



The Nearest and Brightest Stars

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Introduction:

From a dark site we can see thousands of stars in the night sky, as well as one star, the Sun, during the day. However, the stars that we see are not representative of our celestial neighborhood. Most of our neighbors are too faint to be seen without the aid of a telescope. Some of them are so faint that it requires a telescope in space or special equipment to see them. Also, many of the stars that we do see are actually double and even multiple stars that need a telescope to separate them or are even too close for most telescopes to separate the two stars

Making Models:

In this representation of the nearest and brightest stars, we use marbles to approximate the colors of the stars. Unfortunately, it is sometimes difficult to get marble colors that are close to actual star colors—a limitation to this model. All of the marbles are the same size, while the actual stars range in size from sub-brown dwarfs (free-floating planets?) with masses a few times that of Jupiter and about the same size as Jupiter, to giants with masses 10 to 30 times the mass of the Sun and diameters over a thousand times that of the Sun. While we can approximate the colors of the stars, we clearly cannot model their sizes simultaneously!

Materials:

For our model, we use 1-inch (25 mm) marbles and two clear plastic containers to hold them. In addition, we use a plastic display tray to hold and to display the marbles with their representative star colors (see Figures 1 and 2). The total that you order for each color will depend on how the objects you use are packed (5s, dozens, etc.). We obtained marbles from: <http://www.rainbowturtle.com/> and <https://www.moonmarble.com/> You can use smaller marbles or other spheres or pony beads that can represent the range of star colors. Table 1 includes the marbles that we used.

Table 1: Colors and Numbers Needed

Color	Marble	Number	Color	Marble	Number
Blue	Crystal Dark Blue	6	Orange	Orange	47
Light Blue	Crystal Light Blue	51	Red	Opal/Solid Red	106
White	Opal/Solid White	36	Red-Brown	Crystal Quartz/Peach	2
Yellow-White	Lemon Yellow	14	Brown	Bald Eagle	14
Yellow	Opal/Solid Yellow	21	Dark Brown	Crystal Amber	3

Displaying the Stars:

There are several ways that one can display the nearest and bright stars.

Lists of Stars: Table 3 (at the end of the activity) lists the 150 nearest stars. The stars are listed in order of their distances from the Earth. Obviously, the closest one is the Sun. Table 3 contains 107 star systems (including the Sun), with a total of 150 individual stars. There are a number of multiple star systems represented. Nineteen of the stars are known as of the beginning of 2018 to have planetary systems in orbit around them. There may be five other stars with planets, but these are yet to be confirmed. We have listed their names, visual magnitudes, ***absolute magnitudes***, ***luminosities*** relative to the Sun, distances in ***light-years***, temperatures, diameters, ***spectral types***, and number of planets (if they have any). Terms in bold italics are defined at the end of this activity. Table 4 (at the end of the activity) has the 149 brightest stars as we see them (visual magnitude) in the night sky. With the closest star, the Sun, this makes 150 stars. The columns are similar to those for Table 3. There are six stars common to both lists and these are shown in bold type. Seven of these stars, including the Sun, have known planetary systems. There is one other star with a possible planet, but this has yet to be confirmed.

Stars grouped by spectral type: One can also group the stars by their spectral types (Table 2). In this case, it becomes clearer that there is a difference between the nearest and brightest stars: most nearby stars are faint and cool while the brightest stars are generally brighter and hotter. It is clear that the *Nearest Stars* are dominated by the cooler (and smaller) stars while the *Brightest Stars* are dominated by hotter (larger) stars. Figure 1 shows this trend as represented by the marbles. Figure 2 gives the key to the marble representation of the star colors, temperatures, and classifications. Figures 3 and 4 represent this as a graph using marbles and Figure 5 shows this as a traditional graph. Figure 6 is the same as Figure 1, except for the use of pony beads. While not quite as visual, the cost of pony beads is about \$10 while the marbles cost over \$100. **Note:** star temperatures do not always exactly match spectral type as there are uncertainties in both, especially for faint objects.

Table 2: Stars Listed by Spectral Type

Spectral Type	Approximate Temperature Range	Color	Number Nearest Stars	Number Brightest Stars
O	>30,000K	Blue	0	6
B	10,000K-30,000K	Blue-White	3	48
A	7,500K-10,000K	White	4	32
F	6,000-7,500K	Yellow-White	2	12
G	5,200K-6,000K	Yellow	7	14
K	3,700K-5,200K	Orange	18	29
M	2,400K-3,700K	Red	97	9
L	1,300K-2,400K	Red-Brown	2	
T	500K-1,300K	Brown	14	
Y	<500K	Dark Brown	3	

O >30,000 K blue	K 3,700-5,200 K orange
B 10,000-30,000 K blue white	M 2,400-3,700 K red
A 7,500-10,000 K white	L 1,300-2,400 K red brown
F 6,000-7,500 K yellow white	T 500-1,300 K brown
G 5,200-6,000 K yellow	Y <500 K dark brown

Figures 1 to 4: The Nearest Stars and the Brightest Stars, Represented by Marbles



Fig. 1: The jar on the left represents the nearest stars and the jar on the right the brightest stars.



Fig. 2: Marble color coding

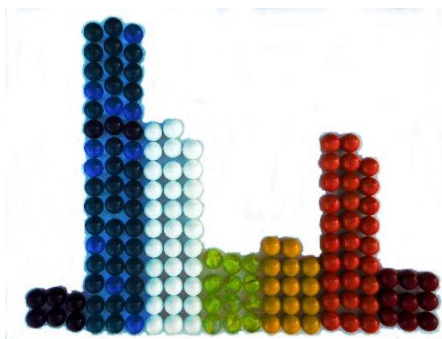


Fig. 3: Nearest stars

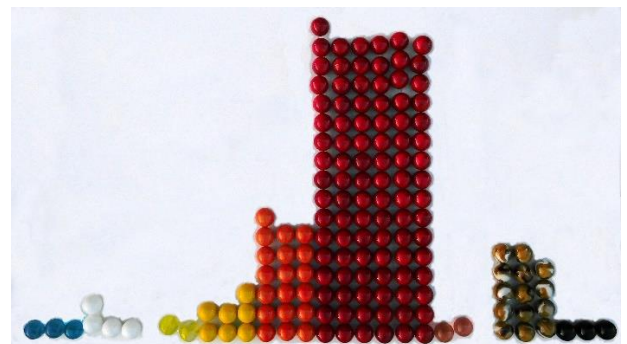


Fig. 4: Brightest Stars

Figure 5

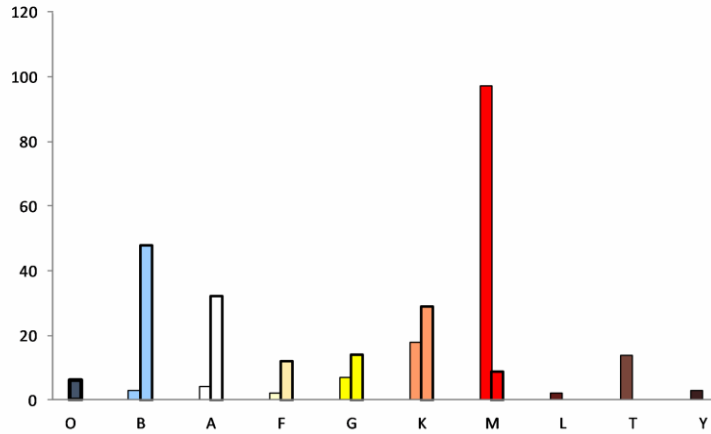


Fig. 5: Number of stars in each spectral/color range

Figure 6



Fig. 6: The Container on the left represents the nearest stars and the container on the right the brightest stars. This is the same as Figure 1, except with pony beads.

