Astronomy Test Study Guide

**Cosmology:**

* Universe began as a point called a \_\_**Singularity**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and has been \_**expanding**\_\_\_\_\_\_\_\_\_ ever since.
* What is the evidence for the Big Bang (3 types of evidence)
  + The \_\_**redshift\_\_\_\_\_** in the galaxy light spectrum (Doppler shift) show that galaxies are moving away from each other
  + In 1965, scientists discovered a persistent background noise from space caused by weak radiation called \_\_**cosmic background radiation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** This radiation was radiating from all directions and was consistent with the temperature thought to happen during the Big Bang.
  + The abundance of the “light elements” \_**hydrogen\_**\_\_\_\_\_\_\_\_\_\_\_\_ and **\_\_helium**\_\_\_\_\_\_\_\_\_\_\_\_\_ found in the observable universe.

**Galaxies/Sun:**

* How to read an H-R diagram. Make connections between
  + Temperature versus luminosity

**Main sequence: as temperature increases, so does luminosity.**

**Giant stars: as temperature increases, luminosity stays the same…. This is the same for white dwarfs, red giants and supergiants.**

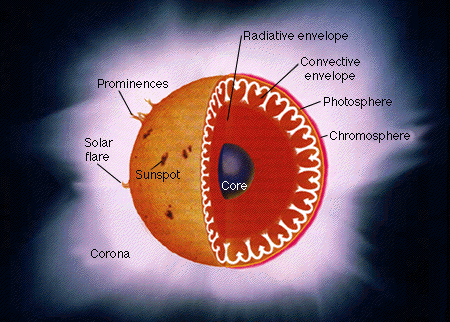
* + Luminosity versus size

**As luminosity increases, size increases. In fact, size is the reason luminosity increases.**

* What kind of wavelength is considered the “red end of the spectrum”? Long or short?

**Long wavelengths are red.**

* Draw and label a picture of the sun with its layers:



* Which layer of the sun is the densest? **Core**
* Which layer of the sun do we see normally? **photosphere**
* Which layer of the sun can we only see during a total solar eclipse? **Corona**
* How does the sun convert energy? **Nuclear fusion – hydrogen into helium**
* What is the difference between apparent magnitude and absolute magnitude?

**absolute magnitude – The measure of the amount light a star gives off (How bright the star really is)**

**apparent magnitude – A measure of the amount of light received on Earth (How bright it looks because it is closer).**

* Explain the differences between galaxies, solar systems, galaxy clusters and superclusters. (size? What are they made of? Etc.)

**Superclusters are made of galaxy clusters. Galaxy clusters are made of galaxies. Galaxies are made of billions of stars. Solar systems are made of planets revolving around a star.**

**Big to small: Supercluster – galaxy cluster – galaxies – solar systems – stars**

* What does the element spectral line shift of a star (red or blue) mean?

**If the spectral lines make a small shift toward the red end of the spectrum, it’s called a red shift which means that object is moving away from. If it makes a small shift toward the blue end of the spectrum, it’s called a blue shift which means the object is moving TOWARD us.**

* How are stars formed?

**Stars are formed from the gravitational attraction between gas and dust in a NEBULA that get so hot that fusion (nuclear fusion) can occur.**

* How is color related to a star’s temperature? Give an example.

**The color of a star tells us its temperature. The sun is yellow and its temperature of 5300 degrees corresponds with the color yellow on the H-R diagram.**

**Cooler stars = red/orange**

**Hotter stars = Blue/white**

* What is the life cycle of our sun?

**Nebula – Protostar - Main sequence – red giant – planetary nebula – white dwarf…all based on MASS!!!**

* What is the life cycle of a more massive star? Which type of star becomes a black hole? Neutron star?

**Nebula – protostar - main sequence – super giant (red/blue) – SUPERNOVA – neutron star (10-17x’s sun’s mass) or black hole (17x’s sun or more)**

* Why do stars appear to change position during the night?

**The earth rotates on its axis**

**Planets**

* What type of measurement are we referring to if we’re comparing mass and volume? **Density**
* Why would the gas planets be significantly larger in diameter but smaller in comparison in mass**? Despite being larger, the elements that make up the Outer planets are less densely packed together causing them to be quite light for their size.**
* Why does a person weigh more on Earth than on the Moon? **Earth has greater gravitational pull (mass)**.
* Why has life flourished on Earth (presence of what)? **Liquid water**

