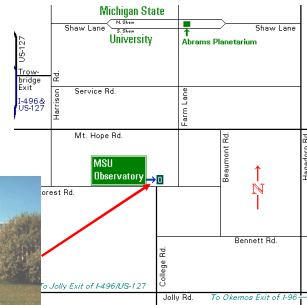
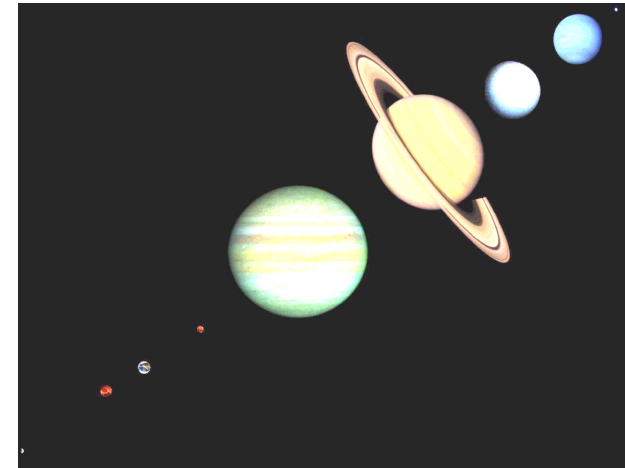


Overview of the Planets—February 4

- New policy on absences
 - You may miss classes for a university sanctioned event if you bring me a letter from your sponsor.
 - You may miss class if you are really sick if you bring me a note from your doctor.
 - If you miss class for either of these two reasons, you will not be penalized for missing clicker questions.
 - Of course you will need to learn the material that you missed.
- Public viewing sessions at MSU campus observatory.
 - Fri & Sat, 9-11pm, if it is not cloudy.
 - Mar 18 & 19
 - Apr 15 & 16
 - May 13 & 14
 - 24-inch telescope in dome
 - small telescopes outside



Overview: The nine planets [6.1]



Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune Pluto

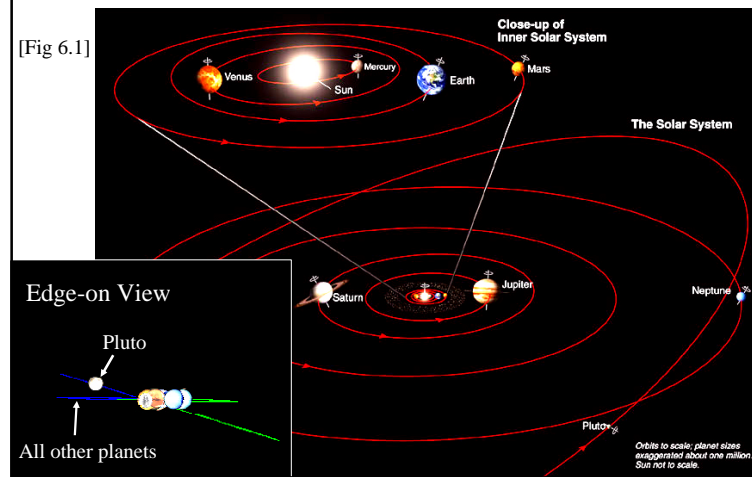
Contents of Solar System

- Sun
- 9 planets
- Moons
- Asteroids
 - rocky mini-planets
 - up to a few 10's of km diameter
 - mostly in orbits between Mars and Jupiter
- Comets
 - icy
 - spend most of time at fringes of Solar System.
- Dust (==> meteorites)

Object	% Total Mass
Sun	99.8
Jupiter	0.1
Comets	0.05
All other planets	0.04
Satellites & rings	0.00005
Asteroids	0.000002
Cosmic dust	0.0000001

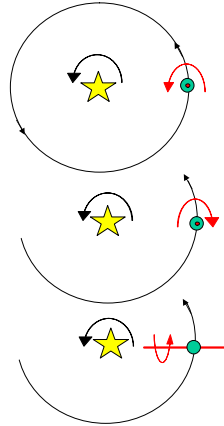
The orbits of the planets

- Planets all go around Sun in same direction



The rotation of the planets

- same sense as orbital motion



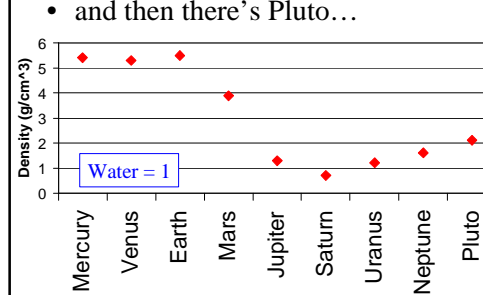
except:

- Venus (retrograde, very slowly)
- Uranus, Pluto (tipped on side)

Two distinct types of planets

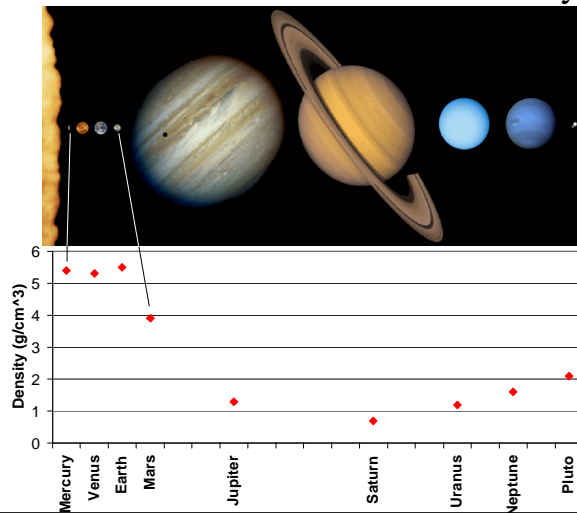
- Terrestrial planets
 - small, rocky, made of **heavy elements**: silicon, oxygen, iron, etc.
- Giant (Jovian) planets
 - large, primarily gas, ice & liquid: **hydrogen & helium**.
- and then there's Pluto...

Same as the Sun



Planet	Density g/cm ³
Mercury	5.4
Venus	5.3
Earth	5.5
Mars	3.9
Jupiter	1.3
Saturn	0.7
Uranus	1.2
Neptune	1.6
Pluto	2.1

Terrestrial vs. Giant - Size & Density



Moons & Rings

Planet	Known Moons*	Rings?
Mercury	0	
Venus	0	
Earth	1	
Mars	2	
Jupiter	63	Yes
Saturn	33	Yes
Uranus	27	Yes
Neptune	13	Yes
Pluto	1	

* Nine Planets web site

Q

1. You plan to land and visit a planet. You cannot land and walk on
 - a. Mercury
 - b. Venus
 - c. Mars
 - d. Jupiter
2. Even if you landed, you would be crushed on (same choices)
3. If you lived on ____, you would be a few years old.
4. If you lived on ____, you celebrate your birth more than once a day.

Planet	Orbit	Rotation	
Mercury	88da	58da	
Venus	225da	243da	
Earth	1yr	1da	
Mars	1.88yr	1da	
Jupiter	11.9yr	9.9hr	