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Understanding Astronomy: Characteristics Of Celestial Bodies As Knowledge In Science Learning

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ABSTRACT

This research aims to provide an understanding of astronomy, specifically the celestial bodies studied in science material. The method used in this research is a descriptive method. Celestial bodies are usually also called astronomical objects, celestial bodies are objects in the sky that can be seen from the earth. There are many types of objects in the sky such as the sun, moon and stars. In science lessons we study astronomy, one of which is about celestial bodies. By studying celestial bodies we can find out about various kinds of objects in the sky. From the results of the research we can understand about astronomy, specifically celestial bodies.

Keywords:
Astronomy, celestial bodies, science learning

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INTRODUCTION

Natural Science according to Sudana (2021) is a science whose object is natural objects with definite laws, applicable anytime and anywhere. Science learning serves to provide knowledge about the surrounding natural environment. One of the science lessons is about celestial bodies. Celestial bodies consist of planets, the sun, satellites, and other objects that are in outer space. As explained by (Suhandi) that what we know about the solar system is a celestial body and is included in astronomy. The solar system contains the sun, planets, asteroids, comets, satellites, and meteoroids in motion. The sun belongs to celestial bodies. The sun is often referred to as the solar system. The solar system according to Najib (2023) is an arrangement of celestial bodies consisting of planets, the sun, satellites, and other celestial bodies. The purpose of studying the solar system is to find out where it lives. The solar system is also one of the lessons taught in school, so we can know the uses of each solar system. As in the solar system there is also a science that studies celestial bodies. Astronomy is the study of the movement of celestial bodies that occur in outer space. Astronomy is the oldest science because the development of astronomy has been carried out for centuries with simple media. Astronomy helps humans map specific things about celestial bodies such as how stars, suns, and planets originate. The science of astronomy plays an important role in natural knowledge that cannot be separated from life. The opinion expressed (Suhandi) explained based on the results of observations of the solar system has a different character from others. The character of each solar system is very important and useful in various ways, including analyzing and explaining natural phenomena related to the character of the solar system, predicting future events, predicting whether or not planets can be occupied by living things, and taking precautions if there are things that will endanger life on earth related to other members of the solar system.

METHOD

The method used uses qualitative. This method is done by looking for journal references related to celestial bodies and is developed based on previous opinions. Journal references obtained from google scholar with the latest year, then journals related to the title are concluded to make an explanation of the title.

RESULTS AND DISCUSSION

Understanding astronomy according to Rasyid (2020) there are two terms for qualitative studies of objects in the universe: astronomy, astronomy, or simply astronomy. In theory these two terms have the same meaning, but in their development these two terms are different. In classical Islamic literature (Turat), astronomy is known as the science of Haya. The science of Ha'ai is the study of the position of the geometry of celestial bodies in order to determine the schedule for the implementation of sharia and its position from the surface of the earth. It was born from the innovation of Muslim scientists in studying celestial bodies, because this expression was not influenced by outside influences. "Science hai 'ah" is equivalent to the term astronomy. Astronomy itself comes from the Greek words: "astro" and "nomos." Astro means star and Nomos means "rule". This term refers to the scientific field that studies celestial bodies, namely astronomy.

The definition of astronomy according to Koto (2016) is a space that extends in all directions and cannot be known its limits. Astronomy in space there are thousands of galaxies that are star clusters. Astronomy as the oldest known science of astronomical artifacts dates back to the prehistoric era.

Solar system and astronomical phenomena proposed by Mahmudah (2016) that astronomy is the science of the universe related to celestial bodies such as planets, moons, stars, sun, galaxies, solar systems, from the universe. This astronomy is observational because there is no estimate of the object observed.

Based on the understanding of astronomy that has been described, it can be concluded that astronomy is a science related to celestial bodies such as the moon, stars, sun, planets, galaxies in the universe. This astronomical science requires a long time to study objects in space. Astronomy requires special tools to make observations. Observations contained in astronomy are not arbitrary and estimates of objects observed must be precise.

After knowing the meaning of astronomy, the next thing to know is celestial bodies. Celestial bodies according to Azizah (2018) are all objects that are in the sky and visible from the earth. The celestial bodies in question are mataharai, moon, stars, clouds, and others. During the day the visible celestial bodies are the sun and clouds. The sun emits Light to illuminate the earth and the source of life on earth. During the day it looks bright in the sky because there are clouds moving like waves of clouds that envelop the earth. Clouds are a collection of water vapor that comes from the earth. Celestial bodies when viewed from their physical properties according to Kusumawati (2019) have a very large size. Various kinds of celestial bodies seen from the earth look small, so a telescope is needed to see celestial bodies.

