Classical Astronomy

Classical astronomy is the study of the motions of the heavenly bodies: the sun, moon, stars, and planets. Unlike modern astronomy, classical astronomy does not rely on telescopes or other modern observational equipment: it is the lost art of using the unaided eye to observe the clockwork of the heavens. Classical astronomy is the "everyday life" astronomy ancient people did: studying the heavens for navigation and for marking times of day and seasons of the year. Unlike astrology, which attaches superstitious meanings to the stars, classical astronomy is immensely practical. It seeks to understand the heavens as God designed them for us to use (Genesis 1:14–19). For hundreds of years astronomy was considered one of the seven classical Liberal Arts of Christian education.

Note to parents and students: In this course students will be required to do a fair amount of sky observation, daytime and night, from their homes. This observation homework will not usually be time-intensive, but much of it will involve going outside during odd hours: early mornings before sunrise, midnight, and late nights after dark. The class will also involve a visit to a local planetarium and a research paper.

Requirements

Your grade for this course will consist of four sections:

1. 8 Chapter Tests
2. Planetarium Paper (due January 23)
3. Research Paper (due May 21)
4. Field Guide Activities (due May 21)

PLANETARIUM PAPER:

Attend a local planetarium show and write a one-page (three-paragraph) synopsis of the program. Choose from a number of nearby planetariums (there are over 15 within a two-hour driving distance). Abram's Planetarium at MSU, the LCC Planetarium, and Robert T. Longway Planetarium in Flint are the closest. There are also planetariums at Alma College, Olivet College, and the University of Michigan.

The paper should include the following information: (1) the name of the program attended, (2) the name of the planetarium, (3) the creator/writer of the program, (4) the date and time you attended, (5) a brief synopsis of the program, and (6) specific astronomy facts you learned during the program. Remember: planetarium shows are dark, so you won't be able to take notes during the program.

RESEARCH PAPER:

The purpose of your research paper is to familiarize yourself with a section of biblical or classic literature that pertains to astronomy. There are a number of topics to choose from.

7th-9th Grade Options:

The paper should be 2-4 pages, double-spaced, 12-point Times New Roman font. It should cite the Bible and 2 other sources. No Internet sources allowed.

Option #1: The Sun Stands Still

Examine the miracle reported in Joshua 10:12-14 and write an astronomical explanation of what happened. The paper should (1) mention any major characters and their significance in that period of Israel's history, (2) describe the historical setting and time, (3) give an adequate description of the event as the Bible records it, and (4) make use of terms and concepts learned in *Signs & Seasons*, assuming the reader has no knowledge of how heavenly bodies move the way they do.

Option #2: Hezekiah's Sundial

Examine the miracle reported in Isaiah 38:1-8 and write an astronomical explanation of what happened. The paper should (1) mention any major characters in the story and their significance in that period of Israel's history, (2) describe the historical setting, (3) give an adequate description of the event as the Bible records it, and (4) make use of terms and concepts learned in *Signs & Seasons*, assuming the reader has no knowledge of how heavenly bodies move the way they do.

Option #3: Constellation Stories

Pick any constellation visible in the night sky in Shiawassee County at any time of the year and research the mythology behind it. The paper should address the following questions: (1) What is the name of the constellation? Where does the name come from? (2) What ancient stories and mythologies were told about this constellation or the person/creature/object it represents? (3) When is the constellation visible in our community? (4) What are the names of some its brightest stars and what is their magnitude? (5) If you were trying to describe how to find this constellation to an inexperienced sky observer, how might you do it?

Option #4: The Christmas Star

Study some of the major interpretations of the "star" seen by the Magi in Matthew 2:1-12. What was the stellar event they witnessed? If there are competing theories or explanations, these should be mentioned, along with any arguments for or against them.

10th-12th Grade Options:

The paper should be 4-6 pages, double-spaced, 12-point Times New Roman font. It should cite the Bible (if applicable) and 3 other sources. No Internet sources allowed.

Option #1: The Speaking Heavens

CS Lewis said of Psalm 19, "I take this to be the greatest poem in the Psalter and one of the greatest lyrics in the world." Study and write an analysis of Psalm 19. Special attention should be paid to (1) key Hebrew words in the psalm, (2) its overall structure and flow, and (3) any major theological

themes the psalm addresses. When key astronomical terms are used, these should be interpreted and explained. To help you write this use a concordance and several detailed commentaries of the Psalms.

