

TEACHER GUIDE

9th–12th Grade

Includes Student
Worksheets

Science



Weekly Lesson Schedule



DVD



Quizzes



Answer Key

SURVEY OF ASTRONOMY







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-  Weekly Lesson Schedule
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-  Quizzes

Survey of Astronomy



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MASTERBOOKS
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Using This Teacher Guide

Features: The suggested weekly schedule enclosed has easy-to-manage lessons that guide the reading, worksheets, and all assessments. The pages of this guide are perforated and three-hole punched so materials are easy to tear out, hand out, grade, and store. Teachers are encouraged to adjust the schedule and materials needed in order to best work within their unique educational program.

Lesson Scheduling: Students are instructed to read the pages in their book and then complete the corresponding section provided by the teacher. Assessments that may include worksheets, activities, quizzes, and tests are given at regular intervals with space to record each grade. Space is provided on the weekly schedule for assignment dates, and flexibility in scheduling is encouraged. Teachers may adapt the scheduled days per each unique student situation. As the student completes each assignment, this can be marked with an “X” in the box.



Approximately 30 to 45 minutes per lesson, five days a week



Includes answer keys for worksheets and quizzes.



Worksheets for each chapter



Quizzes and tests are included to help reinforce learning and provide assessment opportunities.



Designed for grades 9 to 12 in a one-year course to earn 1 science credit



Suggested labs (if applicable)

Course Objectives: Students completing this course will:

- ✓ Explore numerous evidences that point to a young universe
- ✓ Discover how you can choose the best telescope for you
- ✓ Learn the best ways and optimal times to observe planets and stars
- ✓ Investigate the universe and God’s powerful hand in His created cosmos
- ✓ Identify how the moon could only have been placed in its orbit by an all-knowing, all-powerful Creator
- ✓ Study the facts that challenge secular theories and models of the universe — how it began and how it continues to amaze the scientific community

Course Description

The Psalmist wrote, “When I consider Your heavens, the work of Your fingers, the moon and the stars, which You have ordained, what is man that You are mindful of him, and the Son of man that You visit him?” (Ps. 8:3–6). Students taking this course will tour the universe, marveling at our galaxy through hundreds of beautiful, full-color star charts, easy-to-use illustrations, and even glimpses of the red supergiant star Betelgeuse over 3000 trillion miles away without the need of binoculars or a telescope. They will also be able to answer questions like: “How do phases of the moon work? When will the next solar eclipse take place? What is that bright star setting in the west? How do I find Saturn? What sorts of objects can be seen with binoculars?” These questions and many more are easily answered with the helpful tips and basic understanding of astronomy presented through the materials included in this course. Take a few moments to stand and look up at the glorious night sky, appreciating the majestic beauty of God’s vast universe.

Suggested Optional Science Lab

There are a variety of companies that offer science labs that complement our courses. These items are only suggestions, not requirements, and they are not included in the daily schedule. We have tried to find materials that are free of evolutionary teaching, but please review any materials prior to presentation. The following items are available from www.HomeTrainingTools.com. A good telescope is highly recommended.

