

1. What is Astronomy?

1. Where do you live?

- A. Northern Hemisphere
- B. Southern Hemisphere
- C. Very close to the equator
- D. I don't know.

2. Someone predicts that people will be more emotional because Mars appears near the Moon. Is this considered astrology or astronomy?

- A. Astrology
- B. Astronomy
- C. Both

3. Someone predicts the aurora will be visible on January 15th because a large x-class solar flare was observed on January 12th. Is this considered astrology or astronomy?

- A. Astrology
- B. Astronomy
- C. Both

4. Which of the following are evidence of the Earth being round?

- A. The Earth casts a round or curved shadow.
- B. The Sun and the Moon are about the same size in the sky.
- C. Islands in the ocean appear "top first" when viewed from a distance.
- D. Shadows of identical objects are different lengths at the same time in different locations.

5. What is pseudoscience? Select all that apply.

- A. A belief or practices that claims to be scientific but is incompatible with the scientific method
- B. A scientific practice that has popular appeal
- C. A system of study that relies on anecdotal evidence and tradition instead of observations and controlled studies
- D. A pursuit of knowledge following evidence-based practices with testable hypotheses and predictions

2. Diurnal Motion

1. What is the primary reason the Sun rises in the East and sets in the west?

- A. Earth has a tilted axis.
- B. The Sun circles around the Earth.
- C. Earth revolves around the Sun.
- D. The Earth spins west to east.

2. Why do the stars appear to move in circular paths around the North Star?

- A. Because stars orbit the North Star
- B. Because Earth rotates
- C. Because Earth revolves
- D. Because the Sun revolves around the North Star

3. Which statement(s) are true?

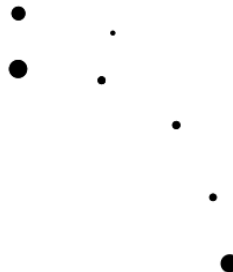
- A. The equator is tilted approximately 23 degrees from the ecliptic.
- B. The equator and the ecliptic are on the same plane.
- C. Earth revolves along the plane of the ecliptic.
- D. Earth revolves along the plane of the equator.

4. Why were Mars, Venus, Jupiter, and Saturn named “planets?”

- A. They change position in the sky more than the stars.
- B. They do not move in the sky but the stars do.
- C. They were much brighter than other stars.
- D. They moved in the opposite direction of the stars.

5. What constellation is this?

- A. Capricornus
- B. Cassiopeia
- C. Orion
- D. Ursa Major
- E. Ursa Minor



4. The Seasons

1. What is the term for the two days of the year when day and night are of nearly equal length?

- A. Solstice
- B. Equinox
- C. Aphelion
- D. Perihelion

2. What would happen if the Earth's axis were not tilted?

- A. Seasons would be more extreme.
- B. Earth would be hotter.
- C. Earth's orbit would change.
- D. There would be no seasons.

3. Summer in the Northern Hemisphere is primarily caused by

- A. the northern hemisphere being closer to the sun
- B. the northern hemisphere receiving more daylight each day
- C. the Earth spinning faster in the summer
- D. the Sun's rays get more spread out in the summer

4. When is the summer solstice in the Southern Hemisphere?

- A. Mar 20
- B. June 21
- C. Sep 23
- D. Dec 21

5. Which point(s) on Earth spends the most time in the dark on average?

- A. The equator
- B. The North Pole
- C. The South Pole
- D. The tropics
- E. They all spend the same amount of time in the dark.

6. Lines of Latitude

1. Which latitude experiences 24 hours of daylight during the summer solstice in the Southern Hemisphere?

- A. The Tropic of Cancer
- B. The Tropic of Capricorn
- C. The Arctic Circle
- D. The Antarctic Circle

2. Why are the poles colder than the equator, even during summer?

- A. They are further from the Sun.
- B. Earth's atmosphere is thinner at the poles.
- C. They receive less direct sunlight.
- D. The Sun's rays are blocked by ice and snow.

3. What is the approximate latitude of the Arctic Circle?

- A. 23° N
- B. 42° N
- C. 66° N
- D. 90° N

4. At which latitude is the sun directly overhead at noon during the summer solstice in the Northern Hemisphere?

- A. Equator
- B. Tropic of Cancer
- C. Tropic of Capricorn
- D. Arctic Circle

5. Select each true statement.

- A. At every location on Earth, the Sun passes directly overhead at least one day of the year.
- B. The Arctic and Antarctic circles are getting smaller each year.
- C. On the June solstice, everything north of the Arctic circle experiences polar night.
- D. If you know both the longitude and date for a location you can predict the amount of daylight.

7. The Moon

1. How much of the Moon's surface is illuminated by sunlight when it is in the waning crescent phase?

- A. 12.5%
- B. 25%
- C. 50%
- D. 75%
- E. 100%

2. How long is a day on the moon?

- A. 16 hours
- B. 24 hours
- C. 14 Earth days
- D. 29 Earth days

3. Select each false statement.

- A. It takes about as long for the Moon to complete 1 rotation as it does to complete 1 revolution around Earth.
- B. Footprints on the Moon will last forever because there's no atmosphere.
- C. Sun doesn't shine on the far side of the Moon.
- D. The dark-colored maria have lower elevation than the lighter-colored areas of the Moon.
- E. The moon's surface is about the color of asphalt.

4. Which phase of the Moon occurs when the Moon is between the Earth and the Sun?

- A. Full Moon
- B. New Moon
- C. First Quarter Moon
- D. Third Quarter Moon

5. Which constellation is pictured below?

- A. Cancer
- B. Capricornus
- C. Ursa Major
- D. Ursa Minor



9. Eclipsed

1. What is the primary cause of a solar eclipse?

- A. The Moon passing through Earth's shadow
- B. The Moon passing between the Earth and the Sun
- C. The Sun passing between the Earth and the Moon
- D. The Earth passing between the Sun and the Moon

2. During which phase of the Moon does a lunar eclipse occur?

- A. Full Moon
- B. First Quarter
- C. New Moon
- D. Third Quarter

3. Select each true statement.

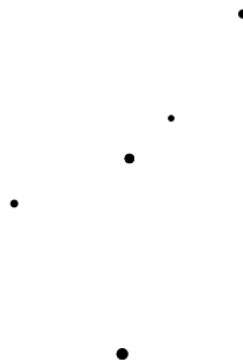
- A. All 8 planets are in syzygy approximately every 50 years.
- B. Syzygy occurs when 2 or more objects are in a straight line.
- C. Transits and eclipses only occur during syzygy.
- D. The Sun is never between two planets.

