

**Note-taking
Worksheet****Stars and Galaxies****Section 1 Stars****A. Patterns of stars—**_____

1. Ancient cultures used _____ or everyday items to name constellations
2. Modern astronomy studies _____ constellations
3. Some constellations are not _____ all year because Earth revolves around the Sun
4. _____ in the northern sky appear to circle around Polaris and are visible all year

B. Star _____

1. _____—measure of the amount of light a star actually gives off
2. _____—measure of the amount of a star's light received on Earth

C. Space _____

1. Astronomers measure a star's _____—shift in its position when viewed from two different angles
2. Distance is measured in _____—the distance light travels in a year

D. Star _____

1. Color indicates _____
 - a. Hot stars are _____
 - b. Cool stars look _____
 - c. _____ stars like the Sun are medium temperature
2. A spectroscope breaks the visible light from a star into a _____
 - a. Spectrum indicates _____ in the star's atmosphere
 - b. Spectrum gives the _____, _____, _____, and _____ of the star's gases

Section 2 The Sun

- A. Sun's** _____—energy created in the core moves outward through the radiation zone and the convection zone and into the Sun's atmosphere

Note-taking Worksheet (continued)**B. Sun's _____**

1. _____—lowest layer gives off light and is about 6,000 K
2. _____ is the next layer about 2000 km above the photosphere
3. Extending millions of km into space, the 2 million K _____ releases charged particles as solar wind

C. Surface _____

1. _____—dark areas cooler than their surroundings
 - a. _____ features which come and go over days, weeks, or months
 - b. Increase and decrease in a 10 to 11 year pattern called _____ cycle
2. Sunspots are related to _____
 - a. Magnetic fields may cause _____—huge, arching gas columns
 - b. Violent eruptions near a sunspot are called _____
3. Bright _____ (CMSs) appear as a halo around the Sun when emitted in the Earth's direction
 - a. Highly charged _____ can disrupt radio signals
 - b. Near Earth's polar areas solar wind material can create light called an _____

D. Sun is mostly _____

1. _____-aged star
2. Typical _____ with yellow light
3. Unusual—Sun is _____ of a multiple star system or cluster

Section 3 Evolution of Stars

A. Classifying stars—Ejnar Hertzsprung and Henry Russell _____ stars by temperature and absolute magnitude in a H-R diagram

1. _____—diagonal band on H-R diagram
 - a. Upper left—hot, _____, bright stars
 - b. Lower right—_____, red, dim stars
 - c. Middle—average _____ stars like the Sun
2. _____—the ten percent of stars that don't fall in the main sequence

Note-taking Worksheet (continued)

B. _____ of hydrogen occurs in star cores releasing huge amounts of energy

C. _____ of stars

1. A _____ contracts and breaks apart from the instability caused by gravity
 - a. _____ in each nebula chunk increase as particles move closer together
 - b. At 10 million K _____ begins and energy from a new star radiates into space
2. The new main sequence star _____ pressure from fusion heat with gravity
 - a. Balance is lost when core hydrogen fuel is _____
 - b. Core contracts and heats up causing outer layers to _____ and cool
 - c. Star becomes a _____ as it expands and outer layers cool
 - d. Helium nuclei fuse to form core of _____
3. A _____ forms from the giant star
 - a. Helium is exhausted and outer layers of giant escape into space
 - b. Core contracts into hot, dense, small star
4. In massive stars fusion causes higher temperatures and greater expansion into a _____
 - a. Eventually fusion stops as iron is formed
 - b. The core crashes inward causing the outer part to explode as an incredibly bright _____
5. The collapsed core of a supernova may form a _____ of extremely high density
6. A tremendously big supernova core can collapse to a point with no volume forming a _____
 - a. _____ is so strong not even light can escape
 - b. Beyond a black hole's _____ gravity operates as it would before the mass collapsed
7. Matter emitted by a star over its life time is recycled and can become part of a new _____

Note-taking Worksheet (continued)**Section 4 Galaxies and the Universe**

A. _____—gravity holds together a large collection of stars, gas, and dust

1. Earth galaxy is Milky Way which is part of a galaxy cluster named the _____

2. _____—spiral arms wind out from inner section; some have barred spirals with stars and gas in a central bar

3. _____—large, three-dimensional ellipses; most common shape

4. _____—smaller, less common galaxies with various different shapes

B. The Milky Way Galaxy—usually classified as a _____

1. Contains more than 200 _____ stars

2. About 100,000 light-years _____

3. Sun orbits galaxy's core every 240 million years

C. Theories on the _____ of the universe

1. _____—universe has always existed just as it is now

2. _____—universe expands and contracts repeatedly over time

D. Universe is _____

1. _____ light changes as it moves toward or away from an object

a Starlight moving toward Earth shifts to _____ end of spectrum

b. Starlight moving away from Earth shifts to _____ end of spectrum

2. All galaxies outside the Local Group indicate a red shift in their spectra indicating they are moving _____ Earth

E. _____—holds that universe began 12 to 15 million years ago with huge explosion that caused expansion everywhere at the same time

1. Galaxies more than 10 _____ light-years away give information about a young universe

2. The universe may eventually _____ expanding and begin _____