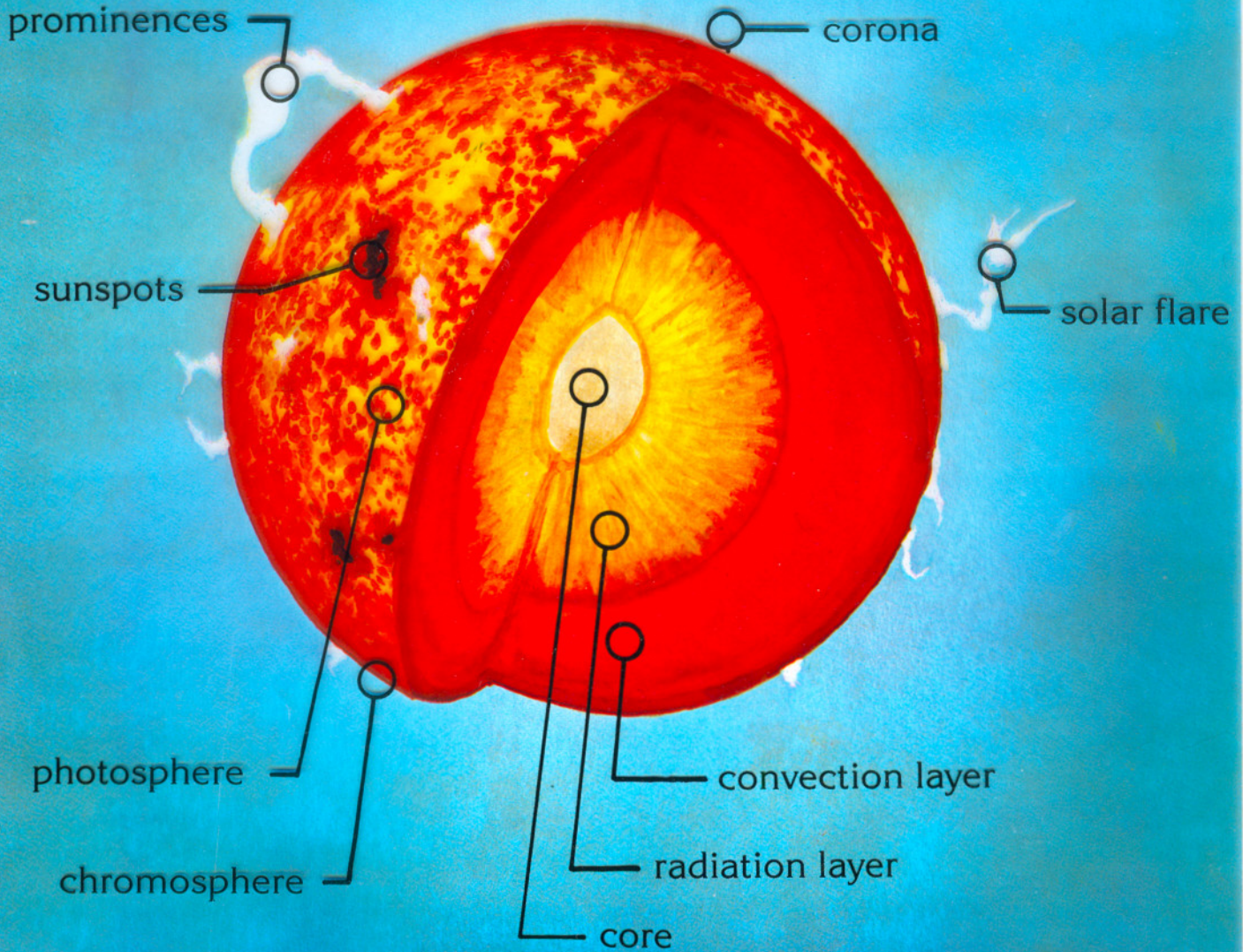


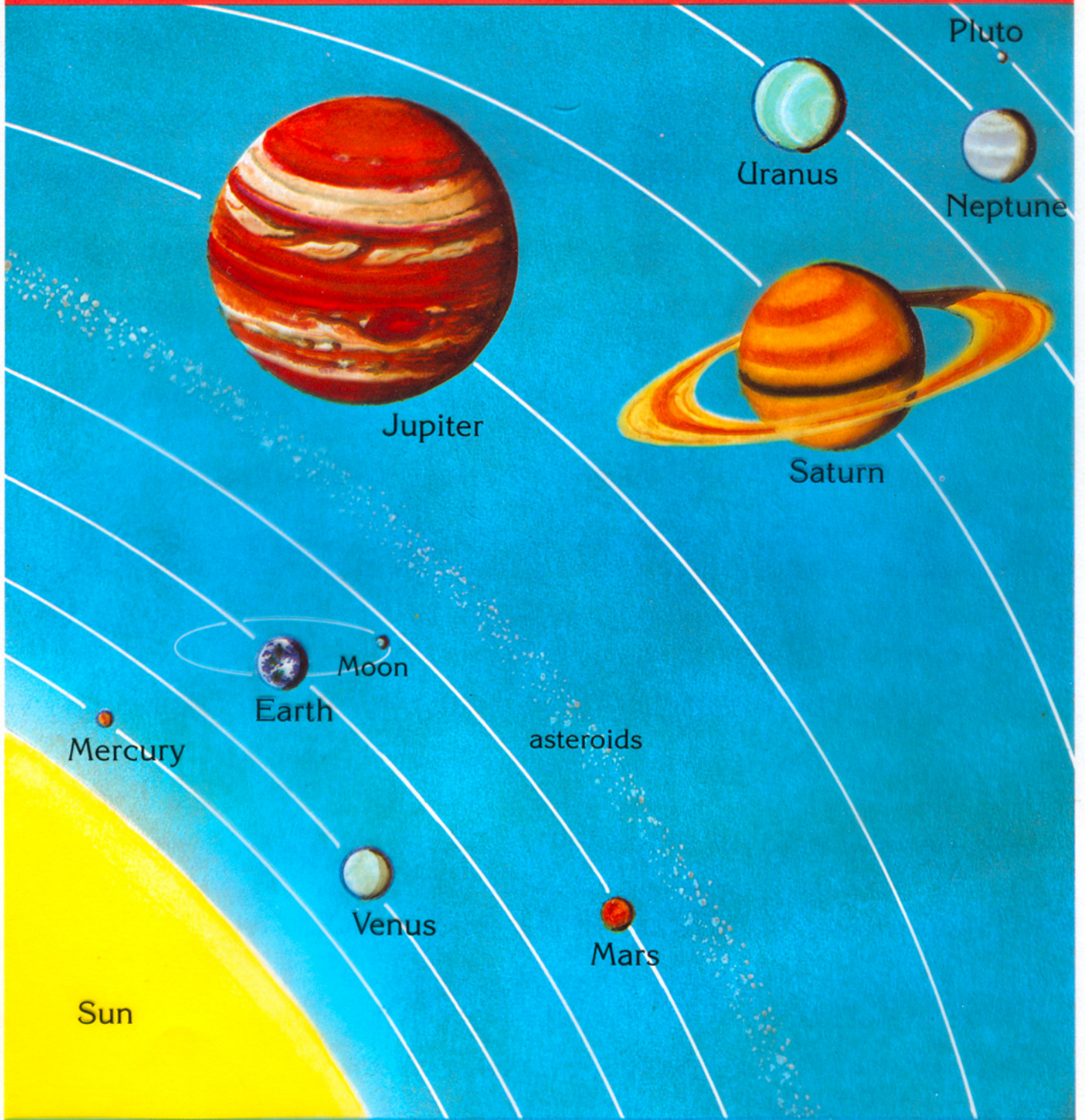
The Sun



1. What is the name of the central portion of the sun that we see?
2. Identify the irregularly-shaped clouds of hot gases that erupt from the chromosphere.

STUDY QUESTION: What effects do solar flares have on the planet Earth?

Our Solar System



1. Identify the two largest planets.
2. Name the three planets closest to Earth.
3. What are the tiny bodies that circle the sun between Mars and Jupiter?

STUDY QUESTION: Why do planets revolve around the sun?

Mercury and Venus



Mercury

*harsh landscape; no air or water;
no natural satellites*

Distance from sun:
57,900,000 km
Diameter: 4,878 km
Revolution time: 88 days
Rotation: 59 days
Surface temperatures:
430°C on day side to
-170°C on night side

Venus

*harsh landscape; heavy cloud cover;
strong surface winds; seen in phases;
referred to as a "star"; no natural
