Explanation for instructors

Why do stars have different colors?

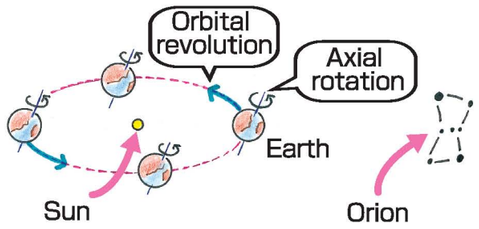
The stars that form constellations in the night sky are just like our Sun: they give off their own light. In fact, our Sun is a star, too. Different stars have different colors because a star's color depends on its surface temperature. Stars that appear to be red in color have relatively low surface temperatures and those that shine a bright bluish white have relatively high surface temperatures.

The color of stars	Surface temperature	Star's name	The color of stars	Surface temperature	Star's name
Bluish-white	10,000°C or higher	Rigel	Yellowish-white to yellow	5,000–4,100°C	
Light bluish-white	10,000–7,000°C		Yellowish-orange	4,100–3,600°C	
White to light yellow	7,000–5,000°C	Sun	Orange to red	3,600°C or lower	Betelgeuse

Why do the constellations move?

Just like the Sun, Orion rises in the east, crosses the southern sky, and sets in the west. This apparent motion is due to the west-to-east rotation of the earth on its axis. (Axial rotation)

Orion also moves a little bit farther west in the sky each day. This apparent motion is due to the Earth revolving in its orbit around the Sun. (Orbital revolution)



(This figure is not drawn to scale, and the relative sizes of the Earth and the Sun are different in real life.)

The content of this experiment is related to the following classes (teaching guidelines) taught at Japanese schools.
- Fourth grade science (elementary school): The moon and the stars
- Third grade science (junior high school): Celestial motion
  —the Earth's rotation and revolution, Stars and planets

Japan Aerospace Exploration Agency(JAXA), Space Education Center

3-1-1 Yoshinodai, Chuo-ku, Sagamihara, Kanagawa 252-5210, Japan
Tel:+81-50-3362-7590 Fax:+81-42-759-8612
http://edu.jaxa.jp

Space School for Families

Let's Examine the Movement of Stars

Objectives:

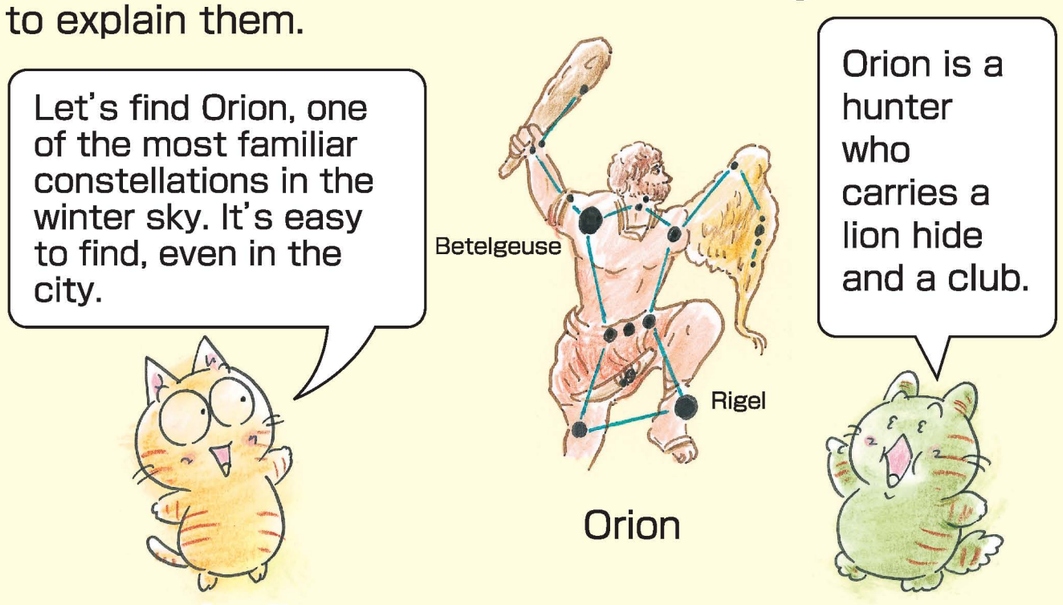
Foster an interest in outer space by finding Orion or other constellations in the night sky and observing differences in the color and brightness of individual stars as well as the regularity of their movement.

