

Freezing Game and Fish

The Cold Hard Truth

By [Steve Jones](#)



How long can wild meat stay good in your freezer? I'll bet it's longer than you think.

You have a lot of control over the key variables: temperature, air and time.

Temperature

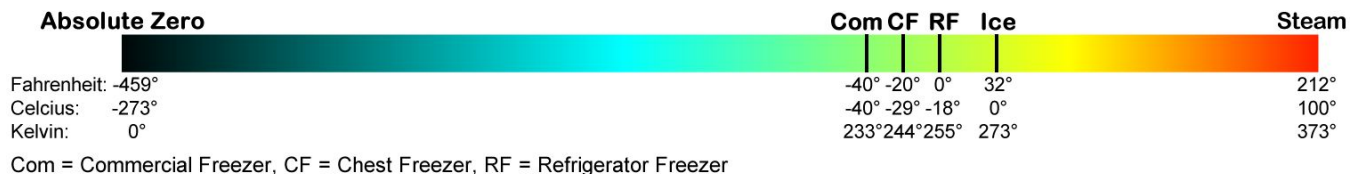
Sorry, we need to start with a little science.

Temperature is sort of a measurement of molecular motion. The higher the temperature, the more molecular kinetic energy there is.

When heated beyond 212°F water molecules are so active they exceed the force of their natural attraction and transform from liquid to gas. Steam. Hang with me, I'm getting to the point.

Cooled to below 32°F those same molecules slow down until that attraction causes them to come together to form crystals, transforming from a liquid to a solid. Ice.

But even in ice the molecules still have a lot of kinetic energy. The colder it gets the less they move — but the motion doesn't stop until "absolute zero". As the graphic below shows, Ice in your freezer is actually closer to steam than it is to absolute zero:



Molecular motion plays a big role in the deterioration of food quality over time: appearance, taste, texture, smell, and nutrients. The issue in the freezer isn't safety — it's quality.

Consumer freezers deal in a very narrow temperature range, but even in that range it's easy to demonstrate the massive change in molecular motion. Scooping ice cream tells the tale. You'd need a jackhammer to scoop from a -20°F carton, but it scoops ok at 0°F, easier at 5°F, and gets downright soft at 10°F.

Another factor is that the water inside of food is not alone. It carries dissolved goodies like sugars, soluble proteins, and amino acids. This extra stuff can keep the water from forming a stable crystal as it freezes, giving the molecules even more opportunity to move around.

So how cold should your freezer be? From a quality and long-term storage standpoint, as cold as you can make it. On my chest freezer that's about -20°F. Zero°F is the highest temp you should consider for long term storage of frozen foods.

Yes, it takes more energy to set it that cold. You can reduce that by locating your chest freezer in a cool non-drafty area. A sheet of insulating foam resting on the lid can help too - just don't do the same along the sides - they play a part in dissipating heat generated by the compressor.

Air

When water molecules near the surface of frozen food contact air, they tend to form a new crystal. Once that crystal starts more water piles on, reaching out into the air. Even though frozen, some of that exposed water "sublimates" into the air inside the freezer (think of it as evaporation) leaving the food and collecting on the freezer walls as frost.

That is freezer burn. It desiccates the surface of afflicted foods, damaging texture and flavor. It is inevitable when meat is not protected from the air.

Good wrapping material and technique help a lot, such as first wrapping tightly in plastic wrap before freezer paper. Vacuum sealing all but eliminates the problem.

A word about vacuum bags. Those used for suction sealers are pretty sturdy. But if using a chamber sealer, the cheaper bags are 3mil thick. That's a little delicate if the freezer is frequently disturbed by someone rooting around to find that hidden package of tenderloin. Either treat those packages gently, or buy the more expensive 4 or 5 mil thick bags. They are significantly more rugged.

And lastly, Time – and Time

Yes, time factors into the equation in two completely different ways:

1. The speed at which the meat initially freezes.
2. How long the meat is held frozen before use.

How fast meat freezes is a huge factor in quality. The transition to frozen can be a violent act if you are a meat cell. The transformation takes time, during which ice crystals form. The slower the process, the larger and more jagged the crystals - leading to more damage to cellular walls. Damaged cells leak when thawed.

That's why a steak tossed into a freezer at 0°F oozes a lot of liquid—and flavor—when thawed. That same steak does a much better job holding on to its goodies if originally frozen at -20°F with good air circulation all around the package.

Commercially frozen foods are initially processed in super cold blast freezers, Think of them as a convection freezer. You can't reproduce those conditions at home, but the closer you get the better. Here are some tips:

- Stage meat in the fridge until thoroughly chilled before moving to the freezer.
- If your freezer is set above its minimum, turn it all the way down an hour or so before freezing a lot of meat, such as after processing a deer. Return it to your preferred setting after frozen solid.
- Ensure good air circulation all around all packages. Placing them on a rack or grate works well. Once frozen solid remove the rack and arrange the packages to your convenience.

These techniques apply to any meat but are most important when freezing large items like roasts. For the

same reason, don't just pile new packages in the freezer. The ones in the middle take a long slow time coming to a hard freeze — the worst possible scenario.

So, how long will your meat stay good? Published lists of freezer storage times are based on typical wrapping and storage techniques in the freezer compartment of the average home fridge/freezer.

I believe you can double typically published estimates, maybe even more, if you vacuum seal and quick freeze the food then hold it at -20°F. I've eaten 4-year-old venison I cannot tell from fresh.

Another note on thawing then refreezing: If the meat is still wholesome before re-freezing, this is perfectly safe. The issue is quality. Each freezing cycle adds more cellular damage, increasing moisture loss. If you're using good freezing techniques the damage should be minimal.

There's flavor in that liquid. When thawed, if practical reserve the liquid and add it back to however you are cooking the meat. Obviously, that doesn't apply to dry methods like grilling or roasting.

Fat: The surprise variable

Fat and fatty meats lose quality faster than lean meats. Off flavors or smells (rancidity), granular texture, etc. are all possible. Extra attention to the other variables can buy you some time, but they can't make fatty meats last 4 years frozen.

Most game meats are so lean this is not an issue. But Fall bears, some feral hogs, and fatty/oily fish (like salmon) have a shorter freezer life than your lean game. Ditto for sausage or any ground meat with added fat.

Homework

Some topics we didn't cover, worthy of their own article or quality time with the google:

- Meat from omnivores or carnivores like feral hogs, bears, and mountain lions poses a risk for trichinosis. There are many species of trichina, some of which can be made safe by freezing long and cold enough, and some that cannot. Better safe than sorry. All is rendered safe by cooking to 160°F all the way through. Maybe even a bit less, but get educated on it before taking any chances.
- Fish can be less forgiving of poor freezer technique than other meats, but there are tricks. For instance, freezing them in liquid, or glazing them in a liquid before wrapping. A gelatin/lemon juice glaze for instance.

The Bottom Line

Think about the time, expense and energy you put into acquiring that meat. With a little attention to freezing that treasure should be ready when you are.

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