264°F	75°F	38°F	38°F
15	301	53	49	51
30	330	70	77	85
45	328	84	118	125
60	331	101	140	141
75	333	118	151	160
90	328	130	162	179

Here's the physics of how it works. When you insert the can, the beer and chicken become a single thermal mass. The chicken is a cool thick wet insulation blanket wrapped around the beer, so, contrary to myth, the beer remains cool and never ever steams. The beer is wrapped in a chicken coozie. The chicken is only 75% water while the beer is 92% water, and water is a great insulator. In the table below, an actual typical cooking session we did, you can see the beer peaks at 130°F, 82°F below the boiling point of water and 40°F below the boiling point of alcohol!

Starting with room temperature beer, you will notice that the beer temperature actually drops a bit at first because the chicken is cold. Since the center of the bird is cooled by the beer can, the risk of undercooking is high. You absolutely *must* use a digital meat thermometer if you are cooking Beer Can Chicken.

For our experiments, we used a 2-zone system on both gas and charcoal grills. In the pictures here, we used a four-burner gas grill with two burners on high, two off, and a fan to enhance convection airflow. We used a lab quality multi probe thermocouple to monitor the air temperature at the cooking surface (not way up in the dome), the breast meat, the thigh meat, and the beer temperature.

But even if the beer got hot enough to evaporate, it can't because it is covered by a layer of chicken fat! Look at the top right picture of the can’s contents after the cook. That's right, as the chicken cooks, fat and juices drip into the can, and fat floats on top of the beer preventing anything from escaping. The pictures also show that the can weighs more after the cook than before because of the fat and juices!

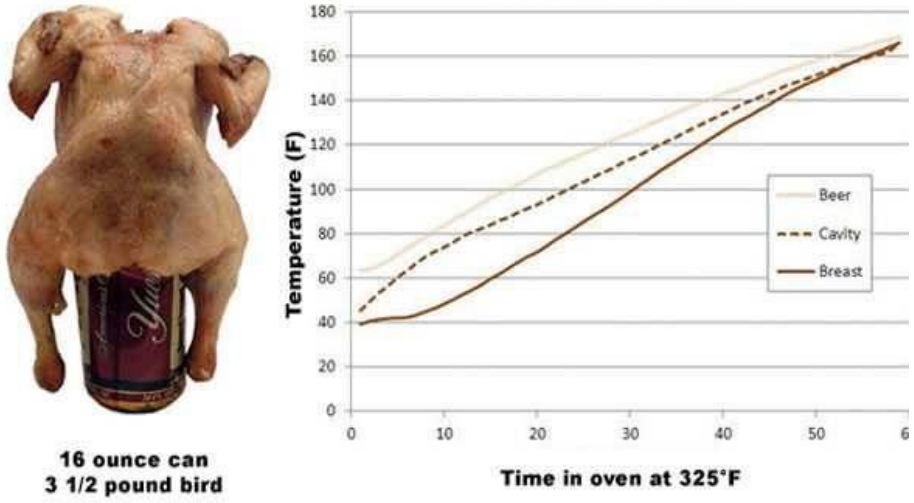
Also, the can is inserted half way up the cavity and blocks the meat from contact with the beer. The can is like a condom. There is very little surface area for flavor to penetrate, just the 2 inches or so above the can in the shoulder.

If you remove the top of the can, even if the beer were to evaporate, and yes, a small amount will evaporate even at low temperatures, it would come into contact with only a small amount of meat in the cavity above the can. Since the meat is relatively cool at first, much of the beer condenses and rolls back down into the can. But remember, chicken is muscle. That area is white meat, a solid mass of muscle which is saturated like a sponge with 75% water. There is no room for liquid to enter, and no mechanism, chemical or

physical, to propel it inward. There are no superhighways for the beer to travel through.

Do this experiment. Get a mouthful of beer. Take a straw and place one end against a chicken breast and the other in your mouth. Now blow. Hard. No beer can enter the flesh. It is fully saturated. There is no place for it to go, even under pressure.

And anyone who says the beer crisps the skin, which is separated from the can by at least 1 inch of meat really has been smoking more than chicken. The skin is crisp because there is warm dry air all around it and because fat drips away in the vertical orientation.



In our tests we used 12 ounce cans. The AmazingRibs.com science advisor Professor Greg Blonder used 16 ounce cans. He also monitored the air temperature in the cavity above the can. A 16 ounce can extends several inches lower (below the chicken) than a 12 ounce can and is exposed to more heat so all three rose in temperature together and reached safe

serving temperature at about the same time. The beer and space above the beer got hotter than the 12 ounce can, but still peaked at about 165°F, well below steaming. Some of the beer at the bottom of the can probably got hotter because it was exposed to hot air, but that liquid rises and mixes with the cooler beer above, so there is no way it will come close to the boiling point.

What about beer flavor? According to Scott Bruslind, Laboratory Manager at Analysis Laboratory, on average, 92% percent of beer is flavorless water and 5% is flavorless alcohol. All the flavor compounds are at most 3.5% of the weight: 1 to 2.5% sugars with 0.5 to 1% a mix of proteins, minerals, small chain organic acids, and esters, aldehydes, and ketones, which are a mix of acids and alcohols. Finally, 0.25% of the beer is carbon dioxide under pressure to make it bubble.

That means that in a 12 ounce can of beer, there is about 1 teaspoon of flavor, even in big dark beers like stout, the flavor compounds are a very small part of the brew. In other words, it is impossible for the beer to flavor the meat in any detectable way. Yes, you might be able to smell beer while it is cooking, but that smell is the result of immeasurably small parts per billion of the aromatics.

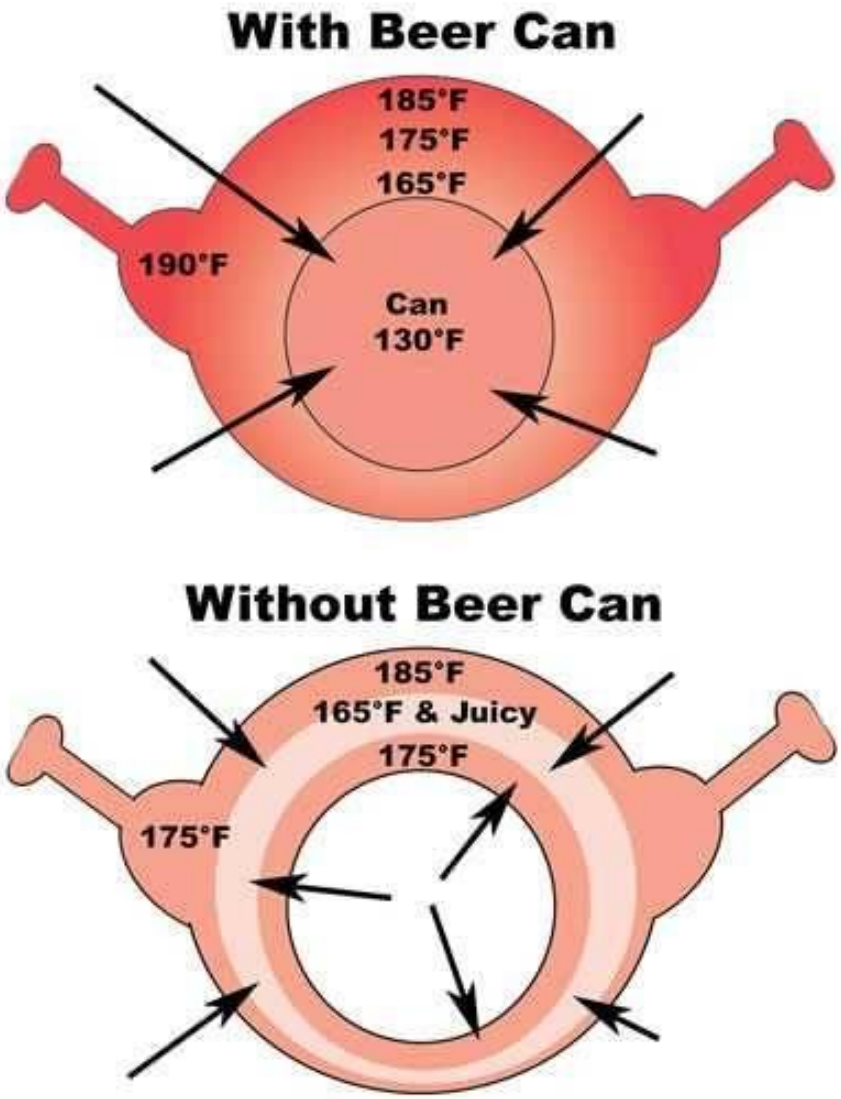
And no, it won't make any difference if you use soft drinks or other beverages. None of them will evaporate any faster or contribute any more flavor.

John Kass, formerly a columnist for *The Chicago Tribune*, raves about beer can chicken. He says you need to

put spices and herbs in the can. Alas, only a few molecules will escape the can, and most go right out the top.

With a metal cylinder up its butt, warm air cannot enter the cavity from below and only the tiniest amount can enter from above. The can effectively prevents the chicken from cooking on the inside. All the heat must enter the meat from the outside. Because meat doesn't heat evenly, it progresses inward from the part in contact with warm air, and the outer parts are warmer than the inner parts. By the time the meat in contact with the can hits 160 to 165°F the outer layers are in the 180 to 190°F range. That may darken and crisp the skin a bit more, but it makes the outer layers of muscle drier.

Take away the can and heat will enter the cavity and warm the inside of the meat so heat is working its way to the center of the muscles from both sides. This way neither surface gets far overcooked. Remember, air cooks the outside of the meat, but the outside of the meat cooks the inside of the meat, not the air. The more meat the heat has to travel through, the more the outer layer gets overcooked. So cooking both sides insures the outer layers are not as hot and not as dry.



We love the flavor of browned meats. By inserting a metal tube filled with liquid into the chicken you prevent the inside of the bird from browning, so you get less of the stuff we love best.

Finally, getting the bird and can off the grill is tricky. How do you grab it, by the can or by the bird? With what? And separating the two can be especially tricky because they are hot and they tend to stick together. Spill hot beer and fat on

bare legs and feet in sandals and your July 4 will be spent in the emergency room.

