



# Let's observe Saturn

## Observation & Sketch

In 1609, the Italian scientist Galileo Galilei became the first person to make astronomical observations using a telescope. A year later he made a great discovery while observing Saturn. What did he find?

Let's experience his surprise by recreating his observations using our telescope.

Name \_\_\_\_\_

Address \_\_\_\_\_

■ Let's observe and draw sketches of Saturn and other stars (except for the Moon and the Planets).

### Example

weather: Clear

Date & Time 21:00 Month 4 Day 30

Aperture of Telescope 4 cm

Site Tokyo, JAPAN

Magnification \* 35 x

\*Magnification of a telescope can be calculated as follows: Focal length of telescope ÷ Focal length of eyepiece.

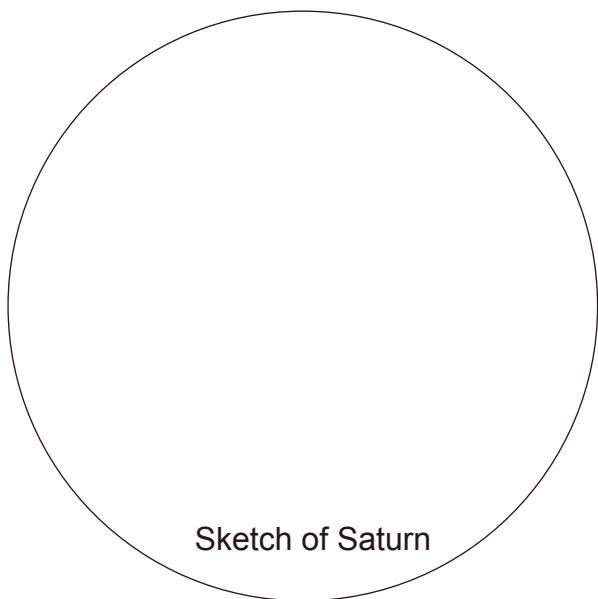
weather: \_\_\_\_\_

Date & Time \_\_\_\_\_

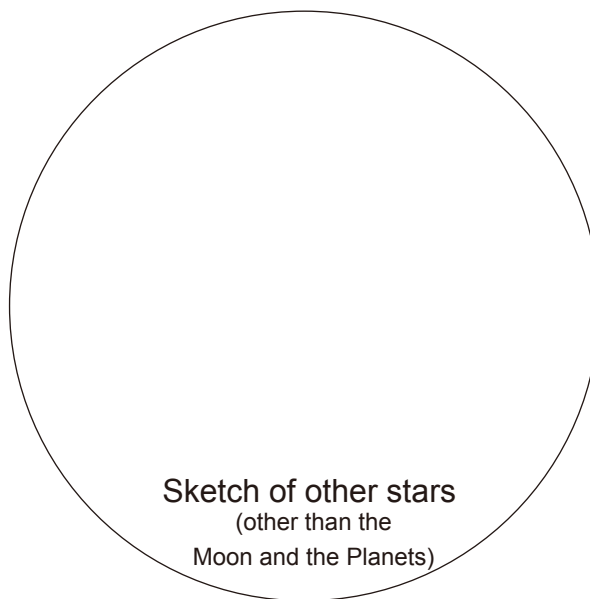
Aperture of Telescope \_\_\_\_\_ cm

Site \_\_\_\_\_

Magnification \* \_\_\_\_\_ x



Sketch of Saturn



Sketch of other stars  
(other than the  
Moon and the Planets)

■ How is Saturn different from other stars? Write down what you have noticed.

### How to find the Saturn

On the following web page, you can get information about the location of Saturn (Moon, other planets, bright stars and constellations also).

