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## Our Sun

Sure, you're glad the sun rises every morning, without it life on Earth would not exist. But, what do you really know about our closest star? For example, the sun makes up over 99% of the mass of our solar system. It is about halfway though its multi-billion year lifespan. Scientists have learned much about the sun simply through studying it—and other stars—with telescopes and probes, but many mysteries still exist. Use this webquest to find out what we already know about the sun, so you're not caught in the dark.

First, go to **www.worldbookonline.com**
Then, click on "Advanced." If prompted, log on with your ID and Password.

## Find It!

Use the World Book search tool to find the answers to the questions below. Since this activity is about the sun, it is recommended you start by searching the key word "sun." Write the answer below each question.

1. In the late 1800's, American astronomer George Ellery Hale developed an instrument called the _____ to photograph the sun in different colors of the spectrum.
2. The sun is made up mostly of atoms of the chemical element _____.
3. A typical _____ _____ _____(3 words) leaves the sun at a speed of about _____miles (_____ kilometers) per second.
4. Where on the surface of the sun do sunspots form?
5. The flow of coronal gas from the sun into space is known as the _____ _____(2 words).

***Users of the *Advanced* database can find extension activities at the end of this webquest.**

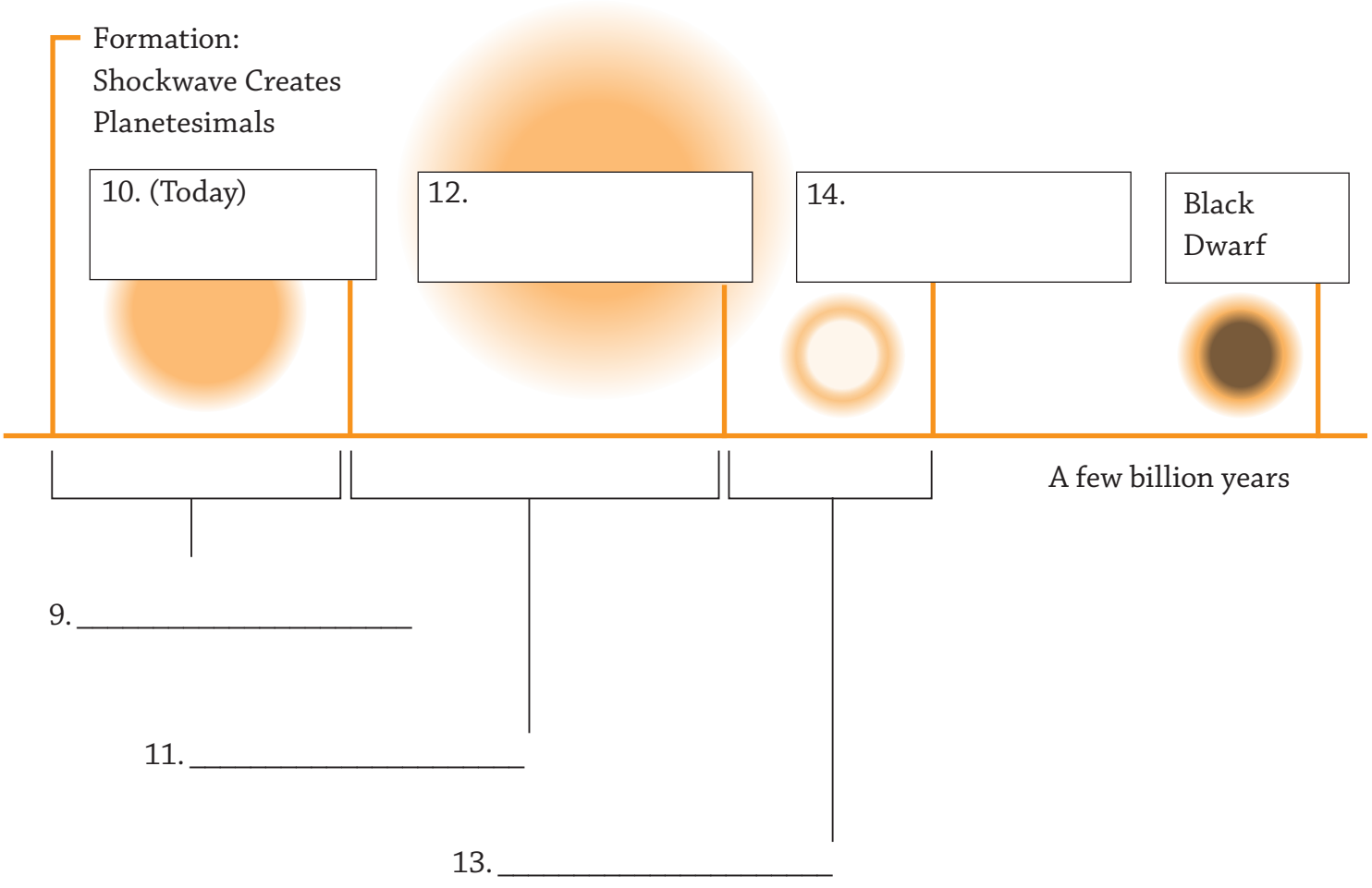
6. The sun emits energy in the form of _____ _____ two most common forms the sun emits are_____ _____ (2 words) and _____ _____ (2 words), which we feel as heat.

