Investigating the Sun-Earth-Moon System Name:_____Block:_____

Personal Ads for the Sun, Earth, and Moon

In this activity you will use textbook resources to write personal ads for the Sun, Earth, and Moon. Personal ads for people usually give some general physical characteristics (height, weight, hair and eye color); they then list interests and hobbies (scuba diving, sports, watching movies), and they finally include special personality traits (calm and peaceful, high-energy, non-smoker) to make the person's description stand out and potentially match the interests of others.

1. To help you prepare, read FYI: *Our Star—The Sun*.

   As you read use the spaces below to write down any information you find especially interesting. Also define the bold terms used in the text. If you run across any other words that you don't know the meaning of, write those down and ask your teacher to help you with them.

Word/Term	Definition
Nuclear Fusion	
Solar Flare	
Northern Lights (aurora borealis)	
Prominences	
Corona	
Extra space for additional words or interesting information.	

2. In what ways is the Sun important in our solar system?

3. Explain how nuclear fusion is responsible for life on Earth.

FYI Our Star – The Sun

The sun is the only star in our solar system. It is the central gravitational body that governs the orbits of nearly all of the planets in our solar system. The sun is a yellow star that has medium temperature and medium size compared to other stars. It is made of mostly hydrogen and helium with traces of other elements.

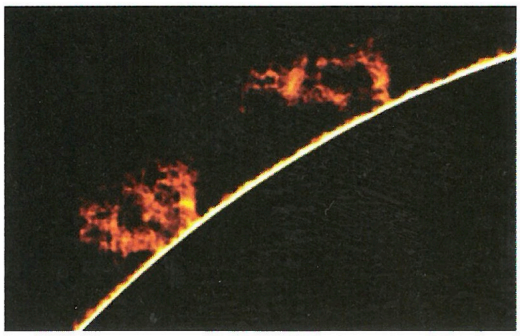

Figure 1-4: Image of prominences erupting in the corona of the sun during a solar eclipse

By observing star-forming regions in our galaxy and using computer models to recreate similar features and processes, scientists have learned that about 4.5 billion years ago, the sun formed from a large cloud of molecular gas. A small clump of gas within the cloud collapsed under its own gravitational force until it became hot and dense enough to start fusion in its core, and at that point it became a star. **Nuclear fusion** in the core of the sun combines lighter elements, such as hydrogen and helium, into heavier ones, such as carbon, nitrogen, and oxygen. These elements, made inside most stars, are the basis for life on Earth, including what makes up our bodies and most of the food we eat. Every second, 700 million tons of hydrogen are converted into helium in the core of the sun—releasing of an enormous amount of energy (about 4×10^{20} megawatts!) that radiates in all directions into space.

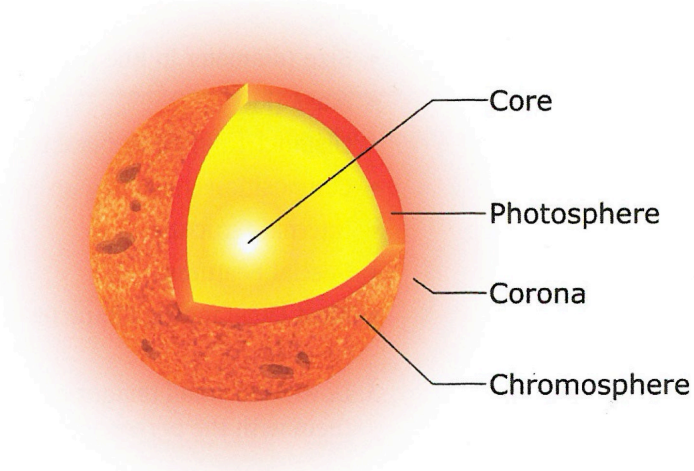

Figure 1-5: Diagram of the structure of the sun

The nuclear fusion in the core of the sun also provides all the energy we receive from the sun as light and heat. Earth is the perfect distance away from the sun to receive the exact amount of energy necessary for life. If Earth were 5% closer to the sun, the oceans would evaporate; 5% farther and all the oceans would freeze!

As energy leaves the core of the sun and makes its way to the sun's surface, eruptions of hot gas can occur. These are called **solar flares**. High-energy particles emitted during flare events create the shimmering **Northern Lights** (**aurora borealis**) and also can disrupt communication systems on Earth. During an eclipse, when the disk of the moon covers the disk of the sun, we can observe **prominences**, large jets of glowing gas that erupt from the surface of the sun, extending into the sun's outer layer, the **corona**.

Personal Ads for the Sun, Earth, and Moon (cont.)

4. Using information from the Foundations of Astronomy Textbook (pages 151, 445, and 461 are good places to start) as well as other astronomy texts, construct personal ads for the Sun, the Earth, and the Moon. You can use blank paper, lined loose-leaf paper, or a large notecard.

   Include the following information:
   - Name
   - Age
   - Size (diameter in kilometers)
   - Mass (kg)
   - Distance from other notable objects
   - Composition (what's it made of?)
   - Internal structure (layers on the inside)
   - Special features
   - Most Outstanding Characteristic(s)

5. Include a small drawing of the Sun, Earth, and Moon that highlights what you would notice most when looking at the object and include it on the personal ads.

Reflect

6. Which characteristic(s) of the Sun distinguishes it from both the Earth and the Moon?

7. Which of Earth's characteristics distinguishes it from both the Moon and the Sun?