Space Science Review

Earth in the Solar System (Earth Sciences)

4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution. As a basis for understanding this concept:
   a. *Students know* galaxies are clusters of billions of stars and may have different shapes.
   b. *Students know* that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.
   c. *Students know* how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.
   d. *Students know* that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.
   e. *Students know* the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.

Use the words in the box and Chapters 17 to fill in the blanks below. Each word will be used once.

4.6 billion
10 million
Carbon Dioxide
Comets
Continents
Core
Crust
Mantle
Nebula
Orbit
Oxygen
Planetesimals
Planets
Pressure
Revolves
Rotates
Sun

Formation of the Solar System

The solar system formed out of a vast cloud of cold gas and dust called a _____. Gravity and _____ were balanced, keeping the cloud unchanging until something upset the balance. Then the nebula began to collapse. Collapse of the solar nebula caused heating in the center. As materials crowded closer together, _____ began to form. The central mass of the nebula became the _____. _____ formed from the surrounding disk of material. Because of their greater gravitational attraction, the largest planetismals begin to sweep up more and more of the dust and gas of the solar nebula. Smaller planetesimals collide with the larger ones, and planets begin to grow. It took about _____ years for the solar system to form, and it is now _____ years old.

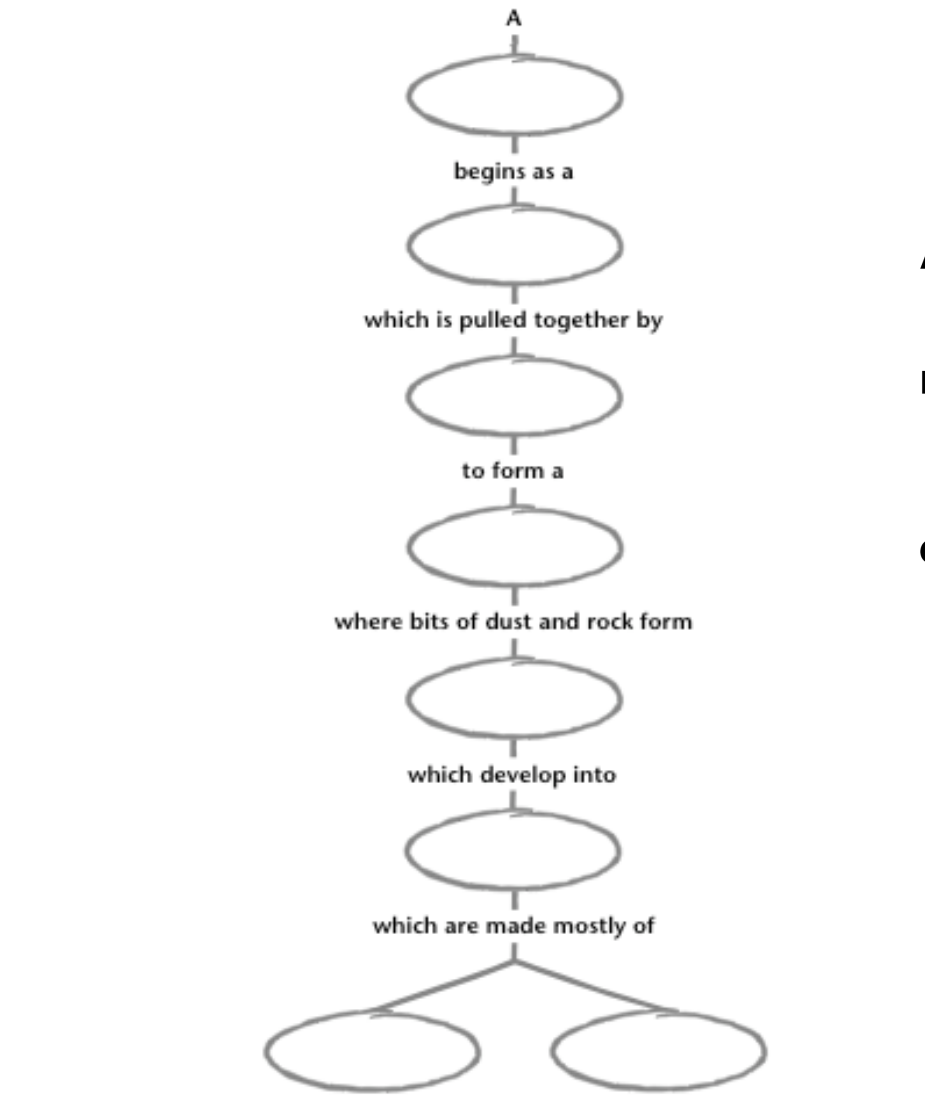
Planetary Motion

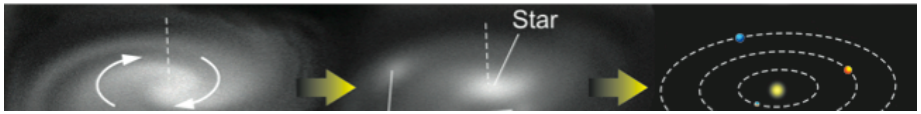
A planet _____ on its own axis and _____ around the sun in a path called an _____.