AS-ASTRLAB Astrolabe Kit

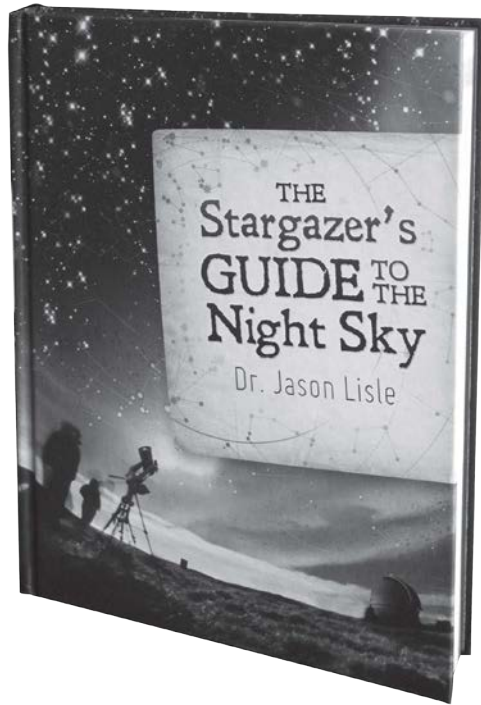
AS-BACSTAR Backyard Stars Guide

AS-STARLOC Star and Planet Locator

First Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
First Semester–First Quarter					
Week 1	Day 1	Read Pages 4-5 • <i>The Stargazer's Guide to the Night Sky</i> • (SGNS)			
	Day 2	Intoduction - Short Answers Stargazer Introduction: Worksheet 1 • Pages 15-16 Lesson Planner • (LP)			
	Day 3	Read Pages 6-10 • (SGNS)			
	Day 4	Motions in the Sky — Basic - Short Answers Stargazer Ch1: Worksheet 1 • Pages 17-18 • (LP)			
	Day 5	Read Pages 11-15 • (SGNS)			
Week 2	Day 6	Motions in the Sky — Basic - Short Answers Stargazer Ch1: Worksheet 2 • Pages 19-20 • (LP)			
	Day 7	Read Pages 16-20 • (SGNS)			
	Day 8	Motions in the Sky — Basic - Short Answers Stargazer Ch1 • Worksheet 3 • Pages 21-22 • (LP)			
	Day 9	Read Pages 21-23 • (SGNS)			
	Day 10	Motions in the Sky — Basic - Short Answers Stargazer Ch1 • Worksheet 4 • Pages 23-24 • (LP)			
Week 3	Day 11	Read Pages 24-27 • (SGNS)			
	Day 12	Motions in the Sky — Advanced - Short Answers Stargazer Ch2: Worksheet 1 • Pages 25-26 • (LP)			
	Day 13	Read Pages 28-33 • (SGNS)			
	Day 14	Motions in the Sky — Advanced - Short Answers Stargazer Ch2: Worksheet 2 • Pages 27-28 • (LP)			
	Day 15	Read Pages 34-37 • (SGNS)			
Week 4	Day 16	Motions in the Sky — Advanced - Short Answers Stargazer Ch2: Worksheet 3 • Page 29 • (LP)			
	Day 17	Read Pages 38-41 • (SGNS)			
	Day 18	Motions in the Sky — Advanced - Short Answers Stargazer Ch2: Worksheet 4 • Page 31 • (LP)			
	Day 19	The Stargazer's Guide to the Night Sky: Chapters 1-2 Quiz Pages 183–186 • (LP)			
	Day 20	Read Pages 42-47 • (SGNS)			
Week 5	Day 21	Understanding the Eye - Short Answers Stargazer Ch3: Worksheet 1 • Page 33 • (LP)			
	Day 22	Read Pages 48-53 • (SGNS)			
	Day 23	Astronomy with the Unaided Eye - Short Answers Stargazer Ch4: Worksheet 1 • Page 35 • (LP)			
	Day 24	Read Pages 54-61 • (SGNS)			
	Day 25	Astronomy with the Unaided Eye - Short Answers Stargazer Ch4: Worksheet 2 • Page 37 • (LP)			

