

Astronomy

Semester 2

Weeks 3 - 4

Tuesday / Wednesday (Jan 20 & 21)

- Test Review (Sub on Wednesday)

- T: **11C** compare the planets in terms of orbit, size, composition, rotation, atmosphere, natural satellites, magnetic fields, and geological activity; and
- O: I will prepare for my test on the Terrestrial Planets
- D: by completing the SmartBook test review.
- A: Mars
- Y: What are the important aspects of the terrestrial planets?

Thursday / Friday (Jan 22 & 23)

- Test inner-planets

- **T: (11) Science concepts. The student uses models to explain the formation, development, organization, and significance of solar system bodies. The student is expected to:**
- **11A** relate Newton's law of universal gravitation and Kepler's laws of planetary motion to the formation and motion of the planets and their satellites;
- **11B** explore and communicate the origins and significance of planets, planetary rings, satellites, asteroids, comets, Oort cloud, and Kuiper belt objects;
- O: I will demonstrate my understanding of the terrestrial planets
- D: making a stellar grade on my unit 6 test
- A: Mercury, Venus, Mars
- Y: What similarities and differences do the terrestrial planets have?

Monday / Tuesday (Jan 26 & 27)

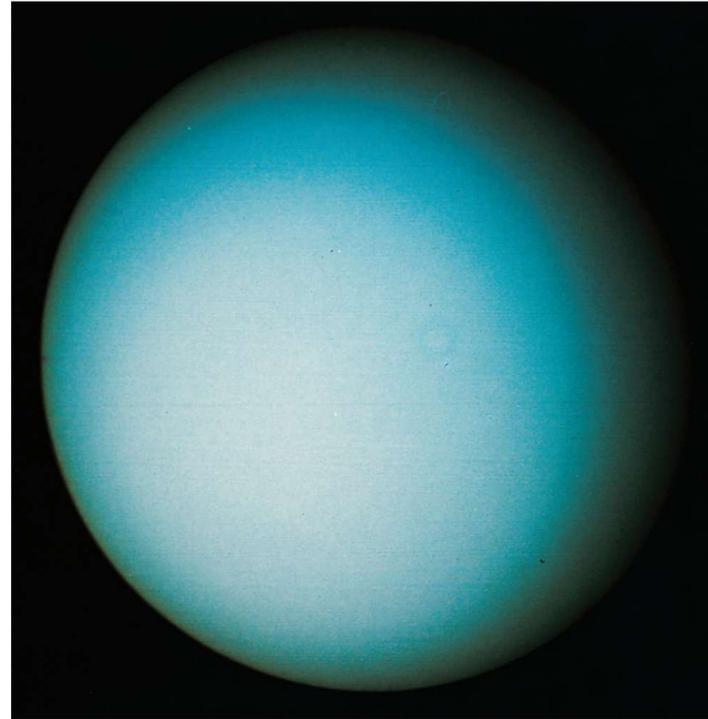
- Uranus and Neptune

- **T: (11) Science concepts. The student uses models to explain the formation, development, organization, and significance of solar system bodies. The student is expected to:**
- **11A** relate Newton's law of universal gravitation and Kepler's laws of planetary motion to the formation and motion of the planets and their satellites;
- **11B** explore and communicate the origins and significance of planets, planetary rings, satellites, asteroids, comets, Oort cloud, and Kuiper belt objects;
- **O:** I will learn about the remaining planets
- **D:** by conducting a group discussion, lecture with notes, and begin my unit project.
- **A:** Uranus, Neptune
- **Y:** What are the major similarities and differences between the inner and outer planets?