[http://eco.mtk.nao.ac.jp/cgi-bin/koyomi/skyviewer\\_en.cgi](http://eco.mtk.nao.ac.jp/cgi-bin/koyomi/skyviewer_en.cgi)



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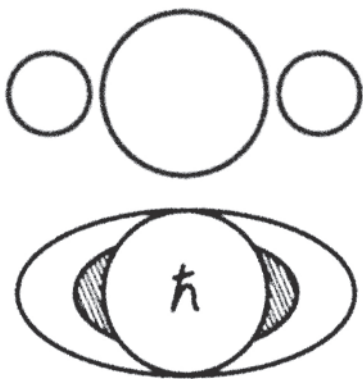
# Let's observe Saturn

## Post Observation Study

Name \_\_\_\_\_

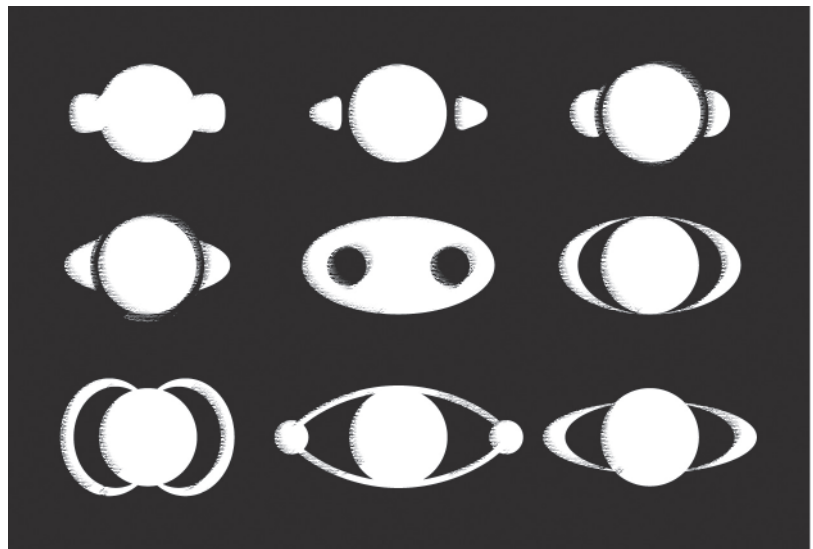
Address \_\_\_\_\_

- What are those objects attaching to Saturn?  
Make your guess by referring to your sketches and the figures below.



Above: A copy of the sketch of Saturn drawn by Galileo in 1610.

Below: A copy of Galileo's sketch of Saturn published in The Assayer of 1623.



A copy of the sketches of Saturn drawn by 17th century scientists after Galileo's work.



A copy of the figure of Saturn predicted by Huygens of the Netherlands.

In 1659, Huygens revealed the true identity of those objects attaching to Saturn.

**Saturn has**   **!**

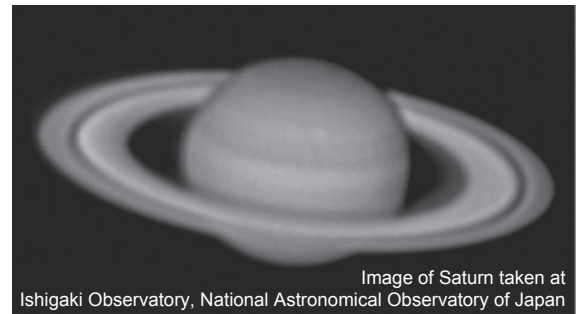
## Post Observation Study

## Let's observe Saturn

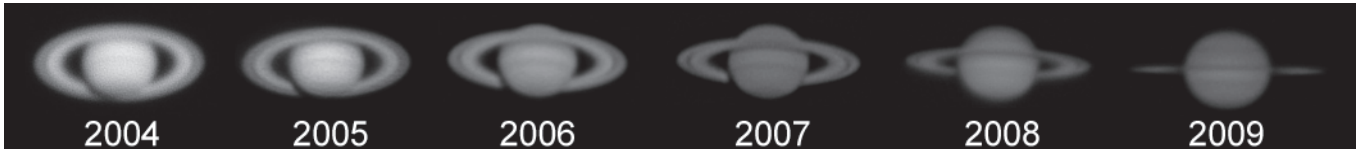
### Saturn has a beautiful ring system!

