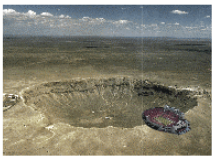




Barringer Crater

- This crater is located in Arizona, USA
- It was created 50,000 years ago by a chunk of **METAL** from space
- It measures about **1.2 km** in diameter



Size of crater compared to a stadium

Ceres

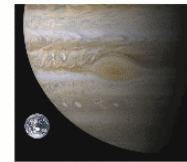
- Ceres is the largest object between the orbits of Mars and Jupiter
- It is made mostly of **ROCK** and **ICE**
- Ceres is about **950 km** in diameter



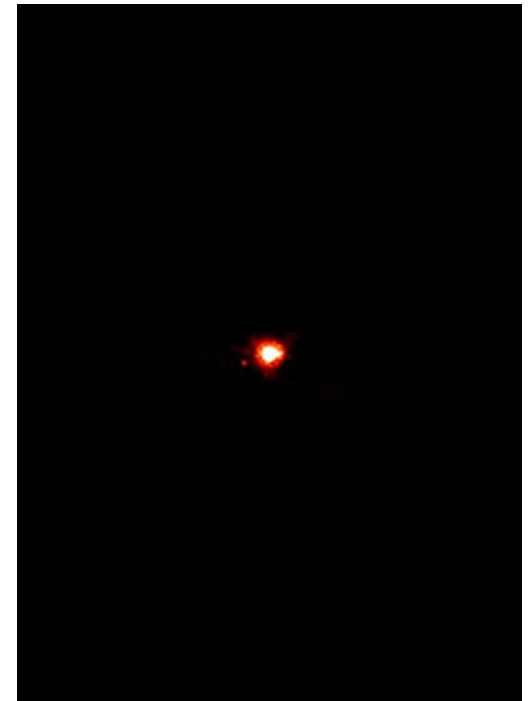
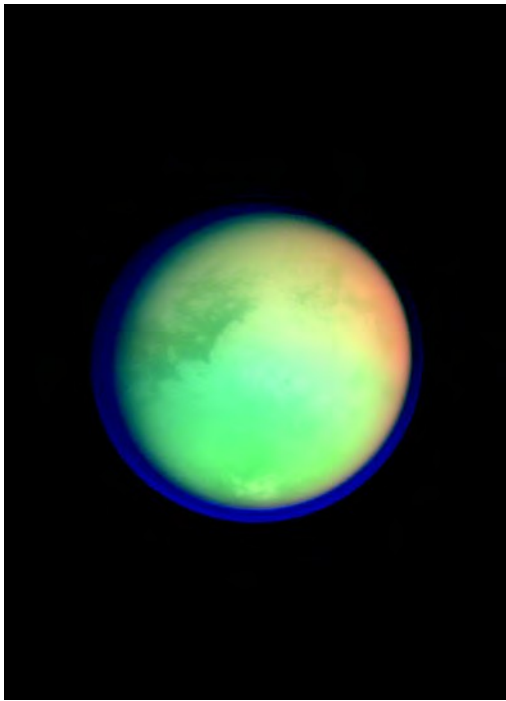
Ceres (bottom left) compared to the Earth and Moon

Earth

- It orbits the Sun between Venus and Mars
- Earth is made of **ROCK**, a **METAL** core and both solid and liquid **ICE** (water, that is) on its surface
- Its diameter is **12,650 km**

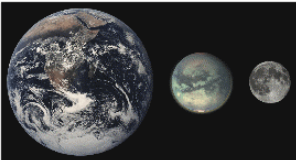


Size of Earth compared to Jupiter



Titan

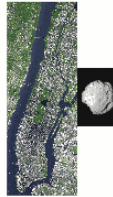
- Titan orbits Saturn
- It is made of **ROCK** and **ICE** and has a thick atmosphere
- It is **5,150 km** in diameter, between the size of the Earth and Moon



