# Science and Human Society
(Geology, Mineral and Environment in our society)

Friends of the Earth

The Earth is one planet of the solar system. Friends of the Earth are lectured.

1.Planets

2.Meteorites

3.Motion of the Earth

・The planets are classified into 3 types: Terrestrial planets, Ice giants and Gas giant planets.

・Meteorite is the space material which has fallen to the earth’s surface.

・Rotation of the Earth produces apparent force, Coriolis force.

# 1 Planets


- Terrestrial planets: Mercury, Venus, Earth and Mars are primarily composed of rock and metal.
- Gas giant planets: Jupiter and Saturn are composed of hydrogen and helium.
- Ice giants: Uranus and Neptune are composed of hydrogen and methane.

# Comparison of Jupiter and Earth

**Jupiter**:

Distance from the sun (AU) 5.2026, Orbital period (years)11.862,

Rotation period (days) 0.414, Equatorial diameter (km) 71492,

Mass (kg) 1.899 x 10(power of 27)

Average density (g/cubic cm) 1.33, Confirmed satellites (moons) 79

**Earth**:

Distance from the sun (AU)1.0000, Orbital period (years) 1.0000,

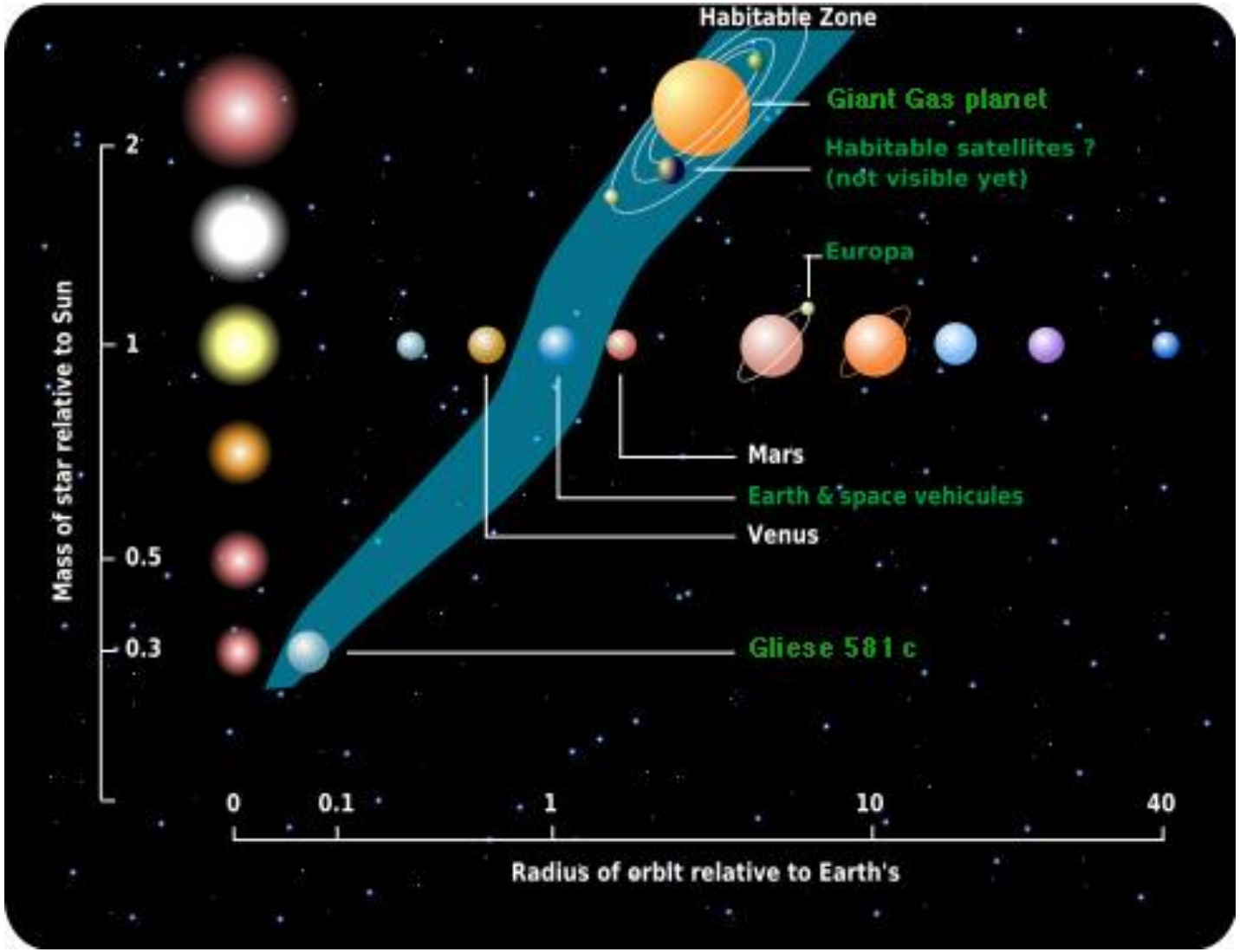
Rotation period (days) 0.997, Equatorial diameter (km) 6378,

Mass (kg)5.974x 10(power of 24),

Average density (g/cubic cm) 5.52, Confirmed satellite (moon) 1

# Habitable zone

- This zone is the orbital region around a star in which an Earth-like planet can possess liquid water on its surface and possibly support life.
- A planet's surface temperature depends not only on its proximity to its star but also on such factors as its atmospheric greenhouse gases, its reflectivity, and its atmospheric or oceanic circulation.



