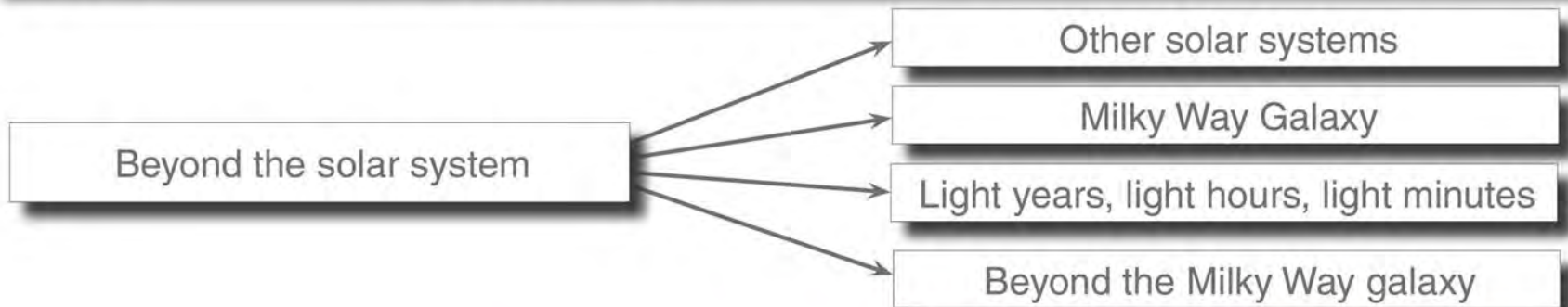




TERM 4: EARTH AND BEYOND

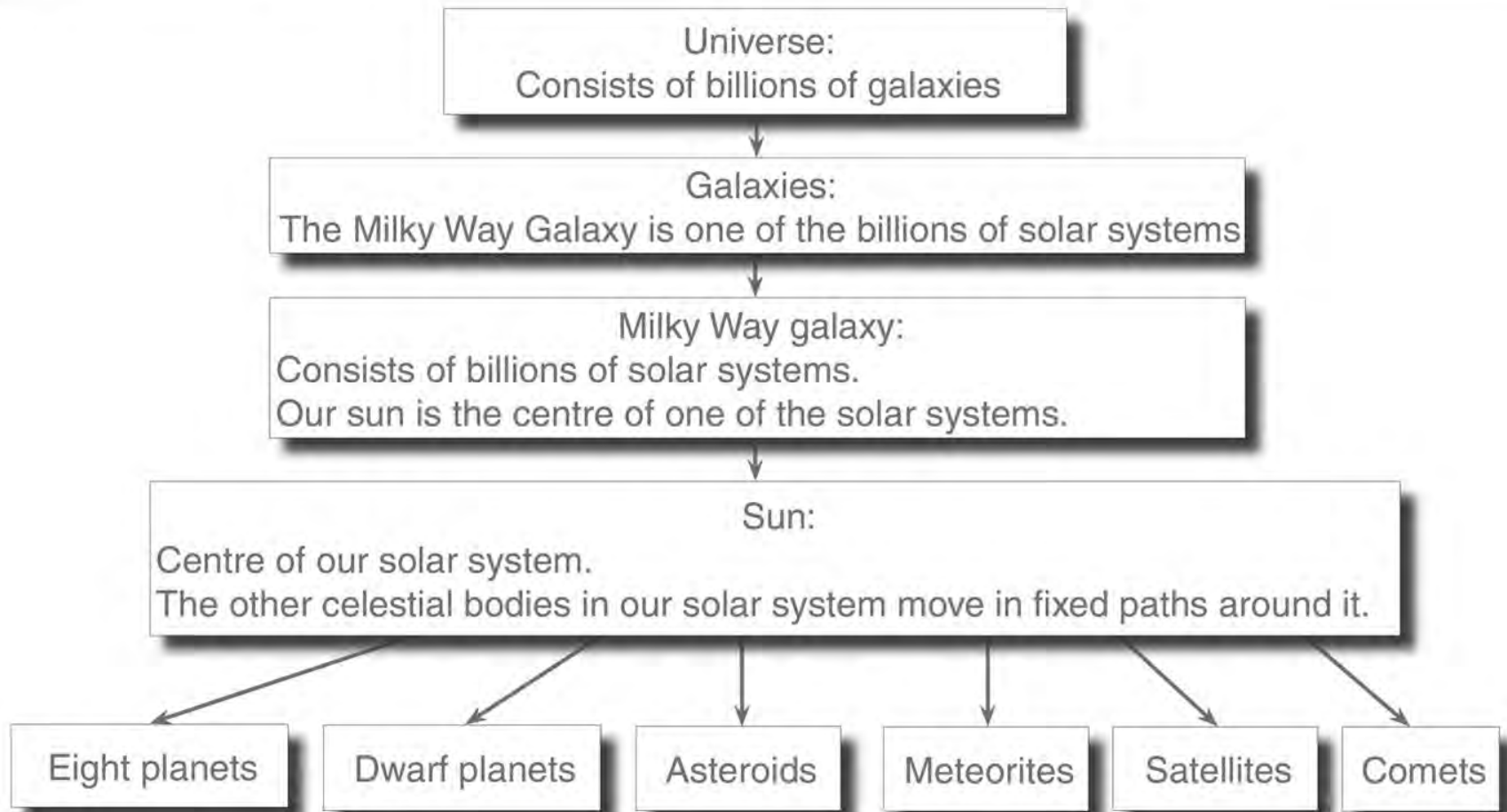
UNIT 2

BEYOND THE SOLAR SYSTEM



Quick facts

Satellites are man-made, semi-independent computer controlled systems.





2.1 Galaxies

Galaxies:

- sizes and shapes differ.
- consist of gas, dust and a neverending number of stars.
- stars are held together by mutual gravitation (attractive forces).
- isolated from similar systems by large spaces.

2.2 Milky Way Galaxy

The Milky Way is a galaxy that looks like a hazy band stretching over the skies. Our sun is one of the stars in the Milky Way galaxy.

Spiral-shaped galaxy

Our sun is located towards the edge of the Milky Way galaxy in one of the spiral arms.



Activity 22: Page 279

Use a flat surface, like a large tray/hardboard, and sand.

Use the sand to demonstrate the spherical shape of the Milky Way galaxy with the arms.

Use a small button to represent our galaxy in one of the arms.



The stars that we see are suns

Giant stars are 10 – 100 times larger than our sun and 10 – 1 000 times brighter than our sun
Hydrogen is changed to helium and energy is released.

Vary in temperature, brightness and size.

Other than our sun, the nearest star to earth is Proxima Centauri.

2.3 Light years, light hours, light minutes

A light year is the distance that light travels in one year.

A light hour is the distance that light travels in one hour.

A light minute is the distance that light travels in one minute.

2.4 Beyond the Milky Way galaxy

Our Milky Way Galaxy is only one of billions of galaxies.

Most of space is empty.

Milky Way galaxy is approximately 150 000 light years in diameter.





Solar systems have various shapes and sizes.

Some examples of galaxies are:

- Andromeda galaxy; the nearest to our galaxy.



- Sombrero galaxy



- A windmill galaxy

Exercise 26: Page 281

1. Complete the following flow diagram about the universe.





2. Use one of the following words that fits best to the description in the table below.

A word can be used more than once.

Proxima Centauri, star, Southern Cross, light year, Andromeda, light minutes, Milky Way galaxy

| | | |
|-----|--|----------------------------------|
| 2.1 | The Greeks referred to it as splattered milk. | Milky Way galaxy |