How'd you like some plastic in your chicken? Brewers do not test the plastic liners inside the can at cooking temperatures, and the ink on the outside of the can is not likely food grade. We asked the folks at Anheuser-Busch, maker of Budweiser and other popular beers. They said "There are many recipes that cooks have been passing around for years that use beer to flavor chicken, and some of them suggest using an actual can of beer in the cooking process. While many people swear by these methods, and apparently they produce some delicious results, it's not one we endorse or recommend, since we don't design our cans for this purpose. We do, however, recommend many recipes using beer and for cooks to be creative with beer in many other dishes as well."

THE FINAL EXAM

Meathead and his wife tasted all the chickens that he cooked in his experiments and paid especially close attention to the areas around the shoulder. They could find no trace of beer flavor. Prof. Blonder also tasted the birds he cooked side by side and found no beer flavor. Since we published our myth busting analysis of Beer Can Chicken, others have verified our conclusions:

Doug Hanthorn, the very clever fellow behind TheNakedWhiz.com also set out to test the beer can chicken concept and came up with similar data.

Michael Chu, the author of the excellent website CookingForEngineers.com tested the Poultry Pal, a device that is supposed to improve on the beer can. He came to the same conclusion.

PART VII
RECIPES

Now that you have the basics down, here are some of our favorite recipes. But first a few tips.

Tinkering. We know you like to tinker. *Do us and yourself a favor, try our recipes our way with no changes the first time.* You will then have a memory of what the recipe is *supposed* to taste like.

If the recipe calls for regular old fashioned granulated white sugar, don't use brown sugar. If it calls for boring old distilled white vinegar, don't reach for the cider vinegar. We worked very hard to perfect and test these recipes and some substitutions just don't work. After you've tasted the dish the way we intended it to taste, then the next time you make it, riff on it however you want.

Here are some key steps to creating a successful dish.

Timing. Prep times include all the washing, measuring, chopping, and peeling. Cooking times are our best

guesstimates based on our tests, but keep in mind, this is food, not a widget, and two seemingly identical chickens may cook at different rates. No two cookers are exactly alike. Weather, humidity, and wind also impact outdoor cooking times. Click here to read more about what influences cooking time.

Wood. We have not specified precisely how much wood you will need or what type of wood to use for smoking because the strength and flavor of wood depends on many variables, including the nature of your cooker and your preferences. Go easy at first. A meal is never ruined by too little smoke. Measure wood and keep records with a cooking diary (you can download one here).

2-zone almost everything. For most recipes on a grill, we recommend 2-zone cooking. *The indirect convection heat zone is for slow roasting and smoking.* It is cooler and acts as your safe zone for when pieces finish early or if they are cooking too fast. Whenever cooking over indirect heat, we always specify an air temperature, usually 225°F or 325°F. You need a good digital oven thermometer with a probe placed on the cooking surface near the food. A thermometer in the dome cannot be trusted.

Over the direct infrared radiant energy zone, we want lots of fire power for searing. "Give 'er all she's got, Scottie." For searing, we usually do not specify the temperature because most cooking thermometers cannot go high enough and infrared radiant energy is best measured in calories rather than temperature. Moreover, the direct radiant heat side is usually only being used for searing and browning the

surface. The food isn't there for long. We sometimes call cooking by direct infrared radiant heat Warp 10, Warp 9, Warp 8, etc. in homage to Star Trek.

Lid position. Almost all the recipes in this book require you to cook, roast, bake, and smoke with indirect convection heat with the lid down. In most cases when we ask you to sear, the food is over direct infrared radiant heat, and the lid is up.

Some recipes call for cooking in a pan or pot. You can do that on the direct heat side or on your side burner, or, horrors, indoors. We strongly recommend that you have a frying pan and a sauce pan set aside just for outdoor cooking. You can cook with your best expensive pots and pans, but sometimes they fall, or get scorched, and we don't want to risk the wrath of a spouse by ruining a wedding gift.

Salt. We use Morton Coarse Kosher Salt. No Morton did not pay us. Different salts have different grain size and that can influence salinity when measured by volume (teaspoons, tablespoons, cups) rather than weight. We wanted to standardize on one salt, and the grain size of Morton Coarse Kosher Salt makes it easy to pinch and scatter. If you substitute table salt, cut the quantity in half since it is more concentrated. Click here to learn more about the science of salt and see a conversion calculator for different salt types.

Black pepper is always best when ground fresh. Ditto for other spices that start out as seeds.

Butter is usually unsalted in our recipes. We prefer to control the salt content precisely without the wild card of an unknown quantity coming from the butter. That said, if you

use salted butter, there is so little that the recipe will probably turn out fine, especially if you cut back a tad on other salt.

Eggs are large.

Flour is all-purpose flour.

Fruits and vegetables are medium size, and they should always be fresh and scrubbed with cool water.

Garlic powder is pure garlic powder, never garlic salt, which has salt in it. You should control salt separately.

Mayonnaise. Never substitute Miracle Whip or light mayonnaise for mayonnaise. The chemistry is very different. Among other things, Miracle Whip has two kinds of sugars, mayo has none.

Milk is whole milk. You can get away with 2% in many cases, but not skim milk, soy milk, almond milk or any other substitutes. If we call for half-and-half or cream, it is because we think the fat is important to the chemistry. You can probably substitute one for the other, but don't use milk.

Oil is usually olive oil unless otherwise noted and is usually extra-virgin olive oil if it is not being heated. If it is being heated, use inexpensive olive oil or vegetable oil.

Sugar is granulated white sugar. Sugar is a common ingredient in spice blends and sauces because it is a flavor enhancer, it helps browning, and it encourages crust formation. When we want brown sugar, we will call for it.

Ingredients are listed in the order in which the recipe calls for them. If you see the term “divided” it means that the ingredient will not be used all at once.

Mise en place. Always practice *mise en place* (i.e. putting everything in its place). Gather all your ingredients and chop, slice, and dice before you apply heat to anything. You don’t want to be scrambling to chop an onion while things are cooking in the pan. This is a vital foundation level concept.

SIMON AND GARFUNKEL RUB FOR POULTRY

Chicken and herbs get along like peanut butter and jelly. This wonderful herb blend goes on chicken, turkey, grilled potatoes, even on the outside of baked potatoes, grilled asparagus, and in omelets.

“Are you going to Scarborough Fair? Parsley, sage, rosemary and thyme, Remember me to one who lives there, She once was a true love of mine.” Simon & Garfunkel

Measuring the ingredients is a bit tricky since some of the herb leaves may be powdered, not crushed. The big chunks, like oregano have more air in them, so try to compensate by adding more or less depending on how much air in your raw materials. If your measurements are not precise or if you lack one or two ingredients, no wars will break out, but we think the sage, bay leaf, and rosemary are essential. Crushed bay leaf may be hard to find so you can use whole bay leaves. Just take about 10 leaves and crush them with a mortar and pestle, spice grinder, or blender. The pepper will add a little heat, but you can cut it out if you're a wimp or amp it up if you're a tough guy.

Makes. About ¼ cup, enough for about 8 large whole chickens

Takes. 10 minutes

- 2 tablespoons dried crushed sage
- 1 tablespoon dried crushed parsley
- 1 tablespoon dried crushed rosemary
- 1 tablespoon dried crushed thyme
- 1 tablespoon dried crushed oregano
- 1 tablespoon dried crushed basil
- 1 tablespoon dried crushed bay leaf
- 1 tablespoon ground black pepper
- 1 tablespoon sugar

Where's the salt? *We have left the salt out of this recipe. Read why in Meathead's article on the Science of Rubs.*

Optional. *If you want a capsaicin jolt, go for it. Start with ½ teaspoon of chipotle powder.*

Method

1| Prep. Measure everything and dump it into a blender. Put the lid on the blender (very important), and run it on medium for a few seconds, turn it off, and run it again. Continue pulsing until you have a powder. Dump the whole thing in a jar and label it.

2| How to use this stuff. If the food has not been brined, then sprinkle it with salt, ½ teaspoon per pound. If it has been brined, then skip the salt. *Lightly* coat your chicken or potatoes or asparagus or whatever with water (the ingredients dissolve better in water than oil), sprinkle on the rub liberally, even if you are a conservative. If time permits, let the seasoned meat sit in the fridge for an hour or three. Then grill, smoke, or roast.

POULTRY SEASONING

This is an easy all-purpose spice mix for poultry, pork, or veal, pretty much the same thing you get when you buy a jar of “poultry seasoning” in the store, minus the salt.

Makes. ½ cup

Takes. 20 minutes

- 3 tablespoons rubbed sage

- 1 tablespoon dried rosemary leaves
- 1 tablespoon dried thyme
- 1 tablespoon dried marjoram
- 1 tablespoon ground black pepper
- 1 teaspoon celery seeds
- ¼ teaspoon ground cloves

Method

If you can only get whole sage leaves, break them up into small bits or flakes in a mortar and pestle, spice grinder, food processor, or blender. Ditto for the rosemary. Mix everything together and store in a tightly sealed glass bottle.

MEATHEAD'S MEMPHIS DUST

If you've ever enjoyed true Memphis barbecue at world famous joints like Paynes, Cozy Corner, Rendezvous, Corky's, or the Bar-B-Q Shop then you know that the "go-to" dish is Memphis dry rub ribs. Unlike BBQ

ribs in other parts of the country that are slathered in sauce, Memphis-style ribs are dressed with nothing more than a flavorful spice blend that lets the perfectly smoked meat shine through. In Memphis they season the meat with the rub before smoking then apply a second light coating just before serving. Or as the rack of ribs once said to a famous Memphian, perhaps inspiring a song: Rub Me Tender, Rub Me True.

The fun part about making rubs is the fact that you can add or subtract ingredients in order to suit your own taste. For example, this recipe has no chile heat in it because some people just can't take it. But we almost always add some.

Then, when properly impressed guests ask "What's your secret?" you can answer, as the pros do, "It's my rub, man."

After you use it on Last Meal Ribs try it on Perfect Pulled Pork, smoked salmon, raw celery stuffed with cream cheese, on the rim of a Bloody Mary, and even popcorn.

Makes. About 3 cups. At about 2 tablespoons per slab of ribs, this is enough for 24 slabs. Store the extra in a zipper bag or a jar with a tight lid at room temperature.

Takes. 15 minutes. 10 minutes to find everything and 5 minutes to dump them together.