Date	Day	Assignment	Due Date	✓	Grade
Week 6	Day 26	Read Pages 62-69 • (SGNS)			
	Day 27	Astronomy with the Unaided Eye - Short Answers Stargazer Ch4: Worksheet 3 • Page 39 • (LP)			
	Day 28	The Stargazer's Guide to the Night Sky: Chapters 3-4 Quiz Pages 187-188 • (LP)			
	Day 29	Read Pages 70-74 • (SGNS)			
	Day 30	Celestial Events - Short Answers Stargazer Ch5: Worksheet 1 • Page 41 • (LP)			
Week 7	Day 31	Read Pages 75-79 • (SGNS)			
	Day 32	Celestial Events - Short Answers Stargazer Ch5: Worksheet 2 • Page 43 • (LP)			
	Day 33	Read Pages 80-83 • (SGNS)			
	Day 34	Celestial Events - Short Answers Stargazer Ch5: Worksheet 3 • Page 45 • (LP)			
	Day 35	Read Pages 84-87 • (SGNS)			
Week 8	Day 36	Celestial Events - Short Answers Stargazer Ch5: Worksheet 4 • Page 47 • (LP)			
	Day 37	Read Pages 88-91 • (SGNS)			
	Day 38	Telescope Basics - Short Answers Stargazer Ch6: Worksheet 1 • Page 49 • (LP)			
	Day 39	Read Pages 92-96 • (SGNS)			
	Day 40	Telescope Basics - Short Answers Stargazer Ch6: Worksheet 2 • Page 51 • (LP)			
Week 9	Day 41	Read Pages 97-100 • (SGNS)			
	Day 42	Telescope Basics - Short Answers Stargazer Ch6: Worksheet 3 • Page 53 • (LP)			
	Day 43	Read Pages 101-105 • (SGNS)			
	Day 44	Telescope Basics - Short Answers Stargazer Ch6: Worksheet 4 • Page 55 • (LP)			
	Day 45	The Stargazer's Guide to the Night Sky: Chapters 5-6 Quiz Pages 189-190 • (LP)			
First Semester-Second Quarter					
Week 1	Day 46	Read Pages 106-108 • (SGNS)			
	Day 47	Telescope Observing Sessions - Short Answers Stargazer Ch7: Worksheet 1 • Page 57 • (LP)			
	Day 48	Read Pages 109-115 • (SGNS)			
	Day 49	Telescope Observing Sessions - Short Answers Stargazer Ch7: Worksheet 2 • Page 59 • (LP)			
	Day 50	Read Pages 116-121 • (SGNS)			



Astronomy Worksheets

for Use with

The Stargazer's Guide to the Night Sky



Short Answers

1. What are you expecting and hoping to learn from this course?

2. What are three different ways you can observe the night sky?

3. Is there a difference in the sky depending on whether you live in the Southern or Northern Hemisphere?

4. Is there a difference in the sky depending on the season?

5. What are the two largest celestial objects we can view?

4. Name the concept that is useful for understanding the positions and motions of stars.

5. Name the concept that involves expanding the earth's equator into space.

6. What are constellations called that are close enough to the celestial pole that they are visible all night, year-round?

7. Since the 23 hours and 56 minutes period is the length of time it takes the earth to turn as seen from a distant star, this is called a "_____."

5. Why is it ironic that the moon is called “the moon” in regards to the gravitational pull of the earth and sun?
6. The phases of the moon are not related to the earth’s shadow, but to the _____ of the day side of the moon we can see from our position.
7. It takes _____ days for the moon to go through its phases, and _____ days for its orbital period.

5. _____ describes how far along the horizon an object is to the right of due north.

6. Equatorial coordinates are based on the _____. In particular, they are based on the celestial _____.



Short Answers

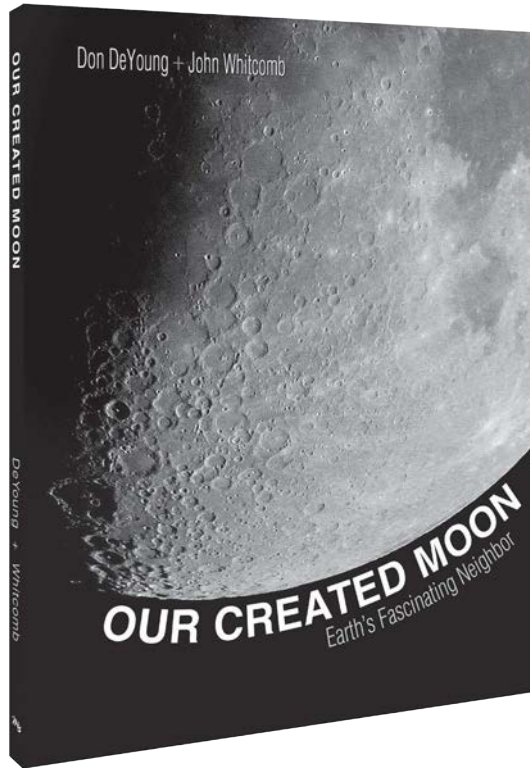
1. Stars with a declination that is less than your latitude will pass _____ of zenith when they cross the meridian; and stars with a greater declination will pass _____ of zenith.

