

### Getting to know your potato gun

There are four basic parts to any spud gun, understanding them allows you to work with them. How you work with them and how they work together, will make, or break, the fun factor of vegetable launching.

You will need: a combustion or propellant chamber, a barrel or launching tube, a launching media or propellant, and a projectile.

The propellant can take two different forms. Enough force to launch an object can be obtained from compressed air. The other option is to create the air pressure through the use of flammable materials and igniters. When a flammable vapor and oxygenated air are ignited by a spark, they rapidly burn and produce expanding gases and increased air pressure needed to activate a launch.

The combustion chamber houses the propellant and the high pressure gases it creates. The area is sealed off during operation allowing for an outlet only in the direction of the barrel. The pressure that builds up in this area is used to push the projectile out of the cannon. There is usually a re-sealable access route to allow for cleaning and loading of the propellant. If compressed air is being used as an actuator, the chamber is sealed, with a valve release to the barrel. When the valve is actuated, the object is launched. If a flammable material is used, there is no valve. The final seal of the combustion chamber is the projectile itself.

The barrel is the section of the cannon that allows a track, or escape route, for the high pressure, or force, to escape. In order to do so, it must push the projectile out of the way. When pushed by the propellant, the projectile's only outlet should be to follow the line of the barrel until it is expelled

from the cannon. If the projectile does not leave the barrel, and it becomes backed up, the safety of your potato gun is compromised. Anyone who is near the cannon will be at risk for injury during an improper launch.

The projectile is the proper term for what you want to launch. Your options include any fruit or vegetable (potato, apple, lemons and limes, squash, etc.), or you can choose a reusable object such as a tennis ball, golf ball, ping-pong or foam balls). For testing and in areas without adequate clearance, blanks can also be fired. These are objects that are lightweight and have high wind resistance (wadded up newspaper, rolled up socks, t-shirts or rags).

Depending on which propellant method you have chosen, the following courses of operation are possible:

Using compressed air power, the valve leading to the barrel should be shut, and then the projectile can be loaded into the barrel. The Compressed air is then force into the chamber through a one-way sealing valve resulting in increased pressure inside the chamber. The valve to the barrel is opened quickly, releasing the pressure to push against the projectile. The projectile will move with increasing speed down through the barrel until both the projectile and compressed air exit the barrel through the far end.

If you are using a flammable gas to create the needed pressure, load the projectile into the barrel first. The gas and oxygen are placed in the chamber from the opposite end, and then the chamber is re-sealed. An ignition source inside the chamber produces a spark that ignites the flammable compound inside the chamber. As the material burns, hot gases are released which build up pressure within the chamber. Eventually the pressure is great enough to force the projectile