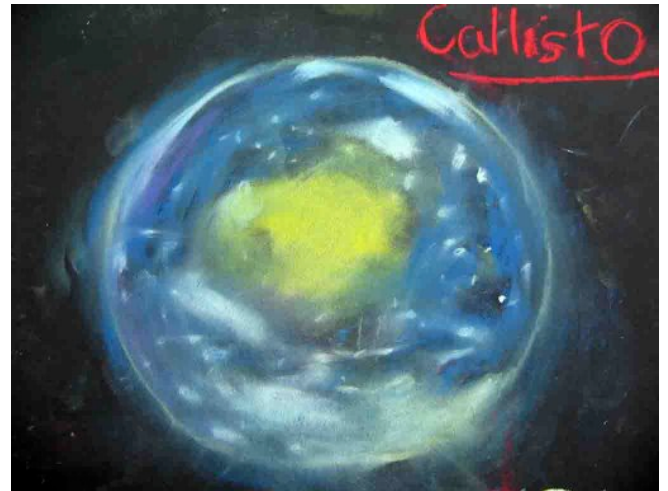




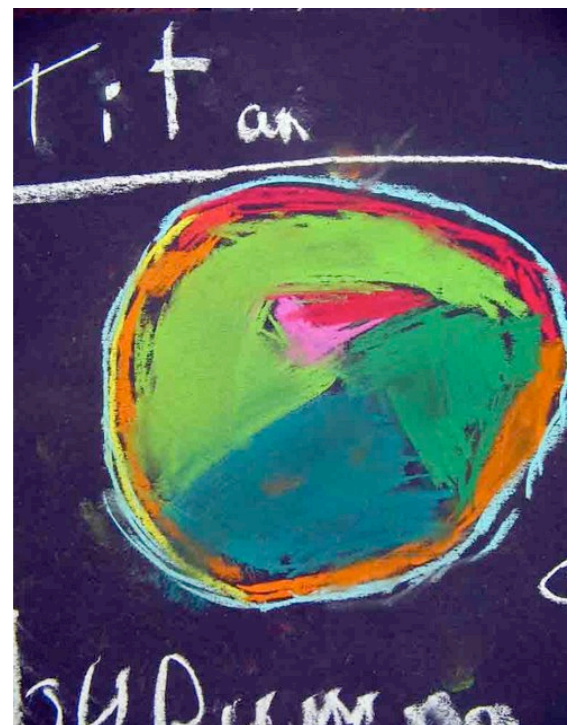
## Deadly Moons

Moons are beautiful.  
You've just got to love them.  
There are so many moons to  
enjoy...



Get to know our own moon a little  
better. Say 'hi' to other moons.  
Learn a little more about them.

Look at moons. Draw moons. Make art  
with moons. Show your moons.



Have fun with deadly moons!



The term 'Deadly' comes from the response of young Irish children who first did this activity. Moons that look like flying saucers, moons with volcanoes, moons that explode and shoot frozen water hundreds of kilometres into space, were considered so awesome they were 'deadly'.

In this activity children view and then vote for the 'deadliest moon'. They then draw that moon from a still image on a screen.

## Deadly Moons



**GOAL:** to combine the goals/methods of learning through art and science, to foster the skills of observation and recording the many moons in the solar system and at the same time stimulate an appreciation of their beauty and wonder, to inspire children to investigate further the bodies within our solar system.



**MATERIALS:** Black paper, White paper, Soft Pastels, Crayons, Felt pens, Paint, Brushes, Pencils, PowerPoint slide show.



**AGE GROUP:** Supervised, indoor activity for 4 years and up.

### WHAT TO DO:

- Before the slideshow begins, tell the children that you are going to show them some pictures of our moon AND the moons of other planets in our solar system. Emphasize that all of them are beautiful images (many of the moons have beautiful surfaces and interesting features). Ask the children to think about choosing the slide that they like the best. The one that they choose will be the moon they will draw at the end of the slideshow. Ask the children to pay special attention to the shapes, colors and textures in the moons so that they can do a really good drawing.



- Present the slideshow of the moon images. You can follow the suggested commentary provided, or improvise according to the knowledge of the group.
- Spend just a minute or two on each slide (depending on the age of the group) relating scientific information. Keep the explanations brief and encourage the group to be vocal from the start.
- At the end of the slide show, remind the children that they have to vote for the moon they like the most.
- Repeat the slideshow with a vocal voting system. Ask the kids to give a big 'Yay!' for the moons they like and a 'Boo' for the ones they don't like.
- Tell the children that they will be drawing the most popular moon (s). Help them to observe their choice. Remind them about shape, colour and texture.
- If the children need a visual reminder, invite them to tell you which moon they want to see again by name or by relevant detail. " Do you want to see the smelly methane moon? Is it one of the moons that have a cold icy ocean in the middle? Which one?"
- Give the children pastels for drawing on black paper (messy but effective), crayons on white paper, felt pens or water-paints.
- Hold an exhibition of your Deadly Moons
- Follow up with a brief evaluation. It is not vital that they recall and understand absolutely everything. But they will go away knowing that (A) there are many moons (B) these moons are very beautiful.

UNAWE is an international programme to inspire young underprivileged children with the beauty and scale of the universe. Universe Awareness illustrates the multicultural origins of modern astronomy in an effort to broaden children's minds, awaken their curiosity in science and stimulate global citizenship and tolerance.

Universe Awareness is imagination, excitement and fun in the universe for the very young.



**Evaluation Sheet for 'Deadly Moons'**

<p>Did you have fun doing Deadly Moons?</p>	
<p>What is your 'deadliest moon'? Why do you like it?</p>	
<p>Did you learn something new about our moon?</p>	
<p>What do you see when you look at the Moon at night?</p>	
<p>Many of the other moons in the solar system are named after characters in myths and legends. If you could, what would you name our moon?</p>	
<p>What is the name of the line between day and night on the Moon?</p>	
<p>What is the most surprising thing you learned in this workshop?</p>	

UNAWE is an international programme to inspire young underprivileged children with the beauty and scale of the universe. Universe Awareness illustrates the multicultural origins of modern astronomy in an effort to broaden children's minds, awaken their curiosity in science and stimulate global citizenship and tolerance.

Universe Awareness is imagination, excitement and fun in the universe for the very young.

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<http://www.unawe.org/>



# Deadly Moons



An astronomy / art workshop:

'Learning about and having fun with moons'

Created by Deirdre Kelleghan

# Waxing Crescent Moon

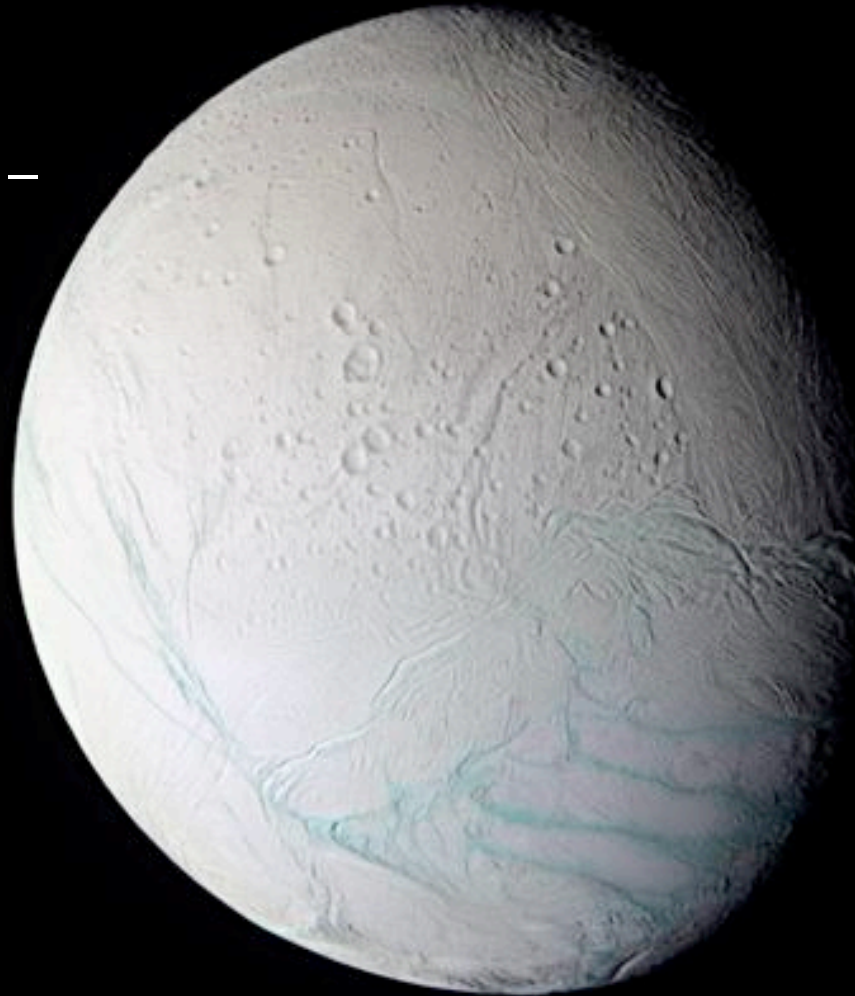
with earthshine and a well defined terminator