Creating an H-R Diagram: One can also plot the luminosity of the stars (relative to the Sun) on the Y-axis and the temperature on the X-axis. This creates a **Hertzsprung-Russell diagram (H-R diagram)**. Only a few of the nearest stars are more luminous than the Sun and only a few are hotter than the Sun. This is shown in Figures 7 and 8, coded by color. What is most striking about the H-R diagrams is how the other stars compare with our Sun. Many of us are taught that the Sun is a “typical” or “average” star. As can be seen in Figures 7 and 8, the Sun is not typical of either the brightest stars or the nearest stars!

Figures 7 and 8

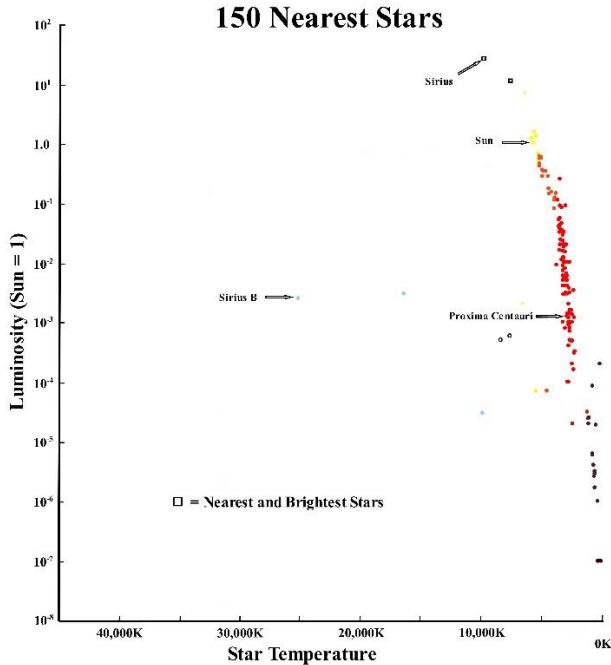


Fig. 7: H-R diagram for nearest stars.

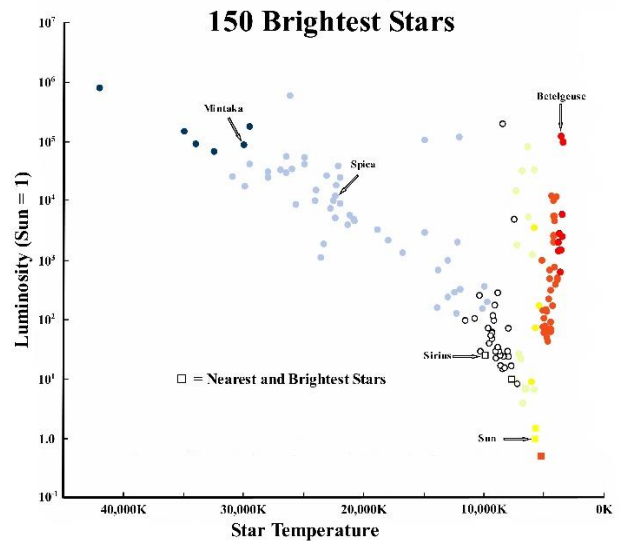


Fig. 8: H-R diagram for brightest stars.

Do not judge a star by its color:

If you carefully look at the stars in Tables 3 and 4, you will note that the classifications and the colors/temperatures of the stars do not match perfectly. Temperatures may be uncertain by a few hundred degrees and spectral classifications are based on spectral lines, not the colors of the stars.

You can also see that, for example, a red or blue star in the Nearest list is much fainter than a red or blue star in the Brightest list. In the Nearest list, we find very small and faint red dwarf stars, stars that may only be 10% or 15% of the diameter (and mass) of the Sun, while, in the Brightest list, we find stars such as Betelgeuse, which are near the end of their lives and have evolved into red giants or supergiants. In contrast, the Brightest blue stars are many times more massive than the Sun, while the blue stars in the Nearest list have evolved beyond the red giant stage, no longer support nuclear reactions, and are now cooling off.

In Figures 9 to 11, we illustrate the size difference among some of the stars that we might be familiar with. In Figure 9 are Mintaka (O-star, about 16.5), Spica (B-star), Sirius (A-star), the Sun (G-star), and Proxima Centauri (M-star). In Figure 10 we have shrunk the scale down to show Betelgeuse (M-star, supergiant) and Mintaka! In Figure 11 are the Sun and Sirius B (“white” dwarf). There are several things to note here: 1. Betelgeuse is about 1,000 times the diameter of the Sun but is about 12 times the mass of the Sun. 2. At the other extreme, Sirius B (which was once a B-star and then a red giant) is about the diameter of the Earth with a mass about the same as the Sun!

Figures 9 to 11: Relative Star Sizes



Fig. 9: Right to left—Mintaka, Spica, Sirius, Sun, and Proxima Centauri

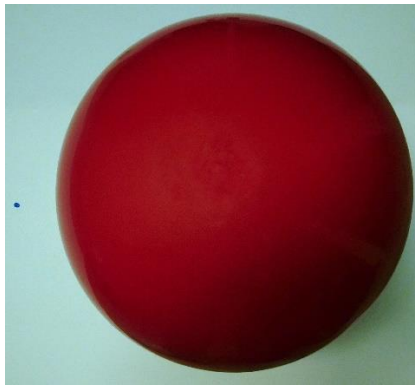


Fig. 10: Right to left—Betelgeuse and Mintaka



Fig. 11: Right to left—the Sun and Sirius B

Terminology:

Light-year: A light-year is the distance light travels in one year, 9.46×10^{12} kilometers.

Arcsecond: An arcsecond is an angular measurement equal to 1/60 of an arcminute and 1/3600 of a degree. Since the Moon is about one-half of a degree (30 arcminutes), an arcsecond is 1/1800 the width of the Moon.

Parsec: A parsec (parallax-second) is a unit of distance equal to 3.26 light-years. From 3.26 light-years away, the Earth would have a maximum separation of 1 arcsecond from the Sun. As viewed from the Earth, a star 3.26 light-years away would appear to move back and forth by 1 arcsecond (each way) relative to distant stars because of the motion of the Earth in its orbit around the Sun.

