**Pre-AP Semester 2 Final: Review Guide Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd \_\_\_\_**

**Artifacts to review:**

Warm-Up and Cool Down Sheets, Big Bang Notes, Atoms and Elements Notes, Atomic Structure Worksheet, EM Spectrum Worksheet, Nuclear Reaction Videos, Star Notes, H-R Diagram Worksheet, Massive Star Video, and Sun Video, Supernova Video, Gravity Tides and The Moon Activity, Gravity Video, Eclipse Video, Moon Phases Worksheet, Kepler’s Laws notes, Solar System Notes.

**ESS 1-2: The Big Bang:**

1. Summarize the Theory of the Big Bang from your notes:
2. Explain Redshift and how it is supporting evidence to the Big Bang Theory.
3. What was the ratio of hydrogen and helium at the beginning of the universe?

What are they now? Why are these two ratios important?

1. Who discovered that galaxies were moving away from us?

Explain why this discovery is important evidence to the Big Bang Theory?

1. What did Arno Penzias and Robert Wilson discover?

What important evidence did this contribute to the Big Bang Theory?

1. What is spectroscopy?

How does this help us identify elements in stars?

**ESS 1-1 Life Cycle of Stars**

**Atoms and the Periodic Table**

1. Define the following terms. Include as much information as you can about each term.

Atom

Proton

Neutron

Electron

Ion

1. Complete the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Symbol | Atomic Number | Mass | Protons | Neutrons | Electrons |
| Beryllium |  |  |  |  |  |  |
| Iron |  |  |  |  |  |  |
| Manganese |  |  |  |  |  |  |
| Nickle |  |  |  |  |  |  |
| Arsenic |  |  |  |  |  |  |

1. Draw and label the life cycle of a Massive Star in the space below:
2. What is the highest element that a Main Sequence star can produce in its core?
3. What about a Red Super Giant before it burns out?
4. What about a Supernova?
5. What kind of star has the shortest lifespan, Massive or Sun-like?
6. Explain why?
7. Name 2 blue stars: Name 2 Yellow Stars: Name 2 Red Giant Stars:

b.

1. What are the 4 things that contribute to a Star’s Absolute Magnitude on the Hertzsprung-Russel Diagram:
2. 2.
3. 4.

**ESS 1-3 Life Cycle of Sun**

1. Draw and label the life cycle of a Sun-like Star in the space below:
2. What’s the biggest element that a Sun-like Star can make in its life time?
3. How does nuclear fusion work? Draw a diagram to go with your explanation:
4. What does the Sun produce that makes life possible on Earth?

**Waves**

1. Define each term:

Wavelength

Frequency

Amplitude

Crest/Trough

Medium

**Electromagnetic Spectrum**

1. Complete the table below using your EM Spectrum Worksheet.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Radio waves | Microwaves | Infrared waves | Visible waves | Ultraviolet waves | Xrays | Gamma rays |
| Frequency (highest? Lowest?) |  |  |  |  |  |  |  |
| Wavelength  (shortest? Longest?) |  |  |  |  |  |  |  |
| Energy  (highest? Lowest?) |  |  |  |  |  |  |  |
| Uses (list 1-2 uses of each) |  |  |  |  |  |  |  |

1. What is the relationship between energy and frequency? Between frequency and wavelength?
2. What is unique about light waves? (Hint: What don’t they use that other types of waves need?)
3. Circle the types of electromagnetic radiation that the Sun emits.

radio microwave infrared visible ultraviolet xray gamma

**ESS 1-4** **Gravity and Orbits:**

1. What is the equation for the Law of Gravity?
2. Explain what the Law of Gravity means in your own words:
3. What is an “Exit Velocity” and how does the gravity of a planet affect it?
4. Draw and label the phases of the Moon below:
5. What is the difference between a Neap and Spring Tide? Which type of moons are associated with each tide (New, 1st quarter etc.)
6. Which one, Neap or Spring, has the biggest difference between the daily high and low tides? Explain why you think this.

1. What is the difference between a Lunar Eclipse and a Solar Eclipse?
2. What are Kepler’s 3 laws?

a.

b.

c.

1. Now explain each law in your own words:

a.

b.

c.

1. What is the shape of our orbit?

**ESS 1-5 Formation of the Earth**

1. What celestial event caused our Sun’s nebula to collapse into a star and for the solar system to form?
2. How did the Earth and other planets go from random debris to a fully formed planet?
3. Explain how the moon was formed from Earth’s rock?
4. What was the Hadean period? What did this period first produce?
5. What was our first rains on Earth made out of?
6. How long did it rain after the Hadean period?
7. How old is our solar system?

How do we know this?

1. What are three-four things that scientists have found on recovered meteorites?
2. What extremely important compound did meteorites and comets bring to Earth that it did not have originally?
3. Explain the Theory that Alfred Wegener presented?
4. What 4 pieces of evidence did he present in support of his theory?
5. c.
6. d.
7. What one piece of evidence did his critics suggest was he missing?
8. Why does Continental Drift and Plate Tectonics explain why we have a scarcity of impact craters from space debris?
9. What are two other reasons that we don’t have a lot of impact craters from space debris
10. What are two types of dating that we use to date Earth materials, Lunar rocks and Space debris?
11. Define the following terms:
    1. Radioactive decay:
    2. Half-Life:
    3. Absolute Dating:
    4. Relative Dating:
12. Explain what Radioactive dating is:

**ESS 3-4 Electromagnetism**

1. Define the following symbols

C= λ=

f= h=

E=

Equations: C=λf E=hf C= 2.998 x 108 m/s h=6.626 x 10-34 J-s

Use the equations above to solve the following problems:

2. The yellow light given off by a sodium vapor lamp used for public lighting has a wavelength of 5.89x10-7 nm. What is the frequency of this radiation? Once you find the frequency, then find the Energy.

3. A certain microwave has a wavelength of 0.032 meters. Calculate the frequency of this microwave.

4. A radio station broadcasts at a frequency of 5.90x103 KHz. What is the wavelength of the radio waves?

5. Microwave ovens emit microwave energy with a wavelength of 1.29x10-3 cm. What is the energy of exactly one photon of this microwave radiation?

6. Calculate the energy of one photon of yellow light that has a wavelength of 5.89x10-7nm.