Pastel Sketch © Deirdre Kelleghan  
February 11<sup>th</sup> 2008

# Enceladus

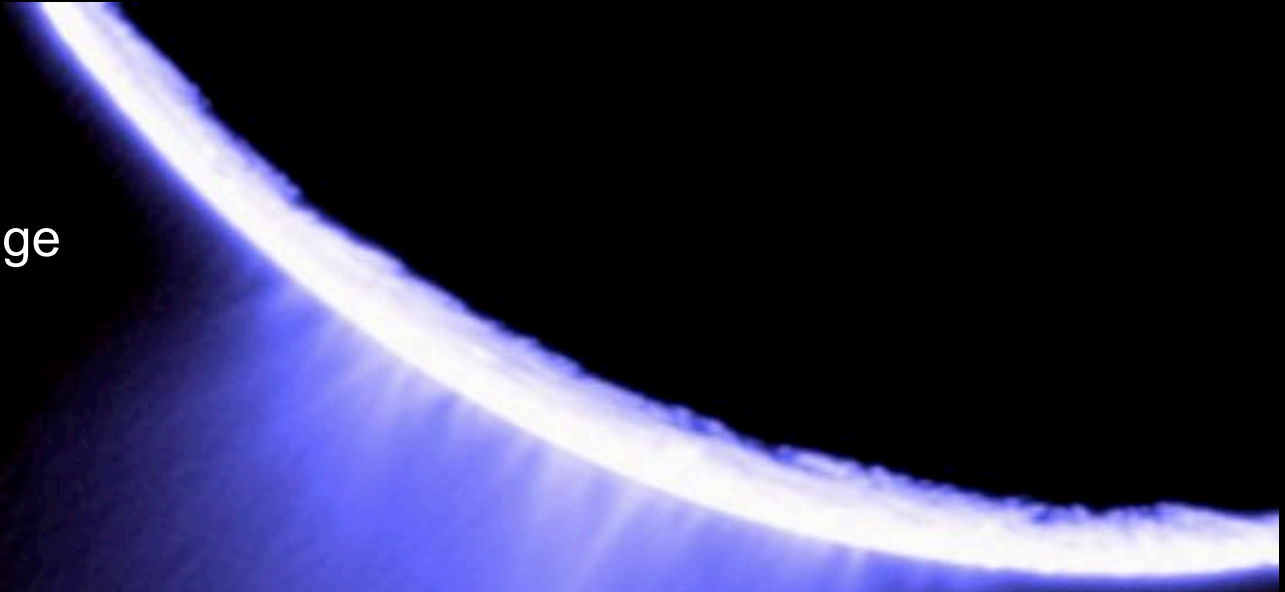
Close flyby July 14<sup>th</sup> 2005 –  
Cassini



