

The Physics of Fancy Cooking

Ben Kruser, The Leader, October 1991.

Cooking over an open fire remains one of Scouting's more pleasant and traditional sources of enjoyment. To add to Scouter Greybeard's list of public perceptions of Scouting (we tie knots and save lives; The Essence of Scouting, Feb.'88), I'd include "Scouts are clever cooks".

I'm not talking about gourmet one-burner meals here, but food cooked over burning coals with Scouting flare and a special joie de vivre that verges on chutzpah. I call it "fancy cooking".

Fancy cooking means frying eggs in a bag or poaching them in a paper cup, cooking tin foil meals, and baking in orange skins. An understanding of the underlying thermal physics involved in success with such no-pot cooking adds to some of the ability and prestige of being an accomplished woodsman.

Let's start with the most unusual cooking methods. Fill a paper cup with water and set it on hot coals. The water will boil but the paper will not burn. Why? Water can get no hotter than its boiling point--100 C. Paper will not burn until it reaches 205 C. The paper is so thin that the heat it receives passes to the water and is expelled through the steam.

The more coals you add, the faster the water boils, and you can poach or boil an egg in the cup. One warning; if the water does not reach the top of the cup, the edge may burn down to the water level.

You can apply this example to a winter survival situation where you use heavy-duty aluminium foil in your survival kit to make a cup of boiling water. A hot fire can destroy foil but, if you keep the cup filled with snow water, the fire's heat will be quickly conducted through the metal to the water and dissipated.

This fact about water leads to another fancy cooking method. Frying eggs in a paper bag. Crack several eggs into a lunch size paper bag and fold the top closed. Suspend over hot coals. The bag bottom will not burn because the water in the eggs prevents the paper from reaching its ignition point. Since, however, the eggs will stick to the paper, experienced cooks first grease the bag inside as you would a normal frying pan.

The skin of an orange can also serve as a mini baking dish. Cut the fruit in half and scoop out and eat the insides. Fill one half shell with dough or egg, cover with the other half, and put in the coals to cook.

Heat conducted through the orange skin bakes the food. Since the skin is thick and moist, it does not conduct heat rapidly, so the food is protected against overheating in places where the skin touches the coals. You can try using banana or onion skins for

this technique, too. A side benefit is that the food you are cooking absorbs some of the flavour of the shell it is in.

Foil Cooking

Tin foil dinners were a staple item in my Scouting days, so I was surprised to find Scouters who now consider them "fancy cooking". You can make up the packages at home, freeze them for Friday night packing, and cook them for lunch on Saturday while Scouts work on fire-making or cooking requirements.

There are two approaches to making a foil dinner. Some sources recommend wrapping the food in two layers of heavy aluminum foil and sandwiching several layers of wet newspaper between the foil.

The air trapped on the newspaper layers slows the transfer of heat.

The other method to protect food from an over-rapid transfer of heat into the foil is to make sure part of the food is fairly moist. Here, much of the heat goes into heating and vaporizing the water. The steam produced transfers heat to the food and helps cook it.

I've found this method quite successful using a rutabaga (turnip). It's a fairly large and inexpensive vegetable you can cut into plate size slices. Package your foil dinner like a sandwich, with the main meal layered between two thick slices of rutabaga. They add moisture and keep the main meal from burning. And you can eat them, too.

Another helpful tip is to pile some dirt on the foil after you place it in the fire. Because the dirt cuts down the oxygen supply, it tamps and traps heat more effectively for cooking.

Try out some of these ideas to turn you and your Scouts into fancy cooks. And please share some of your own fancy cooking ideas and recipes with the Leader.

Resource: Scientific American, August 1985: The Amateur Scientist.

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