satellites*

Distance from sun:
108,200,000 km
Diameter: 12,100 km
Revolution time: 225 days
Rotation: 243 days
Surface temperature: 470°C



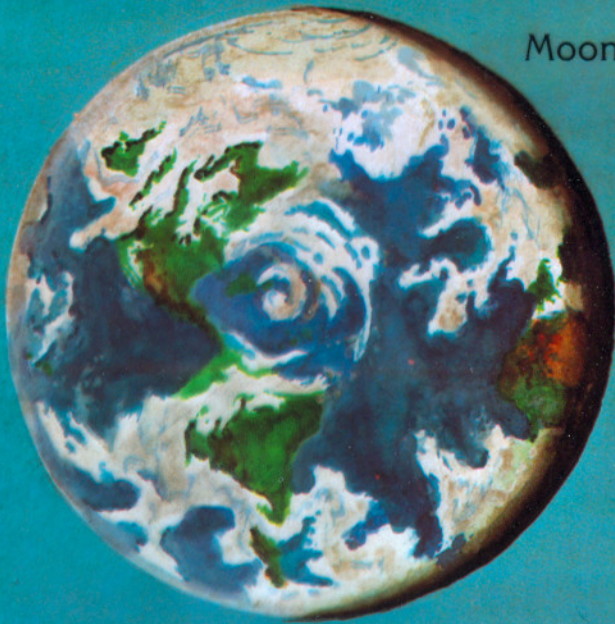
1. Identify the planet in the solar system which revolves around the sun the quickest.

2. How many kilometers is Venus from Mercury?

STUDY QUESTION: Why does Mercury revolve around the sun faster than Venus?

Earth and Mars

Earth



Moon



one-fourth of surface covered by land, three-fourths by water; atmosphere mostly of nitrogen and oxygen; supports intelligent life; one natural satellite

Distance from sun:

149,600,000 km

Diameter: 12,756 km

Revolution time: 365 $\frac{1}{4}$ days

Rotation: 23.93 hours

Surface temperature:

varies, averages around 15°C

varied surface conditions—deserts, craters, valleys, volcanoes, great dust storms, polar ice caps; thinner atmosphere than Earth; two natural satellites

Distance from sun:

227,900,000 km

Diameter: 6,787 km

Revolution time: 687 days

Rotation: 24 $\frac{1}{4}$ hours

Surface temperature:

varies, averages around -50°C



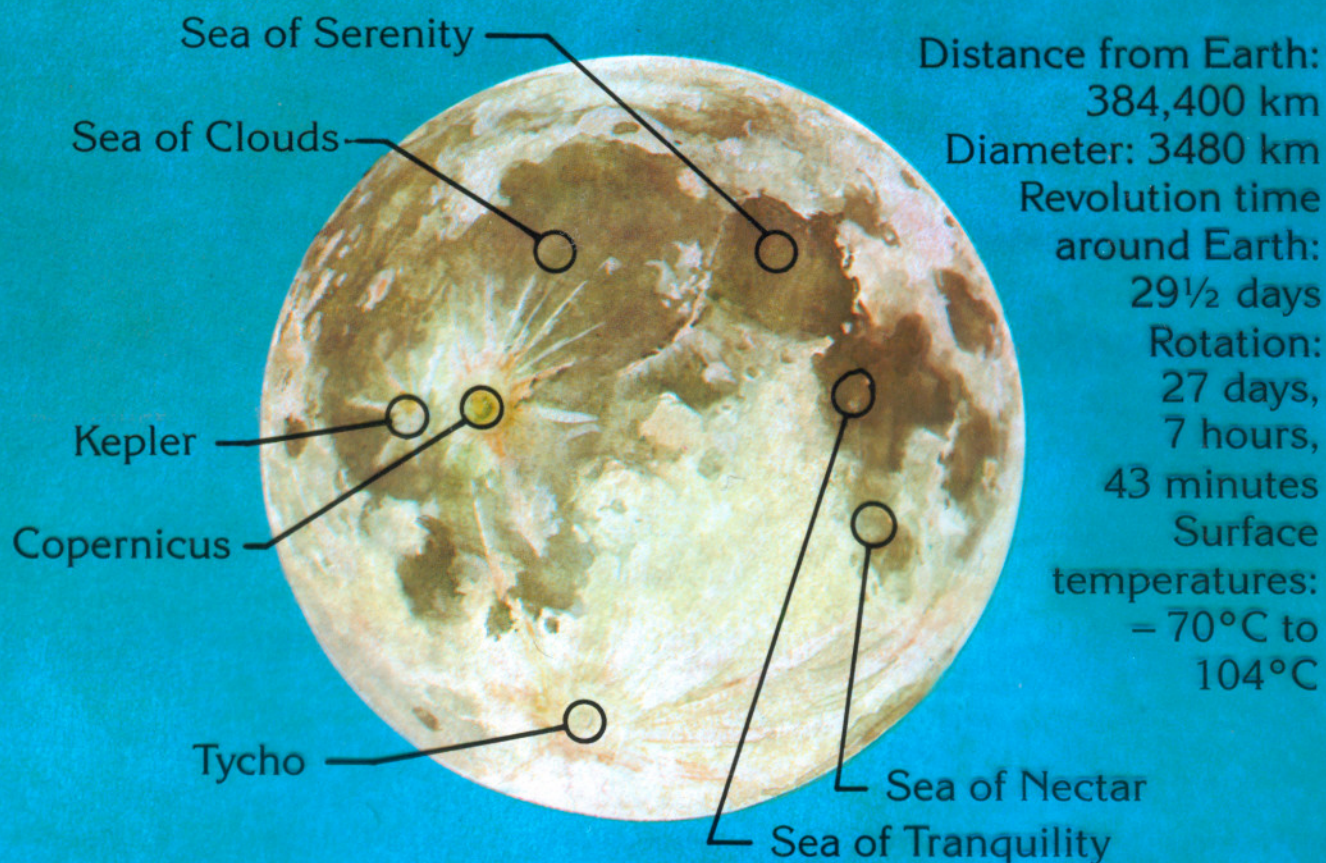
one of two moons

Mars

1. Identify the planet scientists know best.
2. How many kilometers is Mars from Earth?
3. Which planet has iron-rich minerals “rusting” and giving the entire planet a reddish glow?

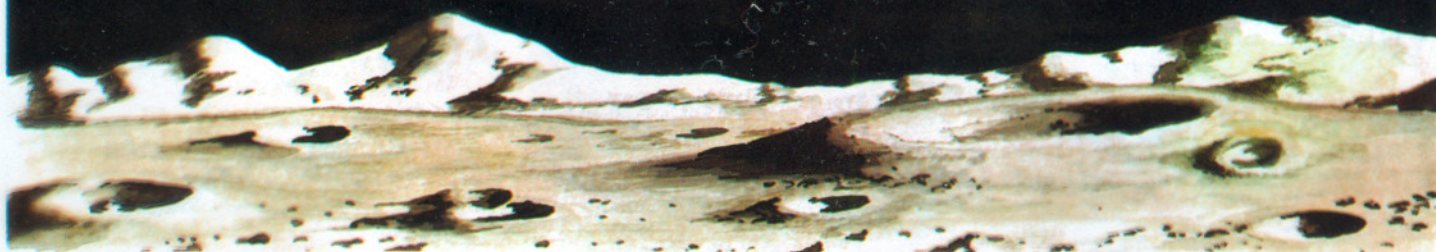
STUDY QUESTION: Why could Mars possibly sustain some form of life?

