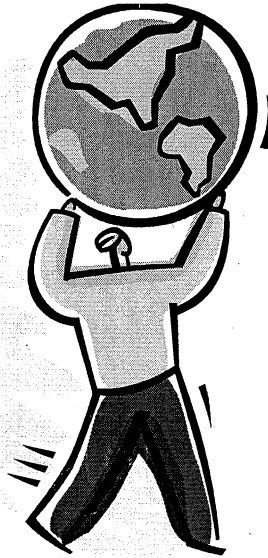


Science Notebook

Unit 4: Stars and Space Exploration



- Stars
- Tools of Astronomers
- Galaxies
- Theories about the Universe

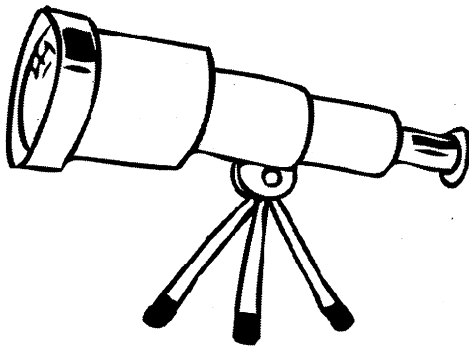
NAME: _____

Monday	Tuesday	Wednesday	Thursday	Friday

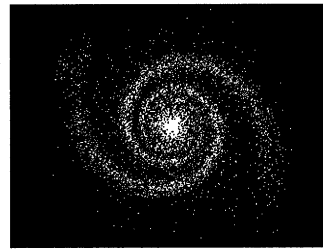
Introduction to Earth and Space Science

Stars and Space Exploration

MAJOR TOPICS OF STUDY:



- Stars
- Tools of Astronomers
- Galaxies
- Theories about the Universe



IMPORTANT VOCABULARY:

star
main sequence star
supergiant
light year
galaxy
Doppler effect

brightness
white dwarf
nebula
parallax
black hole
red shift

luminosity
red giant
supernova
telescopes
Big Bang Theory

CONTENT OBJECTIVES AND END OF UNIT PROJECT:

Chapter 27.2 Reading Guide - Stars

Stamp

Read 694-698 and answer the following questions.

1. What are the categories for star classification that scientists use?
2. The largest stars have a mass of about _____ the mass of the sun. The smallest stars are about _____ the mass of the sun.
3. What are two key differences between blue giants and red giants?
 - a.
 - b.
4. What are two key differences between dwarfs and neutron stars?
 - a.
 - b.
5. List the following colors in order of least to most energy. Green, Yellow, Blue, Red, Purple, Orange.
6. Define brightness.
7. Define luminosity.
8. What contributions to astronomy did Ejnar Hertzsprung and Henry Russel provide?
9. What is a main sequence star?

10. What is a white dwarf?

11. What is a red giant?

12. What is a supergiant?

13. Do section review questions 3,4,5,7,10 found on page 698 and place the answers below.

27.2 Stars Notes

Categories

1.

2.

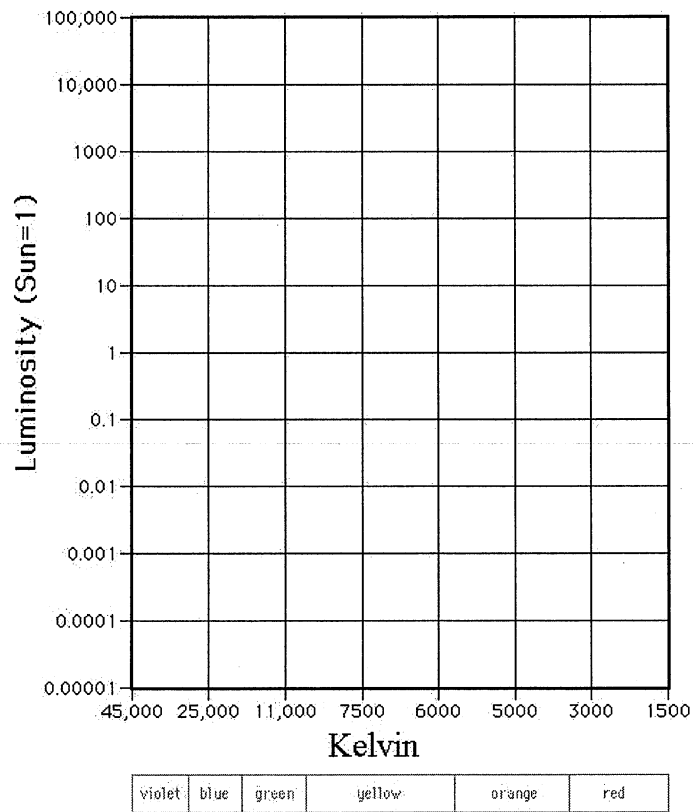
3.