2. Which RA coordinates can be seen depends on the time of ___ and the time of ____.

3. Once calibrated on an object whose RA and Dec you know, you can use _____ circles on a telescope to find any other RA or Dec.

4. What is the best way to get a feel for the motions in the sky?

5. A star wheel or planisphere helps you find stars by lining up the _____ with the _____ on the planisphere.
6. A planisphere helps find constellations, but will not help with ____ or the _____.



Moon Worksheets
for Use with
Our Created Moon

8. What is the elusive force that occurs between objects — Even over large stretches of empty space and continues to puzzle scientists?

9. What do physical laws say about the universe?

10. Who said, “That’s one small step for man; one giant leap for mankind?”

Discussion Question

“If the moon’s tangent speed ceased, it then would fall directly toward the earth and collide with us. On the other hand, if gravity ceased, the moon would leave its Earth orbit on a straight line path like a stone from a whirling slingshot.” (pg. 10, *Our Created Moon*) Secular science and evolutionary theories often rely on random events over long periods of time to explain the world we see. The Bible tells us that God created everything — including the universe — and it was good. Knowing the precision of how the moon stays in the sky, what do you think about these two opposing worldviews in explaining the moon? What details from what you have read so far support your answer?

Bonus Activity

Research Newton’s law of universal gravitation. How does this help us understand the effects of gravity? What do you need to know to use the following formula to determine the gravity force between two objects?

$$F = G \frac{m_1 \times m_2}{r^2}$$

- ⇒ F is the _____.
- ⇒ G is the _____.
- ⇒ m_1 is the _____.
- ⇒ m_2 is the _____.
- ⇒ r is the _____.



Words to Know

breccias

libration

lowlands

lunar eclipse

lunar highlands

regolith

sidereal period

synodic period

Short Answer

1. How large is the moon?

2. What is another name for the mutual balance point or center-of-mass between two objects?

3. Explain what is meant by “a many body problem” in physics in how it relates to the gravity interactions between celestial objects like the moon, sun, or earth.

4. Why is the size of the moon considered to be unusual compared to other moons we see in our solar system?

5. Why is the moon also referred to as a “secondary” or “double planet” companion to earth?

6. Why do we see only one side of the moon?

7. What are some of the previous theories on what created lunar craters? What is the predominant idea of their origin today?

8. How many estimated craters are thought to be on the moon, larger than one kilometer in size?

9. How does the lack of an atmosphere tie in with the presence of the craters?

10. There are impact craters on earth, but they don't look the same as those on the moon. Why?

11. What are three varieties of moon rocks that have been collected?

12. How is soil on the moon different from that on earth?
13. Do lunar crystalline rocks contain the same chemical minerals that are found in earth rock?
14. What do crystalline rocks hint about the moon's history?
15. Are sodium, potassium, and lead found in rocks on the moon?
16. All moon rocks contain more heat-resistant elements than rocks on earth — true or false?
17. Where is anorthosite found on the moon?
18. What rocks help give color to the maria area of the moon?

19. What shape are lunar rocks?

20. What do the small bright beads of colored glass in the lunar soil indicate?

Discussion Question

Although it cannot produce light on its own, how is the moon's ability as a reflector critical in understanding Genesis 1:16?

Bonus Activities

1. Research lunar mass. Can you find the answer to the following equation? Why are complex equations like this one vital to the success of the space program?

1 lunar mass = _____ x _____ kilograms

2. Research the moon as a reflector. Are there substances on the moon's surface that help to reflect light or is the sheer size of the moon and the intensity of sunlight what makes the moonlight bright?



