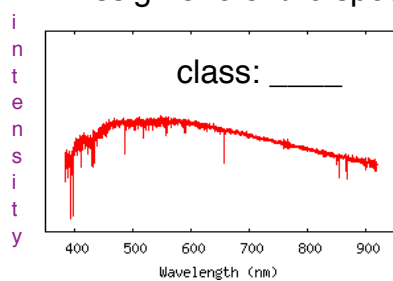


Names \_\_\_\_\_

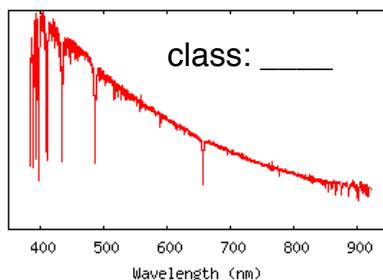
# ASTRONOMY - IN-CLASS EXERCISE – STELLAR PROPERTIES

- Look at the following stellar spectra. Label each one with its Spectral Type. Assign one of the spectral classes [OABFGKM] to each spectrum. No class is repeated.

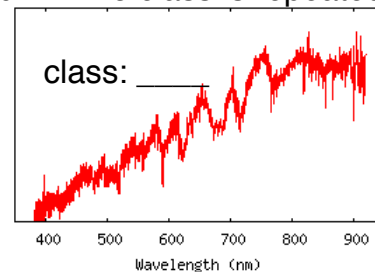


Blue on the Left, Red on the Right

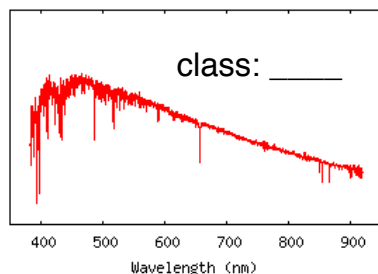
1



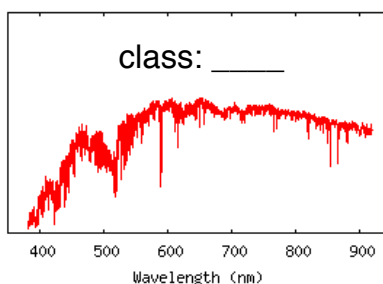
2



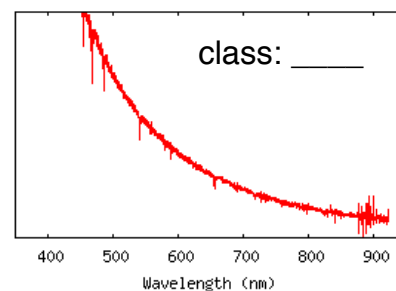
3



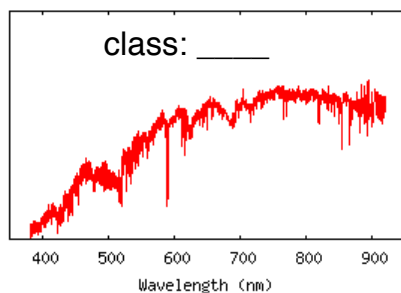
4



5

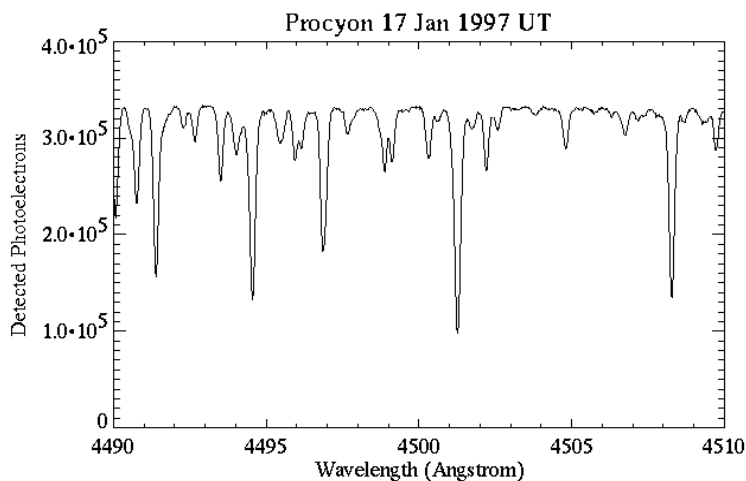


6



7

- Here's a part of the visible light spectrum from the star Procyon. Pick the three strongest absorption lines, mark them on the graph, and identify which element(s) causes them. Use the table of wavelengths on the back of this sheet.