# 2 Meteorite

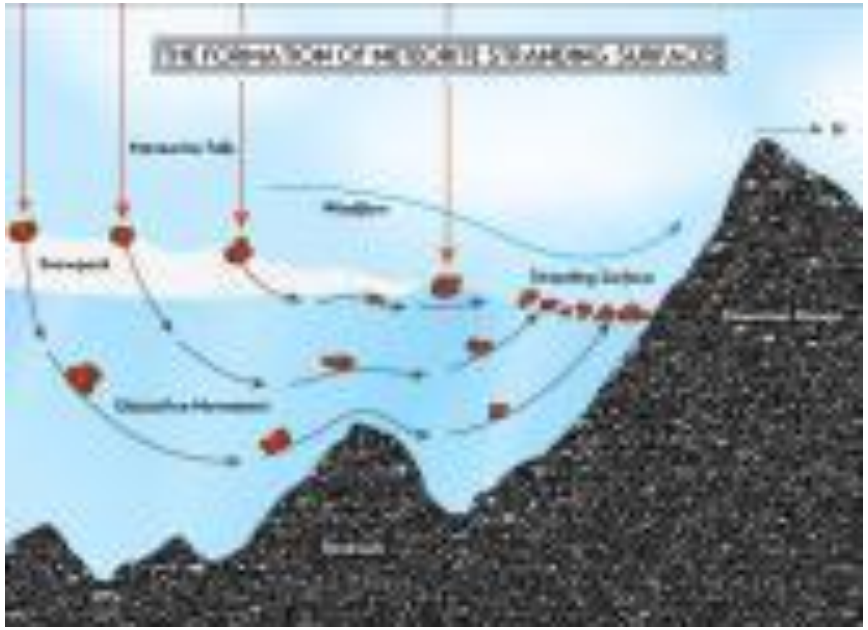
A meteorite is a solid piece of debris from an object, such as a comet, asteroid, or meteoroid, that originates in outer space and survives its passage through the atmosphere to reach the surface of a planet or moon. Most meteorites are stony meteorites, classed as chondrites and achondrites. Only about 6% of meteorites are iron meteorites or a blend of rock and metal, the stony–iron meteorites.

Narashino Meteorite
Shooting was observed on July 2, Two meteorites were found.
（Chiba Museum HP）

# Antarctica Meteorite

In 1969, the 10th Japanese Antarctic Research Expedition found nine meteorites on a blue ice field near the Yamato Mountains. With this discovery, came the realization that movement of ice sheet might act to concentrate meteorites in certain areas.

Images are cited from Field Museum website.



# Characteristics of the Antarctic Meteorite

・A lot amounts

“Find” meteorites except the Antarctica Meteorite may have more iron meteorite group ratio than “fall” meteorites. Constitution ratio of the Antarctica Meteorite may represent true meteorite constitution ratio in the Earth surface.

・Packing in ice just after falling

Meteorites can almost escape weathering and contamination.

・Careful sampling

Meteorites can be carefully collected with no direct hand picking and packing new plastic bags.