Luminosity: In astronomy, the total amount of energy emitted by a star, galaxy, etc. For stars, the luminosity is usually given relative to the Sun (Sun = 1).

Absolute Magnitude: In order to compare the relative magnitudes (brightnesses) of stars, astronomers use the term absolute magnitude: how bright a star would look from a distance of 10 parsecs (32.6 light-years). Magnitudes and absolute magnitudes are usually given at visual wavelengths.

Spectral Type: A good explanation of the currently used spectral classification system is given at: http://en.wikipedia.org/wiki/Stellar_classification. Briefly, stars are classified by their temperature (hottest to coldest): O, B, A, F, G, K, M, L, T, Y, a number (0 to 9, hotter to cooler) that further subdivides the temperature, and a Roman numeral that subdivides the stars into hypergiants, supergiants, *main sequence*, etc. and the several classes of dwarfs. Technically, all main-sequence stars, including the Sun, are dwarfs!

Hertzsprung–Russell diagram: The Hertzsprung–Russell diagram (H-R diagram) is a graph of stars showing the relationship between their luminosities and their temperatures (spectral types). A little caution is needed here. You may see variations on the way the H-R diagram is plotted. The Y-axis may be plotted as luminosity relative to the Sun or as absolute magnitude. The X-axis may be plotted as spectral type or temperature (with color tossed in).

Main Sequence: The band of stars on the H-R diagram where stars reside as they fuse hydrogen to helium. Once they exhaust the hydrogen in their cores, stars will evolve off the Main Sequence and become red giants or supergiants. Stars up to about 8 times the mass of the Sun will collapse and become “white dwarfs” once fusion ceases. Larger stars will become supernovas and become neutron stars or black holes.

Figures 12 and 13: Two Representations of the Hertzsprung-Russell Diagram

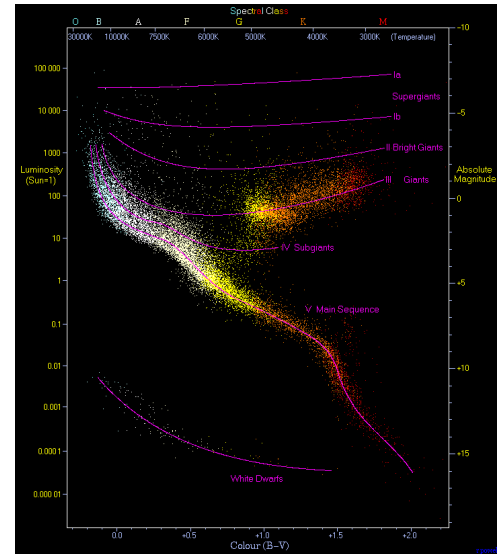
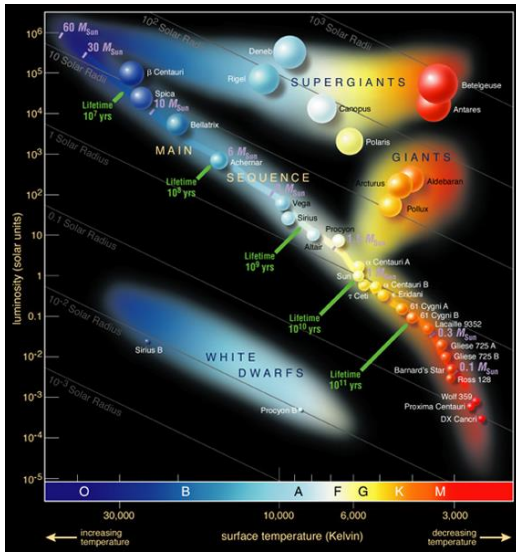


Fig. 9: An example of an H-R diagram showing some of the stars in the Tables 3 and 4. By ESO - <https://www.eso.org/public/images/eso0728c/>, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=19915788>

Fig. 9: By Richard Powell - The Hertzsprung Russell Diagram, CC BY-SA 2.5, <https://commons.wikimedia.org/w/index.php?curid=1736396>

