#flo #inclass

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1 | so, capacitors.

```
is there a charge on the terminals of the battery?
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yes! but not much. very small surface areas, very far away from eachother

1.0.1 | why resistors?

used to control things, and components behave like resistors

1.0.2 | what doesnt behave like resistors?

batterys, diodes, motors? ect. and capacitors, but those don't exist yet

```
title: capacitors
something designed to store a significant amount of charge
```

how do you do this? spread it over a big surface area

represeted as two equal len lines

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vs

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 -
```

surface area comes from it being wrapped

net charge is zero! but it stores charge because the charges are separated kinda like a very small battery

capacitors are not like a bucket. they are like a water balloon, in the sense that the more voltage you put across it, the more charge flows until it pops, of course

```
C: capacitance
$C = \frac{Q}{V}$
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coulomb per volt is a *Farad* after Faraday Q is on positive side

$C = \kappa\epsilon_0 \frac{A}{d}$

A = area of each plate d = separation between plates ϵ_0 = some constant, $8.85 * 10^{-12}$ κ = dielectric constant of the material between the plates for air, it's 1. else, for insulators it's between 2 - 4

if you have a material which can get polarized, like the paper we had early on, then it will draw addition opposite charges! and now the charge is a lil bigger then when u just had air

that extra charge is the κ! typically 1-4.

```
title: dialtectic
insulator that polzarisis
```

turns out, most capacitors are not symetrical! can't connect an arbitrary side

LED: longer goes to positive