

# VAN DE GRAEFF GENERATOR

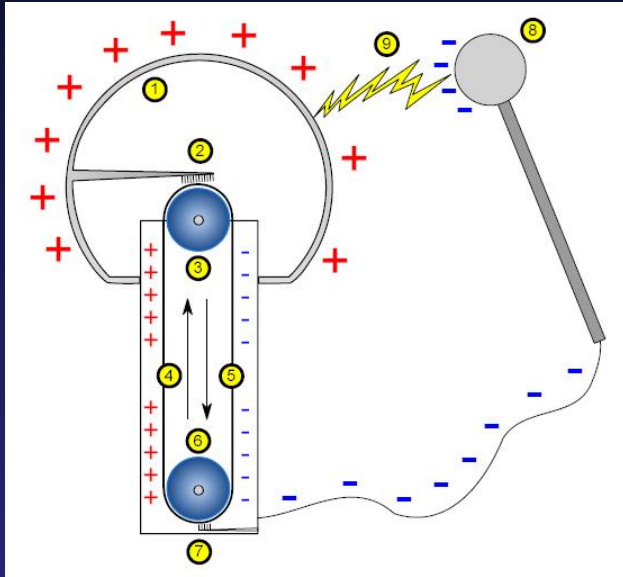
## What to do

1. Turn the crank of the machine
2. Bring the wand close to the dome.

**BEWARE OF SPARKS!!**



## How does the Van de Graaff Generator work?



The crank is connected to the bottom pulley (6). A belt made of insulating material connects the bottom pulley with the top pulley (3). When the crank is turned the belt moves positive charges from the bottom of the generator to the top of the generator.

At the top of the generator the belt passes under a comb (2). The comb is made of a conducting material and removes the positive charge from the belt, distributing it throughout the dome (1). This process allows charge to accumulate on the surface of the dome. Through this method large voltages can be produced from a relatively low source charge.

Similarly, negative charge is moved to the bottom of the generator. This is removed by a second comb (7), giving the wand a negative charge.

## What makes the wheel turn?

Charged particles escape from the dome to the wheel, accumulating at the pointed ends.

The electric field from these charges ionizes the air surrounding the points. The continually accumulating charge on the pointed ends interacts with the charges in the ionized air. This produces a force that rotates the wheel.

Use your hand to spin the wheel in the direction of the sharp ends. Then turn the crank of the generator. The wheel should slow down and then begin to spin in the opposite direction.

## How does the spark form?

The dome carries a large positive charge and the wand carries a large negative charge. The electric fields surrounding the dome and the wand ionize the surrounding air. Electrons from the air are attracted to the positively charged dome, neutralizing the positive charge. Positive ions from the air are attracted to the negatively charged wand, neutralizing the negative charge.

The ionized air allows for a charge flow to occur. This neutralizes the charge separation created by the Van de Graaff generator.

Air emits light when the ions recombine with electrons from the wand. This is what we see when a spark occurs.



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