Electrostatic Potential Energy

We know that an object gains gravitational potential energy as it increases in height above Earth. But there are other types of potential energy. An object can also store potential energy in the form of static electricity. Remember that static electricity is a buildup of electrons on the surface of an object. The electrons are stationary, so they are “static”. Stationary electrons generate an electric field. This field has the potential to act on other charged objects nearby. An example is a balloon that has been electrically charged by rubbing it with a woolen cloth. The amount of potential energy the balloon has will depend on the amount of static electric charge built up on its surface, which determines the strength of the electric field. The balloon will continue to generate an electric field around itself as long as it is charged. The balloon will remain charged until the static electric charge is discharged as an electrics hock.

Procedures:

1. Copy down the data table below

2. Rub the wool on the balloon for 30 seconds.

3. Place the zero end of the meter stick gently against the balloon.

4. Hold the green strip on one tip so it is hanging down.

5. Start at the far end of the meter stick and move the green strip closer until the balloon makes the strip bend toward it.

6. Record the distance on the data table.

7. Rub the wool on the balloon for 60 seconds.

8. Repeat steps 3-6.

9. Rub the wool on the balloon for 90 seconds.

10. Repeat steps 3-6.

11. Clean up.

|  |  |
| --- | --- |
| Rub time / power charge | Maximum Attraction Distance |
| 30 s |  |
| 60 s |  |
| 90 s |  |

Analyzing the data:

1. Correlate the level of electrostatic potential energy in a charged balloon with the distance.
2. If we went for 120 seconds what distance do you think would be the attraction.