

Stocks are the backbone of any kitchen and their skillful *production, reduction and use* are the mark of any true cook/chef. In the traditional kitchen/brigade structure this type of stock production would fall on the ***saucier*** who would be a senior member of the ***chef de partie system*** (one below say sous chef, or chef). The reason for this is the critical nature of the stock/jus/sauce component of the dish.

In naming the difference; traditionally a ***stock*** is *made from bones*, where as a ***jus*** is *made from meat and or meat drippings* (think a turkey stock vs. a turkey drippings). The critical aspect we get from bones that we don't get from drippings is gelatinization, as collagen is transformed from the animal's bones/joints and transforms itself into gelatine in the liquid.

There are all kinds of stocks available: vegetable stock, mushroom stock, fish stock, lobster stock, duck, veal all come to mind.

The basic stock methodology is pretty similar across the board... **with 10 basic steps:**

1. **fill pot with bones** (*chopped smaller if planning a shorter cook time*)
2. **fill with cold water - JUST TO COVER COMMODITY** (*don't over dilute*)
3. **slowly bring to a simmer gently** (*do not rush this*)
4. **skim off the froth/scum that develops** (*do before seasoning elements added*)
5. **add seasoning elements** (*mirepoix / bouquet garni / wine etc*)
6. **cook for desired amount of time** (*dependent on stock type/size*); *continue skimming (to remove scum as it develops)*
7. **strain through fine mesh** (*to catch any bones or loose debris*)
8. **reduce stock to desired flavour/viscosity** (*sometimes no reduction/some 12:1*)
9. **strain again once reduced/adjusted** (*catches any coagulation which occurs during reduction and or secondary seasoning elements*)
10. **use quickly (1-3 days) or properly cool & freeze** (*for up to 3 months*)

STEP 1 - FILL THE POT WITH BONES (or vegetables)

They type of bones, ie the base commodity of the stock, will dictate which type of stock it is (mushroom vs. veal); and it is the commodities which tell us how to prepare them (ie size of bone / size of vegetable / cooking time, etc)

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COMMODITY	BONE SIZE	VEG SIZE	COOK TIME	RESULT
VEGETABLE	N/A	Small / mandolin / julienne	25-30 mins	Flavour infused quickly before veg break down
FISH	Small 1-2"	Small / mandolin / Julienne	20 mins	Flavour infuse quickly before flesh breaks from bone
CHICKEN	Small pieces	1-2" mirepoix bouquet garni	~ 3 hours	Flavour infuse relatively quickly as mild in flavour
DUCK	Whole carcass - can be roasted	2-3" mirepoix Bouquet garni	~ 5 hours	Longer cook, more flavour, can be roasted in for maillard
LAMB	Bones/Necks seared/roasted	Large dice Bouquet Garni juniper	~ 7 hours	Pricey bones – gamey stock; other flavours possible to offset flavours (ie juniper)
PORK	Femur / ribs Blanched	Large dice Bouquet Garni Sage/thyme	~ 7 hours	Most unpleasant aromas exceptionally high in gelatin blanch bones before use.
VEAL/BEEF	Femur / Joints blanched = white roasted = dark	XL dice Bouquet Garni tomato paste Rosemary	~ 12 hours	High degree of gelatin / largest of bones can be used twice to make a secondary or "remi" stock

SOAKING OF BONES:

Some bones - ie fish do help by soaking and straining several times first to remove excess impurities; prior to cooking in the stock.

BLANCHING BONES:

Blanching of bones is done to remove excess or strong flavours (*pork/veal/beef*); and or if someone is attempting to achieve a "**WHITE STOCK**". Bones can be washed or rinsed; filled with cold water - brought to a simmer - strained (and discarded) - filled a second time with cold water. After this blanching process bones are cooled then the similar multi-step process is followed.

-- *common with:* white veal stock - pork stock

ROASTING BONES:

Roasting bones in an oven deepens flavours by producing a charred or cooked flavours in the bones not possible in the liquid medium. As a stock is liquid it's maximum temperature threshold is 212F; well below the mallard reaction seen with the browning of bones (275F minimum). By roasting in advance not only do we add this depth of flavour but we are also able to "cook out" fats and have them removed before even entering the stock - thus making out skimming job later on much easier. Keep in mind not all stocks require or want this depth of flavour.