Understanding celestial bodies according to Azizah (2018) is objects in the sky that can be seen from the earth. There are many types of objects that are in the sky such as the sun, moon, stars. There are celestial bodies that illuminate the earth during the day, and the source of life on earth is the sun. In addition to the sun, there are also other celestial bodies such as the moon and stars. Celestial bodies exist between 2 times, namely in the morning and night. Examples in the morning are like the Sun and if at night there are stars, moon, planets. They have their own benefits. Celestial bodies are very beneficial to human life. Like stars at night whose benefits provide light on this earth.

So, it can be concluded that celestial bodies are objects in the sky. When viewed from the earth it looks small. Various kinds of celestial bodies include the sun, moon, and stars. Celestial bodies are very beneficial for life because they can illuminate the earth.

Celestial bodies that include the sun, moon, stars also contain the solar system. The solar system in question is all celestial bodies such as planets, meteoroids, comets and others.

The definition of the solar system itself according to Suda (2021) is an arrangement of celestial bodies consisting of the sun as the center of various planets, meteoroids, comets, and asteroids that surround it. The solar system consists of the sun, eight planets, satellites residing on planets, and celestial bodies surrounding them. When you already know the meaning of the solar system, then in the solar system there is the term revolution. Revolutions are the sun, planets, meteoroids and satellites that surround the sun.

The process of the formation of the solar system according to (SURYA) which explains that, there are several theories of the formation of the solar system according to heliocentric understanding. In this understanding explains that the planet circles the sun with a shape like a circle. The circulation of

planets in this theory is related to the direction of circulation, that the direction of circulation of planets is not clockwise but counterclockwise. According to (SURYA) in the theory neabule explains that the planet and the sun come from incandescent fog in the universe.

Based on the opinion expressed by (SURYA) tells about the occurrence of planets and the sun coming from incandescent fog, namely:

1. The sun and planets are gaseous
2. The mist swirled and gathered vigorously
3. Compaction occurs at the center of the circle that forms the sun
4. Other materials form masses smaller than the sun or called planets.

While according to (Khoiriyah) there are facts of the formation of the solar system, namely:

1. The planet's orbit is said to be small inflatation on the same plane
2. The entire planet surrounds the sun in the same direction
3. The orbital trajectory of the planet is circular
4. The spin of the planet is equal to the orbit of the sun.

CHARACTERISTICS OF THE SOLAR SYSTEM

A solar system is a system that includes a collection of celestial bodies, consisting of the sun and all objects within the solar system due to the gravity attached to it. Rosa (2019: 2) characteristics found in members of the solar system are:

1. All planets and parts of the moon have oval-shaped orbits and counterclockwise. According to Santi & Darajat, (2017: 44) Sir Isaac Newton (1642–1727) was an English scientist who lived in the heyday of Europe. Isaac Newton was the first to realize why moons and planets move in orbits, because they are affected by gravity. Wahyu Kurniawati, (2022:106)
2. The planets fall into two main categories
    1. Terrestrial (Inner Planets) - small, dense, near the Sun. According to the Basic, n.d. (:3) the four inner planets or terrestrial planets have solid rock compositions and have few or no satellites and have no ring system. Three of these four planets (Venus, Earth and Mars) have atmospheres, and all have meteor craters and structural surface properties such as volcanoes and valley fragments. Planets located between the Sun and Earth (Mercury and Venus) are also called inferior planets.
    2. Jovian (outer Planets) - large, gaseous, further away. According to Nurcresia et al., (2018: 3) giant planets are planets whose mass is greater than 10 times the mass of Earth (m > 10). Giant planets are composed of gas and ice, but some are made of rock or solid matter. Giant planets are also sometimes referred to as Jovian planets. According to Stavinschi et al., n.d. Giant planets form on a time scale of 10 million years (rocky planets take about 100 million years). Planets do not form "in situ", but through the exchange of angular momentum between the formation of mercury planets and planetesimals that are swept in other directions and even out of the solar system. The planets that enter the outer planet members are Jupiter, Saturn, Uranus, Neptune. Very different from the inner planet, its characteristic is that it is a very large ball of gas and liquid, without a solid surface and has hundreds of moons.
3. The asteroid region fills the solar system