Table 3: 150 Nearest Stars, Including the Sun (107 Star Systems)¹

#	Star System	Star Name	Star #	Vmag	Abs Mag (visual)	Lum. Sun = 1	Dist. (ly)	Temp (K)	Diameter Sun = 1	Spectral Type	Planet?
1	Solar System	Sun	1	-26.8	4.85	1	0.00002	5780	1.00	G2V	8
2	Rigel Kentarus (Alpha Centauri)	Proxima Centauri	2	11.09	15.53	0.00125	4.24	3040	0.15	M5.5V	1
		Alpha Centauri A	3	-0.01	4.38	1.52	4.355	5790	0.22	G2V	
		Alpha Centauri B	3	1.34	5.71	0.56		5260	0.26	K1V	1?
3	Barnard's Star		5	9.53	13.22	0.0031	5.963	3130	0.20	M4.0	
4	Luhman	Luhman 16A	6	10.7 J		0.000022	6.52	1350	0.1	L7.5	
		Luhman 16B	6			0.000021		1210	0.1	T1	
4	WISE 0855-0714		8	25 J		0.0000001	7.2	250	0.1	Y2	
6	Wolf 359 (CN Leonis)		9	13.44	16.55	0.00093	7.782	2800	0.16	M6.0V	
7	Lalande 21185		10	7.47	10.44	0.032	8.29	3480	0.39	M2.0V	1?
8	Sirius (Alpha Canis Majoris)	Sirius A	11	-1.47	1.42	25.4	8.60	9940	1.7	A1V	
		Sirius B	11	8.44	11.34	0.0025		25200	0.008	DA2	
9	Luyten 726-8	Luyten 726-8 A	13	12.54	15.40	0.0016	8.73	2670	0.14	M5.5V	
		Luyten 726-8 B	13	12.99	15.85	0.0034		2500	0.14	M6.0V	
10	Ross 154 (V1216 Sagittarii)		15	10.43	13.07	0.0029	9.68	3340	0.24	M3.5V	
11	Ross 248 (HH Andromedae)		16	12.29	14.79	0.0031	10.3	2800	0.16	M5.5V	
12	Epsilon Eridani		17	3.73	6.19	0.35	10.5	5080	0.74	K2V	1 + 1?
13	Lacaille 9352		18	7.34	9.75	0.055	10.7	3630	0.46	M1.5V	
14	FI Virginis (Ross 128)		19	11.13	13.51	0.0055	10.9	3180	0.2	M4.0V	1
15	WISE 1506+7027		20	14.3 J		0.0002	11.1	350	0.1	T6	
16	EZ Aquarii	EZ Aquarii A	21	13.33	15.64	0.00135	11.3	2650	0.1	M5.0V	
		EZ Aquarii B	21	13.27	15.58	0.001		2650	0.1	M?	
		EZ Aquarii C	21	14.03	16.34	0.0002		2650	0.1	M?	
17	Procyon (Alpha Canis Minoris)	Procyon A	24	0.38	2.66	6.9	11.4	6530	2.05	F5IV-V	
		Procyon B	25	10.70	12.98	0.0006		7740	0.012	DQZ	
18	61 Cygni	61 Cygni A	26	5.21	7.49	0.14	11.4	4530	0.67	K5.0V	
		61 Cygni B	26	6.03	8.31	0.11		4080	0.6	K7.0V	
19	Struve 2398	Struve 2398 A	28	8.90	11.16	0.016	11.5	3680	0.35	M3.0V	
		Struve 2398 B	28	9.69	11.95	0.01		3000	0.27	M3.5V	
20	Groombridge 34 (Gliese 15)	Groombridge 34 A	30	8.08	10.32	0.04	11.6	3730	0.39	M1.5V	1+1?
		Groombridge 34 B	30	11.06	13.30	0.003		3000	0.19	M3.5V	
21	Epsilon Indi	Epsilon Indi A	32	4.69	6.89	0.25	11.8	3630	0.73	K5V	1?
		Epsilon Indi Ba	32	12.3 J		0.00002		1280	0.08	T1.0V	
		Epsilon Indi Bb	32	13.2 J		0.000004		850	0.08	T6.0V	
22	DX Cancri (Gliese 1111)		35	14.78	16.98	0.0014	11.8	2840	0.11	M6.5V	
23	Tau Ceti (Gliese 71)		36	3.49	5.68	0.51	11.9	5340	0.79	G8Vp	4+??
24	GJ 1061 (LHS 1565)		37	13.09	15.26	0.0014	12.0	2900	0.1	M5.5V	
25	WISE 0350-5658		38	22.8 J		0.0000001	17.7	400	0.1	Y1	
26	YZ Ceti		39	12.0	14.17	0.005	12.1	3000	0.17	M4.5V	3 + 1?
27	Luyten's Star		40	9.86	11.97	0.01	12.4	3150	0.35	M3.5V	2
28	Teegarden's Star		41	15.14	17.22	0.0007	12.6	2640	0.13	M6.5V	
29	SCR 1845-6357	SCR 1845-6357 A	42	17.39	19.41	0.0004	12.6	2600	0.1	M8.5V	
		SCR 1845-6357 B	42	13.3 J		0.000006		950	0.1	T6	
30	Kapteyn's Star		44	8.84	10.87	0.024	12.8	3570	0.3	M1.5V	2
31	Lacaille 8760 (AX Microscopii)		45	6.67	8.69	0.11	12.9	3800	0.5	M0.0V	
32	Kruger 60 (Gliese 860)	Kruger 60 A	46	9.79	11.76	0.015	13.1	3180	0.35	M3.0V	
		Kruger 60 B	46	11.41	13.38	0.0037		2890	0.25	M4.0V	
33	DENIS-P 1048-3956		48	17.39	19.37	0.0003	13.2	2450	0.1	M8.5V	
34	UGPS 0722-05		49	16.52 J		0.0000001	13.3	520	0.1	T9	
35	Ross 614	Ross 614 A	50	11.15	13.09	0.006	13.3	3000	0.1	M4.5V	

#	Star System	Star Name	Star #	Vmag	Abs Mag (visual)	Lum. Sun = 1	Dist. (ly)	Temp (K)	Diameter Sun = 1	Spectral Type	Planet?
		Ross 614 B	50	14.23	16.17	0.0004		2900	0.1	M5.5V	
36	Wolf 1061 (Gliese 628)		52	10.1	11.93	0.012	13.8	3350	0.3	M3.0V	3
37	Van Maanen's Star (Gliese 35, LHS 7)		53	12.38	14.21	0.002	14.1	6750	0.11	DZ7	
38	Gliese 1		54	8.55	10.35	0.03	14.2	3380	0.47	M3.0V	
39	Wolf 424 (Fl Virginis, Gliese 473)	Wolf 424 A	55	13.18	14.97	0.002	14.3	2900	0.17	M5.5V	
		Wolf 424 B	55	13.17	14.96	0.002		2800	0.14	M7V	
40	TZ Arietis (Gliese 83.1)		57	12.27	14.03	0.0014	14.5	3000	0.2	M4.5V	
41	Gliese 687 (LHS 450)		58	9.17	10.89	0.02	14.8	3100	0.5	M3.0V	1
42	LHS 292 (LP 731-58)		59	15.60	17.32	0.0005	14.8	2800	0.1	M6.5V	
43	Gliese 674 (LHS 449)		60	9.38	11.09	0.02	14.8	3600	0.4	M3.0V	1
44	Gliese 1245	Gliese 1245 A	61	13.46	15.17	0.0014	14.8	2900	0.15	M5.5V	
		Gliese 1245 B	61	14.01	15.72	0.001		2900	0.15	M6.0V	
		Gliese 1245 C	61	16.75	18.46	0.0001		2900	0.1	M5.5V	
45	Gliese 440		64	11.50	13.18	0.0005	15.1	8500	0.01	DQ6	
46	Gliese 1002		65	13.76	15.40	0.0001	15.3	2900	0.1	M5.5V	
47	Gliese 876 (IL Aquarii, Ross 780)		66	10.17	11.81	0.011	15.3	3470	0.38	M3.5V	4
48	LHS 288 (Luyten 143-23)		67	13.90	15.51	0.0012	15.6	2900	0.1	M5.5V	
49	Gliese 412	Gliese 412 A	68	8.77	10.34	0.032	15.8	3690	0.38	M1.0V	
		Gliese 412 B (WX Ursae Majoris)	68	14.48	16.05	0.001		2700	0.13	M5.5V	
50	Groombridge 1618 (Gliese 380)		70	6.59	8.16	0.144	15.8	3970	0.6	K7.0V	1?
51	AD Leonis		71	9.32	10.87	0.023	15.9	3390	0.39	M3.0V	
52	DENIS J081730.0-615520		72			0.000085	16.1	950	0.1	T6	
53	Gliese 832		73	8.66	10.20	0.043	16.1	3620	0.48	M3.0V	2
54	LP 944-020		74	18.69	20.02	0.00016	16.2	2500	0.1	M9.0V	
55	DENIS 0255-4700		75	22.92	24.44	0.000024	16.2	1300	0.1	L7.5V	
56	40 Eridani (Gliese 166)	40 Eridani A	76	4.43	5.94	0.46	16.2	5300	0.8	K0.5V	
		40 Eridani B	76	9.52	11.03	0.013		16500	0.014	DA4	
		40 Eridani C	76	11.24	12.75	0.008		3100	0.3	M4.0V	
57	WISE 1639-6947		79	20.5 J	22.1 J	0.0000001	16.3	400	0.1	Y0	
58	Gliese 873 (EV Lacertae)		80	10.29	11.77	0.011	16.5	3400	0.36	M3.5V	
59	Gliese 682		81	10.95	12.5	0.01	16.5	3300	0.3	M4.0V	2?
60	70 Ophiuchi (Gliese 702)	70 Ophiuchi A	82	4.21	5.67	0.59	16.6	5300	0.9	K0.0V	
		70 Ophiuchi B	82	6.01	7.47	0.15		4350	0.6	K5V	
61	Altair (Alpha Aquilae)		84	0.77	2.21	10.7	16.7	7700	1.8	A7IV-V	
62	Gliese 1116 (EI Cancri)	Gliese 1116 A	85	14.06	15.46	0.0016	17.1	2800	0.1	M5.5V	
		Gliese 1116 B	85	14.92	16.32	0.0008		2800	0.1	M V	
63	G 099-049		87	11.31	12.71	0.005	17.1	3400	0.25	M3.5V	
64	LHS 1723		88	12.22	13.59	0.003	17.4	3200	0.2	M4.0V	2
65	2MASS 0939-2448		89			0.000019	17.4	650	0.08	T8.0V	
66	Gliese 445		90	10.79	12.15	0.0088	17.4	3400	0.32	M3.5	
67	Wolf 498 (Gliese 526)		91	8.46	9.79	0.045	17.7	3500	0.6	M1.0V	
68	WISE 1741+2553		92	16.53 J		0.000001	17.9	500	0.1	T9	
69	Gliese 169.1 (Stein 2051)	Gliese 169.1 A	93	11.04	12.32	0.01	18.1	3200	0.25	M4.0V	
		Gliese 169.1 B	93	12.43	13.71	0.00003		10000	0.01	DC5	
70	2MASS 1114-2618		95	15.52 J		0.0000017	18.2	750	0.1	T7.5	
71	Gliese 251 (Wolf 294)		96	10.02	11.27	0.02	18.3	3300	0.45	M3.0V	
72	2MASS 1835+3259		97	18.27	19.50	0.00032	18.5	2400	0.1	M8.5V	
73	Gliese 205 (Wolf 1453)		98	7.95	9.18	0.09	18.5	3600	0.3	M1.0V	
74	LP 816-060		99	11.50	12.72	0.0073	18.6	3400	0.2	M3.5V	
75	2MASS 0415-0935		100	15.34 J		0.0000032	18.7	760	0.1	T8.0V	
76	Sigma Draconis (Gliese 764)		101	4.67	5.87	0.45	18.8	5300	0.78	K0V	
77	Gliese 229	Gliese 229 A	102	8.14	9.34	0.052	18.8	3700	0.7	M1.5V	1
		Gliese 229 B	102			0.0000062		950	0.1	T8.0V	
78	Gliese 213 (Ross 47)		104	11.57	12.74	0.0079	19.0	3200	0.17	M4.0V	

