EXPERIENCE ASTRONOMY

Grading Astronomy PLUS Projects

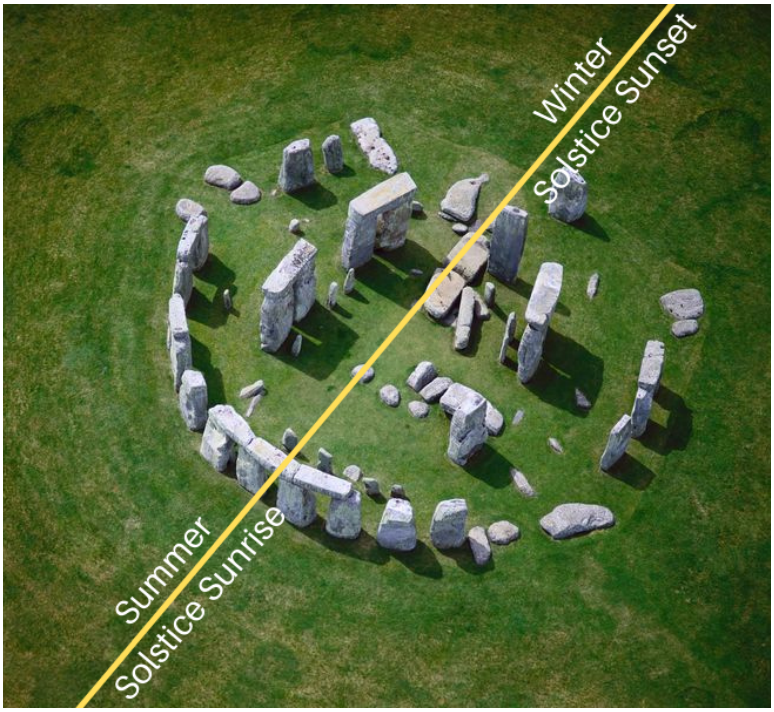
On the following pages, you'll find some guidelines to help you as you grade your students' Experience Astronomy PLUS assignments. In addition to completing these assignments, your students are asked to compile what they're learning into a portfolio. We recommend using a 12x12 scrapbook album for the portfolio.

If you or your students have questions or would like feedback on their assignments, please contact us via email (info@journeyhomeschoolacademy.com) and attach your students' project — we'd be happy to answer questions and provide feedback!

Assignment 1: Build a Model of Stonehenge (The Central Stones)

Students should receive full credit if they do all the following:

- Create a model of the large central sarsen sandstones of Stonehenge—either how the stones look now, or how they may have looked in the past. This model can be made from any material the student likes.
- Research how these stones are aligned with the sunrise and sunset at specific times of year, drawing a line on the model to show this alignment. The alignment should look similar to the picture below. The taller horseshoe configuration in the middle opens in the direction of the sunrise on the summer solstice (also called "midsummer"). The opposite direction points to the sunset on the winter solstice (also called "midwinter").



- Take several pictures of the model and paste them into the student portfolio.
- Caption each picture with a description of what the picture shows. For example: "*This image shows the alignment of stones at Stonehenge as they look today*," or "*The line on this model shows how the stones are aligned with the sunrise on the summer solstice every year*."
- Write a two- to three-paragraph description of what Stonehenge is, when it was built, who built it, and how solar astronomy unlocks some of the mysteries of why it

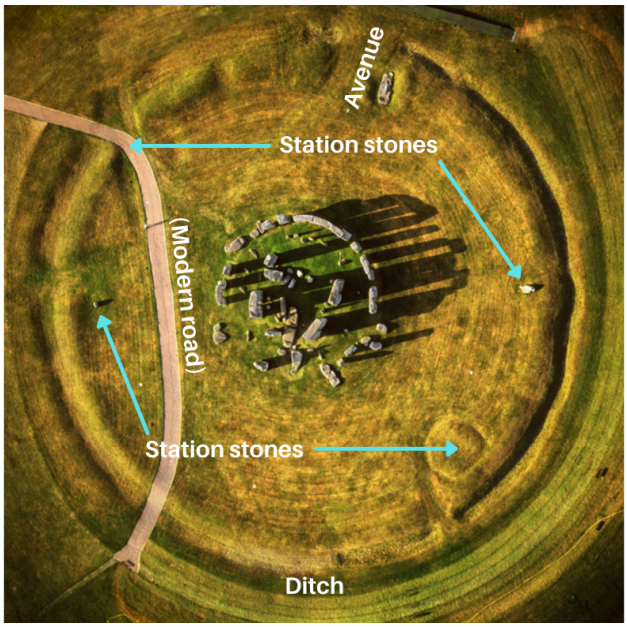
was built. This should be included in the portfolio somewhere near the pictures of the model. Facts might include:

- Stonehenge is a prehistoric monument in Wiltshire, England, made of about 100 large sarsen sandstones and bluestones.
- Stonehenge was built over many centuries, starting with a large circular ditch. Around 2500 B.C., the large sarsen sandstones were erected on the site.
- The sandstones were from quarries 25 miles north of the site, but the bluestones likely came from Wales (200 miles away). It is not known exactly how builders brought these enormous stones from so far away, but there are some theories.
- Some believe Stonehenge was built by Neolithic agrarians who lived in the area. Others believe Celtic priests, called Druids, were involved.
- It was originally used as a burial ground for cremated individuals. Over time, it was also possibly used as a ceremonial site, a place of healing, a religious pilgrimage destination, a place where royalty were buried, or a memorial erected to honor ancestors.
- The builders of Stonehenge purposefully aligned the stones to point to the summer solstice sunrise and the winter solstice sunset, perhaps because these were significant days on their calendar.

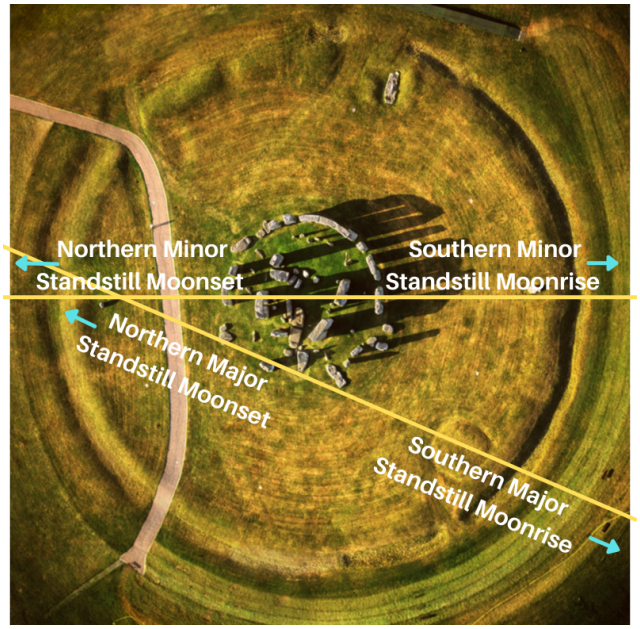
Assignment 2: Build a Model of Stonehenge (The Ditch and Avenue)

Students should receive full credit if they do all the following:

- Build on to their existing model of Stonehenge, including the surrounding ditch (represented by a circle), the avenue, and four station stones near the ditch.



- Research how these station stones are aligned with the moonrise and moonset at specific times of year, drawing a line on the model to show this alignment. The alignment should look similar to the following picture.