4. The distance between the Earth and the Moon is roughly how many Earth diameters?

- A. 8
- B. 30
- C. 44
- D. 120

5. Which constellation is pictured below?

- A. Cancer
- B. Capricornus
- C. Cassiopeia
- D. Canis Major



10. Totality

1. What is the darkest part of the shadow called?

- A. Umbra
- B. Penumbra
- C. Antumbra
- D. Corona

2. If you are standing in the **penumbra** during a solar eclipse, what will you see?

- A. A total solar eclipse
- B. A partial solar eclipse
- C. An annular solar eclipse
- D. A full moon

3. If the Moon were significantly smaller, what would occur when it was aligned between the Earth and Sun?

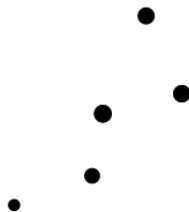
- A. A total eclipse
- B. A partial eclipse
- C. An annular eclipse
- D. No eclipse

4. Why don't eclipses occur every month?

- A. The Earth's orbit isn't aligned with the ecliptic
- B. The Moon only passes through Earth's atmosphere twice a year
- C. The Moon's orbit is not circular
- D. The Moon's orbit is tilted relative to Earth's orbit around the Sun

5. Which constellation is pictured below?

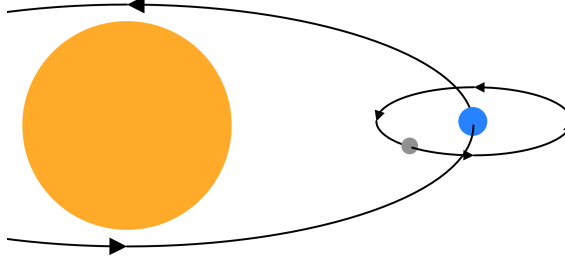
- A. Cancer
- B. Capricornus
- C. Cassiopeia
- D. Canis Major



12. Earth And Moon Quiz Show

1. What is the best description of the moon phase pictured below?

- A. Waning crescent
- B. Waxing crescent
- C. Waning gibbous
- D. Waxing gibbous



2. The reason we see the Sun move across the sky each day is due to

- A. The Earth rotating on its axis from east to west
- B. The Earth rotating on its axis from west to east
- C. The Sun traveling around the Earth each day
- D. The tilt of the Earth away from the ecliptic

3. Select each true statement.

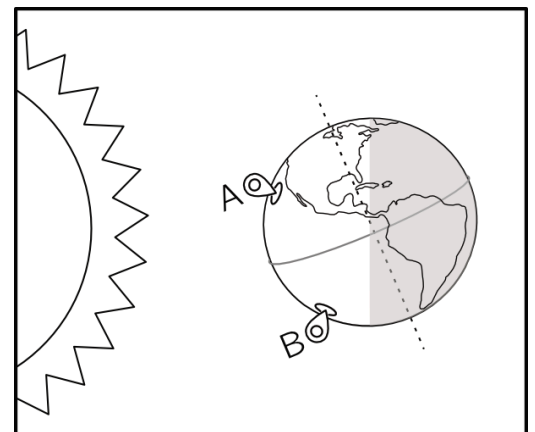
- A. The angle of inclination up to the North Star or South Star will match your latitude.
- B. If the Earth had no axial tilt, then there would be no equator.
- C. All stars revolve around the North Star.
- D. The North Star is the only star that is visible from every location on Earth.

4. What phase of the moon occurs about two weeks after the full moon

- A. Another full moon
- B. First quarter moon
- C. New moon
- D. It depends on the time of year.

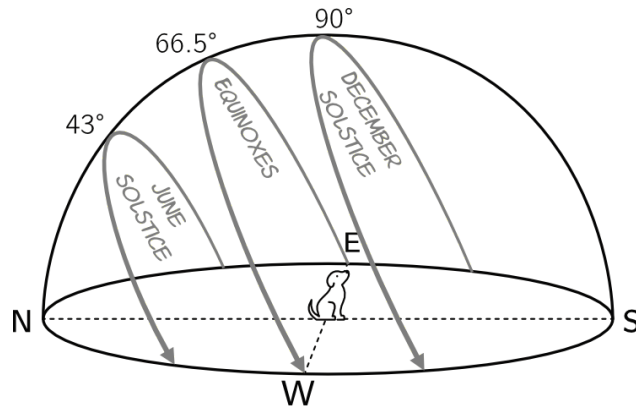
5. What season is Point B experiencing in the image below?

- A. Spring
- B. Summer
- C. Fall
- D. Winter
- E. Not enough information to tell



6. The image below shows the Sun's path across the sky at:

- A. Antarctic Circle
- B. Tropic of Capricorn
- C. Equator
- D. Tropic of Cancer
- E. Arctic Circle



7. How many copies of the Moon would it take to equal the volume of the Earth?

- A. 6
- B. 12
- C. 30
- D. 49

8. The word “syzygy” means

- A. An axis of rotation
- B. The repeated path that an object in space travels
- C. The alignment of three or more celestial objects
- D. The point in the sky directly overhead

9. When is the spring equinox in the Southern Hemisphere?

- A. March
- B. June
- C. September
- D. December

10. Which would you rather have?

- A. A functional teleporter
- B. A functional time machine
- C. A lifetime supply of your favorite food

11. What is the most widely accepted theory for how the Moon formed?

- A. The Moon was captured by Earth's gravity.
- B. The Moon formed at the same time as Earth.
- C. The Moon was a wandering planet that got stuck in orbit.
- D. A large object collided with Earth, and the debris formed the Moon.

12. Why are lunar eclipses more commonly experienced than solar eclipses?

- A. The Moon orbits Earth faster than Earth orbits the Sun.
- B. The Earth's shadow is much larger than the Moon's shadow.
- C. The Moon moves slower in its orbit than Earth rotates.
- D. The Sun is much farther away, so its shadow rarely reaches Earth.

13. What would happen if Earth's axial tilt were 45 degrees instead of 23.5 degrees?

- A. Days and nights would be shorter.
- B. Seasons would be more extreme.
- C. The Moon would no longer cause Earth's tides.
- D. Earth would have no seasons.

14. Select each statement below that describes a solar eclipse.

- A. The Moon is positioned directly between the Sun and Earth.
- B. It's usually visible from a large area like a hemisphere.
- C. It occurs during a new moon phase.
- D. It usually lasts for just a few minutes.

15. As we watch the sky change from our position, the backdrop of stars returns to the same location in the sky

- A. in exactly 24 hours
- B. in slightly less than 24 hours
- C. in slightly more than 24 hours

16. Which constellation is pictured below?

- A. Canis Major
- B. Cassiopeia
- C. Orion
- D. Ursa Minor



17. Select each true statement.

- A. A sundial will work best if you orient it so that the gnomon is pointed straight up towards the zenith.
- B. An inclinometer is used to measure the angle of inclination up to a distant object.
- C. Earth rotates faster than the Moon rotates.
- D. The Moon is in the antumbra of the Earth's shadow during a lunar eclipse.

18. Select each statement that is true during the equinox.

- A. The Sun is directly over one of the tropics.
- B. Earth's axis is leaning directly toward or away from the Sun.
- C. Everywhere on Earth experiences about 12 hours of daylight.
- D. Either the Arctic Circle or Antarctic Circle experiences 24 hours of night.

13. Our Solar System

1. What is the primary difference between the Kuiper Belt and the Oort Cloud?
 - A. The Kuiper Belt contains only small rocks, while the Oort Cloud contains only comets.
 - B. The Kuiper Belt is located between Mars and Jupiter, while the Oort Cloud surrounds Earth.
 - C. The Kuiper Belt is closer to the Sun and lies in the plane of the Solar System, while the Oort Cloud is a distant, spherical shell of icy bodies.
 - D. The Kuiper Belt surrounds Pluto while the Oort cloud is between Jupiter and Mars.
2. Approximately how long does it take light from the Sun to reach Earth?
 - A. 8 seconds
 - B. 8 minutes
 - C. 8 hours
 - D. 8 days
3. Select each FALSE statement.
 - A. All eight planets could fit between Earth and the Moon.
 - B. The distance from the Oort Cloud to the Kuiper Belt is less than the distance from the Kuiper Belt to the Sun.
 - C. Mercury is the only planet without an atmosphere.
 - D. Venus is more dense than Saturn.
4. What percentage of the Solar System's total mass is contained within the Sun?
 - A. 89%
 - B. 98.6%
 - C. 99.86%
 - D. 99.9998%
5. Which constellation is pictured below?
 - A. Canis Major
 - B. Capricornus
 - C. Ursa Minor
 - D. Ursa Major



15. Inner vs Outer Planets

1. Which planets below are known for having famous storm systems?

- A. Mercury
- B. Jupiter
- C. Saturn
- D. Neptune

2. Select each true statement.

- A. The planet with the longest day is Venus.
- B. A day on Mercury is longer than a year on Mercury.
- C. The planet with the shortest day is Saturn.
- D. The planet with the longest year is Neptune.