#	Star System	Star Name	Star #	Vmag	Abs Mag (visual)	Lum. Sun = 1	Dist. (ly)	Temp (K)	Spectral Type	Planet?	
79	Gliese 693 (Luyten 205-128)		104	10.76	11.93	0.0155	19.1	3400	0.3	M3.0V	
80	Gliese 752 (Wolf 1055)	Gliese 752 A	106	9.10	10.26	0.032	19.1	3300	0.55	M2.5V	
		Gliese 752 B	106	17.45	18.61	0.00049		2600	0.1	M8.0V	
81	Gliese 570 (33 G. Librae)	Gliese 570 A	108	5.64	6.80	0.28	19.1	4600	0.75	K4.0V	
		Gliese 570 B	108	8.30	9.46	0.083		3500	0.5	M1.5 V	
		Gliese 570 C	108	9.96	11.12	0.018		3300	0.4	M3 V	
		Gliese 570 D	108			0.0000029		750	0.1	T7.0V	
82	Gliese 754		112	12.23	13.37	0.004	19.3	3200	0.2	M4.0V	
83	Gliese 588		113	9.31	10.44	0.034	19.4	3440	0.5	M2.5V	
84	Gliese 1005	Gliese 1005 A	114	11.60	12.73	0.012	19.4	3300	0.2	M3.5V	
		Gliese 1005 B	114	14.02	15.15	0.0001		3000	0.1	M7 V	
85	Eta Cassiopeiae (Gliese 34)	Eta Cassiopeiae A	116	3.46	4.59	1.2	19.4	5970	1.04	G3V	
		Eta Cassiopeiae B	116	7.21	8.34	0.12		4040	0.66	K7.0V	
86	36 Ophiuchi (Gliese 663/664)	36 Ophiuchi A (663)	118	5.07	6.20	0.34	19.4	4800	0.82	K2V	
		36 Ophiuchi B (663)	118	5.08	6.21	0.34		5000	0.81	K1V	
		36 Ophiuchi C (664)	118	6.32	7.45	0.17		4550	0.72	K5.0V	
87	Gliese 908		121	8.98	10.11	0.0365	19.4	3600	0.6	M1.0V	
88	Ross 882 (Gliese 285)		122	11.19	12.31	0.008	19.5	3200	0.3	M4.0V	
89	Gliese 783 (279 G. Sagittarii)	Gliese 783 A	123	5.31	6.42	0.28	19.6	5070	0.7	K2.5V	
		Gliese 783 B	123	11.50	12.61	0.00079		3200	0.3	M4.0V	
90	82 Eridani (Gliese 139)		125	4.26	5.35	0.66	19.7	5400	0.92	G8V	3
91	Gliese 1221		126	14.22	15.30	0.00007	19.8	5600	0.01	DXP9	
92	Gliese 338	Gliese 338 A	127	7.64	8.71	0.11	19.9	3800	0.6	M0.0V	
		Gliese 338 B	127	7.70	8.77	0.08		4100	0.6	K7.0V	
93	Delta Pavonis (Gliese 780)		129	3.55	4.62	1.31	19.9	5600	1.22	G8.0IV	
94	Gliese 268 (QY Aurigae)	Gliese 268 A	130	12.05	13.12	0.006	20.0	3100	0.3	M4.5V	
		Gliese 268 B	130	12.45	13.52	0.004		3000	0.2	M5 V	
95	2MASS 0937+2931		132			0.0000026	20.0	800	0.1	T6.0V	
96	Gliese 784		133	7.95	8.99	0.009	20.2	3900	0.7	M0.0V	
97	Gliese 555 (HN Librae, Wolf 1481)		134	11.32	12.35	0.09	20.3	3150	0.25	M4.0V	
98	Gliese 896 (EQ Pegasi)	Gliese 896 A	135	10.27	11.29	0.006	20.4	3400	0.4	M3.5V	
		Gliese 896 B	135	12.21	13.43	0.005		3100	0.2	M4.5V	
99	Wolf 562 (Gliese 581. HD20794)		137	10.57	11.56	0.011	20.7	3480	0.3	M3.0V	3 + 2?
100	LHS 2090		138	16.10	17.08	0.0012	20.8	2450	0.1	M6.0V	
101	LHS 337		139	12.75	13.73	0.003	20.8	3100	0.2	M4.0V	
102	Gliese 661	Gliese 661 A	140	9.93	10.90	0.029	20.9	3400	0.4	M3.0V	
		Gliese 661 B	140	10.35	11.32	0.02		3300	0.35	M4 V	
103	Gliese 223.2 (WD 0552-041)		142	14.47	15.44	0.00007	20.9	4700	0.01	DZ9	
104	G180-060		143	14.76	15.73	0.0009	20.9	2900	0.1	M5.0V	
105	LHS 3003		144	17.14	18.06	0.00048	21.4	2700	0.1	M7.0V	
106	Wolf 630	Wolf 630 A (Gliese 644 A)	145	9.72	10.67	0.03	21.0	3400	0.5	M2.5V	
		Wolf 630 B (Gliese 644 B)	145	10.37	11.32	0.02		3400	0.4	M V	
		Wolf 630 C (Gliese 644 D)	145	10.87	11.82	0.001		3400	0.3	M V	
	van Biesbroeck 8	v B 8 (Gliese 644C)	145	16.78	17.73	0.001		2700	0.1	M7.0V	
	Wolf 629	Gliese 643	145	11.80	12.75	0.004		3400	0.25	M3.0V	
107	Gliese 1128		150	12.74	13.66	0.003	21.1	3200	0.15	M4.0V	

