**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

**H-R Diagram Excel Activity**

1. Go to classroom website: [www.mspricescience.weebly.com](http://www.mspricescience.weebly.com) and open up the excel worksheet entited H-R Diagram Excel Lab in the geology tab.
2. Click Open
3. Input temperatures and luminosities for the 15 closest and the 15 brightest stars to earth using the data charts below:

|  |  |  |
| --- | --- | --- |
| **Nearest stars** | | |
| Name | Temperature (K) | Luminosity (Lo) |
| Sun | 5860 | 1.0 |
| Proxima Cen | 3240 | 0.00006 |
| alpha Cen A | 5860 | 1.6 |
| alpha Cen B | 5250 | 0.45 |
| Barnard's star | 3240 | 0.00045 |
| Wolf 359 | 2640 | 0.00002 |
| BD +36 2147 | 3580 | 0.0055 |
| L 726-8A | 3050 | 0.00006 |
| UV Ceti | 3050 | 0.00004 |
| Sirius A | 9230 | 23.5 |
| Sirius B | 9000 | 0.003 |
| Ross 128 | 3100 | 0.0004 |
| Ross 154 | 3240 | 0.00048 |
| Ross 248 | 3050 | 0.00011 |
| epsilon Eri | 4900 | 0.30 |
| 61 Cyg A | 4000 | 0.08 |

|  |  |  |
| --- | --- | --- |
| **Brightest stars** | | |
| Name | Temperature (K) | Luminosity (Lo) |
| Sun | 5860 | 1.0 |
| Sirius A | 9230 | 23.5 |
| Canopus | 7700 | 1400. |
| alpha Cen A | 5860 | 1.6 |
| Arcturus | 4420 | 110. |
| Vega | 9520 | 50. |
| Capella | 5200 | 150. |
| Rigel | 11200 | 42000. |
| Procyon | 6440 | 7.2 |
| Betelgeuse | 3450 | 12600. |
| Achernar | 15400 | 200. |
| beta Cen | 24000 | 3500. |
| Altair | 7850 | 10. |
| alpha Cru | 25400 | 3200. |
| Aldebaran | 15400 | 95. |

1. Select columns B&C by clicking and dragging the top of the columns labeled B&C.
2. To insert a graph, click on the insert button on the top of the menu bar, select scatter, and select the graph at the top left
3. Add a title to your graph. It should come up automatically as Luminosity. To change this, double click on the work luminosity, and it should allow you a cursor to change the title. (I would go with H-R Diagram Luminosity vs Temperature)
4. Change your luminosity values to to from increasing to decreasing. To do this click on the y axis. A box should appear around your values. Right click and select format axis. After the format axis box appears, look at the axis options. Go down to where you can check boxes and check the box that says values in reverse order. Then click close. **Repeat for the X-axis.**
5. The graph should look weird, so to make it more understandable we are going to change it into a logarithmic scale. Click on the y axis again, right click and select format axis. Below where you checked values in reverse order, check the box that says Logarithmic scale.
6. Call me over to check your graph. Ms. Price initials \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Answer the questions below using your graph.

**Questions**

1. Upon review of your graph, do you see any obvious groupings of stars? Identify the man sequence stars, red giants, and white dwarfs.
2. Study the graph and describe trends relating temperature and luminosity.
3. Suggest which three stars on the diagram seem most unusual. Describe the characteristics of these stars.
4. Studying the diagram, which stars are the most common?
5. Where does our sun lie on the diagram? What other stars are similar to our sun and what characteristics do they share?
6. What stars would be the most visible? The least? Why? What factors determine how visible a star is in the sky as observed from Earth?
7. If a star were seen in the sky and measured to have a temperature of 7000 K, predict the luminosity it should have, explain how you arrived at this, and include any assumptions you made in this prediction.
8. Reflect on this activity. What have you learned with respect to the scientific study of stars?