Earth Takes Shape

The Earth is divided into 3 main layers: _____, _____, _____. Materials with different densities separated because of high heat, pressure, and melting inside the Earth. Heavy elements sank to the center because of Earth's gravity. Earth's original atmosphere formed from the release of gases brought to Earth by meteorites and _____. Earth's second atmosphere arose from impacts by comets and volcanic eruptions. The composition was largely water and _____. The presence of life dramatically changed Earth's atmosphere, adding free _____. Earth's oceans formed shortly after the Earth did, when it had cooled off enough for rain to fall. _____ were formed when lighter materials gathered on the surface and rose above sea level.

Use the following terms from Chapter 17 to complete the concept map below: planetesimals, gas, nebula, solar system, gravity, solar nebula, planets, rock.

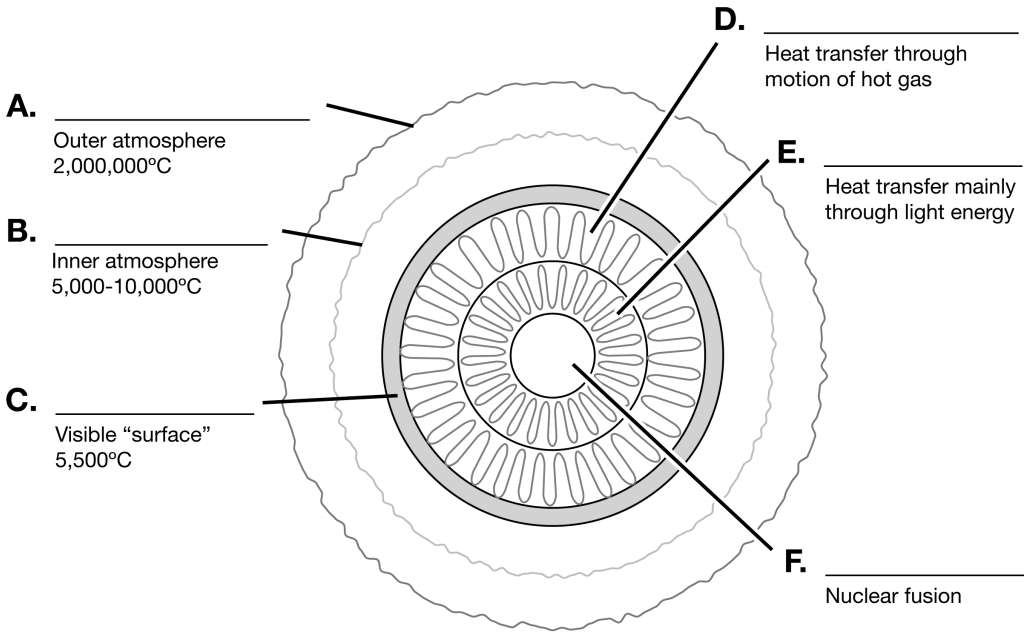


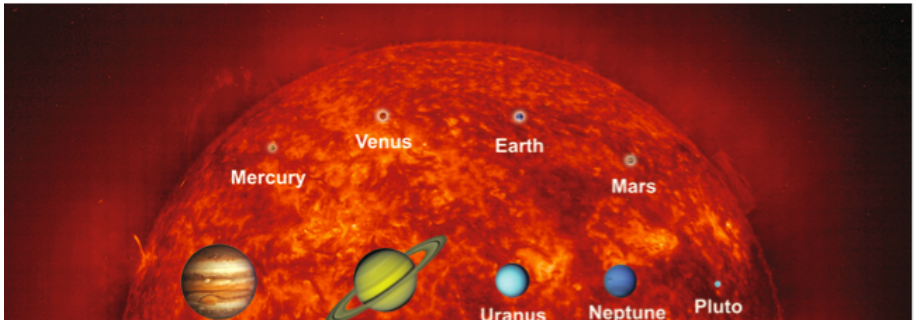


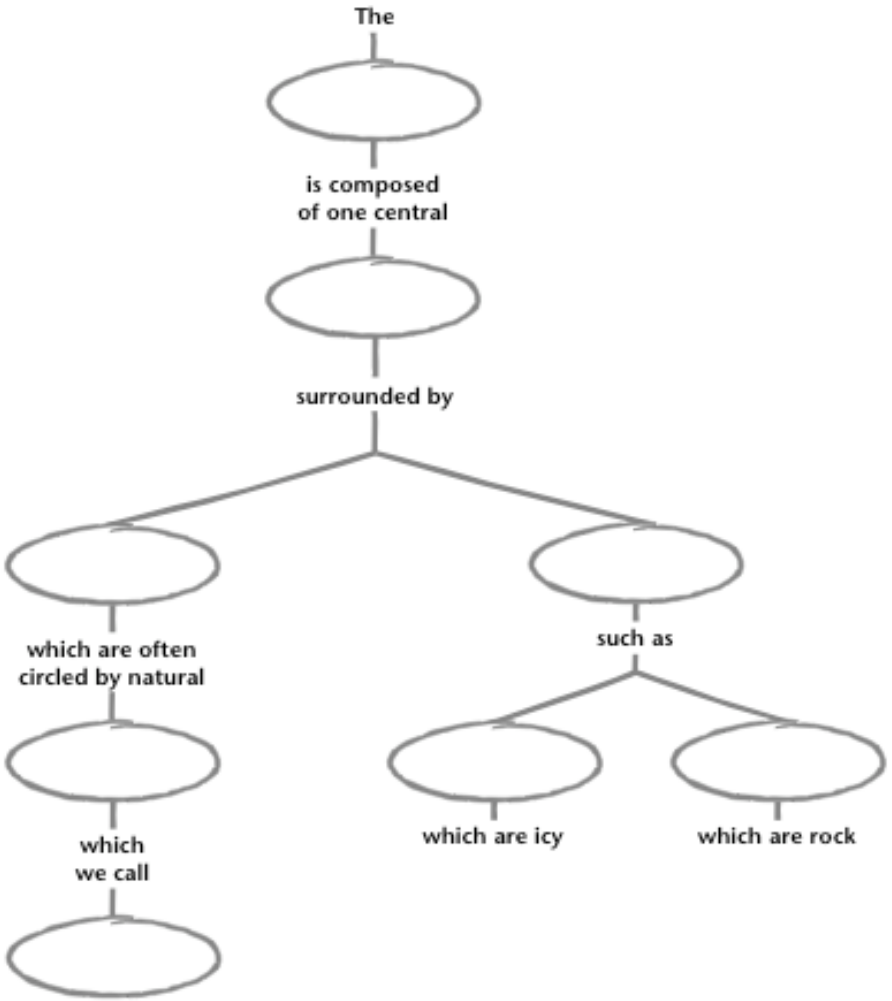
Label the Parts of the Sun

Use page 433 in Chapter 17 of your book to help.

Use the following terms from Chapter 18 to complete the concept map below: comets, small bodies, moons, star, solar system, planets, satellites, asteroids.







Understanding Light Years

How far is it from Los Angeles to New York? Pretty far, but it can still be measured in miles or kilometers. How far is it from Earth to the sun? It's about one hundred forty-nine million, six hundred thousand kilometers (149,600,000, or 1.496×108 km). Because this number is so large, and many other distances in space are even larger, scientists **developed bigger units** in order to measure them.

An **Astronomical Unit (AU**) is 1.496×10^8 km (**the distance from Earth to the sun)**. This unit is usually what is used to measure distances within our solar system.