Size of Titan (center) compared to the Earth and Moon

Wild 2

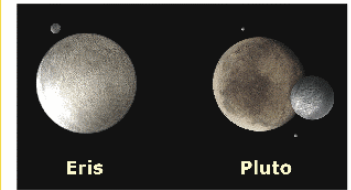
- Wild 2 orbits the Sun between Mars and Jupiter, though its orbit used to be much more distant
- It is made of **ICE** and **DUST**
- It is about **4 km** across



Size of Wild 2 compared to Manhattan

Eris

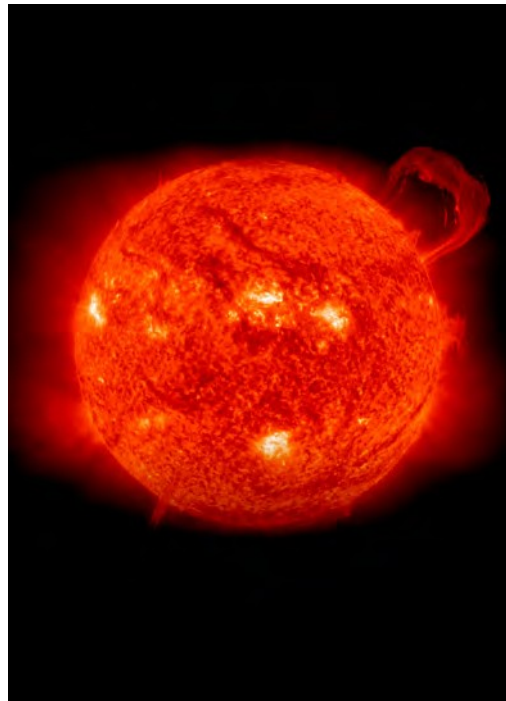
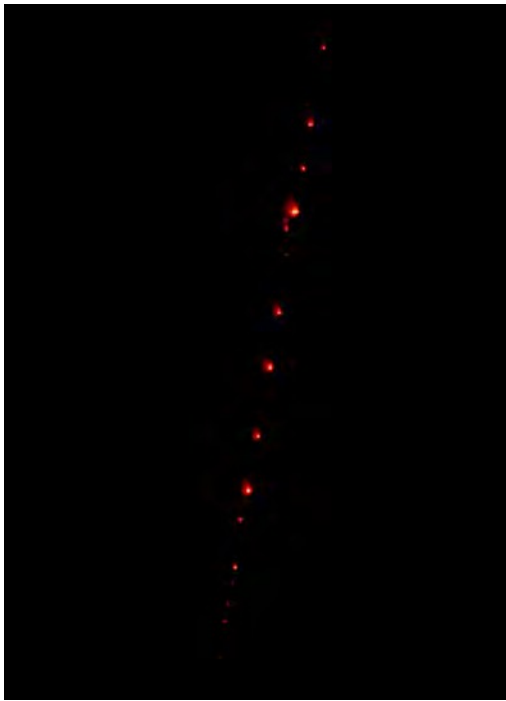
- The orbit of Eris is very distant, mostly beyond Pluto's orbit.
- It is made of **ICE** and **ROCK**
- The diameter of Eris is about **2,600 km**



Eris

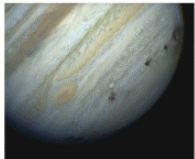
Pluto

Size of Eris compared to Pluto



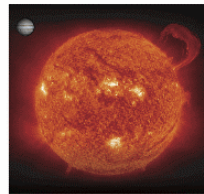
Shoemaker-Levy 9

- Its orbit originally took it beyond Pluto. After it was captured by Jupiter's gravity, it was torn apart and eventually smashed into Jupiter.
- Made of **ICE** and **ROCK**
- Largest pieces were **1km** and left huge marks on Jupiter



Sun

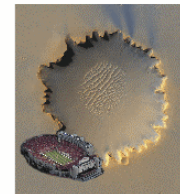
- The Sun is located in the center of our Solar System
- It is made mostly of hydrogen and helium **GAS**
- The Sun is **1.4 million km** in diameter



