The Ellesmere Port C of E College

Part of the Frank Field Education Trust

Year 13 Physics
Learning Programme 4

The LORIC skill focus for his LP is: INITIATIVE.
The Moral Virtues focus for this LP are: INTEGRITY and GRATITUDE.

Integrity - Having strong moral principles.
Gratitude - Feeling and expressing thanks.

What will I be learning about in this Learning Programme?
Astrophysics- a study of the large scales structures and organisation of the universe.

Where have I seen this learning before?
Basic concept of space are covered at the end of the GCSE Physics specification, and parts are also covered in Key Stage 3.

What could I use it for?
Degrees in Astrophysics and Space Physics.

Literacy:
- Capital letters must be used at the start of sentences and for the first letter of proper nouns
- Full stops must be used at the end of a sentence
- Question marks must be used at the end of a question
- Apostrophes should only be used for possession or omission
- Days of the week and months must be spelled correctly
- Key words must be spelled correctly

In LP4.1, I will know: 10/03/25 - (WK 2)	Key Vocabulary	Homework
LP4 summative assessment 2; how to explain the various astronomical objects within the universe and the process of star formation; how to describe the lifecycle of both large and small stars, explaining the mechanisms that cause their transition.	Planet Star Supernova	Past paper questions on the stellar lifecycle
In LP4.2, I will know: 17/03/25 - (WK 1)	**Key Vocabulary**	**Homework**
my strengths and areas for developments following the LP 4 summative assessment 2 and PRT; how to sketch and label a HR diagram & how a star moves through the HR diagram during its evolution; how changes in electron energy levels leads to emission of photons of discrete frequencies. How to determine the frequencies of photons from their electron transition.	Excitation De-excitation	Past paper questions on HR diagrams
In LP4.3, I will know: 24/03/25 - (WK 2)	**Key Vocabulary**	**Homework**
how continuous, emission and absorption spectra and how they are formed & how spectra can be used to identify the elements in stars; how a diffraction grating can be used to analyse starlight and how to use the grating equation; LP 4 formative assessment 1. Extended Task.	Diffraction grating	Past paper questions on emission and absorption spectra
In LP4.4, I will know: 31/03/25 - (WK 1)	**Key Vocabulary**	**Homework**
my strengths and areas for developments following the LP 4 formative assessment 1 and PRT; how to use Wien's law to estimate stellar peak surface temperature. How to use Stefan's law to find luminosity. Combine both to estimate the radius of a star; how to convert between km, light-years, parsecs. How to define the parsec. How stellar parallax can be used to estimate distance.	Luminosity	Past paper questions on luminosity
In LP4.5, I will know: 21/04/25 - (WK 2)	**Key Vocabulary**	**Homework**
how to describe the Doppler effect, Doppler shift of electromagnetic radiation and use the Doppler equation; how to describe the Cosmological principle; universe is homogeneous, isotropic and the laws of physics are universal; use Hubble's law; $v \approx H_0 d$ for receding galaxies; how to describe experimental evidence for the Big Bang theory and an estimation for the age of the universe.	Doppler shift Big Bang	Past paper questions on Hubble's law and the Doppler equation
In LP4.6, I will know: 28/04/25 - (WK 1)	**Key Vocabulary**	**Homework**
how to describe the evolution of the universe after the Big Bang to the present and current ideas about the composition of the universe in terms of dark energy, dark matter and a small percentage of ordinary matter; LP 4 formative assessment 2. Extended Task.	Dark energy Dark matter	Past paper questions on the Big Bang theory
In LP4.7, I will know: 05/05/25 - (WK 2)	**Key Vocabulary**	**Homework**
my strengths and areas for developments following the LP 4 formative assessment 2 and PRT; how to describe the observations and conclusions from the alpha-particle scattering experiment; evidence of a small charged nucleus; how to describe the simple nuclear model of the atom, the strong nuclear force and the radius of nuclei; how to describe particles and their corresponding antiparticles, classification of leptons	Strong Nuclear Force Antimatter Leptons	Past paper questions on the Rutherford Alpha Scattering experiment

PRT Task 1

PRT Task 2

Resources to support learning:
Knowledge organiser, Isaac physics, www.physicsandmathstutor.com, text book

FFET Award Challenge for this Learning Programme:
LP3 Year 13 Physics: Complete a practice paper independently.