- 3/4 cup firmly packed dark brown sugar
- 3/4 cup white sugar
- 1/2 cup paprika
- 1/4 cup garlic powder
- 2 tablespoons ground black pepper

- 2 tablespoons ground ginger powder
- 2 tablespoons onion powder
- 2 teaspoons rosemary powder

About the sugar. *We appreciate that many of you feel the need to reduce sugar in your diets but sugar is in this recipe for more than flavor enhancement, it helps form the bark, an important part of the texture of the surface of ribs and smoke roasted pork. It mixes with the moisture and caramelizes, creating special unique flavors.*

There are only about 2 tablespoons of rub on a large slab. Of that about 1 tablespoon is sugar. Some of it falls and drips off during cooking. If you eat half a slab, you're eating about 1 teaspoon of sugar. The glycemic load (GL) is about 3. Compare that with a slice of white bread with a GL of 10.

And for those of you who object to white sugar for non-dietary reasons, and use brown sugar instead, you need to know brown sugar is just white sugar with molasses added. It is not unrefined sugar as many people believe. We use brown sugar for the flavor and white sugar because it improves the bark.

If you want to cut back on carbs, leave off the sweet barbecue sauce. It has a ***lot*** *more sugar than the rub. Switch to a Lexington sauce which is mostly vinegar, or just eat the pork Memphis style, with rub and no sauce. It's mighty good that way.*

About the rosemary. *Several readers tell us they hate rosemary and leave it out. Trust us, it hides in the background and you will never know it is there. It is subtle and important in this blend. Substitute thyme or oregano if you must, but we think rosemary is*

the best choice. If you can't find ground rosemary just grind the leaves in a mortar and pestle or in a coffee grinder or a blender. It will take 2 to 3 tablespoons of leaves to make 2 teaspoons of powder.

About the paprika. *If you read our discussion of paprika by clicking this link you'll learn about the different kinds of paprika. In short, garden variety grocery store American paprika has little flavor and is used mostly for color. However fresh Hungarian or Spanish paprika have mild but distinctive flavors. In many European countries, paprika is hot. Not in the US. If you wish, you can use smoked paprika, especially good if you are cooking indoors, or even mix in some stronger stuff like ancho (slightly spicy), chipotle powder, cayenne, or chili powder (not very hot). Chipotle can be quite hot, so be thoughtful of who will be eating your food.*

***Optional**. If you'd rather not make this rub from scratch you can click this link and buy [Meathead's Amazing Smoked Pork Seasoning & Dry Brine] instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub, you do not need to add the salt that is called for in the recipe.*

Method

Mix the ingredients thoroughly in a bowl. If the sugar is lumpy, crumble the lumps by hand or on the side of the bowl with a fork. If you store the rub in a tight jar, you can keep it for months. If it clumps just chop it up, or if you wish,

spread it on a baking sheet and put it in a 175°F oven for 15 minutes to drive off moisture. No hotter or the sugar can burn.

KC GRILLED CHICKEN

Here's the all time fave grilled chicken in classic Kansas City BBQ sauce. Everybody does it. But it is soooo easy to screw up, so let’s just go over the basics: Reverse sear to make it tender, juicy, and safe with crispy

skin, kick in a little smoke, and leave the sauce til the end so you don't burn it.

Makes. 4 servings

Takes. 30 minutes

- 1 (3 to 4 pound) chicken
- Morton Coarse Kosher Salt
- Your favorite Kansas City BBQ Sauce

About the BBQ Sauce*. Buy your favorite or make your own. If you want to make a good one, try our KC Classic recipe or our Tennessee Hollerin' Whiskey BBQ Sauce recipe or buy Meathead's Amazing KC BBQ Sauce.*

Method

1| Prep. Sprinkle the salt on the meat and if you can, let it work its way in in the fridge for an hour or two. This process is known as dry brining.

2| Fire up. Prepare the grill for 2-zone cooking and shoot for 225°F in the indirect zone. Place the meat on the indirect side and just let it roast there. If you want, throw some wood on the fire and make some smoke.

3| Cook. When the meat hits 150°F, move it to the direct heat side and lift the lid. Brown both sides, turning frequently, and get the skin crispy. Now, finally, it is sauce time. Paint your sauce on both sides and move it back to the indirect side. Close the lid and let the sauce bake on and thicken.

Then lift the lid, paint on a second, final coat, and move it back over direct heat for 1 to 2 minutes per side. Let the sauce sizzle and bubble, but don’t let it burn, and you’re done. If you want to be fancy, sprinkle some finely chopped chives or green onion on before you serve.

BAMA WHITE SAUCE CHICKEN

In Decatur, AL, just across the Tennessee border, you'll find a barbecue landmark: Big Bob Gibson Bar-B-Q, home of the famous white sauce since 1925. Yes, you heard me. The pitmasters smoke their chickens and then

dunk them in a white mayo and vinegar-based sauce. Sounds weird, tastes great! It's so good, many other joints now make it. So of course I had to eat there and buy a bottle of the sauce and try to reverse engineer it. Their head pitmaster, Chris Lilly, tells me if I came any closer he'd have to kill me.

Makes. Approximately 1 ¾ cups of sauce

Takes. 10 minutes for the sauce, about 45 minutes to cook the meat

Sauce ingredients

- ¾ cup mayonnaise
- ⅓ cup apple cider vinegar
- ¼ cup lemon juice
- ¼ cup apple juice
- 1 tablespoon garlic powder
- 1 tablespoon prepared horseradish from a jar
- 1 tablespoon coarsely ground black pepper
- 1 teaspoon mustard powder
- ¼ teaspoon Morton Coarse Kosher Salt
- ½ teaspoon finely ground cayenne pepper

Chicken ingredients

- 2 (3 to 4 pound) chickens
- Morton Coarse Kosher Salt
- 1 ¾ cups Bama White Sauce

Method

1| Prep the sauce. Whisk together all the sauce ingredients in a large bowl and refrigerate in a jar for at least 2 hours, if possible, to allow the flavors to meld.

2| Prep the birds. Chris Lilly spatchcocks his chickens, which makes sense in a high production environment, but I prefer to quarter them so I can make sure no part is overcooked. Breasts and thighs cook at different rates. Sprinkle the chicken liberally with salt and pepper on both sides.

3| Smoke 'em. Crank up your smoker or prepare the grill for 2-zone indirect cooking. Shoot for 325°F in the indirect side. Place the chicken skin side up on the indirect side of the grill. Put a handful of wood chips, chunks, or pellets on the heat source. Don't overdo it.

4| Stick the landing. Check the temp of each piece independently because they will cook at different rates. Place your probe in the thickest part of each chunk but don't touch the bones.

On a grill, when all parts hit about 150°F, put them skin down on the hot side. When they reach 160°F, paint them generously on all sides with the sauce (at Big Bob's they dunk the birds in a vat of sauce). Show them the direct heat for a few minutes, not too much, hit them with a second coat of sauce, and serve. On a smoker, when the parts hit 155°F, paint and let them come up to 160°F, then paint again.

5| Serve. Plate and serve immediately along with extra sauce for dipping.

HULI-HULI TERIYAKI BRINERADE AND SAUCE

In 1955 Ernest Morgado cooked up a big batch of chicken for a farmer's group in Hawaii. It had been marinated in his take on the classic Japanese teriyaki sauce, and painted with the sauce on the grill. It was such a hit that, by the time he died, it had become a signature dish beloved throughout Hawaii, served mostly by shade tree cooks from roadside stands, parking lots, and parks at fundraisers. Drive around Oahu and if you see smoke rising and smell

something sweet, it is likely Huli-Huli chicken. The locals keep napkins in their glove compartments just in case.

Rather than turn scores of chicken pieces one by one when he was catering an event, Morgado sandwiched the meat between two mesh grates, and, with the help of an assistant, flipped the whole contraption. Sort of Hawaiian rotisserie. When it was time to turn, he would shout “huli” which is Hawaiian for “turn” to his assistant who would shout “huli” back, grab the handles on the other side of the grates, and turn the chicken over, lickety split. Huli-Huli Chicken was born.

Although Huli-Huli was designed for chicken, it is common to see it on ribs, pork chops, whatever. Morgado's recipe is a secret, and every vendor on the islands has his or her own variation on the theme, so this is our interpretation. Because it has a high acid, salt, and sugar content, it can keep for months in the refrigerator.

Makes. Enough for 2 whole chickens cut into quarters

Takes. 30 minutes

- 1 cup pineapple juice
- 1 cup chicken stock
- ¼ cup soy sauce
- ¼ cup ketchup or red Kansas City style barbecue sauce
- ¼ cup rice vinegar
- ¼ cup dark brown sugar
- 4 tablespoons freshly grated ginger

- 2 tablespoons Worcestershire sauce
- 1 teaspoon toasted sesame oil
- 2 teaspoons Sriracha sauce
- 4 medium cloves of garlic, pressed or finely minced

About the chicken broth. *Feel free to substitute white wine, sherry (dry or sweet), or even water.*

About the vinegar. *If you wish you can swap some fresh lemon or lime juice for all or part of the vinegar.*

About the Sriracha. *Sriracha is a garlicky hot chile paste originally from Thailand. It is special and widely available, but if you can't get it, feel free to use whatever hot sauce you have around. This quantity is not very hot, especially when painted on chicken, but you can use less or add more to your taste.*

Method

Mix all the ingredients together in a saucepan and simmer gently for about 10 minutes. You can refrigerate the sauce for several weeks. Click here for the Huli-Huli chicken recipe.

BRICKLAYER'S SPATCHCOCKED CORNISH GAME HEN

You can make this indoors, but there will be spattering, so it is better on the grill. This

recipe/method is perfect for Cornish hens—which are really just young chickens—because they fit so well in a 10 to 12-inch cast iron frying pan. If you want to do this with a broiler/fryer, switch to a 12-inch pan.

This recipe uses four classic techniques: Spatchcocking, pan roasting, cooking under a hot brick, and making a pan sauce. Cooking under a hot brick is like a crude panini press for poultry. You cook by conduction from both sides at once. If you wish, you can replace the brick with a second hot frying pan on top of the bird.

Makes. 2 servings

Takes. Less than an hour.

Special tools. 12 inch frying pan, preferably cast iron, and a brick

- 1 Cornish Game hen
- 1 teaspoon Morton Coarse Kosher Salt
- 1 teaspoon medium cracked black pepper
- 1 ½ tablespoons Poultry Seasoning*
- 2 tablespoons olive oil
- 3 cloves of garlic
- 1 lemon
- 3 ounces dry white wine
- 6 ounces chicken stock (or water)
- 2 teaspoons fresh thyme leaves
- 4 tablespoons unsalted butter, divided
- 1 medium shallot
- 1 tablespoon all-purpose flour

- Morton Coarse Kosher Salt, for seasoning
- 2 tablespoons heavy cream (optional)

About the thyme. *If you can't find fresh, use 1 teaspoon dried.*

About the Poultry Rub. *If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Tuscan Herb Seasoning & Dry Brine instead. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

Method

1| Spatchcock. Flatten the bird as described above. Season well inside and out with the salt, black pepper, and Poultry Seasoning.