Option #2: The Maker of Constellations

Examine the prophecy in Amos 5:1-17 and write a detailed explanation of the significance of the constellations mentioned in verse 8 from a modern astronomer's viewpoint. The paper should explain to readers (1) the theme and message of the book of Amos as a whole, (2) a synopsis of Amos' message in 5:1-17, (3) the identification of the constellations mentioned in verse 8, and (4) modern knowledge about some of the stars and astronomical objects contained in these constellations. The paper should answer the question: How does a modern understanding of astronomy enhance our appreciation for the message behind these verses?

Option #3: The Christmas Star

Study some of the major interpretations of the stellar event recorded in Matthew 2:1-12 (a.k.a. the "Star of Bethlehem"). The paper should address some of the following questions. (1) Who were the Magi and why is their presence in Matthew's gospel significant? (2) What was the "star" they witnessed and how can its movements be explained? (3) Why did the Magi believe the star was a sign of the birth of a Jewish king? If there are competing theories or explanations, these should be mentioned, along with arguments for or against them.

Option #4: The Spindle of Necessity

Study the "Myth of Er" as it is recounted in *The Republic*, by Plato, and give a detailed account of its "Spindle of Necessity" and its influence later works of literature. The paper should address the following questions: (1) Who was Plato and what is *The Republic* about? (2) Who was Er? (3) What is the Spindle of Necessity and what are the planetary spheres mentioned? (4) What notable works of literature or science are later inspired by this description of the planetary spheres and Er's story?

FIELD GUIDE ACTIVITIES

The observation activities are the most important part of this class. There is no better way to be more familiar with the movements of the heavenly bodies than to spend time outside looking up.

Please note: While most of these field activities do not take a lot of time (many times only 15-30 minutes), you will need to get started on them right away. Bad weather and cloudy skies can cause problems.

All of the following activities are required for this course. They can be found in the *Signs & Seasons Field Guide and Test Manual* from Fourth Day Press.

Create a Backyard Compass (p.1-2)
Create the compass exactly as the book requires. When finished, snap a picture of you standing on your completed work and show to the instructor (print or digital copy).
Estimated time = One sunny day, between 10 a.m. and 2 p.m.

Noon Shadows (p.4)
Only do this activity over a 2-month period, not a 3-month period as the book requires.
Estimated time = 1 hour around noon once a week for 2 months

Exposures (p.6)
Complete activity exactly as book requires.
Estimated time = 1 sunny day around your house, periodic observations throughout the day

Twilight Activity (p.8)
Do this activity during 2 evenings, separated by at least 1 month.
Estimated time = About 1-2 hour each on 2 clear evenings at sunset

Historical Timeline (p.10)

No observation needed for this activity. Put more information into this timeline while you read each chapter of *Signs & Seasons.*

Estimated time = A few minutes; do this every time you read a chapter in the textbook

Direction Activity (p.21)

Create sky compass exactly as book requires. When finished, snap a picture of you holding your completed work and show to the instructor (print or digital copy), or bring it into class.

Estimated time = 30 minutes one day (any time of day or night)

Learn to find the constellation Orion (p.16)

Do visual activity exactly as book requires.

Estimated time = 3 clear early mornings before sunrise for 15 minutes each

Rotation around Polaris (p.17)

Do this activity exactly as book requires.

Estimated time = 2 consecutive clear nights, 2 observing times each night: once when it is first dark, once at midnight; about 15 minutes each time

Sketching Activities (p.38-40)

Do all except the flat map activity.

Estimated Time = 1 clear night: observing in the late evening, midnight, and early morning, 20 minutes for each time; also includes drawing homework (no observation needed)

Observing the Constellations (p.40-44)

Do all observing, writing, and drawing activities except the "For Observers in the City," "Identifying Stars," and "Observing the Celestial Equator" sections.

Estimated Times:

- Observing Orion = 1 clear night (about 10:00 p.m.), 20 minutes

- Observing the Zodiac = 1 night: late evening, midnight, early morning, 15 minutes each
- Observing the Northern Sky = 10 clear nights (any time), 15 minutes each
- Observe Risings and Settings of the Zodiac = 2 clear nights (any time)

Find Your Limiting Magnitude (p.64)

Do activity exactly as book requires.