4.

Brightness –

Luminosity –

Ejnar Hertzsprung and Henry Russell



Supergiants –

Red giants –

White Dwarfs –

Main sequence star –

Life Cycles of Stars

Chapter 28.1 Reading Guide – Tools of Astronomers

Stamp

Read pages 707-716 and answer the following questions.

1. What is the universe?
2. What is scientific notation?
3. List the 4 steps for scientific notation
 - a.
 - b.
 - c.
 - d.
4. Convert 345,000,000,000 to scientific notation.
5. Convert 1.2×10^9 to standard notation.
6. How far is a light year in kilometers?
7. What is a parsec?
8. How far is a parsec in light years?
9. Describe how parallax works in determining the position of stars.
10. How far away is the Andromeda galaxy? How long ago was light produced in that galaxy that we are observing today?

11. What is a telescope?

12. Describe how a telescope works.

13. What are three differences between a refracting and a reflecting telescope?

14. For each of the instruments listed below state the function and what scientists get from their use.

a. Optical telescope

b. Radio telescope

c. Infrared telescope

d. X-ray telescope

e. Hubble telescope

f. Space probes

g. Piloted spacecraft

h. Space shuttles and stations

i. Unmanned missions to Mars

28.1 Tools of Astronomers Notes

Scientific notation –

Standard notation –

Examples:

150,000,000

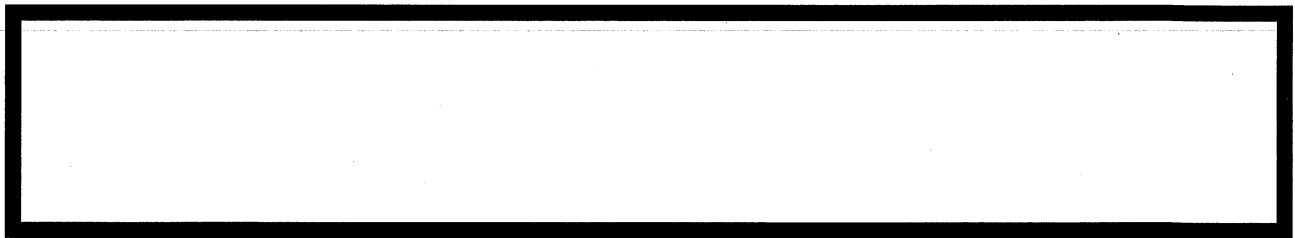
345,000,000,000,000

2.5×10^3

9.6×10^{17}

Light year –

Parallax –



Telescope –

Refracting telescope –

Reflecting telescope –

Refracting telescope	Reflecting telescope
----------------------	----------------------

Radio telescope –

Infrared telescope –

x-ray telescope –

Chapter 28.2 Reading Guide - Galaxies

Stamp

Read pages 718-724 and answer the following questions.

1. What is a galaxy?
2. How many stars belong to the Milky Way galaxy?
3. The majority of stars are arranged in a disk that is _____ across and only _____ light years thick.
4. How often do we orbit around the center of our galaxy?
5. The Hubble Space Telescope is named for Edwin Hubble. What contribution to astronomy did he provide?
6. List the 4 types of galaxies and their shape.
7. Where do scientists hypothesize galaxies shapes come from?
8. Define black hole.
9. What is the central black hole theory and what evidence supports it?
10. What is the Large Magellanic cloud? How far away is it?
11. What is the Small Magellanic cloud? How far away is it?
12. Copy the inverse square law below.

13. What does the inverse square law allow astronomers to figure out?
14. What is a standard candle?
15. Explain the process of measuring the distance to stars in the Milky Way.
16. Explain the process of measuring the distance to other galaxies.
17. Do the section review questions 1,3,6,9 found on page 724 and place the answers below.

