

Name \_\_\_\_\_ Date \_\_\_\_\_ Moravian Exam \_\_\_\_\_

## Popular Misconceptions-Study Guide

**INSTRUCTIONS:** **Make sure that your first and your last name and date appear at all applicable locations, yes, even the first page.** This examination is in the form of multiple choice and a few fill-in-the blank questions/statements. After reading the question or instructions carefully, select your answer(s) and mark it (or them) plainly on the answer sheet provided with this test. The answer sheet can be found at the end of the exam. You may detach it. Only answer the odd or even questions depending upon whether your exam number is odd or even. **Take a moment to circle the questions which are your questions throughout the exam.** You may work alone or with **ONE PARTNER** who is taking the other portion of the exam to help each other attain a higher grade. **There will be no communications between teams.** All correct answers must be provided to receive full credit; however, partial credit will be given unless stated otherwise. This exam has a total value of 40 points. **MUCH SUCCES!**

**CANVAS INSTRUCTIONS:** This Quest is in the form of multiple-choice questions and a few fill-in-the blanks. After reading the question carefully, select your answer or answers. **If the question calls for multiple answers, two or more, you must provide all answers and all answers must be correct to receive full credit. Questions with multiple answers will be identified.** Consider this open book. All answers can be found in the lecture material created in class, the assigned reading material, the PowerPoint presentations, and the YouTube videos, but if you feel the need to consult online sources, books, or magazines, please feel free to do so. This Quest has a total value of 40 points. **MUCH SUCCESS!!!**

### **POPULAR MISCONCEPTIONS IN ASTRONOMY**

**Instructions:** 1-12. Label the phases... Complete the questions below the diagram noting your responses on your answer sheet. **Each phase number from 1-8 must have TWO WORDS (no abbreviations if you want credit).**

**Key Concepts** are from *Know the Phases of the Moon or Die*. You've done this before.

**INSTRUCTIONS:** 13.-18. **Key Concepts:** The rise and set time of the various major moon phases, as well as specific alignments for eclipses. In these questions the rise and set times for the sun are 6 a.m. and 6 p.m., respectively, or 06:00 and 18:00 respectively.

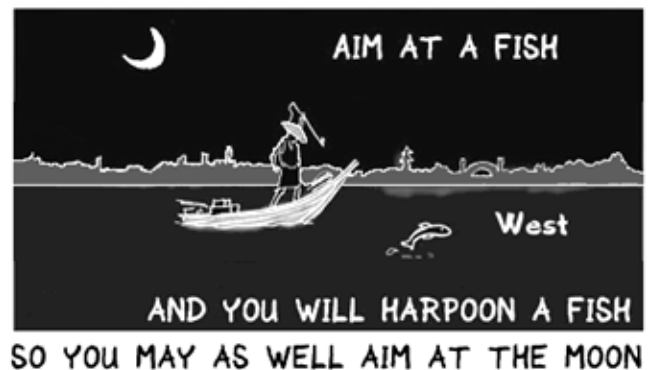
19. When the moon is full...

**Key Concept:** What makes the moon full, its geometry with respect to the Earth and what can happen when the moon is full

20. We know that the moon rotates because

**Key Concept:** What are the characteristics of a rotating moon?

21. What phases of the moon are one-night stands?  
Key Concept: Know the duration of time of the various phases of the moon.
22. What phases of the moon occur over many nights?  
Key Concept: Know the duration of time of the various phases of the moon.
23. **Pick the correct answer.** When you look at the moon in any other phase than full, the lunar terminator is visible. It is at this location where  
Key Concept: What does the terminator on the moon represent?
24. Why do you think your astronomy teacher has many more pictures of a waxing moon than a waning moon?  
Key Concept: Understand the time of night when the various phases of the moon are visible.
25. What **general phase** of the moon: new, crescent, quarter, gibbous, or full is **INCORRECTLY** shown on this Oreo cookie model of lunar phases? Consider only the shapes of the moon, not their order or from where the sunlight is coming.  
Key Concept: Identify the correct shapes of the phases of the moon in the sky.
26. From the cartoon, how long has the fisherman been fishing? Please see the picture below.  
Key Concept: Understand the time interval between two different lunar phases.



SO YOU MAY AS WELL AIM AT THE MOON

27. Below are a few lines from the country songwriter, Chris LeDoux's, *County Fair*. What is the problem astronomically?

