If you grow up to be an astronomers and want to study these objects, which form of light (EM energy) might you choose, and why?

Almost every one of these objects can be studied in any part of the electromagnetic spectrum! What we give here are examples of the most commonly used portions for the various objects.

Our Sun

You can learn about the Sun in any range of the EM spectrum. Use visible light to better understand its composition, movement, temperature, magnetic fields, evolution of sunspots, interior, and solar cycles. Ultraviolet images show the dramatic solar activity in the corona, as well as causing sunburn and cell damage to life on Earth. Solar flares produce x-rays, which can damage satellites, affect astronauts, and interfere with communication on Earth. The Sun also influences Earth's ionosphere, which both enables and impedes radio wave propagation. Infrared energy from the Sun is the heat that warms our planet. Coronal mass ejections generate microwaves that can be measured to study magnetic fields in the corona.
http://www.windows2universe.org/sun/spectrum/multispectral_sun_overview.html

Would you like to study the effect of the Sun on the Earth's ionosphere yourself, using radio waves? You can get a SID Space Weather Monitor instrument to set up at your home or school:
http://sid.stanford.edu

Jupiter

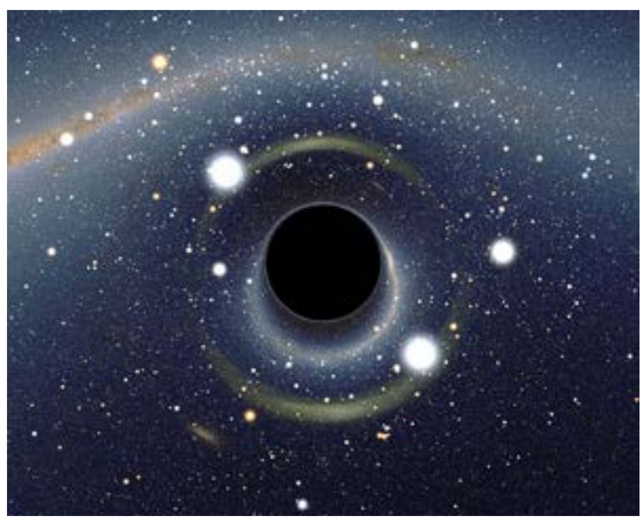
Humans from Galileo on, and several NASA missions, have been using visible light to examine Jupiter's surface features, composition, storms, moons, magnetic fields, orbit, and more. Radio telescopes add to this by examining its rotation rate, the electrons and electromagnetic radiation accelerated in its magnetic fields, and thermal radiation produced by heat in its atmosphere. NASA missions have used almost every wavelength to explore the Jupiter system! Which would you choose?

http://en.wikipedia.org/wiki/Exploration_of_Jupiter

http://solarsystem.nasa.gov/planets/profile.cfm?Object=Jupiter

Black Hole

Stellar-mass black holes are born with a bang. They form when a very massive star (at least 25 times heavier than our Sun) runs out of nuclear fuel. The star then explodes as a supernova. What remains is a black hole, usually only a few times heavier than our Sun since the explosion has blown much of the stellar material away. Supermassive black holes are even heavier that stellar-mass ones and live in the centers of galaxies. Scientists aren't sure how these supermassive ones formed, but one possibility is that supernova explosions of massive stars in the early universe formed stellar-mass black holes that, over billions of years, merged and grew supermassive. Though you cannot see a black hole directly, you can visibly observe the accretion disks around black holes that have stellar companions. Gamma rays are produced in jets powered by supermassive black holes. If you want to study the explosions that produced these monsters, consider using x-rays and gamma rays.



http://science.nasa.gov/astrophysics/focus-areas/black-holes/

http://www.theregister.co.uk/2014/06/26/trio_of_supermassive_black_holes_found/

Want to help search for black holes, now? http://radio.galaxyzoo.org/

Venus

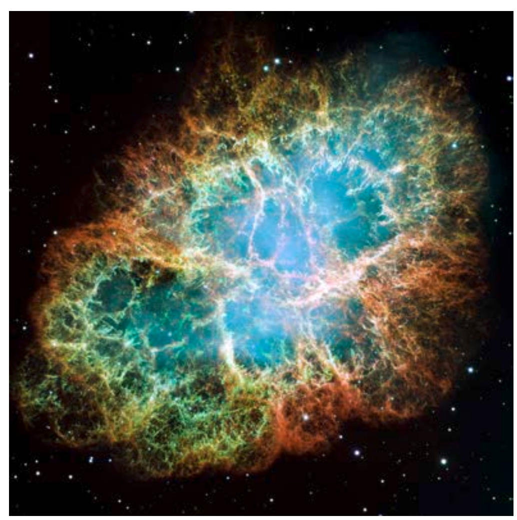
Because of Venus's thick cloud cover, radar (i.e. microwaves) is used to map its surface. The atmosphere of Venus is much denser and hotter than that of Earth and ben be seen in ultraviolet light as well as visible. You can easily observe Venus in visible light both with your naked eye and with a telescope.

http://www.space.com/44-venus-second-planet-from-the-sun-brightest-planet-in-solar-system.html

Center of our Galaxy

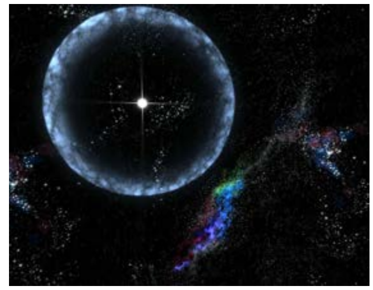
Because of interstellar dust along the line of sight, the galactic center cannot be studied in visible, ultraviolet, or soft (lowest energy) x-ray wavelengths. The available information about the galactic center comes from observations in gamma rays, hard (highest-energy) x-rays, infrared, and radio wavelengths.
http://en.wikipedia.org/wiki/Galactic_Center