Words to Know

cold traps

neap tides

spring tides

Short Answer

1. By total weight, what percentage of water do most earth rocks contain?

2. What is the assumed significance of water on the moon?

3. How might water have gotten to the moon?

4. Is there life on the moon?

5. Why were the first lunar rock samples and astronauts put into isolation for a time at the end of their space missions to the moon?

6. What two things are missing from the moon that would help with the possibility of life?

7. If life is found in the universe, what are the three possible explanations for it?

8. Why is abiogenesis not a realistic expectation for life to occur?
9. Is there biblical support for life in space beyond that on earth?
10. What causes the moon phases?
11. In what Bible verses is the new moon mentioned?
12. Were some Old Testament festivals timed with the phases of the moon?
13. What do the moon phases affect here on earth?
14. What is the cause for the high spring tides?
15. Though not proven, what other things are often attributed to the moon and its phases?
16. When does a lunar eclipse occur?
17. How often do lunar eclipses occur?

18. What is a solar eclipse?

19. Why don't lunar and solar eclipses happen every month?

20. How long does a total eclipse last?

21. What causes the earth's tides?

22. How does the moon's proximity to one side of the earth or the other impact tides?

23. How quickly can the tidal bulge move at the earth's equator?

24. Does the moon's gravity affect the crust of the earth?

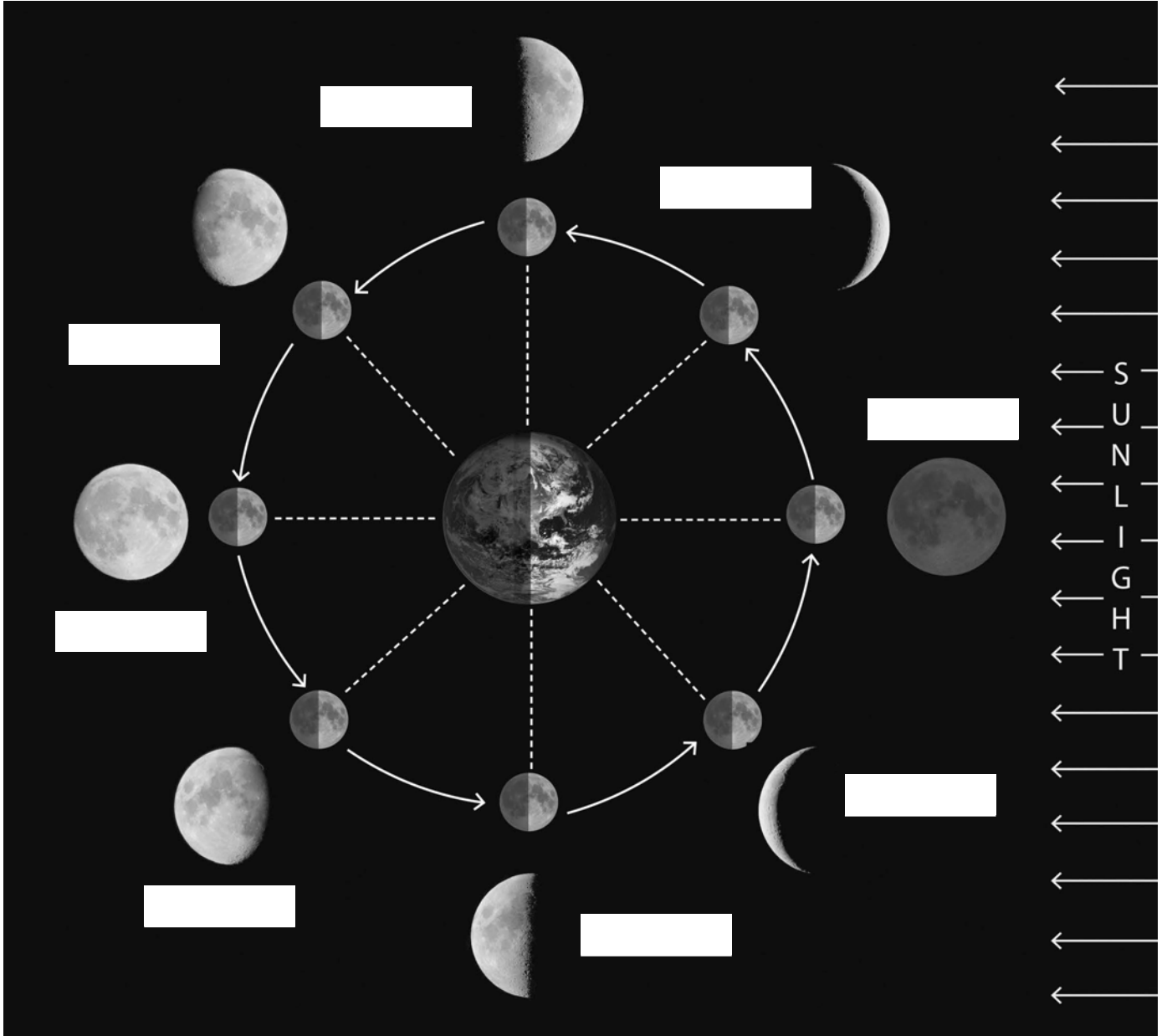
25. In what quarters of the moon's phases do neap tides occur?