Our Moon



harsh landscape; no atmosphere or water; 1/6th gravity of Earth; reflects light from sun; causes tides on Earth

Landscape on the Moon

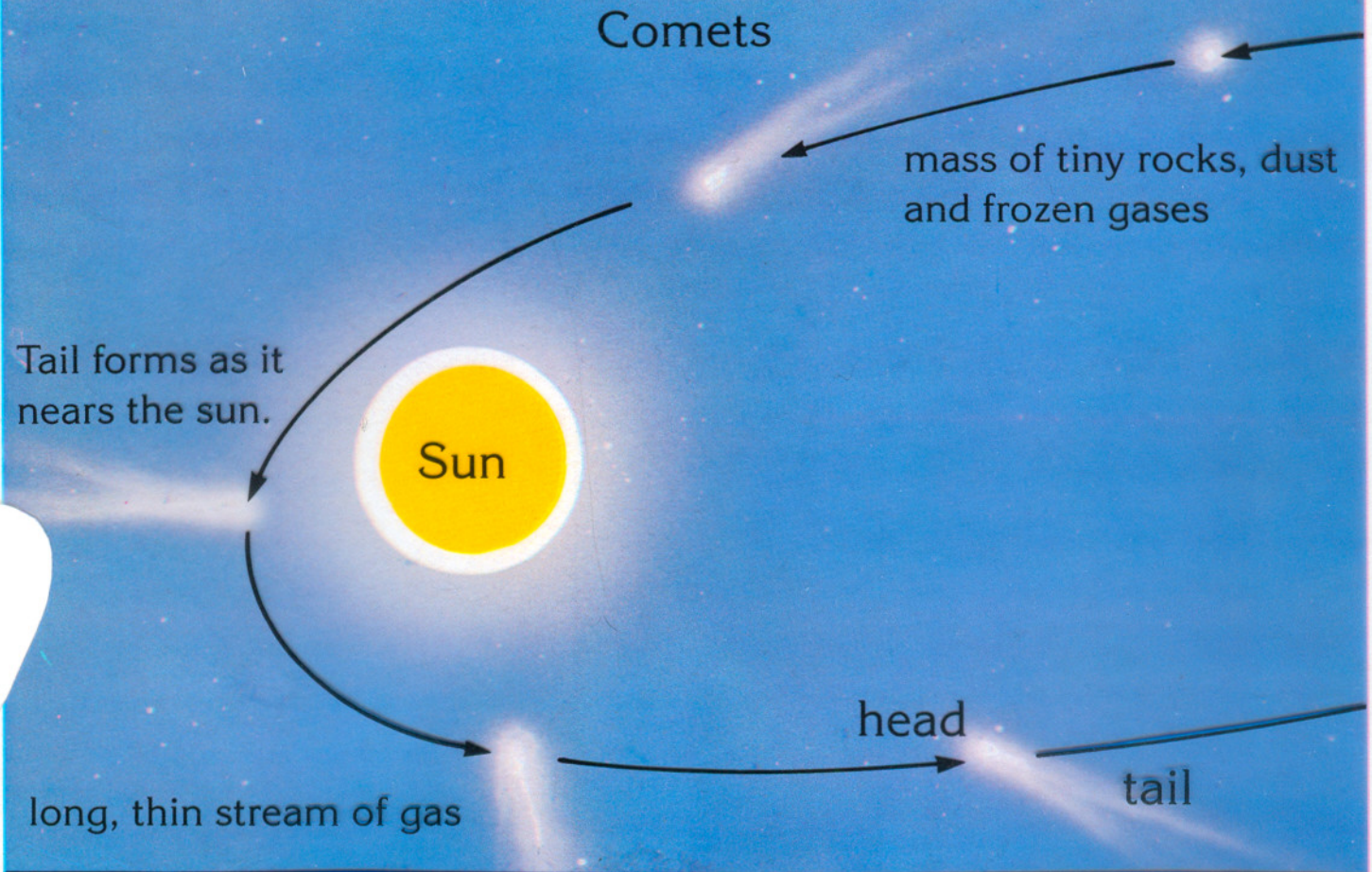


mountain ranges, craters, rills, ridges, plains; abundance of igneous rocks; surface covered with layers of rock dust and rubble; crust about 60 km thick

1. Describe the "Sea Areas" of the moon's surface.
2. Why would a 600-pound object only weigh 100 pounds on the moon?

STUDY QUESTION: Why is only one side of the moon's surface seen from Earth?

Comets and Meteors



Meteor



Meteorite

a meteoroid seen in the atmosphere

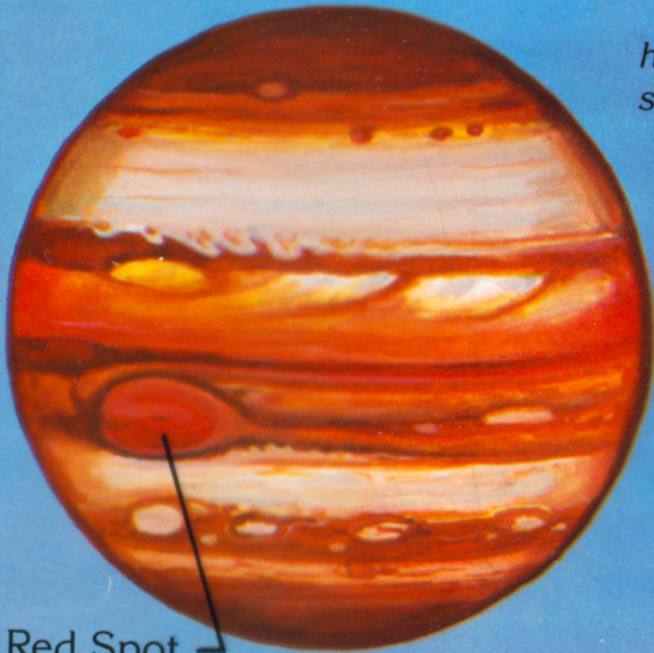
piece of rock or metal material

1. When is a comet's tail visible?
2. What is a meteor which strikes the Earth's surface called?

STUDY QUESTION: Why are comets sometimes referred to as "dirty frozen snowballs"?