NASA/JPL/Space Science Institute

# Enceladus

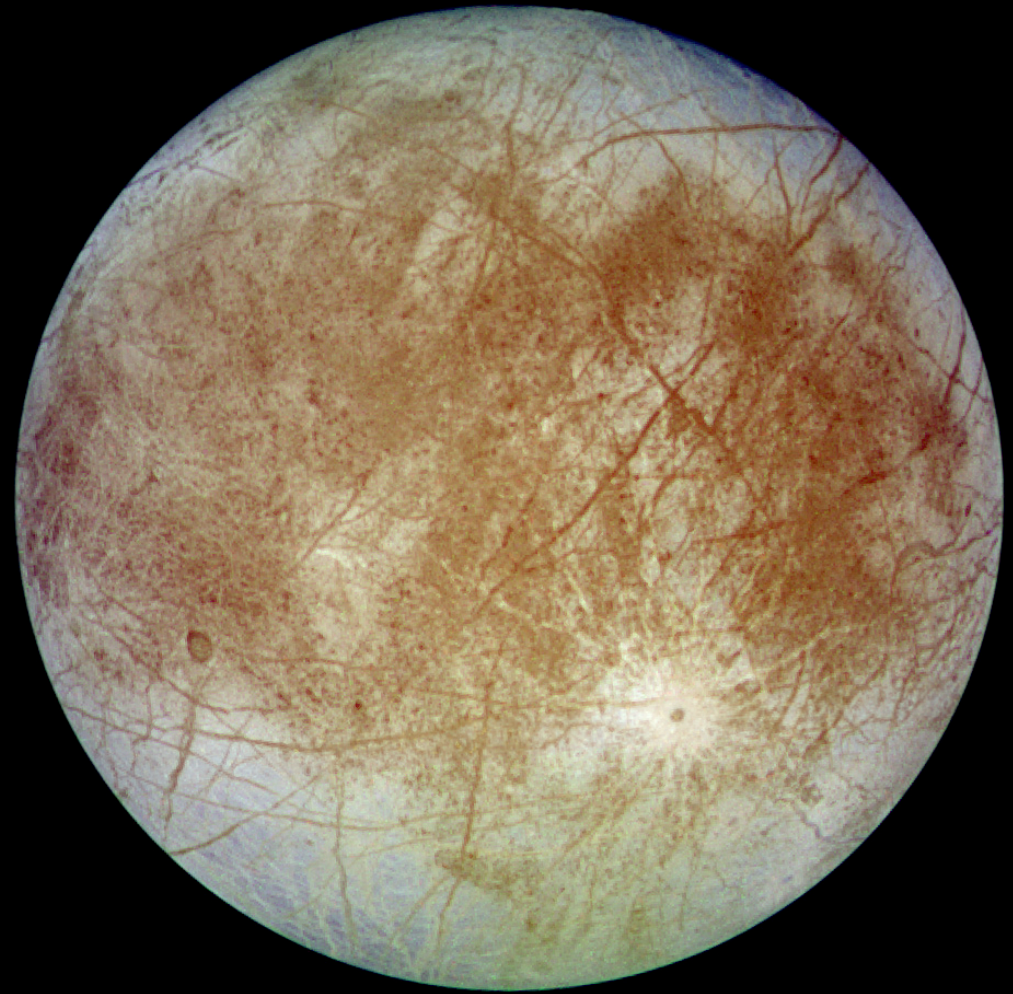
False Colour Image



NASA/JPL/Space Science Institute



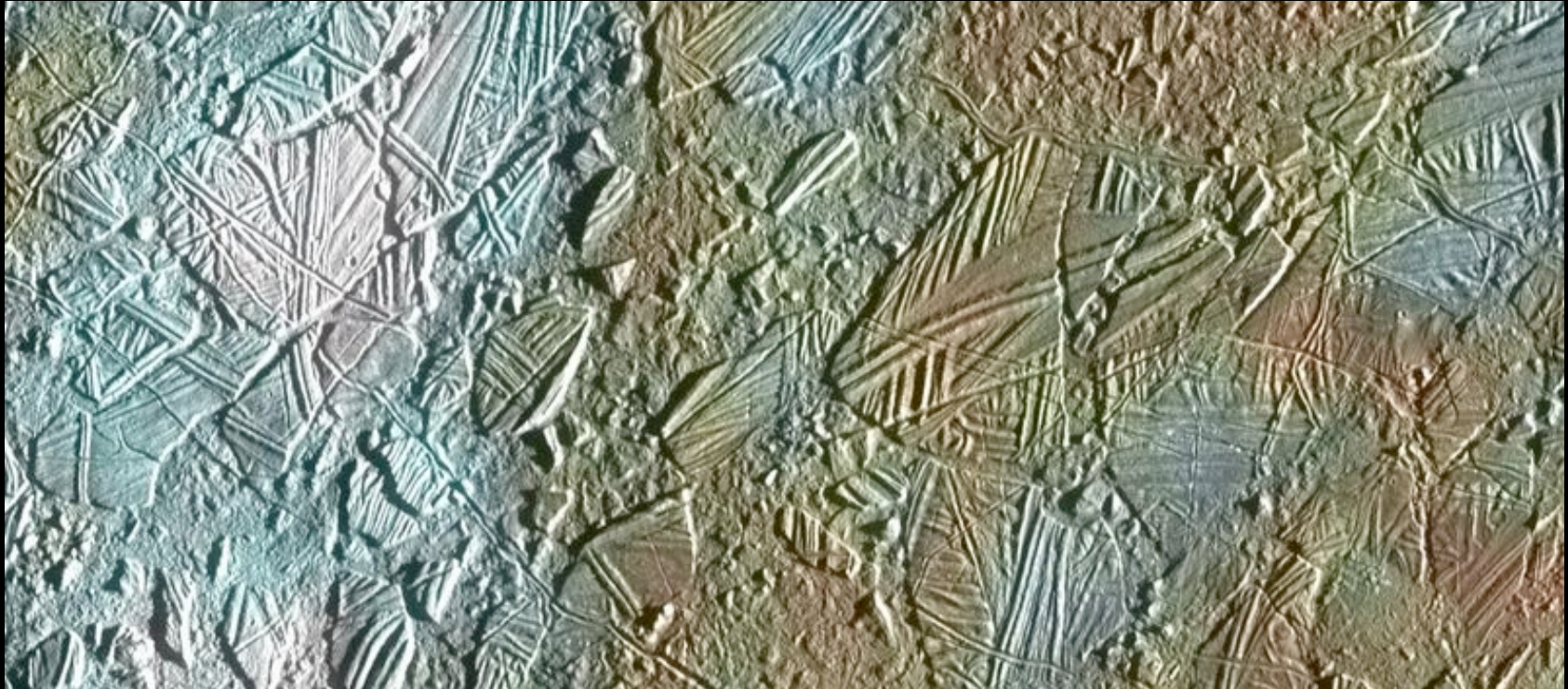
# Europa



JPL NASA

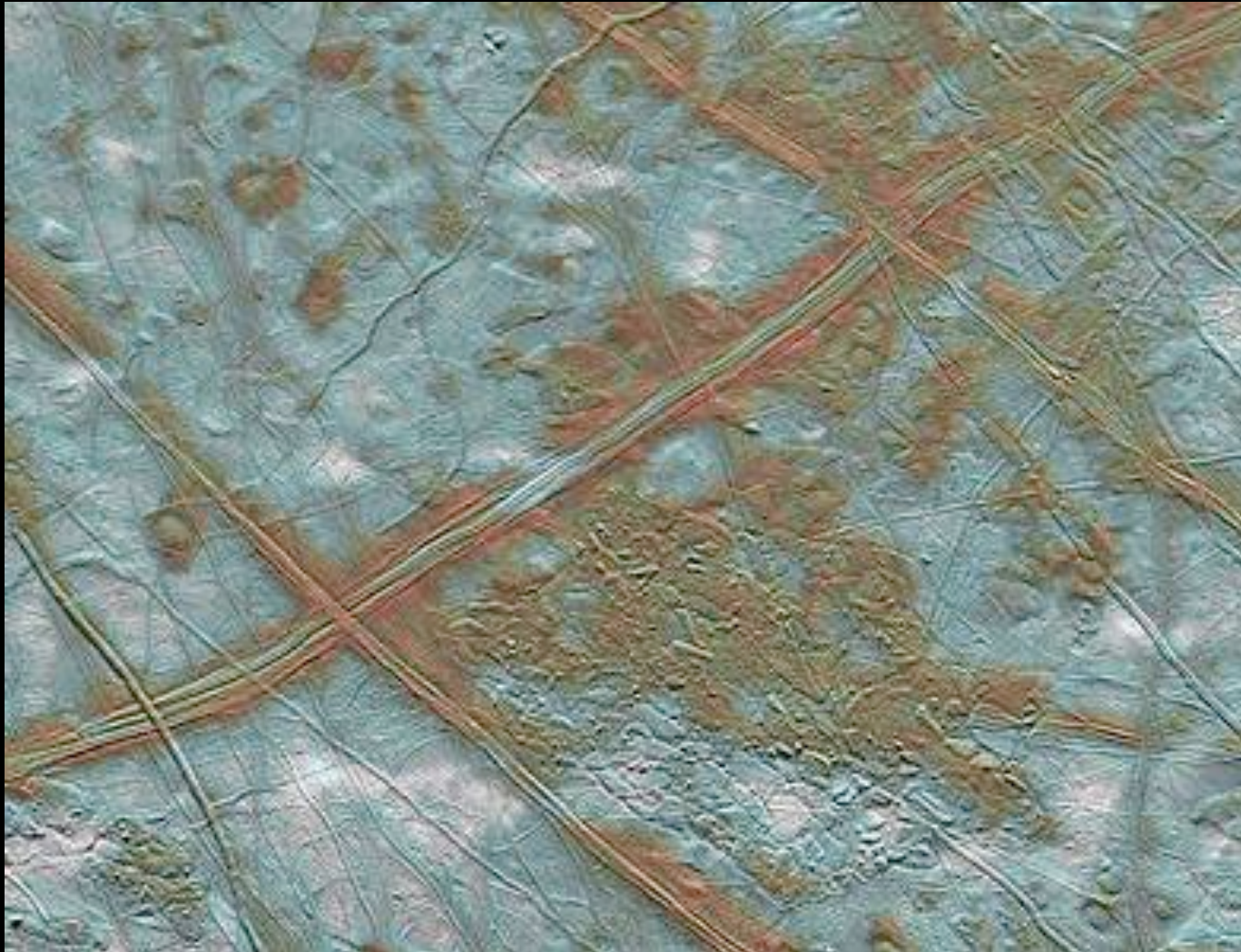
# Wonderful ice surface of Europa

One of Jupiter's 63 moons

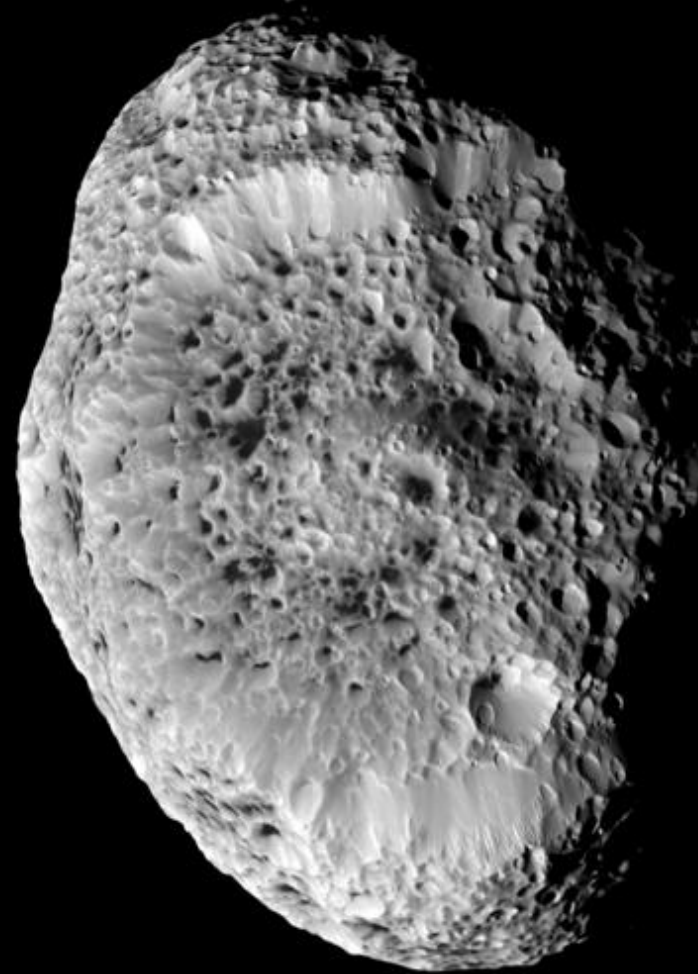


# The Connamara Chaos region on the surface of Europa.

Many features on Europa are named after Irish heroes and legends.



