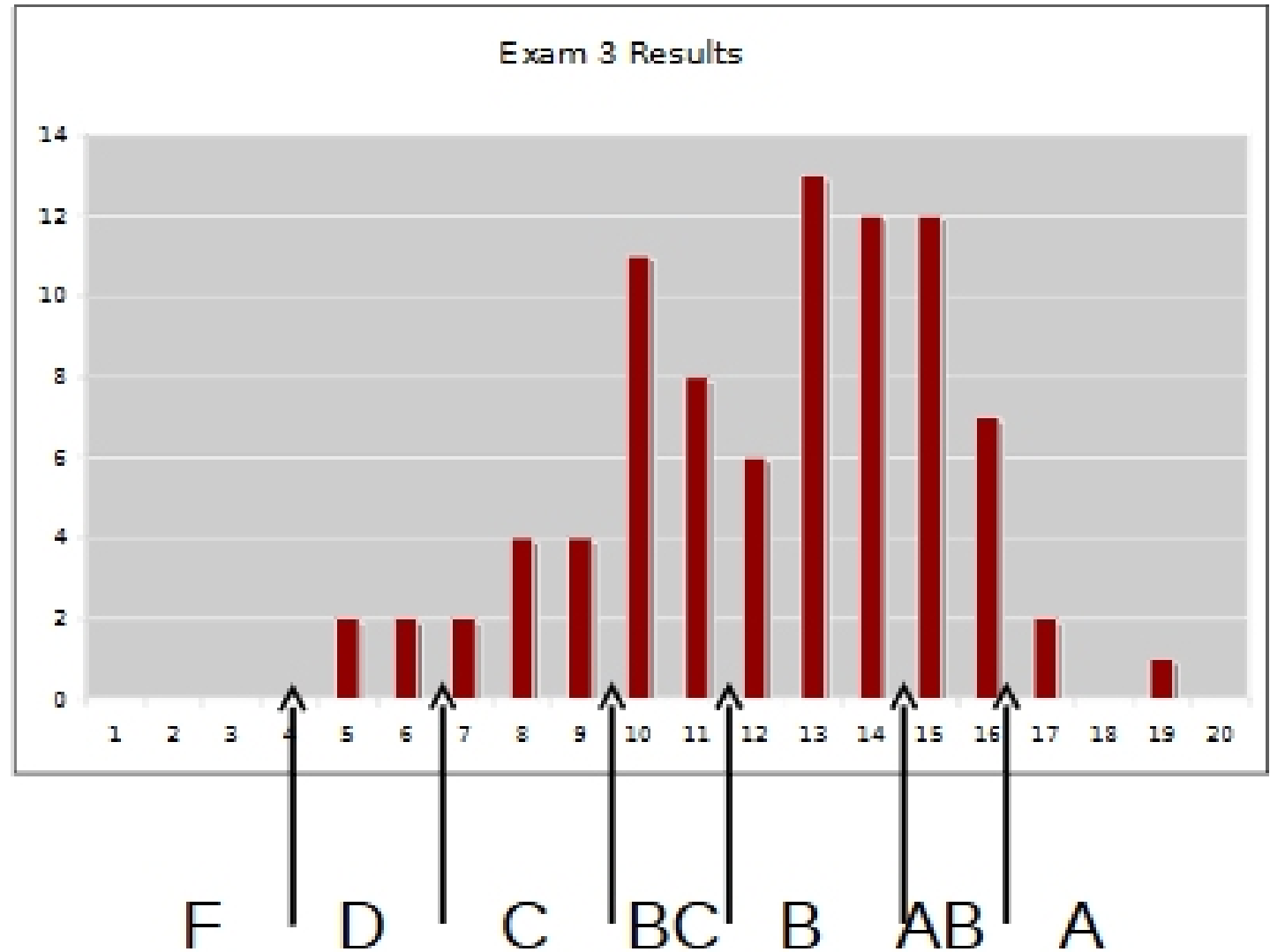


Exam Results

- Exam:
 - Exam scores posted on Learn@UW

- No homework due next week



Particles and fields

- We have talked about several particles
 - Electron, photon, proton, neutron, quark
- Many particles have internal constituents
 - Not fundamental: proton and neutron
- We have talked about various forces
 - Electromagnetic, strong, weak, and gravity
- And some fields...
 - Electric field
 - Magnetic field
- Modern view is that particles, forces, and fields are intertwined - and all quantized

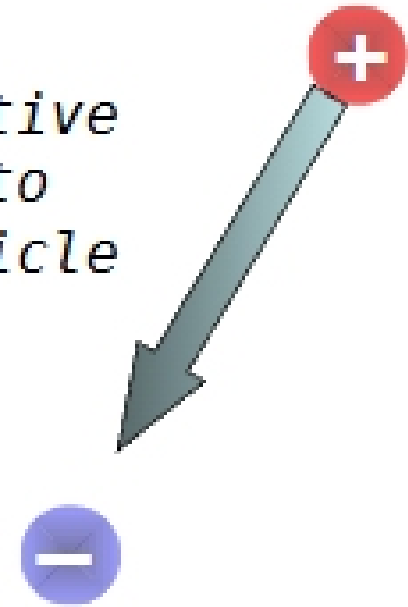
Force between charges

Opposite charges attract

Like charges repel.

- Other than the polarity, they interact much like masses interact gravitationally.
- Force is along the line joining the particles.

Force on positive particle due to negative particle



Electrostatic force: $F_E = k Q_1 Q_2 / r^2$

$$k = 9 \times 10^9$$

Gravitational force: $F_G = G M_1 M_2 / r^2$
 $G = 6.7 \times 10^{-11} \text{ Nm}^2 / \text{kg}^2$