

1. **DESCRIPTION:** Students will demonstrate an understanding and basic knowledge of stellar properties, stellar evolution, open and globular star clusters, and spiral, elliptical and irregular galaxies.

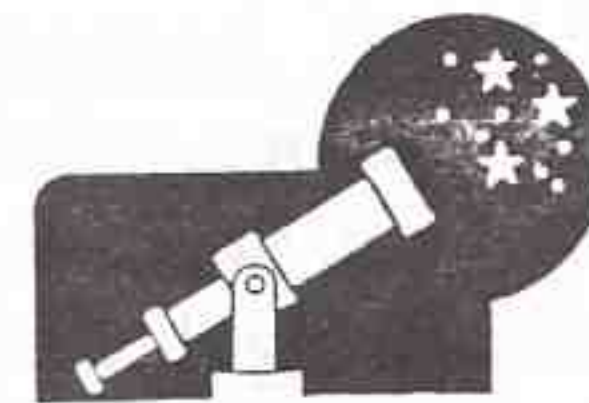
A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 Minutes

2. **EVENT PARAMETERS:** The only resource permitted is one 8.5" x 11" two-sided page of notes containing information in any form from any source.

3. **THE COMPETITION:**

Part I: Participants will be asked to identify some or all of the stars, constellations, and deep sky objects included in the list below as they appear on star charts, H-R diagrams, portable star labs, photos, **slides**, or planetariums. Notes may be used in both parts. Parts I and II may be combined.



Note: Constellations are underlined; **stars are bold face**; and *deep sky objects are italicized*. **Objects preceded by an asterisk are new for 2009**. Participants must provide their own clipboards and red-filtered flashlights.

Andromeda: *M31 Andromeda Galaxy*

*Aquarius: **Helix Nebula*

Aquila: **Altair**

Auriga: **Capella**

Bootes: **Arcturus**

Cancer: *M44 Beehive Cluster*

Canes Venatica: *M51 Whirlpool Galaxy*

Canis Major: **Sirius A & *Sirius B**

Canis Minor: **Procyon**

Cassiopeia: *Cas A & Tycho's SNR*

*Cygnus: ***Deneb**, **Veil Nebula*

Dorado: *LMC*

Gemini: **Castor & Pollux**

Hercules: *M13 Globular Cluster*

*Leo: ***Regulus** & ***Wolf 359**

Lyra: **Vega** & *M57 Ring Nebula*

Mensa: *LMC*

Milky Way Galaxy

Orion: **Betelgeuse, Rigel**

*M42 Orion Nebula & *Trapezium*

Perseus: **Algol**

Sagittarius: *Sgr A*(asterisk is standard)*

*Scorpius: **Antares** & **M6 Butterfly Cluster*

***Sun**

Taurus: **Aldebaran, Hyades**

Tucana: *SMC*

M1 Crab Nebula & M45 Pleiades

Ursa Minor: **Polaris**

Virgo: **Spica, *M84**

*Vulpecula: **M27 Dumbbell Nebula*

Part II: Participants will be asked to complete one or more hands-on or interpretive tasks selected from the following topics: characteristics of the Sun as an average-sized star, spectral classification of stars, evolutionary stages of stars, open and globular clusters, and galaxies.

4. **SAMPLE PERFORMANCE TASKS:**

- a. Given the properties and/or spectra of stars and deep sky objects, participants will identify their proper placement on an H-R Diagram.
- b. Given a set of images illustrating the various evolutionary stages of stars, participants will attempt to order them in the proper sequence from birth through death.

5. **SCORING:** Each task and/or question will have been assigned a predetermined number of points. Rank will be determined by total number of points. Ties will be broken by the accuracy and thoroughness of responses.

SUGGESTED REFERENCES: <http://imagine.gsfc.nasa.gov/docs/teachers/lifecycles/Imagine2.pdf>

http://chandra.harvard.edu/edu/formal/stellar_cycle/ <http://www.glyphweb.com/esky/default.htm>

NATIONAL SCIENCE EDUCATION STANDARDS: Standard A: Abilities necessary to do scientific inquiry; Understandings about scientific inquiry. Standard B: Properties and changes of properties in matter. Transfer of energy. Standard E: Understandings about science and technology. Standard G: Science as a human endeavor.