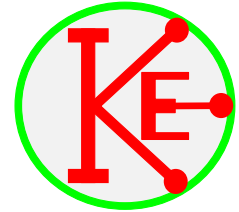# Investigation of Capacitors.

A capacitor is a device that can store electrical energy.
The unit of capacitance is the Farad (F), but practical units are µF.

(a)   Use the INSULATION setting of Squeekie, connect
        a 0.47µF capacitor between the crocodile clips.
        Remember not to touch the crocodile clips while making your observations.
        Describe the tone produced by Squeekie.

……………………………………………………………………………………………

……………………………………………………………………………………………

(b)   With the capacitor still connected, momentarily touch the crocodile clips
        together to discharge the capacitor.
        Describe the tone produced by Squeekie.

……………………………………………………………………………………………

……………………………………………………………………………………………

(c)   Complete the following sentences:

        When a discharged capacitor is connected to Squeekie, a large electric …………

        passes into the capacitor and Squeekie produces a …………… pitched tone.

        As the capacitor ……………, the electric current passing into the capacitor

        decreases and the pitch of the tone from Squeekie …………….. .

        When the capacitor is fully ………………, no more electric ……………..

        enters the capacitor and the tone from Squeekie …………. .

(d)   Repeat (a) and (b) with a 1µF capacitor.

        What do you notice about the time taken for the tone from Squeekie to stop.

……………………………………………………………………………………………

(e)   The time taken for a capacitor to fully charge using Squeekie can be used to
        determine the approximate value of the capacitor with the formula

Capacitance (µF) = time (s) / 5

        Measure the time for the 1µF capacitor to fully charge.   …………………………(s)

        => Capacitor value = …………………………….. (µF)

(f)   Capacitors with a value larger than 1µF are usually made in a different way to those with a smaller value.
These larger value capacitors use a process that relies on a very small electric current passing through the capacitor, and are called Electrolytic Capacitors.
The electric current must pass the correct way through Electrolytic capacitors.
When using Squeekie to test these capacitors, use the CONTINUITY setting and ensure that the COMMON crocodile clip lead is connected to the negative lead of the capacitor.
With the CONTINUITY setting, the value of the caacitor is given by

Capacitance (µF) = 1000 × time (s) / 5

Touch the leads of the 470µF capacitor together to ensure it is discharged.

Measure the time for the 470µF capacitor to charge ………………………….(s)

=> Capacitor value = …………………………….. (µF)

Further investigations.

(g)   Use the Internet / books to find the circuit symbol for a capacitor and draw it below.

(h)   Research the construction of a capacitor.
Present your findings below and remember to reference your sources of information.

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………