Uranus

- Discovered in 1781 by Sir William Herschel.
- While small relative to Jupiter/Saturn, Uranus is $4 \times$ larger in diameter than Earth and has $15 \times$ the mass.
- 19 AU from Earth

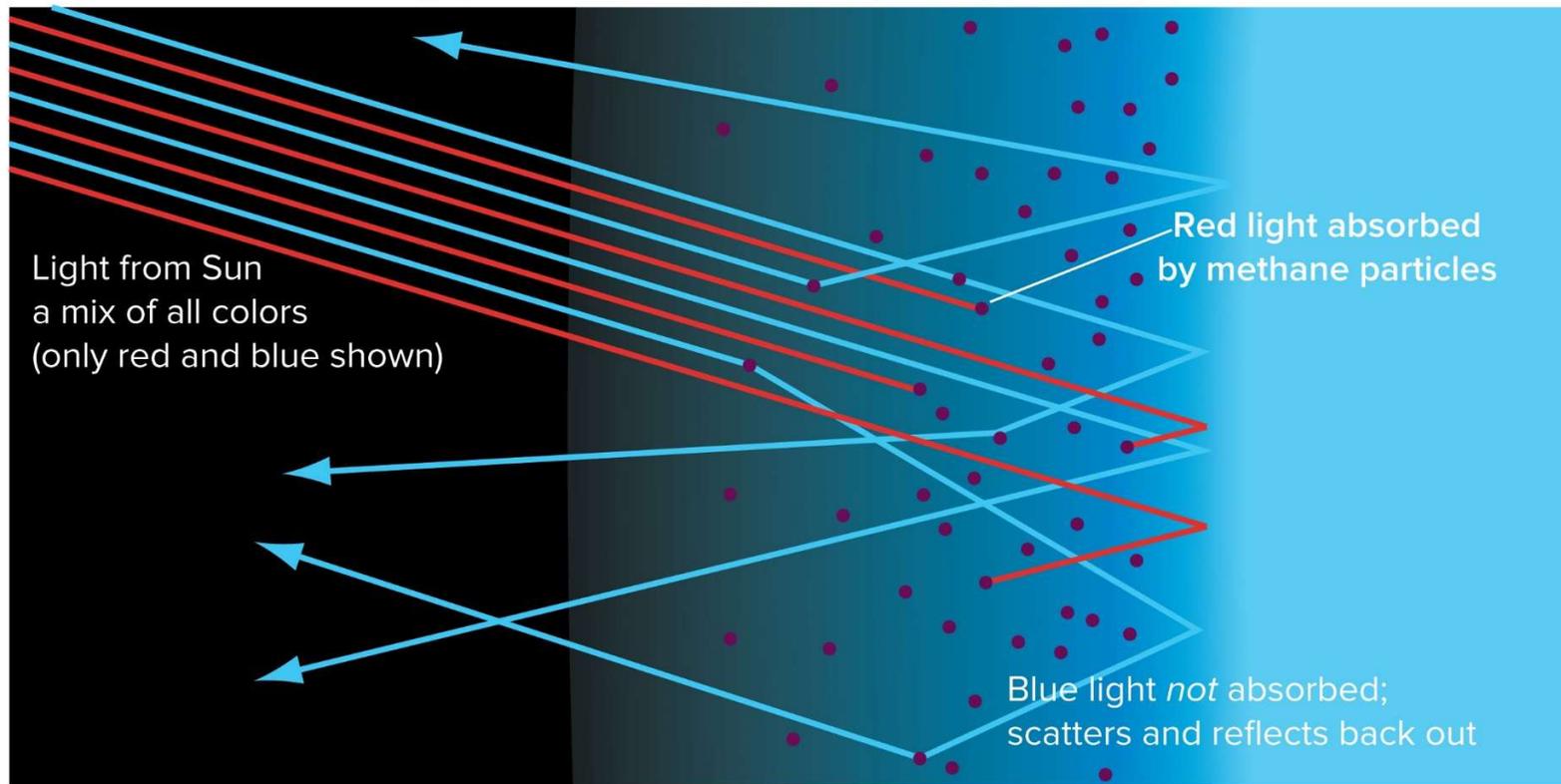
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Atmosphere of Uranus

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- Atmosphere is rich in hydrogen and methane.
- Methane gas and ice are responsible for the blue color of Uranus's atmosphere.