2| Preheat. Set up the grill for 2-zone cooking. Wrap a brick with aluminum foil. Put the 12 inch frying pan and the brick on the direct side for about 15 minutes so they load up with energy.

3| Lay some brick. Pour 2 tablespoons of olive oil into your pan and place the hen skin side down in the pan. Lay the brick on the bird and with a glove or tool, press down. Put some wood on the flames or coals. Close the lid.

4| Get the pan sauce ready. Meanwhile mince or press the garlic into a bowl. Scrape the zest from the lemon with a zester, microplane, or potato peeler. Get just the very thin yellow part and none of the white pith. Into the bowl it goes. Then juice your lemon into the bowl and add the spent lemon parts. Add the white wine, stock, thyme, and half the butter to the bowl as well. Mince the shallot but don't add it to the bowl. Set the bowl aside and save the rest of the butter for later.

5| Flip. When your bird is temping about 150°F in the breast, or when the skin is getting dark, flip it over. Remove it once the temperature hits 155°F and the skin is golden brown. Put

the bird on a heat proof plate and put it on the indirect side of the grill, then hold it there until the sauce is done. The chicken will carryover to 160°F or above.

6| Make the pan sauce. Now move the pan with all the chicken drippings in it to the hot side and add the shallots. Cook them until they go liomp, perhaps 2 minutes. Then add the flour and whisk it until the flour starts to turn amber. Add the bowl full of goodies stirring often and scrape any brown bits off the bottom. Let come to a simmer, and let it reduce to a rich sauce (taste and add salt as you like). Pass the contents of the pan through a strainer or cheesecloth into a bowl and then back into the warm frying pan. If you wish, whisk in 2 tablespoons cream. Stir in the remaining butter (this is called mounting with butter).

7| Serve. Serve the pan sauce under the hen and possibly some rice, couscous, lentils on the side.

WHOLE ROASTED CHICKEN (ROTISSERIE OPTIONAL)

"The real test of a good chef is a perfectly roasted chicken."

— JULIA CHILD

In this preparation the bird drips onto a pan of veggies, flavoring them with chicken juices and an aromatic herb rub. You can do this two ways: Place a spatchcocked bird or parts on a grate and a pan of veggies under the grate, or place the bird on a rotisserie. Totally awesome either way!

Makes. 4 servings

Takes. 15 minutes to prepare, an hour or two to sit in the fridge (optional), and about 45 minutes to cook

Ingredients for the bird

- 1 (3 to 4 pound) whole chicken
- 1 ½ teaspoons Morton Coarse Kosher Salt
- 2 tablespoons olive oil
- 2 tablespoons Simon And Garfunkel rub or Meathead's Amazing Tuscan Herb Poultry Rub*

Vegetables

- ½ pound brussels sprouts
- ½ pound potatoes
- ½ pound carrots
- ½ pound onions
- 2 tablespoons olive oil
- ½ teaspoon Morton Coarse Kosher Salt

- 2 tablespoons honey

About the Simon And Garfunkel Rub. *If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Tuscan Herb Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

Method

1| Prep the chicken. Salt the bird several hours in advance so the salt has a chance to work its way down, using more on the thick parts than the thin parts. After the salt has disappeared, lightly coat the bird with oil and sprinkle on the rub.

2| Prep the vegetables. Cut any brown spots from the bottom of the roots of the Brussels sprouts and pull off any dry or brown leaves. Slice the sprouts in half from top to root so the root will keep the leaves together. Peel and slice the potatoes and carrots into chunks about the same size as the halved sprouts. Peel and quarter the onions. Pour the oil into a 9 x 13-inch baking pan and turn to coat the bottom. Then pour in ½ inch of water and add the veggies and salt. Add the chicken neck, gizzard, and heart but not the liver. We like to trim off excess fat from around the cavities and throw that in too.

3| Take your pick. Two roads now diverge before the yellow bird: On a grate, or on a rotisserie. Both work very well

although the rotisserie method does usually yield a slightly moister bird with crispier skin.

3a| On a grate. Place a grill grate or oven grate or cooling rack on top of the pan with the veggies and place the bird on top. Resist the temptation to put an onion, herbs, or orange peels or goodness knows what inside the bird. Leave the cavity wide open. Do not use a V shaped roasting rack. That puts the underside of the bird too close to the cool water and it won't brown. Now you're going to have to do some thinking. On some grills you will need to put the pan right over the hot flame or coals, but don't get it so hot that the water boils and steams the bird. On other grills you can place the pan in an indirect zone but you need to crank the heat so you can get the air to about 325°F in order to render fat and crisp skin. Every grill is different so put on your thinking cap and figger it out.

3b| On a rotisserie. Spear the bird, attach the counter balance if you have one, and pin or tie the wings and drums to the body so they don't flap around. Set the rotisserie burner for medium. Be careful, these burners can get quite hot and the chicken is a thick thermal mass that needs time for the energy to penetrate.

4| Temp the bird. Place the chicken on the grill or rotisserie and keep a close eye on its progress. You're shooting for 160°F in the thickest part of the meat without touching bone. You want to gauge the bird's temperature to make sure the skin doesn't burn before the center is done either on the rotisserie or on the grate. On the grate, if the inside gets done and the skin is still pale, lift the bird up, drain the

juices from the cavity into the pan, and move the bird to direct infrared heat and roll it around to darken and crisp the skin. This won't be a problem on the rotisserie. The skin should be nicely browned. But you still might want to remove the spear and drain the juices from cavity into the veggies.

5| Watchit, Buster! Keep a close eye on the vegetables. You want them tender but not mushy. You also want the water to evaporate but if it evaporates too quickly the juices will burn. So you need to add more water a little at a time and scrape the bottom of the pan. When the bird is done you can move the veggie pan over direct heat, boil off the water, and fry the veggies a bit in the chicken fat and olive oil, stirring to prevent burning.

6| Serve. We like to give the veggies a gentle drizzle of honey and stir them around before serving.

SWEET GEORGIA BROWN SMOKED YARD BIRD

Smoked chicken, Georgia style, is big, bold, and assertive, but the skin, although it is packed with flavor, is not crisp. We'll show you how to fix this and get crisp skin too.

Makes. 3 or 4 servings

Takes. 1 to 3 hours to dry brine, 60 to 90 minutes to cook

- 1 (3 to 4 pound) chicken
- 1 ½ teaspoons Morton Coarse Kosher Salt

- ¼ cup Meathead's Memphis Dust or Meathead's Amazing Smoked Pork Seasoning & Dry Brine*

***About the Meathead's Memphis Dust.** If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Smoked Pork Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

Method

1| Prep. Split the chicken in half or cut it into 8 parts, sprinkle the pieces with salt, and dry brine in the fridge for 1 to 3 hours. Dust both sides thoroughly with the rub. Lay it on thick.

2| Fire up. Get your smoker up to 225°F or set up the grill for 2-zone cooking and shoot for about 225°F on the indirect side.

3| Cook. Put the meat on the indirect side of the grill and add wood. Smoke for 60 to 90 minutes, or until the temperature in the thickest part of the meat (without touching bone) is 145°F. Now fire up the direct side of your grill to Warp 10, lid open, and move the chicken there, skin side down. Sear it until the internal temperature is 160°F and the skin is crispy. Watch carefully because there is sugar in this rub and it can burn.

CRISPY GRILLED CHICKEN WINGS

Some will say the quintessential American foods are hot dogs and hamburgers. But those foods have their roots in Europe. Buffalo Chicken Wings were born in the USA, made from a part of the chicken that once upon a time was used for soup stock. Scrap. Heck, even chickens can't use chicken wings.

True Buffalo wings are deep fried, but we love the flavor and ease of cooking them on the grill. And there is much less

mess.

The popular dish was invented in Buffalo, NY, at the now fabled Anchor Bar, still at the original location, 1047 Main St., although ownership has changed.

Makes. 4 appetizer servings

Takes. 2 hours prep, 30 minutes to cook

Blue Cheese Dip

- 3 ounces cream cheese
- 3 ounces good-quality blue cheese
- ½ cup half and half
- ¼ cup sour cream
- ½ teaspoon Simon And Garfunkel rub or Meathead's Amazing Tuscan Herb Poultry Rub*

Classic Buffalo Hot Sauce

- ½ cup melted salted butter
- 2 cloves minced or pressed garlic
- ½ cup Frank's Original RedHot Sauce

The rest

- 24 whole chicken wings (about 4 pounds)
- 2 tablespoons Morton Coarse Kosher Salt
- 2 tablespoons finely ground black pepper
- 6 stalks of celery

About the blue cheese dip. *When we're feeling lazy, we just use Marie's Blue Cheese salad dressing. Great stuff. It's in the refrigerator section of your grocery. Also, Ranch dressing works beautifully.*

About the sauce. *We often use DC Mumbo Sauce, Danny Gaulden's Glaze, Chris Lilly's Spiced Apricot Glaze, or Kansas City Style Barbecue Sauce. Of course you could do as they do at Buffalo Wild Wings and other restaurants: Put out a variety of sauces and let people pick their fave. That's democracy at work.*

About the hot sauce. *Frank's is the classic Buffalo Wing Sauce base, and its charm is the fresh red pepper flavor. But it is not very hot. If you want more heat, try Meathead's Controlled Burn Hot Sauce or pick your poison. Keep in mind, not everyone is as manly as you. Like Meathead. Better still, make two or three levels of heat so people can pick.*

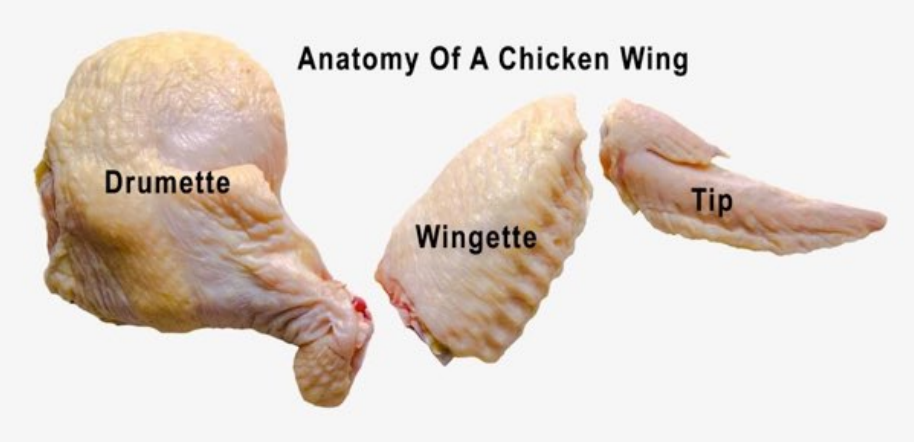
Optional. *Baking powder slightly raises the pH of the skins making them less acidic which helps them crisp and brown. So here's what you need to do: Put the salt, pepper, and 2 teaspoons of baking powder in a big bowl and add the wings, tumbling them around until they have a little of all three on them.*

**About the Simon And Garfunkel Rub.* *If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Tuscan Herb Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

Method

1| Make blue cheese dip. Take the cream cheese and blue cheese out of the fridge and let them come to room temp. Then crumble the blue and smush them together in a serving bowl with the spice mix. Mix in the half and half and sour cream. Refrigerate. You can do this a day ahead. Clean and cut the celery into 4 inch lengths and return to the chiller. When it is time to serve, take the dip out of the fridge to warm a bit, say 30 minutes.

