**Static electricity**

**Label the following on the diagram:**

Electron

Proton

Neutron

+ (positive charge)

- (negative charge)

0 (neutral charge)

Nucleus

Atom

|  |  |  |  |
| --- | --- | --- | --- |
|  | Proton | Neutron | Electron |
| Charge: | +1 | 0 | -1 |
| Location: | Nucleus  - | Nucleus  - | Outside the nucleus  + |
| Attracted to:  (Opposite charges attract) | +­  0  +­  + | 0­  +  0 | -­  0  -­  - |
| Repelled by:  (Same charges repel) | +­ |  | -­ |
| Electric force: | When charged objects push or pull on one another. The closer the two objects are the bigger the force. The further they are the smaller the force. Electric force can occur between two objects without them touching so it is referred to as a action-at-a-distance force. | | |

**What is a static charge?**

An electric charge that can be collected and held in one place

**Where might I have seen static charge?**

Lighting, Van der Graaff generators, clingy laundry

**How do we produce a static charge?**

The charge on an atom is equal to the number of protons minus the number of electrons, so an atom with equal numbers of protons and electrons is neutral. Because protons are so large and are contained within the nucleus they cannot be added or removed from an atom, however, electrons can move easily in solid materials. This can occur simply from friction between two materials, and can create a static charge. When electrons are removed from a neutral atom or material the charge becomes positive. When electrons are added to a neutral atom or material the charge becomes negative.

**Do all materials interact with electrons in the same way?**

|  |  |  |
| --- | --- | --- |
|  | **Insulator** | **Conductor** |
| Definition: | Materials that do not allow charges to move freely | Materials that do allow charges to move freely |
| Examples: | Wood, glass, plastic | Metal |
| Diagram: | + + + + + + + + - - - - - - - - - - -  + + + + + + + + - - - - - - - - - - - - | + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + - |

**Ouch! What shocked me?**

Static electricity can continue to build up but eventually, the electrons want to travel back to a positively charged or neutral material. The movement of the electrons creates a current and small electrical shock.

Grounding: Occasionally static charges can build up to dangerous levels. In this case we use ‘grounding,’ transferring excess charge to the Earth, to ensure the current doesn’t harm anyone.

**How can we measure charge?**

Charge is measured in Coulombs (C), named after Charles Augustin de Coulomb

1 C = 6.25 x 1018 electrons

**Can static charge ever be useful?**

Plastic wrap, removing air pollution, etc.

**Recall the snake charmer task from the relay race. Using what you’ve learned today, explain how it worked using the proper scientific vocabulary.**

**Rubbing the ruler with the wool transferred electrons from the wool to the ruler, making the ruler negatively charged. The neutral tissue paper was attracted to the negatively charged ruler. The charge difference created an attractive electric force between the two materials, pulling the tissue paper snake off the table.**