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 eye piece.

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weather:

Date & Time _____ Aperture of Telescope _____ cm
Site _____ Magnification * _____ x

Sketch of Saturn

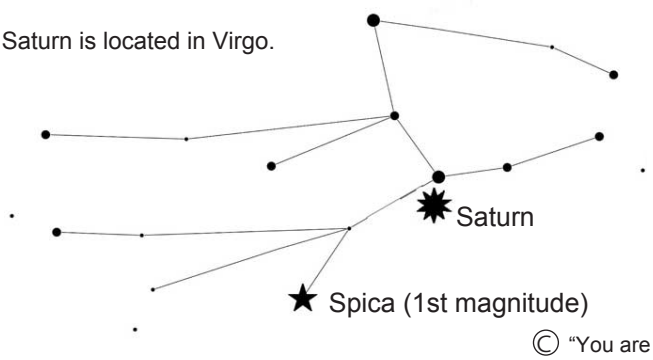
Sketch of other stars
(other than the Moon and the Planets)

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

Saturn Transit & Set Time

	Date	Rise	Transit	Set
Ulaanbaatar	June 1	15:02	20:57	02:55
	July 1	13:05	18:59	00:57
Khovd	June 1	16:03	21:58	03:56
	July 1	14:06	20:00	01:58
Dalanzadgad	June 1	15:11	21:07	03:06
	July 1	13:14	19:09	01:08

Saturn is located in Virgo.



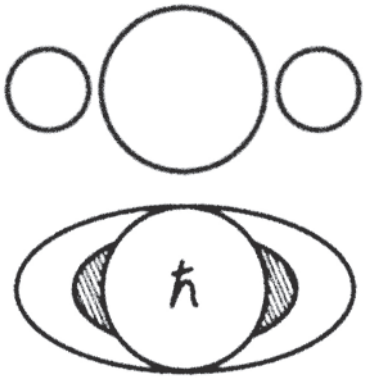
Let's observe Saturn

Post Observation Study

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.

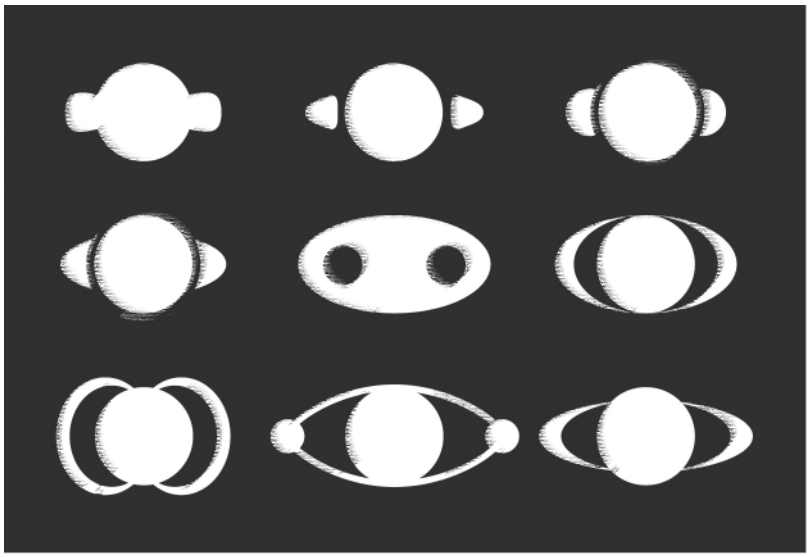
Name _____ Address _____

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

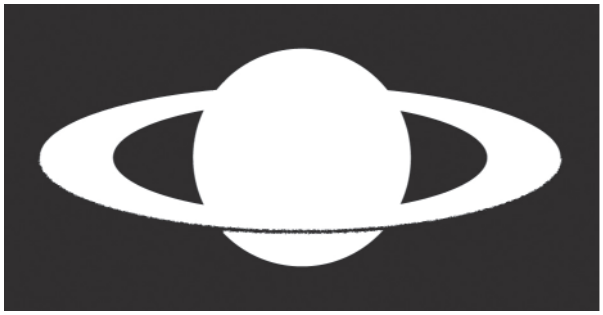


Above: A copy of the sketch of Saturn drawn by Galileo in 1610.

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?

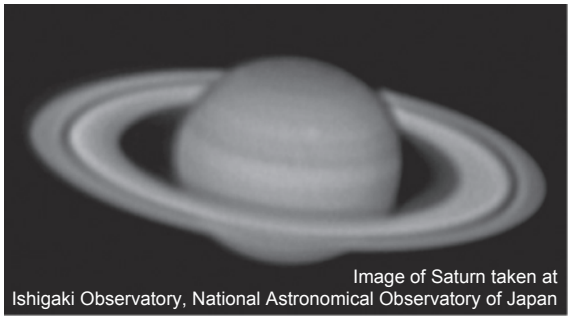


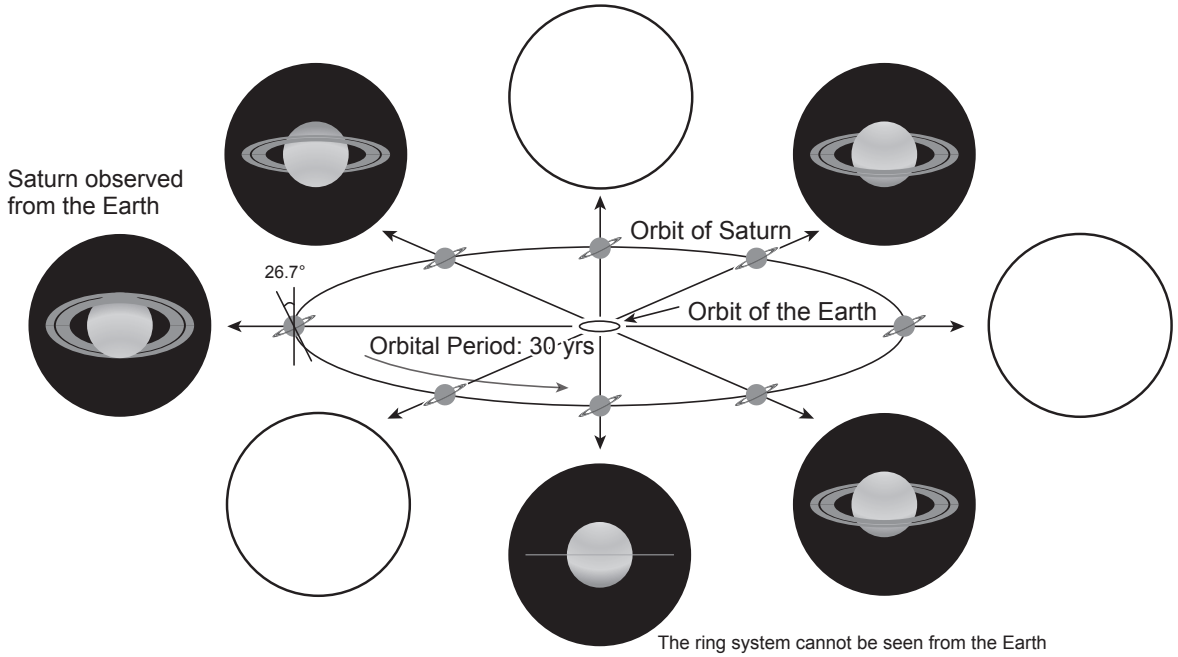
Image of Saturn taken at Ishigaki Observatory, National Astronomical Observatory of Japan

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.