Line 1: wavelength \_\_\_\_\_ Element: \_\_\_\_\_

Line 2: wavelength \_\_\_\_\_ Element: \_\_\_\_\_

Line 3: wavelength \_\_\_\_\_ Element: \_\_\_\_\_

|            |         |            |         |            |          |            |          |
|------------|---------|------------|---------|------------|----------|------------|----------|
| 4490.      | N VI    | 4494.13073 | Ar II   | 4500.0     | S V]     | 4504.1     | S V      |
| 4490.0080  | [Fe II] | 4494.374   | Ne I    | 4500.027   | Ni II    | 4504.131   | Ne II]   |
| 4490.041   | Ni II   | 4494.445   | Ni II   | 4500.061   | Ni II    | 4504.18    | Ni V     |
| 4490.08    | Na II   | 4494.515   | Ne II]  | 4500.07    | C VI     | 4504.18964 | Ar II    |
| 4490.080   | Si I    | 4494.630   | O III]  | 4500.0736  | Fe I]    | 4504.2383  | Fe II]   |
| 4490.119   | Fe II]  | 4494.6319  | Fe I]   | 4500.1?    | Na IV    | 4504.35117 | Ar II]   |
| 4490.16530 | Fe I]   | 4494.64    | S IV    | 4500.1296  | Ni I]    | 4504.411   | Ar I     |
| 4490.18    | Mg III] | 4494.756   | Ne II   | 4500.1335  | [Fe II]  | 4504.47    | O III]   |
| 4490.18345 | Fe I]   | 4494.7893  | Fe II   | 4500.17    | [Fe IV]  | 4504.6381  | Ar II]   |
| 4490.1873  | Fe I]   | 4494.84    | N I]    | 4500.187   | Ne II    | 4504.85    | [Ni VI]  |
| 4490.20    | Ni V]   | 4494.93495 | Fe I]   | 4500.252   | Ne I     | 4504.97    | Al IV    |
| 4490.439   | Ca II   | 4494.9524  | Ne I    | 4500.270   | Na III]  | 4505.      | Ar VIII] |
| 4490.4421  | Fe II   | 4495.      | O VI    | 4500.306   | Fe II    | 4505.188   | Si III]  |
| 4490.49584 | Ar II   | 4495.08    | Fe III] | 4500.335   | Fe III]  | 4505.47379 | Fe I]    |
| 4490.501   | Fe III] | 4495.158   | Ne I    | 4500.335   | Fe IV    | 4505.521   | [Ni III] |
| 4490.5889  | Fe I    | 4495.16267 | Fe I]   | 4500.379   | Ne II    | 4505.6061  | Fe II    |
| 4490.709   | Ni II   | 4495.182   | Ne III] | 4500.452   | Ni II    | 4505.66    | Ni V     |
| 4490.721   | O II    | 4495.267   | Ni II   | 4500.476   | Fe III]  | 4505.8     | Na IV    |
| 4490.73    | Na II   | 4495.303   | Si III] | 4500.484   | S III]   | 4505.810?  | Ni II]   |
| 4490.979   | Ni II   | 4495.31321 | Fe I    | 4500.5458  | Fe II    | 4505.842   | Ne II]   |
| 4490.99874 | Fe I]   | 4495.317   | Ni III] | 4500.695   | Na II    | 4506.015   | Ne II    |
| 4491.003   | Fe IV   | 4495.344   | Fe III] | 4500.79    | [Fe IV]  | 4506.03    | Na II    |
| 4491.0625  | Fe II]  | 4495.441   | Na I    | 4500.855   | Ne II    | 4506.055?  | Ni II    |
| 4491.134   | Al II   | 4495.47    | S IV    | 4500.873   | Na II    | 4506.09422 | Fe I]    |
| 4491.3142  | Ni I    | 4495.4826  | Fe I]   | 4500.9502  | Fe II    | 4506.258   | Ni II]   |
