Aleksander Zujev

Terrestrial and Jovian Planets May 16, 2017

Terrestrial and Jovian Planets

Outline

- Last Time: Inner Planets
- Review Quiz
- Solar System: Overview
- Terrestrial and Jovian Planets: Main Differences
- Terrestrial and Jovian Planets: Main Differences: Why
- Exoplanets
- QUIZ

Last Time: Inner Planets

- Mercury
- Venus
- Earth
- Mars

Review Quiz

- What is Earth's orbit semi-major axis, in AU (astronomical units)?

- Mars' orbital period is 1.88 years. What is its orbit semi-major axis, in AU?

- What are satellites of Mars?

- What are satellites of Earth?

- Which planet has higher albedo, Mars or Venus, and why?

Solar System: Overview

Mercury

Venus

Earth

Mars

Belt

Jupiter

Saturn

Uranus

Neptune

(Pluto)

Picture here

Terrestrial and Jovian Planets: Main Differences

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Distance	0.387	0.72	1	1.52	5.2	9.5	19.2	30.1
T Orb	0.24	0.615	1	1.88	11.86	29.4	84	164.8
T Rotat	58.6	-243	0.997	1.026	0.41	0.44	-0.72	0.67
Radius	0.38	0.95	1	0.53	11.2	9.5	4.0	3.9
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- Larger distance from Sun

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- Larger distance from Sun, Larger orbital period (equivalent)

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- Faster rotation (what follows from it?)

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- Faster rotation, Larger rotational flattening

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- Larger mass

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- Larger mass, Larger radius, Larger surface gravity
- Smaller density, Composition: H, He
- But core has **larger** density
- More moons
- Generally higher albedo. Why Venus is an exception?

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The most important difference:
Inner planets: **Rocks**

Outer planets: **Gas Giants**

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Formation Solar System.

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Formation Solar System.

• Beyond **frost line** - about 3 AU - possible condensation of hydrogen compounds as well as metals and rocks in the outer solar system, making for larger planetesimals.

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• Beyond **frost line** - about 3 AU - possible condensation of H compounds as well as metals and rocks, making larger planetesimals.

• Rotation and Solar winds blew gas into outer solar system , where larger planetesimals captured H and He.

QUIZ

• There is an asteroid belt between Mars and Jupiter. Why there is no planet there instead of the belt?

• Searching for planets orbiting other stars, what is easier to discover - a Terrestrial planet, or Jovian planet, and why?

• A minor planet Pluto has semi-major axis 39.48 AU. What is its orbital period?