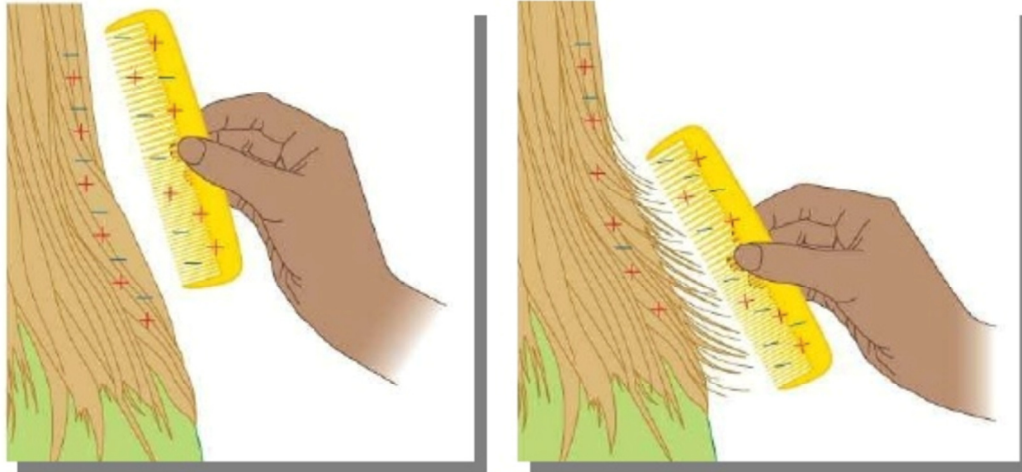


## 7.1 Static charge: pg 248- 251

**Static charge** is an electrical charge that is held in one place.

When do we experience static charge?

- **Friction!** -Often encountered in daily life when materials rub against one another and transfer charge.
  - o One material **loses** electrons while the other **gains** electrons



### **Positive and Negative charges:**

All matter is made up of particles called **atoms**

- The centre of the atom (the nucleus) contains protons (**positively charged**), and neutrons (**neutral/balanced charge**)
- Surrounding the nucleus are electrons (**negatively charged**)

**To charge** a solid material, electrons can be added or removed from that material

- **Removal of electrons** = positively charged object
- **Gain of electrons** = negatively charged object

~3 mins?

### **Insulators and conductors (pg. 252-254)**



Electrical **Insulators**: Solid materials that **do not allow** electrons (charges) to move easily (Examples: Glass, cork, wood, rubber)

- ONLY insulators are good at retaining static charge

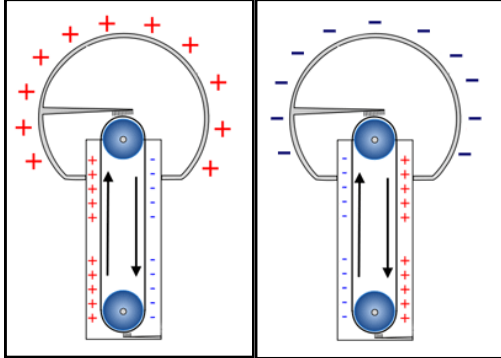
Electrical **Conductors**: -Solid materials that **allow** electrons to travel freely

(examples: most metals)

Charge is measured in **Coulomb (C)**

- One coulomb =  $6.25 \times 10^{18}$  electrons (or 6 250 000 000 000 000 000)

So... how can we **generate Static Charge**?



**Van de Graff generators (VDG)** use friction to produce a large amount of static charge (see page 253)

- As a belt rapidly moves over rollers, the contact between the rollers and belt results in a **transfer of charge**
- The moving belt produces static charge on the metal dome – the charge resulting on the dome depends on the material used in the VDG belt and rollers

### Applications and Dangers



Static charge can be useful – **electrostatic filters** can clean air, **paint** automobiles, objects can be held with the help of **electrostatic attraction**, Plastic wrap, photocopiers

However, it can also be dangerous – **Buildup and discharge** of charge can cause a serious shock, explosions or fires.

- When pumping gasoline, objects should be **grounded** (connected to the earth so that static charge is discharged into the earth)

What is a dangerous, natural source of electricity?

- **Lightning** – buildings can be protected with the help of a **lightning rod**.

Lightning in some indigenous cultures is believed to be created by the **Thunderbird**. For the Sumas First Nation's people, it is believed that a Shaman confronted the Thunderbird and was

transformed to stone which was split by lightning. The Cultural significance of the stone is so great that it has protected the land that it sits on from development.

~6mins