Discussion Question

Explain how the size and relative distance of the moon and the sun can help eclipses to occur.

Bonus Activities

1. Research the latest findings on the question of whether or not the moon has water at www.nasa.gov. Why is water an important component of potential future missions to the moon?
2. Identify the various phases of the moon.





Short Answer

1. How many unmanned Soviet landings have there been on the moon?
2. What American president in 1961 set the national goal of a manned moon exploration?
3. What does it mean for a space mission to be a “manned” one?
4. Describe the Saturn rockets used in the Apollo program for manned flights to the surface.
5. Where on the moon’s surface did Astronaut Neil Armstrong take his first steps on July 20, 1969?
6. When did the Apollo program end and how do we continue to study the moon without manned missions?
7. What are the names of the two moons of Mars?

8. When were Jupiter's largest moons discovered and by whom?

9. Are there marked similarities among the moons of our solar system that would suggest a common spontaneous origin?

10. Which American president began NASA in order to study the possibilities of space exploration?

Discussion Questions

1. What global pressures helped to initiate the Apollo space program's moon exploration? How did these factors help or hurt space exploration in your opinion?

2. After reading the facts about NASA on page 25 of Our Created Moon, do any of the facts change some misconception you have had about the history, purpose, and events of NASA missions?

Bonus Activity

Create an informative chart and detail key factors of the Apollo Missions to the moon, or choose a particular manned Apollo mission to the moon and write a two-page essay about some aspect of the mission.



Short Answer

1. Has water been found in trace amounts on the moon?

2. Why have scientists been trying to find recoverable amounts of water on the moon's surface?

3. What was one extreme method NASA used to try and find water molecules on the moon?

4. Earth's surface contains an abundance of water and it is also found in three states of solid, liquid, and gas — is this a commonly found substance throughout our own solar system?

5. Why was the South Pole of the moon a target for probes trying to find water on the moon?

6. Why hasn't there been a continuing search for life on the moon?

7. About how much of the earth's surface is covered by water?

8. What is one chief lesson you can take away from the explorations of space?

9. Which of the Apollo missions was considered a “successful failure”?

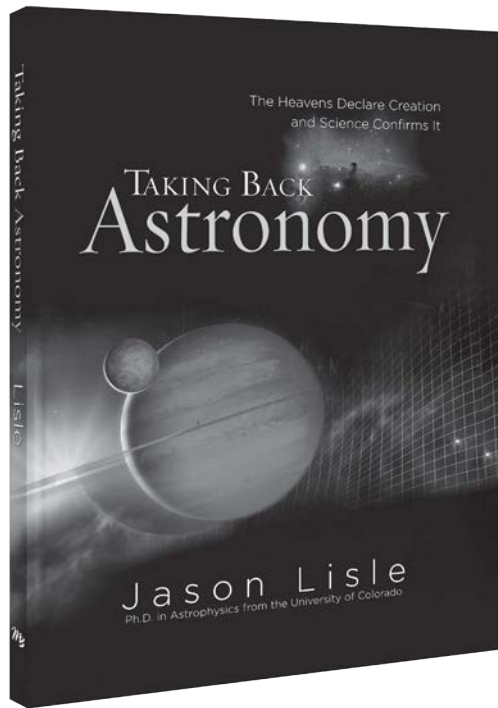
10. How long is a trip to the moon by rocket?