2| Make Buffalo sauce. Melt the butter over low heat and then add the garlic. Let it simmer for about a minute but don't let the garlic brown. Then add the Frank's RedHot sauce. Let them get to know each other for at least 3 to 4 minutes. But remember, if you don't want to use the original and you want to get creative, try one or more of the other sauces listed above. Meathead is partial to DC Mumbo Sauce. Like the dip, the sauce can be made a day in advance.



3| Wing it. When it comes time to prep the wings, note that there are three distinct pieces with different thicknesses and

different skin to meat ratios: (1) The tips (2) the flats or wingettes in the center, and (3) the drumettes on the end that attaches to the shoulders. The thickness difference means they cook at different speeds and finish at different times. The best thing to do is separate them into three parts with kitchen shears, a sturdy knife, or a Chinese cleaver (the ka-chunk noise of chopping them off is very satisfying).

The tips are almost all skin, really thin, and small enough that they often fall through the grates or burn to a crisp. You can cook them if you wish, but we freeze them for making chicken stock. Separate the V shaped piece remaining at the joint between the flat and drumette. You will cook both of these parts.

Some folks like to season them with a spice rub. That works most of the time. Meathead finds that most commercial rubs are too salty for such thin cuts, and most have too much sugar that tends to burn during the crisping phase. Besides, the spices just get lost under the sauces and dips. So we just season them with salt and pepper. As Rachael Ray says: "Easy peasy."

4| Fire up. You can start them on a smoker if you wish, but we usually grill them. Set up the grill for 2-zone cooking with the indirect side at about 325°F to help crisp the skin and melt the fat. If you wish, add wood to the direct side to create smoke. Use a lot of smoke.

5| Cook. Add the wings to the indirect heat side of the grill and cook with the lid closed until the skins are golden. That

will probably take about 7 to 10 minutes per side. By then they are pretty close to done.

6| To crisp the skin, move the wings to the direct heat side of your grill, high heat, lid open, and stand there, turning frequently until the skin is dark golden to brown but not burnt, keeping a close eye on the skinnier pieces, moving them to the indirect zone when they are done.

7| Serve. Put the sauce in a big metal mixing bowl or pot and put it on the grill and get it warm. Stir or whisk well. Keep warm. When the wings are done you can serve them with the sauce on the side for dipping, or just dump them in with the sauce and toss or stir until they are coated. Then slide them onto a serving platter. Put the celery sticks next to them, and serve with the Blue Cheese Dip. People can scoop some Blue Cheese Dip on their plates, and dip in the celery and wings.

> *"I want chicken wings at my funeral."*
>
> *— A CHARACTER IN THE MOVIE AMERICAN GANGSTER*

CRACKLINS

When you make skinless chicken, save the skins! Handle them right and they are as good as bacon. Toss them on a salad, on a boneless skinless chicken breast sandwich, on pizza, or right in your mouth.

Makes. As many as you want

Takes. 20 minutes

- Chicken skins
- Salt

Optional. If you want to have fun, sprinkle the skins with Meathead's Memphis Dust and some hot chipotle powder! Or any other spice rub such as Meathead's Amazing Smoked Pork Seasoning & Dry Brine

Method

1| Prep. Cut chicken skins into ½ inch squares or strips.

2| Cook. Put a thin layer of water about ⅛ inch deep in the pan, and start the water simmering over medium heat. Add the skins and render them slowly until the water evaporates and they are crisp and golden. The water helps break down the fat and connective tissues. Don't crowd them in the pan and keep the pan over medium heat. Stir regularly so they don't burn.

3| Drain on paper towels. Sprinkle with salt while hot.

GRILLED SKINLESS BONELESS BUXOM CHICKEN BREASTS

This is the recipe you want for when you have the gang coming over and you want to step up a notch from hot dogs and burgers -- flavorful, moist, buxom chicken breasts. We recommend you remove the skins because they can prevent the brinerade from penetrating (the salty soy sauce makes it a brinerade), and the liquid just makes the skin soggy. Save the skins and make chicken skin cracklins to sprinkle on top.

This brinerade was the first recipe Meathead ever sold. He liked it so much he sent it to the producer of a fancy Dijon mustard and they liked it so much they published it on one of those little booklets that hangs on the bottle and sent him a check! So long ago he can't even remember the mustard brand. But the recipe still works, and he still gets email from people telling him how much they like it.

These breasts are designed to be eaten hot, but Meathead has used leftovers as toppings for salads and even add-ins for omelets and quesadillas. The marinade is also great for stir fry.

Makes. Enough for 4 chicken breasts

Takes. 15 minutes to make the marinade, 2 to 3 hours to marinate (overnight would be better), and about 45 minutes to cook

Ingredients for the bird

- 4 boneless, skinless chicken breasts
- ½ teaspoon Morton Coarse Kosher Salt per pound of chicken

The brinerade

- ⅓ cup dry white wine
- ⅓ cup fresh lemon juice
- ¼ cup brown sugar, light or dark
- 2 tablespoons Dijon-stye mustard
- 2 tablespoons soy sauce, light or dark

- 2 tablespoons vegetable oil
- 1 teaspoon ground black pepper
- 1 teaspoon garlic powder

Optional. *Serve these tasty breasts on a toasted bun with lettuce, tomato, chicken skin cracklins. Mix a little mayo with a few drops of sesame oil to make sesame mayo for spreading on the bun.*

About the brinerade quantity. *We usually make a triple batch and refrigerate the rest. It keeps for months.*

Method

1| Prep. We're going to pound these breasts to make them flatter. This way there is more surface area exposed to the flavorful juice, and the brinerade's penetration depth becomes a greater portion of the total meat, adding even more flavor. After you pound them to about 3/4 inch thickness, dry brine the meat by salting it about 4 hours before cooking. This gives the salt a chance to penetrate.

2| Brinerade. Put all the brinerade ingredients in a bowl and whisk together. Pour into a zipper bag. If you have readthe info above about brinerades you know that, other than the salt, they do not penetrate very far. But they do find their way into cracks and cuts. So add the meat to the bag about 2 hours before cooking. And if you want, cut diamond patterns in the surface of both sides about 1/8 inch deep. These grooves will gather and hold the brinerade.

3a| For grilling. Grill over indirect heat to keep the sugar from burning. Shoot for about 325°F in the indirect zone. It will take about 45 minutes depending on how thick your chicken breasts are and how hot your grill is, and you should use a meat thermometer to get it off at optimum safe temp, 165°F.

3b| For stir-fry. Cut the breasts into strips about 1 ½ inches long and ¼ inch wide. Soak the chicken strips for 20 minutes in small quantities of this brinerade in a sealed zipper bag. Then stir-fry the meat in a wok or skillet over high heat and set aside. Stir-fry chopped vegetables of your choice and set aside. We like thick onion slices, red bell pepper slices, mushroom halves, and sugar snap pea pods. To make a sauce, whisk 1 teaspoon of cornstarch into ½ cup brinerinade. Stir the sauce in the pan until the sauce thickens, then add the meat and veggies to reheat and coat with the sauce. Serve over cooked rice.

BONELESS SKINLESS POUNDED CHICKEN BREASTS WITH SOUS VIDE QUE

While we appreciate chicken breasts for their meatiness and adaptability, it's hard to forget the hundreds of stringy, cardboard breasts we have suffered through.

Why is it so difficult to properly cook a chicken breast? As discussed above, the problem is two-fold. First, breast meat is very lean and prone to dryness. Second, the UDSA tells us to cook chicken to at least 165°F in order to kill harmful pathogens. We want to cook it to 154°F, but that's risky. Or is it?

Enter Sous Vide Que. Space doesn't permit us to go into all the fascinating details behind the science but there's a summary above.

By preparing the chicken breast in a controlled temperature water bath before finishing on the grill, we are able to extend the cooking time and therefore reduce the temperature needed for pasteurization thus keeping the meat tender and moist. We did a lot of testing and in the end, we settled on 2 ½ hours at 154°F.

Makes. 2 servings

Takes. 6 hours, mostly unattended

Special tools. Sous vide machine (immersion circulator) and 2 zipper bags

- 2 boneless skinless chicken breasts
- ½ teaspoon Morton Coarse Kosher Salt
- 2 tablespoons mayonnaise
- ¼ teaspoon toasted sesame oil
- 2 nice rolls

Optional. *Lettuce and tomato and sandwich pickles.*

Method

1| Pound. Insert your immersion circulator in a large pot and set the temperature for 154°F. Remove the chicken skins. They don't fare well in the moist cooking environment inside the sous vide bag. Pound the breasts flat, or not. We like pounding them for sandwiches, but the beauty of sous vide is that even in their normal teardrop shape and uneven thickness they don't overcook. Season with the salt. No need to add rub or pre-smoke. Our tests have shown that these treatments make little difference before sous-viding.

2| Cook. Place the breasts into the zipper bags and put a spoon in there too, to make sure the bags will sink below the surface. Now slip each bag slowly into the pot of water with the zipper on top. When the water pressure has pushed out all the air, zip the bag shut (here's a video showing the technique), drop it in the water, and walk away for 2 ½ to 3 hours.