¹Stars in boldface are in both tables.

Note: List compiled using the following sites:

<http://www.johnstonsarchive.net/astro/nearstar.html>

https://en.wikipedia.org/wiki/List_of_nearest_stars_and_brown_dwarfs

This list was accurate as of the end of 2017. However, new faint stars are continually being discovered and distances may change as the results from the Gaia survey are analyzed.

Table 4: 150 Brightest Stars as Seen from Earth¹

	Star Name	Vmag	Abs Mag (visual)	Luminosity Sun = 1	Distance (ly)	Temp (K)	Diameter Sun = 1	Spectral Type	Binary/ Variable	Planet?
1	Sun	-26.74	4.85	1.0	0.00002	5780	1	G2		8
2	Sirius (Alpha Canis Majoris)	-1.47	1.42	25.4	8.60	9940	1.7	A0		
3	Canopus (Alpha Carinae)	-0.72	-5.53	15,000	310	7350	71	F0I		
4	Rigel Kentaurus (Alpha Centauri AB)*	-0.27	4.38	1.52	4.36	5790	1.22	G2V	-0.01+1.33	
5	Arcturus (Alpha Boötis)	-0.04	-0.30	170	36.7	4290	25.4	K2III		
6	Vega (Lyrae)	0.03	0.58	40	25.0	9600	2.6	A0V	-0.02-0.07v	
7	Capella Aa (Alpha Aurigae)**	0.08	0.3	79	42	4970	12	G5III	0.03-0.16v	
8	Capella Ab (Alpha Aurigae)**		0.17	73	42	5730	8.9	G1III		
9	Rigel (Beta Orionis)	0.12	-7.84	120,000	860	12100	80	B8I	0.05-0.18v	
10	Procyon (Alpha Canis Minoris)	0.34	2.65	6.9	11.4	6530	2.05	F5IV		
11	Achernar (Alpha Eridani)	0.46	-2.77	3000	140	15000	9	B3Vp		
12	Betelgeuse (Alpha Orionis)	0.50	-5.85	126,000	640	3590	900	M2I	0.00-1.03v	
13	Hadar (Beta Centauri; binary)	0.60	-5.43	42,000	350	25000	8.6	B1III		
14	Altair (Alpha Aquilae)	0.77	2.21	10.7	16.7	7700	1.8	A7IV		
15	Acrux (Alpha Crucis)*	0.77	-4.14	25,000	320	28000	10	B0.5IV	1.33+1.75	
16	Aldebaran (Alpha Tauri)	0.86	-0.63	520	65	3910	44	K5III	0.75-0.95v	1
17	Antares (Alpha Scorpii)	0.96	-5.28	98,000	550	3400	680	MII	0.6-1.6v	
18	Spica (Alpha Virginis)	0.97	-3.50	12,000	260	22400	7.5	B1V	0.97-1.04v	
19	Pollux (Beta Geminorum)	1.14	1.08	43	33.8	4700	8.8	K0III		1
20	Fomalhaut (Alpha Piscis Austrini)	1.16	1.72	17	25.1	8600	1.8	A3V		1
21	Deneb (Alpha Cygni)	1.25	-8.38	200,000	2600	8500	200	A2I	1.21-1.29v	
22	Mimosa (Beta Crucis)	1.25	-3.92	34,000	280	27000	8.4	B0.5IV	1.23-1.31v	
23	Alpha Centauri B	1.33	5.71	0.5	4.36	5260	0.86	K1V		1?
24	Regulus (Alpha Leonis)	1.35	-0.52	290	79.3	12500	3.1	B7V		
25	Adhara (Epsilon Canis Majoris)	1.50	-4.11	39,000	430	22200	13.9	B2II		
26	Castor (Alpha Geminorum AB)*	1.62	0.96	30	51	10300	2.4	A2V	1.98+2.97	
27	Shaula (Lambda Scorpii)	1.62	-5.05	35,000	570	26000	9	B1.5IV		
28	Gacrux (Gamma Crucis)	1.63	-0.52	1,500	88.6	3600	84	M4III		
29	Bellatrix (Gamma Orionis)	1.64	-2.72	9,200	250	22000	5.8	B2III		
30	Elnath (Beta Tauri)	1.68	-1.34	700	130	13800	4.2	B7III		
31	Miaplacidus (Beta Carinae)	1.68	-1.02	290	113	8900	6.8	A2IV		
32	Alnilam (Epsilon Orionis)	1.69	-6.37	600,000	1300	26200	32	B0I	1.64-1.74v	
33	Alnair (Alpha Gruis)	1.74	-0.72	160	101	13900	3.4	B7IV		
34	Alnitak (Zeta Orionis AB)*	1.77	-6.00	180,000	700	29500	20	O9.5I	2.08+4.01+4.28	
35	Alioth (Epsilon Ursae Majoris)	1.77	-0.21	108	82.6	10800	4.2	A0		
36	Dubhe (Alpha Ursae Majoris)	1.79	-1.10	224	123	4660	30	K1 I-III		
37	Mirfak/Algenib (Alpha Persei)	1.80	-5.1	5,400	510	6350	68	F5I		
38	Wezen (Delta Canis Majoris)	1.82	-6.86	82,000	1600	6400	200	F8I		
39	Regor (Gamma Velorum)	1.83	-5.63	150,000	1080	35000	6	O7.5I	1.81-1.87v	
40	Sargas (Theta Scorpii)	1.84	-2.75	1,800	300	7270	26	F1II		
41	Kaus Australis (Epsilon Sagittarii)	1.85	-1.41	360	143	9960	6.8	B9.5III		
42	Alkaid [Benetnasch] (Eta Ursae Majoris)	1.86	-0.68	1,350	104	16800	3.4	B3V		
43	Avior (Epsilon Carinae AB)*	1.86	-4.22	6,000	610	3500	120	K3III	2.17+4.12	
44	Menkalinan (Beta Auriga AB)*	1.90	0.55	48	81	9350	2.8	A2V	1.89-1.94v	
45	Atria (Alpha Trianguli Austras)	1.91	-3.68	5,500	390	4150	130	K2II		
46	Alhena (Gamma Geminorum A)	1.92	-0.60	120	109	9260	3.3	A0IV		
47	Peacock [Joo Tseo] (Alpha Pavonis)	1.94	-1.81	2,200	179	18000	4.8	B2IV		
48	Alsephina [Koo She] (Delta Velorum)*	1.96	0.02	56	80.6	9470	2.8	A1V	1.97+5.57	
49	Polaris (Alpha Ursae Minoris)	1.98	-3.6	1,260	425	6010	37	F7I	1.86-2.13v	
50	Mirzam (Beta Canis Majoris)	1.99	-3.95	27,000	500	23150	10	B1II		
51	Alphard (Alpha Hydrae)	2.00	-1.69	780	177	4120	50	K3III		
52	Hamal (Alpha Arietis)	2.00	0.47	91	65.8	4480	15	K2III		1
53	Diphda [Deneb Kaitos] (Beta Ceti)	2.02	-0.13	140	96.3	4800	16.8	K0III		
54	Mizar (Zeta Ursae Majoris)*	2.04	0.33	30	82.8	9000	2.4	A2V	2.23+3.88	

