

Guidance of Saturn watching

1. Background

With the naked eye, the Saturn looks only a yellowish bright star. However it has a beautiful ring system.

In 1610, Galileo Galilei observed the Saturn with his telescope for the first time. Unfortunately, since his telescope did not have enough resolution, Galileo could not find the ring system. Instead, he reported that "the Saturn is a three stars system". Galileo observed the Saturn over many years and then he noticed the change of the Saturn's shape through his sketches. Indeed, he left the sketch of various shape of Saturn. However, he could not finally think of an idea that the changing of shape is because of the existence of the ring system. Christian Huygens is the first person to describe the existence of the ring system of the Saturn in 1656.

2. Purpose

The aim of this activity is that children experience the feeling of wonder that Galileo had when he observed celestial bodies for the first time. When children observe the Saturn with the telescope which made by themselves, they will notice the ring system of the Saturn. Teachers make children do sketch of the Saturn by themselves and lead them to find the ring.

3. Observation Tips

It is a little difficult to acquire the Saturn into the field of view of the telescope. When the Saturn enters in the field of view, tighten the tripod to fix the telescope at once. Then, adjust telescope focus. As for the person who use telescope for the first time, it is advisable to have a practice session by using distant scenery in daytime.

4. Steps

(a) Observation and sketch

There are two sketch columns on the work sheet. Draw the Saturn into one of the sketch column, then draw other star into another column as a comparison. Choose nearby bright star as a comparison star.

Since the apparent radius of the Saturn is small, it is difficult to recognize the ring system with the x15 telescope. If you use the x35 telescope, you are able to see the Saturn surrounded by some structure. If you really want to see the ring system in detail, you need to use a larger telescope with higher magnification.

Magnifications of the telescopes are as follows:

For Hoshi-no-Techou Inc. telescope kit, the magnification is a 15 power

(Focal length of the telescope is 273mm and focal length of the eyepiece is 18.2mm).

For ORBYS Inc. telescopes kit, it is a 35 power

(Focal length of the telescope is 420mm and focal length of the eyepiece is 12mm).

(b) Write any findings and/or questions

Write anything you found out and/or question from your observations in your sketch sheet under the sketch column.

(c) Guess the existence of the ring system

There are several sketches of the Saturn on the first page of the work sheet of the post observation study. Teachers make children noticing the existence of the ring system through these sketches.

(d) How the Saturn's rings looks from the Earth?

The thickness of the Saturn's ring plane seen from the Earth changes at the cycle of about 30 years that is the revolution period of the Saturn around the Sun, because of the inclined rotation axis of the Saturn from its orbital plane. By working on the second page of the work sheet, children will understand how the Saturn's ring from the Earth looks like.

(e) Write down what is learned today, and what you want to know more.

Summarize your knowledge of the Saturn and its ring system, which you learned from observations with the telescope and through a textbook or the internet. Also, write down what you want to know more and what you can do further.

5. Notes

In this activity, children will notice the ring of Saturn. Unfortunately, it is difficult to see the Saturn's ring well enough to discern (understand) its nature. However, if you have a strong eyesight, you can see slightly elongated shape of the Saturn by the x15 telescope.

Teachers show the Saturn's ring system to children with a larger telescope at other opportunities, if possible.

Caution must be given to children that "Never watch the Sun through the telescope!"