

Observational Activity #2: H-R Diagrams and Identifying Star Colors

At home on a clear dark night when you can see at least twenty or so stars in the sky as well as the moon, complete the following observations and answer the questions below.

1. Locate several constellations which are easily identifiable at the time of observation. Find at least 10 bright stars from the table below within those constellations.

(To make this project easier, you might try picking an observation time that allows you to locate bright stars in and around the constellation Orion)

Date/Time of Observation:

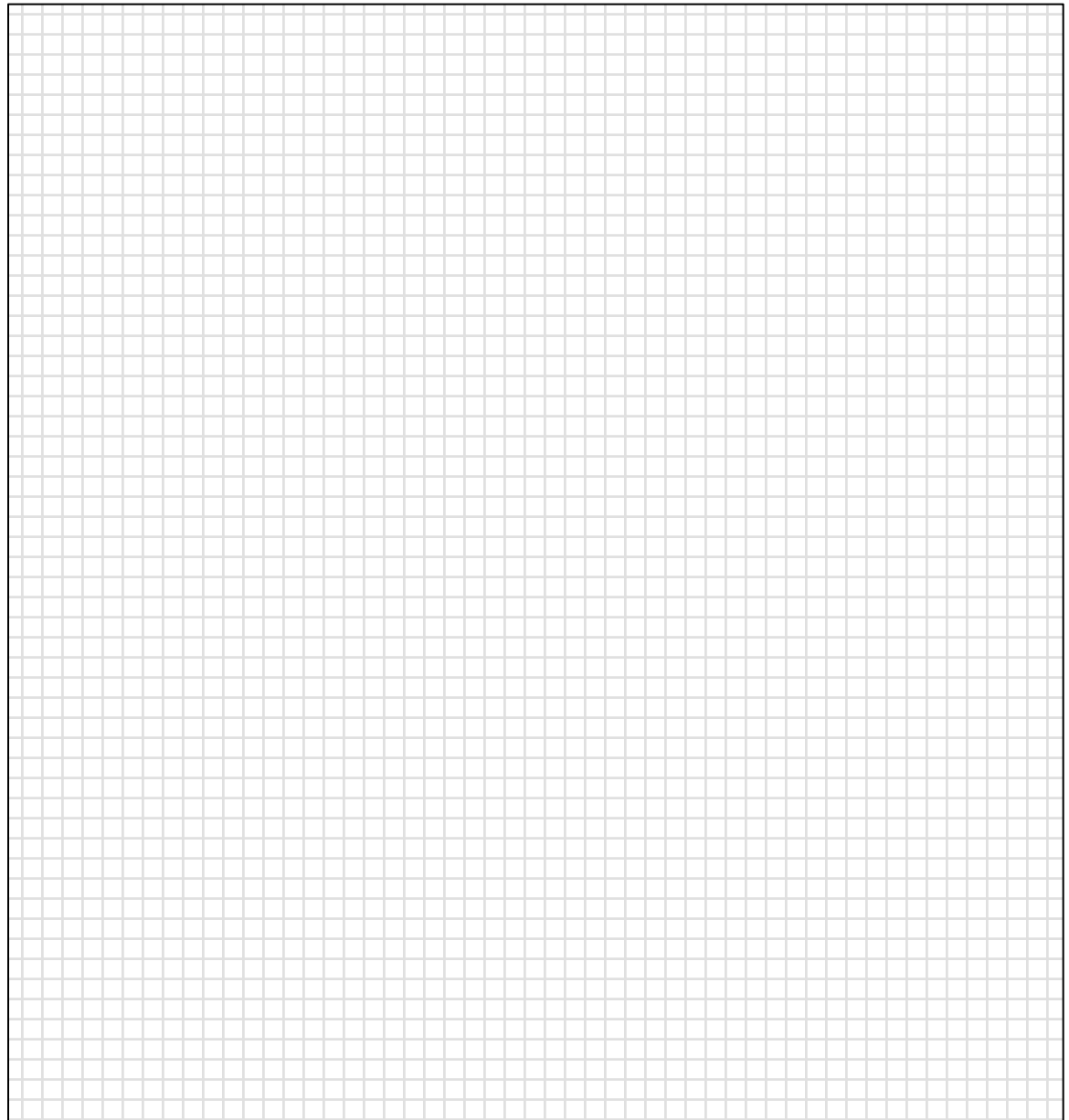
Constellations Identified:

List at least 10 bright stars which you found in those constellations which are also in the table below and their colors.