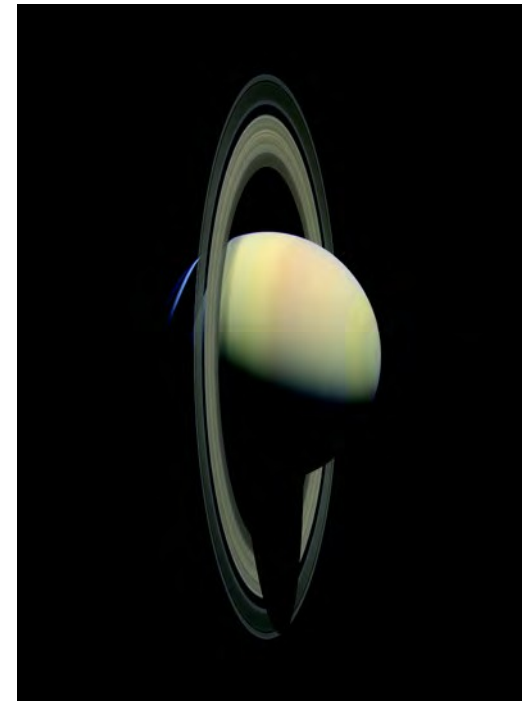
Size of Sun compared to Jupiter

Victoria Crater

- This crater is one of the smaller craters on Mars
- The rim's jagged edges are due to erosion caused by **ROCK** and **DUST**
- It is **750 meters** across

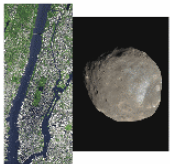


Size of crater compared to a stadium



Phobos

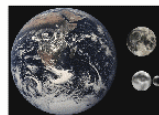
- Phobos closely orbits Mars and will eventually collide with it
- It is mostly made of **ROCK** but may have **ICE** inside
- Phobos is about **11 km** across



Size of Phobos compared to Manhattan

Pluto & Charon

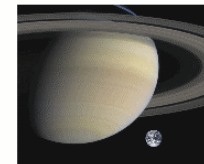
- Pluto and Charon orbit each other, together are mostly outside Neptune's orbit
- These round objects are made of **ICE** and **ROCK**
- Pluto is about **2,300 km** across



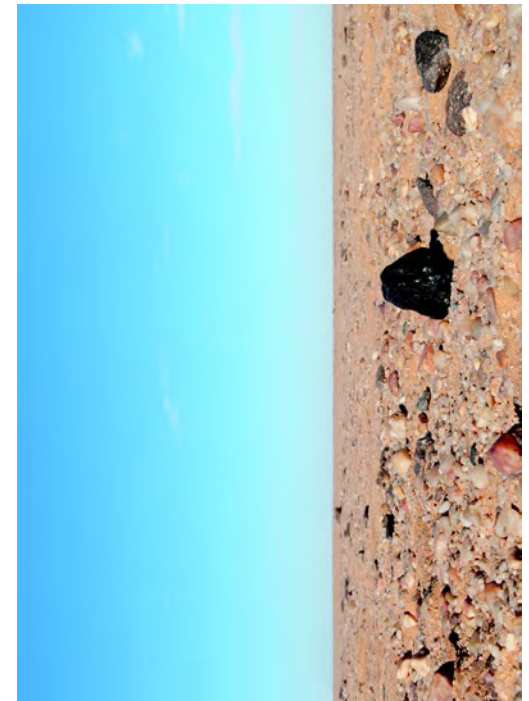
Size of Pluto & Charon compared to Earth and Moon

Saturn

- Saturn orbits the Sun between Jupiter and Uranus
- Saturn is mostly made of **GAS**
- The main body is **120,000 km** across

