

Space Homework Packet

Homework #1

Hubble's Law (pages 852–853)

1. How can astronomers use the Doppler effect? _____

2. The shift in the light of a galaxy toward the red wavelengths is called a(n) _____.
3. Describe Hubble's Law. _____

4. Describe what the observed red shift in the spectra of galaxies shows.

The Big Bang Theory (page 854)

5. Astronomers theorize that the universe came into being in an event called the _____.
6. Circle the letter of each sentence that is true according to the big bang theory.
 - a. The matter and energy in the universe was once concentrated in a very hot region smaller than a sentence period.
 - b. The universe began billions of years ago with an enormous explosion.
 - c. The universe came into existence in an instant.
 - d. The matter and energy in the universe has taken billions of years to form.
7. What evidence supports the Big Bang Theory? _____

8. Recent measurements of the microwave background radiation have led astronomers to estimate that the universe is _____ years old.

Continued Expansion (page 855)

9. Circle the letter of each sentence that is true about dark matter.
 - a. Astronomers currently don't know what it is or how it is distributed.
 - b. It cannot be seen directly.
 - c. It can be measured using the Doppler effect.
 - d. It can be detected by observing how its gravity affects visible matter.

Exceeds Question

10. Use Figure 26 on page 854 to make a flowchart showing the chronological sequence of events after the big bang.

Homework #2

Groups of Stars and Star Systems (page 846-847)

1. A group of stars that seems to form a pattern as seen from Earth is called a(n) _____.
2. A group of two or more stars that are held together by gravity is called a(n) _____.
3. **Circle: True or False:** Astronomers have concluded that more than half of all stars are members of groups of two or more stars.

Star Clusters (page 847)

Match each basic kind of star cluster to its description.

	Description	Star Cluster
_____	4. A loose grouping of no more than a few thousand stars that are well spread out	a. globular cluster b. open cluster c. associations
_____	5. Loose groupings of bright, young stars	
_____	6. A large group of older stars	

Galaxies (pages 848–849)

7. A huge group of individual stars, star systems, star clusters, dust, and gas bound together by gravity is called a(n) _____.
8. Our galaxy is called the _____.

Match each type of galaxy to its description.

	Description	Galaxy
_____	9. Spherical or oval, no spiral arms, and usually contains only old stars	a. barred-spiral galaxy b. elliptical galaxy c. spiral galaxy d. irregular galaxy
_____	10. Bulge of stars at the center with arms extending outward like a pinwheel	
_____	11. Composed of many young stars, comes in many shapes, and has a disorganized appearance	
_____	12. Has a bar through the center with arms extending outward from the bar on either side	

13. **Circle: True or False:** The Milky Way appears as a band from Earth because we are looking at it edgewise.
14. The enormously bright centers of distant galaxies are called _____.

Exceeds Question

15. How would our lives be different if Earth was in a binary star system?

Homework #3

How Stars Form (pages 840–841)

1. A large cloud of dust and gas spread out over a large volume of space is called a(n) _____.
2. Circle the letter of each sentence that is true about a protostar.
 - a. Nuclear fusion is taking place within it.
 - b. It has enough mass to form a star.
 - c. Its internal pressure and temperature continue to rise as it contracts.
 - d. It is a contracting cloud of dust and gas.
3. Describe how a star is formed. _____

Adult Stars (page 841)

4. A star's _____ determines the star's place on the main sequence and how long it will stay there.
5. Circle the letter of each true sentence about adult main-sequence stars.
 - a. High-mass stars become the bluest and brightest main-sequence stars.
 - b. Low-mass stars are usually short-lived.
 - c. Yellow stars like the sun are in the middle of the main sequence.
 - d. Red stars are the hottest and brightest of all visible stars.

The Death of a Star (pages 842–844)

6. The core of a star starts to shrink when the core begins to run out of _____.
7. Name three possible end stages of a star.
 - a. _____
 - b. _____
 - c. _____
8. List the stages in the evolution of a low-mass star shown in the diagram below.



- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____

Match each final stage of a high-mass star to its correct description

A. Neutron Star B. Pulsar C. Black Hole

- _____ 9. Surface gravity so great that nothing can escape from it
- _____ 10. A spinning neutron star that gives off strong pulses of radio waves
- _____ 11. The remnant of a high-mass star that has exploded as a supernova, which begins to spin more and more rapidly as it contracts

(Exceeds question on next page)

Exceeds Question

12. Astronomer Carl Sagan once said, "We are made of star stuff." Explain what he meant.

Homework #4

The Nebular Theory (pages 818–819)

1. The generally accepted explanation for the formation of the solar system is called the _____. Which states that _____.
2. A large, spherical cloud of dust and gas in space is called a(n) _____.
3. **True or False:** Most planets and moons are revolving now in the direction that the protoplanetary disk was spinning.
4. The process by which planetesimals grew is called _____.
5. Put the following events about the formation of planetesimals and protoplanets in correct order. Number the events 1–5 in the order that they occurred.
_____ Balls of gas and dust collided and grew larger.
_____ Planetesimals became large enough to exert gravity on nearby objects.
_____ Planetesimals grew by accretion.
_____ Protoplanets joined to form the current planets in a series of collisions.
_____ Planetesimals grew into protoplanets.

Composition and Size of the Planets (page 820)

6. Why are the terrestrial planets relatively small and rocky? _____
7. Circle the letter of each sentence that is true about the formation of the gas giants.
 - a. The gravity of the gas giants decreased as they grew larger.
 - b. Ice-forming material could condense in the outer solar system.
 - c. The planets grew large and were able to capture hydrogen and helium from nearby space.
 - d. Less material was available for the gas giants to form than was available for the terrestrial planets.

Exceeds Question

8. What three criteria must any theory of the origin of the solar system satisfy? What theory satisfies all three?

Homework #5

Summarizing: Fill in the table as you read to summarize the characteristics of the outer planets.

The Outer Planets	
Outer Planets	Characteristics
Jupiter	Largest; most mass; most moons; Great Red Spot

Gas Giants (page 811)

1. Circle the letter of each sentence that is true about Jupiter, Saturn, Uranus, and Neptune compared to the terrestrial planets.
 - a. Their years are shorter than the terrestrial planets.
 - b. They are colder than the terrestrial planets.
 - c. They are further from the sun than the terrestrial planets.
 - d. They are much larger than the terrestrial planets.
2. Why are the outer planets called the gas giants? _____

3. Describe the cores of the gas giants. _____

Jupiter (pages 811–812)

4. The _____ is a huge storm on Jupiter.

Saturn (pages 812–813)

5. Saturn has the largest and most visible _____ in the solar system.

Uranus (page 813)

6. **True or False:** Uranus gets its distinctive blue-green appearance from large amounts of methane in its atmosphere.

Neptune (page 814)

7. The _____ in Neptune's atmosphere causes its bluish color.

Pluto (page 814)

8. **True or False:** Pluto is both larger and denser than the outer planets.

Comets and Meteoroids and The Edge of the Solar System (page 815)

9. A(n) _____ is made of ice and rock that partially vaporizes when it passes near the sun.
10. Chunks of rock, usually less than a few hundred meters in size, that travel through the solar system are called _____.
11. The _____ contains tens of thousands of objects made of ice, dust, and rock that orbit the sun beyond Neptune.
12. The thick sphere of comets encircling the solar system out to a distance of about 50,000 AU is called the _____.

Homework #6

Summarizing: Fill in the table as you read to summarize the characteristics of the inner planets.

Inner Planet	Characteristics

The Terrestrial Planets (pages 803–804)

- Circle the letter of each sentence that is true about the terrestrial planets.
 - They all are relatively small and dense.
 - They all have rocky surfaces.
 - They all have thick atmospheres.
 - They all have a crust, mantle, and iron core.

Mercury (pages 804–805)

- True or False:** Mercury has a large number of craters, suggesting that the surface has been largely unchanged for billions of years.

Venus (page 805)

- Describe the effect that carbon dioxide in Venus's atmosphere has on its temperature. _____

Earth (pages 805–806)

- Why does Earth's surface continue to change? _____

Mars (pages 807–808)

- Is the following sentence true or false? Mars shows evidence of once having liquid surface water. _____

Asteroids (page 809)

- Define: Asteroid: _____
- Circle the letter of each sentence that is true about asteroids.
 - Most small asteroids have irregular forms.
 - The asteroid belt formed when a giant planet was shattered by a collision with a meteoroid.
 - Most asteroids are found in the asteroid belt between Earth and Mars.
 - Most asteroids are less than 1 kilometer in diameter.
- What do scientists hypothesize about how the asteroids formed? _____

Exceeds Question

- Which planets, besides Earth, do you think are the most likely to harbor life? Why?