-- *common with:* dark chicken / dark duck / dark veal

NOTE ON THE SIZE OF THE VEG: keep in mind that the longer a stock cooks the larger the veg must be. The reason for this is to prevent the vegetable from overcooking, turning soft, breaking down, and making a cloudy stock. Thus with a veg stock they are as thin as you

can make them (to increase surface area extraction before veg break down... only cooked for 20 mins). With a veal stock your carrots, onion, celery are virtually cut in half only (so they don't break down after cooking for 10+ hours)

- a **standard mirepoix = 2 parts onion : 1 part carrot : 1 part celery**
 - I generally use at an approximate ratio of approximately **1 cup mirepoix to 2L stock** (~ 2L of veg to 16L of stock)
- Remember to add vegetables/seasonings only after skimming has subsided.

STEP 2 - FILL WITH COLD WATER - just to cover bones

The amount of water to use is completely relative to the amount of bones and or commodity you are using. As stock production is often a way to "use bits up" - ie two chicken carcasses; veg scraps, etc - *the recipes are largely flexible (in terms of scale) to whatever is on hand*. We start by filling with bones (or veg) because this tells us how much water to add -- ***JUST ENOUGH TO COVER THE BONES***. The reasons for this judicious and or reserved scale of water to commodity ratio are several:

1. more nutrient / flavour extraction per mL of water
2. ensures we don't make more than necessary (as we're probably going to reduce it down to concentrate after cooking anyways)
3. allows us to add more liquid in stages (to top up only as/if needed... ie evaporation brings water level below that of the bones)
 - this is an ideal way to reduce stocks (which we will address later)

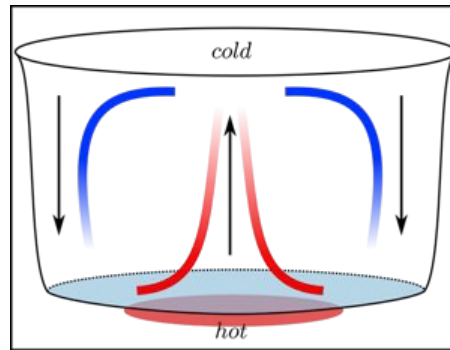
STEP 3 - BRING SLOWLY TO A SIMMER

First - we should only ever bring to a simmer (not a boil), as boiling is too violent an action and causes a cloudy stock. The reason we bring the stock to a simmer slowly/gently is that this allows us to skim off the scum as it develops.

STEP 4 - SKIM OFF THE FROTH/SCUM THAT DEVELOPS AS STOCK HEATS

As the bones/water come to a simmer gently proteins will begin to coagulate; forcing out impurities that as they heat. These impurities will thicken, group together and eventually rise to the top via convectional currents. This gives us, as the chef, and opportunity to skim them off, as they rise to the top hitting the surface, before they drop down back into the liquid environment. If this process happens too rapidly, or at too rapid of a boil (vs. simmer) the scum does not rise to the top in groups, and as the convectional currents are much more quicker and violent than a simmer, the impurities are brought back down into the stock before we are able to skim them off. The result of each of these stock faults is visual/aesthetic cloudiness.

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To remove the scum/froth that develops we must skim it off; and there are a number of ways to employ this skimming technique:

	<p>REGULAR LADLE – By using this technique chefs place a regular ladle into the stock at a perfect perpendicular angle. The hydrophobic fat which rises to the top and is not being brought down via a strong current can rest into the ladle without removing any stock (which remains below the stock line)</p> <p>- <i>requires delicate temp control & experience</i></p>
	<p>LADLE WITH ICE – here the ladle is used in an opposite way. Instead of catching the fat atop the stock IN the ladle cold ice is placed in it. Then the ladle is moved around the stock so that the ice coagulates the fat which then sticks to the exterior of the spoon in order to be extracted.</p> <p>- <i>best used for trace elements of fat; and or off heat (ie soup bowl vs. large stock pot)</i></p>
	<p>FAT SKIMMING LADLE – special tool which employs the first method of catching fat WITHIN the ladle, but then has a tool which catches the fat line (on top of the ladle) allowing the fat free stock to be poured back in underneath</p> <p>- <i>again best used for trace amounts of fat</i> -- <i>ok to be used in high temps; but costly</i></p>
	<p>FINE MESH – relies on a fine mesh to extract both particulate matter and or trace amounts of oil. Not as great at removing all fat/impurities like other skimming methods do. Often used in conjunction with the cooling/setting method seen below.</p> <p>- <i>doesn't remove all particulate matter</i> -- <i>can be used as secondary / fine mesh/straining device after primary (colander style) straining.</i></p>
	<p>NO SKIMMING AT ALL – ie cooling/setting The easiest of all methods to employ – no skimming at all. This relies on the similar principle of hydrophobic separation; but also on the principle of saturated fat coagulation (at cold temps). As the fats settle in the fridge they rise to the surface; as they cool they turn solid and can be removed manually with your hand next day.</p> <p><i>Easy to employ – no equipment required</i> -- <i>doesn't actually skim as you cook – thus cloudiness is common</i></p>

After a prolonged period of time and skimming, dependent on the type of stock and size of batch; the frothiness will subside and cease to develop. It is at this point that we add our seasoning/aromatic ingredients.