3| Amp up the mayo. While the meat is cooking, mix the mayonnaise and sesame oil and store in the fridge.

4| Make the cracklins.

5| Chill. When the time is up, take the bags and toss them in the fridge for a few hours. You heard me. Believe it or not, chilling after sous vide actually improves the meat. You can leave it there for days because it has been pasteurized.

6| Fire up. Fire up the grill and get it good and hot. Throw some wood on the fire and get some smoke rolling. If you have GrillGrates™, now is the time to do some close

smoking. Keep in mind you are simply adding some sear and smoke. The meat is cooked perfectly, so don't ruin a good thing by keeping it on the heat too long. 3 to 5 minutes per side should be enough.

7| Serve. Slather the mayonnaise on the buns, lay down the lettuce, tomato, and pickles, mount with the meat, and serve the most tender, juicy and tasty chicken breasts ever.

HAWAIIAN HULI-HULI CHICKEN

As popular as this dish is in Hawaii, it is surprising that it hasn't become more popular on the mainland.

Let's change that!

Makes. 1 whole chicken, or enough for 2 to 4 people

Takes. About 30 minutes to make the brinerade, 3 to 24 hours to marinate, and 30 to 45 minutes to cook

- 2 cups Huli-Huli Teriyaki Brinerade And Sauce
- 1 (3 to 4 pound) chicken

Method

1| Marinate. Make the sauce as directed above. Pour 1 cup, *not all of it,* into a large bowl, or a large zipper bag. Cut the chicken into quarters, and skin on or off is your choice. Add to the bag and marinate in the fridge for at least 3 hours, as long as 24 hours. As you can see in the section above on marinades and binerades, only the salt penetrates but the rest can flavor the surface. The fun part of this recipe is that the Huli-Huli sauce contains a lot of soy sauce, which is salty, so some of this brinerade will penetrate.

2| Make the glaze. Pour the remaining cup of brinerade into a sauce pan and bring it to a boil, then back off to a simmer. Keep simmering until it reduces to about one quarter of its original volume and you have a fairly thick sauce for glazing.

3| Fire up. Set up the grill for 2-zone cooking and preheat it so the indirect side is about 225°F.

4| Cook. Roast the chicken with the lid down on the indirect side of the grill. Huli it (turn it frequently) and watch carefully so the sugar in the marinade doesn't blacken.

5| Glaze over. Take the meat's temp, and as it approaches 145°F, move the meat over the direct heat, lid up, skin side down to crisp the skin or the meat. Flip every minute or two to make sure it is not burning. When the white meat is 150°F move it back to the indirect side, paint both sides with the glaze, close the lid, flip, paint, close, until you hit 160°F and you're ready for your luau.

6| Serve. Plate and serve immediately.

CRISPY GRILLED CORNELL CHICKEN

If you like grilled chicken with golden crispy skin, say "thank you, to Bob Baker."

— MEATHEAD

Bob Baker was a professor of food science at Cornell University and Meathead once had the honor of meeting him when Meathead's wife was a PhD candidate in microbiology at Cornell.

A specialist in poultry, Baker helped invent chicken nuggets, turkey ham, and poultry hot dogs. But in picturesque Ithaca, NY, where Cornell is located, about six hours north and west of Manhattan, he is best remembered for Cornell Chicken. In fact, the recipe has become so popular it is served all across Western New York. It is not known for sure when he introduced the recipe but it is contained in a Cornell Cooperative extension Bulletin probably from the early 1950s. Here is a photo of Nathan "Nate" Hardy from the early 1960s in Almond, NY contributed with permission by his family. The buildings in the background were once chicken houses.

Meathead lived in Ithaca for 18 years and fell in love with this recipe. Every fund-raising event, every fire department cookout, every little league barbecue must serve this recipe or nobody would come. Even though Baker died in 2006, his family has operated Baker's Chicken Coop restaurant at the New York State Fair in Syracuse since 1949.

Here is our slightly modernized version of Dr. Baker's Original Recipe.

Makes. 16 chicken quarters

Takes. 20 minutes prep, about 90 minutes to cook

- 1 egg
- 1 cup vegetable oil
- 2 cups cider vinegar
- 2 tablespoons Morton Coarse Kosher Salt
- 1 tablespoon Poultry Seasoning or Simon And Garfunkel rub or Meathead's Amazing Tuscan Herb Poultry Rub*
- ½ teaspoon ground black pepper
- 4 broiler chickens cut into quarters

About quartering the bird. *The original recipe calls for cutting the birds in half, but we think it is better to quarter them since breasts and thighs cook at different rates.*

About the marinade*. It is very close to a mayonnaise, so you can store the sauce in the fridge for a few days, even though there is raw egg, because the vinegar, salt, and cold will prevent salmonella from multiplying.*

**** About the Simon And Garfunkel Rub.*** *If you'd rather not make this rub from scratch you can click this link and buy Meathead's Amazing Tuscan Herb Seasoning & Dry Brine instead. It is very similar. Keep in mind that our bottled rubs have salt in them. When using the bottled rub with this recipe, you do not need to add the salt that is called for in the recipe.*

Method

1| Prep. In a large bowl, whisk the egg with a balloon whisk or a hand mixer. Add the oil slowly, and whisk until it gets thick, homogeneous, and bright yellow, about 2 minutes. Now whisk in the vinegar and salt. This makes it a brinerade.

2| Stab the chicken skin several times with a fork or knife so the fat can get out when cooking. This will help make the skin crispy. Marinate/brine the chicken for 3 to 24 hours in zipper bags in the fridge. You can do this in a bowl or pan, but you will need more marinade than needed if you use zipper bags. Every hour or so, turn the meat a bit so all surfaces get well coated.

3| Fire up. Set up the grill for 2-zone cooking. Try to get the indirect side in the 225°F range. Take the pieces out of the bags and let them drip dry a bit. Sprinkle the rub and black pepper on all sides of the meat.

4| Roast. Place the chicken over the indirect zone and close the lid. Every 5 to 10 minutes baste with the marinade on both sides in a dabbing motion rather than a painting

motion, being careful to not wash off the rub, flip them occasionally, and move the ones closer to the heat away and the ones away, closer.

5| Sear. Cook the chicken for about 60 minutes until the internal temperature of each part is 150°F, then stop basting. The baste is contaminated and we want the final searing step to pasteurize the surface of the meat. Exact time will depend on how thick the meat is, and how often you basted. Now move the chicken pieces over the hot direct heat side of the grill, skin side down, lift the lid, and crisp the skin without burning it. Flip, flip, flip. This step is important to finish cooking the meat, crisp the skins, and make sure everything is pasteurized since raw egg can contain *salmonella*. When the skin is crisp and the temperature is 160°F, take the meat off the grill.

6| Serve. Plate and serve immediately.

COMPETITION CHICKEN

Ask any competition BBQ cook what category gives them the sweats. Most will say chicken.

It would seem that grilling a piece of chicken is relatively easy compared to brisket or ribs. But competition chicken has to be perfect in every way – from the uniform shape and size of each piece (usually thighs), the glistening coat of silky BBQ sauce, the bite-through skin, and moist, flavor-

packed meat. Keep in mind, competition cooks bend over backwards to blow away the judges who only take one or two bites. They rarely cook like this at home.

When it came time to add a chicken recipe to our catalog of competition BBQ recipes we turned to one of the biggest names in the game – Darren Warth of Iowa Smokey D's restaurant BBQ team. Darren and his wife Sherry have more than 800 category wins and over 75 state championships, including prestigious championships at the American Royal World Series of BBQ, the Jack Daniels World Championship BBQ Invitational, the Kingsford Invitational, the Sam's Club National Championship, the King of the Smokers, and the Houston Livestock Show and Rodeo World Championship Bar-B-Que Contest.

Makes. 12 servings

Takes. 20 minutes prep, about 2 hours to cook

- 12 medium sized bone-in skin-on chicken thighs
- 1 (4 ounce) stick salted butter
- 2 cups water
- ¼ cup Butchers BBQ Rotisserie Injection
- Big Poppa Smokers Sweet Money Rub

- Simply Marvelous Genie's Trinity Rub
- Simply Marvelous Sweet Seduction Rub
- 2 cups Craig's BBQ Sauce
- 1 ½ cups Blues Hogs Champions Blend Sauce
- ½ cup apple juice

** **About rubs and sauces.** If you'd rather not buy all the rubs and sauces, you can substitute Meathead's Memphis Dust recipe from above and your favorite red BBQ sauce. Or you can buy Meathead's Amazing Smoked Pork Seasoning & Dry Brine and Meathead's Good Enough To Drink KC BBQ Sauce.*

Method

1| Prep. To trim the thighs, remove the fat on the edge of thighs and any visible blood veins. Scrape the edges of the skin to remove any remaining excess fat. The goal is to make all the thighs the same size so they cook at the same rate, each weighing approximately 5 ounces after trimming. Cut the butter into 12 equal size slices and set aside.

2| Inject. Mix the water and injection mixture, stirring until the injection mixture has completely dissolved. Place a wire rack in a pan and set the chicken thighs on the rack skin side down. Inject about 1 ounce of the injection mixture into each thigh. Aim to inject each thigh approximately five times in various muscles.

3| Rub. Sprinkle the non-skin side of the meat with Big Poppa Smokers Sweet Money Rub and place them in the refrigerator uncovered for 2 hours. Remove thighs from

refrigerator. Turn them over with the skin side up and reshape them so they all look uniform. Sprinkle the skin side with Simply Marvelous Genie's Trinity Rub. Place the thighs back in refrigerator uncovered for 1 hour.

4| Fire up. Prepare a smoker for indirect cooking and bring the temperature to 275°F. Alternatively, you can set up a charcoal grill for 2-zone cooking and get the indirect convection zone to 275°F.

