Names:_____ Date: _____

Module 1A: Sun Primer Key

Instructions: Navigate to the Stanford Solar Center Comparison Activity webpage (http://solar-center.stanford.edu/compare/). As a team, research answers to the activity questions and write down the correct responses. Shine on!

A) How BIG is the Sun? Click on the "Diameter", "Outer Layers", and "Mass" links to learn about and compare the size of the Sun and its features.

Diameter:

- Using a ruler, draw a diameter across the false-color image of the Sun. Next, label your prediction of the width of the Sun in miles and kilometers on the diameter line - don't forget units (mi. and km).

We predict the Sun's diameter is…

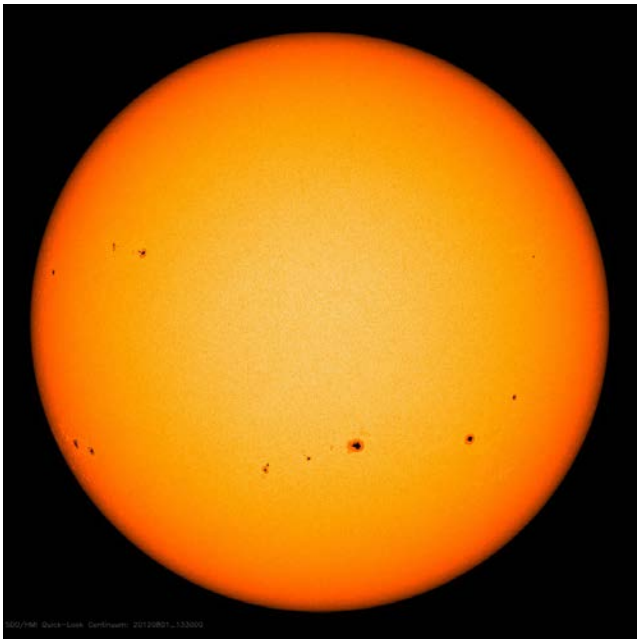

Image: NASA

- Draw a **box** around the feature found **on** the Sun's surface:
  Corona Prominence Sunspot

- **Circle** the choices that correctly complete the statement:
  *Sunspots are **hotter / cooler** than the surrounding surface of the Sun so they appear as **darker / lighter** areas on the Sun's surface.*

- The Earth's diameter is 7909 miles or 12,756 kilometers.
- The number of Earths that would fit across the disc of the Sun is 109 Earths!
- Now that you know how the size of the Sun compares to other objects, use a ruler to draw a diameter and label the actual width of the Sun in miles and kilometers on the diameter line - don't forget units (mi. and km).

The Sun's actual diameter is… 868,000 miles (1,400,00 km)