| 4491.34386 | Fe I    | 4495.550   | Ni II   | 4500.99270 | Ar II]   | 4506.2845  | Ca I     |
| 4491.409   | Na II   | 4495.8     | S V     | 4501.      | Al V     | 4506.390   | Ca III]  |
| 4491.451   | Na II   | 4495.82412 | Fe I    | 4501.019   | O II]    | 4506.423   | Ar I     |
| 4491.49273 | Fe I]   | 4495.908   | Ni II   | 4501.046   | Ne II]   | 4506.476   | Ni II    |
| 4491.58    | Al IV   | 4496.029   | Fe III] | 4501.084   | Ne I     | 4506.486   | Ni III]  |
| 4491.688   | O II]   | 4496.061   | Fe II]  | 4501.097   | Ne I     | 4506.498   | Fe III]  |
| 4491.75702 | Fe I]   | 4496.06244 | Fe I]   | 4501.147   | Ca III]  | 4506.516   | Na III]  |
| 4491.7984  | Ni I    | 4496.13    | Fe III] | 4501.204   | Ni II    | 4506.634   | Ni II    |
| 4491.827   | Fe II   | 4496.63600 | Fe I]   | 4501.394   | Ne II    | 4506.874   | Ni II]   |
| 4491.891   | Ni II   | 4496.6522  | Fe I]   | 4501.404   | Ni II    | 4506.9519  | Fe I     |
| 4491.89261 | Fe I]   | 4496.688   | Ni II   | 4501.4440  | Ne I     | 4506.9742  | Fe II]   |
| 4491.899   | Ni II   | 4496.68877 | Fe I]   | 4501.457   | Na III]  | 4507.      | Na VII   |
| 4491.9158  | Ni I    | 4496.7773  | Fe II]  | 4501.469   | Ne I     | 4507.0496  | Fe I     |
| 4491.982   | Na III] | 4496.82850 | Fe I]   | 4501.487   | Ni II    | 4507.13    | Al II]   |
| 4492.      | Na VI]  | 4496.91    | Ni V    | 4501.5074  | Fe II]   | 4507.19    | Si I     |
| 4492.004   | Ni II   | 4497.0     | Na IV   | 4501.512   | Fe II    | 4507.266   | Fe IV    |
| 4492.01993 | Fe I    | 4497.13    | N IV    | 4501.722   | Fe II]   | 4507.28    | N II     |
| 4492.07138 | Fe I    | 4497.187   | Ni II   | 4501.885   | Fe II    | 4507.33    | Na II    |
| 4492.141   | Na II   | 4497.206   | Ni II]  | 4501.8977  | Fe I]    | 4507.514?  | Ni II    |
| 4492.151   | Fe III] | 4497.25    | [Fe V]  | 4501.949   | Ni II    | 4507.5705  | Ni I     |
| 4492.173   | O II    | 4497.254   | Ca III] | 4501.9536  | Ni I]    | 4507.625   | Fe III]  |
| 4492.189   | Fe III] | 4497.258   | Fe III] | 4502.      | Al V     | 4507.86    | N II     |
| 4492.230   | Si III] | 4497.4350  | Ca I    | 4502.010   | Ni II]   | 4507.8858  | Ca I     |
| 4492.24129 | Ar II   | 4497.5048  | Fe I]   | 4502.203   | Ne I     | 4507.904   | O III]   |
| 4492.3     | N I     | 4497.507   | Ne II   | 4502.233   | Ni II    | 4508.13    | N II     |
| 4492.319   | Na II   | 4497.69    | Si I    | 4502.253   | Ni II    | 4508.235   | Na II    |
| 4492.3503  | Fe I    | 4497.815   | Ni II   | 4502.320   | Ni II    | 4508.3024  | Fe I     |
| 4492.351   | N II]   | 4498.00    | Ar I    | 4502.34    | O VIII]  | 4508.3665  | Fe II    |