# Hyperion



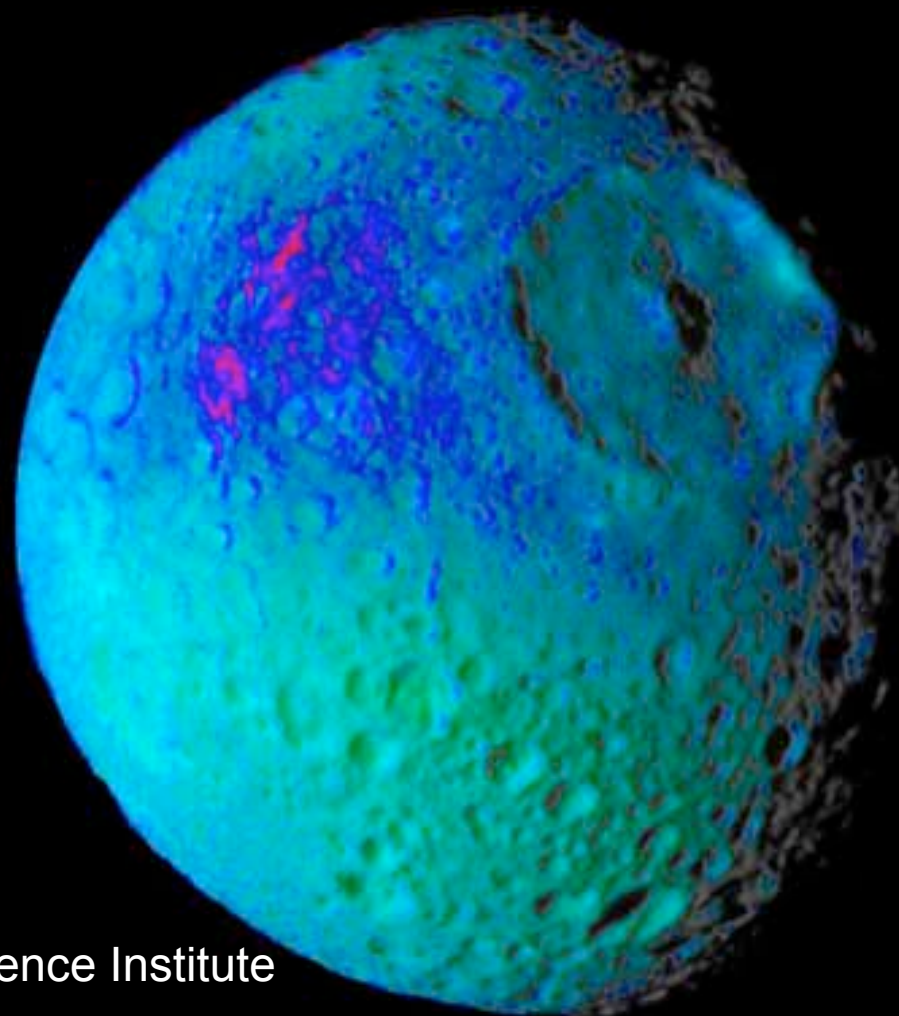
NASA/JPL/Space Science Institute

# First Quarter Moon

Our moon in the daytime



# Mimas

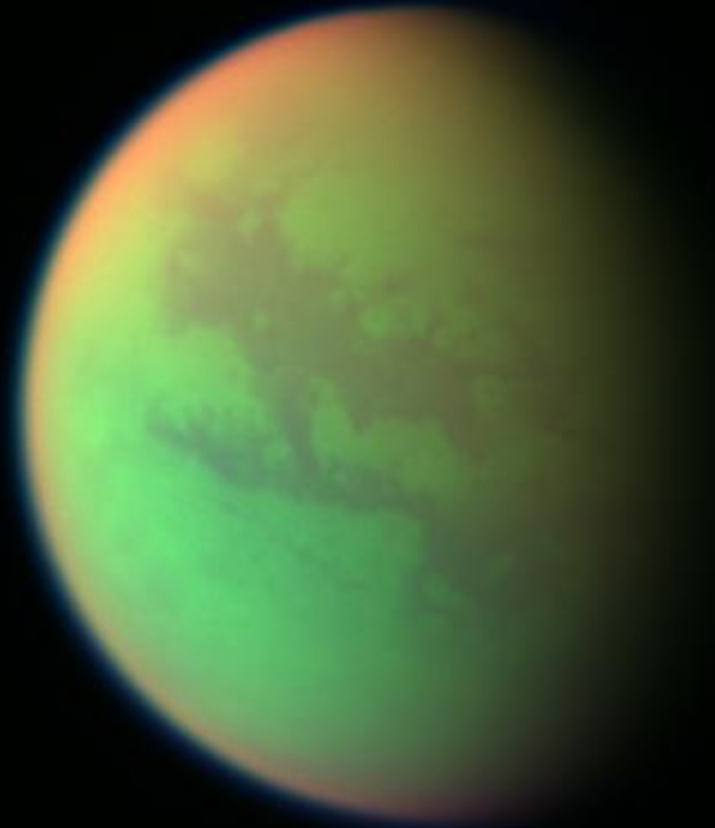


NASA/JPL/Space Science Institute

# Last Quarter Moon



# Titan



NASA/JPL/Space Science Institute

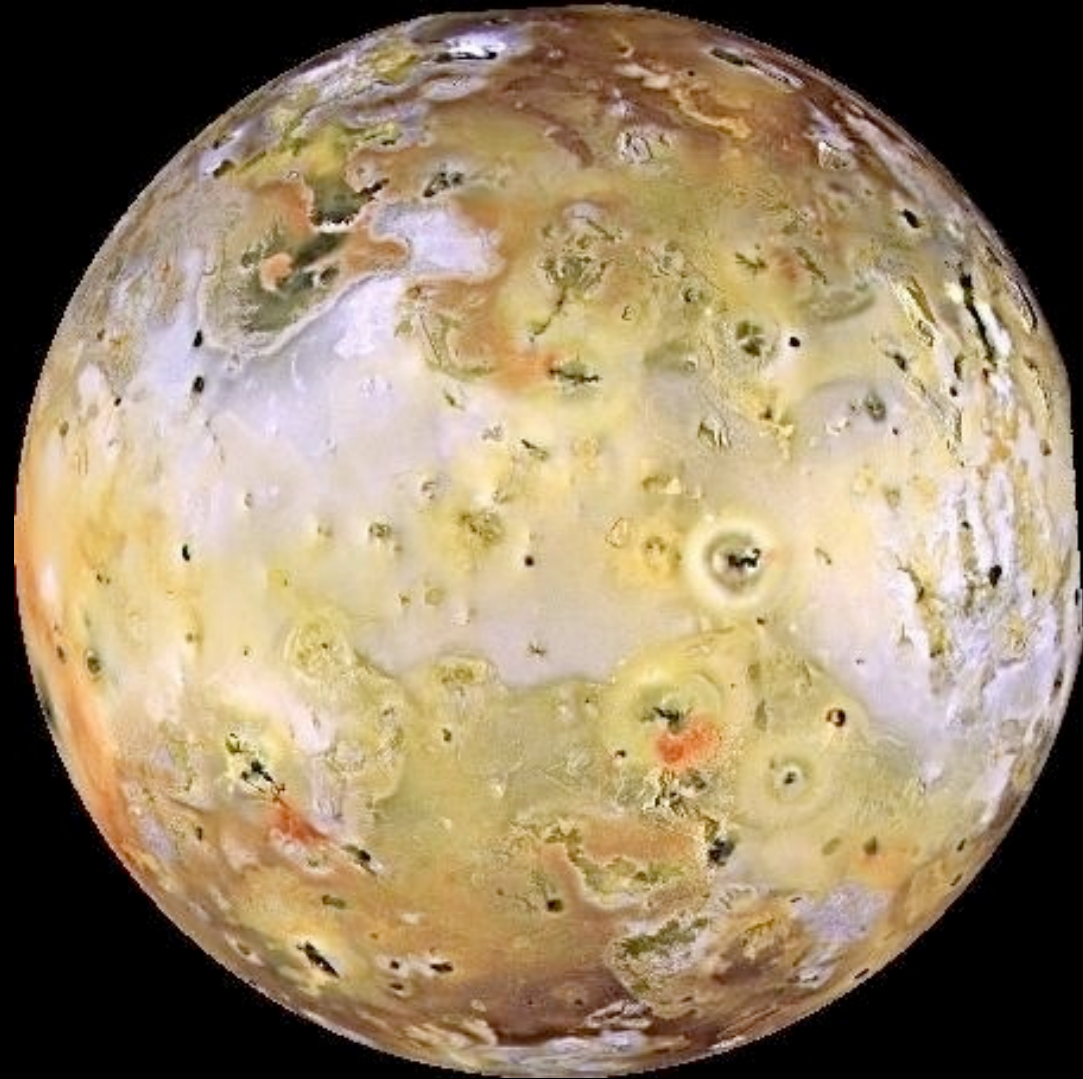


# Unique surface of Titan

Saturn's largest moon

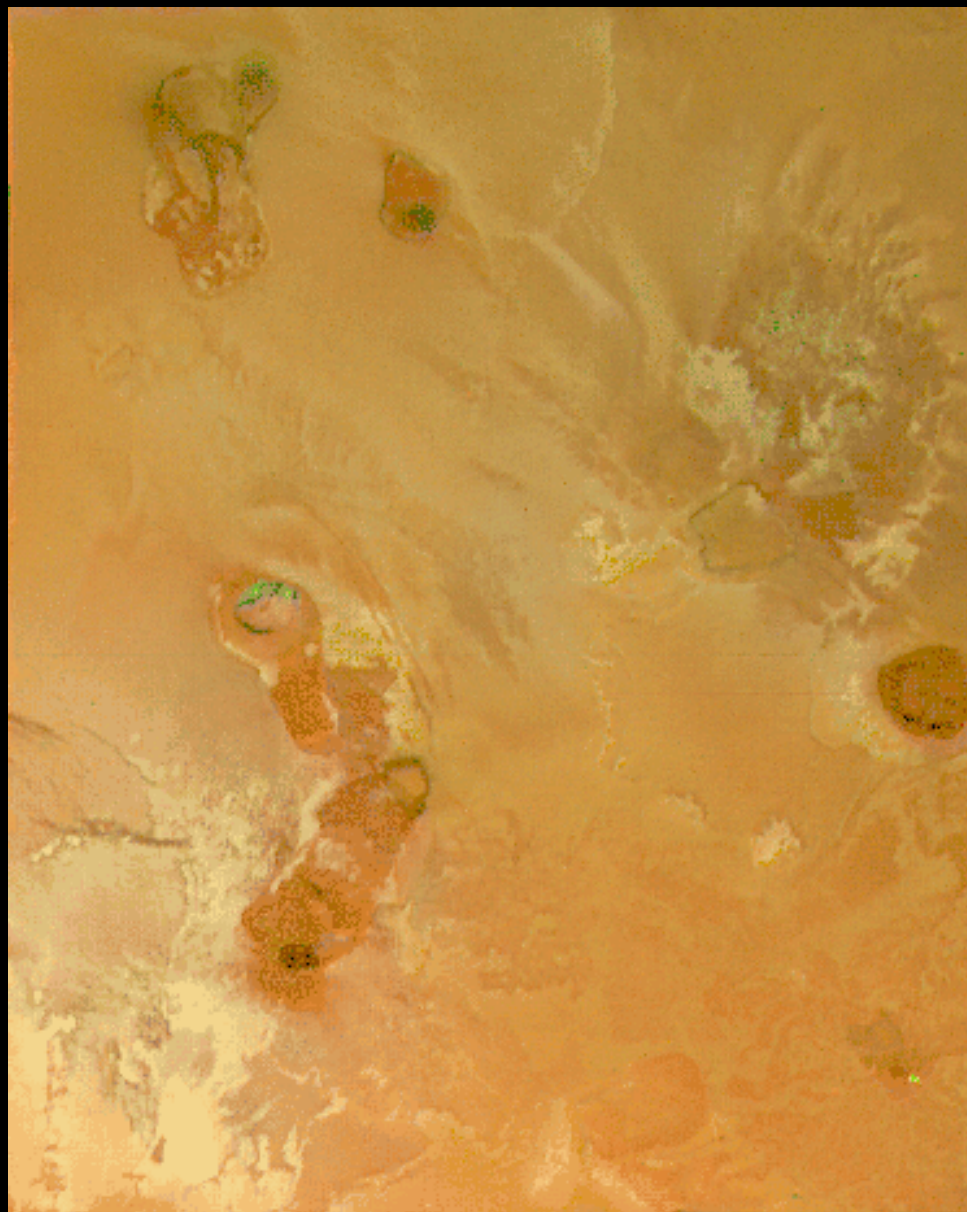


10



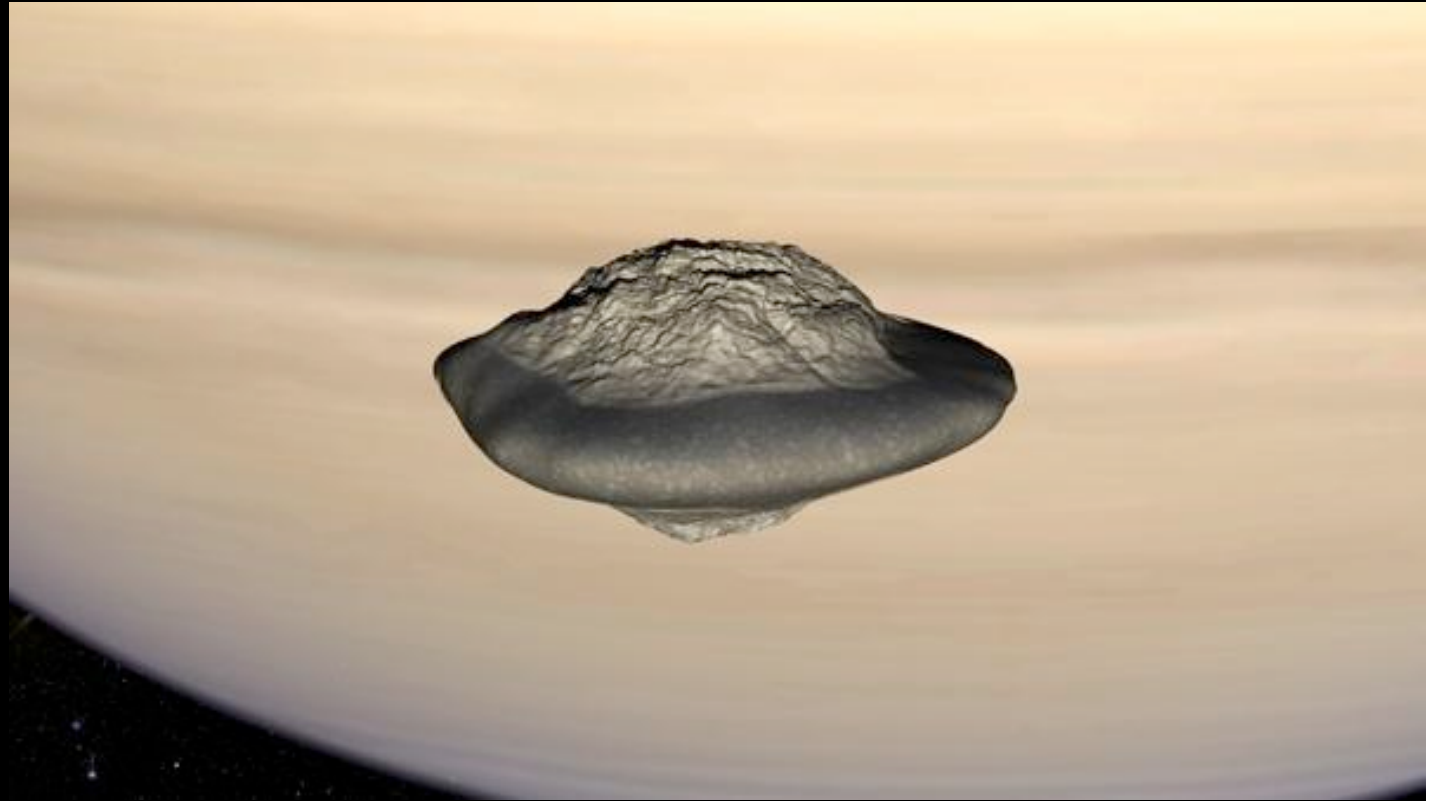
JPL NASA

# Beautiful surface of IO



JPL NASA

# Atlas



JPL NASA

# Our moon

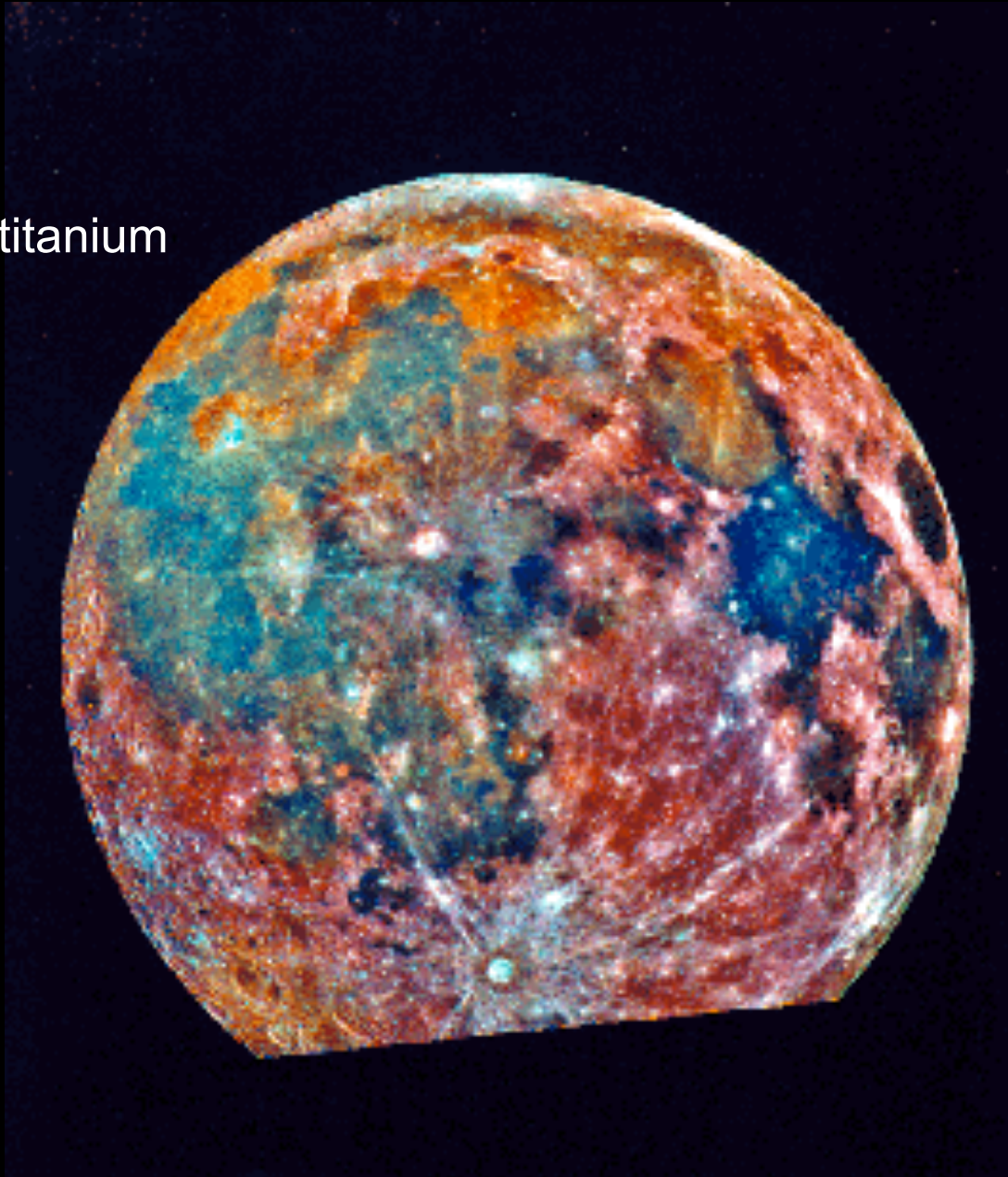
Lunar Eclipse