3. Select each true statement.

- A. Venus orbits in the opposite direction from the other planets as it revolves around the Sun.
- B. Mercury is the hottest planet in the Solar System.
- C. Saturn's rings are made entirely of gas.
- D. Earth is the densest planet of the Solar System.

4. Select each true statement.

- A. Saturn is the only planet with rings.
- B. Nights on Mercury are colder than nights on Earth.
- C. Uranus and Neptune appear blue because they contain large amounts of water.
- D. The atmosphere of Venus is mostly nitrogen.

5. What role did gravity play in the formation of the solar system?

- A. It repelled gas and dust away from the forming Sun.
- B. It caused a cloud of gas and dust to collapse and form the Sun and planets.
- C. It had no effect on the formation of the solar system.
- D. It only influenced the formation of the Sun, not the planets.

16. Planetary Motion

1. In which month does Earth travel fastest in its orbit?

- A. January
- B. April
- C. July
- D. October

2. What happens to a planet's orbital speed as it moves farther from the Sun?

- A. It speeds up.
- B. It slows down.
- C. It stays the same.

3. Which of the following is the best definition of retrograde motion?

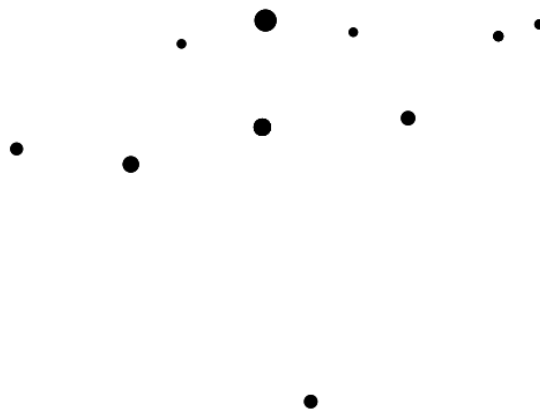
- A. A planet temporarily appears to move backward in the sky due to Earth's motion.
- B. A planet orbits in the opposite direction.
- C. A planet has an elongated orbit instead of a circular one.
- D. A planet accelerates as it approaches the Sun.

4. Why does Mercury experience the greatest variation in orbital speed among all the planets?

- A. It has the strongest magnetic field.
- B. It is closest to the Sun.
- C. It has the fastest rotation.
- D. It has the most eccentric orbit of all the planets.

5. Which constellation is represented below?

- A. Canis Major
- B. Cassiopeia
- C. Cygnus
- D. Ursa Minor



18. Dwarf Planets and Moons

1. Which of the following is NOT classified as a dwarf planet?

- A. Pluto
- B. Ceres
- C. Europa
- D. Eris

2. Which of the following moons is known for its thick atmosphere and lakes of liquid methane?

- A. Ganymede
- B. Titan
- C. Io
- D. Callisto

3. Which region of the Solar System contains most of the known dwarf planets?

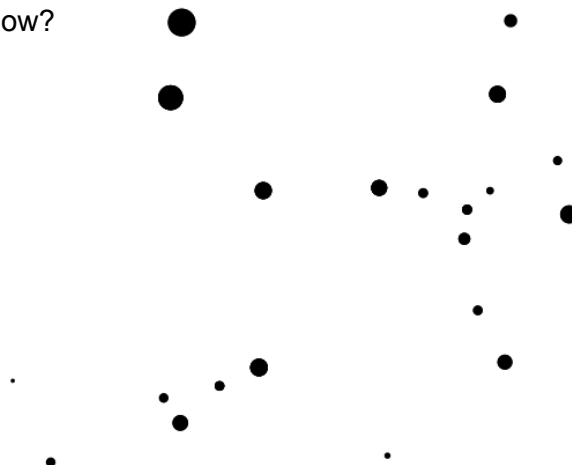
- A. The asteroid belt
- B. The Oort Cloud
- C. The Kuiper Belt
- D. The inner Solar System

4. What characteristics are in the IAU definition of a planet?

- A. Becomes round under the force of its own gravity
- B. Formed at the same time as a star
- C. Has similarly-sized objects in its orbit
- D. Orbits around a star

5. Which constellation is represented below?

- A. Cancer
- B. Centaurus
- C. Crux
- D. Cygnus



19. Asteroids Comets And Meteors

1. What is a comet's tail primarily made of?

- A. Rocks and ice
- B. Ice and snow
- C. Gas and dust
- D. Liquid water

2. What is the difference between a meteor and a meteorite?

- A. A meteor impacts the ground.
- B. A meteorite impacts the ground.

3. Why are there no comets in the Asteroid Belt?

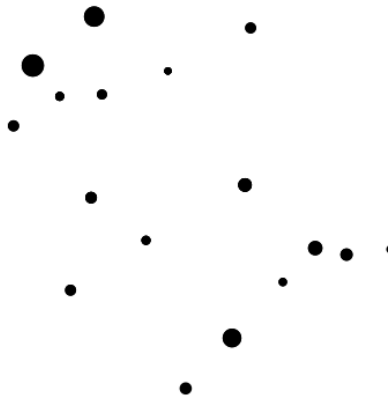
- A. The Asteroid Belt is inside the frost line.
- B. Comets are not dense enough.
- C. Comets are repelled by gas giants.
- D. Asteroids and comets are mortal enemies.

4. Select each true statement.

- A. Asteroids are only found in the asteroid belt.
- B. Comets can become asteroids.
- C. The asteroid belt used to be a planet.
- D. The biggest asteroid is about half the size of the Moon.

5. Which constellation is pictured below?

- A. Cancer
- B. Capricornus
- C. Gemini
- D. Leo



21. Near Earth Objects

1. Approximately how often do small meteoroids burn up in Earth's atmosphere, creating "shooting stars"?

- A. Only during annual meteor showers
- B. Every few years
- C. Monthly
- D. Daily

2. What is the estimated size of the asteroid that caused the extinction of the dinosaurs?

- A. 1 km
- B. 10 km
- C. 100 km
- D. 1,000 km

3. What features of a complex crater are not found in a simple crater?

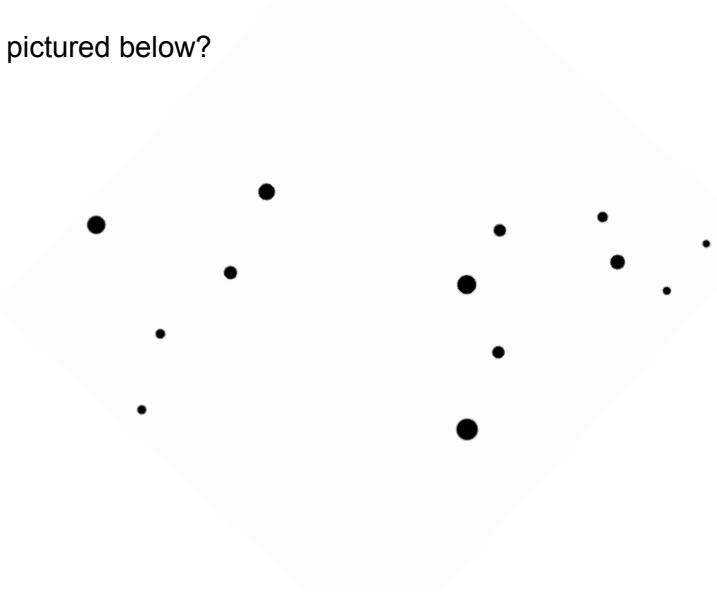
- A. A central peak
- B. Fractured rock
- C. Ejecta blanket
- D. Molten rock

4. Select each true statement.

- A. Near-Earth Comets don't pose a risk to Earth because their ice would melt while entering the atmosphere.
- B. Humans have used a spacecraft to change the orbit of an asteroid.
- C. A 50 km-wide asteroid would cause mass extinction.
- D. There are fewer than 5,000 known NEOs.

