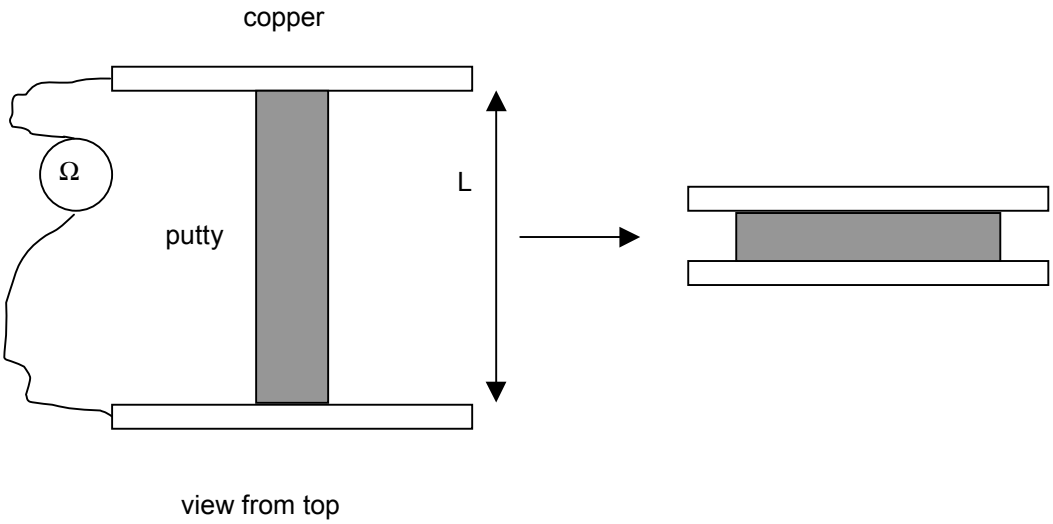
Resistance of a fixed volume of conducting putty

Introduction:
Create a cylinder of conducting putty
Place copper discs at either end
Connect a digital ohm-meter to the discs
Sit the putty on the surface of the bench.



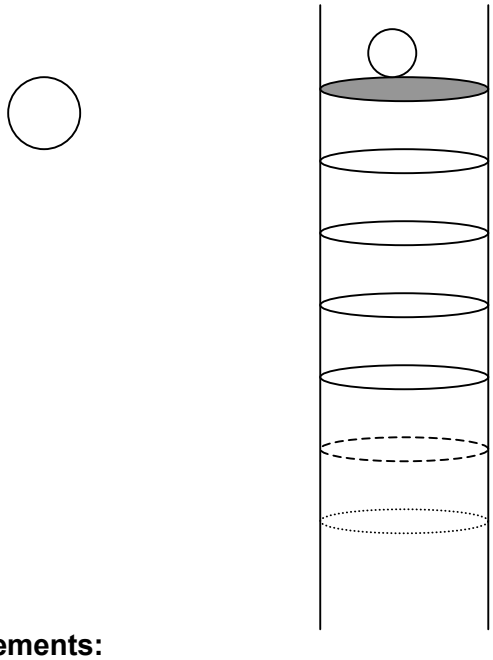
Measurements:
Push discs together in stages.
Record ohm-meter reading as a function of *L*
Do lots of times

Theory: $R = \frac{\rho L}{A}$, volume $V = LA$ …… ρ independent of volume

Expected analysis will lead to $R = KL^2$ and relating value of K to experiment.

Falling through a fluid

Introduction:
Use a wide cylindrical glass/clear plastic tube (1.0m to 1.5m long)
Tight fitting bung at one end
Fill tube with glycerol or other viscous liquid
Steel ball bearing(s)



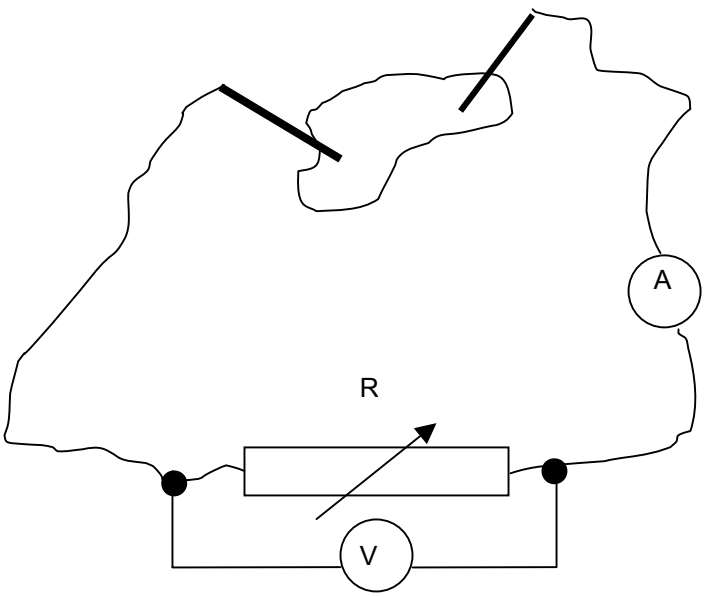
Measurements:
Release ball at surface
Record time of descent *t* as a function of distance *s* fallen through liquid
(retrieve ball with a magnet placed close to ball on outside of tube)
Repeat lots of times to obtain *t* for a wide range of distances *s*.
Record s and t

Expected analysis:

s-t graph interesting; v-t graph can be deduced from s-t graph; terminal velocity can be found; a second ball of **different radius** r may fall at a **different** terminal velocity.

An unusual source of emf

Introduction:
A potato is used as a source of emf
A resistance substitution box is used a variable load resistor



Measurements:
Set external resistor to a low value
Record voltmeter V and ammeter I readings
Repeat to obtain V and I for a wide range of load resistance R.
Record V, I and R.
Vary separation of electrodes.

Theory: $V = E - Ir$, $V = IR$, $E = IR + Ir$ power $= I^2R$
$R = r$ for max power delivered

Analysis: lots of graphs to draw