A2 Physics (ABP) — Year 13 LP 3

This half term: Skills, Knowledge and Understanding to be developed:

Skills (students will be able to by the end of the Learning Programme): To draw electric and gravitational field lines of a charged and mass objects. Students will be able to calculate the field strength, potential and forces when having two charged or mass particles.
Knowledge (students will know by the end of the Learning Programme): How to distinguish the differences between the properties of electrical and gravitational fields.
Understanding (students will demonstrate their understanding): By answering past A2 exam papers on the subject electrical and gravitational field of force.

Key Terms/Words:
Electric, Gravitational, Field, Potential, Intensity, Equipotential lines, Work, Permittivity of free space

LP 3 – Week 1 & 2 Learning Outcomes:

Mock Exam – Unit 3 Paper

Lesson 1 - Students will be able to identify the features of electric and gravitational fields.

Lesson 2 - Students will know that the gravitational field outside spherical bodies such as the Earth is essentially the same as if the whole mass were concentrated at the centre.

Assessment
Mock Exam
Mark
Grade

Success criteria:

1. Students will draw electric and magnetic field lines.

2. Students will draw equipotential lines of magnetic and electric field.

Homework LP 3 1 /3

LP 3 – Week 3 & 4 Learning Outcomes:

Lesson 3 - Students will know how field lines (or lines of force) giving the direction of the field at a point, thus, for a positive point charge, the field lines are radially outward.

Lesson 4 – Students will understand what an equipotential surfaces is and how they have equal potential and therefore spherical for a point of charge.

Lesson 5 – Students will be able to calculate electrical field strength or intensity of a charged particle by using the equation $E = \frac{Q}{4\pi\varepsilon_0 r^2}$

Lesson 6 – Student will be able to calculate the potential charge of an electrical field and understand the relationship between potential and electrical field strength.

Students will apply and demonstrate new knowledge and skills in APP1 assessment

Assessment
APP1
Mark

Success criteria:

1. Students will calculate the electrical field strength by answering past exam papers.

2. Students will calculate the work by two interactive charged particles.

APP1 (10 marks)

Homework LP3 2 /3

Revise for APP1

LP 3 – Week 5 & 6 Learning Outcomes:

Lesson 7 – Students will be able to calculate the work done between two interacting charged particles by bringing a unit positive charge from infinity to that point.

Lesson 8 – Students will be able to calculate the forces between charged particles by looking at Coulomb's law.

Lesson 9 – Students will know how to calculate gravitational field strength or intensity by using the equation $F = G\frac{M_1 M_2}{r^2}$

Lesson 10 – Students will know how to calculate the gravitational potential energy of an object by using the equation $V_g = -\frac{GM}{r}$

Success criteria:

1. Students will calculate the gravitational field of a mass.
2. Students will calculate the potential energy of a mass.
3. Students will calculate the forces interacting between two masses.

Homework LP 3 3/3

Prepare for SA

LP3 – Week 7 Learning Outcomes:		**Success criteria:**	
Lesson 11 – Students will know how to calculate the potential at a point due to a point mass in terms of the work done in bringing a unit mass from infinity to that point. Lesson 12 – Students will be able to calculate the forces between masses by using the equation $F = \frac{G M_1 M_2}{r^2}$ Lesson 13 – Students will know that the field strength at a point is given by the E = - slope of the V_E – r graph at that point. Lesson 14 – Students will know that the field strength at a point is given by g = - slope of the V_g – r graph at that point.		1. Students will analyse and calculate the gradient of line of the graph to calculate the value of electrical potential field and gravitational potential field.	