Jupiter and Saturn

Jupiter



Great Red Spot

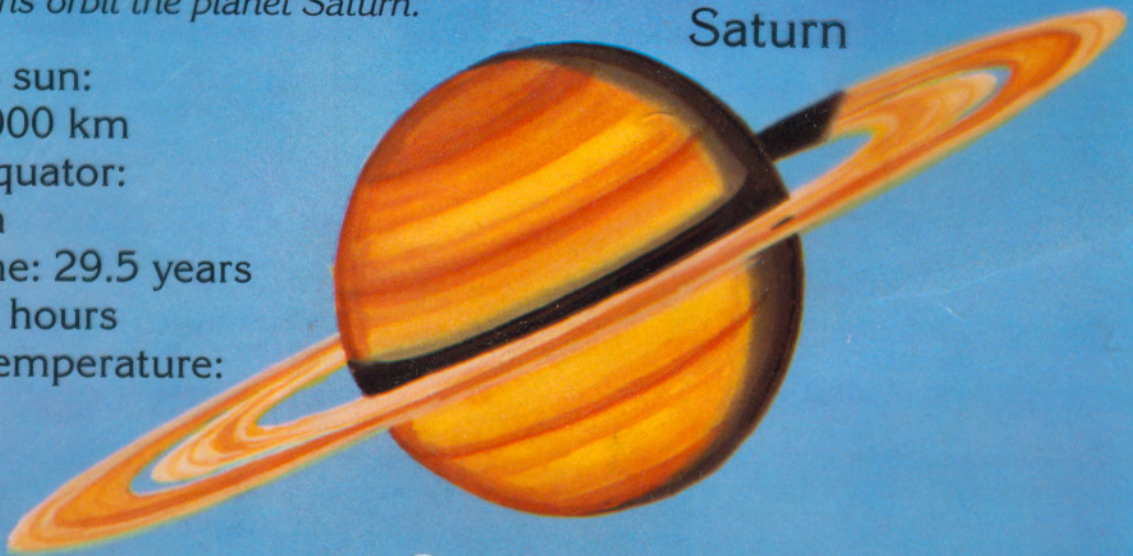
*has shifting belts of gaseous clouds;
sixteen moons orbit this planet.*

Distance from sun:
778,300,000 km
Diameter at equator:
142,800 km
Revolution time: 11.86 years
Rotation: 9.9 hours
Atmosphere temperature:
- 130°C

*rings composed of rocks and ice particles;
seventeen moons orbit the planet Saturn.*

Distance from sun:
1,427,000,000 km
Diameter at equator:
120,400 km
Revolution time: 29.5 years
Rotation: 10.7 hours
Atmosphere temperature:
- 185°C

Saturn



1. What is a unique feature of Jupiter? of Saturn?
2. Which of these giant planets is the larger?

STUDY QUESTION: What event was photographed on the surface of Jupiter's moon, Io?

Far Distant Planets: Uranus, Neptune, and Pluto

Uranus



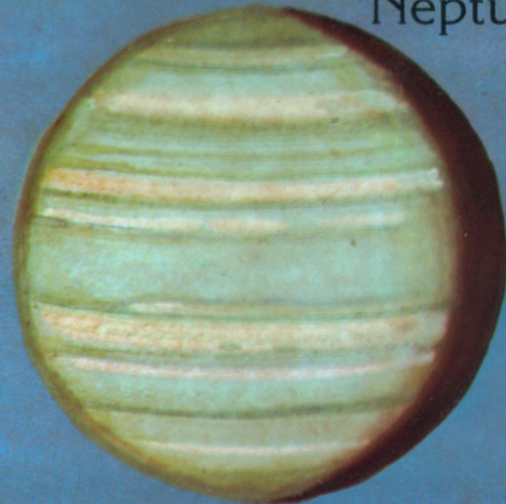
has greenish color with narrow rings; thick atmosphere of gases; rotates on horizontal axis of about 98° from perpendicular; five natural satellites

Distance from sun:
2,870,000,000 km
Diameter: 51,800 km
Revolution time: 84 years
Rotation: about 15.6 (?) hours
Atmosphere temperature:
 -215°C

has greenish color; thick atmosphere of gases; "twin of Uranus"; two natural satellites

Distance from sun:
4,504,000,000 km
Diameter: 48,600 km
Revolution time: 165 years
Rotation: 17.9 hours
Atmosphere temperature:
 -200°C

Neptune



Pluto



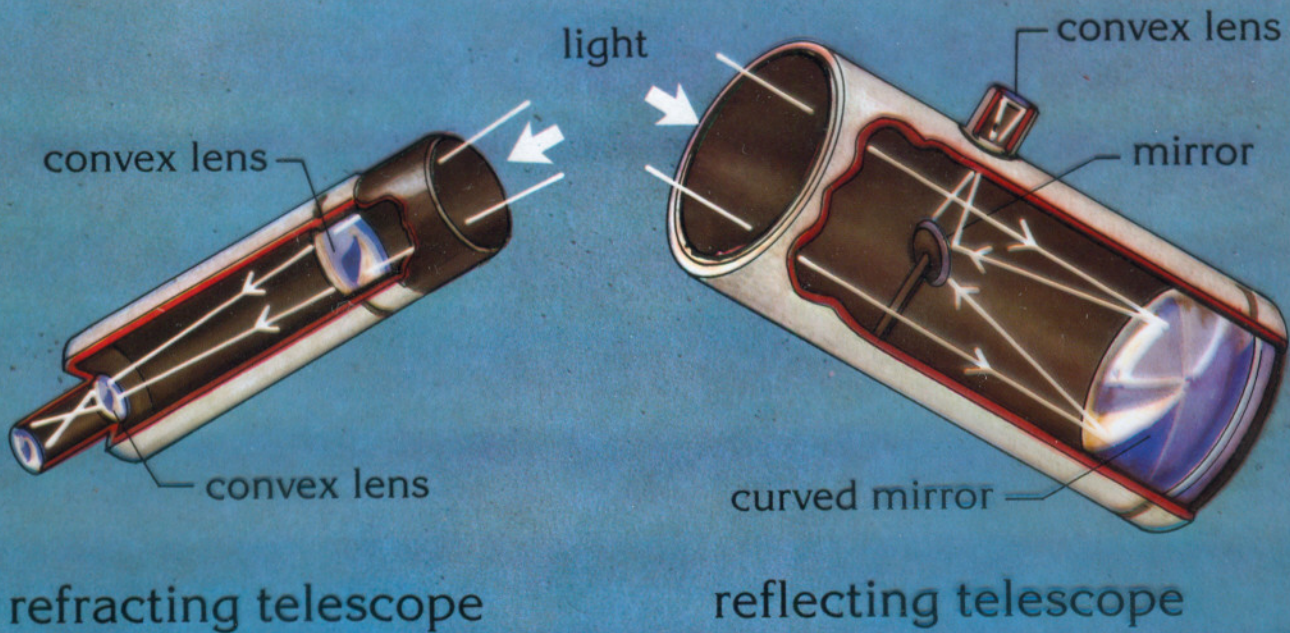
most recently discovered planet in solar system (1930); least known planet; one natural satellite