STEP 5 - ADD SEASONING AGENTS

We add our aromatics to our stock after skimming mainly for a matter of convenience. In some liquid soups etc, we put our seasoning agents into a sachet, cheese cloth, tea infuser, so that they can be extracted later (aka a [bouquet garni](#)). With a stock these seasoning agents do not require costly cheesecloth as the entire stock will be strained through a fine mesh anyways. As these herbs and spices are added in a free floating form, we do not want to mistakenly scoop them out when skimming (ie a peppercorn in our froth). It is for this reason that we add them after the majority of scum has ceased to develop.

A NOTE ON SEASONING AGENTS:

Seasoning agents should be kept natural and minimal in stock formation. The reasoning for this restraint is that:

- that most stock will be reduced, some heavily (ie 10:1) - this is especially true of salt
- some spices/seasonings will lose vibrancy/appeal with prolonged cooking (fresh herbs, acids turn acrid)
- we generally don't know the final application of the stocks; best to keep a neutral stock which can be tailored to suit.

So what seasonings are common in stocks?

- ***Bouquet Garni*** = parsley / thyme / bay leaf / pepper corn
- ***Other common herbs & spices*** = Leeks / leek tops / MUSHROOMS / tarragon / rosemary / sage
-- coriander / juniper / star anise / chili flake / white pepper
- ***Wine / Acids*** = break fat & gelatine networks

ITEMS TO AVOID IN STOCKS –

- foods which break down easily (broccoli)
 - foods which produce excess odours (cauliflower / turnip)
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STEP 6 - COOK FOR DESIRED AMOUNT OF TIME

As alluded to previous the amount of cooking time (and veg size) is relative to desired stock commodity; and purpose of stock (see chart above).

VEG STOCK = vegetables have no gelatin, and therefore there is no benefit to cooking them for prolonged periods of time. Instead cut into small uniform size pieces to ensure uniform extraction and quick cooking (ie before fibres break down)

FISH STOCK = minimal gelatin - plus fact that the flesh is very delicate and will break apart from bones easily. This is generally the cloudiest of all stocks and is likewise cooked for a relatively short amount of time.

MEAT/BONE STOCKS = longest - with the primary purpose of extracting gelatin from bones. The larger the bone the more there is available to extract; down to veal bones which can literally be cooked twice - two make two stocks; known as a remouillage

ALL THE WHILE - CONTINUE TO SKIM!!!

- Skimming never ceases in this process; from stock Skimming never ceases in this process; from stock production to final reduction
- Do not be complacent here... proper skimming is the primary difference between a good an great stock

STEP 7 - STRAIN THROUGH A FINE MESH STRAINER

Since we are dealing with bones, and or potentially chopped bones, diligent skimming is absolutely required, and to a very fine degree. Since we may have potential shards of bone, it is important that we strain through something finer than your standard colander. The objective with all three of these options is that if your stock passes through these; than it'll pass through your intestines no problem!.

<p>CHEESECLOTH: fine mesh natural cloth fabric designed to catch small particulate matter; allowing liquids to fall/pass through (think curds and whey)</p> <p>Advantage:</p> <ul style="list-style-type: none">- easy to find- easy to store- natural / cloth / sustainable <p>Disadvantage:</p> <ul style="list-style-type: none">- single use- costly- can tear easily with bones	
<p>NUT MILK BAG Fine mesh plastic, designed as to filter small particular matter (ie nuts from ground "milk")</p> <p>Advantage:</p> <ul style="list-style-type: none">- somewhat stronger than cloth; less so than metal- can be reused- economical middle ground <p>Disadvantage:</p> <ul style="list-style-type: none">- not as easy to find- still prone/able to break with bones- synthetic / not-natural / high temps w/ plastic	
<p>CHINOIS Dine mesh metal strainer used in professional kitchens in a multitude of applications.</p> <p>Advantage</p> <ul style="list-style-type: none">- reusable for years (multiple uses)- will not break (can stand up to bones)- best for environment overall <p>Disadvantage</p> <ul style="list-style-type: none">- can be costly- takes up space to store in kitchen	

