

Activity #6:

1. What do you think is the probability that “intelligent” life that can communicate over interstellar space occurs for an Earth-like planet around a Sun-like star? This involves these three factors and multiplying them together gives the probability, where I have given the estimated range for each factor. Give a brief explanation why you picked each value.

fraction of planets where life arises 0.001 – 0.1

fraction of life that develops intelligence 0.0001 - 0.5

fraction of intelligent life that communicates by radio 0.0001- 0.9

2. The last factor is how long will the “intelligent” civilization exist? The estimates for this are from 100 years to 250,000 years. What is your guess? And of the various causes I list on slide 17 (volcano, meteor, plague/virus, environmental, war where environmental/war are both “human stupidity”), which do you think will end civilization as we know it? Why did you pick that cause?

3. This uses Stellarium to explore different types of nebula. Start up Stellarium at a time of early morning (like 3:00 AM) in late-October. Turn on the 2 constellation buttons at the bottom (constellation lines, labels) and the deep space objects button 9. You should now see red ellipses (galaxies), green squares (area with mostly emission nebulas), and yellow circles (star cluster). Point to the South and find the Orion constellation. Just north (above) Betelgeuse you should see the 37 Cluster. Left click on it and write down the name (37 Cluster NGC 2169), the type (open star cluster), and Magnitude (5.9). Recall that with the magnitude scale, the lower the number the brighter the object. You can turn off the info by right clicking your mouse. Move to the constellation Taurus (to the right, or west, of Polaris and just below Perseus). Click on the green box of the Pleiades and write down the name, the type, the Magnitude, the distance, and a summary of the description at the bottom. Continue moving to the right and down slightly until you find the Andromeda constellation. You should see 3 red ellipses and one is the Andromeda galaxy. Write down the name, type, magnitude, and distance. Pick on your own 7 more “deep space objects”. Make a table with all 10 DSOs listing the type and magnitude, and distance if it is given.

- Which nebula is the brightest in the sky (has the lowest Magnitude)? Which, of those where distance is given, is the furthest away? Note that the Andromeda Galaxy is the most distant object you can see with the unaided eye.