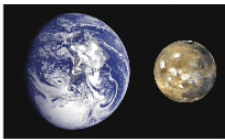


Size of Saturn compared to Earth



Mars

- The orbit of Mars is between Earth and the Asteroid Belt
- Mars is made of **ROCK** with a **METAL** core and some solid **ICE** on its surface
- It is **6,800 km** in diameter, about half as wide as the Earth



Size of Mars compared to Earth

Meteor

- Meteors occur in Earth's atmosphere, about 75km above the surface
- We see the glowing pieces of **ROCK**
- The pieces of rock are mostly less than **1cm**, or the size of a coin

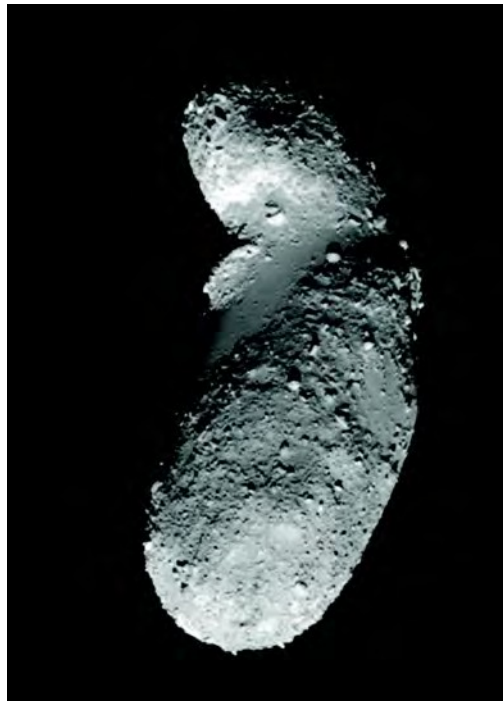
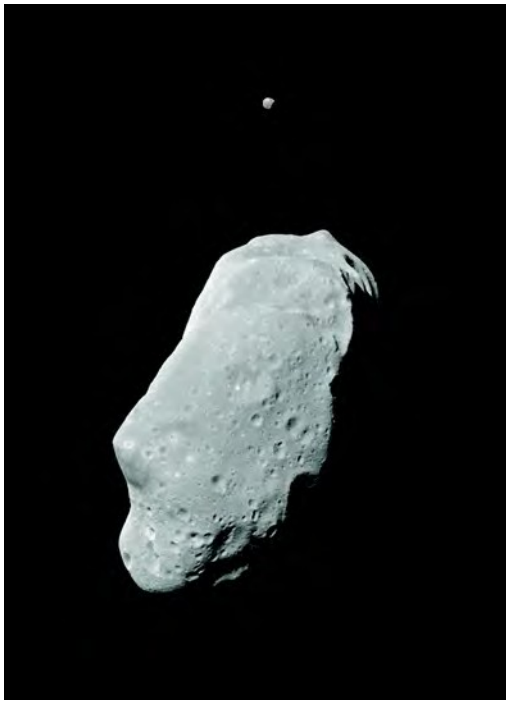


Size of rock compared to a coin

Meteorite

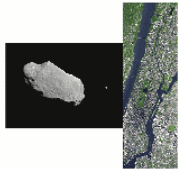
- Meteorites are pieces of asteroids that land on other worlds
- They are made of **METAL** and **ROCK**
- Almost all meteorites on Earth are smaller than **1 meter**





Ida and Dactyl

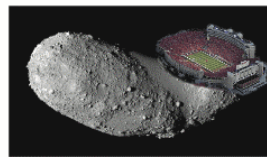
- Together they orbit the Sun between the orbits of Mars and Jupiter. Dactyl (the smaller object) orbits Ida.
- They are mixtures of **ROCK** and **METAL**
- Ida is about **15 km** across



Size of Ida compared to Manhattan

Itokawa

- Itokawa's orbit crosses the orbits of Earth and Mars but is not a threat to either
- It is made of a loose pile of boulders made of **ROCK** and **METAL**
- Its longest side is **535 meters**