	Star Name	Vmag	Abs Mag (visual)	Luminosity Sun = 1	Distance (ly)	Temp (K)		Spectral Type	Binary/ Variable	Planet?
55	Mirach (Beta Andromedae)	2.05	-1.76	2,000	197	3840	33	M0III	2.01-2.10v	
56	Nunki (Sigma Sagittarii)	2.05	-2.14	3,300	228	18900	4.5	B2.5V		
57	Menkent [Haratan] (Theta Centauri)	2.06	0.87	60	58.8	4980	10.6	K0III		
58	Alpheratz [Sirrah] (Alpha Andromedae)*	2.06	-0.19	240	97	13000	2.7	B9	2.22+4.21	
59	Rasalhague (Alpha Ophiuchi)	2.06	1.30	25	48.6	7960	2.6	A5III		
60	Algieba (Gamma Leonis)*	2.08	-0.27	320	130	4470	32	K0III	2.61+4.08	1 + 1?
61	Kochab (Beta Ursae Minoris)	2.08	-0.87	390	131	4030	42	K4III		1
62	Saiph (Kappa Orionis)	2.09	-6.1	57,000	650	26500	22	B0.5I		
63	Almach (Gamma Andromedae)*	2.10	-2.9	2,600	350	4200	80	K3-II	2.26+3.88	
64	Denebola (Beta Leonis)	2.11	1.92	15	35.9	8500	1.7	A3V		
65	Algol (Beta Persei)	2.12	-0.15	98	93	9200	2.7	B8V	2.1-2.39v	
66	Tiaki (Beta Gruis)	2.15	-1.51	2,500	177	3480	180	M5III	2.0-2.3v	
67	Muhlifain (Gamma Centauri AB)*	2.17	-0.81	180	130	9080	4.7	A1IV		
68	Aspidiske [Tureis] (Iota Carinae)	2.21	-4.42	4,900	690	7500	43	A8I		
69	Suhail (Lambda Velorum)	2.21	-3.99	10,000	545	4230	210	K4.5I	2.14-2.30v	
70	Alphecca (Alpha Coronae Borealis)	2.23	0.16	74	75.0	9700	3	A0V	2.23-2.35v	
71	Sadr (Gamma Cygni)	2.23	-6.12	33,000	1800	5800	150	F8 Ib		
72	Eltanin (Gamma Draconis)	2.23	-1.93	470	154	3930	48	K5III		
73	Mintaka (Delta Orionis AB)*	2.23	-4.99	90,000	690	30000	16.5	O9.5II	2.50+3.9	
74	Schedar (Alpha Cassiopeiae)	2.24	-1.99	680	228	4530	42	K0II		
75	Naos (Zeta Puppis)	2.25	-6.23	810,000	1090.	42000	20	O4I		
76	Caph (Beta Cassiopeiae)	2.28	1.16	27	54.7	7080	3.5	F2III	2.25-2.31v	
77	Epsilon Centauri	2.30	-3.9	15,200	430	24000	11.5	B1 III	2.29-2.31v	
78	Alpha Lupi	2.30	-4.3	25,000	460	22000	10	B1.5III	2.29-2.34v	
79	Dschubba (Delta Scorpii)	2.31	-3.8	42,000	490	29,500	6.7	B0.2IV	1.6-2.32v	
80	Larawag [Wei] (Epsilon Scorpii)	2.31	0.78	70	63.7	4560	12.6	K1III		
81	Marfikent (Eta Centauri)	2.35	-2.55	8,700	306	25700	5	B1V	2.30-2.41v	
82	Izar (Epsilon Boötis)*	2.35	-1.61	500	203	4550	33	G8II	2.37+5.21	
83	Merak (Beta Ursae Majoris)	2.37	0.41	63	79.7	9380	3.0	A1V		
84	Ankaa (Alpha Phoenicis)	2.38	0.52	64	85	4440	.815	K0III		
85	Girtab (Kappa Scorpii)	2.39	-3.38	1,900	480	23400	6.8	B1.5III		
86	Enif (Epsilon Pegasi)	2.40	-4.14	12,200	690	4380	18.5	K2I	0.7-3.0v	
87	Scheat (Beta Pegasi)	2.42	-1.49	1,500	196	3690	95	M2II	2.31-2.74v	
88	Sabik (Eta Ophiuchi AB)	2.43	0.37	35	88	8900	3	A2.5V		
89	Phecda (Gamma Ursae Majoris)	2.44	0.36	60	83	9355	3	A0V		
90	Aludra (Eta Canis Majoris)	2.45	-6.44	105,000	2000	15000	56	B5I		
91	Markeb (Kappa Velorum)	2.46	-3.62	18,400	570	22300	4.7	B2IV		
92	Tsih (Gamma Cassiopeiae)	2.47	-3.66	55,000	550	25000	10	B0.5IV	1.6-3.0v	
93	Epsilon Cygni (Gienah)	2.48	0.78	62	72.7	4710	10.8	K0III		
94	Markab (Alpha Pegasi)	2.48	-0.67	200	133	9760	4.7	B9III		
95	Acrab [Graffias] (Beta Sco)*	2.5	-3.92	31,600	530	28000	6.3	B1V	2.62+4.92	
96	Alderamin (Alpha Cephei)	2.51	1.57	17	49.1	7740	2.3	A7IV		
97	Menkar (Alpha Ceti)	2.53	-3.2	1,450	249	3800	89	M1.5III		
98	Zeta Centauri (Alnair)	2.55	-2.81	1,100	380	23600	58	B2.5IV		
99	Zosma (Delta Leonis)	2.56	1.32	16	58.4	8300	2.1	A4V		
100	Han (Zeta Ophiuchi)	2.57	-4.20	91,000	370	34000	8.5	O9.5V		
101	Arneb (Alpha Leporis)	2.59	-6.57	32,000	2200	6850	129	F0I		
102	Delta Centauri	2.57	-2.94	5,100	410	22,400	6.5	B2IV	2.51-2.65	
103	Gienah (Gamma Corvi)	2.58	-0.79	330	154	12000	3.5	B8III		
104	Ascella (Zeta Sagittarii)*	2.6	0.42	30	88	8800	3.3	A2IV	3.27+3.48	
105	Zubeneschamali (Beta Librae)	2.61	-1.16	130	185	12300	4.9	B8V		
106	Unukalhai (Alpha Serpentis)	2.62	0.88	70	74	4500	12	K2III		
107	Theta Aurigae	2.62	-1.05	263	166	10400	5	A0III		
108	Kraz (Beta Corvi)	2.64	-0.61	146	164	5100	16	G5III		
109	Phact (Alpha Columbae)	2.64	-1.87	1,000	261	13000	5.8	B7IV		
110	Zubelgenubi (Alpha Librae)*	2.64	0.77	30	75	8100	1.5	A3IV	2.74+5.15	
111	Sheratan (Beta Arietis)	2.65	1.55	23	60	9000	2.6	A5V		