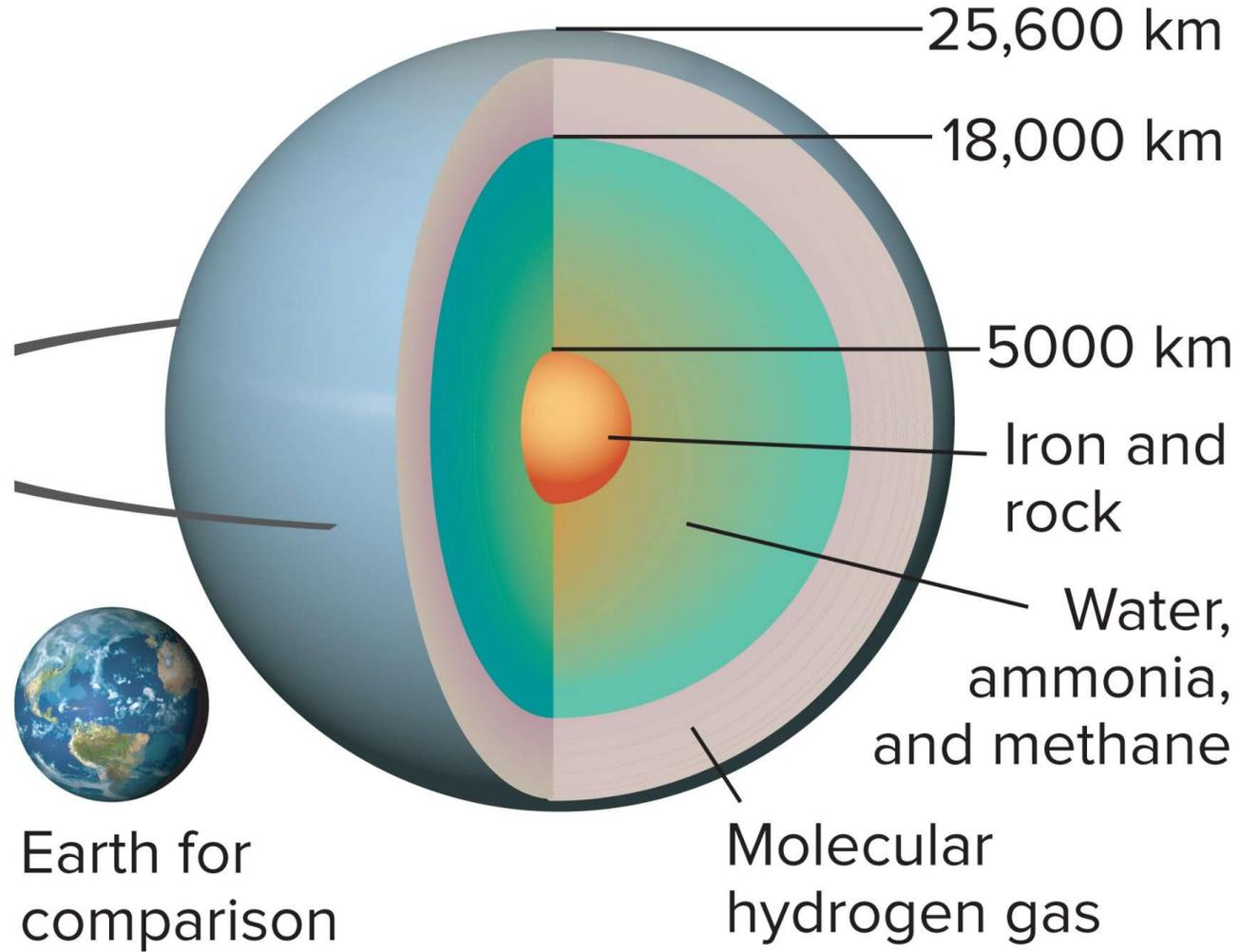


Composition of Uranus

- With a density of 1.2 g/cm^3 and smaller size, Uranus must contain proportionally fewer light elements than Jupiter/Saturn.
- Density is too low for it to contain much rock or iron.
- Uranus's interior probably contains water, methane, and ammonia.