# Our moon

In false colour

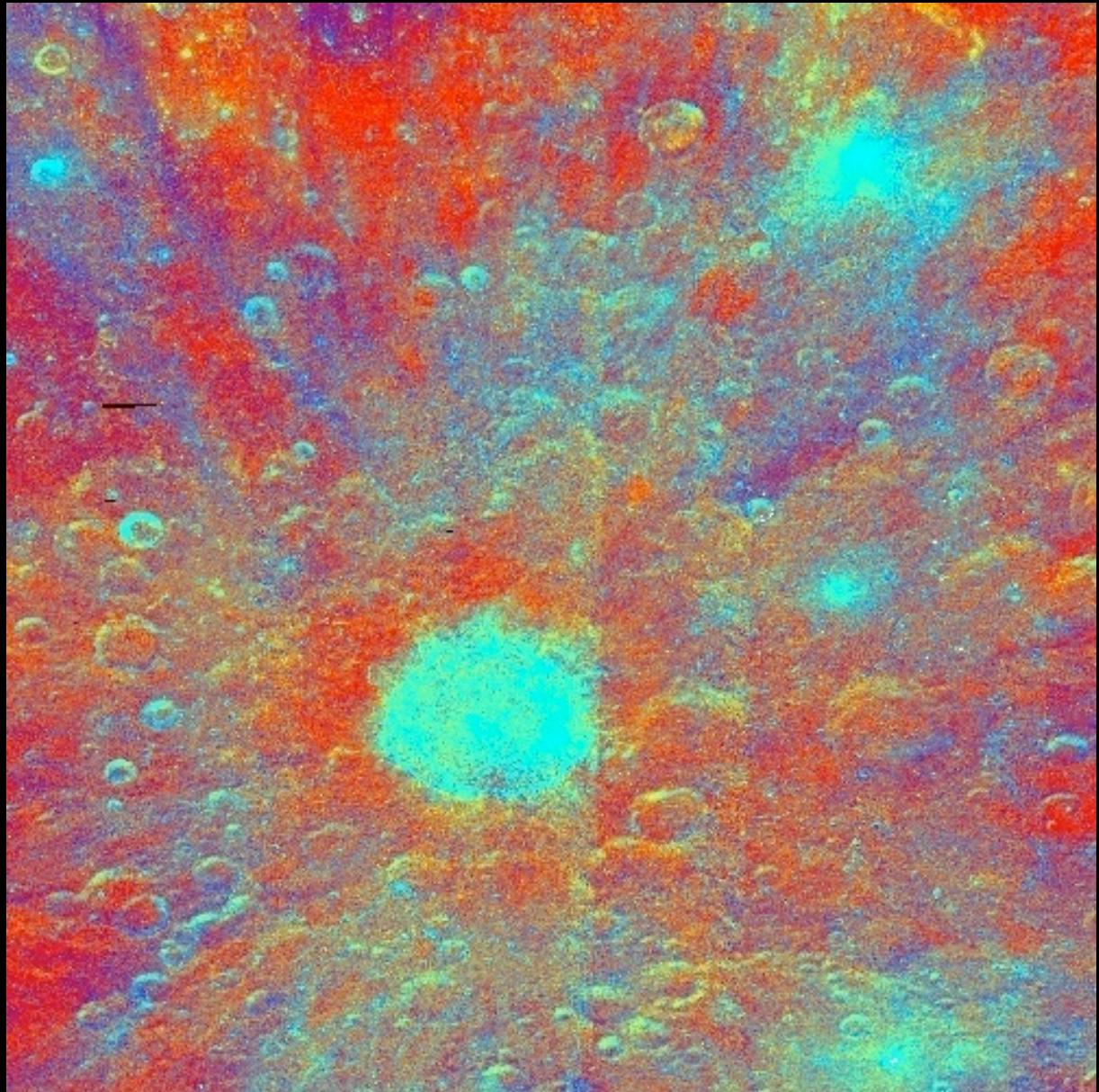
Blue shows richness in titanium



NASA

# Our moon

Close up of the  
surface in false colour  
showing the crater  
Tycho



JPL/NASA

# Callisto



NASA/JPL/DLR



# Phobos



Image Credit: NASA/JPL-Caltech/University of Arizona

# Waning Crescent Moon



# Deadly Moons



An astronomy / art workshop:  
'Learning about and having fun with moons'

Created by Deirdre Kelleghan

**Qu.1 "Who knows how many moons the Earth has?"**

Follow up this answer by adding that many other planets have moons also (some have more than sixty moons going around them).