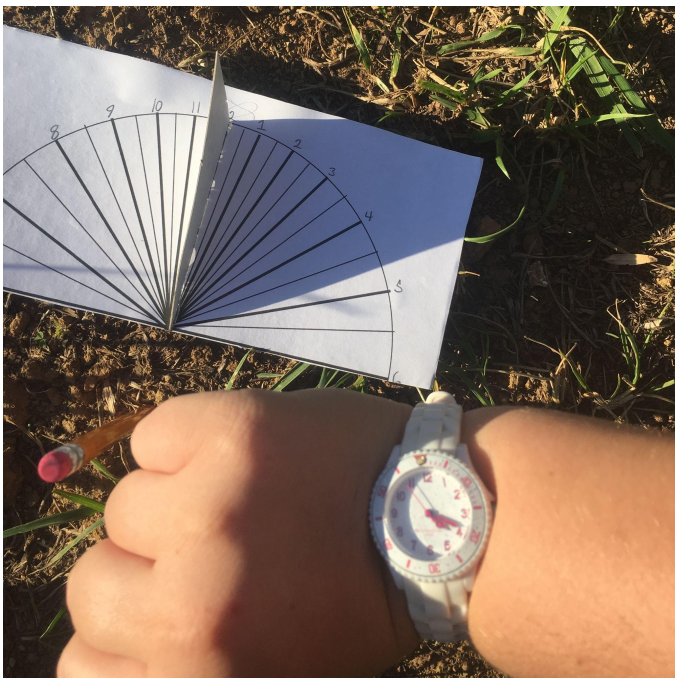


- Take several pictures of the model and paste them into the student portfolio.
- Caption each picture with a description of what the picture shows. For example: "*This image shows how the station stones around Stonehenge are aligned to point to the moonrise and moonset during the major and minor standstills of the moon.*"
- Write a one-paragraph description of how knowing about standstills of the moon unlocks some of the mysteries of why Stonehenge was built, making clear what lunar standstills are. This should be included in the portfolio somewhere near the pictures of the model. Facts might include:
    - Lunar standstills are the range of the moon's position north and south of the celestial equator in a given lunar month. From month to month the range changes, growing larger for 9.3 years, and then shrinking over the next 9.3 years.
    - The station stones of Stonehenge were aligned to point to the moonrise and moonset, both on the days when the range of standstills was the smallest (the minor standstill) and when the range was the largest (the major standstill). These were obviously important days for the builders of Stonehenge.

Assignment 3: Build a Sundial

Students should receive full credit if they do all the following:

- Build a sundial from any kind of material that accurately tells the time during daylight hours. The student online classroom contains step-by-step instructions for how to do this so the sundial is accurate to where you live. Take pictures of this sundial to include in the portfolio. Below are some examples from past students:



- Write a three-paragraph description of what a sundial is, what its main parts are, how they are used, how your sundial was made, and the location it was made for. This should be included in the portfolio somewhere near the picture of the sundial. Facts might include:
    - A sundial is a device that tells the time of day using shadows. They are often called shadow clocks.
    - The main parts of a sundial include the dial plate, which includes numbers for the hours of the day, and the gnomon, which is the object that casts a shadow.
    - As the sun appears to move across the sky, the shadow cast by the gnomon points to different numbers on the dial plate, indicating the time of day. The edge of the gnomon that points to the time of day is called the “style.”
    - There should be some description about how the sundial was constructed, explaining the process that was used.
    - There should be a description of where this sundial works. For example: “*This particular sundial was designed to tell the time of day in Paris, France, but it works for any other location along the same latitude of the earth.*"

Assignment 4: The Heavenly Spheres

Students should receive full credit if they do all the following:

- Read and study one of the following works of literature:
    - The Myth of Er in *The Republic*, by Plato
    - The Dream of Scipio in *On the Commonwealth*, by Cicero
    - Canto 1 and Canto 21 in *Paradiso*, by Dante
- Create some sort of artwork showing a scene from the literature (drawing, painting, sculpture, computer graphics, photo collage, etc.). Place the artwork (or a photo of the artwork) in the portfolio.
- Write a one-page summary of the story that was chosen, including a description of how this piece of literature reflects the common understanding of astronomy at the time it was written. This should be included in the portfolio somewhere near the artwork.
    - Student summaries will vary depending on the book they chose to read.
    - Summaries should include some description of what the geocentric model of the universe is. Ancient and medieval thinkers believed the earth stood at the center of the universe, while the sun, moon, and other planets revolved around the earth in concentric spheres. This belief melded with the spiritual beliefs of different cultures, as authors pictured ascending through these spheres to eventually reach the highest heavens, where they can receive a divine perspective on the universe and human life.

Assignment 5: Paul in Athens

Students should receive full credit if they do all the following:

- Create a page or spread of pages in the student portfolio decorated with images having to do with the Apostle Paul's sermon at Mars Hill in Athens, as recorded in Acts 17 (famous paintings, photos of the site, photos of a Bible open to this story, etc.).
- Write a paper, included in the portfolio, about why Paul chose to quote the poem Phaenomena by Aratus. The paper should:
    - Summarize the major themes and message of Paul's sermon, such as:
        - The nature of the the true God (the Creator who is self-existent and self-sufficient, but who is also near to us)
        - The knowability of God (he is vaguely and imperfectly known to pagans but is made known by the preaching of Christ's resurrection)
        - The nature of humanity (the offspring of God, created to seek and find God)
        - The coming judgment (humans must repent of their idolatry; the man God has appointed, Jesus, will judge the world, and we know this because he was raised from the dead)
    - Summarize the major themes and parts of Aratus' poem, such as:
        - The importance of Zeus, on whom all things depend
        - The two poles of the sky, north and south
        - Various northern constellations and mythologies associated with them
        - Various southern constellations and mythologies associated with them
        - The path of the sun through the zodiac constellations
        - Weather patterns
    - Indicate the section of Aratus' poem Paul quotes and summarize its original meaning.
        - Paul quotes the line, "For we are indeed his offspring."
        - The original meaning of the line refers to how all human beings are the offspring of "Zeus." By this, Aratus is not referring to the sky god of ancient Greece, but Zeus as he was called by the Stoic philosophers: the rational principle that controlled, upheld, and permeated nature itself.