Once we have strained your stock your options are two-fold:

- use or cool and store right away - "as is"
 - or reduce the stock, thus concentrating flavour and body, before using right away or storing.
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STEP 8 - REDUCING THE STOCK

This purpose of reducing a stock is to get it to the desired body / flavour / colour that we are looking for. Please note that this reduction step is not always required for all stocks. If you're already have a well flavoured fish or veg stock there is no purpose to "cooking out" or reducing, as there will be not "natural thickening" in either of these stocks since they lack natural gelatin. It is at this stage that we can also "tailor our stock" to its specific application, and use non-generic seasoning agents tailored to our specific dish and or use.

The primary reasons we reduce a stock are:

- concentrate and or adjust the flavour
- thicken stocks viscosity (ie evaporation & increased gelatine to water ratio)
- to darken stock

CONCENTRATING OR ADJUSTING FLAVOURS

Not all stock stocks require reduction for flavour; some do some do some do not. Some stocks are designed to be light by design (ie a light bodied vegetable stock or [nage](#)); some stocks (and jammy reduced sauces) are designed to be the most flavourful element on the plate (even more than game meats they are served with).

IF YOUR STOCK IS TOO LIGHT IN FLAVOUR

- reduce down to concentrate flavour (as diluted water concentrates)
- add seasoning agents (this is where your stock can become tailored to your specific dish/use)
 - don't do this too early if reducing still 10:1
- reinforce with more bones and or based components (known as a [fortified stock](#))
 - classic example = [Demi Glace](#)

IF YOUR STOCK IS TOO HEAVY IN FLAVOUR

- Do not continue to reduce your stock to thicken
 - (as this will become too strong a flavour)
- Instead thicken the already full flavoured stock through an artificial means (ie commercial gelatine)
- I would refrain from thickening via cornstarch slurry or roux - which have odd reheating and or allergen properties

TIPS TO REDUCING A STOCK

- **low and slow is the name of the game**
 - **skim often**
 - **use an off-centre heat** to control currents and force "scum" to one area"
 - by having the reduction pot slightly off centre you can better control heat and force scum to one region of pot
 - this makes skimming easier, and with less stock/liquid waste.
 - **choose a pot appropriate to the size of stock** (minimum 1/2 to 3/4 full as reducing)
 - the higher the walls the more steam gets trapped in (don't reduce in a near empty pot)
 - the more surface area the quicker the reduction (rondeau or sauce pans = near instant results)
 - strain through chinois each time if/when reducing down to smaller size pot
 - **Do not over reduce your stock** - but most strong stocks can easily go 10:1 or more
 - taste regularly - stocks can "burn" in flavour (or too dark in colour)
 - **ARTIFICIAL THICKENING CAN BE ACCOMPLISHED** via gelatine if absolutely necessary
 - can also be mounted with butter, [a la minute](#), ie RIGHT before serving to add body/weight/texture
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STEP 9 - STRAIN / ADJUST FLAVOURS

Near - the end of the cooking process, once desired viscosity, colour, flavour has been achieved is when we should be introducing particular, strong, and or isolating flavours into our stocks. IF I am to make a caper, black olive, garlic, or juniper jus for instance I am not going to add that flavour early on, as A) it will loose it's vibrancy; and B) I many end up with too much reduced olive stock on my hands. Instead keep stocks mostly neutral in flavour until they are near completed - then season only what is needed in a particular way

Once flavours are finally adjusted we strain our stock through a chinois or cheese cloth one last time, to catch any particulate matter and or any of the newly introduced seasoning agents introduced.

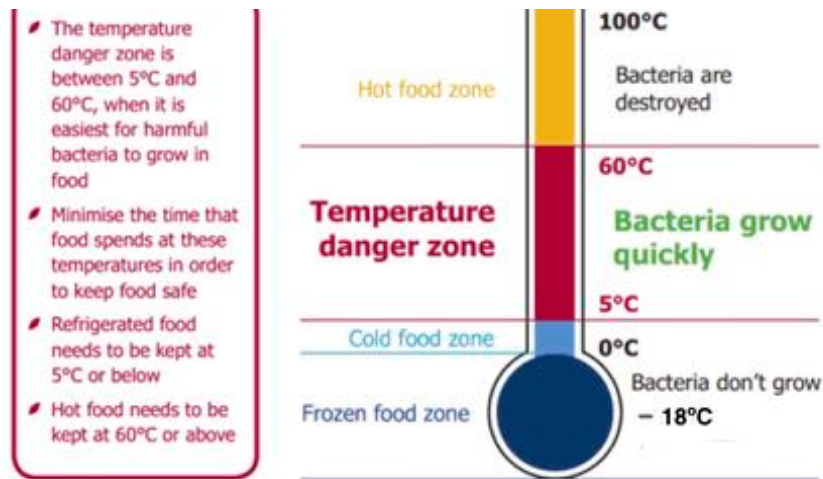
STEP 10 - USING AND OR STORING THE STOCK