	Star Name	Vmag	Abs Mag (visual)	Luminosity Sun = 1	Distance (ly)	Temp (K)		Spectral Type	Binary/ Variable	Planet?
112	Ruchbah (Delta Cassiopeiae)	2.68	0.28	73	99.4	8000	3.9	A5IV	2.68-2.74v	
113	Muphrid (Eta Boötes)	2.68	2.41	8.9	37	6100	2.7	G0IV		
114	Kekouan (Beta Lupi)	2.68	-3.3	10,000	383	24100	6.6	B2III		
115	Hassaleh (Iota Aurigae)	2.69	-3.2	4,600	490	4160	127	K3II		
116	Mu Velorum*	2.69	-0.06	107	117	5050	13	G5III	2.60+6.4	
117	Alpha Muscae	2.69	-2.2	4,000	315	21400	4.8	B2V		
118	Lesath (Upsilon Scorpii)	2.7	-3.53	7,400	580	22,800	6.1	B2IV		
119	Kaus Media (Delta Sagittarii)	2.7	-1.99	2,000	350	4200	16	K3III		
120	Tarazed (Gamma Aquilae)	2.71	-3.38	2,500	395	4200	95	K3II		
121	Ahadi (Pi Puppis)	2.73	-4.5	11,800	810	4000	290	K4Ib		
122	Athebyne (Eta Draconis)	2.73	0.58	60	92.1	5050	11	G8III		
123	Alhakim (Iota Centauri)	2.73	1.47	26	59	8600	2	A2V		
124	Porrina (Gamma Virginis)*	2.74	2.41	4	38	6760	2.2	F0V	3.65+3.56	
125	Yed Prior (Delta Ophiuchi)	2.75	-0.9	630	170	3680	59	M1III		
126	Cebalrai (Beta Ophiuchi)	2.75	0.77	63	82	4470	12.4	K2III	2.75-2.77v	
127	Theta Carinae	2.76	-3.1	25,700	460	31000	5.1	B0V		
128	Hatysa (Iota Orionis)	2.77	-6.5	68,000	2,300	32500	8.3	O9III		
129	Gamma Lupi*	2.77	-2.4	5,000	420	20900	4.7	B2IV	3.0+4.5	
130	Tureis (Rho Puppis)	2.78	1.41	22	63.5	6920	3.4	F6III		
131	Delta Crucis	2.79	-3.2	10,000	345	22600	8	B2IV		
132	Rastaban (Beta Draconis)	2.79	-2.28	1,000	380	5150	40	G2II		
133	Cursa (Beta Eridani)	2.8	0.59	25	89	8360	2.4	A3III		
134	Beta Hydri	2.8	3.45	3500	134	5870	1.8	G2IV		
135	Kornephoros (Beta Herculis)	2.81	-0.49	150	139	4890	17	G7III		
136	Rutilicus (Zeta Herculis)*	2.81	2.65	6.6	35	5820	2.6	F9IV	2.90+5.5	
137	Deneb Algedi (Delta Capricorni)	2.81	2.48	8.5	38.5	7300	1.9	A5V	2.9+?	
138	Tau Scorpii (Alniyat)	2.82	-4.2	18000	470	29900	6.5	B0V		
139	Kaus Borealis (Lambda Sagittarii)	2.82	1.07	50	78	4770	11	K1III		
140	Vindemiatrix (Epsilon Virginis)	2.83	0.37	77	110	5090	10.6	G8III		
141	Cor Caroli (Alpha Canum Venaticorum)*	2.84	0.16	100	115	11600	2.5	A0IV	2.9 +5.6	
142	Nihal (Beta Leporis)	2.84	-0.65	170	160	5450	16	G5III		
143	Algenib (Gamma Pegasi)	2.84	-2.64	5800	390	21200	4.8	B2IV		
144	Beta Arae	2.84	-3.49	5600	650	4200	100	K3Ib-II		
145	Beta Trianguli Australis	2.85	2.37	9.4	40.4	7400	2	F2IV		
146	Zeta Persei	2.86	-3.91	4700	750	20800	26	B1II		
147	Tejat (Mu Geminorum)	2.86	-1.42	2800	230	3780	40	M3III	var	
148	Alcyone (Eta Tau)	2.87	-2.62	2,000	136	12260	9	B7III		
149	Delta Cygni*	2.87	-0.74	155	165	10150	5.1	B9.9III	2.87+6.33	
150	Alniyat (Sigma Scorpii)*	2.88	-4.12	30,000	590	26,500	13	B1 III	?+?	

¹Stars in boldface are in both tables.

*These stars appear as single stars but are binaries or triple stars. The apparent magnitudes represent the combined magnitudes of multiple star systems, but the rest of the row represents the absolute magnitude, etc., of the primary star. When appropriate, the secondary stars are presented later in the list.

**Capella is listed as one star but is in reality a very close binary with two similar stars with apparent magnitudes of 0.91 (Aa) and 0.76 (Ab) for a combined magnitude of 0.08.

Note: List compiled using the following sites:

https://en.wikipedia.org/wiki/List_of_brightest_stars

<http://www.atlasoftheuniverse.com/stars.html>