Interior of Uranus

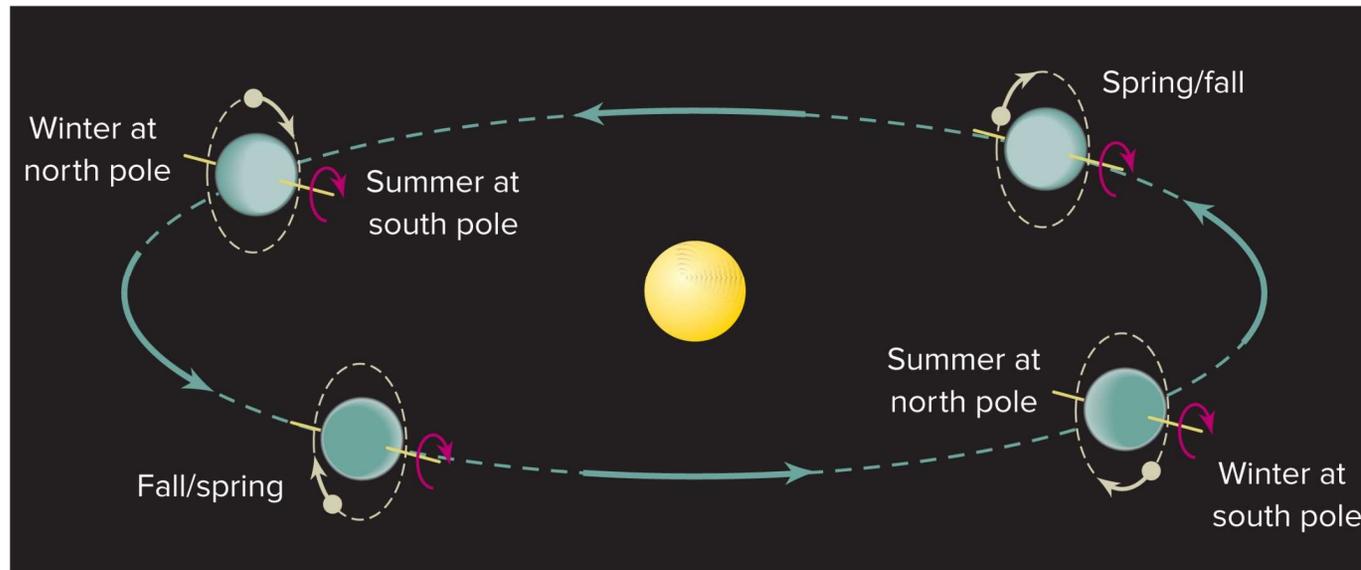
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Uranus's Odd Tilt

- Uranus's spin axis is tipped so that it nearly lies in its orbital plane.
- The orbits of Uranus's moons are similarly tilted.

