

Day 5: Space Science

#4 Earth in the Solar System (Earth Sciences): The structure and composition of the universe can be learned from studying stars and galaxies and their evolution.

- a. Galaxies are clusters of billions of stars and may have different shapes.
- b. The Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.
- c. Know how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.
- d. 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. Know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.

1. Formation of the Solar System: Fill in the blanks with the words in the box.

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 _____ 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 planetesimals 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.

4.6 billion
 10 million
 Nebula
 Planetesimals
 Planets
 Pressure
 Solar
 Sun

2. Galaxies: Turn to page 496.

- a. What is a galaxy? _____
- b. How many stars are in the average galaxy? (circle one) **Hundreds** **Thousands** **Millions** **Billions**
- c. Draw a picture of each type of galaxy in the boxes below (go to my website, click on 8th grade review, Day 5, types of Galaxies)

Spiral	Elliptical	Barred-Spiral	Irregular

3.

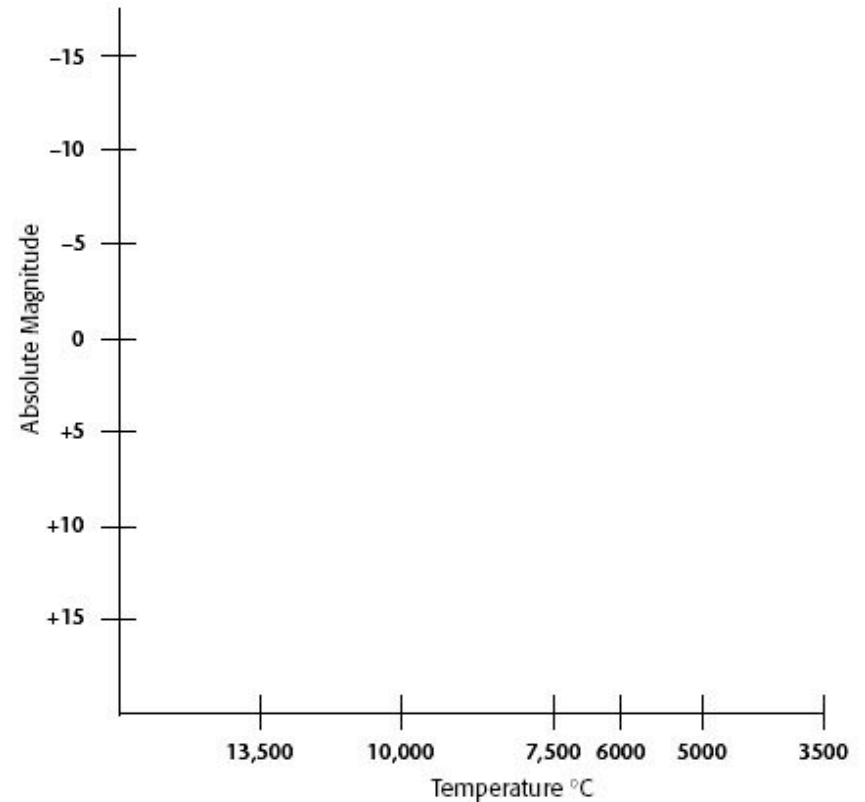
Diagramming the Stars

Complete this worksheet after you finish reading Chapter 19, Section 2.

An H-R diagram shows the relationship between a star's surface temperature and its absolute magnitude. Follow the instructions below to create your own H-R diagram on the next page. You may want to use colored pencils or crayons for this activity. Remember that a star's brightness increases as you move toward the top of the H-R diagram.

1. Our sun is an average star. It should be located at about the center of the diagram. Draw and label the sun on the diagram.
2. Draw and label a red-dwarf star on the diagram. Red-dwarf stars are dim and have a low temperature.
3. Draw and label a white-dwarf star on your diagram. White-dwarf stars are dim and have a high temperature.
4. Draw and label a blue star on the diagram. Blue stars are very hot and bright.
5. Draw and label a red giant on the diagram. Red giants are cool and bright.
6. Most stars can be plotted along the main sequence of an H-R diagram. These stars range from very bright, very hot stars to dim, cool stars. Indicate and label on your diagram where the main sequence should go.
7. Which of the stars that you have plotted are included in the main sequence?

8. Imagine that you have discovered a new star in the night sky. Your measurements show that it has a surface temperature of $10,000^{\circ}\text{C}$ and an absolute magnitude of $+10$. Based on your diagram, what type of star do you think it is?