Distance from sun:
5,900,000,000 km
Diameter: 3,000 (?) km
Revolution time: 248 years
Rotation: 6.4 days
Surface temperature: -230°C

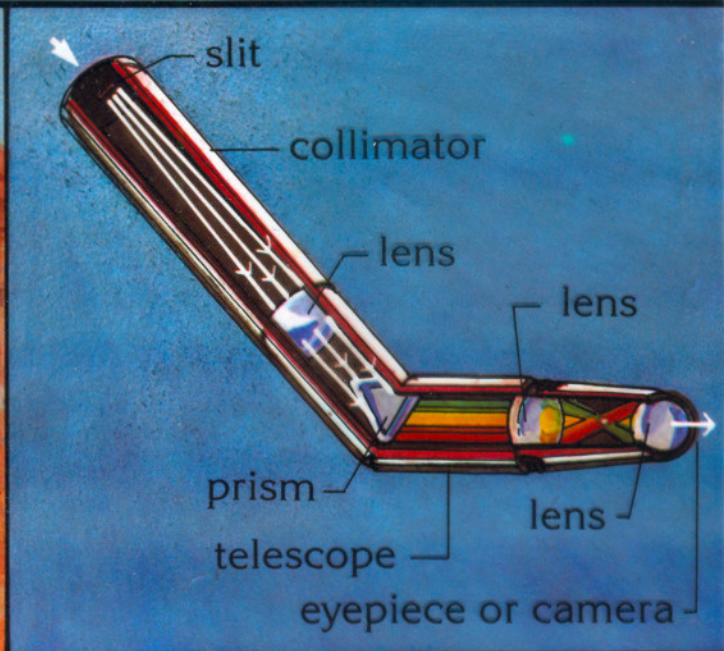
1. Describe the odd pattern of rotation of the planet Uranus.
2. Which planet takes the longest time to revolve around the sun?
3. Why are Uranus and Neptune called the "twin planets"?

STUDY QUESTION: Why are the Far Distant Planets still somewhat of a mystery to scientists on Earth?

Tools of the Astronomer



radio telescope



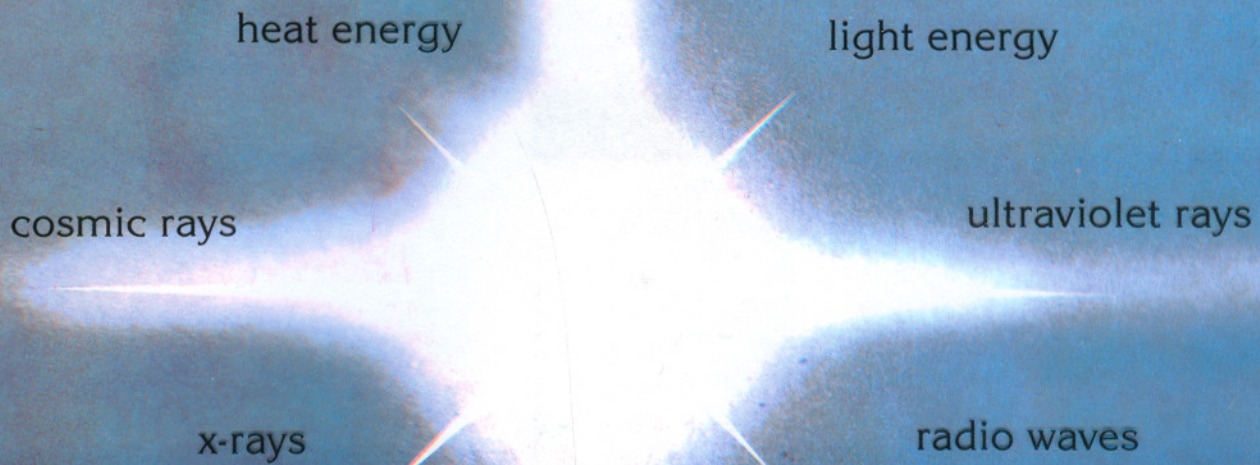
spectroscope

1. Which type of telescope uses mirrors to gather light rays?

2. Which instrument uses a dish antenna?

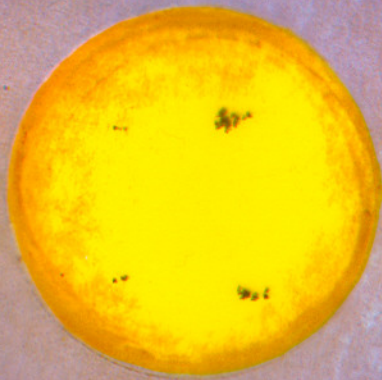
STUDY QUESTION: What are spectroscopes able to do that telescopes cannot?

