The galaxy NGC-1232 was photographed by the ESA, Very Large Telesc ope in May, 2003. From resources at your library or the Internet, fill-in the following information:

1) Type of galaxy ---------- Number of arms ----------
2) Name of galaxy cluster it is a member of --------
3) Distance in parsecs and in light-years ----------
4) Right Ascension ------- Declination------
5) Constellation ---------
6) Diameter in light years ------
7) Diameter in arcminutes -----
8) Apparent visual magnitude ----------

From the photograph below, and an assumed diameter of 200,000 light years, answer these questions:

9) Diameter of nuclear region in light years ----------
10) Average width of arms in light years ----------
11) Average spacing between arms in light years--------
12) Diameter of brightest star clusters (bright knots) in light years ----------
13) Describe in 500 words why this galaxy is so interesting.

1) Type of galaxy ---------- Spiral 'Sc' Number of arms ---------- About 5
2) Name of galaxy cluster it is a member of -------- Eridanus Galaxy Group
3) Distance in light-years ---------- 70 to 100 million Light-years
   This question introduces students to the many different values that can be cited, especially on the internet. Earlier estimates (70 million) sometimes are given even though more recent estimates (100 million) are available. For research purposes, astronomers will always use the most current estimate and will state why they do so.
4) Right Ascension ------- 3h 9m 45s Declination------ -20d 34'
5) Constellation ----- Eridanus
6) Diameter in light years ------ 100,000 light years (or 200,000 lightyears)
   The diameter is based on the angular sized (which is fixed) and the distance (which depends on whether you use the 70 or 100 million light year estimate). At a distance of 100 million light years, the diameter is about 200,000 light years. At 70 million light years, the diameter is (70/ 100)*200,000 = 140,000 light years. Students may find articles where authors cite either 100, 000 or 200,000 light years. This might be a good time to ask students which resources preferred one estimate over another, and why there is such uncertainty. How do astronomers measure the distances to galaxies?
7) Diameter in arcminutes ----- 7 arc minutes (moon is 30 arcminutes!)
   This is the diameter of the galaxy as you would see it in the sky from Earth. The moon is 30 arcminutes in diameter, so NGC-1232 is about ¼ the diameter of the full moon. Students may need to be reminded that there are 360 degrees in a full circle, and each degree consists of 60 minutes of arc.
8) Apparent visual magnitude ---------- +10.6
   This is a measure of how bright the galaxy appears in the sky. The faintest stars you can see in a rural dark sky are about +6, while in an urban setting this limit is about +3 . Because each magnitude corresponds to a brightness factor of 2.5, the galaxy is about 8 magnitudes fainter than the brightest star you can see in a city, or a factor of 2.5 x 2.5 x 2.5 x 2.5 x 2.5 x 2.5 x 2.5 x 2.5 = 1500 fainter.

From the photograph, and an assumed diameter of 200,000 light years, answer these questions:
The diameter of the galaxy photograph is about 100 millimeters, so the scale of the photograph is 200,000 light years / 100 mm = 2,000 light years per millimeter.

9) Diameter of nuclear region. About 10 millimeters or 20,000 light years.
10) Average width of arms. Students will find that the arm widths near the nucleus are narrower than in the more distant regions. They vary from about 4mm (8,000 light years) to 10 mm (20,000 light years).
11) Average spacing between arms. As for the arm widths, this can vary from 4 mm (8,000 light years) to 25 mm (50,000 light years).
12) Diameter of brightest star clusters (bright knots). About 2 mm (4,000 light years).
13) Describe in 500 words why this galaxy is so interesting. Students may cite many features, including its similarity to the Milky Way, the complexity of its arms, the many star clusters, the complexity and shape of the nuclear region.