4. Motion in Space:

a. Define rotation:

b. Define revolution:

c. What causes seasons on Earth?

5. Distance in Space

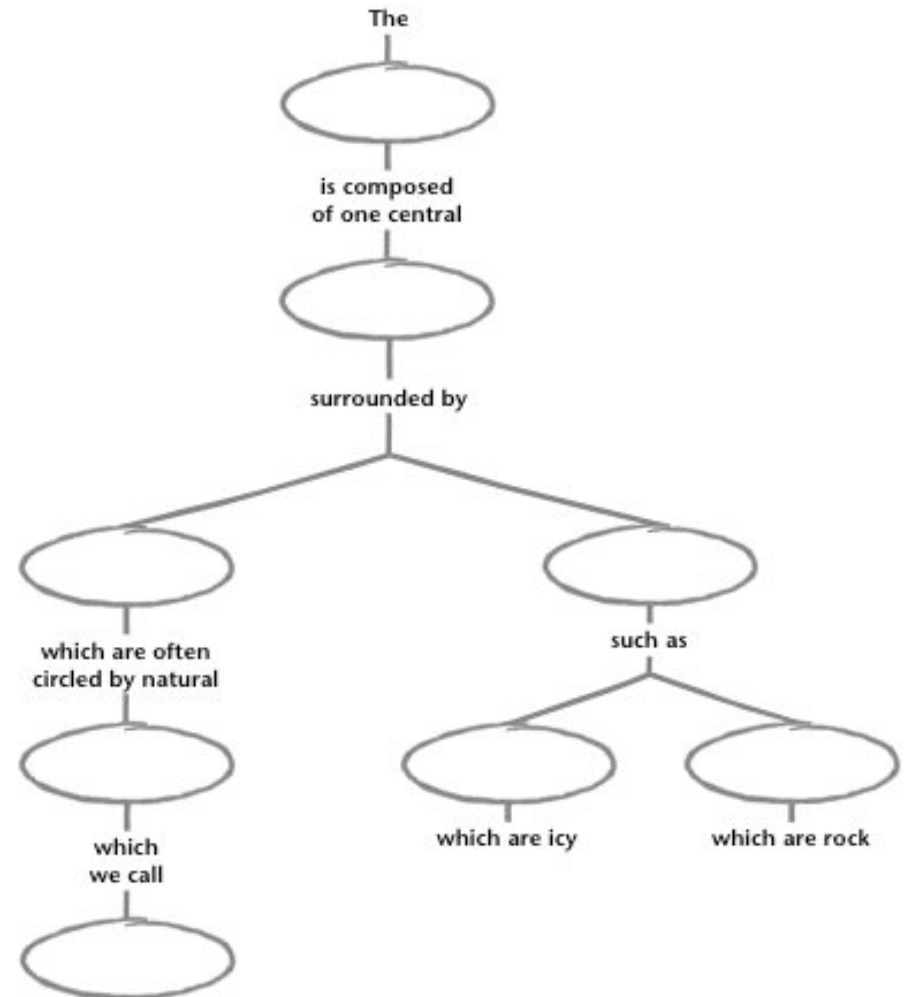
- Go to my website
- Click on "8th Grade Review" in the Announcement box
- Scroll down to "Day 5: Space Science"
- Click on "Examine the Milky Way Galaxy at Different Scales".

- What is Earth's diameter?
- What is the diameter of our solar system?
- Name the 2 closest stars & their distance from our sun.
- Our galaxy, the Milky Way, is how many light years across?
- What are the 2 nearest galaxies to ours?
- Galaxy M32 is how many light years from the Milky way?
- Name 2 local superclusters.
- How far away is the Coma Cluster & the Perseus Cluster?

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.

Why do scientists use these units to measure distance in space?

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



7. Our Solar System: Use your book (Chapter 18) & links from my webpage to help you complete the table below.

Planet	Position to Sun	Relative Size	Composition (Rock, gas, etc.)	Period of Revolution	# of Moons	Appearance
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Inner Planets