**Qu.2 "What kind of moon is this?"**

Full Moon.

The Moon is said to be full, when the Sun shines on it and lights up half the Moon, the half that we can see. When the Moon is full, it is half way around the Earth in its monthly orbit.

This moon is a rich yellow when it is full and low in the sky.

We look at it through the thicker, dustier part of the atmosphere that is close to the ground

## Waxing Crescent Moon

with earthshine and a well defined terminator



Pastel Sketch © Deirdre Kelleghan  
February 11<sup>th</sup> 2008

### Waxing Crescent Moon.

This is a drawing of what the Moon looks like through a telescope.

The black area is the night on the Moon, where the Sun is not shining.

The brighter area is the day on the Moon where the Sun is shining brightly

### Qu. 3 - "Has anyone heard of the movie 'The Terminator?'"

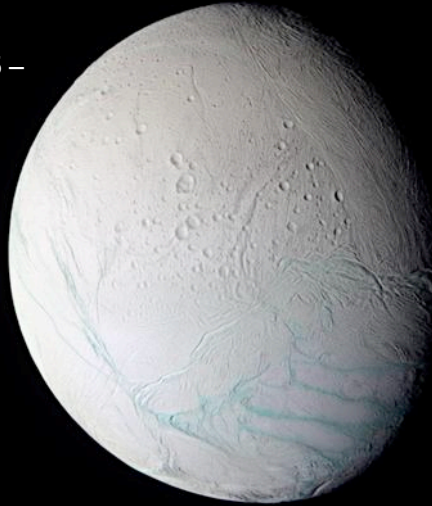
The line on the Moon between the night and the day is called the same name 'The Terminator'.

If suitable for the age group, explain earthshine.

The bright area just visible on the edge of the dark limb is called 'earthshine' – The Sun shines on the Earth and that light is bounced off the Earth's oceans and lights up some of the darkness on the Moon.

## Enceladus

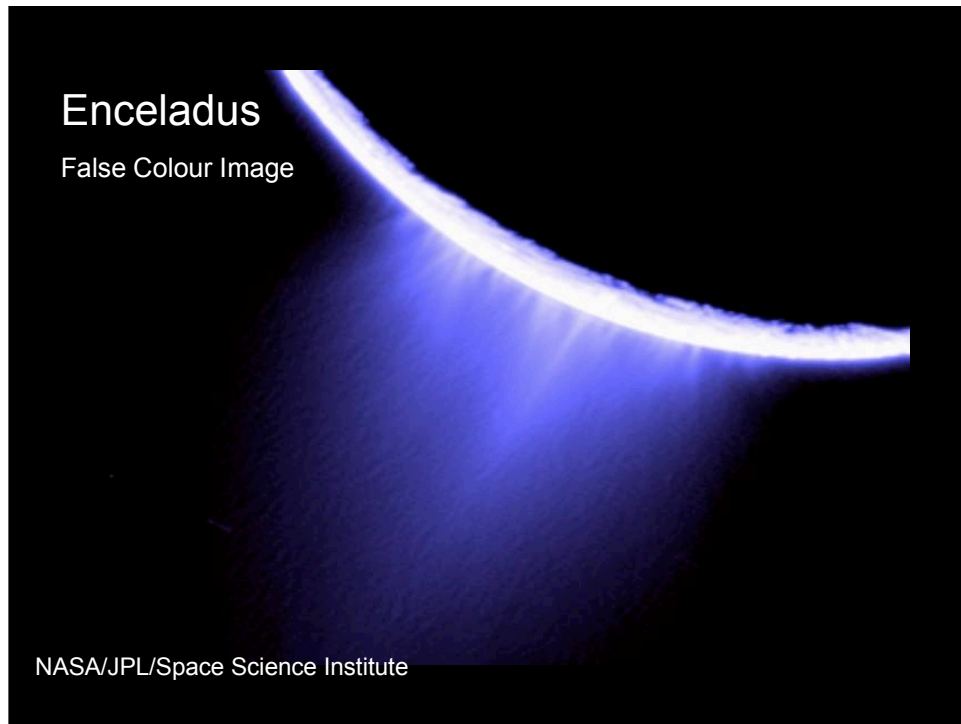
Close flyby July 14<sup>th</sup> 2005 –  
Cassini



NASA/JPL/Space Science Institute

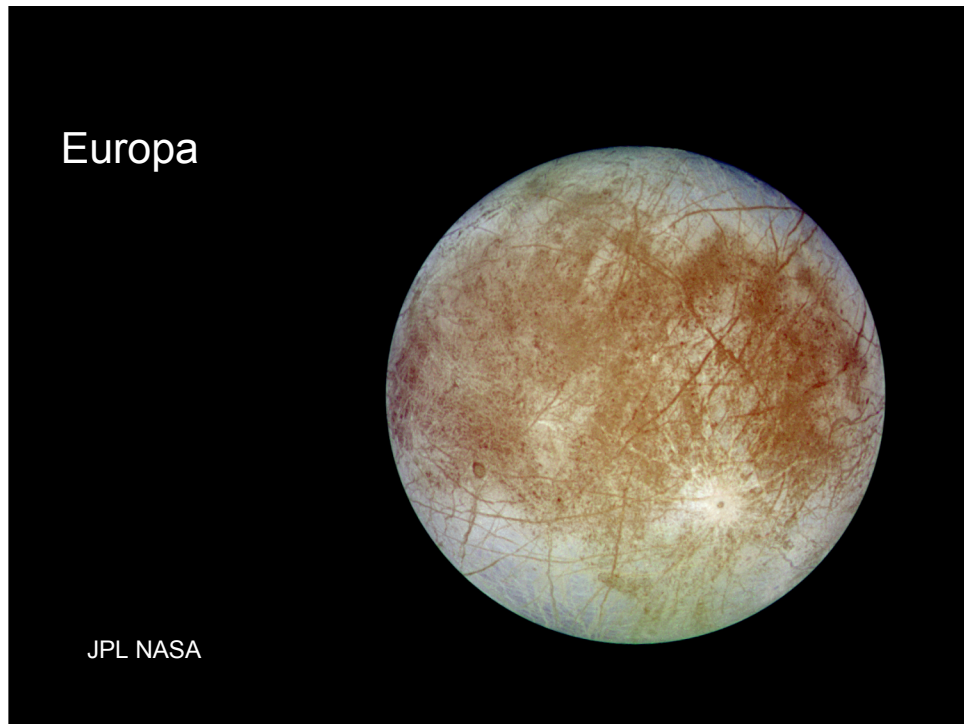
Saturn has many moons.

This one, Enceladus is one of the most beautiful moons in the solar system. It has an ocean inside it, which is made of very, very cold water. Every now and then this water explodes out of the bottom of this moon. The water shoots out of slits in the tiger-stripes and travels hundreds of kilometers out into space.



Enceladus in 'false colour' so named because the colours used in the picture are not 'real' but have been chosen to emphasize important details.

A spacecraft, which is in orbit around Saturn took pictures of the water exploding from this moon. The very clever cameras on the spacecraft can take pictures to show our eyes the pattern this water makes when it bursts out of the moon. The water itself is not blue, but the blue color has been added to let us see the shapes it makes. It is a beautiful image.



Europa is one of Jupiter's moons and is an interesting ice moon.

It has a smooth icy surface that is covered in lines. The surface is full of fractured ice sections and is very unusual.

## Wonderful ice surface of Europa

One of Jupiter's 63 moons



Inside Europa is another cold ocean. Sometime in the future a spacecraft may land on this moon, drill a hole in it, put in a submarine and see if there is anything living in the ocean.

**Qu.4 - “What do you think would live inside a cold icy ocean?”**

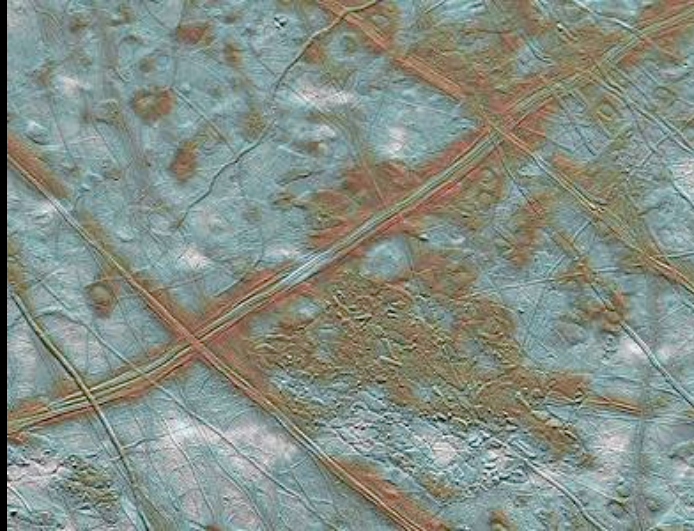
You will get some great answers to this, (space fish, space polar bears, alien monsters) let the children talk about it. Listen to what they say, encourage them to be vocal; imagination fuels the mind to draw.