28.2 Galaxies Notes

Galaxy –

Milky Way galaxy –

Spiral galaxy –

Barred spiral galaxy –

Elliptical galaxy –

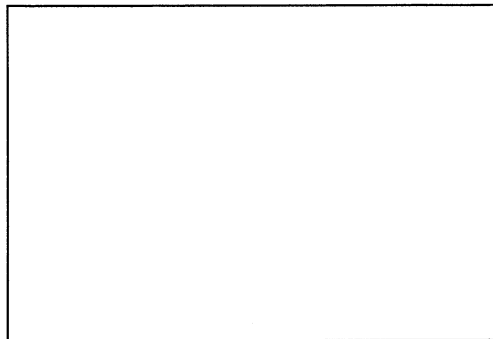
Lenticular galaxy –

Irregular galaxy –

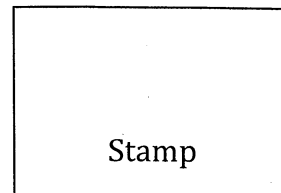
Spiral	Barred spiral
Elliptical	Lenticular
Irregular	Universe

Inverse Square Law of Light –

Standard Candle –



Chapter 28.3 Reading Guide – Theories about the Universe



Read the pages 725-731 and answer the following questions.

1. What is the Big Bang theory?
2. What is the Doppler shift?
3. If the earth is moving towards an object the light shifts towards the _____ end of the light spectrum. If the earth is moving away from an object the light shifts towards the _____ end of the light spectrum.
4. What is the difference between the red shift and the blue shift? What do they tell us about the motion of stars relative to earth?
5. Describe the expanding universe theory.
6. How long after the big bang did each of the following events occur?
 - a. Protons and neutrons form nuclei of hydrogen and helium
 - b. Cosmic background radiation forms
 - c. Stars and galaxies form
7. Where did the name Big Bang originally come from?
8. What is cosmic background radiation? Where did it come from?
9. Which two elements make up most of the universe?
10. What is a planetary system?
11. Describe the nebula theory of planetary formation.

12. What is a binary star?

13. How many stars are there in the Mizar complex?

14. Do questions 2,4,5,6,8,9,10 on page 731 and place the answers below.

28.3 Theories about the Universe Notes

Our Galaxy

Black Hole –

Black hole theory –

Doppler effect –

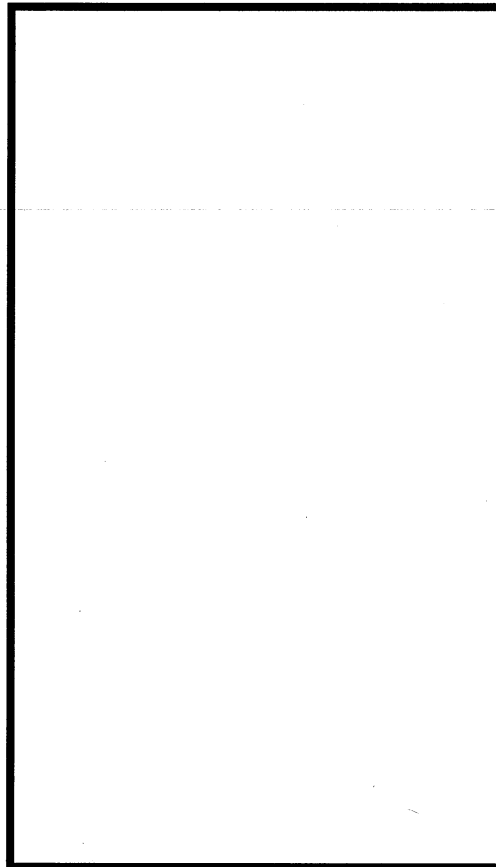
Red shift –

Blue shift –

The Universe

Universe Expansion –

Big bang theory –



Evidence for Big Bang

- 1.
- 2.
- 3.
4.
 - a.
 - b.
 - c.
- 5.

Solar System Formation

Planetary System –

- 1.
- 2.
- 3.
- 4.

Video Notes: Supernovas

Stamp

1. How many times more brilliant is a supernova than the sun?
2. What would radiation do to life on a planet that was orbiting a star that went supernova?
3. Where did Fe, Ca, and Na come from?
4. How often do supernovas go off?
5. How do cosmic rays affect evolution?
6. What information does the light curve and spectrum provide?
7. What are the two types of supernovas and how do they differ?
8. When and where did the first supernova observed by man occur?
9. The type 1a explosions are what kind of stars?
10. Describe how a type 1a supernova happens. What is the process?
11. How are neutron stars formed?
12. When does an iron core form in the life of a star?

13. Where do neutrinos come from?
14. How do neutrino detectors work?
15. What year did the largest known supernova occur? How large was that supernova?
16. What does SWIFT look for?
17. How do standard 1a supernovas help determine the size of the universe?
18. Is the universe expanding at a faster or slower rate?
19. How long ago was the last supernova in our galaxy?