There is a beautiful ring system around Saturn. The rings are considered to consist of rocky debris and ice particles. The ring system has a very small thickness of less than 100 m, while its diameter is as much as 300,000 km.

Look at the images below. The ring system of Saturn changes its apparent inclination through the years. How come?



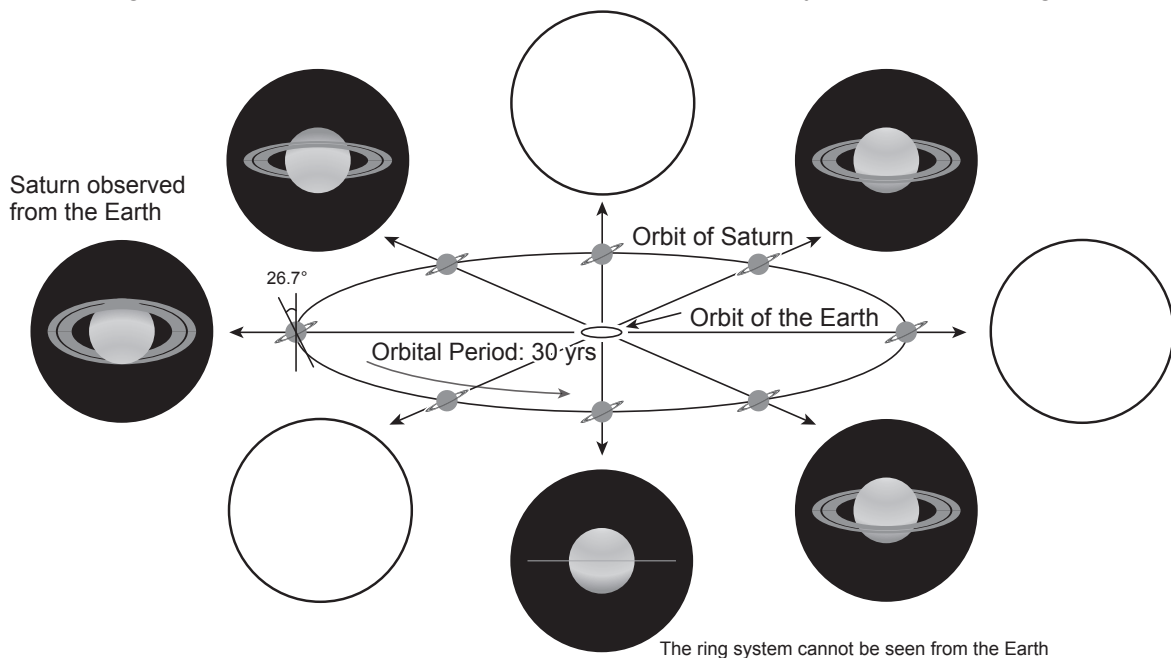
Photos taken by Takeshi Hirano



As in the diagram below, Saturn is tilted 26.7 degrees to its orbital plane and completes its circle around the Sun, a revolution, about every 30 years inclining to the same direction. It causes different apparent inclinations of the ring system of Saturn through years. This is probably one of the reasons why the sketches of the ring system of Saturn drawn by 17th century scientists have all different shapes.

The ring system of Saturn is so thin that it cannot be observed from the Earth when the Earth lines up to view the ring system edge-on, and when the Sun shines upon it from the side. This phenomenon occurs about every 15 years, that is, a half of the revolution period of Saturn. In August 2009, the ring system of Saturn disappeared from our view. However it will not be an appropriate time for the observation because the apparent position of Saturn is close to the Sun around this time. The next time it disappears from our view is in 2025.

### Let's draw figures of Saturn observed from the Earth in the empty circles of the diagram below.



Write down what you learned from this observation, what you want to know more about and what you want to examine in the future.