- Summarize why Paul may have chosen to use the quote from Aratus' poem in his sermon. Answers might include:
    - By tying their minds to Aratus' poem, he is bringing to mind the character of Zeus in the poem: a god who kindly gives signs in the heavens that give us the daily and yearly rhythms of our lives by which to conduct our business.
    - There was a big difference between the Zeus of classical mythology and the Zeus of the Stoics. The former was an anthropomorphic god of thunder, often represented in pagan temples. The latter was a "spiritual," rational principle that permeated the universe. Paul quotes Aratus to show that at least some Greeks already knew the true God cannot be physically represented by a graven image. "We ought not to think that the divine being is like gold or silver or stone, an image formed by the art and imagination of man" (Acts 17:29).
    - To say God has "offspring" indicates God is not just a rational principle behind the universe, but a personal being. While Aratus probably didn't mean the term this way, Paul uses it to point to this reality.
    - Paul builds a strong connection between his listeners and "the unknown god" by saying they are the offspring, or race, of the Creator, created in his image, and thus absolutely dependent on him for life. Paul directly says this, "he himself gives to all mankind life and breath and everything" (Acts 17:25).

Assignment 6: Is the Bible Geocentric?

Students should receive full credit if they do all the following:

- Create a picture collage for the student portfolio dedicated to the work of Galileo. This may include famous paintings of him, photos of original manuscripts, photos of telescopes he used, images of discoveries he made, etc. Photos should include printed captions that explain the images chosen.
- Write a handwritten letter addressed to Cardinal Robert Bellarmine explaining how the Bible allows for a heliocentric model. This should be included in the portfolio somewhere near the Galileo picture collage.
    - The letter should be handwritten with nice penmanship and made to look "old," as you might see with a manuscript that was written 400 years ago.
    - The letter should address, if the earth revolves around the sun, why the Bible says the earth is fixed and immovable (Psalm 93:1; 96:10; 104:5).
        - When the Bible speaks of the "world" in these passages, it's a term for the inhabited world—human beings, cultures, and nations.
        - "Moved" means to slip away or fall into decay.
        - These texts mean the world of human populations will not slip away from purposes God has ordained for them. These texts have nothing to do with the planet itself.
    - The letter should address, if the sun's apparent motion through the sky is caused by the rotation of the earth, why the Bible speaks of the sun's movement (Genesis 15:12; Joshua 10:12-13; Psalm 19:5-6; Ecclesiastes 1:5; Mark 16:2).
        - The Bible uses "phenomenological" language; that is, the language of appearances. This was a very common manner of speaking throughout history and even continues to be so today. To say the sun rises, even today, is not to say that the sun is moving, but that the sun *appears* to be moving.
        - The Bible, like all literature, uses the "metonymy of effect for cause." Metonymy is a figure of speech in which one object or idea takes the place of another with which it has a close association. So a metonymy of "effect for cause" is when an effect stands in the place of the cause. To say the sun moves only states the effect (what we see), but does not address the cause.

Assignment 7: Exploring the Exoplanets

Students should receive full credit if they do all the following:

- Research a specific exoplanet (a planet outside our solar system) that has been confirmed to exist. Databases of exoplanets can be found in the students' online classroom.
- Create an artistic piece for the student portfolio of what that particular exoplanet might look like from the surface, based on the scientific data about it. (This could be in the form of a drawing, painting, picture collage, etc.)
- Write a one page summary of what this exoplanet: what it is like, when it was discovered, who discovered it, how it was discovered, what has been learned about it since then, and what influenced the artistic choices of the picture. This should be included in the portfolio somewhere near the artistic piece.

