

# Astronomy Knowledge Compendium

## Sky Motions



1. What is the zenith and horizon?
2. How does Earth rotate (in what direction)?
3. What are the North & South Celestial Poles and the Celestial Equator?
4. What is the ecliptic?
5. What is the zodiac?
6. What is precession?
7. Why do we experience seasons?
8. What is a solstice? What is an equinox? Where is the Sun located on these days?
9. What are the phases of the moon? Where are the Earth, Moon and Sun located at each phase? What are the rise & set times for each phase?
10. Where are the Earth, Moon and Sun located for a solar eclipse? For a lunar eclipse?

## History

1. How was it first determined that Earth was a sphere and who (what culture) did this?
2. What did Eratosthenes do?
3. What is a geocentric model?
4. What are the contributions of Ptolemy?
5. What was the contribution of Copernicus?
6. What is a heliocentric model?
7. How does the heliocentric model explain retrograde motion?
8. What were the contributions of Galileo?
9. What were the contributions of Tycho Brahe?
10. What were the contributions of Johannes Kepler?
11. What are Kepler's Laws?
12. What were the contributions of Isaac Newton?

## Light and telescopes

1. What is the definition of wavelength?
2. What are the colors of the spectrum?
3. How do astronomers use spectra to determine the chemical composition of objects?
4. What is the Doppler Effect?
5. What is a red shift and a blue shift?
6. What is the difference between a reflector and a refractor? What are the advantages & disadvantages of each type?
7. What is the difference between a Cassegrain and a Newtonian style telescope?
8. How does the aperture of a telescope affect the image?
9. What determines the brightness and resolution of an image?
10. How is the magnification of a telescope calculated?
11. What are the two numbers associated with binoculars?
12. What are the major differences of using a binocular and a telescope?

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## General Solar System Information

1. How much of the Solar System's mass is found in the Sun?
2. How do the planets move around the Sun?
3. What are the characteristics of Terrestrial planets?
4. What are the characteristics of Jovian planets?
5. What is the criteria that differentiates a planet from a Dwarf planet?
6. What is the current scientific theory of how the Solar System formed?
7. How are extrasolar planets detected?
8. What are the characteristics of the extrasolar planets that have been found so far?

## Earth & Moon

1. What are the layers of Earth's interior?
2. What is plate tectonics and what causes it?
3. What is the composition of Earth's atmosphere?
4. What is the greenhouse effect and what causes it?
5. What is the composition of the Moon and what parts of the Earth is it similar to?
6. What are the lunar highlands and what are they composed of?
7. What are the lunar mare and what are they composed of?
8. How did the mare form?
9. How are craters formed?
10. What is the current scientific theory on how the Moon formed?

## Terrestrial Planets

1. What is the temperature range on Mercury?
2. What is the composition of Mercury?
3. What is unusual about the temperature and pressure on Venus? How did Venus get to be so hot?
4. What is the composition of Venus' surface?
5. What is the composition of Venus' atmosphere?
6. What are the highlands of Mars and where are they located?
7. What are the lowlands of Mars and where are they located?
8. What is Olympus Mons?
9. What is Mariner Valley?
10. How do winds affect the surface of Mars?
11. What is the composition of Mars' atmosphere?
12. What is the evidence for water once flowing on Mars?

## Jovian Planets

1. What is the composition of the Jovian planets' atmosphere?
2. Which planet is largest?
3. What is unusual about the density of Saturn?
4. What is unusual about the tilt of Uranus' axis?
5. What is the Great Red Spot?
6. What is the source of heat that allows Europa to have liquid water?
7. What causes volcanoes on Io?
8. What is the composition of Titan's atmosphere?
9. Which planets have rings and what are they composed of?

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## Small Bodies

1. Who is Clyde Tombaugh and what did he do?
2. What is unusual about Pluto's orbit?
3. How does Pluto's atmosphere change with distance from the Sun?
4. What is the Asteroid Belt and where is it found?
5. What are the main parts of a comet?
6. What are the parts of a comet's tail?
7. What is the Oort Cloud?
8. What is the Kuiper Belt?
9. What is the largest Kuiper Belt Object?
10. What causes meteors to give off light?
11. What causes a meteor shower?
12. What are the main types of meteorites?

## The Sun

1. What is the composition of the Sun?
2. What are the layers of the solar atmosphere?
3. How are sunspots formed?
4. Name two features found in the chromosphere and explain how they are formed.
5. Name two features found in the corona and explain how they are formed.
6. How does the Sun produce energy?
7. What are the layers of the Sun's interior?
8. What happens in the Sun's core?

## Stars

1. What is the stellar classification system and who developed it?
2. What are Cepheid variable stars, who discovered them, and how are they used for finding distances?
3. What is an open cluster?
4. What is a globular cluster?
5. What is the composition of the interstellar medium?
6. Where are stars born? Under what kind of conditions?
7. What is a protostar?
8. What is a main sequence star? How does it generate energy?
9. How does the chemical composition of a main sequence star change as it ages?
10. How does the lifetime of a main sequence star depend on its mass?
11. What is an orange giant star?
12. What is a red giant star?
13. How does a planetary nebula form?
14. How does the red giant stage of a high mass star differ from a low mass star?
15. What causes a supernova? What kinds of elements are created during a supernova?
16. What is a white dwarf and how big is it?
17. What sized object becomes a neutron star? A black hole?
18. What is a neutron star and how big is it?
19. Who discovered pulsars and what are they?
20. What are the main parts of a black hole?

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## The Milky Way

1. How did Harlow Shapley determine the Sun's location in the Milky Way? Where are we?
2. What are the main characteristics and components of the disk of the Milky Way?
3. What are the main characteristics and components of the halo of the Milky Way?
4. What are the main characteristics and components of the nuclear bulge of the Milky Way?
5. Where does most star formation occur in the Milky Way and why?

## Galaxies

1. How did Hubble measure the distance to the Andromeda galaxy?
2. What are the characteristics of spiral galaxies (physical appearance and composition)?
3. What are the characteristics of elliptical galaxies (physical appearance and composition)?
4. What are the characteristics of irregular galaxies (physical appearance and composition)?
5. How are irregular galaxies formed?
6. What evidence is there that the Universe is expanding? Who discovered it?
7. What is the relationship between velocity and distance to a galaxy?
8. What is unusual about the distance, brightness and size of quasars?
9. What is the source of power for quasars and active galaxies?

## Cosmology

1. What is the Local Group?
2. What is the difference between a poor and rich galaxy cluster?
3. Where are giant elliptical and spiral galaxies found in clusters?
4. How much of the Universe is made of dark matter? What is the evidence for it?
5. What is the Cosmological Constant?
6. What is the difference between a closed and open Universe?
7. What is an accelerating Universe?
8. What are the key ideas of the standard Big Bang model?
9. Who detected the Cosmic Background Radiation and what is its temperature?

## Observational Astronomy

1. What is "seeing"?
2. What is the definition of apparent magnitude and absolute magnitude?
3. How are numbers assigned in the magnitude scale?
4. What is a safe way to observe the Sun?
5. When is the best time to observe Mercury and Venus?
6. When is the best time to observe superior planets?
7. Name two prominent meteor showers and when they are visible.
8. Name a prominent constellation visible for each season and explain the mythology of each.
9. Name three prominent star clusters, planetary nebulae, supernova remnants, and galaxies, what constellation each is in, and what time of year it is visible.
10. What is star-hopping?

**Note: Answers can be found in any astronomy textbook or on-line. There is no time limit to take this survey. Passing requires a grade of 90% or greater.**