5. Which constellation is pictured below?

- A. Canis Major
- B. Capricornus
- C. Gemini
- D. Leo
- E. Perseus



22. Solar System Quiz Show

1. Which theory best describes the formation of the Solar System?
 - A. The **Nebular Hypothesis**, where a rotating cloud of gas and dust collapses into a disk
 - B. The **Tidal Hypothesis**, where a rogue star's tidal forces create planets
 - C. The **Binary Star Capture Theory**, where a second star collapses into planets
 - D. The **Accidental Collision Theory**, where random collisions formed protoplanets
2. Which of the following statements about Jupiter's atmosphere is correct?
 - A. It has large amounts of oxygen and nitrogen, similar to Earth's.
 - B. It contains significant sulfuric acid droplets in its upper atmosphere.
 - C. It is mostly hydrogen and helium, with trace amounts of methane and ammonia.
 - D. It is heated primarily by solar radiation rather than internal energy.
3. What best describes Saturn's rings in terms of their density and composition?
 - A. They are mostly rocky fragments the size of small moons.
 - B. They consist largely of organic molecules from carbon-rich meteorites.
 - C. They are composed primarily of water ice particles of various sizes.
 - D. They are composed of metallic hydrogen that has frozen in orbit.
4. What makes Saturn's moon Titan stand out from most other large moons in the Solar System?
 - A. It has active volcanoes releasing molten metal.
 - B. It orbits retrograde (opposite the direction of Neptune's rotation).
 - C. It is larger than its host planet.
 - D. It has a thick nitrogen atmosphere.
5. Which planet in the Solar System experiences the greatest range of surface temperatures between day and night?
 - A. Mercury, due to its slow rotation and lack of atmosphere
 - B. Venus, due to runaway greenhouse effect
 - C. Mars, due to its thin carbon dioxide atmosphere
 - D. Earth, due to large land and ocean contrasts

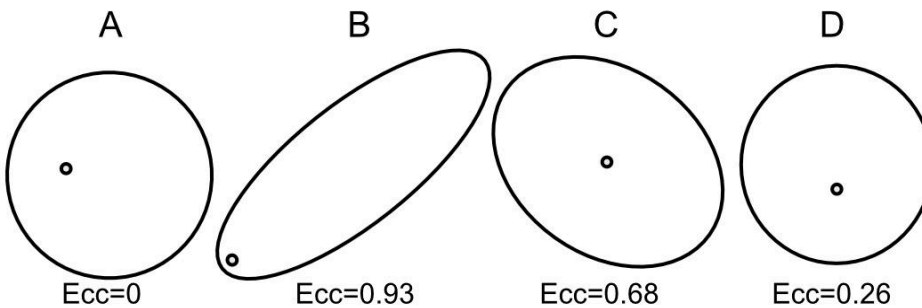
6. In which region of the Solar System is the dwarf planet Eris located?

- A. It orbits Pluto as a dwarf moon.
- B. The Asteroid Belt
- C. The Kuiper Belt
- D. The Oort Cloud

7. What is a key factor causing Uranus to exhibit extreme seasonal variations?

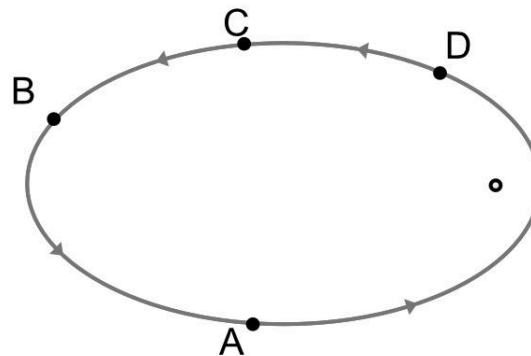
- A. Its highly elliptical orbit
- B. Its axial tilt of about 98° , causing it to essentially rotate on its side
- C. Its rapidly shifting orbital path influenced by Neptune
- D. Its eccentric ring structures blocking sunlight

8. Below are four ellipses along with their eccentricity. Select each ellipse below that could be the orbit of an object around its star.



- A. Orbit A
- B. Orbit B
- C. Orbit C
- D. Orbit D

9. An orbit around a star is shown. If one complete orbit takes 1 year, where will the object at point A be in 6 months?



- A. Point A
- B. Point B
- C. Point C
- D. Point D

10. Which key feature distinguishes a Gas Giant (e.g., Jupiter, Saturn) from an Ice Giant (e.g., Uranus, Neptune)?

- A. Ice Giants are always closer to the Sun.
- B. Ice Giants have liquid metal cores rather than rocky cores.
- C. Ice Giants have significantly more moons.
- D. Ice Giants contain more water, ammonia, and methane.

11. What makes the dwarf planet Haumea stand out among Kuiper Belt objects?

- A. It has the highest temperature of any object beyond Mars.
- B. Its rapid rotation gives it an elongated, ellipsoidal shape.
- C. It is believed to have once been a moon of Neptune.
- D. Its orbit intersects that of Pluto once every 50 years.

12. If an asteroid with a circular orbit is 4 AU from the Sun, how many Earth years will it take to complete one orbit of the Sun?

- A. 2 years
- B. 4 years
- C. 8 years
- D. 16 years

13. Which object below is the biggest?

- A. Ganymede
- B. The Moon
- C. Mercury
- D. Europa
- E. Makemake

14. What is a key reason the Asteroid Belt did not coalesce into a full-fledged planet?

- A. The belt was never bombarded by comets.
- B. Gravitational perturbations from Jupiter prevented accretion.
- C. Most asteroids are too small to collide significantly.
- D. Tidal resonances with Earth removed large fragments.

15. Select each true statement about NEOs.

- A. Most NEOs are asteroids, not comets.
- B. To be an NEO, an object must cross Earth's orbit.
- C. The asteroid Apophis will pass closer to the Earth than the Moon in 2029.
- D. Every NEO is currently within 1.3 AU of Earth.

16. What is the only planet in the Solar System not named after a mythological character?

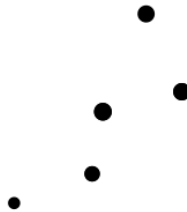
- A. Mercury
- B. Venus
- C. Earth
- D. Mars
- E. Jupiter
- F. Saturn
- G. Uranus
- H. Neptune

17. Select each true statement below.

- A. The Kuiper Belt is spherical, while the Oort Cloud is disk-shaped.
- B. The Kuiper Belt lies roughly in the ecliptic plane near Neptune's orbit, while the Oort Cloud is a far more distant, spherical region.
- C. The Kuiper Belt contains mainly comets, while the Oort Cloud contains primarily asteroids.
- D. The Kuiper Belt is much larger and extends to interstellar space.

18. Which constellation is pictured below?

- A. Capricornus
- B. Cassiopeia
- C. Gemini
- D. Leo
- E. Perseus



24. Constellations

1. What constellation contains the stars Castor and Pollux?

- A. Cassiopeia
- B. Gemini
- C. Orion
- D. Taurus
- E. Ursa Major

2. Select each true statement below.

- A. Sigma Octantis is brighter than Polaris.
- B. Polaris is brighter than Sigma Octantis.
- C. Sigma Octantis is closer to Earth's celestial pole than Polaris.
- D. Polaris is closer to Earth's celestial pole than Sigma Octantis.