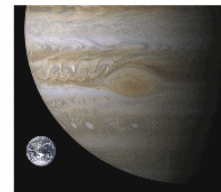


Size of Itokawa compared to a stadium

Jupiter

- Jupiter orbits the Sun between the Asteroid Belt and Saturn
- It is made of **GAS**
- Its diameter is about

143,000 km



Size of Jupiter's Red Spot compared to Earth



Eros

- The orbit of Eros ranges between Earth and Jupiter, crossing Mars's orbit
- It is a mixture of **ROCK** and **METAL**
- This object is **34 km** on its longest side



Size of Eros compared with Manhattan

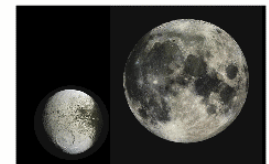
Hoba

- This object landed on Earth 80,000 years ago in what is now the country of Namibia
- Hoba is made of **METAL**
- It measures about **3 meters** across



Iapetus

- Iapetus orbits Saturn
- This walnut-shaped object is made of **ICE** with some **ROCK**
- It is **1,500 km** across, or about half as wide as the Earth's Moon



Size of Iapetus compared to Moon



Earth's Moon

- The Moon orbits Earth
- It is made of **ROCK** with a small **METAL** core
- The Moon is **3,500 km** in diameter or about $\frac{1}{4}$ the width of Earth



Size of Moon compared to Earth



Gaspra

- This object orbits the Sun between Mars and Jupiter
- It is made of a mixture of **ROCK** and **METAL**
- It is **18 km** on the longest side



Size of Gaspra compared to Manhattan



Hale-Bopp

- Hale-Bopp orbits between Earth's orbit and the distant Solar System — far beyond the orbit of Pluto
- Hale-Bopp is made of **ICE** and **DUST**
- The tail shown here extends more than **1 million km**



Key to Sorting the Solar System Cards

Object	Description	Size (km)	Picture Credits
Barringer Crater	Also known as Meteor Crater, it is located in Arizona, USA. Created by the impact of a meteorite about 50,000 years ago, this crater was formed before humans inhabited the Americas.	1.2	B.P. Snowder
Ceres	Ceres is the largest object in the Asteroid Belt. The International Astronomical Union classifies Ceres as a Dwarf Planet. It is the target of the Dawn spacecraft in 2015.	950	NASA, ESA, J. Parker (SwRI) et al.
Earth	Earth is the third planet from the Sun and is the fifth largest planet in the Solar System. About 71% of Earth's surface is water, the remainder consists of land.	12,650	Taken from Apollo 17 in 1972, credit NASA
Earth's moon	The moon is the fifth largest satellite in the Solar System. It is the only celestial body on which humans have landed. Although it appears bright in the sky, it is actually as dark as coal.	3,500	NASA/JPL/USGS
Eris	Eris is a Dwarf Planet with a moon called Dysnomia. It is more massive than Pluto and orbits the Sun three times farther. It was discovered in 2005 and caused a stir after initially being described as the 10th planet.	2,600	NASA/ESA/M. Brown
Eros	Eros was the first near-Earth asteroid discovered. It is also one of the largest. The probe NEAR Shoemaker landed on this asteroid in 2001. Eros orbits between Earth and Jupiter, crossing Mars's orbit.	34	NASA/JPL/JHUAPL
Gaspra	Gaspra is an asteroid that orbits the inner edge of the main Asteroid Belt. The Galileo spacecraft flew by Gaspra on its way to Jupiter.	18	NASA/JPL/USGS
Hale-Bopp	Hale-Bopp was one of the brightest and most widely viewed comets of the 20th century. It came into the inner Solar System in 1997 and has an orbital period of over 4,000 years.	1,000,000	E. Kolmhofer, H. Raab; Johannes-Kepler-Observatory
Hoba	The Hoba meteorite is the largest known meteorite on Earth. It landed here about 80,000 years ago in what is now Namibia. Hoba weighs over 60 tons and is the most massive piece of naturally-occurring iron on Earth's surface.	0.003	Patrick Giraud
Iapetus	Iapetus is the third largest moon of Saturn. It has an equatorial ridge that makes it look a bit like a walnut, as well as a light and a dark side. Astronomers think that the dark side is covered with a thin layer of residue from the icy surface sublimating.	1,500	NASA/JPL/Space Science Institute
Ida and Dactyl	Ida is a main belt asteroid and the first asteroid found to have a moon, Dactyl. It was imaged by the Galileo spacecraft on its way to Jupiter.	15	NASA/JPL
Itokawa	Asteroid Itokawa crosses the orbits of both Mars and Earth. It is a rubble pile of rocks. In 2005, the Hayabusa probe landed on Itokawa to collect samples.	0.5	ISAS, JAXA
Jupiter	Jupiter is the largest planet in the Solar System, more massive than all the other planets combined. This gas giant has been explored by many spacecraft, notably the Galileo orbiter. It has four large moons and dozens of smaller moons.	70,000	NASA/JPL/University of Arizona

