**Introduction to Electricity**

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***Atomic Structure and Electric Charge***

* All matter is made up of atoms
* Atoms contain smaller particles: protons, neutrons, and electrons
* Protons and neutrons are located inside the nucleus, and are held in place by very strong forces
* Electrons can move in the space surrounding the nucleus and can be added or removed from atoms

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| --- | --- | --- | --- |
| Particle | Electric Charge | Location | Particle Symbol |
| Proton | Positive | nucleus |  |
| Neutron | Neutral | nucleus |  |
| electron | Negative | Outside nucleus |  |

* If an atom foes not have an equal number of protons and electrons, it has an electric charge. An atom that has an electric charge is an ion.
* A negative ion has picked up one or more electrons
* A positive ion has lost one or more electrons.
* In this unit + will be used to represent a large number of protons and – will be used to represent a large number of electrons.

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| --- | --- | --- |
| Neutral object | Negative object | Positive object |
| [http://t1.gstatic.com/images?q=tbn:ANd9GcT7ZJC71MVjruGeixDkHDbq_HTXwi37QAhWVlv5rNnexoLlVLMY](http://www.google.ca/imgres?q=van+de+graaf&start=348&hl=en&tbo=d&biw=1251&bih=797&tbm=isch&tbnid=AbIhxM8l22k1OM:&imgrefurl=http://www.nexgensci.com/?product=large-van-de-graaff-generator&docid=y6zdnhD48-j0IM&imgurl=http://www.nexgensci.com/wp-content/uploads/2012/06/lrg_vandegraaff.jpg&w=463&h=463&ei=neW0ULG3Co-y0AGMv4DgDQ&zoom=1&iact=hc&vpx=836&vpy=216&dur=259&hovh=225&hovw=225&tx=128&ty=99&sig=101815741274243047090&page=10&tbnh=145&tbnw=135&ndsp=40&ved=1t:429,r:86,s:300,i:262) |  |  |

* Most objects and materials we interact with daily are electrically neutral.
* When two neutral objects made of different materials come in contact, such as hair and a rubber balloon, electrons can be transferred from one object to the other. Both objects become charged.
* Static electricity – is an imbalance of electric charge on the surface of an object.
* “Static charges” – means the charges are at rest on the surface of the object.

***Detecting Static Electric Charges***

* Scientists can detect the presence of electric charges using an instrument called an Electroscope.
* Pith ball electroscope – can be used to test for the presence and type of electric charge on an object. This is done by bringing an object near the neutral pith ball. If the object is charges, the pith ball will be attracted to it.