2. Using the table below, draw an H-R diagram including at least 20 stars, 10 of which are stars you located yourself in the night sky. Try to include a wide range of absolute magnitudes and spectral types.
- Label the main sequence, where you would find *giants and super giants*, and where you would find *white dwarfs*.
 - Label where short lifetime, high mass main-sequence stars are found and where long lifetime, high mass main-sequence stars are found.
 - Label the direction of increasing star size on your H-R diagram

H-R Diagram

Absolute Magnitude (decreasing →)



O B A F G K M

Spectral Class

3. Take a look at the colors of the stars you found and your H-R diagram:
 - a. Identify any of the stars you located in the night sky which are K or M spectral type. Did their spectral type match your expectations based on their color?
 - b. Identify any of the stars you located in the night sky which are O, B, or A spectral type. Did their spectral type match your expectations based on their color?
 - c. List any stars which are giants or supergiants based on your H-R diagram. Do these stars match your expectations in terms of brightness and color?
4. Why do some of the smaller main sequence stars on your H-R diagram appear brighter in the night sky? Explain.

Table:

PROPER NAME	GREEK LETTER NAME	SPECTRAL CLASS	DIST (LY)	APP MAG	ABS MAG
Sirius	Alpha CMa	A1V	8.6	-1.46	1.43
Capella	Alpha Aur	G8III+G0III	43	0.08	-0.51
Rigel	Beta Ori	B8Iab	860	0.12	-7
Procyon	Alpha CMi	F5IV-V	11.5	0.34	2.61
Achernar	Alpha Eri	B3Vpe	140	0.46	-2.7
Hadar	Beta Cen	B1III	392	0.61	-4.81
Betelgeuse	Alpha Ori	M2Iab	570	0.7	-5.5
Aldebaran	Alpha Tau	K5III	67	0.85	-0.7
Antares	Alpha Sco	M1.5Ib	550	0.96	-5.7
Spica	Alpha Vir	B1V+B4V	250	1.04	-3.38
Pollux	Beta Gem	K0III	34	1.14	1.06
Fomalhaut	Alpha PsA	A3V	25	1.16	1.73
Mimosa	Beta Cru	B0.5III	280	1.25	-3.41
Deneb	Alpha Cyg	A2Ia	1425	1.25	-7.09
Regulus	Alpha Leo	B7V	79	1.35	-0.58
Adhara	Epsilon CMa	B2II	405	1.5	-4
Castor	Alpha Gem	A1V+A5Vm	51	1.58	0.61
Gacrux	Gamma Cru	M3.5III	88	1.63	-0.52
Shaula	Lambda Sco	B1.5IV+B2	365	1.63	-3.6
Bellatrix	Gamma Ori	B2III	245	1.64	-2.72
Elnath	Beta Tau	B7III	130	1.65	-1.37
Miaplacidus	Beta Car	A2IV	111	1.68	-1.98
Alnilam	Epsilon Ori	B0Ia	1340	1.7	-6.6
Alnitak	Zeta Ori	O9.5Ibe+B0III	815	1.74	-5.5
Al Nair	Alpha Gru	B7IV	101	1.74	-0.72
Alioth	Epsilon UMa	A0p	81	1.77	-0.21
Regor	Gamma-2 Vel	WC8+O7.5e	1200	1.78	-6.3
Dubhe	Alpha UMa	K0III	124	1.79	-1.1
Mirfak	Alpha Per	F5Iab	590	1.79	-4.5
Wezen	Delta CMa	F8Iab	1800	1.84	-6.9
Kaus Australis	Epsilon Sgr	B9.5III	143	1.85	-1.38
Alkaid	Eta UMa	B3V	101	1.86	-0.59
Avior	Epsilon Car	K3III+B2V	630	1.86	-4.6
Girtab	Theta Sco	F1II	272	1.87	-2.73
Menkalinan	Beta Aur	A2IV	82	1.9	-0.1
Atria	Alpha TrA	K3II-III	415	1.92	-3.61
Alhena	Gamma Gem	A0IV	105	1.93	-0.6