Essentially a water and protein compound, *stocks should be used in 1-3 days or at minimum 1 week if fresh*. Any time beyond one week and one risks developing food borne illness, as well as off and or acidic flavours/aromas.

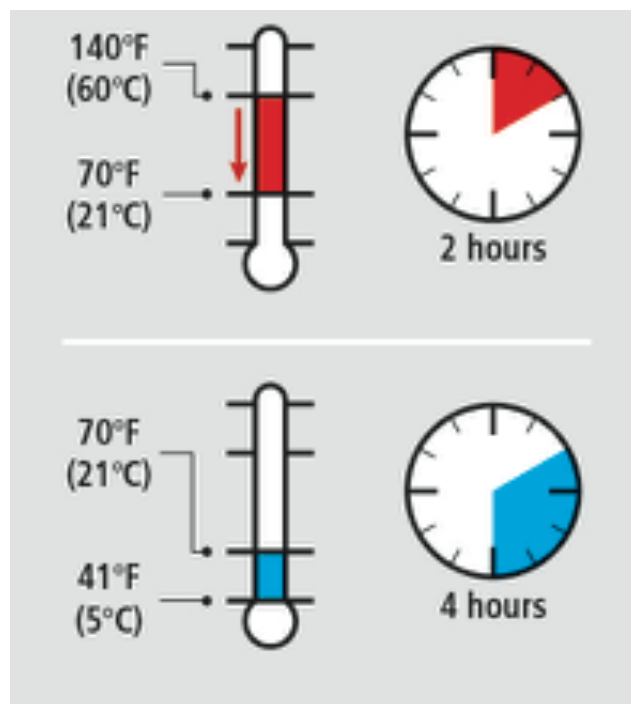
IF not using it is vitally important that one properly cools stocks, especially large batch stocks, quickly in order to prevent spoilage. As stocks a heavy hot mass, it will take a long time too cool in large quantities to its own devices. Instead, we as chefs must intervene to quicken or speed up this process and prevent the stock from being in the [danger zone](#) any

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longer than absolutely necessary. The main ways to do this are by applying cold temperatures, or dividing up the large mass; and or a combination of the two.



With *safe-food-handling* food, in this case stocks, must pass from 140°F to 70°F within 2 hours, and be completely fridge cold (>40°F) within 4 hours (at an absolute maximum). If we were to leave a 10L pail of stock from a simmering temp (ie 180F), it would take well longer than 4 hours to cool; so we must intervene.



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At home you can use things like filling a sink with ice water and or freezing large bottles (ie 2L of water) to submerge within similar to the image seen above.

Rather than trying to cool a large batch; the easiest way to drop temperature quickly is to divide into smaller quantities. These smaller quantities, with less mass, cool exponentially quicker. This is especially handy as we are generally going to be portioning in to smaller batches for storage anyways. When you combine these methods (applying cold and division of mass) it works exceptionally well. Below is an image of a large batch of chili that I have made, litre'd up to cool quickly, then stashed outside in our natural freezer of Canadian winter to cool.



A NOTE ON FREEZING / DISPLACEMENT

Our stocks are essentially water, which is larger in volume as a solid than it is a liquid.

IF one is to portion and or freeze this commodity one should be sure to:

- Label stock type / reduction quantity / date produced
- Allow 1" for expansion (freezer displacement)
- Allow the stock to come to room temp before moving to the freezer
 - never add hot stocks to the freezer as this will heat up your freezer
 - never lid a hot liquid - allow to cool before applying lids
(and or sealing "how you do"; ziplock, mason, etc)

TO THAW a container such as this - place the frozen deli container under hot running water to release the edges; thus allowing it to fall down into the still closed lid. From here, and once released from edges, transfer out of deli container into a pot to gently thaw via direct heat (in pot).

Stocks can also be stored via proper canning procedures (pasteurization); as can be seen with the shelf-ready stocks available for purchase at your local super market.