Stars

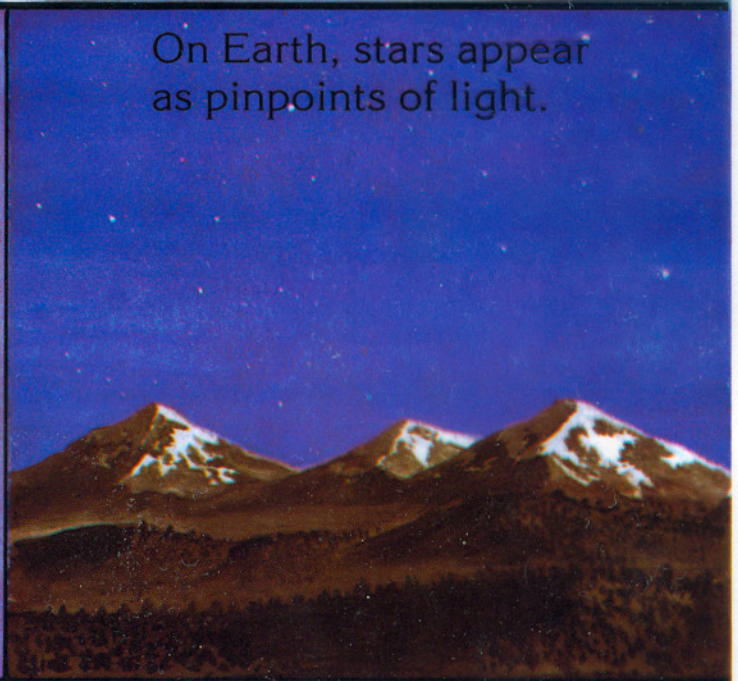


Thermonuclear reactions release tremendous amounts of heat, light, and other forms of energy.

the sun, closest star to Earth



On Earth, stars appear as pinpoints of light.



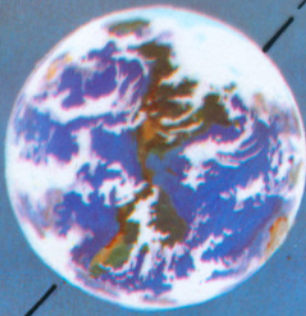
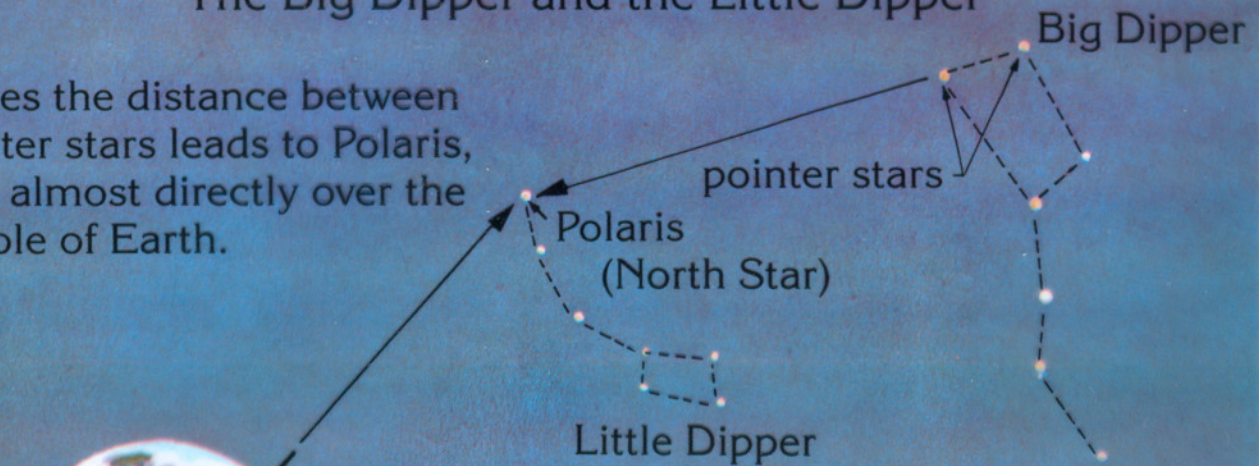
1. What is the cause of the release of energy from stars?
 2. Why does the sun appear so different from the other stars in the sky?
- STUDY QUESTION:** Why do stars seem to twinkle?

Constellations

Constellations are the groupings of stars.

