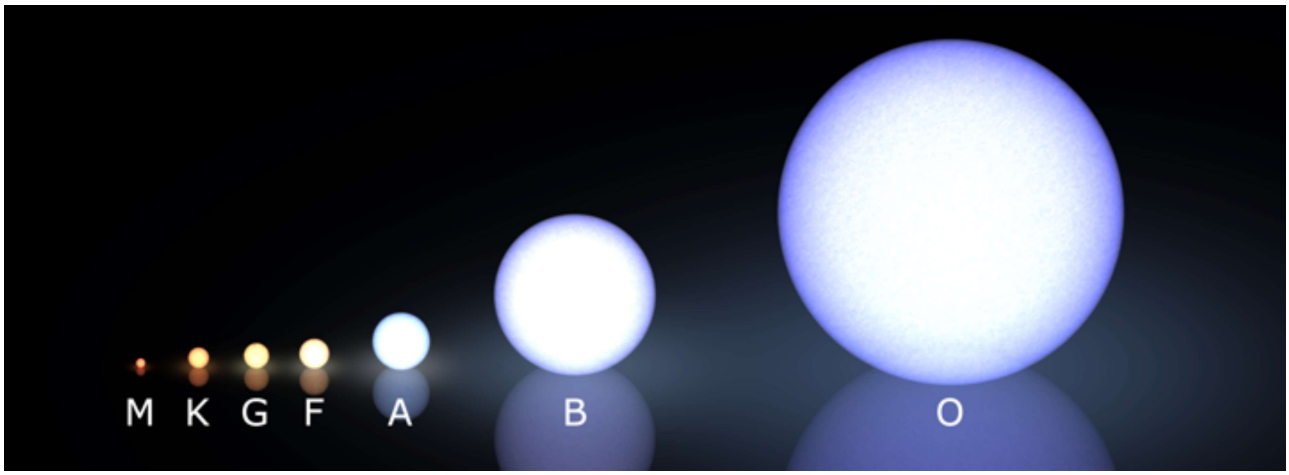
A Quick Guide to Stellar Classification



O Class

About: Largest, brightest, hottest, and most rare stars. They consume fuel very quickly, and don't live for more than about 10 million years. The bigger they are, the less long they live.

Mass: Greater than fifteen times the mass of the Sun.

Temperature: Greater than six times hotter than the Sun.

Color: Blue

How they die: These stars expand to become supergiant stars after they consume most of their fuel. Eventually, they supernova (explode).

A Class

About: These stars live between about 1 billion and 10 billion years.

Mass: Between about 1.5 and two times the mass of the Sun

Temperature: Between about 1.5 and two times the temperature of the Sun

Color: bluish white

How they die: These stars become a red giant. The outer layers of the star expand before they blow off into space leaving a white dwarf star behind.

B Class

About: These stars are similar to O stars, however there are more B class stars than O class stars. They live between 10 to 900 million years. The bigger they are, the less long they live.

Mass: Between about two and fifteen times the mass of the Sun

Temperature: Between about two to six times hotter than the Sun

Color: Bluish or blue-white

How they die: If they are greater than eight times the mass of the Sun, they die like O class stars. If they are less than eight times the mass of the Sun, they still become a supergiant star, but instead of exploding, the outer layers of the star blow off into space and leave a white dwarf star behind. A white dwarf star is like a glowing piece of coal.

F Class

About: These stars live around 10 billion years.

Mass: Between about one and 1.5 times the mass of the Sun

Temperature: Between about one and 1.5 times the temperature of the Sun

Color: yellowish white

How they die: Similarly to A Class stars.

G Class

About: These stars live around 10 billion years. The Sun is a G class star.

Mass: Around the mass of the Sun.

Temperature: Around the temperature of the Sun.

Color: Yellowish white/ white

How they die: Similarly to A Class stars.

K Class

About: These stars live from 15 billion to around 30 billion years

Mass: About 0.5 to 0.8 times the mass of the Sun (smaller than the Sun)

Temperature: Around 0.6 to 0.9 times the temperature of the Sun (cooler than the Sun)

Color: Reddish white/orange

How they die: Similarly to A class stars.

M Class

About: 70% of all stars in the Milky Way are M class. They live from 30 billion to possibly trillions of years.

Mass: From about 0.1 to 0.5 times the mass of the Sun (much smaller than the Sun)

Temperature: Less than 0.6 times the temperature of the Sun

Color: Reddish

How they die: Similarly to A class stars.

G, K, and M class stars and the search for planets

We haven't found life anywhere but Earth—but the Kepler Mission is looking for planets similar to Earth orbiting stars like the Sun (G, K, and M class). Kepler's seeking planets in the habitable zone, an area around stars where liquid water could exist, also called the Goldilocks zone (not too hot, not too cold, but just right). Life on Earth requires liquid water and is in the Goldilocks zone around our G class star, the Sun! A planet in the Goldilocks zone doesn't necessarily have water or life, but the possibility exists.

G, K and M class stars live a long time, and life takes a long time to evolve. The oldest fossil on Earth is 3.8 billion years old. It's a fossil of bacteria that was living 700 million years after Earth formed. That means it took 700 million years to form the bacteria! On a planet orbiting a B Class star that only lives 900 million years, would life have time to evolve before the star dies?

G, K, and M stars have storms like flares, which produce X rays, and Coronal Mass Ejections (CMEs), explosions of material. M class stars have the most storms, and some flare so frequently, they are called "flare stars." Earth's atmosphere protects us from flares and our magnetic field shields us from CMEs. Kepler can't tell anything about the atmosphere or magnetic field of a planet, but a planet would need to both to be habitable.

As of 2015, Kepler has found over 2,000 planets orbiting stars, but only 12 are similar in size to Earth in the Goldilocks zone. The Kepler team is looking at the data to confirm nearly 5,000 more planet candidates, so these numbers can only go up!