Key to Sorting the Solar System Cards

Object	Description	Size (km)	Picture Credits
Mars	Mars is the fourth planet from the Sun. Iron oxide gives it a reddish appearance. It has polar ice caps and a very thin atmosphere. Two tiny moons might be captured asteroids.	6,800	NASA
Meteor	Small pieces of asteroids or comets collide with Earth's atmosphere to create meteors. The compressed air in front of the rock heats up, causing it to glow and leave a trail of ionized gas.	0.00001	Chuck Hunt
Meteorite	Most meteorites are pieces of the Asteroid Belt that land on Earth's surface. Over 90% of meteorites are considered stony meteorites. About 5% are iron meteorites. Both types contain a significant amount of iron.	0.001	Dr. Svend Buhl www.meteorite-recon.com
Phobos	Phobos is the largest moon of Mars, but still quite small. It is likely a captured asteroid and will break up and crash into Mars in the next 40 million years.	11	NASA/JPL- Caltech/University of Arizona
Pluto and Charon	Pluto is the 2nd largest dwarf planet in the Solar System (after Eris). It has a large moon Charon and two smaller moons, Nix and Hydra. Pluto and Charon are sometimes treated as a binary system since their center of gravity is between the two.	2,300	ESA/ESO/NASA
Saturn	Saturn is the second largest planet in the Solar System. It is made of gas and has very thin icy rings. It also has dozens of moons. The Cassini-Huygens spacecraft has been orbiting Saturn since 2004.	120,000	NASA/JPL/Space Science Institute
Shoemaker-Levy 9	Comet Shoemaker-Levy 9 provided the first direct observation of the collision of extraterrestrial solar system objects. It broke into many fragments, called the "String of Pearls," and impacted Jupiter in 1994.	1	NASA/HST
Sun	The Sun is the star at the center of our Solar System, about 150 million km from Earth. It contains 99.9% of all the mass in our Solar System. It travels once around the Milky Way Galaxy in about 250 million years.	1,400,000	ESA/NASA/SOHO
Titan	Titan is the largest moon of Saturn, comprising 96% of the mass of all Saturn's moons combined. It is a cold world with a thick nitrogen atmosphere and liquid methane lakes on its surface. The Huygens probe landed on its surface in 2005 and took pictures of icy conditions.	5,150	NASA/JPL/Space Science Institute
Victoria Crater	This impact crater near the equator of Mars was visited by the Mars Exploration Rover <i>Opportunity</i> . The scalloped edges of the crater are caused by erosion. Although Mars has very little atmosphere, it does have dust storms.	0.75	NASA/JPL- Caltech/University of Arizona/Cornell/Ohio State University
Wild 2	Comet Wild 2 is officially named 81P/Wild. It once orbited beyond Jupiter but got too close to the giant planet in 1974 and was tugged into a smaller orbit between Jupiter and Mars. The Stardust sample return mission took pictures and captured some of the comet's coma in 2004.	4	NASA/JPL-Caltech