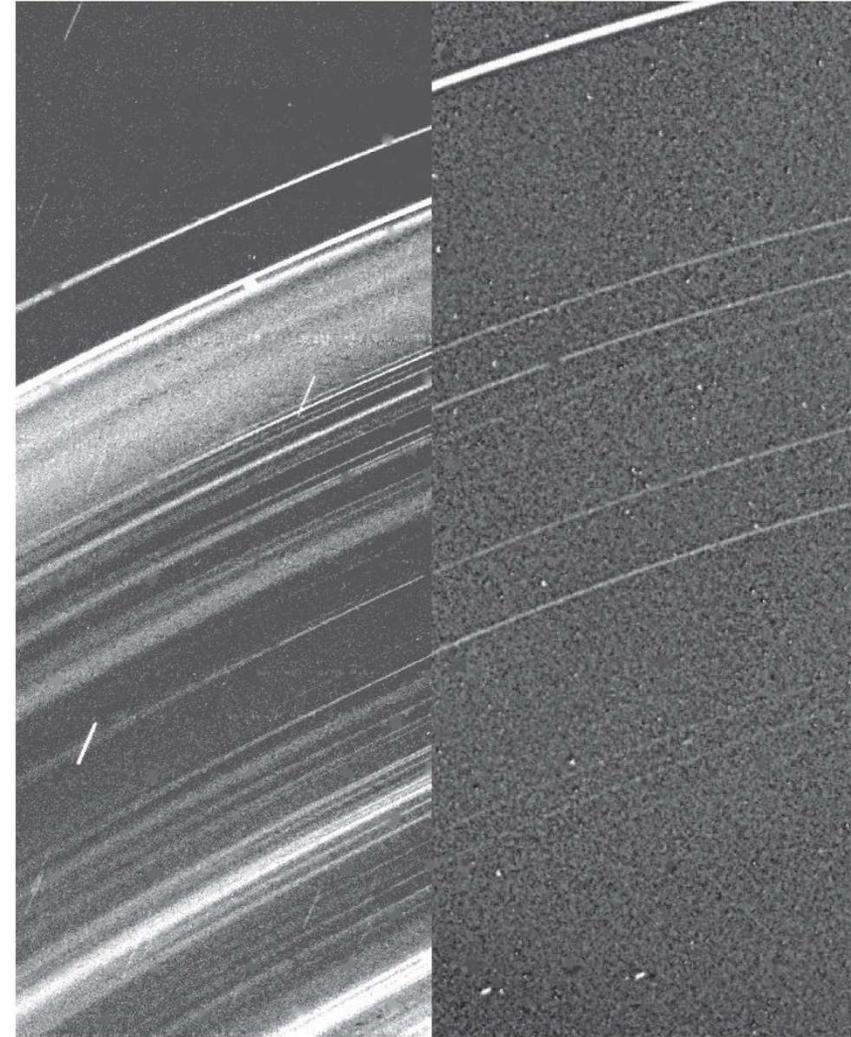
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Rings of Uranus

- Uranus is encircled by a set of narrow rings composed of meter-sized objects.
- These objects are very dark, implying they are rich in carbon particles or organic-like materials.
- The extremely narrow rings may be held in place by *shepherding satellites*.

