

## Astronomy

**Text.** We will not use a formal textbook for this course. Instead, we will pull information from other academic sources (peer-reviewed journals, daily media, etc.) and applicable videos/documentaries/movies.

**Required items to bring daily.** Notebook specific for astronomy and a pen/pencil

### Expectations:

1. Be Responsible.
  - You are responsible for the energy and effort you bring to class (positive or negative), and I will respond in commensurate.
  - No personal electronic devices (phones, tablets, laptops, etc.) without prior permission.
2. Be Respectful.

Failure to comply with these expectations may result in conference with teacher, contact home, or referral to the office. Unsafe, harassing, or intimidating behaviors will result in immediate suspension from the course.

### Grading:

Your grade is based on the following categories:

- Academic – 75%
  - Major Projects, Exams, and Daily Work: 75% (individual and/or group).
  - Personal Management – 25% (conversational participation, either in small-groups or class-wide).
- Multiple Opportunities: Any assignment categorized as an ‘Academic’ grade (see Pinnacle) may be redone for a higher grade. This must be done within the grading period it was assigned (see the whiteboard for dates).
- Note: Late work will be docked ½ credit and will not be accepted after the grading period in which it was assigned. If you need an extension for an assignment, it must be requested prior to the submission date.

Letter grade percentages:

- 90 -100% = A
- 80 - 89% = B
- 70 - 79% = C
- 60 - 69% = D
- 0 - 59% = F

**Resources & Extra Help:** You are most likely to find me before school in my room or during the first session of RIE. Arrangements can be made to work on science during your study halls, advisory group time, and with other teachers if I am not here.

**Attendance:** Attendance is crucial! You’ll miss group discussions, videos, daily work, and other experiences for which there are no reasonable substitutes. You are expected to attend class at least 92% of the semester and to make up ANY and ALL work you missed due to absences.

**Google Classroom:** I will use Google Classroom to post assignments and to provide a weekly calendar of events. If you are absent from a class, it is my expectation you will use our Google Classroom to understand what you missed. Please consult the Google Classroom page and/or your peers before you come to me regarding what you missed.

**Pinnacle Online Gradebook:** I will use the pinnacle online gradebook. Please consult it early and often in the semester so you understand your grade at any point in time and any assignments you may be missing.

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**Units of Study:** This will be a student-led course with the academic rigor expected of high school upperclassmen. Rather than approaching the course in a step-wise, linear progression typically found in a textbook-driven course (“Today we’re in Chapter 1, tomorrow we’re in Chapter 2, etc.”), the course will be driven by nine major questions, each lasting approximately two weeks. Each major question will have several sub-questions that may/may not be addressed, depending on the desires and nature of the class. The major questions and sub-questions are:

1. What was the Big Bang?
  - a. How big is the universe? What is its shape?
  - b. Why is the universe expanding? Will it contract (i.e. the Big Crunch)?
  - c. What is the fate of the universe?
2. What happens when our sun explodes?
  - a. How do stars evolve and die? Why are there different types of stars?
  - b. What does  $E=mc^2$  mean?
  - c. What are the major constellations?
3. Why are all planets not like Earth?
  - a. What makes planets different from each other?
4. Are black holes portals to a different dimension? To a different multi-verse?
  - a. What exists outside our solar system? Our galaxy?
  - b. What is a black hole? Can anything escape it?
5. Is the Dark Side in Star Wars real?
  - a. What is dark matter? Dark Energy?
  - b. What is matter? Antimatter?
  - c. What is the God Particle?
  - d. What is string theory?
6. Are we alone in the Universe?
  - a. What are exoplanets? Fermi's Paradox?
  - b. What is the Black Knight Satellite? 1991vg?
  - c. What is the Bootes Void
  - d. Will we find life on Titan or Europa?
7. Is time travel possible?
  - a. Is it possible to travel at warp speed?
  - b. How far away is tomorrow (space-time relativity)?
8. Is our planet doomed?
  - a. Can we stop an asteroid from hitting the planet?
  - b. Should we colonize Mars? Venus? The Moon?
9. How big do things get? How small can things get?
  - a. What are the elementary particles (fermions, neutrinos, photons, etc.)?
  - b. What is the Sloan Great Wall? The Cosmic Web? What is causing the “Great Roar” from the edge of the universe?

**Movies:** We will watch a number of videos, documentaries, and Hollywood movies, in part or in whole, throughout the course. This includes, but is not limited to, Gravity (2013), Interstellar (2014), the Martian (2015), The Europa Report (2013), Prometheus (2012), Avatar (2009), TED Talks (various), PBS Space-Time (various), BeyondScience vodcast (various), Through the Wormhole with Morgan Freeman (various), and Cosmos: A Space-Time Odyssey (various). Any video, documentary, and Hollywood movie shown will be rated PG-13 or under. Any sexually explicit material will be removed prior to showing, as would be any unnecessary violence, profanity, and alcohol/drug use.