

Kolbe Academy Home School

HIGH SCHOOL ASTRONOMY

Descriptive Astronomy by John Charlesworth

TABLE OF CONTENTS

I. Syllabus	2
A. Diploma Requirements	3
B. Quarterly Reporting Requirements	3
II. Course Plan	
A. Quarter 1	4
B. Quarter 2	7
C. Quarter 3	9
D. Quarter 4	11
III. Exams (Quarters 1-3)	
IV. Answer Keys	

NOTE: There is NO Quarter 4 exam. Quarter 4 is spent doing a term paper entirely.

COURSE TITLE: Astronomy

COURSE DESCRIPTION:

The course is designed to give students an appreciation of the order and complexity of creation, and of the order and complexity in the cosmos. Revelation and science complement each other in illuminating God's glory. The course covers the different kinds of celestial objects, their characteristics, how they formed and developed, and their eventual fates. This includes a discussion of stars (including our sun), star groups, black holes, asteroids and comets, the earth, moon, and planets. It also covers the theories of the origin, development, and future of the universe, as well as whether other planets and life forms exist in space. You will study, and have the opportunity to observe, the main stars and constellations for both summer and winter.

Please note: The workload may vary somewhat week to week. The course plans encourage the student to cover material by topic, which may provide a more thorough understanding of the concept. While some topics may be more simple and covered in less time, others are more complex and may require more of the student's time. Please remember that above all, the student is encouraged to cover material at the pace that works for him/her.

SCOPE AND SEQUENCE:

1. History of astronomy, modern astronomy, electromagnetic waves, the Universe
2. Cosmology and Theology, stars and constellations, sky observations
3. The Solar System: comets, meteors, asteroids, the moon, the earth, the planets
4. A final research paper and oral presentation on an astronomy topic

SKILLS TO BE DEVELOPED:

- Although arithmetical concepts may be used, no advanced mathematics is required
- Students will practice reading and analyzing scientific information; and determining which issues belong properly to science (the mechanics of creation), and which belong properly to philosophy and religion (the meaning of creation)
- Students will gain an understanding of celestial objects and their characteristics, and will have an opportunity to observe various constellations
- Students will learn the steps involved in composing a research paper and oral presentation on a scientific topic

COURSE TEXTS/MATERIALS: *Descriptive Astronomy*, by Mr. John Charlesworth
A Student Guide to Writing a Research Paper, by Phyllis Goldenberg (optional)
 The Edmund Scientific *Star and Planet Locator*

DIPLOMA REQUIREMENTS:

Summa Cum Laude diploma candidates using Astronomy to fulfill their fourth year of science are required to fulfill the Kolbe Core course (K) requirements by following the course plan as laid out. ***Magna Cum Laude*** and ***Standard*** diploma candidates may choose to pursue the (K) designation, but are not required to do so, and instead have the option of altering the course plan as they choose. Astronomy counts toward the physical science requirement for both the Magna and Standard diplomas. Lab credit is not available for the Astronomy course. For a student pursuing the ***Magna Cum Laude*** diploma, the science requirement dictates that lab work is incorporated into two of the following three courses: Biology, Chemistry or Physics. There is no lab requirement for the ***Standard*** diploma. Please see below for specific course titles, quarterly reporting requirements and transcript designations for Astronomy.

REQUIRED SAMPLE WORK:

Designation*		K
Course Title	Astronomy	Astronomy
Quarter 1	1. Any written sample	1. Complete Quarter 1 Exam
Quarter 2	1. Any written sample	1. Complete Quarter 2 Exam
Quarter 3	1. Any written sample	1. Complete Quarter 3 Exam
Quarter 4	1. Any written sample	1. Research Paper

*Designation refers to designation type on transcript. K designates a Kolbe Academy Core course.

If the student wishes to have the course distinguished on the transcript with a (K) as a Kolbe Academy Core course, please be sure to send the correct exams and components each quarter for verification as specified above. **If no designation on the transcript is desired, parents may alter the lesson plan and any written sample work is acceptable to receive credit for the course each quarter.** If you have any questions regarding what is required for the (K) designation or diploma type status, please contact the academic advisory department at 707-255-6499 ext. 5 or by email at advisors@kolbe.org.

COURSE PLAN METHODOLOGY:

Because there are no comprehension questions at the end of the sections, it may seem to be a simple assignment to do the reading. The exams, however, cover the reading in great detail. The student is encouraged to understand and be able to define the key points in detail. It is recommended that the student study each section the week that it is presented, so that he/she will not have to be burdened with excessive study the week before the exam. The student may wish to keep a notebook of key definitions, formulas, concepts, and examples; or highlight them in the text.

Assignments have been recommended for each week to further emphasize and expand upon the topics presented that week. These assignments are marked as optional). The parent may opt to include them in certain weeks, and may choose to omit them in other weeks. To the parent: there is no right or wrong way to do these assignments. Grade them based upon how the student meets your expectations.

A research paper and oral presentation on an astronomy-related topic will be the recommended assignment for the fourth quarter. As the student covers material in the text, he/she is encouraged to be thinking about a topic of interest for the fourth quarter assignment. There are great ideas throughout the text. Pay special attention to the key points. Note, there is no fourth quarter examination.

◆◆◆ FIRST QUARTER ◆◆◆

WEEK 1		
Reading	Descriptive Astronomy	Introduction, Topic Outline, and pages 13-18.
	Sky Calendar and Thoughts on Buying a Telescope in the "Odds and Ends" section (back of the book). The student will be encouraged to do some sky observing. A telescope is <u>not required</u> for this, but if you are interested in purchasing a telescope, you may find Mr. Charlesworth's suggestions helpful.	
Assignments	Understand and be able to define the key points.	
	Page 18	Review Questions 1 – 4
Optional	Write a short essay (1-2 pages) on influential figures in the history of astronomy and their contributions to the field. (Refer mainly to the text. You may use outside resources if you choose)	
Key Points	Highlights from the History of Astronomy: From the Ancient Greeks to Isaac Newton. Incorrect assumptions, origin of the names of the days of the week, Ptolemy and the geocentric model, Arabic contributions, Columbus' observations, Copernicus and the heliocentric solar system, Galileo, Kepler's observations: elliptical orbits, perihelion, aphelion. Isaac Newton: the <i>Principia</i> , Newton's First Law.	
WEEK 2		
Reading	Descriptive Astronomy	Pages 19-30
Assignments	Understand and be able to define the key points.	
	Review questions 5-35.	These will help you to understand the concepts.
Optional	Give a short oral presentation at the end of the week explaining the Law of Gravity, affect of distance, square and inverse square relations and volume relations. Use some of the	