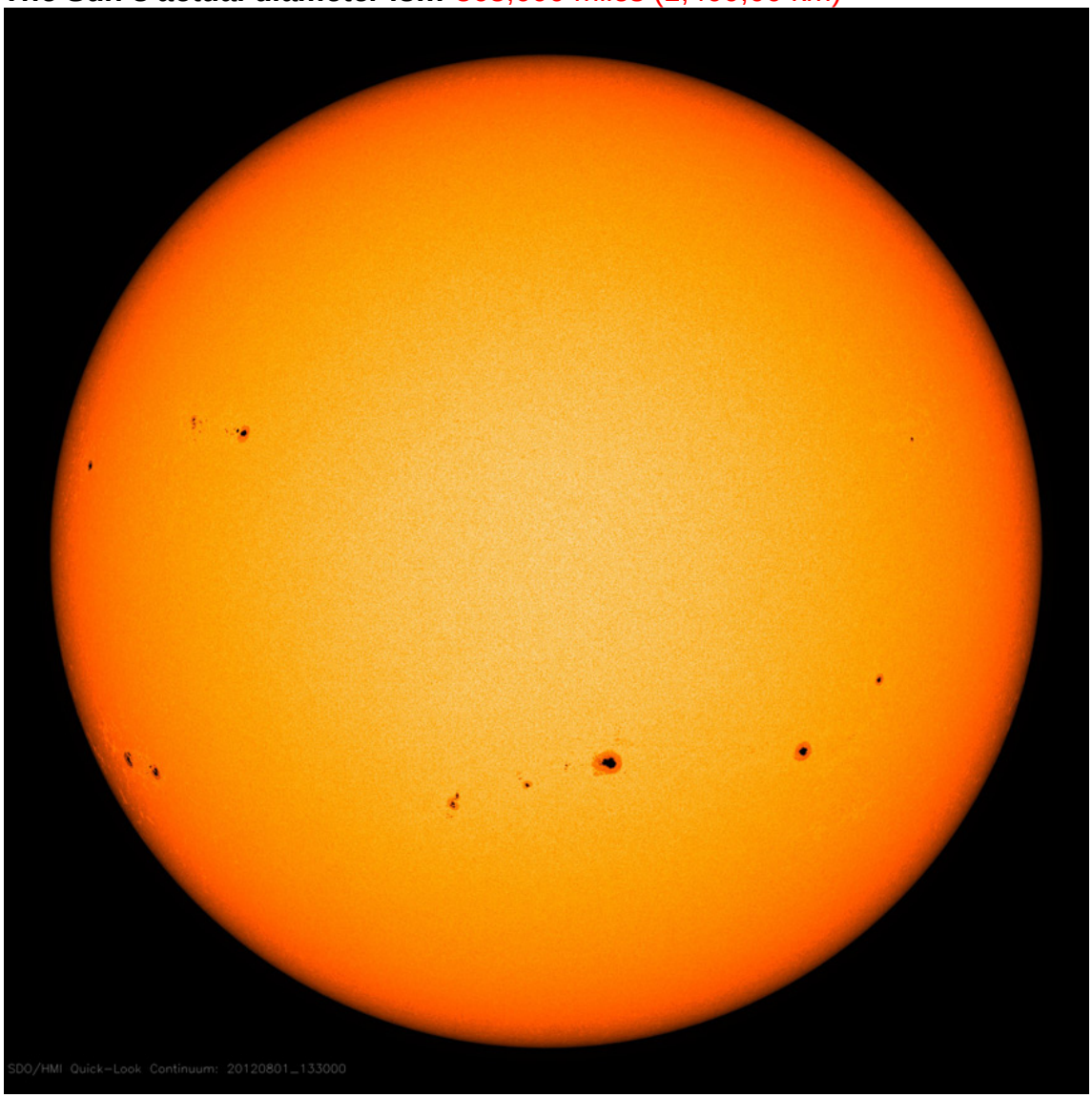

Image: NASA

- After completing the "Diameter" section, click on the "Sun's Vital Statistics" link and research the following "fast facts" about the Sun:

  a. The Sun contains 99.9 % of all the mass of the Solar System.
  b. The number of Earths that would fit inside the Sun is 1,000,000 Earths.
  c. The Sun is 4.5 billion years old
  d. The Sun's chemical composition is mainly made of the element Hydrogen at 73.46% and the element Helium at 24.85%.
  e. The mean (average) density of the Sun is 1.41 g/cm^3.
  f. Water has a density of 1.0/g/cm^3; objects sink in water if their density is greater and they float in water if their density is less.
     The Sun is **more / less** dense than water (circle the correct choice).
  g. Scientists also measure temperature in Kelvin (K). The hottest part of the Sun is the interior (center) at 15,000,000 K. The coolest part of the Sun is the sunspot umbra at 4250K.
  h. The Sun rotates on its axis. True or False (circle the correct choice).
  i. The Sun takes 26.8 days to rotate once on its axis around its equator.

Outer Layers: Click on "Next" and then the "Outer Layers" link.

- List the name and temperature of the three main outer layers of the Sun:

Outer Layers of the Sun	
Description of Layer	Name of Layer
Lowest layer of the Sun's atmosphere, sunspots are observed in this region	Photosphere
Red-colored, mid-layer of the Sun's atmosphere	Chromosphere
Narrow region of the Sun's atmosphere that separates the chromosphere from the corona	Transition Region

- The thickness of the Sun's outer layers is **greater than / less than / similar to** the diameter of the Earth (circle the correct choice).

Mass:

- The mass of the Sun is 300,000 times greater than the mass of the Earth!

B) How HOT is the Sun? Click on the "Photosphere" and "Core" links to learn about and compare temperatures of the Sun.

Photosphere: Click on "Next" and then the "Photosphere" link.

- The temperature of the photosphere is about 5800 K, which is 16 times hotter than boiling water!

Core: Click on "Next" and then the "Core" link.

- Correctly match the parts of the Sun with their correct description on the diagram of the Sun.

