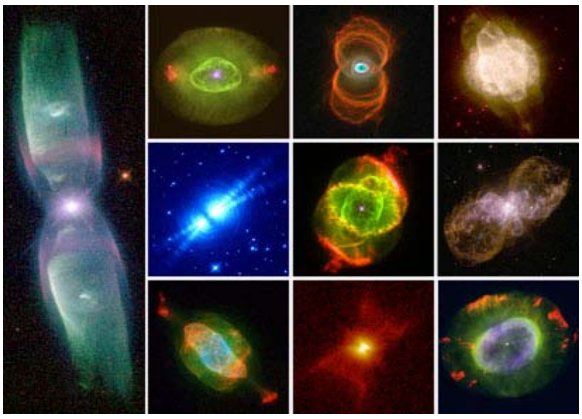
Maine Science Olympiad Reach for the Stars Event
Mt Ararat High School, Topsham - March 22, 2003



Directions:

Do not forget to put your name and team number on the Response Sheet.

Place all of your answers on the Response Sheet.

All resources are permitted.

Good Luck – and May the Stars Be With You…..

Section A: Use the first image sheet (objects A through M) to answer the following questions.

1) **What is the name of the object in image K?**
2) **What type of object is in image K?**
3) **What is the name of the constellation that the object in image K is located in?**
4) **Which image shows the constellation that the object in image K is located it?**
5) **What type of object preceded the object in image K?**
6) **Image D contains the Large Magellanic Cloud and a second object. What is the name of the second object?**
7) **The object named in Question 6 is shown in which two other images?**
8) **The star system in image F will result in the type of object shown in which image?**
9) **What two types of objects are shown in image F?**
10) **Give the names and letters for the two images that contain constellations.**
11) **What is the name of the object in image C?**
12) **What type of object is it?**
13) **The object in image C contains the object located in which other image?**
14) **What type of object is it?**
15) **What is the name of the object in image G?**
16) **What type of object is it?**
17) **What is located in the center of this object?**
18) **What produced the type of object you named in question 17?**
19) **What other image contains the object in image G?**
20) **Which observatory produced the image named in question 19?**

Section B: Use the second image sheet (objects N through Z) to answer the following questions.

1) **Image S was imaged in which band of the spectrum?**
2) **What constellation is in located in?**
3) **What type of object is located behind the number 1?**
4) **What type of object is located behind the number 2?**
5) **What are the small reddish-appearing objects located near the number 3?**
6) **Which image also contains the same types of objects named in question 5?**
7) **Which other image was taken in the same band of the spectrum?**
8) **The image in question 7 is centered in what galaxy?**
9) **What is the name of the very bright structure in this image?**
10) **What type of object is it?**
11) **What type of object is shown in image U?**
12) **What is the name and letter of the image that contains the object in image U?**
13) **Which image shows an oxygen-rich supernova remnant?**
14) **What is the name of the remnant?**
15) **Image P shows the location of a possible new type of object. What is this new type of object called?**
16) **What is the name of the object in image N?**
17) **What type of object(s) is shown in image Z?**
18) **Which image shows a composite image of two bands of the EM spectrum?**
19) **What is the name of this image?**
20) **What type of object is shown in image T?**

Section C: Use the image and diagram sheet (numbered 1 through 18) and the H-R diagram to answer the following questions. Use the letters on the H-R diagram to answer the questions about the locations of objects. Some letters may be used two or more times and some may not be used.

1) **The light curve shown in diagram 13 would happen where on the H-R diagram?**
2) **Just before an 8 solar mass protostar dropped onto the main sequence where would it be located?**
3) **What type of object is shown in number 12?**
4) **Which diagram on this sheet shows a plot of its stars?**
5) **Is the object in number 12 young or old?**
6) **How can you tell whether it is young or old?**
7) **What are the two stages of stellar evolution shown in image 6?**
8) **Where is the object on the right located on the H-R diagram?**
9) **If this object becomes unstable which diagram represents the result?**
10) **Which image shows the progenitor star for this object?**
11) **Which spectrum is produced by this type of object?**
12) **Where on the H-R diagram are the brightest and hottest stars located?**
13) **Which spectra would these types of stars produce?**
14) **Where on the H-R diagram are the brightest and coolest stars located?**
15) **What can you tell about the age of the group of stars plotted on the diagram shown in number 5?**
16) **Where would brown dwarfs be located on the H-R diagram?**
17) **Which two images show the end product of diagram 10?**
18) **The light curve in number 18 is produced by an object located where on the H-R diagram?**

Section D: Use all the images (A through Z and 1 through 18) and the H-R diagram to answer the following questions.

1) **The object in the center of image G is located where on the H-R diagram?**
2) **Where would images O, K. and E be located?**
3) **Where on the H-R diagram was the progenitor star for image K originally?**
4) **Which one of the spectra (2,9,14,17) is produced by the object in image R?**
5) **Object number 16 is located in which two images (A through Z)?**
6) **Where on the H-R diagram would image T be located?**
7) **What are the possible locations on the H-R diagram for the objects associated with image L?**
8) **Where would image I be located on the H-R diagram?**
9) **In image M (larger piece to left) where would the bluish objects be located on the H-R diagram?**
10) **On which branch of the H-R diagram are the objects in image A located?**

TEAM NAME AND NUMBER_____

Response Sheet:

Section A:

1._____	**2.**_____
3._____	**4.**_____
5._____	**6.**_____
7._____	**8.**_____
9._____	**10.**_____
11._____	**12.**_____
13._____	**14.**_____
15._____	**16.**_____
17._____	**18.**_____
19._____	**20.**_____

Section B:

1._____	**2.**_____
3._____	**4.**_____
5._____	**6.**_____
7._____	**8.**_____
9._____	**10.**_____
11._____	**12.**_____
13._____	**14.**_____
15._____	**16.**_____
17._____	**18.**_____
19._____	**20.**_____

Section C:

1._____	**2.**_____
3._____	**4.**_____
5._____	**6.**_____
7._____	**8.**_____
9._____	**10.**_____
11._____	**12.**_____
13._____	**14.**_____
15._____	**16.**_____
17._____	**18.**_____

Section D:

1_____	**2.**_____
3._____	**4.**_____
5._____	**6.**_____
7._____	**8.**_____
9._____	**10.**_____