Estimated Time = 20 minutes, when sky is very dark on a clear night

Observing the Zodiac (p.66)

Do activity exactly as book requires.

Estimated time = 4 nights (a month apart each), observing at sunset, the middle of the night, and sunrise; about 20 minutes each observation time

Observe the Northern Sky (p.70)

Do visual activity exactly as book requires.

Estimated time = 4 clear evenings (starting around 10:00 p.m.) spaced out over a period of 4 months (about 15 minutes each)

RECOMMENDED CALENDAR FOR FIELD GUIDE ACTIVITIES

September 19 – October 1

- *Create a Backyard Compass (p.1-2)* – Complete this activity
- *Direction Activity (p.21)* – Complete this activity
- *Exposures (p.6)* – Complete this activity
- *Historical Timeline (p.10)* – Fill in any historical authors from the readings

October 2 – November 5

- *Noon Shadows (p.4)* – Observe and sketch one day each week for 5 weeks
- *Twilight Activity (p.8)* – Observe one evening during this period
- *Rotation around Polaris (p.17)* – Complete this 2-night activity
- *Observe the Northern Sky (p.70)* – Observe and sketch one night this period (perhaps the same evening as one of your *Rotation around Polaris* activities)
- *Learn to find the constellation Orion (p.16)* – Observe and sketch three early mornings this period (Recommended: do this sometime between October 16 and November 5, between 4:30 and 6:00 a.m. The moon will be least likely to obscure your view the week of the 23rd. You might also see the Orionids meteor shower at its peak October 20-22.)
- *Historical Timeline (p.10)* – Fill in any historical authors from the readings

November 6 – December 17

- *Noon Shadows (p.4)* – Observe and sketch one day each week for 5 weeks
- *Twilight Activity (p.8)* – Observe one evening during this period
- *Observe the Northern Sky (p.70)* – Observe and sketch one night this period
- *Sketching Activities (p.38-40)* – Observe and sketch one night: evening, midnight, and early morning (You might also see the Geminids meteor shower December 7-16, at its peak on the 13th)

- *Historical Timeline (p.10)* - Fill in any historical authors from the readings

December 18 - January 7

- *Observe the Northern Sky (p.70)* - Observe and sketch one night this period
- *Historical Timeline (p.10)* - Fill in any historical authors from the readings

January 8 - February 11

- *Observing the Zodiac (p.66)* - Observe and sketch one night this period (evening, middle of the night, and early morning)
- *Observing the Constellations (p.40-44)* - "Observing the Zodiac" portion (do this at the same time you do the *Observing the Zodiac* activity from p.66)
- *Observing the Constellations (p.40-44)* - "Observing Orion" portion (Recommended: Do this activity after 11:00 p.m.)
- *Observe the Northern Sky (p.70)* - Observe and sketch one night this period
- *Historical Timeline (p.10)* - Fill in any historical authors from the readings

February 12 - March 17

- *Observing the Zodiac (p.66)* - Observe and sketch one night this period (evening, middle of the night, and early morning)
- *Observing the Constellations (p.40-44)* - "Observe Risings and Settings of the Zodiac" portion (do this at the same time you do the *Observing the Zodiac* activity from p.66)
- *Observing the Constellations (p.40-44)* - "Observing the Northern Sky " portion: do this 3 or 4 times this month
- *Find Your Limiting Magnitude (p.64)* - Observe and write observations one late night
- *Historical Timeline (p.10)* - Fill in any historical authors from the readings

March 18 - April 21

- *Observing the Zodiac (p.66)* - Observe and sketch one night this period (evening, middle of the night, and early morning)
- *Observing the Constellations (p.40-44)* - "Observe Risings and Settings of the Zodiac" portion (do this at the same time you do the *Observing the Zodiac* activity from p.66)
- *Observing the Constellations (p.40-44)* - "Observing the Northern Sky " portion: do this 3 or 4 times this month
- *Historical Timeline (p.10)* - Fill in any historical authors from the readings

April 22 - May 19

- *Observing the Constellations (p.40-44)* - "Observing the Northern Sky " portion: do this 3 or 4 times this month
- *Observing the Zodiac (p.66)* - Observe and sketch one night this period—evening, middle of the night, and early morning (You might spot the Aquarids meteor shower in the early morning, May 1-10, at its peak on the 6th)
- *Historical Timeline (p.10)* - Fill in any historical authors from the readings