A. Chromosphere
B. Convective Zone
C. Core
D. Corona
E. Photosphere
F. Radiative Zone
G. Sunspot

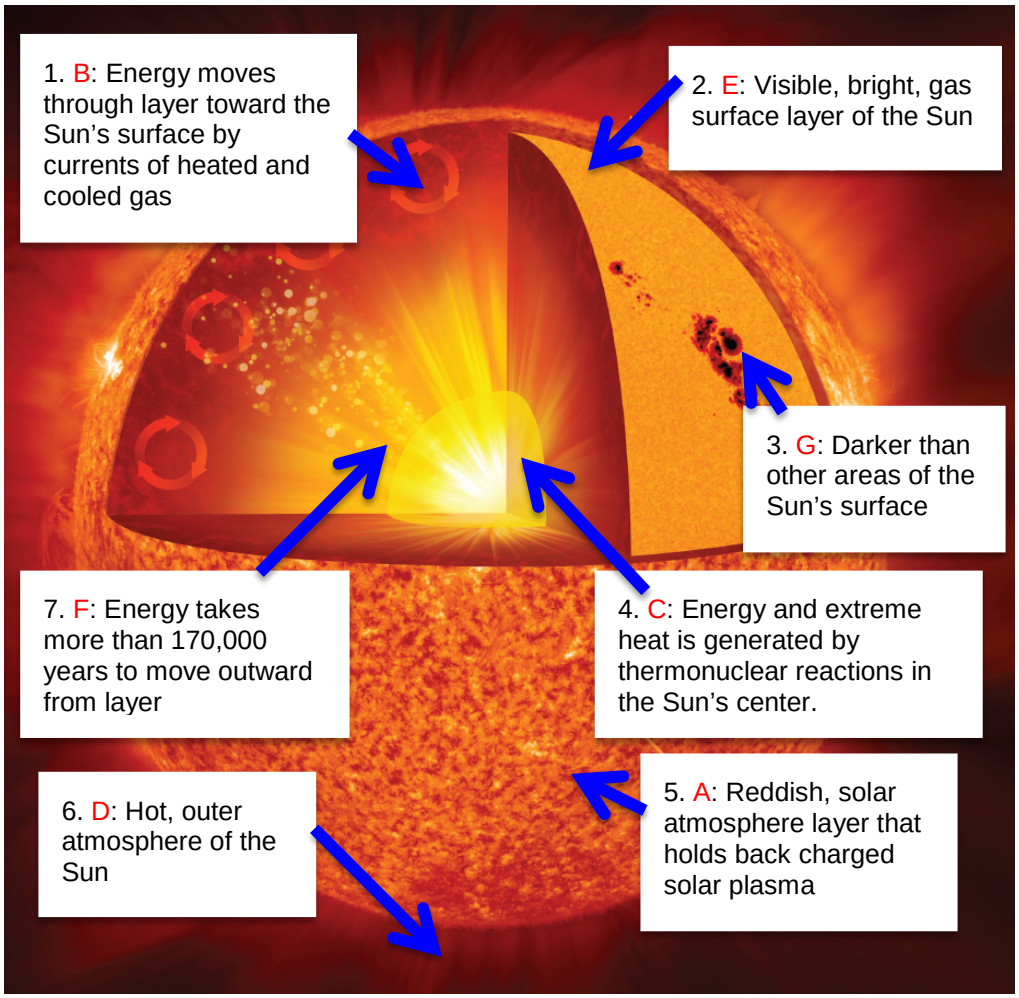

Image: NASA

- List the temperature of the three inner layers of the Sun:

Inner Layers of the Sun		
Name of Layer	Temperature in degrees Kelvin (K)	Temperature in degrees Fahrenheit (°F)
Core	15,000,000	27,000,000
Radiative Zone	2,000,000-7,000,000	3,600,000-12,600,000
Convective Zone	5,800-2,000,000	9,980-3,600,000

C) How <u>FAR</u> is the Sun? Click on the "Distance" link to compare and learn about distances in the Solar System.

<u>Distance:</u> Click on "Next" and then the "Distance" link.

a. Circle the word that has the same meaning as "orbit": **rotate** **revolve**
b. The Earth's orbit around the Sun is very slightly elliptical, which means that it is not a perfectly circular path.
c. The Earth's *perihelion* (closest distance) to the Sun is 146,000,000 Km or 91,000,000 miles away.
d. The Earth's *aphelion* (furthest distance) from the Sun is 152,000,000 km or 94,500,000 miles away.
e. The average (mean) distance the Earth is from the Sun is 150,000,000 km or 93,200,000 miles away.

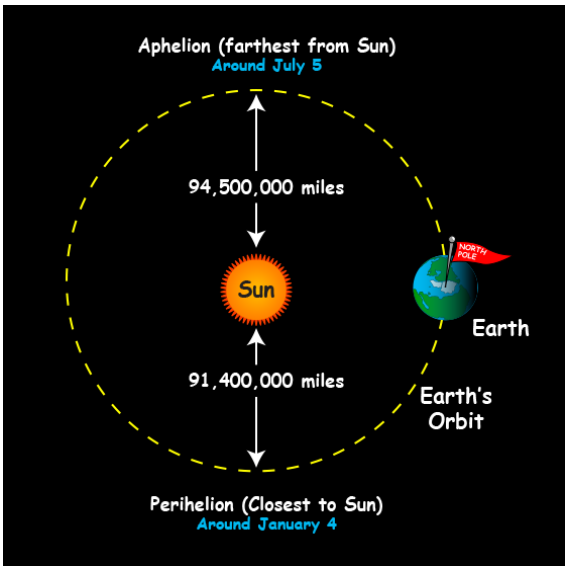

Image: NASA

Well done, your team has completed the Sun Primer!