Unit 7 Study Guide Name:

Stars, Fusion, Galaxies, The Universe, The Solar System, Planets, Kepler’s Laws, The Moon

**Stars**

1. What are the two forces acting on a star at all times, and what direction does each force point?
2. The brightest star in the night sky is Sirius, in the Canus Major constellation, at 8.61 light years away. What does that 8.61 light years actually mean?
3. On the HR diagram to the right, label giants, main sequence, supergiants, and white dwarfs. Also draw a STAR where the Sun is.
4. What does LUMINOSITY mean?
5. On the diagram to the right, where do I find the brightest, coolest stars?
6. Where/how are stars born?
7. Explain the 5 step lifecycle of OUR SUN, and how each step leads into the next.
8. How old is our Sun?
9. How much of the life of any given star is spent in the Main Sequence?
10. For each of the following sized Stars, explain what will happen to the star, if it will supernova or not, and what the star will end up as?
	1. 0x – 10x the size of our SUN
	2. 10x – 30x the size of our SUN
	3. 30x – 50x the size of our SUN

**Fusion**

1. What is an isotope?
2. Explain how 126C and 146C are different? Be specific in terms of the number of protons, neutrons, and electrons.
3. In 7 words or less, explain what nuclear fusion is.
4. Draw the 3 steps of the proton-proton chain reaction and EXPLAIN it in a sentence or two to the right of your picture.
5. What is the largest element that is capable of being made during the fusion process inside a star?
6. How many fusion stages inside a star are necessary to actually make this element? (Google image will help)
7. How do larger elements than that element actually get made then?
8. What is the largest element that can be created during a supernova?
9. What is the largest element that our Sun will make during its lifetime? Why is that?

**Galaxies**

1. List and draw the 3 major types of galaxies?
2. Which of the above types of galaxies have new stars in them? Why do they have new stars in them?
3. Which type of galaxy has a “normal” and a “barred” type?
4. What is the name of our galaxy and what type is it?
5. How old is our galaxy?
6. How do galaxies get bigger?

**The Universe**

1. What did the Universe start out as? List 3-4 properties of that thing we started off as?
2. What is the equation for gravity?
3. How do increase the gravitational pull between 2 objects?
4. How long ago did the Big Bang happen, or how old is the universe?
5. What is a theory in science?
6. What are the 3 major pieces of evidence/data that support the theory of the Big Bang?
7. What are the 2 major points of Hubble’s law?
8. What are the 7 types of light from the Electromagnetic Spectrum, from longest wavelength to shortest wavelength?
9. What does red-shifting mean?
10. What do Cosmic Microwave Background Radiation show/tell us?
11. List the order of when each of these happened, from first to closest to now?
	1. Stars Form, Protons and electrons attach, Stable atoms began to form, Big Bang, Protons/Neutrons/Electrons form

**The Solar System + The Planets**

1. What do stars form from and how do they form?
2. What happens to the speed of the spin of an object when it is pulled in (think figure skater)?
3. What is accretion?
4. Name the 8 planets in order from closest to furthest from the Sun.
5. What phrase can we use to remember this?
6. What are the 2 major groups of planets? What caused these two groups to form differently?
7. What are the 2 smallest planets in our Solar System?
8. What are the 2 largest planets in our Solar System?
9. What are 2+ trends you see within the major groups of planets?
10. What are 2+ abnormalities you see when looking at data tables of each of the planets?
11. Where are most of the moons in the Solar System found?
12. In what 2 locations are most of the asteroids of our Solar System found?

**Kepler’s Laws**

1. List, and briefly explain each of Kepler’s 3 laws of planetary motion.
	1. 1st
	2. 2nd
	3. 3rd
2. What does having an ellipse with an eccentricity of zero mean?

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| **Planet** | **Eccentricity****( *0 = circle* )** |
| Mercury | 0.205 |
| Venus | 0.007 |
| Earth | 0.017 |
| Mars | 0.094 |
| Jupiter | 0.049 |
| Saturn | 0.057 |
| Uranus | 0.046 |
| Neptune | 0.011 |

1. What does it mean as the eccentricity of an ellipse gets further away from zero?
2. Which planet has the most rounded orbit?
3. Which planet has the most compressed orbit?

**The Moon**

1. How many moons are located inside of the Asteroid Belt?
2. What is special about OUR moon compared to other moons in the solar system?
3. Draw me the Sun, Moon, and Earth in a way that would cause the:
	1. LARGEST TIDES SMALLER TIDES
4. What does *crescent* mean? What does *gibbous* mean?
5. What does *waxing* mean? What does *waning* mean?