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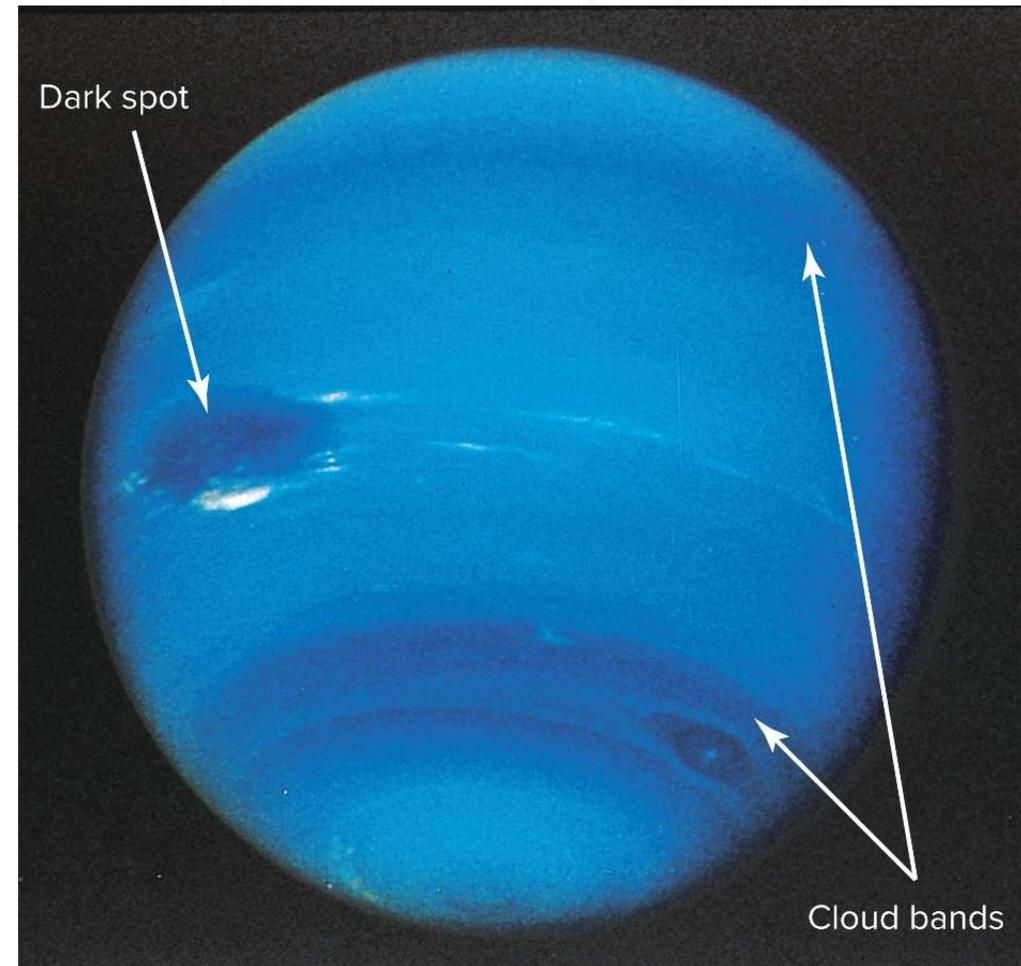


Moons of Uranus

- Uranus has 5 large moons and several small ones that form a regular system.
- Moons probably composed of ice and rock and many show heavy cratering.

