

In-class activity 28

This assignment is worth a maximum of 3.0 *extra-credit* points, and is due in class today. No in-class assignment is accepted after the end of class.

Work cooperatively and collaboratively as a team on this in-class assignment. Each person in your group will be awarded the same points as the entire assignment. *Turn in this sheet at the end of class, and attach another page if necessary.*

Assemble Your Group

1. [0.5 points.] Find your assigned group members, and sign in below.

Team member: _____

Team member: _____

Team member: _____

Team member: _____

*Star Evolution and Lookback Time**

2. [1.5 points.] (Cf. *Lecture-Tutorials for Introductory Astronomy*, pages 89-90 for additional practice.) Consider the four stars listed below by spectral type, that had all become main sequence stars at exactly the *same time* 10 billion years ago. However, these stars all have different masses (and thus evolve differently at different rates), and are located at different distances away from the Sun.

Star (spectral type)	Mass	Time from start of main sequence life to end stage	Distance from Sun [light years]
O	$60M_{Sun}$	500,000 years (Massive m.s. → type II s.n./black hole)	10 billion ly (in distant galaxy)
B	$18M_{Sun}$	10 million years (Massive m.s. → type II s.n./neutron star)	5,000 ly (in Milky Way)
F	$1.7M_{Sun}$	3 billion years (Medium-mass m.s. → planetary nebula/white dwarf)	50 ly (in our spiral arm)
G	$1.1M_{Sun}$	8 billion years (Medium-mass m.s. → white dwarf/type Ia s.n.) (Due to mass transfer in a close-pair binary system)	5 million ly (in nearby galaxy)

* Adapted from "Astronomy Ranking Task: Star Evolution & Lookback Time," Conceptual Astronomy and Physics Education Research (CAPER) Team, University of Arizona (Center for Astronomy Education, <http://astronomy101.jpl.nasa.gov/>).