To measure longer distances (like the distance between Earth and stars and other galaxies), the **light year (ly)** is used. A light year is the **distance that light travels through space in one year**, or 9.468×10^{12} km.

Example: Convert 4 light years to kilometers

Explanation/Answer: Multiply the number of kilometers in one light year (9.468×10^{12} km/ly) by the number of light years given (in this case, 4 ly).

Convert each number of light years to kilometers:

1. 6 light years

2. 11 light years

Use the words from Chapter 19 to fill in the blanks. After you've filled in the blanks, complete the word search.

1. _____ is the apparent shift of nearby stars relative to more-distant stars as Earth orbits the sun.
2. A(n) _____ cluster is a group of older stars located in the halo of spiral galaxies.
3. A _____ is so small and massive that its gravity does not even let light escape.
4. A _____ is a small, hot start that is near the end of its life.
5. A(n) _____ galaxy has distinctive arms and a nuclear bulge.
6. A _____ is a star of about two solar masses formed from a supernova.
7. A(n) _____ galaxy has a very bright center and contains almost no gas and dust.
8. A _____ is a giant cloud of gas and dust.
9. A large, cool star formed when a star runs out of hydrogen is a _____.
10. The _____ magnitude of a star is how bright it looks.
11. The explosive death of a star is a _____.
12. A large grouping of stars in space is called a _____.
13. A group of stars that form when a lot of gases and dust come together is known as a(n) _____ cluster.
14. The diagonal pattern of stars on an H-R diagram is known as the _____.

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