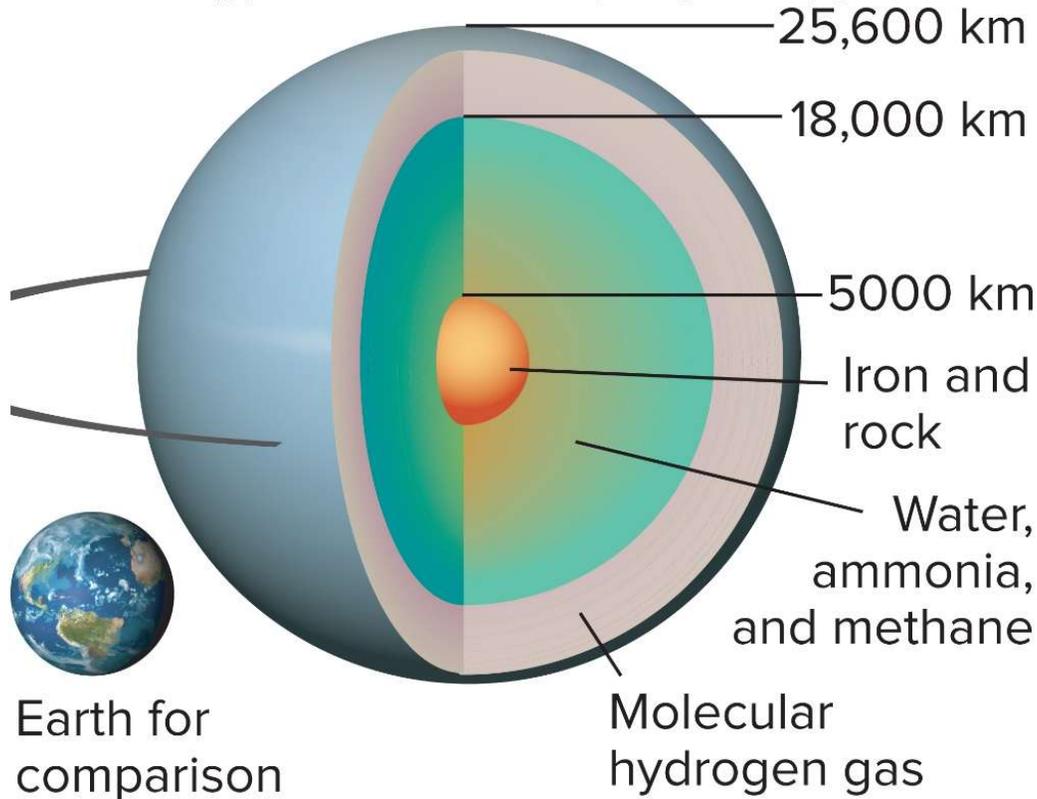
Neptune

- Neptune is similar in size to Uranus.
- Deep blue world with cloud bands and vortex structures – the Great “Dark” Spot



Interior of Neptune

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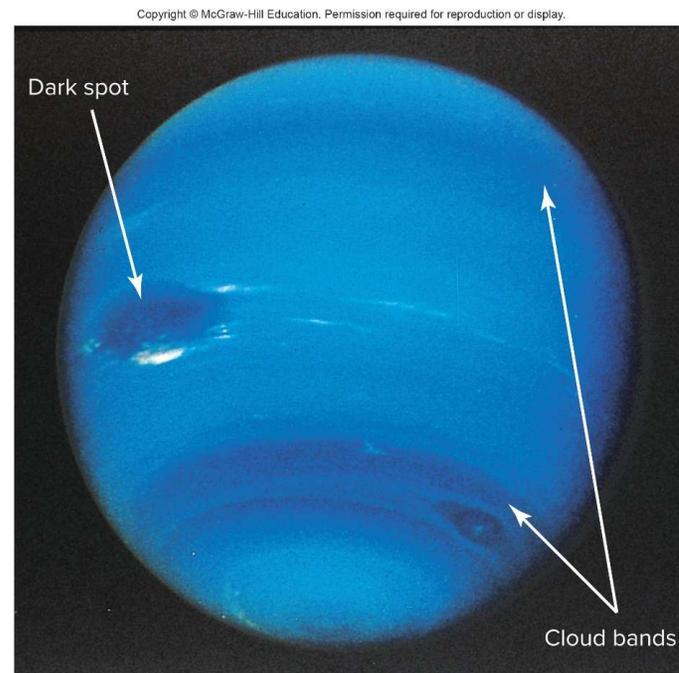
- Neptune's interior is probably similar to Uranus's – mostly ordinary water surrounded by a thin atmosphere rich in hydrogen and its compounds and probably has a rock/iron core.

Neptune's Atmosphere

Neptune's blue, like Uranus, comes from methane in its atmosphere.

Unlike Uranus, Neptune has cloud belts.

- Like Jupiter/Saturn, Neptune radiates more energy than it gains from the Sun.
- The deep interior heat source drives convective currents which then lead, via the Coriolis effect, to the visible atmospheric belts.