Name: _____

Let's find Orion

Step 1: Find the constellation Orion.

The stars in the sky form many easy-to-recognize patterns. People in ancient times connected the stars with lines to form constellations and thought of stories to explain them.



Orion

Step 2: Observe the color of the stars in Orion.

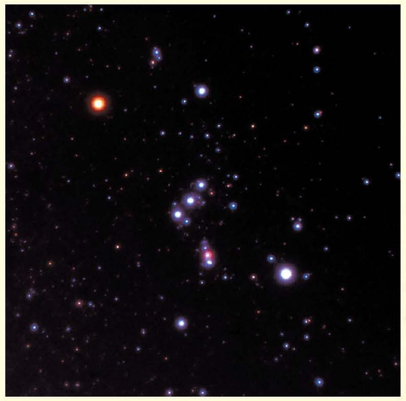
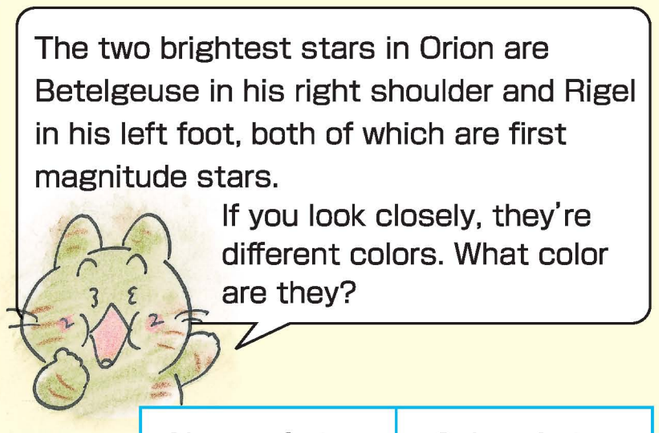


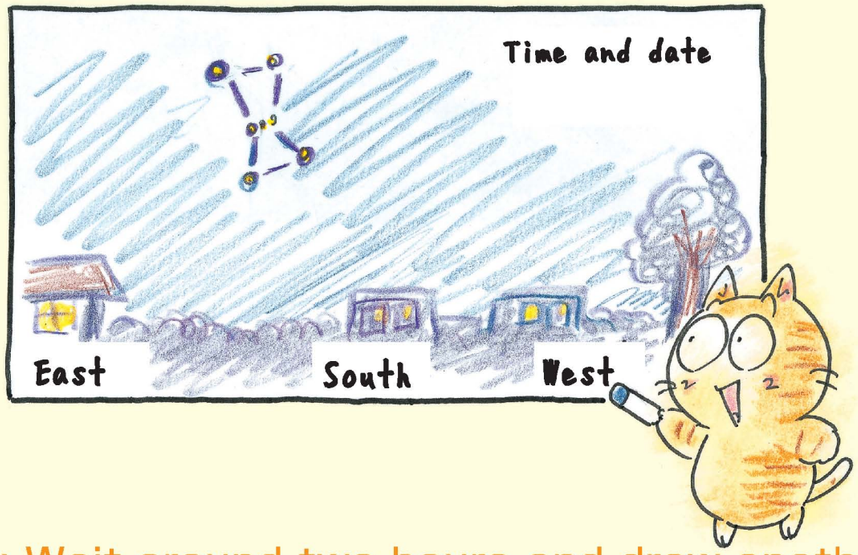
Photo by Tetsuya Toyoda



Name of star:	Color of star:
Betelgeuse	
Rigel	

Let's watch Orion's movement

Step 1: Establish landmarks, such as buildings or trees, and draw a picture showing Orion's position relative to these landmarks.



Step 2: Wait around two hours and draw another picture of Orion. How has Orion's position changed? Has the shape changed?