This small generator is able to perform most of the demonstrations that a larger one can perform. It runs on 2 D-cell batteries and can produce a 1 inch long spark but is safe to the touch.

**Materials:**
- D-cell battery holder
- 2 alligator clips
- soda can
toy DC electric motor
- 4 x 8 inch wood base
- PVC 1 inch to 1/2 inch adapter (for base)
PVC T joint 1 inch by 3/4 inch by 1 inch
- PVC pipe 1 inch thin walled
- 3 and 3/8 inch long
- PVC pipe 3/4 inch about 1 inch long
- Rubber band 1/2 inch wide by 4 inch
- Two 1/4 inch nylon bolt
- 1&1/2 inch long and 2 nuts
- Plastic tubing 1/4 inch inside diameter (pen)
- 1/8 inch bolt and nut 2 1/2 inches long
- fender washer 3/16 x 1 inch diameter

A pilot hole is drill into the wood base. The 1/8 inch bolt is screwed upwards to secure the base of the generator. It should be cut off to a height of 1 and 3/4 inches.
The PVC adapter is placed over the bolt, the fender washer is then fitted over the bolt and into the top section of the PVC adapter. A nut is then screwed down against the washer the hold the PVC piece tight down against the wood base.

A 2 D-cell battery holder can be attached to the wood base using two small wood screws.

The two alligator clips should be soldered to the wires attached to the battery holder. These clips will allow for easy connection and disconnection of the power to the small motor.

The motor needs to have wood dowel added to the end of it. The dowel is cut one inch long. It is 1/4 inch diameter. It needs a 1/16 inch hole drilled into it. Slide the dowel onto the shaft of the toy motor as far as possible without rubbing
The wooden shaft extending out of the motor needs to be covered with aluminum tape. The center needs to be built up using thin strips of the tape. This will help to keep the rubber band belt centered on the center of the shaft. The first strip is cut to 1/4 inch wide.

The next strip is cut thinner. This strip is and 1/8 inch wide. And is layered on top of the first strip.

A 1 inch wide strip of the aluminum tape is cut and then wraps over top of the center strips. It is one thickness of tape.
One end of the T connector should be sanded to allow for an easier fit onto the wood base. Sand enough of the plastic to allow for the connector to slide on and off with a firm push or pull. The T connector should be able to slide all the way onto the PVC adapter on the wood base.

Some motors may not fit snugly into the side of the T adapter. A 1 inch long piece of 3/4 inch thin walled PVC pipe can make a snug fit for the motor. Sand the inside of the pipe until the motor can slide in and out with a firm push or pull. An alternative method can be to wrap the motor with several turns of tape until the motor fits snugly into the side of the PVC adapter.

The short piece of pipe can now be slide into the side of the PVC adapter. The motor should fit snugly into this short piece of pipe.
Check the fit of the motor into the side of the PVC adapter. The wood shaft should not touch the opposite side when it is all the way into its position.

The 1 inch pipe of thin walled PVC is 3 and 3/8 inches long. It needs two sets of holes drilled into it.

The pipe is clamped into a vise to hold it in position. The first hole is 5/8 of an inch from the end. It is a 1/4 hole and is drilled straight through both sides.

The next set of holes is drilled perpendicular to the first set. A straw or dowel is fit through the first set of holes to keep the pipe in the correct position when clamped in the vise. The holes are 1 and 1/16 inches from the end of the pipe. Drill all the way through both sides.
A piece of 1/4 inch clear plastic tube is cut to about 3/4 inch long. It should fit onto one of the nylon bolts, and turn freely. If tubing can not be found, A suitable alternative is cutting a piece the of a tube of the appropriate sized pen or mechanical pencil.

The bolt, clear plastic tube and rubber band are assembled into the PVC tube. The Bolt is slide part way into one of the holes that measures 1&1/16 inch from the end. The plastic tube and rubber band slide over the of the bolt. Extend the end of the bolt through the second hole.

The can must still have the tab on it since this is what will hold the can in place. Cover the sharp edge of the can opening with plastic tape, this will keep electrons from leaving from this point. The can is held upside down and the end of the tab so hangs straight down. The nylon bolt will slide through this tab as it sits inside the end of the pipe.
This part gets to be a little tricky, partially insert the nylon bolt into the first hole in the pipe. Slide the can’s tab onto the bolt. The bolt is then twisted and pushed through the hole on the opposite side of pipe. This may be difficult since the can will need some pressure to hold it tight against the pipe end. A wire with a hook on the one end can be fitted into the opposite end of the pipe to help pull the bolt into place.

The example at the right was made with a clear tube for demonstration purposes.

This picture shows the assembly of the can, bolts, and rubber band in the proper place. Note that the tab of the can is centered and directly over the other bolt. It is very close to the rubber band but is not touching it.
Slide the end of the can and pipe assembly into the unsanded side of the T connection. Reach in with pliers and grab the rubber band and pull out the bottom side of the T connection.

The motor should then be inserted into its housing. Release the rubber band. The rubber band should sit directly on the center of the wood shaft extension.

Note that most of the wires on the motor has been snipped off.

The can, pipe and T connection assembly should be slid down on the PVC base. Attach the alligator clips to the motor. You should be able to hear the motor running and turning the rubber band. If the assembly is pulled off the base, you can see the band turning.

Test to see if any spark is being produced, hold your wrist near the top of the soda can. You should be able to feel an electric charge and see a spark.