Rings of Neptune

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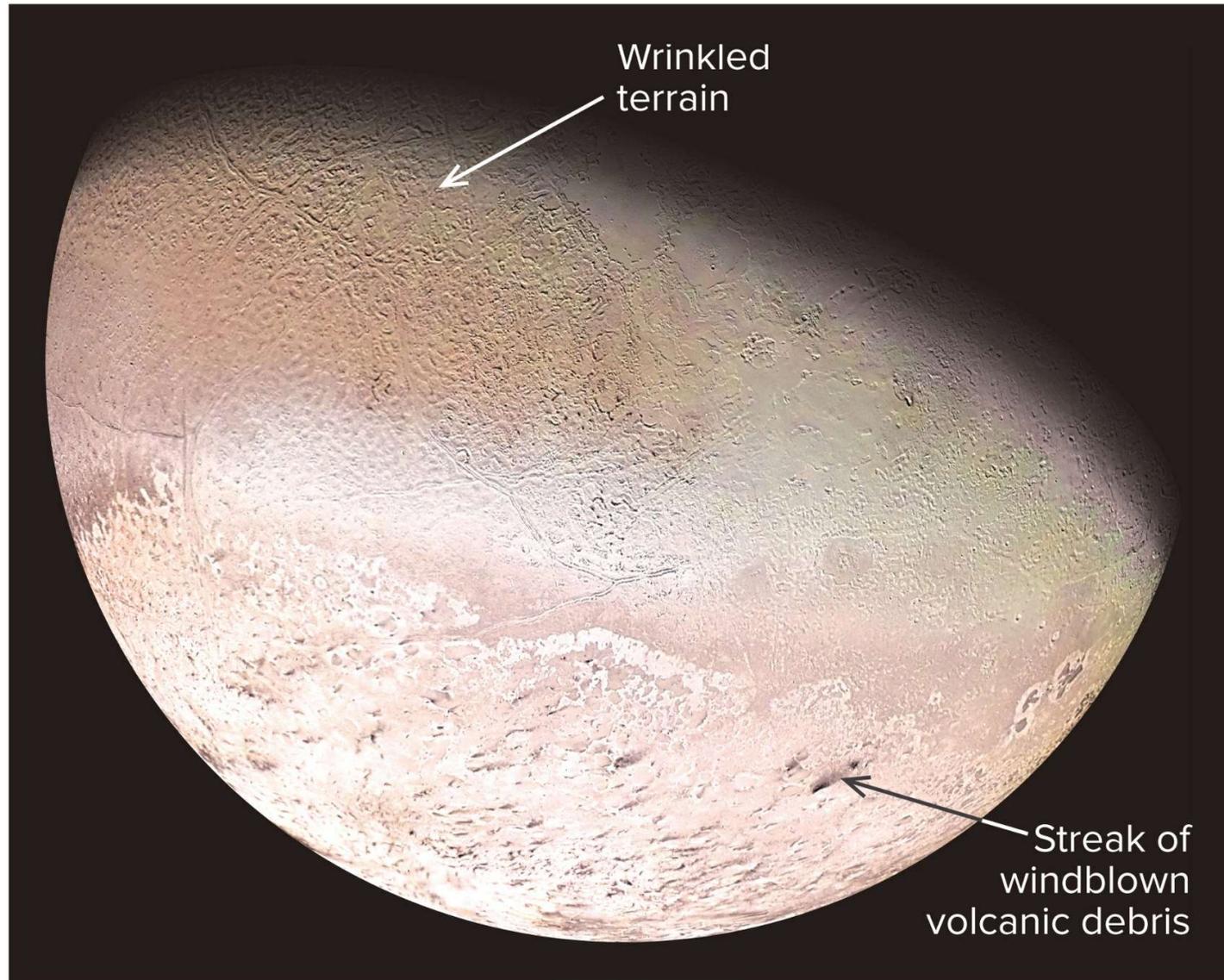


- Neptune, like the other giant planets, has rings.
- They are probably debris from satellites or comets that have broken up.
- They contain more dust than the Saturn/Uranus rings.
- The rings are not distributed uniformly around the ring indicating they are relatively new.

Triton

- Neptune's largest moon
- Triton's orbit is "backwards" and is highly tilted with respect to Neptune's equator
- Triton is perhaps a captured planetesimal from the Kuiper belt.
- Triton is large enough and far enough from the planet to retain an atmosphere.

The Face of Triton



Wednesday / Thursday (Jan 28 & 29)

- Finish and turn in the project (major grade)

Friday (January 30)

- C-day