    According to Sumilah, (2021:42) Asteroids are small and dense objects in the solar system. Asteroids are examples of small planets that are still much smaller than planets. This asteroid is located in the zone between Mars and Jupiter and is known as the asteroid belt. Asteroids are concentrated in the asteroid belt and to a much lesser extent in Jupiter's orbit. The comet resides in the Kuiper belt and Oort cloud. Pluto is now considered a member of a dwarf planet rather than a planet. So why is Pluto not considered the main planet anymore? According to Saputra, (2018: 78) Pluto was classified as the ninth planet immediately after its discovery and this grouping has been running for 75 years. Pluto is different from the other eight planets, but has similarities to objects in the Kuiper Belt. Pluto is considered a Kuiper belt and Pluto does not meet the criteria of a planet.
4. Important exceptions

There are planets with unusual tilts (Venus and Uranus), according to Planet, (2022: 76) the axis of Venus has a tilt of 177.3o while according to Surya, (n.d.: 92) the planet Uranus has a tilt of 98o so there are moons with unusual orbits.

Which includes members of the solar system as stated by (Saputra, 2018), namely:

1. Sun
   The Sun as explained by Saputra (2018) is the star closest to the earth, which is 150 million kilo meters. The shape of the sun is an incandescent ball of gas composed of hydrogen and helium gas.
2. Comet
   Often referred to as a tailed star, which is a celestial body whose orbital line is oval. The comet's tail gets pressure from the sun so that the comet's position is not close to the sun and is always away from the sun. Comets are formed from fragile ice crystals that easily escape from their bodies.
3. Meteor
   Meteors are celestial bodies in the form of fragments of space rock falling and entering the earth's atmosphere. When a meteor falls into the Earth's atmosphere, there will be friction between the air so that the object becomes hot and causes burning. The fall of meteors to earth gives rise to meteor craters like the Arizona phenomenon in the United States.
4. Asteroid
   The asteroid according to Saputra (2018) is between Mars and Jupiter. Asteroids rotate between Mars and Jupiter forming the aasteroid belt.
5. Satellite
   Satellites according to Saputra (2018) always revolve around the central planet. Satellites are divided into two, namely natural satellites and artificial satellites.
6. Planet
   Planets according to Saputra (2018) are dark objects orbiting stars (suns). The planets discovered by observers over thousands of years are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.

The solar system according to Luthfi (2022) is a celestial body consisting of the sun, 8 planets, small planets, satellites, meteors, comets, and other celestial bodies. The sun is the main center of the solar system, while the other members revolve around the sun.

The structure of the solar system according to Luthfi (2022)

1. Sun
   The sun is the pusta of the solar system and is a true star because it can emit its own light. The diameter of the sun is about 1,392,500 km which is 109 times the diameter of the earth and 10 times larger than the planet Jupiter.
2. Planet
   A planet is a celestial body that revolves around the sun that can reflect light from the sun. There used to be 9 planets, but today Pluto is not included in the family of Milky Way planets that surround the sun.

Based on its location, planets are divided into two, namely the outer planet and the inner planet. The inner planet is a planet whose path is close to the earth, including Mercury and Venus.

Merkurius

Characteristics of the planet Mercury:

1. Mercury has a diameter of 4,862 km and is the smallest planet
2. It is the closest planet to the sun
3. The distance of Mercury to the Sun is about 58 million km
4. The surface is a large crater crater
5. Mercury is the brightest planet from Earth
6. Mercury has no satellite

Venus

1. Venus is located between the orbits of Mercury and Earth which has a diameter of about 12,100 km and is the closest planet to Earth.
2. It is about the same size as the earth

3. The distance to the sun108 million km takes 225 days
4. The temperature of the planet Venus is 480 degrees Celsius so it is very dry
5. It is a brightly lit white planet, looks beautiful and brilliant and appears after sunrise.

