

## Rocket Stove

The Rocket stove design is a very versatile design that can be improvised with a variety of different materials. The heart of the stove is an elbow-shaped, insulated combustion chamber. The fuel, in the form of sticks or narrow pieces of wood (or even tightly rolled-up paper, if that's all you have), is fed into the fire on the shelf, as shown. The air enters into the fire underneath the shelf. Because the combustion chamber is insulated, the fire can get very hot, and burn very efficiently.

- ▶ Insulation around the fire keeps the fire burning hot (above 600°C or 1100°F), which is more efficient.
- ▶ Insulation around the chimney increases the draft, which provides a constant supply of air.
- ▶ Wood burns at the tip, and wood is shoved into the fire, controlling the burn rate and reducing smoke.
- ▶ The air/fuel mixture is controlled, since too much air will only cool the fire.
- ▶ A skirt around the pot maximizes heat contact and transfer into the food.
- ▶ Cooking occurs directly on top of the chimney for efficient heat transfer. This is possible because the stove burns at high temperatures and is nearly smokeless.

To build a rocket stove, you will need a larger housing container, such as a coffee can. Make a hole to put the fuel in through. For the elbow-shaped chamber you can use stovepipe, scrap metal, or a pair of cans put one into the other. An improvised can chamber will last for about 3 months. Plastering the inside with castable firebrick will improve the lifespan. A taller chimney will be more smokeless. However, a shorter chimney will let the flame touch the bottom of the pot, and transfer heat more efficiently to the food. Place the elbow joint inside of the larger container. You may need to place a brick or other material underneath to help keep the placement. Then fill the space between the elbow and the housing with fireproof insulation. This insulation could include wood ash, vermiculite, perlite, pumice rock, dead coral or air-trapping layers of aluminum foil. You will need to make a shelf for the fuel wood to put in the elbow joint. You can pound a can flat, and cut it to fit. You may want to make a wire grill to place on top of the housing, to rest the pot on. Adding a metal skirt will also help the heat transfer tremendously, because it will force the hot gases to rub against more of the pot, as shown. The skirt should be about 1 cm from the pot.

Starting a Rocket stove is a little bit different from starting an open fire. Try putting your tinder on the shelf, igniting it, and then pushing the fuel in.

The Rocket stove is an improvement over the three stone fire but it is only one part of the equation. In order to really save fuel wood we must maximize the heat transfer to the pot. This picture shows a thin piece of metal (a skirt) wrapped around the pot. This skirt forces the hot flue gases to rub against the bottom and the sides of the pots. The gap between the pot and the skirt should be about 1cm (assuming you are using an average-sized pot). In our tests, this simple heat exchanger (an old coffee can works well!) almost doubles the efficiency of the rocket stove.

sticks of wood form a grate which improves the air to fuel ratio. Only the tips of the sticks are combusted

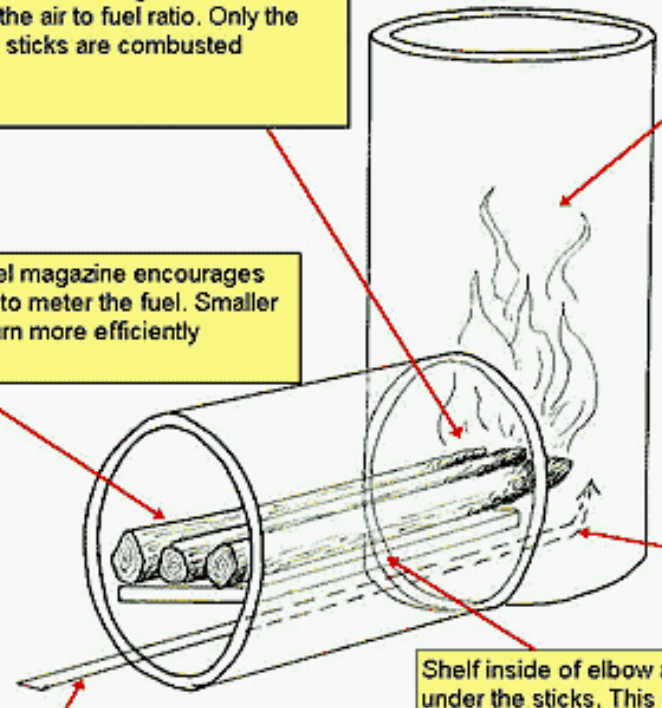
Small fuel magazine encourages the user to meter the fuel. Smaller sticks burn more efficiently

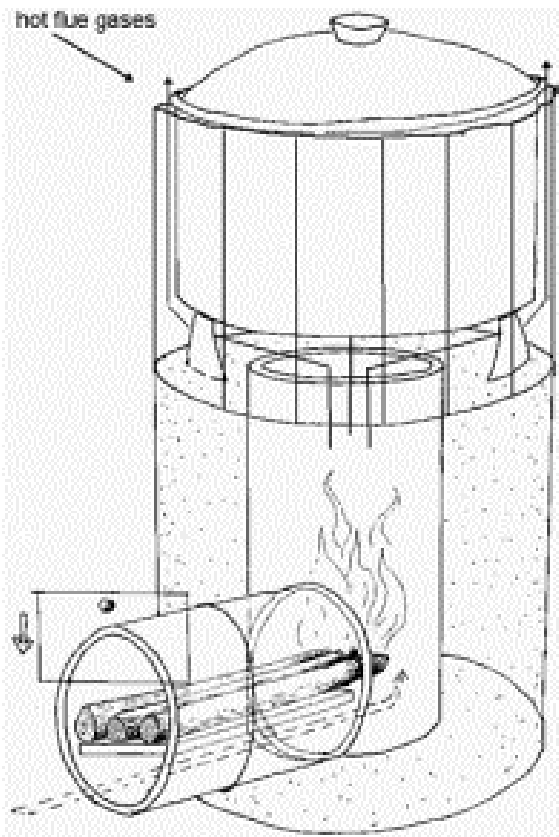
Rocket chimney increases draft. Smoke is drawn through flame and combusts

Air passing under the shelf is preheated .

Shelf inside of elbow allows air to pass under the sticks. This ensures optimal airflow into combustion chamber

Fuel magazine helps to limit the inflow of cool air. Cool air reduces the temperature in the the combustion chamber and decreases efficiency.





This elbow is then placed inside of a container that is filled with insulation. The container can be made from almost any material. We have used 5-gallon drums, brick, clay, cement. For insulation we suggest using wood ash or perlite, or pumice,

Do not use massive things such as earth, sand or cement. These will rob heat from the stove and reduce your combustion efficiency. For optimal use we recommend a 9" chimney and a 4" fuel feed magazine.