7. How long does it take for the sun to make a complete rotation on its axis?

8. What are two reasons a spinning cloud of dust and gas might become denser the surrounding parts?

## Timeline

*Just like us, the sun and other stars go through different changes during their lifetimes. In the spaces below, fill in the number of years (numbers 9, 11, and 13) and each stage in the sun's life cycle (numbers 10, 12, and 14). The numbers might be approximate, like "a few million years."*

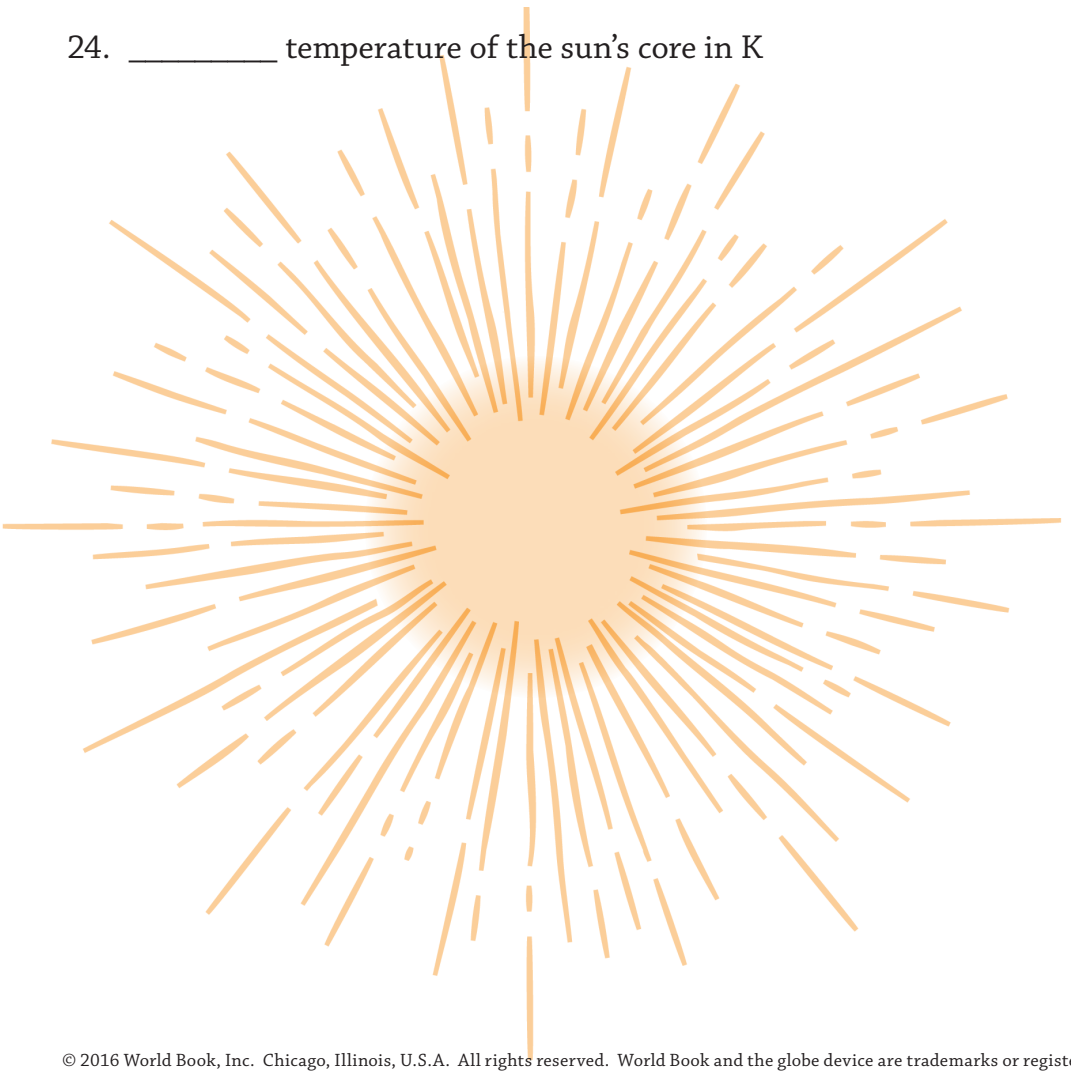


## Match It!

*Take a look at the "Sun" article and match the measurements of the sun below with the correct numbers on the right.*

