

## How To Make Black Powder or Gunpowder

Black powder is used as a propellant for bullets, as well as for fireworks and rocketry. Use these instructions for history, not practical application!

1. Originally, black powder was made by mixing equal amounts, by weight, of elemental sulfur, charcoal, and saltpeter (potassium nitrate).
2. The ratio was later adjusted to 75:15:10 saltpeter:sulfur:charcoal. Willow is most often used as the source for the charcoal.
3. The three components were carefully and completely ground together, resulting in a powder called 'serpentine'.
4. Serpentine often required re-mixing prior to use. The grinding and mixing process was very, very dangerous!
5. Some of the hazard was reduced by adding water, wine, or other liquids while grinding and mixing.
6. The slurry was forced through a screen to make small pellets. The pellets were then allowed to dry.
7. All it takes is a single spark to ignite gunpowder!
8. A great deal of smoke is produced when gunpowder is burned. This impairs visibility in battle.
9. Willow is the traditional wood used to make charcoal, but grapevine, hazel, elder, laurel, and pine cones may be used.
10. Charcoal is not the only fuel that can be used. Sugar is used instead in many pyrotechnic applications. Too much smoke ruins a firework display!
11. To summarize, black powder consists of a fuel (charcoal or sugar) and an oxidizer (saltpeter), and sulfur, to allow for a stable reaction.
12. The carbon from the charcoal plus oxygen forms carbon dioxide and energy.
13. The reaction would be slow, like a wood fire, except for the oxidizing agent. Carbon in a fire must draw oxygen from the air. Saltpeter provides extra oxygen.
14. Potassium nitrate, sulfur, and carbon react together to form nitrogen and carbon dioxide gases and potassium sulfide.
15. The expanding gases, nitrogen and carbon dioxide, provide the propelling action.

**Tips:**

1. Black powder is of great historical importance in chemistry. Although it can explode, its principal use is as a propellant.
2. Gunpowder was invented by Chinese alchemists in the 9th century.
3. Unless you are making black powder for rocketry or pyrotechnics and know what you are doing, don't make it!

**What You Need:**

- Saltpeter (Niter)
- Sulfur
- Charcoal or Sugar
- Water