Discussion Questions

Which among the moons described in this part of the reading is to you the most interesting one, and why?

Bonus Activity

Complete the moon phase calendar activity on page 27 of the book.



Astronomy Worksheets
for Use with
Taking Back Astronomy



Words to Know

worldview

naturalism

big bang

nebular accretion

Short Answer Questions

1. A worldview is really a kind of _____. It prevents us from being objective and “open-minded” about certain things.
2. A correct worldview can help us draw _____ about the evidence.
3. The Bible claims to be the _____.
4. Ultimately, we can base our beliefs about origins on the Word of God, or the speculations of other _____.
5. The Bible provides a _____ for the interpretation of scientific evidence in the field of astrophysics, as it does for other areas of science.

Discussion Questions

1. Discuss why the creation versus evolution debate is not primarily about science, but instead about worldviews.

2. What do you think it means to have the “mind of Christ”? How would having the mind of Christ affect your worldview?

Activities

Use your Bible to answer the following questions. Include at least one Scripture reference with each answer.

How was the universe formed?

When was the universe formed?

Where did mankind come from?

Why am I here?

Why is there so much pain and death in the world?

What is the definition of truth?

Activities

Write a one-page essay on one of the following prompts:

a. How do you feel when confronted with the amazing supernatural power of the Creator?

b. How do you believe the universe declares the glory of God?



Words to Know

nebula

galaxy

Virgo Cluster

Local Group

Short Answer Questions

1. When a nebula is heated by _____, it glows, often with vivid and beautiful colors.
2. The Milky Way belongs to a cluster of galaxies called the _____.
3. The sun gives off more energy every second than one billion major cities would produce in _____.
4. God has created innumerable galaxies with a wide range of shapes and sizes. Clusters of galaxies are organized into even larger bodies called _____.
5. How many stars are estimated to be in the Milky Way?

Discussion Questions

1. Read Psalm 8, 1 Peter 5:7, Luke 12:7, John 3:16. Discuss how it makes you feel to know that this same God cares about you individually.

2. After reading these pages we get an idea that the universe is so vast it is beyond our ability to comprehend, yet Genesis 1:16 states simply that God "also made the stars." Why do you think the Bible speaks more about God's plan for mankind than of all His other created works?

Activity

Memorize Psalm 8:3–4.

Quizzes Section

5. The moon rises (on average) about _____ later each day.
6. The motion of the planets is complicated because their apparent motion in the sky is the combination of their _____ around the sun, plus the _____ in position due to Earth's motion around the sun.
7. Equatorial coordinates are based on the _____. In particular, they are based on the celestial _____.
8. A star wheel or planisphere helps you find stars by lining up the _____ with the _____ on the planisphere.
9. What does the term *equinox* mean?

10. What does the term *solstice* mean?

11. In the Northern Hemisphere, days are longer in the ____ and ____ seasons, and shorter in the ____ and ____ seasons.

12. The configuration of the sun, moon, and Earth is about the same every 18.031 years, and is called the _____ cycle.

13. The Earth actually has two shadows. A darker inner shadow called the “_____” and a lighter outer shadow called the “_____.”

14. When the moon is farther from the earth, it appears smaller than the sun, and when it passes directly in front of the sun it leaves a thin “ring” or “_____.”

