Fun Facts:

**M27: DUMBBELL NEBULA**

Computer Code: M27

* **Other Names:**
  + Apple Core Nebula
  + NGC 6853
* **Basics:**
  + Description: Planetary Nebula in Vulpecula
    - Planetary Nebula are the remains of a sun-like star that has used all of its hydrogen gas (fuel). The Sun will become an object like this in 5 to 6 billion years. The glowing gases were once thought to be planets in the process of forming, hence the name “planetary nebula”.
  + Visual Magnitude: +7.4 (not visible to naked eye but can supposedly be seen in binoculars)
    - Brightest planetary nebula
  + Apparent Size: 80 x 5.7 arcminutes
  + Distance: 1,700 light years away…although estimates are all over the place for this one
    - It’s suspected the light we’re seeing now left M27 around 300 AD.
    - This is what was happening on Earth around 300 AD:
      * Persecution of Christianity ended when Constantine the Great legalized.
      * Bible was translated into Latin by Jerome.
      * Stirrups were invented in China
  + Diameter: between 1.5 and 4 light years across (estimating this one is tough)
* **History:**
  + This is the first planetary nebula ever discovered. Charles Messier found it in 1764 and described it as an oval nebula without stars.
  + The name “dumbbell” came from William Herschel’s son, John, who compared it to a “double-headed shot.”
* **Other Notes:**
  + The central star, a white dwarf, is a very faint magnitude 13.5, barely visible even with large telescopes, and surrounded by a slightly darker area. It is about 1/3 the luminosity of our Sun, contains about 60% of the Sun’s mass, and is about 5% of the Sun’s diameter. It is one of the largest white dwarf stars known and has a surface temperature of >150,000⁰ F, about 14 times hotter than our Sun.
  + This central star has an even fainter yellow companion star (mag 17).
  + The nebula is likely cylindrical. If you looked at it down one of the ends, it would probably appear circular like the Ring Nebula.
  + The inner region appears to have knots. The brighter heads are due to photoionization fronts. The darker areas are emitting mostly UV radiation, not visible light.
  + Planetary nebulae are formed by medium or low-mass stars (like our Sun). When they exhaust their hydrogen supply, they become red giant stars. Their internal nature then becomes unstable and causes their outer atmospheres to be expelled in energetic pulses. The escaping gasses form the nebula, leaving behind a super hot white dwarf star that illuminates the gaseous cloud with UV radiation. For the Dumbbell Nebula, this happened between 3,000 and 15,000 years ago.
  + It is expanding at 20 miles/sec.