**Match the following with the correct planet.**

1. Called the Earth’s twin (similar in mass)
2. Orbit is so eccentric it crosses the orbital path of another planet
3. Has the shortest day (Rotation)
4. Has the shortest year (Revolution)
5. Has a fierce hurricane-like storm (several times the size of Earth)
6. Has a rocky surface (several planets)
7. Has a gaseous surface (several planets)
8. Low-density (several planets)
9. Has little to no atmosphere (heavily cratered)
10. Largest planet
11. Has no moons (two planets)
12. Called the Morning Star/Evening Star
13. Appears red because of iron in the soil
14. Thick atmosphere of carbon dioxide
15. Thin atmosphere of carbon dioxide
16. Atmosphere: 78% Nitrogen and 21% Oxygen
17. Atmosphere mostly Hydrogen and Helium (several planets)
18. Least dense of all the planets (could float in water)
19. Day is longer than its year
20. Rotates on its side (Early comet strike)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mercury  D, F, I, K | Venus  A, F, K, L, N, S | Earth  F, P | Mars  F, M, O | Jupiter  C, E, G, H, J, Q | Saturn  G, H , Q, R | Uranus  G, H, Q, T | Neptune  G, H, Q | Pluto (dwarf)  B |

* If there are sand dunes that look to be shifting on another planet, what causes these shifts (think about what normally causes the shifts in sand on the earth)? **Wind**

**Asteroids/Comets**

* Where is the asteroid belt located? **Between Mars and Jupiter**
* What causes meteor showers? **Meteors burning up in the Earth’s atmosphere**
* In which direction does a comet’s tail point? **Away from the sun** Why? **Solar wind blows it away from the sun.**
* What is a comet? **A frozen mass (3-5 mile diameter) that travels around the sun in a highly elliptical orbit.**
* What is the difference between a meteoroid, meteor, and meteorite?

**Meteoroid – Debris located outside Earth’s atmosphere.**

**Meteors – When a meteoroid is located within Earth’s atmosphere and often burn up in the atmosphere leaving a streak of light.**

**Meteroites – Meteroids that don’t burn up in the atmosphere strike the Earth and form craters**

**Sun Earth Moon Relationship**

* What causes day and night? **The rotation of the Earth on its axis.**
* If the Northern Hemisphere is experiencing summer, what is the Southern Hemisphere experiencing? **Winter**
* If the Southern Hemisphere is experiencing summer, what is the Northern Hemisphere experiencing? **Winter**
  + What is an equinox? **Two times each year when the sun crosses the equator.** **Day and night everywhere on earth is equal in length.** 
    - **March 21st – Vernal Equinox (Spring)**
    - **September 23rd – Autumnal Equinox**
* The seasons are caused by what three factors?
  + **Revolution of Earth around the Sun.**
  + **Tilt of the Earth’s axis**
  + **Parallelism of the axis (always points to the North star - Polaris).**
* What is the approximate percentage of the Earth that is illuminated by the sun at any given time? **50 %**
* How are the sun, moon and earth aligned during a lunar eclipse? Draw a picture.
* How are the sun, moon and earth aligned during a solar eclipse? Draw a picture.
* How long is the moon’s revolution around us and how do we know its revolving?

**The moon revolves about every 27.3 days. We know its revolving because of moon phases.**

* Describe the changes of the moon as it moves from the new moon phase back to the new moon phase again.

**It becomes increasingly brighter until it’s a full moon and then becomes increasingly darker until it becomes a new moon.**

* Describe, in words, how a lunar eclipse occurs.

**A lunar eclipse occurs when the moon passes behind the earth and the earth’s shadow falls upon the moon. The alignment is: Sun – Earth - moon**

* + How does this affect Earth (think tides)?

**A lunar eclipse creates a spring tide on the earth. High tides are higher than normal and low tides are lower than normal.**

* Describe, in words, how a solar eclipse occurs.

**A solar eclipse occurs when the moon passes between the sun and the earth. Because of the apparent diameter, the moon essentially blocks out the sun for some people on earth.**

* + How does this affect Earth (think tides)?

**A solar eclipse creates a spring tide on the earth. High tides are higher than normal and low tides are lower than normal.**

* Explain how we know the moon is gravitationally bound to the Earth.

**The moon’s rotation (27.3 days) is the same as the moon’s revolution (27.3 days.) We only see 1 side of the moon.**

* Are ocean tides and moon phases predictable or unpredictable? Explain.

**They are predictable and cyclical. Moon phases are predictable because we know how long a moon’s revolution is. If we know this, we can predict years in advance what moon phase will fall on what day and, thus, what type of tide we’ll see because of it.**

* What are tides caused by?

**Tides are caused by the gravitational attraction between the moon, earth and sun.**

* The moon has a stronger effect on the Earth’s tides than the sun. Why?

**The moon has a stronger pull than the sun because it is closer.**

* First artificial satellite to orbit Earth: **Sputnik**
* **Apollo 11** – spaceflight that landed first humans on the moon.