15. Planets orbit the sun in slightly _____ paths with the sun at one focus of the ellipse.
16. _____ is when a planet is “behind” the sun.
17. Meteor showers are general caused by debris left behind by a _____.
18. The most impressive, reliable meteor shower is the _____ meteor shower, occurring around August 12th each year.
19. The sun traces out a thin figure-eight shape across the sky with each day, which is called _____.
20. The constellation in which the sun is found at equinox shifts with time. This phenomenon is called the
“_____”

Answer Keys
to
Survey of Astronomy

The Stargazer's Guide to the Night Sky — Worksheet Answer Keys

Introduction – Worksheet 1

1. Answers will vary.
2. With your eyes alone, with binoculars, or with a telescope.
3. Yes. There are many similarities, but star charts can vary.
4. Yes. The book includes star charts depending on the seasonal skies.
5. The moon and the sun.

Chapter 1 – Worksheet 1

1. This is because of the earth's rotation on its axis; because the earth is spinning in the opposite direction.
2. It is called "diurnal motion."
3. It is an approximate 24-hour cycle.
4. It is called the "celestial sphere."
5. It is called the "celestial equator."
6. They are called "circumpolar" constellations.
7. Sidereal day

Chapter 1 – Worksheet 2

1. The sidereal day is the true rotation rate of Earth as seen from a distant star. The solar day is how long it takes for the sun to return to its highest point in the sky as viewed from a location on Earth.
2. 12
3. It washes out nearly everything else in the sky.
4. 50 minutes
5. The gravitational pull of the sun on the moon is about twice the pull of the sun on the moon.
6. percentage
7. 29.3, 27.5

Chapter 1 – Worksheet 3

1. true motion, apparent shift
2. The earth's rotation axis that is tilted relative to its orbit around the sun by 23.4 degrees.

3. The first is based on our local horizon. The second is based on the celestial sphere.
4. Altitude
5. Azimuth
6. celestial sphere, equator

Chapter 1 – Worksheet 4

1. south, north
2. day, year
3. setting
4. It's best to get outside and watch.
5. date, time
6. planets, moon

Chapter 2 – Worksheet 1

1. declination, 12
2. It means "equal night."
3. It means "sun stop."
4. Arctic
5. Spring/summer, fall/winter
6. Ecliptic

Chapter 2 – Worksheet 2

1. On the spring equinox
2. Solar, lunar
3. Node
4. Saros
5. Umbra, penumbra
6. Photosphere
7. 400

Chapter 2 – Worksheet 3

1. Annulus
2. Libration
3. Elliptical
4. Superior
5. Conjunction

***The Stargazer's Guide to the Night Sky* — Quiz Answer Keys**

Quiz 1 – Chapters 1–2

1. It is called “diurnal motion.”
2. It is called the “celestial sphere.”
3. They are called “circumpolar” constellations.
4. 12
5. 50 minutes
6. True motion, apparent shift
7. Celestial sphere, equator
8. Date, time
9. It means “equal night.”
10. It means “sun stop.”
11. Spring/summer, fall/winter
12. Saros
13. Umbra, penumbra
14. Annulus
15. Elliptical
16. Conjunction
17. Comet
18. Perseid
19. Analemma
20. Precession of the equinoxes

Quiz 2 – Chapters 3–4

1. Rods, cones
2. Directly
3. Red light
4. 30
5. Brightness, constellation
6. Job
7. Demon
8. Sirius
9. North Star
10. Southern Crown

Quiz 3 – Chapters 5–6

1. Conjunction

2. Occultation
3. Meteor, meteoroid, meteorite
4. Radiant
5. Meteor storm
6. Geminids
7. Leonids
8. Wavelengths
9. Solar halo
10. Crown
11. Satellites
12. Flare
13. Aperture
14. Refractors
15. Chromatic
16. Mirror
17. Andromeda
18. Clock-drive
19. Equatorial, horizon
20. Telrad

Quiz 4 – Chapters 7–8

1. Coldest
2. Nine
3. Thermal
4. Lowest
5. Blurrier, smaller
6. Collimation
7. Averted
8. Star hopping
9. Terminator
10. Maria

Quiz 5 – Chapters 9–10

1. Ecliptic
2. Jupiter
3. Ammonia