Supernova



These immense stellar explosions can briefly outshine their entire galaxy, radiating as much energy as the Sun is expected to emit over its entire life span. Although we are used to thinking of supernovas primarily as luminous visible events, the EM radiation they produce is almost a minor side effect of the explosion, a tiny fraction of the total event energy. A supernova is most often studied in visible, UV, and x-ray light. Supernova remnants, the gas and dust they expel, are studied in radio waves.
http://imagine.gsfc.nasa.gov/docs/science/know_l2/supernovae.html

Neutron Stars & Pulsars

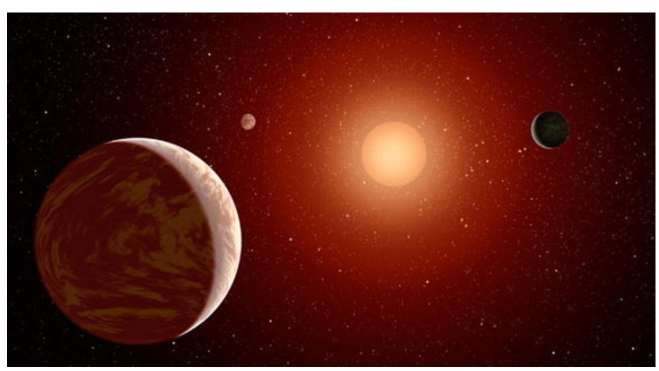


Neutron stars are the remnant cores of stars that dramatically collapsed as supernovas. Some neutron stars rotate very rapidly and emit beams of electromagnetic radiation as pulsars. Gamma-ray bursts may be produced from this rapid rotation, high mass stars that have collapsed to form neutron stars, or from the merger of binary neutron stars. Neutron stars also produce radio and x-rays.
http://imagine.gsfc.nasa.gov/docs/science/know_l1/pulsars.html

Quasar

A quasar (**quas**i-stell**ar** radio source) is a compact region in the center in the center of a massive galaxy, and surrounds its central supermassive black hole. These exotic objects can be studied in radio, infrared, visible, UV, x-ray, and gamma rays.

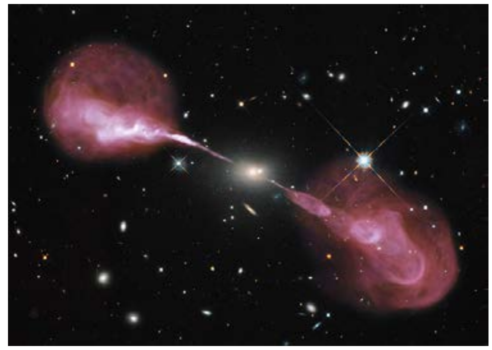
http://www.universetoday.com/73222/what-is-a-quasar/
http://www.phys.vt.edu/~jhs/faq/quasars.html



Red Dwarf

Red dwarfs are small stars making up perhaps 2/3rd of all the stars in the galaxy. Most of the energy them emit is in the infrared range. They are visible, but are very small and hard to find in telescopes. They emit almost no UV light.
http://www.kidsastronomy.com/stars/red_dwarf_star.html

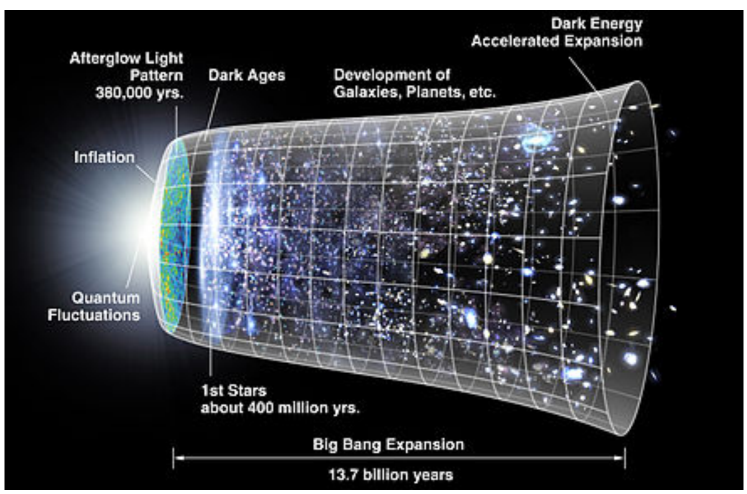
Radio Galaxy



Radio galaxies and their exotic relatives, radio-loud quasars and blazars, are types of active galaxies (i.e. those with very luminous cores) that are especially bright at radio wavelengths. The radio emission is due to charged particles that have been rapidly accelerated at the galaxy's core, usually because of a black hole. Radio galaxy emissions have been observed in the radio, microwave, infrared, visible, UV, x-ray, and gamma ray wavelengths.
http://en.wikipedia.org/wiki/Radio_galaxy

Beginnings and nature of our universe

The universe can be effectively studied in any wavelength you want! Scientists use microwaves to look for the cosmic microwave background radiation left over from the Big Bang. NASA's Fermi mission uses gamma rays to study gigantic explosions such as supernovas, colliding stars, jets powered by black holes, and collapsing stars. NASA's new James Web Space Telescope will be using infrared to study the earliest stars in our universe, how galaxies evolved, the most distant stars, and planetary systems and the origins of life.
http://en.wikipedia.org/wiki/Chronology_of_the_universe
http://fermi.gsfc.nasa.gov/
http://www.jwst.nasa.gov/



What would **you** like to study!