While the outer planet is a planet whose trajectory or circular line is outside the earth, including:

1. Earth
2. Jupiter
3. Saturnus
4. Uranus
5. Neptunus

THE INFLUENCE OF THE SOLAR SYSTEM

The solar system is very influential in everyday life, where according to Anam (2023) the sun as the main center that is most widely used in life, one of the solar system arrays there is only one planet that can be inhabited by humans, namely, planet Earth. Where Earth is the only planet that has life and the gravitational force of the earth. This can be seen by the existence of living things such as humans, plants, animals and objects on earth. In everyday life on earth Sunlight is very important, because without sunlight on this earth, living things will not be able to grow and develop. Earth really needs the sun to help living things to grow and multiply. According to Indri sulastri, (2023) the Sun is the largest celestial body in the solar system. The sun is made of very hot and luminous gas. The sun is also known as a star, a collection of stars that make up galaxies. The Milky Way is a large and very vast galaxy made up of about 200 billion stars. The Sun and its system move at 828,000 km per hour, it takes 230 million years to orbit the Milky Way at the speed of light6. According to Pebriyanto (2023) There are several that can affect the solar system in life on earth, one of which is the influence of the earth's gravitational force, the influence of climate, the influence of the calendar, the influence of navigation, and the influence of cultural motology, and exploration research.

a. The Sun is the main source of energy in our Solar System. Nuclear processes at the core of the Sun produce light and heat essential for life on Earth. Plants can produce energy through photosynthesis, and almost all forms of life depend on the food chain that starts from plants. In addition, in everyday life can help humans to dry, dry, and irrigate during the day. In addition, it can produce energy
b. The influence of gravitational force, gravitational force greatly affects the Solar System on gravity on Earth which is very large. With gravity all objects can be right in place, and according to their state. With the Sun, the power of the planets to defend themselves and other objects corresponds to their orbital trajectories. This gravitational gezeer also affects tides on Earth, which has an impact on fishermen's activities and marine life, and the influence that arises can help fishermen to carry out daily activities to fish easily. Besides being able to affect life on land, garvitation style can also affect daily life at sea.
c. Due to climate influences, the Sun is the main source of energy for the Earth. Solar radiation creates the climate and weather on Earth. Variations in heat and sunlight create different seasons. According to Kurniawati &; Eko Atmojo, (2022) With different seasons, weather temperatures on earth vary, such as winter, summer, spring, autumn. In different countries and regions that also have different temperatures, the Asian continent has various seasons with different weather. The influence of climate is one of the factors that greatly affect the solar system in everyday life on earth. Solar systems also play a role in maintaining long-term climate stability on the planets. Not only on earth that has a climate and weather temperature but on other planets also have differences in temperature and weather even very much different from on earth.
d. The movement of planets in the Solar System forms the basis of our calendar. The rotation and revolution of the Earth with respect to the Sun forms the year and the moon. The calendar is formed with two systems, there is the Gregorian calendar and the Hijri calendar. The Gregorian calendar is calculated based on the circulation of the Earth around the sun in the range of one year AD set at 365 days for one year, with every 4 years added 1 day for February and in each month with a different number of days there are 28 days, 30 days, and 31 days. The addition of days every 4 years in February is called a leap year, with the characteristic of a year that has an exhausted

number of four, and has 12 months in a year. for the Hijri calendar, it is calculated based on the moon circling the earth. In one Hijri year the duration is 354 days, in one dilution to the earth requires 29 days 12 hours 44 minutes 3 seconds and will be rounded up 29.5 days. With this rounding is called leap years.

e. Humans use this calendar to organize time and organize daily activities, such as farming, hunting, and other social activities. In this way, you can remember when the time needs to be marked as a day or time for those who have very memorable events, such as national days, holidays and anniversaries.

f. The stars and planets in the Solar System are used as reference points in navigation. Human history is replete with examples of the use of the stars to determine direction and location. According to Indri sulastri, (2023) In the era where the 80th century BC at that time the people determined the direction by using the star star on the langi, to migrate they also used the star as a direction and location, until now the increase in years and technological advances now many use the compass as a direction, and increasingly sophisticated tools in this day and age not only use a compass but use a very sophisticated media, namely Goegle Maps. With this goegle map, it is easy for people to take a difficult journey to take.

g. Research and Exploration, the Solar System becomes the object of human research and exploration. Knowledge of the Solar System provides insight into the origin and evolution of Earth and life on it.

CONCLUSION

Celestial bodies are objects that are in the sky. The celestial bodies in question are the sun, moon, stars, clouds, and others. Celestial bodies that appear at night include the moon and stars, while those that appear during the day are the sun. In celestial bodies there are also solar systems such as meters, planets, satellites, and comets. One of the influences in celestial bodies in the solar system is influential on everyday life such as the influence of climate, gravity, research, culture, and calendars.

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