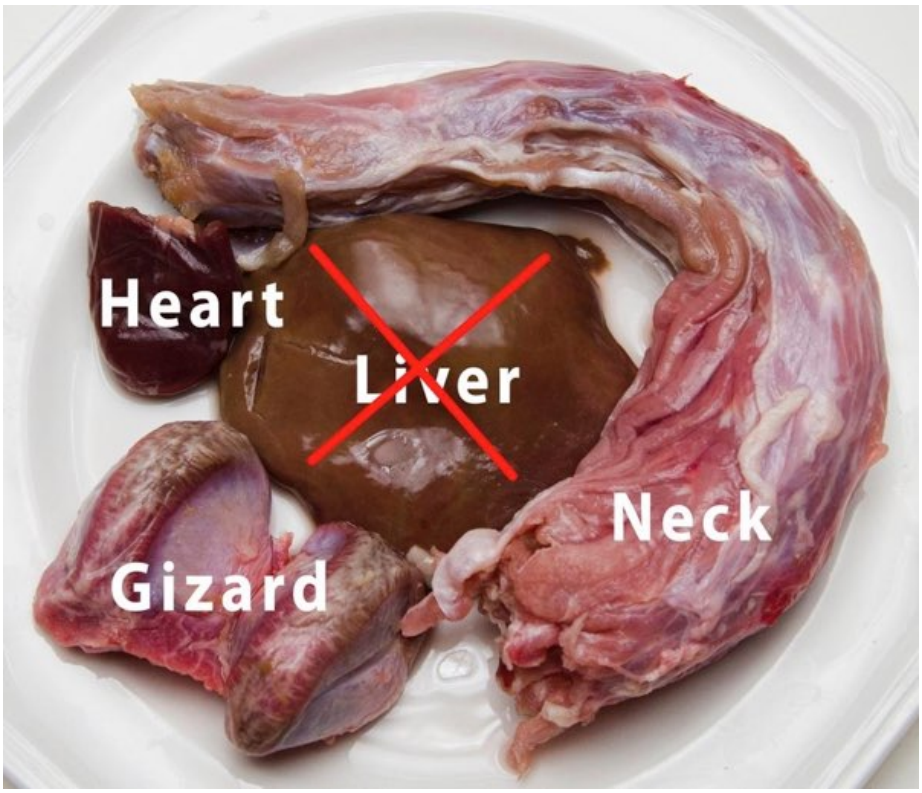
5| Smoke. Place all 12 thighs skin side up in a small foil pan. Put a pat of butter on top of each thigh and place in the smoker (or on the indirect heat side of a grill) until they reach an internal temperature of 165°F, approximately 1 hour. Cover the pan tightly with foil or a pan lid and cook for an additional 40 minutes until thighs reach an internal temperature of 195 to 200°F. Yes, you read that right!

6| Grill. Remove the pan from the smoker or grill. If you are using a grill, adjust the vents to bring the temperature to 300°F. If you are using a smoker with a removable diffuser plate then remove the plate for direct heat cooking and adjust the vents to bring the temperature to 300°F. If you are using a smoker without a diffuser plate, then prepare a grill or drum cooker for direct heat cooking, about 300°F. Remove the thighs from the pan, sprinkle lightly on both sides with Simply Marvelous Sweet Seduction Rub and put on a wire rack skin-side up on a 300°F grill or drum with a small chunk of cherry wood for extra smoke flavor. Rotate the grate ¼ turn every 5 minutes until the rub is set and the bottoms of thighs are dark and almost crispy, approximately 10 to 15 minutes total. Rotating the grate protects against hot spots overcooking the meat. Note that the goal with this step is to combine the backyard grilled flavor on the thighs with the juicy tenderness of a pan cooked thigh.

7| Prep the sauce. As the thighs cook, combine the Craig's BBQ Sauce, Blues Hog Champions Blend Sauce, and apple juice in a small saucepan. Warm the mixture over medium-low heat until heated through. Reduce the heat to low or pour the sauce into an insulated thermos such as a Yeti Rambler to keep it warm while the chicken finishes cooking.

8| Dunk and serve. Remove thighs from grill and let them sit for 5 minutes before dunking each thigh in the warm BBQ sauce. Place the sauced thighs on a rack to drain and then gently place the thighs into the turn-in box, or serve to your guests.

BASIC CHICKEN STOCK



Chicken stock is a staple in most commercial kitchens, just like salt and pepper. It is really easy to make.

We reach for it whenever we need a liquid. It has a mild flavor that works with just about everything. Of course it

makes great chicken soup and chowders, but it is also essential as a sauce base, in gravy and pot pies, as a braising liquid, poaching liquid, for cooking rice and other grains, orzo, couscous, stuffings, and polenta. Let your imagination roam.

Let's get over the nomenclature first. Cooks argue over the definitions of broth and stock. Some say that stock is made from bones and broth is made from meat. Not true. Some say stock will gel when cooled and broth will not. Not true! For all practical purposes, there is no difference. You can use the terms interchangeably.

Meat stocks are usually made by placing meats and bones in cold water, bringing it to a simmer, but not a boil, then skimming off the foam and fat. Sometimes vegetables are added. Sometimes the meats, bones, and vegetables are browned first.

Stocks freeze for months. We like to freeze them in small tubs or ice cube trays, then dump the portions into a zipper bag so we can grab a cube or three whenever needed.

This first version is the quick and simple option. The second version amps it up to 11. There are even further tricks, like "egg white fining", a process of clarifying the stock with whisked egg whites, but we won't get into that here. Too fussy.

Makes. About 3 ½ quarts, may be doubled or halved

Takes. About 2 hours

- 6 pounds chicken bones (raw or cooked), backbones, wings, skin, fat, neck, gizzards, hearts, but no liver
- 7 quarts water

Method

1| Simmer. Scrape all the brown kidney goop from the backbone. In a very large stock pot, combine the water, bones, etc., and place the pot over high heat. Bring to a boil, then immediately adjust the heat so the liquid simmers gently and let it cook, uncovered, reducing in volume. After a short while you will see a scum form on the surface. This is protein and although most cookbooks tell you to skim it off, some chefs maintain it makes no difference if you leave it in, especially if you don't mind a cloudy stock. It will come out when you strain it.

2| Taste. After at least an hour and up to 3 hours, taste the stock. You may want to continue reducing it. If you wish, you can make it very concentrated then dilute it later when ready to use.

3| Strain. Remove the pot from the heat and pour the stock through a strainer into a bowl. Discard the solids. You now will have a coarse chicken stock that is cloudy. You can stop here or to clarify it a bit, line a strainer or colander with a double layer of cheesecloth and place it over a bowl. Ladle the stock through the colander into the saucepan. Let it drain for a few minutes, pressing down gently. Taste and reduce

some more if you wish. Don’t add salt. Do that when you use it.

4| Chill. Let the stock come to room temperature before cooling (putting hot liquids in the fridge can drive the fridge temperature up). Then chill. When it cools, scoop the solidified fat off the top. You can use the fat for frying or discard it. Notice that the remaining stock has gelatinized. That’s good! That’s what homemade stocks do, and the gelatin contributes tremendous to mouthfeel to whatever you make with the stock.

A MORE COMPLEX CHICKEN STOCK

Two bottles of stock and one bottle of chicken fat (schmaltz) for frying.

This variation gives you a stock that is richer and on its way to becoming soup. But you can still use it for rice, couscous, etc.

Makes. About 3 ½ quarts

Takes. About 2 hours

- 6 pounds chicken bones (backbones, wings, skin, fat, neck, gizzards, hearts, but no liver)
- 2 large yellow onions
- 4 large carrots
- 6 stalks celery
- 1 teaspoon dried thyme
- 2 dried bay leaves
- 7 quarts water

About the onions. *You can leave the skins on if they are clean. They add color. But cut off the root. It is dirty.*

Method

In a very large stock pot, combine everything. Follow the same steps as above.

SMOKED OR ROASTED CHICKEN STOCK

Follow one of the stock recipes above, but first smoke the bones and/or veggies or just roast them in a pan in your oven at 225°F for an hour. When you are done, remove the bones, add 2 cups of water and place the pan over direct heat or on the stovetop; let the scrumptious goodies stuck to the bottom dissolve, scraping the bottom with a wooden spoon to release the goodness. Then pour the whole thing into the 7 quarts of water, bones and all, and simmer as described above. The stock will be darker, but trust us, nobody will complain.

OTHER CHICKEN RECIPES ON AMAZINGRIBS.COM

- Grilled Citrus Herb Spatchcocked Chicken Recipe
- Chicken Tortilla Soup Can Be Mild or Spicy As You Like It
- Chicken Spiedini Cordon Bleu Takes Skewers to Another Level
- Classic Chicken Piccata
- Jamaican Sticky Drumsticks (Pitmaster Club Members Only)
- Smoked Miso Wings Take Any Party Over The Top (Pitmaster Club Members Only)
- And just for the fun of it, a bit off topic, here's your Thanksgiving Turkey: Smoked and Grilled Turkey Recipe: The Ultimate Turkey Easily Adapted To Cooking Indoors

SIDE DISHES

Be sure to check out AmazingRibs.com's *many* tested side dish recipes including:

- The Best Grilled Corn On The Cob Ever
- Potato salad recipes especially Mom's Old Fashioned Potato Salad
- Mac-and-cheese recipes especially Smoked Mac And Cheese
- Regional beans recipes especially Bourbon BBQ Baked Beans
- Veggie, salad, and slaw recipes especially Creamy Southern Coleslaw and Thai-style Chilled Cucumber Salad and Caprese Tomato Salad and Grilled Asparagus
- Cornbread, garlic bread, and other bread recipes especially Griddle Grilled Corn Cakes
- Potato recipes especially Grilled Sweet Potato Fries and Grill Baked Potatoes
- Snacks and munchies especially Grilled Guacamole
- and soooo many other wonderful tested recipes

PART VIII
CHECK THIS OUT

Here are some goodies from AmazingRibs.com

MEATHEAD'S AMAZING SEASONINGS & DRY BRINES

Many meals ago, in 2005, my neighbor challenged me to a rib cookoff. I won, got a swelled head, and built a website to share my "secrets." Now, according to Forbes, Meathead's AmazingRibs.com is "By far the leading

resource for BBQ and grilling information" and I am in the Barbecue Hall of Fame.

Since I founded the site in 2005 I have shared more than a dozen of our favorite rub and sauce recipes for free, like the ones on the previous pages, and they have become hugely popular. All of them have won big bucks in competitions and been used in restaurants. Finally, after 16 years, in November 2021, we listened to your requests and created three bottled rubs and a sauce under the name "Meathead's Amazing." They are based on our free recipes, but have several new ingredients and changes.

Why there is salt in these rubs? When you make rubs at home, we recommend you do not add salt because salt penetrates and none of the other spices and herbs do, so thick cuts need more salt. We put salt in these bottled rubs because all commercial rubs have salt and without salt the price would be outlandish. Also, without salt buyers would wonder why their food needs salt. You can still use these as a dry brine, just sprinkle the rub on well in advance to give the salt time to penetrate. For very thick cuts of meat, we recommend adding a bit more salt. Click here to order them.