15. _____ average distance between sun and Earth in miles
16. _____ distance of sun from the center of galaxy in light-years
17. _____ temperature of the sun's surface in F
18. _____ age of the sun in years
19. _____ average lifetime of spicules in minutes
20. _____ duration of sunspot cycle in years
21. _____ mass of sun in tons
22. _____ radius of sun in miles
23. _____ time for sun to revolve around galactic center in years
24. _____ temperature of the sun's core in K

A. 11
B. 15
C. 10,000
D. 25,000
E. 432,000
F. 15 million
G. 93 million
H. 240 million
I. 4.6 billion
J. 2.2 x 1027



## What's the Word?

*Find the vocabulary words hidden within the puzzle by reading the definitions below. You may use context clues to determine the meaning of each word. You may also double-click on the word to access the online dictionary.*

S B S Z A S Z S T G T G S X Y
P H O T O S P H E R E U Y G H
J N R D X Y X E Z F N E O N Y
A N O R O C A U C S L L F I D
N L R I V C J M P T O A N V R
B O O L Z P H O S M R O R L O
P H O T O N T A S A I U Z E G
Q E O G M B D I D S L J M K E
B E U D W Q E D U F F P M Y N
B M I L F S C F V Y I A V J E
C D X J O D I M J L S X T U R
A I T I A K X Y C S R C Y T D
L L L Z I F C M V C M O D J C
W E H R J S A W Y B E R C N S
H E P V U J V R Q P Z E Z W W

25. a band or range of energy of a particular kind: _____

26. the center of the sun, where nuclear fusion reactions produce the sun's energy: _____

27. the highest part of the solar atmosphere: _____

28. a dark, often roughly circular feature on the sun's surface: _____

29. a substance similar to a gas that consists of positive ions and electrons moving about independently:_____

30. an atom that has lost or gained one or more electrons: _____

31. the unit in which astronomers measure the temperature of the sun and other stars: _____

32. the amount of matter in an object: _____

33. a process that produces energy in the sun's core: _____

34. the most common element in the sun: _____

35. a sudden brightening of a part of the sun's atmosphere:_____

36. the study of the vibrations inside the sun: _____

37. a "packet" of electromagnetic radiation: _____

38. the lowest layer of the solar atmosphere, which sends out the light that we see:

    _____

39. the edge of the sun:_____

## Extension Activity 1: In a distant galazy...

Imagine an alien from a distant part of the galaxy has sent you a message. It has seen our sun from a great distance away and wants to know more. Write a message back to this alien (assume it can understand English!) and explain how the sun compares with other stars (check World Book's "Star" article for comparisons). What about it has allowed life to flourish? In what ways is the sun considered dangerous, but important?

**World Book has many eBooks about stars, the planets, and outer space.**
**Read more about the sun and other stars here:**

*The Sun and Other Stars*. Chicago: World Book, 2013. Explore the Solar System. *World eBook*. Web. 1 Dec. 2015. <http://www.worldbookonline.com/wb/ebooks/mall/instt/catalog/urn:ISBN:978-0-7166-1892-8/detail.do>.

# Teacher Page

## Answers:

1. spectroheliograph
2. hydrogen
3. coronal mass ejection, 500, 800
4. Sunspots form where denser bundles of magnetic field lines from the solar interior break through the surface.
5. solar wind
6. electromagnetic radiation, visible light, infrared rays
7. about a month
8. 1. A Supernova may cause a shockwave.

   2. A dense region may begin to shrink, pulled together by its own gravity.
9. 4.6 billion years
10. Sun
11. 5 billion
12. red giant
13. 1 million
14. white dwarf
15. G. 93 million
16. D. 25,000
17. C. 10,000
18. I. 4.6 billion
19. B. 15
20. A. 11
21. J. $2.2 \times 10^{27}$
22. E. 432,000
23. H. 240 million
24. F. 15 million

25. spectrum
26. core
27. corona
28. sunspot
29. plasma
30. ion
31. Kelvin
32. mass
33. fusion
34. hydrogen
35. flare
36. helioseismology
37. photon
38. photosphere
39. limb

S B S Z A **S** Z S T G T G **S** X **Y**
**P H O T O S P H E R E U** Y **G H**
J **N** R D X Y X **E** Z **F N** E **O N** Y
**A N O R O C A** U **C S L L** F **I D**
N L R **I** V C J **M P T O A N V R**
B O O L Z P H **O S M R O R L O**
**P H O T O N T** A **S A I U** Z **E G**
Q E O G M B D **I** D **S L** J **M K E**
B E U D W Q **E** D **U** F F **P M Y N**
**B M I L** F **S** C **F** V Y I **A** V J E
C D X J **O** D I M J L **S** X T U R
A I T **I** A K X Y C S R ***C*** Y T D
L L **L** Z I F C M V C M **O** D J C
W **E** H R J S A W Y B E **R** C N S
**H** E P V U J V R Q P Z **E** Z W W

**Extension Activity 1:** Answers will vary.