Some children think it would be bad to drill a hole in such a beautiful moon.



## The Connamara Chaos region on the surface of Europa.

Many features on Europa are named after Irish heroes and legends.



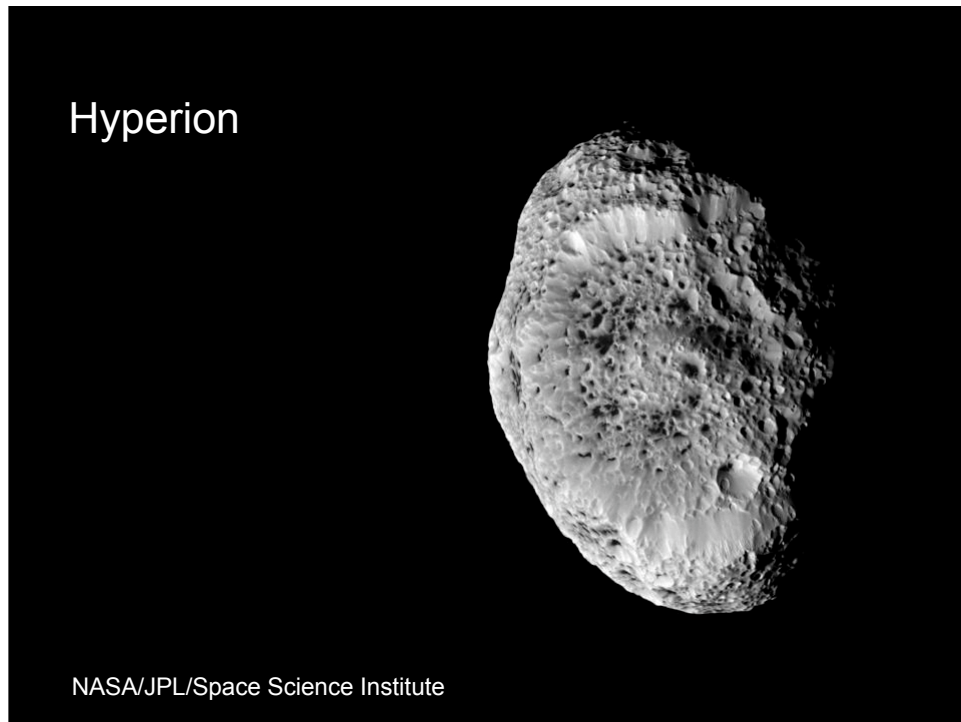
**Qu.5 - “Why do you think many of the features on moons are named after famous people?”**

Most of the features on Europa are called after legendary Irish people; there is even a Deirdre and a Grainne crater.

If another moon has features that relates better to your culture use that instead.

For example, many craters on our moon are named after English, French, German, Polish or American scientists or astronomers.

Perhaps you could find and use close up images of those features. You may have to research other moons to make a cultural connection for your group.



Hyperion

**Qu.6 -"What do you think this is?"**

Answers will include a meteorite, an asteroid, a sponge...

It's another of Saturn's moons, and it is very strange indeed. Most moons go around in a nice smooth path but Hyperion tumbles and rocks around Saturn. If you have a laser pointer, use it on the ceiling to show smooth orbits and tumbling orbits. Or, alternatively, use your hands and arms to mimic the orbit of Hyperion.

## First Quarter Moon

Our moon in the daytime



First Quarter Moon

**Qu.7 - “How many of you have ever seen our moon in the day time?”**

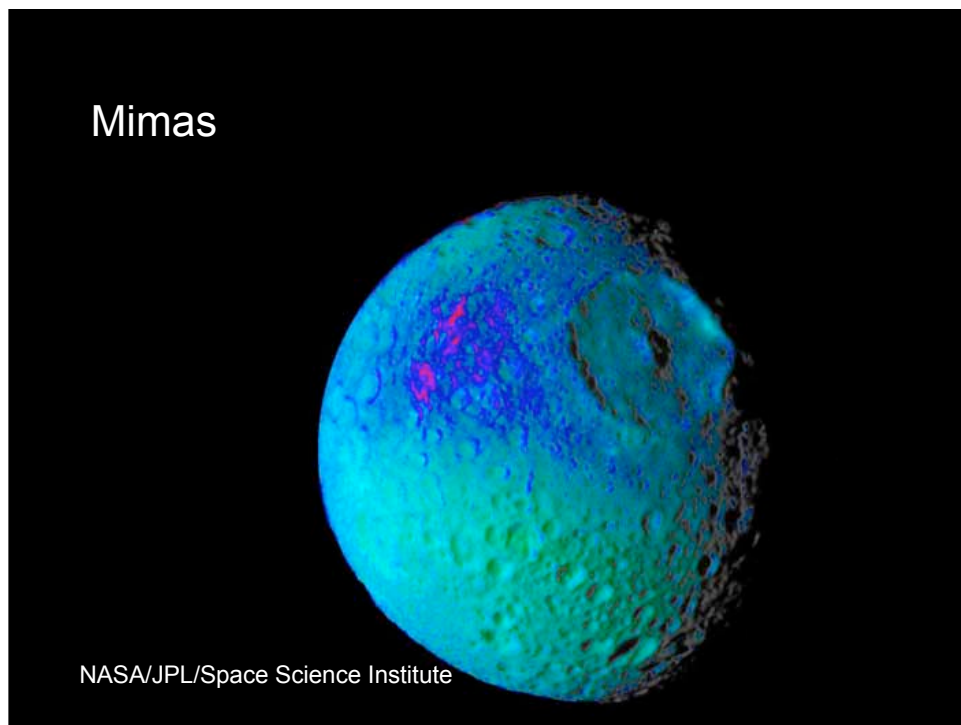
Not many will put up their hands, and the rest will be wondering if we can see the moon in the daytime.

The Moon looks like this when it is one-quarter way around the Earth in its monthly orbit.

We see a quarter of it lit up from our place on Earth, but actually, half the Moon is lit up by the Sun shining on the Moon’s surface. All the sunlight is on the right hand side as we look from the Earth.

We can see a first quarter Moon in the evening or in the daytime depending on the time in the year we are observing.

It’s nice to look at the Moon in the daytime against the blue sky.



Mimas

WOW!!! What a cool moon.

**Qu.8 - “ How many of you have heard of the Death Star?”**

Yes, it is a space ship in the movie Star Wars! Mimas looks a bit like the Death Star.

False colour in this image shows up the texture on the surface.

## Last Quarter Moon

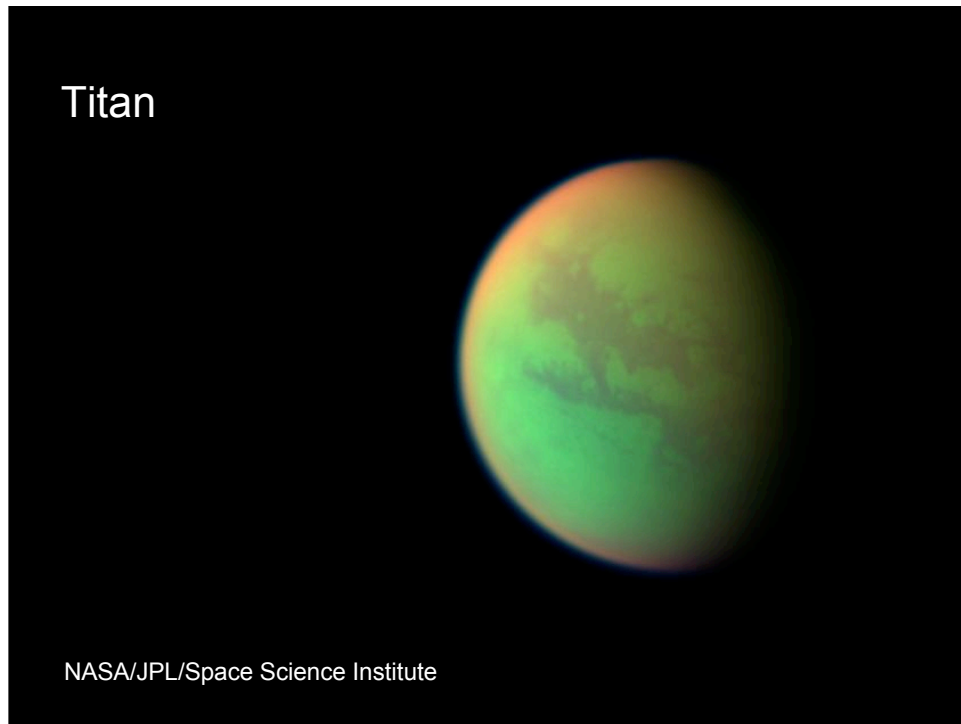


### Last Quarter Moon

Our moon is three quarters of the way around the Earth when it looks like this.

All the sunlight is now on the left hand side of the Moon.

**Qu.9 - "What is the name of the line between daytime, and night time on the Moon? Remember, it sounds like a famous movie."**



## Titan

This is Saturn's biggest moon, it has an atmosphere made of methane and ethane.

Methane is a smelly gas, so I guess this is a really smelly moon.

