

Activity Instructions

The following items will be needed for this activity:

- Van de Graaff generator
- pack of small aluminum pie plates
- fluorescent tube

Step 1

Turn on the Van de Graaff generator. Turn off the lights and close the blinds. Allow charge to build up for at least thirty seconds. Have a student volunteer hold the probe about an inch away from the generator to induce a change in the electric field.

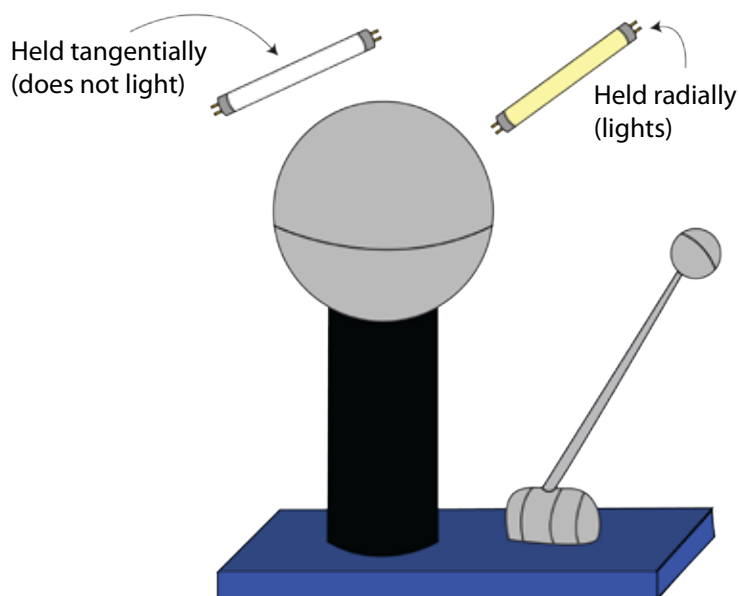


Figure 1

Step 2

Hold the fluorescent tube tangentially to the metallic sphere of the Van de Graaff generator (**Figure 1**). Ideally, the tube will not light up in this position. It is however possible that the tube glows dimly in this position because it is intersecting different equipotential lines (see *Additional Information* for a more detailed explanation).

Step 3

Hold the fluorescent tube radially to the metallic sphere, as shown in **figure 2**. In the right position, the tube will glow brightly without touching any part of the Van de Graaff generator. Find this position by adjusting the distance of the tube from the sphere and its angle relative to the sphere. See **figure 4** in *Additional Information* for a clear illustration of the tangential and radial positions.

Step 4

Now hold onto the centre of the fluorescent tube with your bare hand. The end of the tube closest to the generator is at a high potential and the hand acts as a low, grounded potential. The potential difference will illuminate the tube between the end of the tube and the hand (**Figure 2**).

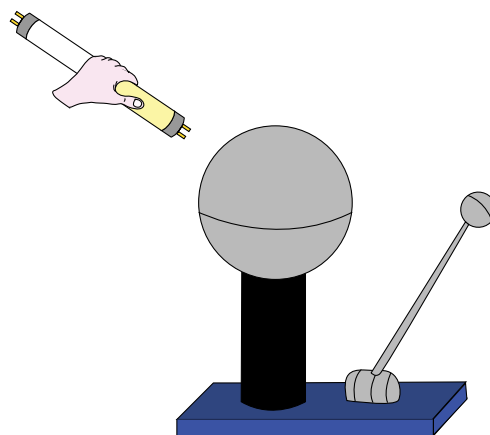


Figure 2

Step 5

Ask a volunteer to also hold onto the tube as shown in **figure 3**. Now, two distinct sections of the tube will light up: the region between the first hand and the end of the tube closest to the sphere and the region of the tube between the two hands. The section closest to the sphere will be brightest because it experiences the greatest potential difference. This demonstration works because the hands are grounded and act as voltage dividers. Most of the electric current is siphoned to the ground through the first hand and the remainder passes through the second hand to the ground.

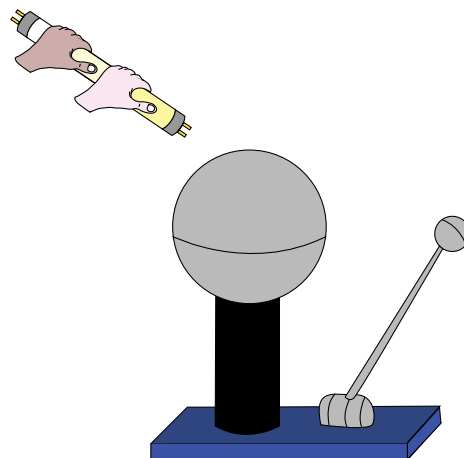


Figure 3

Step 6

Turn the classroom lights back on. Shut the generator off, place the stack of pie plates on the generator and then turn it back on. Allow the charge to build up for a few moments, at which point the plates will begin to fly off.