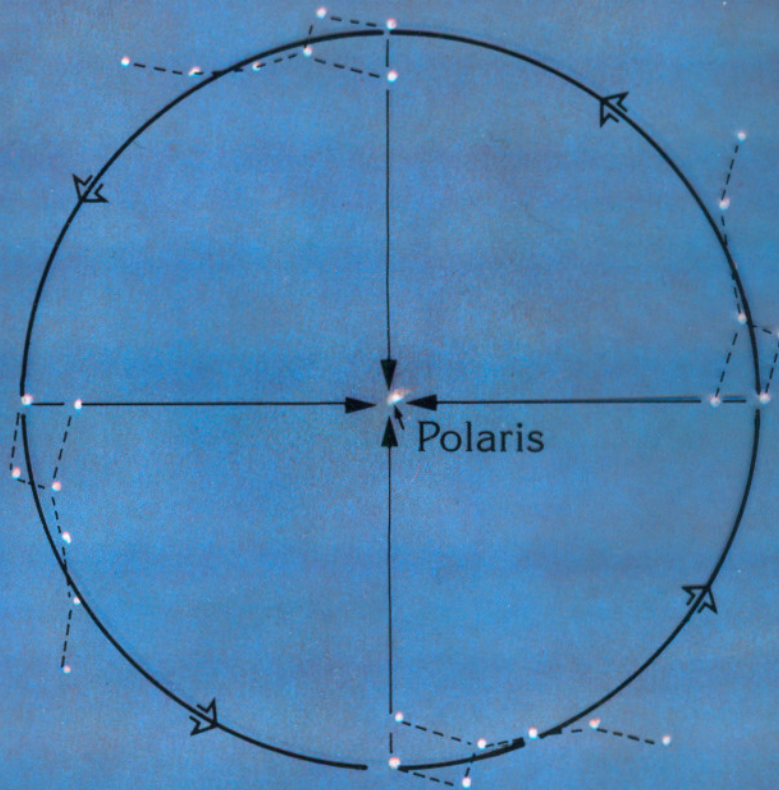
The Big Dipper and the Little Dipper

Five times the distance between the pointer stars leads to Polaris, which is almost directly over the North Pole of Earth.



Earth

The Big Dipper circles Polaris once every 24 hours.



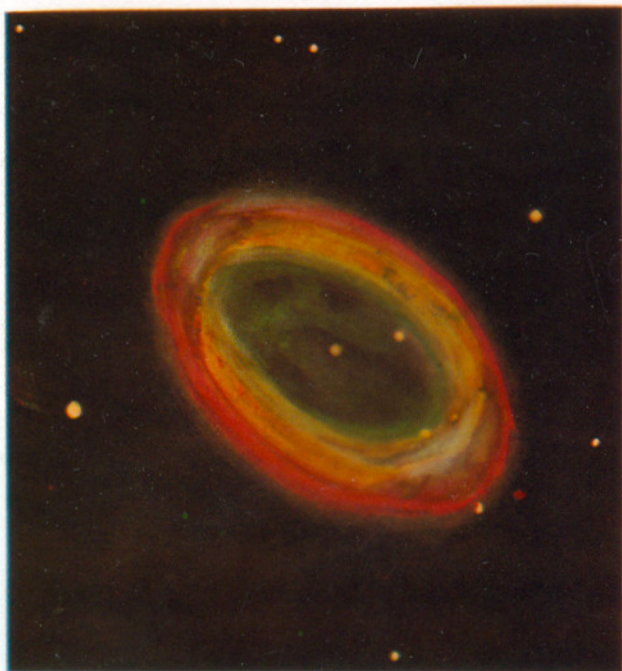
Polaris does not seem to move at all. All constellations in the Northern Hemisphere seem to revolve around Polaris because of the Earth's rotation.

1. Tell why it is important to locate the Big Dipper in order to find Polaris.
2. What does the planet Earth do that causes constellations to appear to revolve around the North Star?

STUDY QUESTION: Why is Polaris an important star for the purposes of navigation?

Nebulae and Galaxies

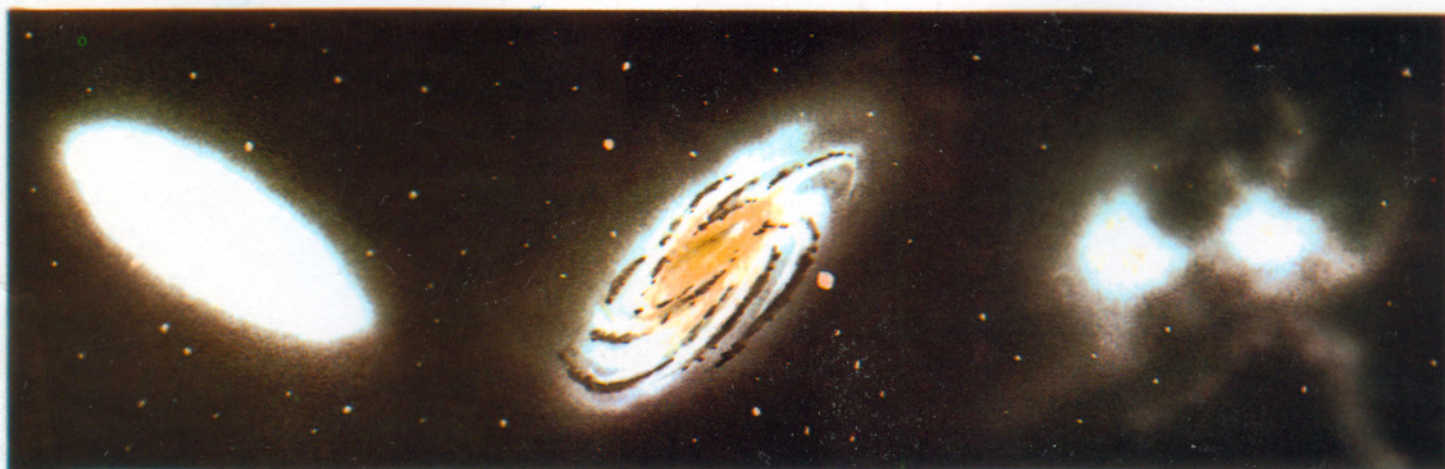
Nebulae are concentrations of gases and dust materials.



ring nebula
in the constellation Lyra



horsehead nebula
a dark nebula found in the constellation Orion



elliptical

spiral

irregular

Galaxies are clusters of large numbers of stars and nebulae.

1. Which type of nebulae block out the light of background stars?
2. Which are larger in size—nebulae or galaxies?

STUDY QUESTION: What type of galaxy is the Milky Way?