Plasma Ball Lesson Plan

Amount of time Demo takes: 2-5 mins.
Don’t try this at home!

**Materials**
- Extension cord - **Needs electricity!**
- Plasma Ball
- Neon flash tube

**Set-up Instructions**
1. Plug in the plasma ball.
2. Handle neon flash tube carefully.
3. If possible, set up in the dimmest place available (such as in the shade) so that people can see the plasma ball and neon flash tubes well.

**SAFETY!**
- Handle neon flash tube carefully.

**Lesson’s Big Idea**
- Charges have associated *electric fields* which create *electric potentials* that systems can interact with. Placing your hand on the bulb changes the electric field at that point and allows a stream of electrons to flow from the inner ball to the point of contact on the bulb. Note the **electrons do not leave the bulb**, but instead return to ground after reaching the interior of the bulb.
- The neon tube demos that the electric field exists outside of the bulb. When the neon tube is brought to close proximity (not touching) with the bulb, the electric potential is capable of exciting atoms of the neon gas causing the atoms to emit (an orange color of) photons. No charge moves the bulb to the neon tube the potential allows the two to interact.

**Instructional Procedure**
1. The key concept to get across are that charges have associated electric fields and that things can interact with the field without having charge move between the interacting systems. The instructional part of this demo
is simple—bring the neon flash tubes close to the plasma ball and watch them light up. You can also try holding the tubes at different locations along the tube. The light will be illuminated only up to the point you are touching.

**Clean Up**
- Clean up between demos if needed. When completely finished gather all materials listed for this demo and make sure everything is accounted for. If something was used up, broken, or damaged, let someone know so it can get replaced or fixed.

**References**
- [Wikipedia: Electric Field](https://en.wikipedia.org/wiki/Electric_field)

**Next Generation Science Standards**
- K-5
  - 5-PS1-1
- 6-8
  - MS-PS2-5
  - MS-PS3-2
- 9-12
  - HS-PS1-3
  - HS-PS3-2/3/5