3. What is a constellation?

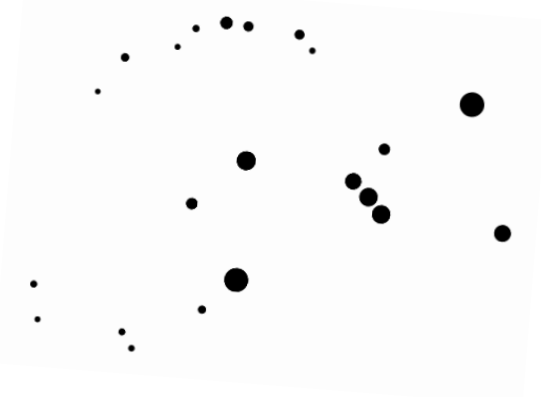
- A. A region of the celestial sphere and everything contained inside it
- B. A prominent pattern or group of stars, such as the Big Dipper
- C. The brightest stars in a grouping of stars
- D. Any bunch of stars that forms a pattern

4. Why are some constellations more visible in the winter sky than the summer sky?

- A. They move behind the Moon during summer months.
- B. As Earth revolves around the sun, night occurs when we are facing a different direction.
- C. The Earth's axis wobbles throughout the year showing different parts of the sky.
- D. Because Earth's rotation moves the stars through the sky.

5. Which constellation is pictured below?

- A. Cancer
- B. Leo
- C. Gemini
- D. Orion
- E. Virgo



25. Stargazing 101

1. How can you tell the difference between a planet and a star in the night sky?

- A. Stars usually twinkle, but planets have a steady light.
- B. Planets usually twinkle, but stars have a steady light.
- C. Planets are red in color while stars have a blue-ish light.
- D. Planets appear smaller than stars.

2. Select each true statement.

- A. The phase of the Moon doesn't have much impact on stargazing.
- B. Direct vision (looking straight ahead) can detect faint light better than peripheral vision.
- C. Red light has more energy than blue light.
- D. Human eyes take about 30 minutes to adjust to low-light conditions.

3. Fill in the blanks: _____ is like longitude for the sky while _____ is like latitude for the sky.

- A. Azimuth and altitude
- B. Right ascension and declination
- C. Zenith and nadir
- D. Sky longitude and sky latitude

4. An object appears to be "one fist" above the horizon when the observer holds their fist at arm's length. Approximately how many degrees is the object above the horizon?

- A. 1°
- B. 5°
- C. 10°
- D. 15°
- E. 25°

5. Which constellation is pictured below?

- A. Capricornus
- B. Leo
- C. Perseus
- D. Sagittarius



27. The Sun as a Star

1. What process powers the Sun and allows it to shine?

- A. Nuclear fission
- B. Combustion
- C. Nuclear fusion
- D. Radioactive decay

2. What layer of the Sun do we see? Hint: It's where sunspots occur.

- A. Core
- B. Corona
- C. Photosphere
- D. Radiative Zone

3. Which part of the Sun is the hottest?

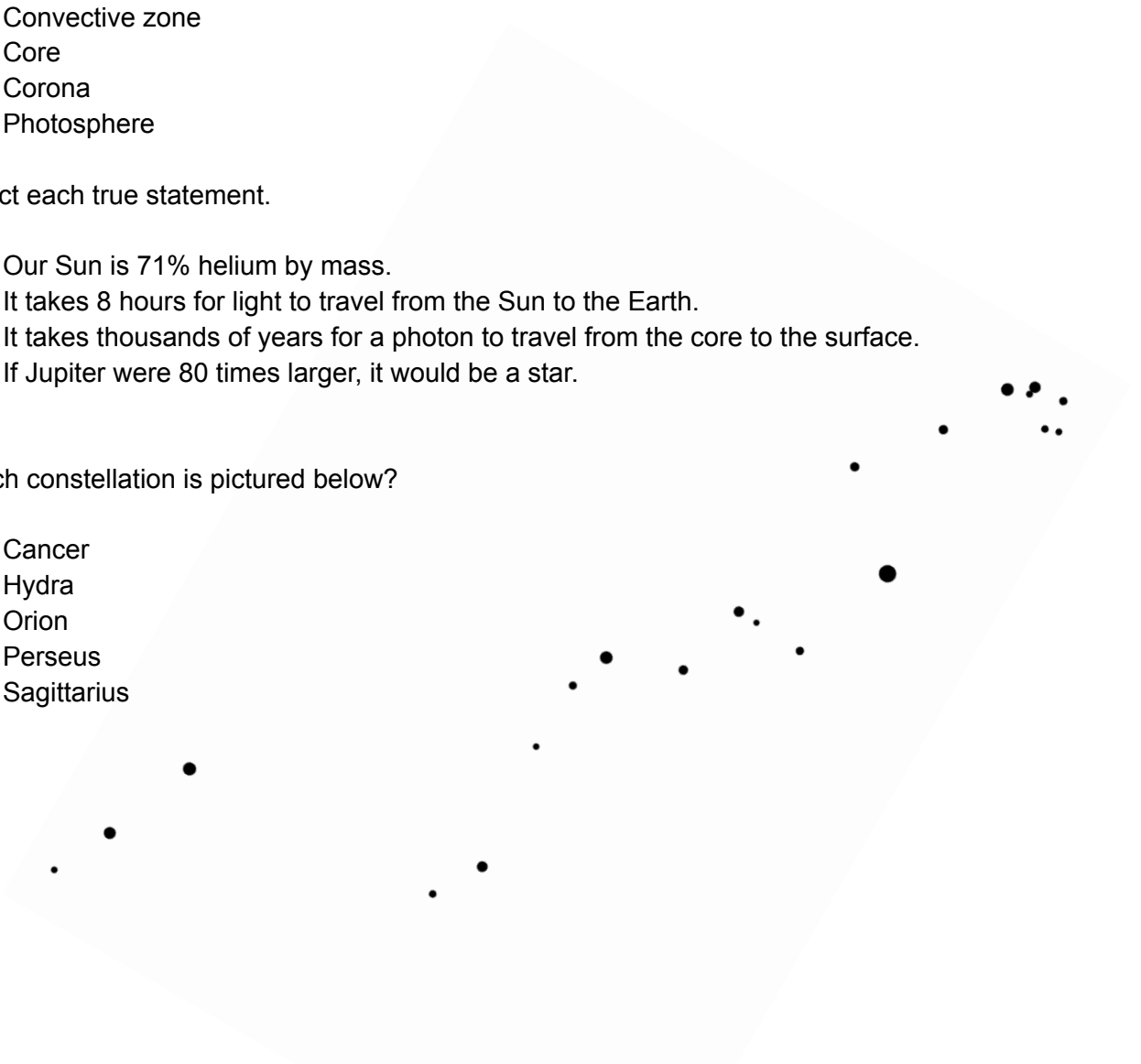
- A. Convective zone
- B. Core
- C. Corona
- D. Photosphere

4. Select each true statement.

- A. Our Sun is 71% helium by mass.
- B. It takes 8 hours for light to travel from the Sun to the Earth.
- C. It takes thousands of years for a photon to travel from the core to the surface.
- D. If Jupiter were 80 times larger, it would be a star.

5. Which constellation is pictured below?

- A. Cancer
- B. Hydra
- C. Orion
- D. Perseus
- E. Sagittarius



28. Solar Weather

1. What is the term for when plasma is ejected from the Sun's surface and travels into space?

- A. Solar flare
- B. Coronal Mass Ejection (CME)
- C. Coronal Loop
- D. Solar Prominence or Filament

2. Why are auroras more commonly seen near the poles?

- A. The poles rotate more slowly.
- B. It's colder at the poles, making particles more visible.
- C. The atmosphere is thinner at the poles.
- D. Earth's magnetic field directs charged particles toward the poles.

