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 tempera-
   ture 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
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 ____________________