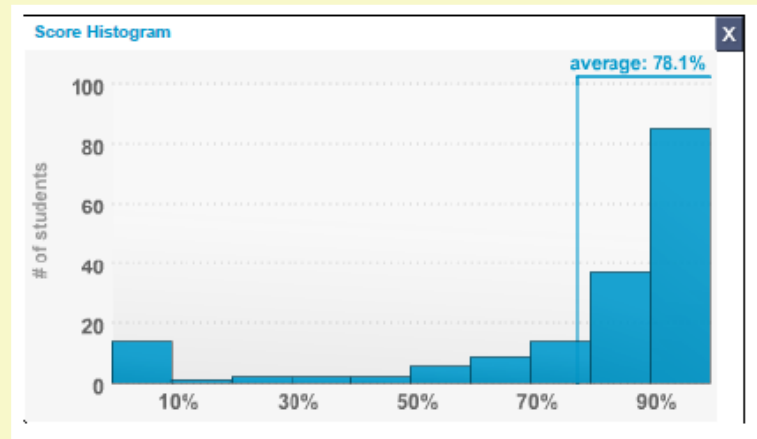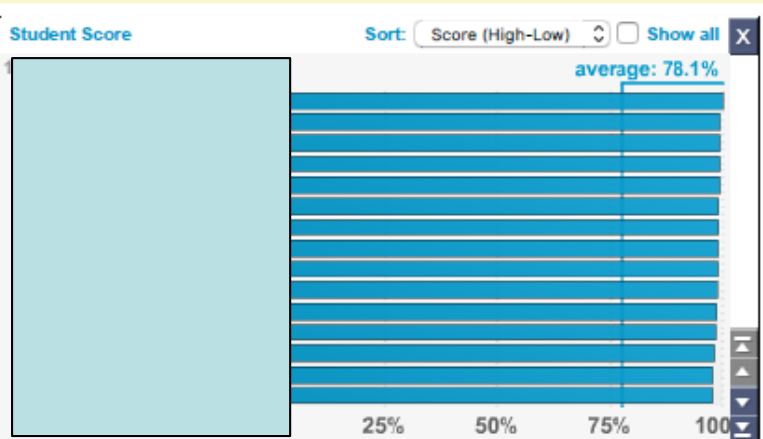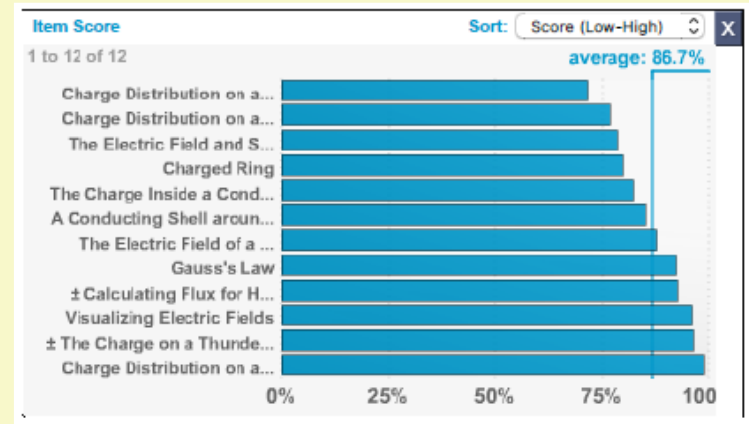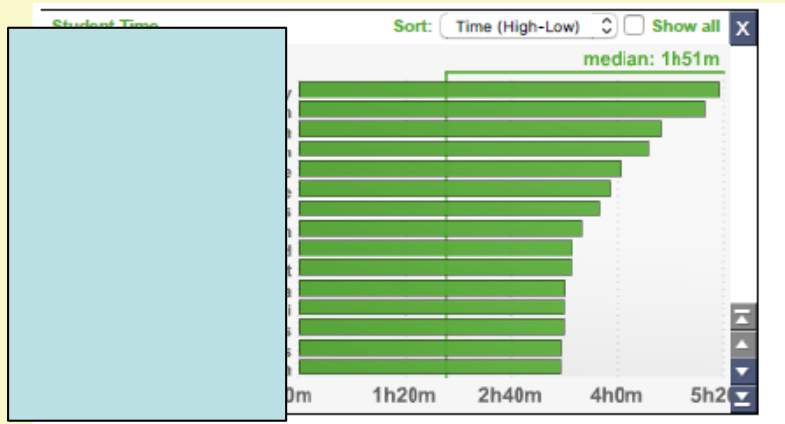# MP3 – Gauss' law

Average 74.5%('18), 80.4 % ('17), 75.9% ('16),   80.1%('15)   75.9% ('14)   81.7%('13)   81.5%('12)
        79.6% ('11)
Ave Time: 1hr 57 min ('18), 1 hr 49 min ('17), 1hr 41 min ('16), 1hr 50min ('15)   1 hr 46 min ('14)
        1hr 50min ('13), 1hr 36min ('12), 1 hr 39min ('11)

MID-SEMESTER TEST

PHYS1022 test will be on Monday 4th November at

11 am (surnames A-K)
Noon (surnames L-Z)
Those who have agreed breakout rooms will be contacted...

It will cover the material from the lectures up to last week and last 40 minutes.

There will be no Tuesday lecture, problem classes or mastering physics due in this week so you can prepare. MP4 is about potential and might be helpful to complete as part of your revision.

Please prepare one A4 sheet of revision notes (aim for one sided) which you may bring with you. This will be handed in with your answers but will not be marked.

The test is worth 10% of your final mark for this course.
The main purpose of the test is to assess your progress and provide feedback.

There are the last two years mid-terms on the web site with solutions – don't revise by only doing those questions – I make up a new paper every year and ask different things!

Count Alessandro Volte 1745 –1827

The battery made by Volta is credited as the first electrochemical cell. It consists of two electrodes: one made of zinc, the other of copper. The electrolyte is sulfuric acid or a brine mixture of salt and water. The electrolyte exists in the form $2H^+$ and SO_4^{2-}. The zinc, which is higher than both copper and hydrogen in the electrochemical series, reacts with the negatively charged sulfate (SO_4^{2-}). The positively charged hydrogen ions (protons) capture electrons from the copper, forming bubbles of hydrogen gas, H_2. This makes the zinc rod the negative electrode and the copper rod the positive electrode. We now have two terminals, and the current will flow if we connect them

Georg Simon Ohm (1789 – 1854) was a German physicist. As a high school teacher, Ohm began his research with the recently-invented electrochemical cell, invented by Italian Count Alessandro Volta. Using equipment of his own creation, Ohm determined that there is a direct proportionality between the potential difference (voltage) applied across a conductor and the resultant electric current.

Ohm's law first appeared in the famous book **The Galvanic Circuit Investigated Mathematically** (1827) in which he gave his complete theory of electricity.
The book begins with the mathematical background necessary for an understanding of the rest of the work. While his work greatly influenced the theory and applications of current electricity, it was coldly received at that time. It is interesting that Ohm presents his theory as one of contiguous action, a theory which opposed the concept of action at a distance. Ohm believed that the communication of electricity occurred between "contiguous particles" which is the term Ohm himself used.

Gustav Robert Kirchhoff (1824 –1887) was a German physicist who contributed to the fundamental understanding of electrical circuits, spectroscopy, and the emission of black-body radiation by heated objects. He coined the term "black body" radiation in 1862, and two sets of independent concepts in both circuit theory and thermal emission are named "Kirchhoff's laws" after him, as well as a law of thermochemistry. The Bunsen–Kirchhoff Award for spectroscopy is named after him and his colleague, Robert Bunsen.