| 4492.39    | C II    | 4498.08    | N III]  | 4502.3539  | Fe II    | 4508.42    | N IV     |
| 4492.40    | [Fe IV] | 4498.369   | S II]   | 4502.4     | N III]   | 4508.459   | Fe III]  |
| 4492.48    | C II    | 4498.379   | Fe III] | 4502.434   | Fe III]  | 4508.4795  | Fe I     |
| 4492.482   | O II    | 4498.43    | N II    | 4502.541   | Ne II    | 4508.6260  | Fe II]   |
| 4492.6655  | Fe II   | 4498.45    | Ar I    | 4502.592   | Ne II    | 4508.63153 | Fe I     |
| 4492.68126 | Ar II]  | 4498.51    | Al II   | 4502.604   | Ni II    | 4508.6710  | Ca I     |
| 4492.72870 | Fe I]   | 4498.55    | Ni V]   | 4502.6308  | Fe II    | 4508.69    | [Ni V]   |
| 4492.837   | Fe IV]  | 4498.559   | Fe III] | 4502.70    | Mg III]  | 4508.707   | O II     |
| 4492.837   | Ni II   | 4498.69    | Mg III] | 4502.78    | [Fe III] | 4508.71    | N II     |
| 4492.933   | Fe II]  | 4498.7880  | Fe II]  | 4502.847   | Ni II    | 4508.7122  | Fe I]    |
| 4493.0297  | Ne I    | 4498.889   | Ni II   | 4502.9     | Na IV    | 4508.714   | Ar I     |
| 4493.096   | Ne I    | 4498.919   | Na I    | 4502.9338  | Ni I]    | 4508.824   | N II     |
| 4493.116   | Ne I    | 4498.95    | Mg III] | 4502.96    | Mg III]  | 4508.922   | Ni III]  |
| 4493.140   | Si III] | 4499.105   | Ar I    | 4502.971   | Ni III]  | 4509.      | C V      |
| 4493.376   | O III]  | 4499.124   | S II]   | 4503.077   | Ni II    | 4509.1089  | Ca I     |
| 4493.378   | Ne I    | 4499.231   | S II]   | 4503.143   | Ne II    | 4509.219   | Na II    |
| 4493.6     | O V     | 4499.241   | O II    | 4503.352   | [Ni III] | 4509.394   | Ne II    |
| 4493.669   | Ne I    | 4499.42    | Fe V]   | 4503.4198  | Fe II]   | 4509.4789  | Fe II    |
| 4493.7075  | Fe I    | 4499.58    | O V     | 4503.61    | N IV     | 4509.534?  | Ni II    |
| 4493.718   | Fe III] | 4499.585   | Ni II]  | 4503.63    | Al IV    | 4509.5524  | Fe II    |
| 4493.8943  | [Fe II] | 4499.778   | Ni II   | 4503.709   | Fe IV]   | 4509.589   | Fe III]  |
| 4493.93909 | Fe I]   | 4499.79836 | Fe I]   | 4503.75    | Fe V     | 4509.7191  | Fe II]   |
| 4494.03    | Fe III] | 4499.79976 | Ar II   | 4503.8539  | Fe I]    | 4509.748   | [Ni III] |
| 4494.05055 | Ar II   | 4499.830   | Ni II   | 4503.863   | Ni II]   | 4509.75    | Na II    |
| 4494.0530  | Fe I]   | 4499.845   | Ne II   | 4503.902   | Ni II]   | 4509.971   | C II]    |
| 4494.063   | Fe III] | 4499.85567 | Fe I]   | 4503.920   | Ne II    |            |          |
| 4494.077   | Fe III] | 4499.9     | Na IV   | 4504.018   | Ne II]   |            |          |
|            |         | 4500.      | Fe XV]  | 4504.060?  | Ni II    |            |          |