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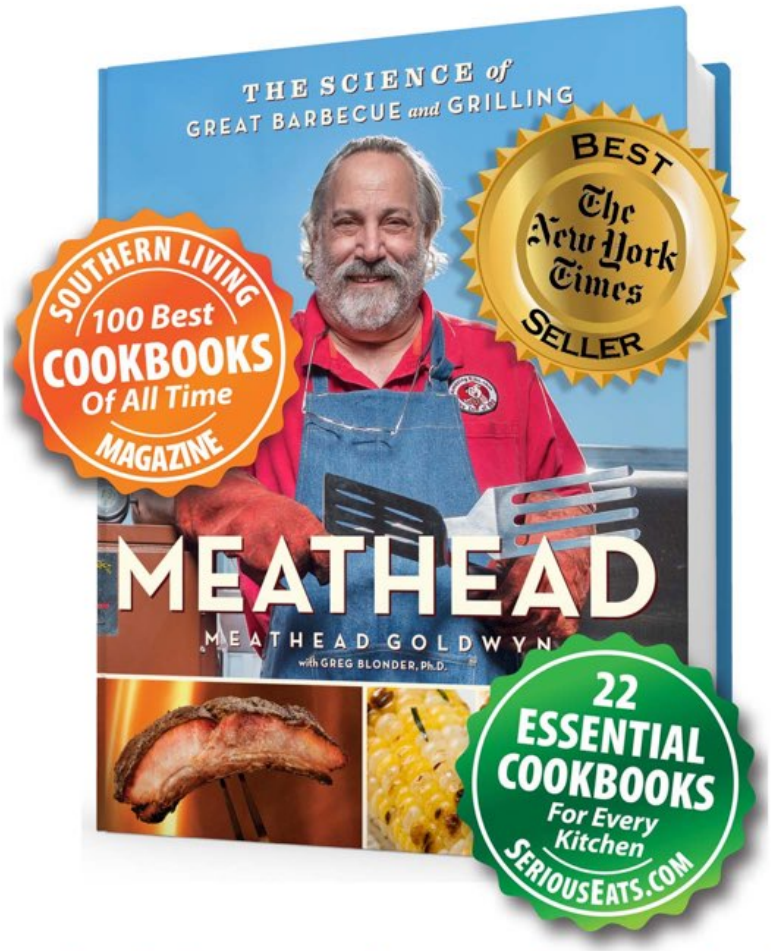

Meathead, The Science of Great Barbecue And Grilling

"100 Best Cookbooks Of All Time" Southern Living

New York Times Best Seller

3,047 ratings on Amazon ★★★★★

Meathead's
AMAZINGRIBS.COM FOOD TEMPERATURE GUIDE
"By far the leading resource for BBQ and grilling information" Forbes

Beef, Lamb, Venison, Duck Breasts (Steaks, Chops, Roasts) - USDA Minimum 145°F (63°C)			A
Blue, "Pittsburgh"	110-120°F (43-49°C)	Dark purple, cool, stringy, slippery, slightly juicy	
Rare	120-130°F (49-54°C)	Bright purple to red, warm, tender, juicy	
CHEF TEMP Medium Rare	130-135°F (54-57°C)	Bright red, warm, tender, very juicy	
Medium	135-145°F (57-63°C)	Deep pink, yielding, juicy	
Medium Well	145-155°F (63-68°C)	Slight pink, some tan, firm, slightly fibrous, moist	
Well Done	155°F (68°C) or more	Tan to brown, no pink, chewy, dry	
Pork, Raw Ham, Veal (Steaks, Chops, Roasts) - USDA Minimum 145°F (63°C)			A
Rare	120-130°F (49-54°C)	Pale pink center, warm, tender, slightly juicy	
Medium Rare	130-135°F (54-57°C)	Creamy pink color, bouncy, very juicy	
CHEF TEMP Medium	135-145°F (57-63°C)	Cream color, some pink, yielding, juicy	
Medium Well	145-155°F (63-68°C)	Cream color, firm, slightly juicy	
Well Done	155°F (68°C) or more	Cream color, tough, dry	
Chicken, Turkey (Whole Or Ground), Including Stuffing - USDA Minimum 165°F (74°C)			A
SV TEMP Medium Well	150-155°F (66-68°C)	Cream color white meat, pale tan dark meat, tender	
CHEF TEMP Well Done	160°F (71°C)	Cream color white meat, pale tan dark meat, firm	
Ground Meats & Raw Sausages - USDA Minimum 160°F (71°C)			A
SV TEMP Medium	145°F (63°C)		
Grill or pan fry these risky meats to	160°F (71°C) and make them juicy by using a 20 to 30% fat blend		
Tuna - USDA Minimum 145°F (63°C)			A
CHEF TEMP Rare	120-125°F (49-52°C)	Bright reddish purple	
Other Fin Fish - USDA Minimum 145°F (63°C)			A
CHEF TEMP Medium Rare	125-135°F (52-57°C)	Slightly translucent, flaky, tender	
Lobster, Crabs, Crawfish, Shrimp, Scallops - USDA/CHEF/SV TEMP When opaque 131°F (55°C)			A
Hams, Hot Dogs, Precooked Sausages - USDA Minimum 140°F (60°C)			A
CHEF & SV TEMP Warm	140°F (60°C) or more	Tender, juicy	
BBQ/Roasted Ribs, Shoulders, Briskets, Legs, Rumps - USDA Minimum 145°F (63°C)			B
CHEF TEMP Tender, Tugs Apart	203°F (95°C)	High in fat and collagen, best cooked low and slow	
Clams, Oysters, Mussels - USDA/CHEF/SV TEMP When shells open			
Leftovers - USDA/CHEF/SV TEMP Minimum 165°F (74°C)			

Other Useful Temperatures

0°F (-18°C) Best freezer temperature.
25°F (-4°C) Meat freezes.
32°F (0°C) Water freezes.
34-39°F (1-4°C) Best refrigerator temperature.
41-130°F (5-54°C) Danger zone in which many pathogenic bacteria grow.
130-135°F (54-57°C) Medium rare, most meats are most tender and juicy.
131°F (55°C) Most pathogenic bacteria begin to die. Minimum sous vide temp.
135°F (57°C) Connective tissues begin to contract and squeeze out pink juice.
150-165°F (66-74°C) Large cuts at low temps stall and do not rise for hours.
160°F (71°C) Soft boiled eggs.
160-165°F (71-74°C) Instant kill zone. Most pathogens die in seconds.
160-205°F (71-96°C) Collagens melt, form gelatin, making meat succulent.
170-180°F (77-82°C) Custards begin to set.
173°F (78°C) Alcohol begins to boil.
180-185°F (82-85°C) Water begins to simmer.
185°F (85°C) Custards begin to break.
190-200°F (87-93°C) Most breads are done baking.
210°F (100°C) Baked potatoes are fluffy.
212°F (100°C) Sea level boiling point. Subtract 2°F every 1000' above.
225°F (107°C) Best temp for low & slow roasting tough cuts of meats - 8.
310°F (154°C) Maillard browning accelerates.
325°F (163°C) Minimum cooking temp for browning poultry skins.
425°F (281°C) Teflon thermometer cables can melt.
450°F (232°C) Teflon pans can emit toxic gases.
500-700°F (299-399°C) Hardwoods start to smoke.
700-1000°F (399-538°C) Hardwood gases produce flame.

Fats & Oils

95-130°F (35-54°C) Animal fats start to soften and melt.
300°F (149°C) Butter starts to smoke.
325-375°F (163-191°C) Extra virgin olive oil begins to smoke.
350-375°F (177-191°C) Best oil temp for most deep frying.
361°F (183°C) Some animal fats begins to smoke.
370°F (185°C) Lard begins to smoke.
375-400°F (190-205°C) Virgin avocado oil begins to smoke.
390°F (199°C) Grapeseed oil begins to smoke.
400°F (204°C) Canola oil begins to smoke.
400-450°F (205-230°C) Vegetable oil begins to smoke.
440°F (227°C) Inexpensive olive oil and sunflower oil begin to smoke.
450°F (232°C) Peanut oil, corn oil, soybean oil begin to smoke.
482°F (250°C) Ghee begins to smoke.
510°F (265°C) Safflower oil begins to smoke.

Sugar

217-222°F (103-106°C) Target temp for most jams and jellies.
230-234°F (110-112°C) Thread Stage. Sucrose (table sugar) melts and makes syrup. Fructose starts to caramelize.
235-240°F (113-116°C) Soft Ball Stage. For fudge, pralines.
244-250°F (118-121°C) Firm Ball Stage. For caramels.
250-265°F (121-130°C) Hard Ball Stage. For nougat.
270-290°F (132-143°C) Soft Crack Stage. For taffy.
300-310°F (149-154°C) Hard Crack Stage. For brittles, lollipops.
320-350°F (160-177°C) Clear Liquid Stage. Caramelizes.
350°F (177°C) Burnt Sugar Stage. Starts to burn and tastes bitter.

SOUS VIDE (SV) RULES OF THUMB

These times and temps are **starting points** that will produce meats that please. Experiment!

A - TENDER CUTS

1 - Cook. Salt, then sous vide for 2-4 hours at the temp at left.

2 - Optional. Chill thoroughly in the bag.

3 - Rub. Remove from bag, pat dry, sprinkle generously with salt-free rub or lightly with salted rub.

4 - Finish. Sear in a hot pan, griddle, or on a grill until you like it, or smoke at 225°F (107°C) and then sear. Bring to the temp at left. Glaze or sauce if you wish.

B - TOUGH CUTS

1 - Cook. Salt, then sous vide at 145°F (63°C) for about 24 hours.

2 - Optional. Chill thoroughly in the bag.

3 - Rub. Remove from bag, leave wet, sprinkle generously with salt-free rub or lightly with salted rub.

4 - Roast or smoke. Roast or smoke at 225°F (107°C) until 145-155°F (63-68°C).

5 - Optional. Thoroughly dry the surface. Sear in a hot pan, griddle or on a grill. Glaze or sauce if you wish.

For ratings and reviews of more than 150 accurate, inexpensive digital thermometers and BBQ thermostats visit: AmazingRibs.com/thermometers

Much more info on Meathead's AmazingRibs.com
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Order our Award Winning Food Temperature Guide. This 8.5 x 11" magnet has more that 80 benchmark temperatures for meats (USDA recommended temps as well as the temps chefs recommend), fats and oils, sugars, sous vide, freezer and fridge temps, eggs, collagens, wood combustion, breads, and more.

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