*Been workin' like a dawg, slavin' on the fence line,  
Stretchin' those wires tight.  
Diggin' and tappin' and sweatin' in the sunshine,  
But I get off tonight.*

*I got a date with a girl, a pretty rancher's daughter,  
Green eyes and golden hair.  
Gonna pick her up at 8 after some soap and water.  
And we're headin' to the county fair.*

*Well there's a full moon in the western sky,  
And there's magic in the air.  
Ain't nothin' I know of, can make you fall in love,  
Like a night at the county fair.*

**Key Concept:** Time and location of the moon at a particular phase is important here. Realize that the public is bombarded with many astronomical errors which they may memorize, like in the lyrics of the song, and passed along to others as incorrect information. This is especially viral with TV ads and the phases of the moon.

28. Paul Revere (1735-1818), accompanied by William Dawes and Samuel Prescott, along with as many as 40 other horsemen made the famous ride to spread the word that the British were approaching on April 18, 1775. Revere never reached Concord. Overtaken by the British, the three riders split up and headed in different directions. Revere was temporarily detained by the British at Lexington. The British saw him silhouetted by the bright light of a silvery moon (light to the left) high in the sky around midnight. Dawes lost his way after falling off his horse, leaving Prescott, a young physician who is believed to have died in the war several years later, the task of alerting Concord's residents. It was obvious from the above statement that the phase of the moon that night was...

**Key Concept:** Understand when the various phases of the moon are visible. Pick out the most important concepts in a question to solve the problem.

29. It is now 9:30 p.m. on September 26, just a few days after the autumnal equinox. Justine has been waiting for well over two hours for her boyfriend, Jake, to arrive. The dinner that she was preparing has been completely ruined. Finally, a half-hour later, she hears a car coming up her driveway and runs out to greet him. "Don't kiss me," Jake says..." There is much more to this story. Astronomically speaking: The moon was full that evening. You now have all of the information necessary, to solve the problem that will confront Justine and Jake's romance.

**Key Concept:** Know the rise and set times of the moon's major phases. Pick out the most important concepts in a question to solve the problem.

30. Based upon the cartoon below, at what time did the cow make her famous jump? East is in back of the moon

Hey diddle, diddle,  
The cat and the fiddle,  
The cow jumped over the moon;  
The little dog laughed  
To see such sport  
And the dish ran away with the spoon.



Key Concept: The orientation of the moon's phases tells you where the sun is located in the sky, above or below the horizon.

31. Day and night results from  
Key Concept: Earth motions are on tap here.
32. The moon shines because  
Key concept: What causes the moon to shine?
33. What are we really seeing as we watch the moon going through its phases?  
Key concept: It's so common that most people get it wrong.
34. I'm being followed by a moon shadow; moon shadow, moon shadow... Please think astronomically.  
Key concept: Don't look up the lyrics to this famous Cat Stevens song, just think of the most common astronomical explanation for what is happening.
35. When is it **completely safe** to observe a total solar eclipse with just the unfiltered eyes?  
Key concept: "I wear my sunglasses at night..." Don't even think of going there.
36. When is it **completely safe** to observe a total lunar eclipse?  
Key concept: How dangerous is it to view a moon completely filled with sunlight?
37. This is a true astronomical story, well almost all of it is true. On the vernal equinox, March 20, 2015, Santa and his helpers at the North Pole were treated to a total solar eclipse with totality lasting one minute, 38 seconds. It was clear that day. Astronomically speaking, what did Santa observe from his location?  
Key concept: Objects rise and set at an angle which is equal to  $90^\circ$  – your latitude position.
38. The moon is a shape changer. Each night it changes its shape just a little. Why does this happen?  
Key concept: Comprehend the basic reason why the moon goes through phase changes.

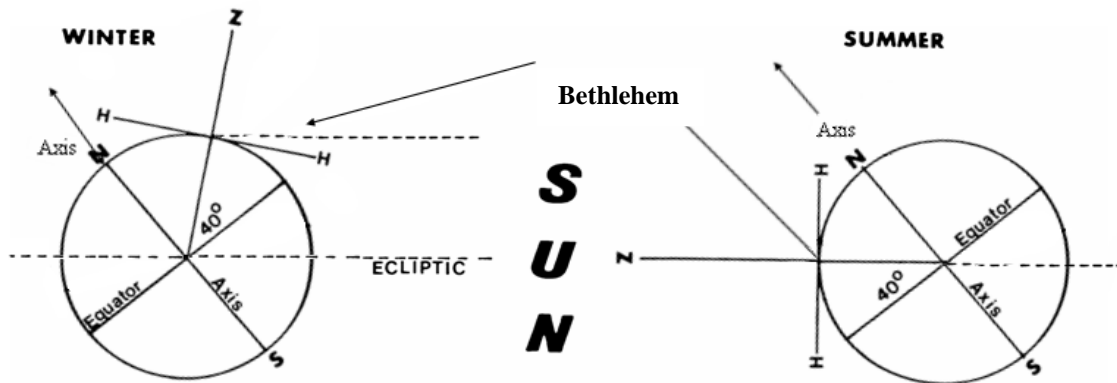


50. The ecliptic represents...

Key Concept: What is the ecliptic?