3. Select each false statement.

- A. The solar cycle lasts approximately 11 years.
- B. Coronal Mass Ejections (CMEs) are more common during a solar minimum.
- C. There is a complete reversal of the Sun's magnetic field every solar cycle.
- D. It takes 8 minutes for a CME to impact Earth.

4. Select each true statement.

- A. Solar storms can cause severe weather events such as tornadoes.
- B. Solar storms interfere with GPS systems.
- C. A solar storm doesn't impact astronauts unless they are doing a space walk.
- D. There is no way to predict solar storms.

5. What causes the colors of the aurora?

- A. How charged particles interact with nitrogen and oxygen particles in the upper atmosphere
- B. How the ozone layer responds to solar energy
- C. Argon gas in the atmosphere glows after absorbing energy from the solar wind
- D. Electrical currents traveling through the upper atmosphere

30. Luminosity and Life Cycle

1. Approximately how old is our Sun?

- A. 4.6 billion years
- B. 10.2 billion years
- C. 13.1 billion years
- D. 23.2 billion years

2. What do we know about a star with an apparent magnitude of -1?

- A. It's one of the brightest stars in the sky.
- B. It's one of the dimmest stars we can see.
- C. It is not visible to the naked eye.
- D. We would need to know the star's distance to draw any conclusions.

3. 5 billion years from now,

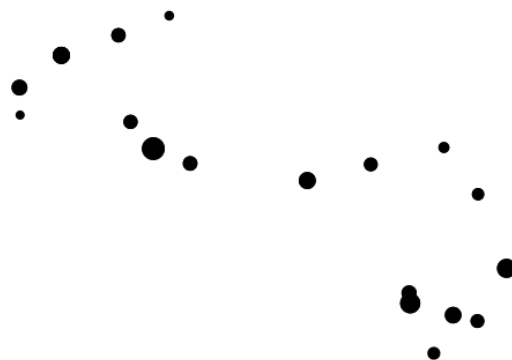
- A. The Sun will be a white dwarf.
- B. The Sun will be the same size it is today.
- C. The Sun will be a red giant.
- D. The Sun will be a black hole.

4. How many times brighter does a star with apparent magnitude 0 appear than a star with apparent magnitude 5?

- A. 5 times brighter
- B. 12.5 times brighter
- C. 25 times brighter
- D. 100 times brighter

5. Which constellation is pictured below?

- A. Canis Major
- B. Pegasus
- C. Sagittarius
- D. Scorpius
- E. Ursa Minor



31. Supernovas

1. What are the two possible remnants of a supernova?

- A. Protostar or a stellar nebula
- B. Black hole or a neutron star
- C. Main sequence star or a planetary nebula
- D. White dwarf or a gas cloud

2. Which body below is the most dense?

- A. Red giant
- B. Main sequence star
- C. White dwarf
- D. Planetary nebula

3. The oxygen in your body and in our atmosphere was primarily made in

- A. Red dwarfs
- B. Exploding massive stars
- C. Merging neutron stars
- D. The core of our Sun

4. Select each true statement.

- A. A supernova always produces a black hole.
- B. The Milky Way has 1 to 3 supernovas each century on average.
- C. The Sun will go supernova in about 7 billion years.
- D. Beetlegeuse is so large, it will skip a supernova and jump straight to being a black hole.

5. Which constellation is pictured below?

- A. Cancer
- B. Canis Major
- C. Pisces
- D. Taurus
- E. Ursa Major



33. Black Holes

1. Which statement is true?

- A. Stephen Hawking was the first person to predict the existence of black holes.
- B. The supermassive black hole nearest Earth is in the Andromeda galaxy.
- C. If the Sun was replaced with a black hole that had the same mass, it would consume the planets in the inner solar system
- D. The event horizon is the region around the singularity where light can't escape.

2. What characteristic do astronomers typically rely on to detect black holes?

- A. Their strong radio signals
- B. Their bright color
- C. Their intense magnetic fields
- D. The effects of their gravity on nearby stars and gas

3. What typically forms after a medium-size star like our Sun dies?

- A. Black hole
- B. White dwarf
- C. Supernova
- D. Neutron star

4. Observed black holes range in size from:

- A. 4 solar masses to over 60 billion solar masses
- B. 1 solar mass to 100,000 solar masses
- C. 100,000 solar masses to 1 billion solar masses

5. Which of the following statements are true?

- A. Every star eventually becomes a black hole.
- B. The event horizon is where the escape velocity equals the speed of light.
- C. A black hole has a physical surface.
- D. If the mass of Mount Everest were crammed into a space the size of an atomic nucleus, it would become a black hole.

34. Galaxies And Our Local Neighborhood

1. Which of these is a galaxy near the Milky Way?

- A. The Pleiades
- B. Pinwheel Galaxy
- C. Large Magellanic Cloud
- D. M80

2. Which is the correct order from smallest to largest?

- A. Planet → Galaxy → Solar System → Universe
- B. Planetary System → Star Cluster → Galaxy → Universe
- C. Galaxy → Star Cluster → Universe → Multiverse
- D. Planetary System → Galaxy → Star Cluster → Universe

3. Which of the following statements are true?

- A. Parallax is only noticeable if the observer moves.
- B. A smaller parallax angle means a star is closer to Earth.
- C. Parallax shift becomes too small to detect at large distances.
- D. Parallax angles are measured in degrees.

4. Which of the following statements are true?

- A. Proxima Centauri is the brightest star in the night sky.
- B. We can't see stars outside of the Milky Way Galaxy with just our eyes.
- C. The farther we look, the younger the universe appears.
- D. Radio waves can travel faster than light.

5. What is a parsec?

- A. How long it takes like to travel to the andromeda galaxy
- B. The distance light travels in a century
- C. How long it takes light to travel 1 AU
- D. The distance of approximately 3.26 light years or 206,265 AU

36. Spacetime and The Universe

1. What does the term “redshift” refer to?

- A. The compression of light as objects move toward us
- B. The stretching of light as objects move away
- C. The change in color observed as stars cool
- D. A change in brightness due to distance

2. What key evidence supports the idea that the universe is expanding?

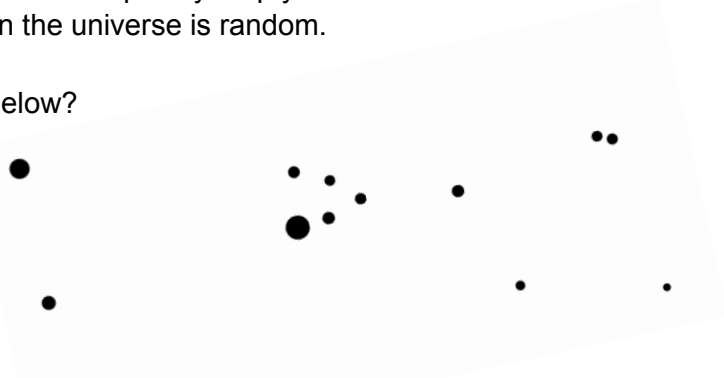
- A. Space is mostly a vacuum of emptiness.
- B. Stars have different temperatures.
- C. Redshift of distant galaxies
- D. The speed of light is constant.

3. Which of the following statements are true?

- A. Cosmic Microwave Background is the oldest light in the universe.
- B. The Big Bang theory states that the universe used to be hotter and denser than it is now.
- C. The space between galaxies is completely empty.
- D. The distribution of matter in the universe is random.