Assignment 8: Space Probe Spotlight

Students should receive full credit if they do all the following:

- Choose a specific space probe and create a visual history of it, taking up multiple page spreads of the portfolio. A list of possible probes can be found in the students' online classroom.
    - The images should tell the story of the space probe by showing images of its creation, the scientists and engineers who created it, the place it was created or launched, where it traveled in the solar system, and the images and/or data it captured along the way.
    - Ideally, the images of the probe or images associated with the probe should be in chronological order.
- Write captions to accompany each image to describe what the image is and how it is significant to the story of the space probe.

Assignment 9: Moonwalker Biography

Students should receive full credit if they do all the following:

- Read a memoir written by an astronaut who has walked on the moon. A list of possible memoirs can be found in the students' online classroom.
- Write a book report about the memoir. The report should be at least three pages long and give readers a feel for what the book is about. This report should be included in the portfolio.
- Create a spread of at least three pages in the portfolio of the astronaut's life and work.
    - Most of the images should focus on the astronaut's work with the Apollo missions that brought him to the moon and back.
    - Images can include photos of, photos taken by, or images created by the astronaut. Images can also include pictures of important pieces of technology used by the astronaut on their moon voyage.

Assignment 10: Hebrew Calendar

Students should receive full credit if they do all the following:

- Create a Hebrew calendar, taking up several two-page spreads of the student portfolio.
    - The calendar should be for the current year or the upcoming year.
    - Each two-page spread should be focused on one month of the calendar. On the left-hand page should be the Hebrew month; on the right-hand page should be the same days, showing the corresponding Gregorian dates instead. For example:

Tishri 5786						
SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

September/October 2025						
SUN	MON	TUE	WED	THU	FRI	SAT
		23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22			

    - The calendar should include all the months of the Hebrew year in order.
        - Nisan, usually overlapping with March and April
        - Iyyar, usually overlapping with April and May
        - Sivan, usually overlapping with May and June
        - Tammuz, usually overlapping with June and July
        - Av, usually overlapping with July and August
        - Elul, usually overlapping with August and September
        - Tishrei, usually overlapping with September and October
        - Heshvan, usually overlapping with October and November
        - Kislev, usually overlapping with November and December
        - Shevat, usually overlapping with January and February
        - Adar, usually overlapping with February and March
        - Adar II (in some years), usually overlapping with February and March

- The Hebrew calendar months should include every weekly Sabbath day and every yearly festival. Each festival should also note the phase of the moon for that day. For example:

Tishri 5786						
SUN	**MON**	**TUE**	**WED**	**THU**	**FRI**	**SAT**
		1 Rosh Hashana	2	3	4	5 Sabbath
6	7	8	9	10 Yom Kippur	11	12 Sabbath
13	14	15 Feast of Tabernacles	16 Feast of Tabernacles	17 Feast of Tabernacles	18 Feast of Tabernacles	19 Sabbath Feast of Tabernacles
20 Feast of Tabernacles	21 Feast of Tabernacles	22	23	24	25	26 Sabbath
27	28	29	30			

- The Gregorian calendar months should include any local or national holidays and special days for your family.

Assignment 11: Planet Poster

Students should receive full credit if they do all the following:

- Research a specific planet or dwarf planet in our solar system. The student should imagine they are living in the future at a time when travel to all the planets and dwarf planets is possible, and they are hired by an interplanetary travel agency to design a poster to entice would-be travelers. Their research should focus on gathering interesting information about that planet or dwarf planet that would interest space tourists.
- Create an attractive design for a poster advertising a trip to that planet. This poster should be created on one or more pages of the portfolio, or a photo of a larger poster board could be added to the portfolio.
    - The poster should be well-designed and attractive.
    - The poster should show images of the planet or dwarf planet.
    - The poster should give information to tourists about where they will be staying when visiting the planet or dwarf planet (such as a nearby moon, space station, or on the surface).
    - The poster should include fast facts about the planet or dwarf planet that would interest space tourists.
- Write and perform a three-minute speech or “sales pitch” for this same interplanetary travel agency to use in front of space tourists.
    - The speech should reflect information on the poster and additional facts not included on the poster.
    - The speech should be polished and give an appealing “call to action” for tourists to visit the planet or dwarf planet.
    - The speech should be delivered orally by the student, with the poster, in front of friends or family.
    - The text of the speech should be included on a page in the portfolio.

Assignment 12: Hubble Images

Students should receive full credit if they do all the following:

- Find 10 stunning images taken by the Hubble Space Telescope and include these in several pages of the portfolio.
- Write captions for each image, describing what the image is and some facts about the object in the image.