

Static Charge and Current

SPH4C

The ancient Greeks knew that _____ could be accumulated by rubbing fur on various substances such as amber, which could then _____ light objects such a feather.

Also, if they rubbed the amber for long enough, they could even get a _____.

When scientists returned to the subject in the 1600s, they coined the word *electricus* from ηλεκτρον (*elektron*), the Greek word for _____.

Guericke invented the 1st electrostatic generator and learned that _____.

Boyle (using a generator and Guericke's other invention, an air pump) determined that electric attraction and repulsion can _____.

In 1729, Gray classified materials as _____ (materials that carry charge easily) and _____ (materials that don't carry charge easily).



Benjamin Franklin argued in favour of the one-fluid theory:

that electricity was a type of fluid present in all matter and an excess of it resulted in positive charge and a deficit of it resulted in negative charge.

Actually, positive charge results from not an excess of "fluid" but a deficit of _____,

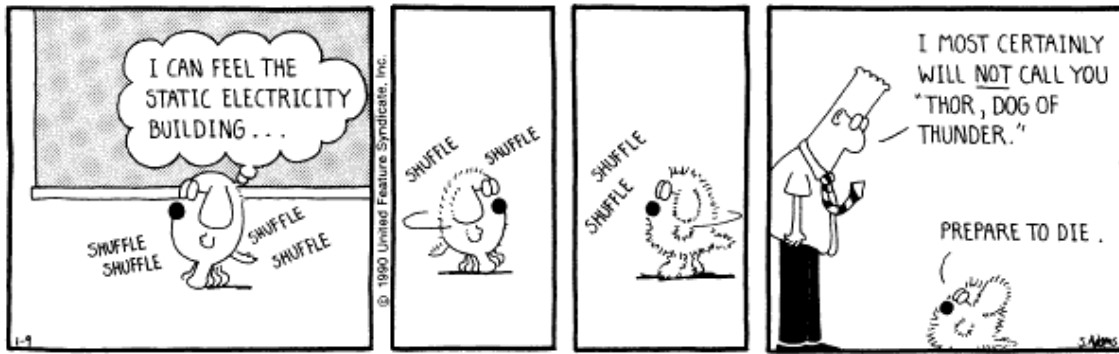
the _____ charged particles on the _____ that

can be given enough _____ to free them from their atoms.

Electrons may be removed from or added to an object by rubbing it with another object with a different electron _____.

E.g. a rubber rod will acquire electrons, i.e. a _____ charge, when rubbed

with fur. The fur, which will have lost electrons, will acquire a _____ charge.



Charge acquired by friction can then be _____ to an object with a _____, _____, or _____ charge.

Electrons will flow from a charged object to a neutral object because they want to be _____. They are **like charges** and like charges repel.

Unlike charges (negative electrons and positive nuclei) _____.

Charge Quantized

Charge (____) is measured in _____ (____).

$$Q_{\text{electron}} = e =$$

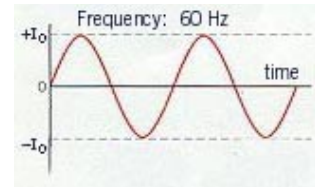
We measure the _____ at which charge is moving or flowing past a certain point, i.e. current (____), in _____ (____):

Example: A lamp uses a 7 W bulb that draws 0.060 A of current. How much charge passes through this bulb in 8.0 hours?

Electrons can be induced to flow by a battery, which will force electrons in a single direction, from the _____ terminal to the _____ terminal.

This single-direction flow is _____ current, or _____.

Electrons can also be induced to flow by an electrical generator, which will force electrons in _____ directions. The direction of the electrons changes 120 times a second.



This alternating-direction flow is _____ **current**, or _____.

In either case, the direction of _____ **flow** is opposite the direction of electron flow.

And in either case, the electrons flow because they are given _____ (measured in Joules) by the battery or generator.

The energy per unit charge is called the _____, or _____.

Voltage is measured in _____ (V):

Example: What amount of energy does it take to move a charge of 0.002 C across a potential difference of 1.5 V?

More Practice

1. Match each unit on the left to the quantity that unit is used to measure on the right:

_____ Ampere	A. charge
_____ Coulomb	B. current
_____ Joule	C. energy
_____ Volt	D. potential difference
_____ Watt	E. power

2. An object becomes positively charged when it:

- A. gains electrons B. loses electrons C. gains protons D. both B and C

3. The term “static,” referring to static electricity, means:

- A. clinging B. direct C. dividing D. unmoving

4. Electrons in a DC circuit flow:

- A. from the positive terminal to the negative terminal
B. from the negative terminal to the positive terminal
C. alternately A and B
D. The electrons do not move.

5. How long does it take a current of 0.009 A to transfer a charge of 3 C?

6. What is the potential difference between two points if 2000 J is needed to move 10 C of charge between the point?