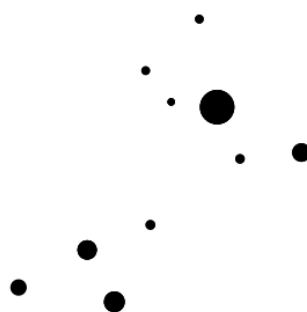
4. What constellation is pictured below?

- A. Pisces
- B. Leo
- C. Cancer
- D. Gemini
- E. Taurus



5. What constellation is pictured below?

- A. Sagittarius
- B. Leo
- C. Ursa Major
- D. Canis Major
- E. Scorpius



37. Dark Matter

1. Select each true statement.

- A. Dark matter does not interact with light in any way.
- B. Black holes are made of dark matter.
- C. Without dark matter, standard physics says galaxies would fly apart.
- D. Dark matter is another term for antimatter.

2. What percentage of the universe's total mass-energy is made up of dark matter?

- A. About 5%
- B. About 27%
- C. About 68%
- D. About 95%

3. Why do planets further away from a star orbit slower than planets closer to the star?

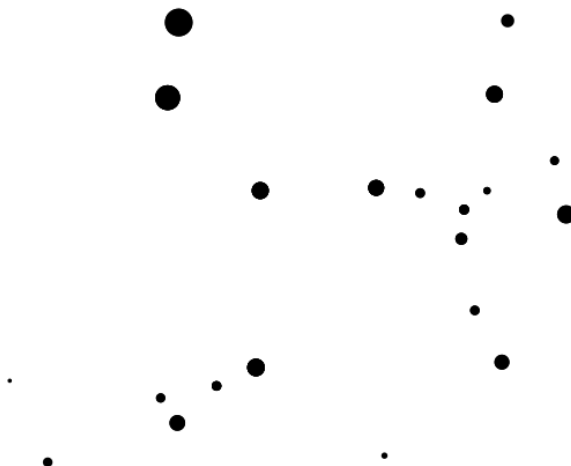
- A. They experience less of the stars magnetic field.
- B. Time dilation.
- C. They experience less gravitational pull from the star.
- D. Space is colder further from the star and this reduces their speed.

4. Select each true statement.

- A. Gravitational lensing was predicted by Kepler's Laws of Motion.
- B. Most of our galaxy's mass is visible matter (ex stars, dust, and gas).
- C. In 2024, scientists detected the particle responsible for dark matter.
- D. In a collision of two galaxies, the gas and dust clouds interact and slow down, but dark matter and stars tend to pass through.

5. What constellation is pictured below?

- A. Pisces
- B. Leo
- C. Virgo
- D. Pegasus
- E. Centaurus



39. Stars, Galaxies, and Universe Quiz Show

1. What is the closest star to Earth?

- A. Proxima Centauri
- B. Sirius
- C. Sol
- D. Alpha Centauri A

2. Select each true statement.

- A. A light year is a measure of time.
- B. White stars are hotter than blue stars.
- C. Blueshift describes what happens when an object moves away from us.
- D. The big bang theory describes how the universe will end.

3. Which of the following correctly lists the stages of a sun-like star's life cycle in order?

- A. Nebula → Main Sequence → White Dwarf → Red Giant
- B. Nebula → Red Giant → Main Sequence → White Dwarf
- C. Nebula → Main Sequence → Red Giant → White Dwarf
- D. Nebula → White Dwarf → Red Giant → Supernova

4. What can we accurately say about a neutron star? Select all that apply.

- A. It's the remnant of a supernova.
- B. It will soon become a black hole.
- C. It is undergoing fusion much faster than a main sequence star.
- D. It will soon go supernova.

5. Which property of a star does "apparent magnitude" measure?

- A. Temperature
- B. Size
- C. Color
- D. Brightness

6. What does the Hertzsprung-Russell diagram compare?

- A. Distance and speed
- B. Temperature and brightness
- C. Mass and volume
- D. Size and age

7. What is the approximate age of the universe?

- A. 36 million
- B. 4.6 billion years
- C. 13.8 billion years
- D. 2.1 trillion years

8. Which feature of a star determines how it will die?

- A. Its color
- B. Its age
- C. Its temperature
- D. Its mass

9. What does it mean when we say a star is in the "main sequence"?

- A. It is about to explode.
- B. It is fusing hydrogen into helium in its core.
- C. It is shrinking.
- D. It has too little mass to become a black hole.

10. Select each true statement about apparent magnitude.

- A. Increasing the distance to a star would increase the value of its apparent magnitude.
- B. Increasing the brightness of a star would increase the value of its apparent magnitude.
- C. A star with apparent magnitude 4 is brighter than a star with apparent magnitude 2.
- D. A star with apparent magnitude 0 will be visible with the naked eye at night.

11. If you could orbit one planet in a space station for 3 hours, which planet would you choose?

- A. Mercury
- B. Venus
- C. Earth
- D. Mars
- E. Jupiter
- F. Saturn
- G. Uranus
- H. Neptune

12. What do astronomers believe makes up most of the mass in the universe?

- A. Stars
- B. Gas clouds
- C. Black holes
- D. Dark matter

13. Why do stars twinkle when viewed from Earth?

- A. Their light is variable; they flash and twinkle in space.
- B. The brightness of a star changes over its lifespan.
- C. Their light is bent by Earth's atmosphere.
- D. They spin rapidly.

14. What is *dark energy* thought to be responsible for?

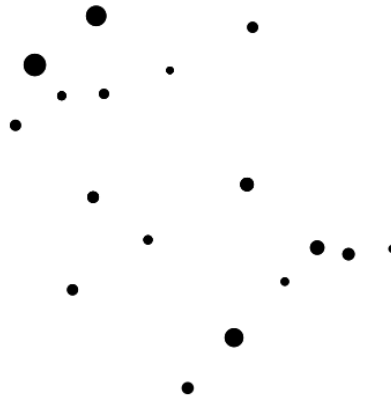
- A. Causing stars to burn out
- B. Holding galaxies together
- C. Making the universe expand faster
- D. Creating black holes

15. It takes 9.7 years for light to travel from V1216 Sagittarii to Earth. How far away is V1216 Sagittarii?

- A. 3 parsecs
- B. 9.7 parsecs
- C. 19.4 parsecs
- D. 30 parsecs

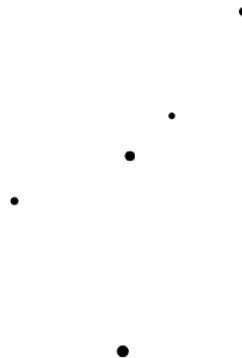
16. What constellation is pictured below?

- A. Centaurus
- B. Gemini
- C. Leo
- D. Pisces
- E. Pegasus
- F. Virgo



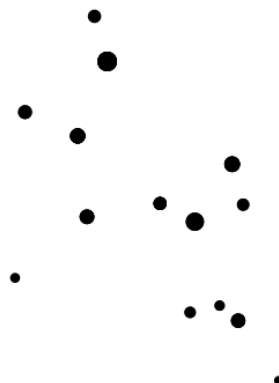
17. What constellation is pictured below?

