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**LANGDON PARK SIXTH FORM**

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| **Subject: Physics** | **Year: Y13** | **Topic: 3.9.1 to 3.9.3 Astrophysics (optional module)** |

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| ***What and Why*** “How has the development of the telescope helped us understand the Universe? What is the life-cycle of a star? How do we know how old the Universe is? How do we know the Universe is expanding at an accelerating rate? This was discovered by astrophysicists in 1998 and subsequently awarded the Nobel prize in 2011” |

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| **Key terms**  Absolute magnitude  Apparent magnitude  Astronomical Unit  Big Bang Theory  Binary Star  Black body  Black Hole  Cassigrain telescope  Chromatic aberration  CMBR | Collecting power  Converging lens  Dark energy  Doppler Effect  Event Horizon  Exoplanet  HR diagram  Hubble’s law  Infra-red telescope  Light year  Line spectra | Luminosity  Main Sequence Star  Minimum angular resolution  Neutron Star  Parallax  Parsec  Quantum efficiency  Quasar  Radio telescope  Ray diagram  Rayleigh criterion | Real image  Red Giant  Redshift  Rayleigh criterion  Real image  Red Giant  Redshift  Reflecting telescope  Refracting telescope  Resolving power  Schwarzschild radius | Spectral class  Spherical aberration  Standard candle  Stefan’s law  Super red Giant  Supernova  Transit  Ultra-violet telescope  Virtual image  Wein’s displacement law  White Dwarf  X-ray telescope |

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| **Specification point** | **Pre-reading** | **Application and Assessment (date)** | **Home learning** | **Extension – Cultural Capital and Reading** |
| **3.9.1.1:** I can draw ray diagrams and apply the equation  **3.9.1.2**: I can draw ray diagrams for a cassigrain, reflecting and refracting telescope and explain spherical and chromatic aberration  **3.9.1.3:** I know the similarities and differences between radio telescopes and optical telescopes  **3.9.1.4:**  I can describe the advantages of large diameter telescopes and use the Rayleigh criterion  **3.9.2.1: I can explain t**he Hipparcos scale and star brightness with the use of logarithms  **3.9.2.2:** Calculate absolute magnitude  **3.9.2.3/4:** I can classify stars according to temperature, colour and prominent absorption lines. I can explain Wein’s displacement law and Stefan’s law  **3.9.2.5:** I can explain and draw the Hertzsprung-Russell (HR) diagram  **3.9.2.6:** I can describe the life cycle of stars and calculate the Schwarzschild radius for a Black hole star.  Use a type 1a supernovae as a standard candle and to describe the evidence for the accelerating Universe  **3.9.3.1:** I can explain the Doppler effect and relate it to binary stars, galaxies and quasars  **3.9.3.2:** To define use the Hubble’s law equation and including calculating the age of the Universe. I can state and explain the evidence for the Big Bang Theory  **3.9.3.3:** Explain the properties of quasars  **3.9.3.4:** Recognise the two methods for the detection of exoplanets | Use the CGP AQA A2 textbook p.201 to 252. Look at other textbooks in the library for alternative ideas, explanations and diagrams.  **YouTube Videos:**  (1) [The Life Cycle of Stars](https://www.youtube.com/watch?v=PM9CQDlQI0A)  (2) [Telescopes in Astronomy](https://www.youtube.com/watch?v=lh0xCAHTLzg)  (3) [Brian Cox explains the Hubble Law](https://www.youtube.com/watch?v=PR6wN8ym7SI)    **Websites:**  <http://hyperphysics.phy-astr.gsu.edu/hbase/Astro/hubble.html>  <https://www.schoolsobservatory.org/learn/astro/stars/cycle>  <https://www.physicsclassroom.com/class/waves/Lesson-3/The-Doppler-Effect>  <https://resources.collins.co.uk/Wesbite%20images/AQA/Physics/sb2module/9780007597642_Astrophysics.pdf> | **Practicals:**  (1) Use converging lenses to identify properties of the images formed  (2) Demonstrate the Doppler effect  **Assessment**:  Minitest on Astrophysics (3rd week Feb) | (1) Write a report on the uses, advantages and disadvantages of Radio, Optical refracting and reflecting telescopes  (2) Recall the sketch of (i) Newtonian reflector (ii) Cassigrain telescope (iii) Refracting telescope (iv) Black body curve (v) HR diagram (vi) Light curve for a supernovae (vii) Light curve for exoplanets | (1) Visit the Greenwich  Observatory  (2) Visit the Science Museum  (Space Exploration) |

**Pre-assessment content review**

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| I feel secure in | I need to focus on | My action plan |

**Pre-assessment skills review**

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| I feel secure in | I need to focus on | My action plan |

**Post-assessment review**

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| Weaknesses in content knowledge | Skills I need to focus on | My action plan |
| Retest / review – teacher and student comment | | |

**Revision planning**

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| Spec point | Notes complete | Revision materials | Past paper Qs | Timed conditions |
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