edexcel

Mapping Document

GCSE (9-1) Astronomy

Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Astronomy (1AS0)

Pearson

GCSE (9-1) Astronomy

Mapping document

This document is designed to help you compare the existing 2011 GCSE Astronomy specification (2AS01) with the new 2017 Edexcel GCSE (9-1) Astronomy specification.

The document gives an overview, at the topic level, of where the material covered in the existing GCSE Astronomy specification can be found in the new Edexcel GCSE (9-1) Astronomy specification.

The tables then give a more detailed breakdown of the new Astronomy specification, highlighting areas of difference. These will help you see where the new 2017 specification incorporates material that is new to you.

As a general overview, the 2017 GCSE (9-1) Astronomy specification is split into 16 topics. These topics are tested separately on the two examinations that make up the GCSE.

Paper 1: Naked-eye Astronomy	**Paper 2: Telescopic Astronomy**
Planet Earth	Exploring the Moon
The lunar disc	Solar astronomy
The Earth–Moon–Sun system	Exploring the Solar System
Time and the Earth–Moon–Sun cycles	Formation of planetary systems
Solar System observation	Exploring starlight
Celestial observation	Stellar evolution
Early models of the Solar System	Our place in the Galaxy
Planetary motion and gravity	Cosmology

As well as great content within the specification, there are other ways in which we can help support your teaching on our new GCSE (9-1) Astronomy specification. Our free support includes:

- Results Plus, now with Mock Analysis service
- Exam Wizard, our online bank of past paper questions
- Getting Started Guide, with course planner
- “Getting Ready to Teach” events
- documents to help deliver the mathematical and observational aspects of the specification.

Overview of content

GCSE Astronomy 2011		GCSE Astronomy 2017
1	**Earth, Moon and Sun**	
1.1	**Planet Earth**	
	features and shape of Earth	1.1–1.3
	light pollution	1.6
	rotation of Earth	1.1–1.2, 13.19
	key divisions of Earth's surface	1.5
	reflecting and refracting telescopes	11.18
1.2	**The Moon**	
	surface features	2.3
	dimensions	2.2
	lunar orbit	2.7
	lunar exploration	11.30
	near and far sides of the Moon	9.2–9.3
	origin of the Moon	9.5
1.3	**The Sun**	
	dimensions and properties	
	principal divisions	10.2–10.5
	surface features	10.6
	energy generation mechanism	10.4
	sunspots and the solar cycle	10.7–10.8
	safe observation	10.1
	solar wind	10.10
1.4	**Earth–Moon–Sun Interactions**	
	lunar phases and cycle	4.9
	eclipses – lunar, solar, total and partial	3.10
	solar and sidereal day	4.1
	shadow sticks and sundials	4.7–4.8
	apparent and mean Sun	4.3
	annual variation in sunrise and sunset	4.11
	Equation of Time	4.4–4.6
	aurorae	6.1, 10.11

GCSE Astronomy 2011		GCSE Astronomy 2017
2	**Planetary Systems**	
2.1	**Our Solar System**	
	planets and other bodies	11.1
	scale and size of Solar System	7.5
	ecliptic plane and zodiac	5.2, 5.4, 11.11
	elliptical orbits – perihelion and aphelion	8.5
	direct and retrograde motion	5.5
	conjunction, opposition and elongation	5.8
	main physical characteristics of planets	11.6
	probes and manned exploration	11.26–11.29
	satellites	11.6, 12.2
	ring systems	11.6
2.2	**Comets and Meteors**	
	cometary orbits	11.3
	Kuiper Belt and Oort Cloud	11.4–11.5
	principal features, including tails	11.2
	meteoroids, meteors and meteorites	11.10
	meteor showers	5.7
	PHOs	11.1
2.3	**Solar System Discoveries**	
	work of Copernicus, Brahe and Kepler	8.1–8.2
	Kepler's laws of planetary motion	8.4, 8.6
	Galileo's telescopic discoveries	11.24
	role of gravity in planetary orbits	8.3
2.4	**Exoplanets**	
	detection methods	12.4
	extra-terrestrial life	12.5–12.8
	liquid water and the Goldilocks Zone	11.13, 12.6
	Drake Equation	12.7

GCSE Astronomy 2011		GCSE Astronomy 2017
3	**Stars**	
3.1	**Constellations**	
	stars and double stars	13.34
	constellations and asterisms	6.1–6.2
	nebulae; open and globular clusters	13.34
	major constellations and pointers	6.3
	seasonal variation in visibility of constellations	6.12
3.2	**Observing the Night Sky**	
	circumpolar stars	6.13, 6.15–6.16
	star charts, planispheres and computer programs	6.5
	observing techniques	6.19
	Messier Catalogue	14.1
	diurnal motion	6.14
	observer's meridian and culmination	6.13
3.3	**Physical Properties of Stars**	
	stellar groupings and line-of-sight effects	13.17
	apparent and absolute magnitude; distance modulus equation	13.1–13.3
	inverse square law for light intensity	13.9
	definition of parsec and use of heliocentric parallax	13.11–13.12
	Cepheid variables and distance measurement	13.14, 13.16
	binary stars and light curves	13.15, 13.18
	stellar spectra, temperature and spectral type	13.4–13.6
	Hertzsprung-Russell diagram	13.7
3.4	**Evolution of Stars**	
	evolutionary paths of low and high mass stars	14.4–14.9
	emission and absorption nebulae; open clusters	14.9
	planetary nebulae and supernovae	14.9–14.10
	neutron stars and black holes	14.10–14.11