- A. Cancer
- B. Canis Major
- C. Crux
- D. Cygnus
- E. Hydra
- F. Orion



18. What constellation is pictured below?

- A. Capricornus
- B. Cassiopeia
- C. Cetus
- D. Perseus
- E. Ursa Minor
- F. Sagittarius



40. Telescopes

1. Why are many large observatories built on mountaintops?
 - A. To be closer to stars
 - B. Because telescopes work in colder temperatures
 - C. To reduce light pollution and atmospheric interference
 - D. Because lower air pressure makes telescopes more efficient

2. Which wavelengths can NOT be observed from Earth's surface?
 - A. Gamma rays
 - B. X-rays
 - C. Ultraviolet
 - D. Visible light
 - E. Infrared
 - F. Microwaves
 - G. Radiowaves

3. What is an advantage of a reflecting telescope over a refracting telescope?
 - A. Mirrors are cheaper and easier to make than large lenses.
 - B. Reflecting telescopes can see better through clouds.
 - C. They can see infrared light.
 - D. They use lenses which can focus light better than mirrors.

4. Select each true statement.
 - A. Hubble primarily sees visible and UV light.
 - B. Both Hubble and the JWST use mirrors to gather light.
 - C. Hubble sees infrared light while JWST perceives all wavelengths of light.
 - D. The Hubble telescope orbits further away than the JWST.

5. Select each true statement.
 - A. The center of the Milky Way galaxy is located in the constellation Sagittarius.
 - B. Planets orbit stars but galaxies are stationary in space.
 - C. The universe does not have a center.
 - D. Polaris is part of the Ursa Major constellation.

42. Lunar Missions

1. When did a person first walk on the Moon?

- A. 1959
- B. 1969
- C. 1979
- D. 1989

2. Which of the following statements is true?

- A. The International Space Station is traveling at 11.2 km/s (about 25,000 mph).
- B. The speed required for a stable orbit is faster than escape velocity.
- C. The higher an satellites altitude, the faster it has to orbit.
- D. Escape velocity depends on both the mass and the radius of the planet or moon.

3. Select each true statement.

- A. Earth rotates along the equatorial plane.
- B. Earth rotates along the plane of the ecliptic.
- C. Earth revolves along the equatorial plane.
- D. Earth revolves along the plane of the ecliptic.

4. What is a meteorite?

- A. A rock that is traveling in space
- B. A rock from space that has entered Earth's atmosphere
- C. A rock from space that has traveled through Earth's atmosphere and impacted the surface
- D. A celestial body made of gas, ice, and dust

5. The Moon's closest approach to the Earth is known as:

- A. Perigee and corresponds with the largest tides
- B. Perigee and corresponds with the smallest tides
- C. Apogee and corresponds with the largest tides
- D. Apogee and corresponds with the smallest tides

43. Living in Space

1. How long would it take to reach Alpha Centauri if traveling at current speeds using current technology?

- A. 20+ years
- B. 200+ years
- C. 20,000+ years
- D. 2 million years

2. Select each true statement?

- A. It's more difficult to land spacecraft on Mars than it is to land on the Moon.
- B. Mars has an atmosphere suitable for plants to grow in.
- C. The travel time between Earth and Mars is 7-10 years.
- D. Europa is estimated to have twice as much total water as Earth.

3. If an arm is held out straight, approximately how many degrees is a closed fist?

- A. 1°
- B. 5°
- C. 10°
- D. 15°
- E. 25°

4. What causes Orion to be easily visible in December but absent from the night sky in June?

- A. Rotation of the Milky Way Galaxy
- B. Precession or wobble of Earth's axis
- C. Rotation of the Earth around its axis
- D. Revolution of the Earth around the Sun

5. When is the Sun directly overhead at noon for an observer in the continental United States or Canada?

- A. Once a year on the summer solstice
- B. Twice a year on each equinox
- C. Never, because the continental US and Canada are north of the Tropic of Cancer
- D. Every day of the year

45. Final Quiz Show

1. What is the primary energy source during the red giant phase of a star's life?
 - A. Gravitational collapse
 - B. Hydrogen fusion in the core
 - C. Helium fusion in the core
 - D. Carbon fusion in the outer layers

2. What portion of the Moon's surface is covered by sunlight during the new moon phase?
 - A. 0%
 - B. 25%
 - C. 50%
 - D. 75%
 - E. 100%

3. What phase of the moon is occurring 3 days after a first quarter moon?
 - A. Waxing gibbous
 - B. Waxing crescent
 - C. Waning gibbous
 - D. Waning crescent

4. Enceladus is a moon of which planet?
 - A. Neptune
 - B. Uranus
 - C. Saturn
 - D. Jupiter

5. Select each true statement.
 - A. Only 10% of stars with the same mass as the Sun become black holes.
 - B. Dark energy adds mass that holds galaxies together.
 - C. Uranus rotates on its side relative to its orbit.
 - D. A full moon can never occur on the summer solstice.

6. What mission successfully landed the first humans on the Moon?

- A. Apollo 8
- B. Apollo 11
- C. Apollo 13
- D. Apollo 17

7. Why do astronomers prefer space-based telescopes for observing ultraviolet and X-ray radiation?

- A. The atmosphere blocks these wavelengths.
- B. These wavelengths are only visible in extremely cold temperatures.
- C. Ground-based telescopes are too expensive.
- D. These wavelengths are only emitted in space.

8. What does cosmic microwave background radiation provide evidence for?

- A. Black hole formation
- B. Formation of the solar system
- C. Expansion of the Sun
- D. The Big Bang

9. Which statement below is NOT true about the James Webb Space Telescope (JWST)?

- A. It orbits Earth.
- B. Its primary mirror is covered in gold.
- C. It launched in 2021.
- D. It uses the infrared spectrum to see through dust clouds.

10. What determines whether a star becomes a neutron star or a black hole after a supernova?

- A. Speed of rotation
- B. Amount of iron in the core
- C. Mass of the stellar remnant
- D. Age of the star

11. Finish the statement that best describes Kepler's 2nd Law "They sweep out equal areas in equal time so fair..."

- A. Their axial tilt leads to seasons long beyond compare.
- B. They move fast when close to the Sun and slow when way out there.
- C. They make an elliptical path, a constant speed they share.
- D. Careful observation shows a circle route so rare.

12. What is the term for the boundary around black hole where the escape velocity equals the speed of light?

- A. Singularity
- B. Accretion disk
- C. Event horizon
- D. Quasar

13. What causes retrograde motion of planets as seen from Earth?

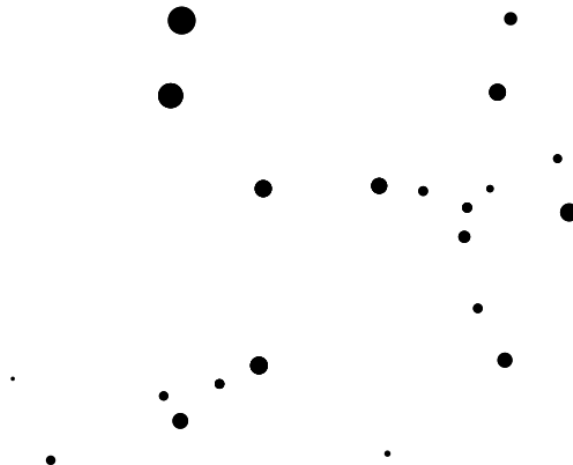
- A. Backward rotation of the planets
- B. Change in Earth's orbit shape
- C. Gravitational lensing effects
- D. Earth overtaking a slower outer planet in its orbit

14. What must the Moon's orbital position be for a solar eclipse to occur?

- A. Apogee
- B. Full moon
- C. New moon
- D. Perigee

15. What constellation is pictured below?

- A. Centaurus
- B. Canis Major
- C. Capricornus
- D. Cancer
- E. Cetus



16. What constellation is pictured below?

- A. Aquarius
- B. Gemini
- C. Leo
- D. Pisces
- E. Pegasus



17. What constellation is pictured below?

- A. Crux
- B. Cygnus
- C. Hydra
- D. Draco
- E. Ursa Minor