51. A planet is discovered in the Milky Way which is an exact duplicate of Earth except for one condition. The planet is tilted in the exact manner as seen in the drawing below, at an angle of 40 degrees. Based upon the sketch and your knowledge of the seasons,

Key Concepts: What are the differences in seasonal effects on a planet with a different axial tilt?



52. If the Earth's axis were not tilted and summer was really caused by the Earth moving closest to the sun in January,

Key Concept: How could seasonal changes be created differently?

53. What would need to happen for the United States to experience only summer?

Key Concept: Understand a basic seasonal misconception held by a large percentage of the world's population.

54. If the Earth's axis were not tilted,

Key Concepts: What seasonal effects would be observed if this condition was true for the Earth?

55. If a hiker on the Appalachian Trail was traveling far enough to the north around the time of the autumnal equinox, she/he might be able to witness...

Key Concept: How does the sky change as you change your position over a spherical Earth?

56. The graph noted below is for the climatological (climate) date for Bellingshausen Station, King George Island in Antarctica, 62 degrees south latitude, where I will be visiting with friends in December of 2020. Why does the least amount of sunshine (last line—Mean monthly sunshine hours) occur in May through August of each year? **Place your written answer on the answer sheet in back of the test.**

Key Concept: Understand the seasons in the Southern Hemisphere.

57. A person lives in a glass house with all of the four sides of the house pointing to the north. If a bear were to walk past the house, what type of bear would it be?  
Key Concept: Understand observations at latitude extremes.
58. A person lives in a glass house with all of the four sides of the house pointing to the north. If a bear were to walk past the house, what type of bear would it be?  
Key Concept: Understand what happens to latitude at extreme positions.
59. A person lives in LA at a latitude of  $34^\circ$  north and observes the sun to be at an altitude of  $56^\circ$  at the time of the vernal equinox. What will be the altitude of the sun at the time of the summer solstice just three months later?  
Key Concept: Understand how the axial tilt of Earth affects the location of the sun at the solstices.
60. My father after World War II was given the opportunity to work as a meteorologist (weather forecaster) in Nome, Alaska at a latitude of  $64.5^\circ$  north. He declined the opportunity because Nome was only accessible by air year-round or by sea in the summer. Had he and my mother gone to live there, they probably would have  
Key Concept: Understand how the axial tilt of Earth affects the location of the sun at different latitudes.
61. The longest day of the year for Chaco Culture National Historical Park occurs on or about  
Key Concept: Identify the dates of the year when seasons begin.
62. The hottest months of the year for us in the northern hemisphere are usually,  
Key Concept: Understand the lag of the seasons.
63. Planet Earth is closest to the sun during early  
Key Concept: A basic misconception about the season must be understood here.
64. Summer for us in the northern hemisphere occurs because  
Key Concept: Appreciate how sun angle affects temperature.
65. Seasons in the southern hemisphere are  
Key Concept: Understanding what to expect if you flew from the US to Australia...
66. Pick the three effects (not causes) of the seasons that students can witness with their own eyes from the Moravian College campus.  
Key Concept: How does the axial tilt of the earth affect the sun's motions (positions and durations of visibility) during the time period of a year.
67. In the 1986 pop/rock band Europe's smash hit, *The Final Countdown*, the lyrics in the second stanza go like this (see below). The problem lies with light years. **Find the misconception, not the correct answer!** Please, please don't ask me to sing the song for you.

Key Concept: What is a light year?

68. If the Earth's axial tilt is 23.5 degrees to the perpendicular of its orbital plane (the ecliptic), and the Tropic of Cancer is positioned at 23.5 degrees north of the equator and the Tropic of Capricorn is located at 23.5 degrees south of the equator, where would the tropic lines of an exoplanet be located if it were inclined 40 degrees to the perpendicular of its orbital plane.

Key Concept: Understand how the total displacement of the sun during the course of one year is related to Earth's axial tilt.

69. Everything said in the following statement is true. The Tropic of Cancer is located at 23.5 degrees north of the equator. It represents the high sun at the summer solstice. The Tropic of Capricorn is positioned 23.5 degrees south of the equator. It represents the position of high sun at the time of the winter solstice. How is the 47-degree displacement of these two locations related to the axial tilt of the Earth?

Key Concept: Understand how the Earth's axial tilt is related to the tropic locations.

The End is Here!

Updated on February 25, 2021