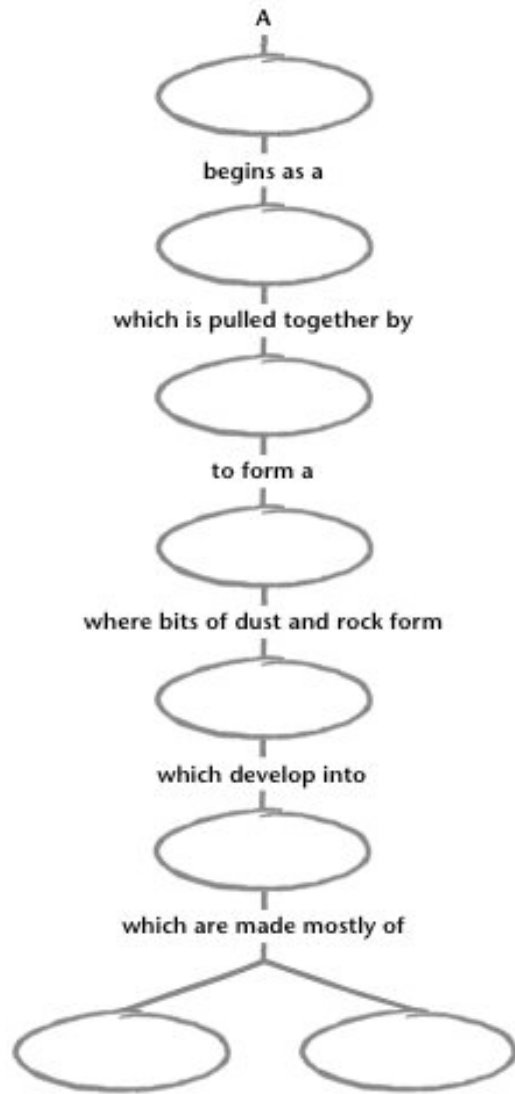
	1					
	2					
Earth	3					
	4					

Outer Planets

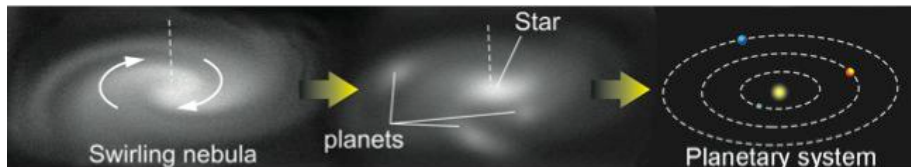
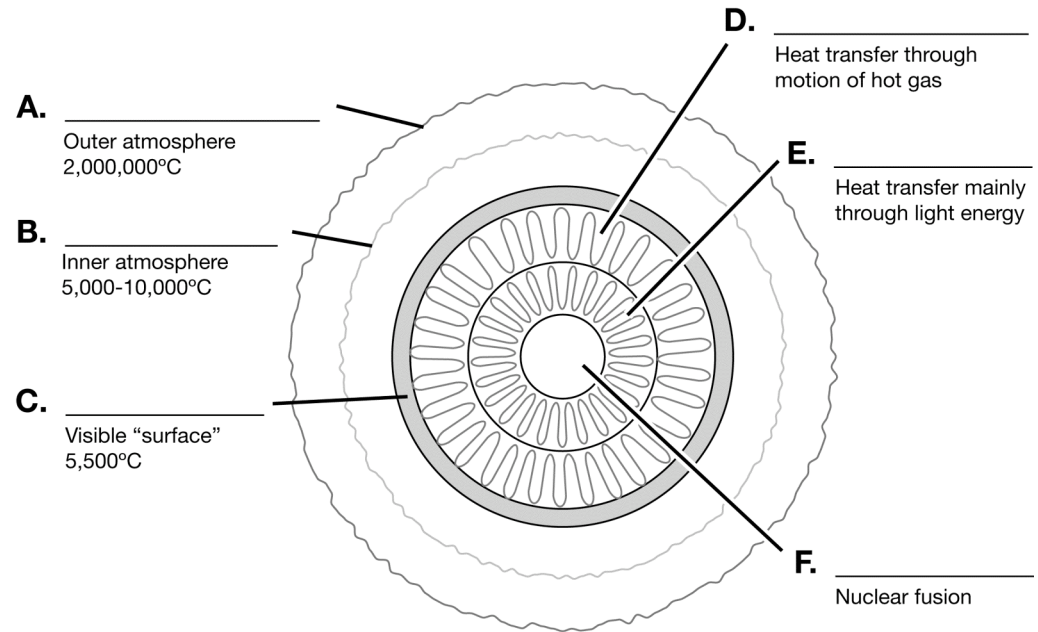
	5	Largest – 1 st				
	6					
	7					
	8					
	9	Smallest – 9 th				

Finish early? Go to Ms Wiggin's web site: <http://erinwiggin.com>
 click on "Links", then review more for Space or any of the other topics in the Fun & Games site.

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.



The Universe Beyond

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

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