Planets going in same direction, around the same plane (evidence sun and planets formed together from spinning gas and dust cloud, solar nebula to circumstellar disc)
Most planets rotate same direction, same direction that they orbit (direction of revolution about the sun)
Venus rotates on its axis the opposite way  the other planets rotate, they all orbit the same direction
This most likely due to the spinning of the circumstellar disc (angular momentum - spinning cloud flattens into disc as shrinks) (down below see Uranus different probably due to chaotic collisions)
Inner parts of disc hotter then outer
8 major planets w nearly circular orbits, nearly
Pluto and eris much smaller with more elliptical orbits, dwarf planets
Eris and Pluto more tilted, not on the same plane as everything else
Ceres asteroid so big its also a dwarf planet
Terrestrial/Inner planets: 4 planets nearest the sun (Mercury, Mars, Venus, Earth) made mostly of metal and rock
Jovian Planets: Jupiter, Saturn, Uranus, Neptune made of lighter ice, liquids, gases
Jupiter and Saturn heavy, dense core made of metal, rock, ice, but can't see, infer from gravity
Pluto unlike either types
Jovian planets have way more moons, with inner planets like earth having way less (think of how massive jupiter is, it attracts things orbiting around it)
Asteroids: Rocky bodies orbiting the sun like mini planets, most remnants of initial population of solar system (pre planets), most near mars and Jupiter
Some small moons captured asteroids
Comets: Mainly ice, frozen gasses like water, carbon dioxide, carbon monoxide
Dwarf planets all in ice
Cosmic Dust: Broken rock, tons of them, meteors in the sky (shooting stars), meteorite when strikes ground
Mercury most metallic, moon least, Mars earth Venus similar mix
At one time terrestrial planets hot enough to melt, why they formed core
Differentiation is gravity separating layers, heavy metals sink to the core, lighter metals float to surface to form crust
Further from sun means colder, closer = hotter and ice + gas evaporate
Planets covered in impact craters, can tell this from Jupiter's clouds and dust to
Geological activity, volcanoes, due to hot interior
Moon and mercury are dead, again earth, Mars Venus similar
Age of a planets surface, generally more craters = older
Far side of moon that doesn’t face the Earth has more craters, why is this?
Can tell age through radioactive half life (decay) in rocks, natural radioactivity, from samples, can learn the length of radioactive decay, how we tell how old earth is (around 4.5 billion years)
Rock samples valuable
Half life = time for half the nuclei in a substance to decay
Something decaying from one thing to another (where we get half from), measuring 1 isotope in comparison to another to figure out how old something is

Solar system around 4.6 billion years old
Again, shared origin, planets formed together, at the same time
Origins of Solar System
Hundreds of planets found orbiting other stars fairly recently
Nebular Theory: evidence sun and planets formed together from gas and dust cloud, solar nebula
Gas clouds collapsing, big gas clouds collapse into numerous stars, get star clusters
Star nurseries/nebulas
New star born a year
Can watch how other planets form from other solar nebulas and use that to tell how our solar system formed
Galactic recycling, Stars form, blows up fueling more stars
Gravity trying to collapse gas cloud in on itself
Rotation increased, increase of angular momentum, as cloud collapses (contraction), as cloud collapsing, spins more, flattens to disc shape (aka circumstellar disc)
Angular momentum related to how fast something spinning
Galaxies like discs
Conservation of energy, gravity causing contraction, hot, inner hotter then outer
Rock can be solid much higher temp then ice, so we see rock in hot area, gas and ice in outer solar system
Terrestrial planets forming in hotter place then Jovian planets
Frost line, within frost line to hot to form ices
Frozen hydrogen compounds = ice
From disc, compounds all together, though as everything heats up in the increased spin, rocks stay solid within frost line, outside they condense, but certain gases solidify
Planetesimals are the small objects forming from gas and dust in nebulas/discs as they cool, the precursor to planets.
Think tasty planet dino time, they start coming together, getting more massive, eventually get Jupiter or Saturn pulling in all this hydrogen and helium
Jupiter so big spinning discs were forming around it
Heavy Bombardment: Formation of the solar system was violent with planetesimals crashing into each other to form planets, sometimes disrupting planets, a complex and random process.
Impacts + collisions potentially reason for outlying weird spins of Uranus and Pluto
These collisions causing moon craters?
Big planets like Jupiter and Saturn's mass kicked comets out, but smaller planets got hit, like earth (theory earth got water from comets hitting Earth)
Comets + asteroids remnants of planetesimals, all the planetesimals that never got there act together
Asteroids inside frost line (rocks+metals), comets outside frost line (mostly ice, bit of rock and metal)
Many planets captured moons, not formed with planet
Giant Impact Theory: Collisions hit earth, stripping crust, crust formed moon - tested theory by analyzing moon rocks, looks like they came from Earth