Peacock	Alpha Pav	B2IV	183	1.94	-1.81
Delta Vel	Delta Vel	A1V	80	1.96	0.02
Mirzam	Beta CMa	B1II-III	500	1.98	-3.94
Alphard	Alpha Hya	K3II-III	177	1.98	-1.7
Algieba	Gamma Leo	K1III+G7III	131	1.99	...
Hamal	Alpha Ari	K2III	66	2	0.47
Polaris	Alpha UMi	F7Ib-II	430	2.02	-3.58
Nunki	Sigma Sgr	B2.5V	225	2.02	-2.17
Deneb Kaitos	Beta Cet	K0III	96	2.04	-0.3
Saiph	Kappa Ori	B0.5Ia	720	2.06	-4.79
Alpheratz	Alpha And	B8IVp	97	2.06	-0.31
Mizar	Zeta UMa	A2Vp+A7Vm	78	2.06	...
Menkent	Theta Cen	K0III	61	2.06	0.7
Mirach	Beta And	M0III	200	2.06	-1.87
Rasalhague	Alpha Oph	A5III	47	2.08	1.3
Kochab	Beta UMi	K4III	126	2.08	-0.86
Beta Gru	Beta Gru	M5III	170	2.1	-1.49
Algol	Beta Per	B8V	93	2.12	-0.15
Denebola	Beta Leo	A3V	36	2.14	1.92
Almach	Gamma And	K3II+(B8V+A0V)	355	2.16	...
Muhlifain	Gamma Cen	A1IV	130	2.17	...
Sadr	Gamma Cyg	F8Ib	1500	2.2	-6.8
Suhail	Lambda Vel	K4Ib-II	575	2.21	-4.02
Mintaka	Delta Ori	B0III+O9V	915	2.23	-5.3
Alphecca	Alpha CrB	A0V	75	2.23	0.43
Shedar	Alpha Cas	K0III	230	2.23	-2
Eltanin	Gamma Dra	K5III	148	2.23	-1.05
Naos	Zeta Pup	O5Ia	970	2.25	-5.4
Aspidiske	Iota Car	A8Ib	690	2.25	-4.42
Caph	Beta Cas	F2III-IV	54	2.27	1.16
Eps Sco	Epsilon Sco	K2.5III	65	2.29	0.77
Eps Cen	Epsilon Cen	B1III	375	2.3	-3.13
Kakkab	Alpha Lup	B1.5III	550	2.3	-4.02
Eta Cen	Eta Cen	B1.5Ve	310	2.31	-2.73
Dschubba	Delta Sco	B0.3IV	400	2.32	-3.6
Merak	Beta UMa	A1V	79	2.37	0.43
Ankaa	Alpha Phe	K0III	77	2.39	0.52
Enif	Epsilon Peg	K2Ib	670	2.39	-4.18
Kappa Sco	Kappa Sco	B1.5III	450	2.41	-3.4
Scheat	Beta Peg	M2.5II-III	200	2.42	-1.51
Sabik	Eta Oph	A2V+A3V	84	2.43	...

Phecda	Gamma UMa	A0Ve	84	2.44	0.39
Alderamin	Alpha Cep	A7V	49	2.44	1.56
Aludra	Eta CMa	B5Ia	3200	2.45	-7.5
Gienah Cygni	Epsilon Cyg	K0III	72	2.46	0.74
Gamma Cas	Gamma Cas	B0IVpe	549	2.47	-4
Markab	Alpha Peg	B9V	140	2.49	-0.67
Graffias	Beta Sco	B1V+B2V	530	2.5	...
Markeb	Kappa Vel	B2IV-V	540	2.5	-3.78