| 2.2 | The star that is 42 trillion kilometers from earth. | Proxima Centauri |
| 2.3 | The galaxy that is closest to the Milky Way galaxy. | Andromeda |
| 2.4 | A sun | Star |
| 2.5 | Gas ball that emits light. | Star |
| 2.6 | A distance described in terms of how fast light travels. | Light minutes/light years |
| 2.7 | Direction indicator at night | Southern Cross |
| 2.8 | Our sun is part of that galaxy. | Milky Way galaxy |
| 2.9 | 9,5 trillion kilometers | Light year |

3 Write down the definition of the following.

3.1 Light year

A light year is the distance that light travels in one year.





3.2 Light hour

A light hour is the distance that light travels in one hour.

4. Name and describe five different types of celestial bodies found in our solar system.

Sun - center point, other objects move in orbits around it.

Planets - large celestial bodies that move in fixed paths around the sun.

Asteroids - rocky, metal-like objects that orbit the sun.

Comets - “dirty snowballs” of gases, dust and ice particles

Satellites - man-made semi-independent computer-controlled systems.

Dwarf planets - orbit the sun, but path is not cleared.

Meteorites - small pieces of rock that orbit the sun, penetrates the earth's atmosphere and hit the ground.

5. Arrange the following in order of size:

Galaxy, universe, earth, Venus, solar system

Venus, earth, solar system, galaxy, universe





6 Are the following statements true or false?

| | Statement | True or false |
|-----|---|---------------|
| 6.1 | Our solar system is in the centre of the Milky Way galaxy. | False |
| 6.2 | The hazy light of the Milky Way galaxy comes from our sun. | False |
| 6.3 | Cooler stars are red to orange. | True |
| 6.4 | Our galaxy is seventeen light hours in diameter. | False |
| 6.5 | Sombrero is a spiral-shaped galaxy. | False |
| 6.6 | Stars are held together by gravitation. | True |
| 6.7 | Satellites are man-made computer-controlled systems. | True |
| 6.8 | Andromeda galaxy has many similarities to the Milky Way galaxy. | True |

Research question:

Why can all suns be called stars, but all stars are NOT suns?

Suns give off light like stars.

Stars must have celestial bodies, e.g. planets, in orbits around them to be called suns.