GCSE Astronomy 2011		GCSE Astronomy 2017
4	**Galaxies and Cosmology**	
4.1	**Our Galaxy – the Milky Way**	
	structure and appearance	15.1
	size and shape of our galaxy	15.2
	rotation of galaxy and 21cm radio observations	15.3
4.2	**Galaxies**	
	spiral, barred spiral, elliptical and irregular galaxies	15.6
	Hubble's "Tuning Fork" diagram	15.7
	non-visible emissions of galaxies	15.9
	AGNs and active galaxies	15.10–15.11
	Local Group	15.4–15.5
	clusters and superclusters of galaxies	15.13
4.3	**Cosmology**	
	Doppler principle	16.1–16.3
	red shifts of distant galaxies	16.1–16.3
	quasars	16.8
	Hubble's Law	16.5
	expanding universe	16.4
	CMB radiation and WMAP	16.8–16.9
	dark matter and dark energy	16.10–16.11
	Big Bang theory	16.7–16.8
	evolutionary models of universe	16.12

In-depth comparison

GCSE (9-1) Astronomy (2017)	GCSE Astronomy (2011)	What's new for you
Topic 1: Planet Earth	Mostly maps to: *Topic 1.1 – Planet Earth*	• latitude and longitude coordinate system (1.4) • telescopes now in Topic 11
Topic 2: The lunar disc	Mostly maps to: *Topic 1.2 – The Moon*	• recognise a wider range of lunar features and their origins (2.4, 2.5) • causes of lunar libration (2.8) • Giant Impact Hypothesis now in Topic 9 • lunar exploration now in Topic 11
Topic 3: The Earth–Moon–Sun system	Material on eclipses maps to: *Topic 1.4 – Earth, Moon, Sun interactions*	• relative sizes and distances (4.1, 4.2) • work of Aristarchus (some overlap with *Topic 1.1e*) • tides (3.5) • precession (3.6, 3.7)
Topic 4: Time and the Earth–Moon–Sun cycles	Mostly maps to: *Topic 1.4 – Earth, Moon, Sun interactions*	• sidereal and synodic months (4.10) • equinoxes and solstices (4.12, 4.13) • local time and time zones (4.15–4.17) • Prime Meridian (4.18) • methods for determining longitude (4.19–4.21)
Topic 5: Solar System observation	Mostly maps to: *Topic 2.1 – Our Solar System* except meteor showers (*Topic 2.2*)	• pinhole projection for Sun observation (5.1) • First Points of Aries and Libra (5.6)
Topic 6: Celestial observation	Mostly maps to: *Topic 3.1 – Constellations* and *Topic 3.2 – Observing the night sky*	• range of names used by different cultures (6.4) • causes and effects of light pollution (6.6) • celestial sphere, poles and equator (6.7) • using coordinate systems (6.8–6.11) • using Polaris to find latitude (6.18) • factors influencing visibility (6.20) • the appearance of the Milky Way (6.21)
Topic 7: Early models of the Solar System	n/a	• this topic mostly includes new material, except for the scale of the Solar System (7.5) and the use of parsec and light year (7.6)
Topic 8: Planetary motion and gravity	Mostly maps to: *Topic 2.3 – Solar System discoveries*	• deeper understanding of Kepler's laws (8.7, 8.8) • non-mathematical treatment of Newton's law of gravitation (8.9)

GCSE (9-1) Astronomy (2017)	GCSE Astronomy (2011)	What's new for you
Topic 9: Exploring the Moon	Some overlap with: *Topic 1.2 - The Moon*	• Moon's internal divisions (9.1) • escape velocity (9.4)
Topic 10: Solar astronomy	Mostly maps to: *Topic 1.3 – The Sun*	• changing appearance of the Sun when viewed from different regions of the EMS (10.9) • Earth's magnetosphere and Van Allen belts (10.11)
Topic 11: Exploring the Solar System	Maps to variety of sections, mostly: *Topic 2.1 – Our Solar System* and *Topic 2.2 – Comets and meteors*	• theories for gas giant formation (11.7) • Topics 11.8–11.9 are a repeat of Topics 7.5–7.6 • transit of Venus (11.12) • principles of telescopes (11.14–11.17) • light grasp, aperture, resolution and magnification (11.19–11.23) • advantages of reflecting telescopes (11.25)
Topic 12: Formation of planetary systems	Mostly maps to: *Topic 2.4 – Exoplanets*	• interaction of gravitational and other forces leading to formation of the solar system (12.1)
Topic 13: Exploring starlight	Mostly maps to: *Topic 3.3 – Physical properties of stars* and *Topic 3.1 – Constellations*	• explaining positions on HR diagram (13.8) • degrees, arcmin, arcsec (13.10) • using HR diagram to measure distances (13.13) • collecting observational data (13.20, 13.21) • radio telescopes (13.22–13.27) • infrared telescopes (13.28–13.29) • siting of telescopes (13.30–13.33)
Topic 14: Stellar evolution	Mostly maps to: *Topic 3.4 – Evolution of stars*	• cataloguing stars (14.2) • radiation pressure and gravity (14.3)
Topic 15: Our place in the Galaxy	Mostly maps to: *Topic 4.1 – Our galaxy: the Milky Way* and *Topic 4.2 – Galaxies*	• information about AGNs from different regions of the electromagnetic spectrum (15.12) • theories for the formation and evolution of galaxies (15.14)
Topic 16: Cosmology	Mostly maps to: *Topic 4.3 – Cosmology*	• Hubble Deep Field image as evidence for Big Bang theory (16.8)