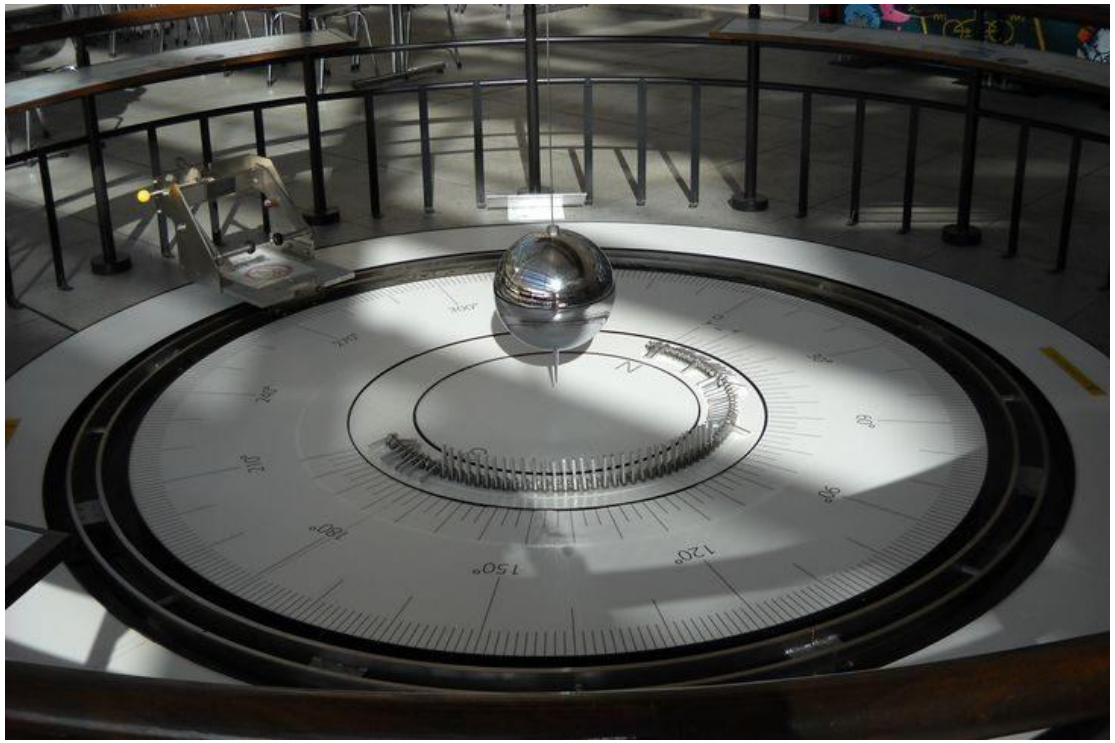
# 3. Motion of the Earth

・Rotation of the Earth

Can we know the Earth's rotation.?

The Foucault's pendulum is a simple device named after French physicist L. Foucault and conceived as an experiment to demonstrate the Earth's rotation.

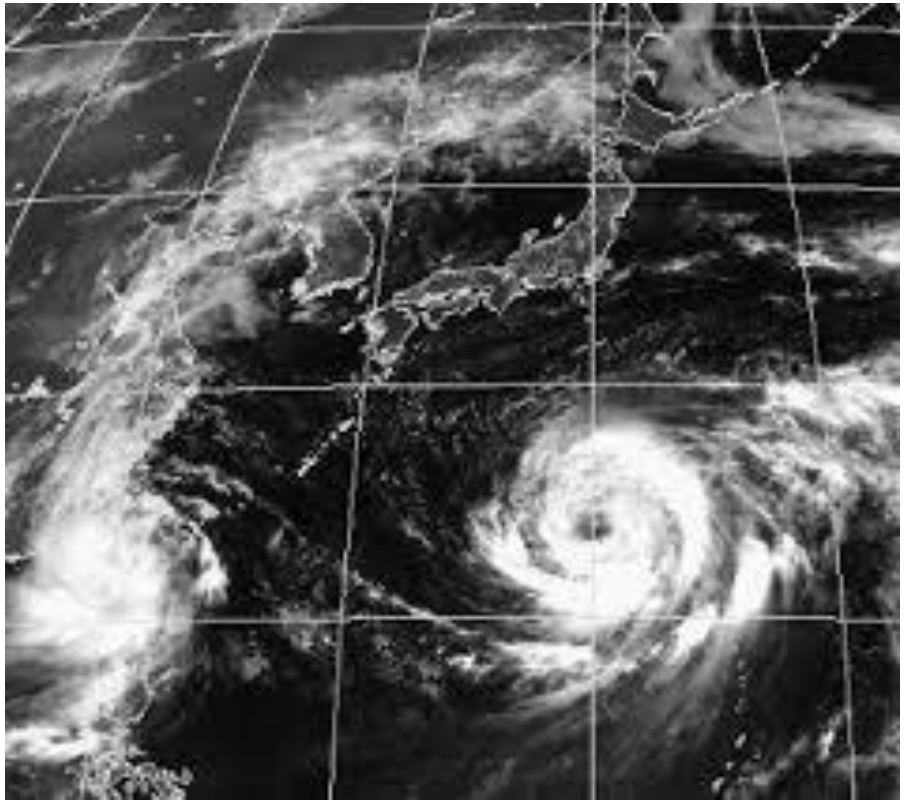
The pendulum was introduced in 1851 and was the first experiment to give simple, direct evidence of the Earth's rotation.



Foucault's pendulum in Nagoya City Museum.

# What is the Coriolis effect?

The Earth's rotation means that we experience an apparent force known as the Coriolis force. This deflects the direction of the wind to the right in the northern hemisphere and to the left in the southern hemisphere. The Coriolis force is the reason why the wind–flow around low and high–pressure systems circulates in opposing directions in each hemisphere.



I add other information.
“Apollo 13 Views of the Moon” by NASA and “The Coriolis effect in action” by Met Office are introduced.

Video: Apollo 13 View of the Moon (2min 25sec)
https://www.youtube.com/watch?v=Ilifg26TZrI

The Coriolis effect (1min 53sec)
https://www.youtube.com/watch?v=WB4dxpUS530&t=89s