## Unique surface of Titan

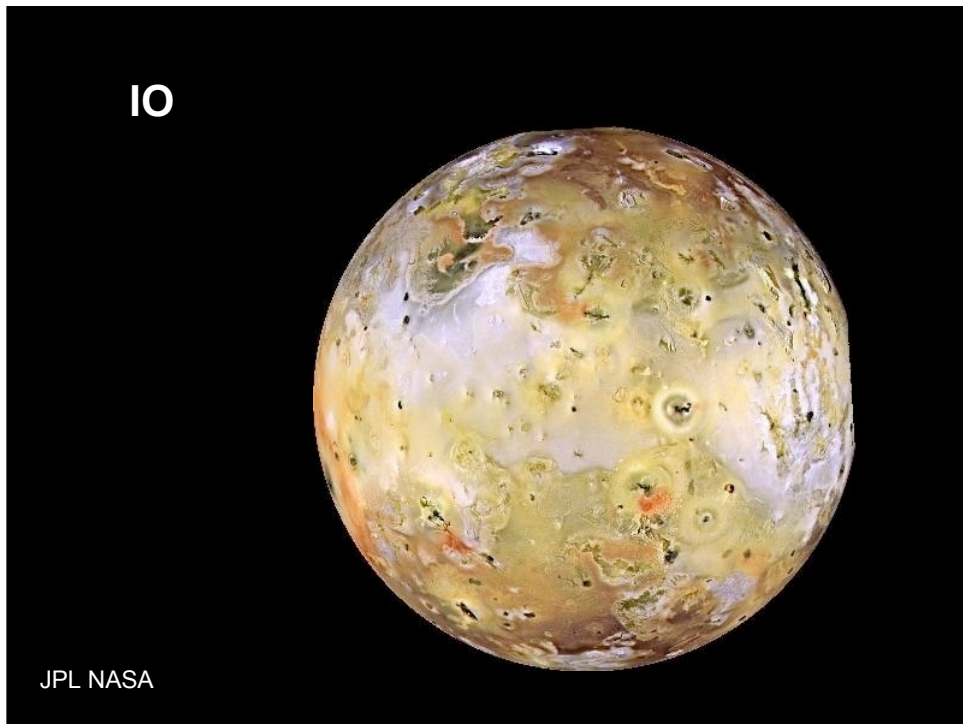
Saturn's largest moon



This land on the moon's surface is called Xanadu.

The photograph was taken by the Cassini spacecraft.

Cassini sent a robot probe called Huygens down to the surface and took this picture of the surface that is full of ice pebbles. It was the first robot to land on another planet's moon.



IO

Another of Jupiter's moons

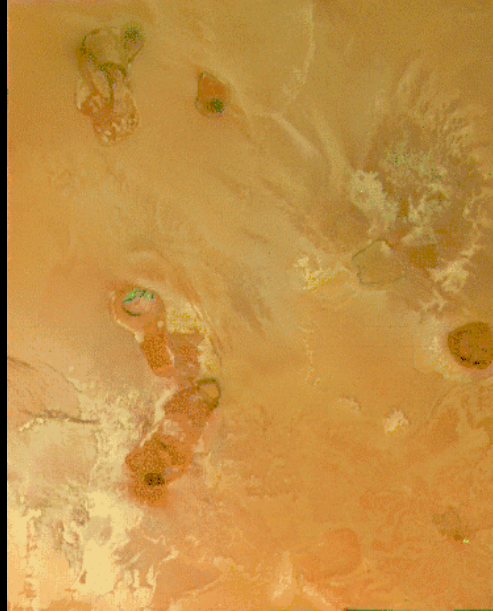
**Qu.10 - "What does this moon look like?"**

Let the kids talk about it, you will get funny answers.

Some people think that it looks a bit like a pizza, but actually, those marks are caused by active volcanoes. The volcanoes can spray sulfur and sulfur dioxide hundreds of kilometres above the surface of the moon. What goes up then falls back down, creating huge circular red, yellow, white and black bruises across the surface of Io.

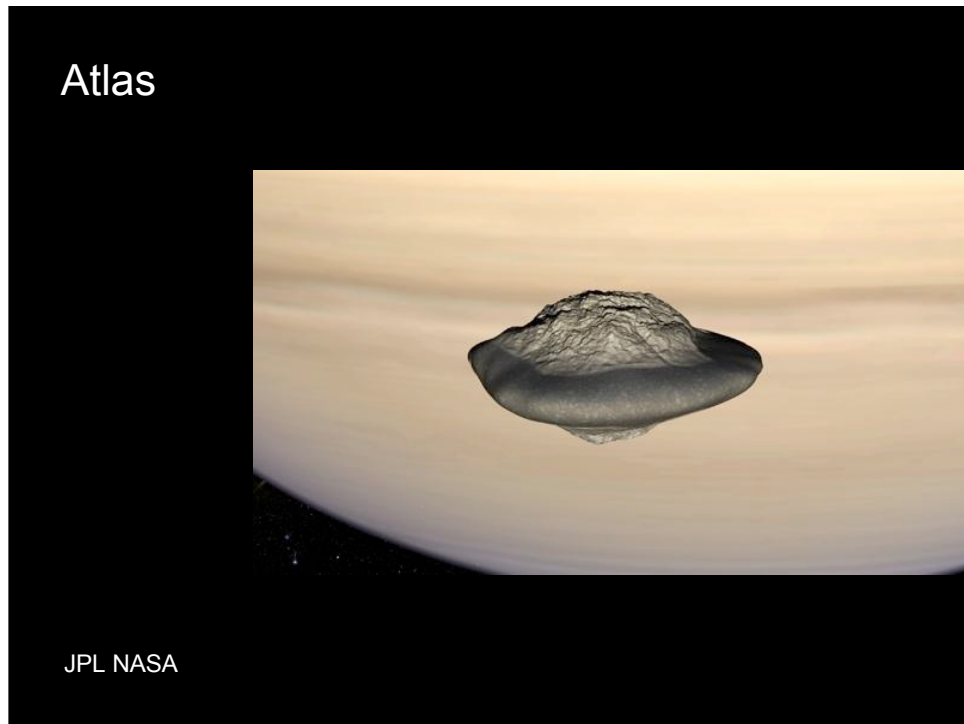


Beautiful surface  
of IO



JPL NASA

Io is covered with hundreds of active volcanoes that cover the surface with lava flows.



Atlas

**Qu.11 - "What do you think this is, or what does it look like to you?"**

A stone? A mushroom? A UFO? Many such answers will come up and bring a good laugh at this point.

("Wow, you must have some funny looking mushrooms where you come from".)

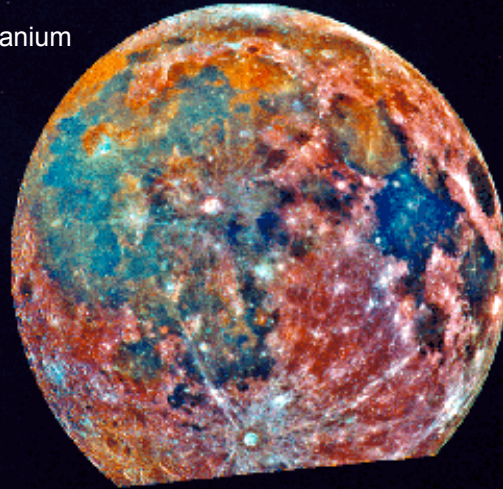


Our moon in a Lunar Eclipse – Our moon can look like this when it is going through the shadow of the Earth. This is not false colour!

Isn't it gorgeous?

## Our moon

In false colour  
Blue shows richness in titanium



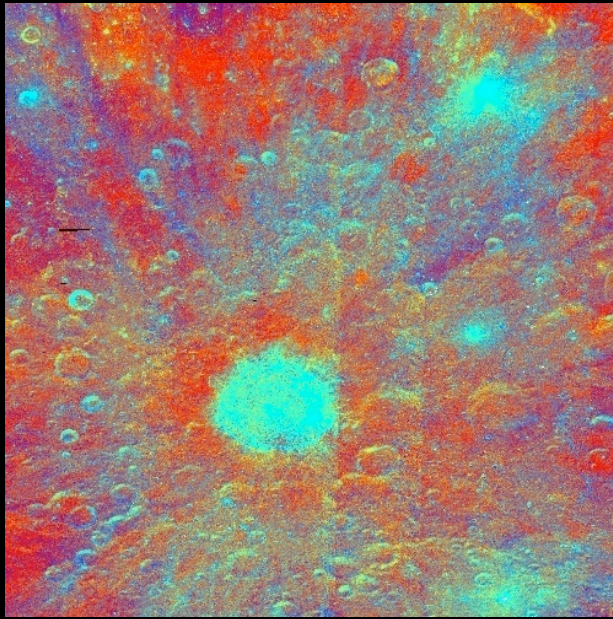
NASA

Our moon in false colour.

This very clever photograph shows up the different elements present on the surface of our moon. The blue color indicates the metal titanium. Some golf clubs, tennis racquets and special racing bikes are made of titanium.

## Our moon

Close up of the surface in false colour showing the crater Tycho



JPL/NASA

Close up of the surface in false colour shows up Tycho, one of our moon's most interesting craters.

The surface of the Moon shown in this way gives us a beautiful picture.



Callisto.

One of Jupiter's moons, a very beautiful moon. It is one of four of Jupiter's moons that we can see through a telescope and was first discovered by Galileo in 1610.

The rest of Jupiter's moons are too small to see from Earth.

This is difficult to draw but well worth a try.

## Phobos



Image Credit: NASA/JPL-Caltech/University of Arizona

Phobos – Mars has two moons, this is one of them. It is made of ice and is almost the same colour as the planet.

Qu. 12 – “What do you think it looks like, a potato?”

## Waning Crescent Moon



Waning crescent Moon – Our moon has almost gone around the Earth once and looks like this. It is almost a New Moon. When it is a New Moon we see no light shining on it at all.

The Sun's light is shining only on the far side of the Moon at New Moon, so we here on the Earth cannot see the Moon at all.