

# Constellation Project

Multimedia report about a region of the sky

## Purpose

Communicate your understanding of the different types of celestial objects.

## Method

Select a constellation, catalogue its major features, and describe its notable members.

## Overview

The sky is divided more or less arbitrarily into 88 zones called constellations. Each constellation appears from our perspective as an area on the surface of the celestial sphere. Actually, each is a three-dimensional wedge of the universe originating at the Earth and extending to the edge of the observable universe. Together, the 88 constellations encompass the entire universe. In this project, you will highlight some of the contents of one of those sections.

## Graded Components

**3D model:** A physical model of the spatial distribution of the prominent stars in your constellation.

**Report:** Tells how to locate the constellation in the sky, catalogues its most prominent stars, and describes four notable objects in the constellation. It is submitted as an HTML file, to be posted to the class web site.

**Oral presentation:** Describes your constellation to your classmates.

## What to Do

Select a constellation. Find its location and a catalogue of its most prominent stars.  
Make a three-dimensional scale model of the positions of the stars.

Select four notable features of the constellation and learn about them. What makes them noteworthy? How are they unique in the sky, or what is their significance to astronomy?

Submit the final report as an HTML file for posting on the class web site. Submission of the report denotes your permission for me to publish it on the web and to reproduce it on other media in accordance with a Creative Commons license of your choosing. (see [creativecommons.org/about/licenses/](http://creativecommons.org/about/licenses/).) You will be credited as the author and copyright holder on all copies.

Finally, briefly report on your constellation orally to the class.

## **Resources**

### **Coe Library Reserve**

Lloyd Motz, Carol Nathanson. *The Constellations*. New York: Doubleday, 1988.

Contains descriptions of the constellations, their stars, and other notable members.

James B. Kaler. *The Hundred Greatest Stars*. New York: Copernicus, 2002.

Fascinating descriptions of 100 noteworthy stars selected for scientific or historical interest.

Bob Berman. *Secrets of the Night Sky*. New York: HarperCollins, 1995.

Lessons in astronomy based on objects that can be seen by the naked eye. I wanted to use this book as the textbook for this class, but it is out of print.

### **Coe Library Reference stacks**

Hans Vehrenberg. *Atlas of Deep-Sky Splendors*. New York: Cambridge University Press, 1983. Ref QB65.V413 1983.

Stephen James O'Meara. *Deep-Sky Companions: The Messier Objects*. Cambridge, MA: Sky Pub. Corp., 1998. Ref QB65.O44 1998.

Robert Burnham Jr. *Burnham's Celestial Handbook: An Observer's Guide to the Universe*. New York: Dover, 1966, 1978; v. 1–3. Ref QB64 .B85 1978.

There are other useful references nearby, as well as numerous titles in the library annex.

## **Dates and Deadlines**

Nov 5	Project introduced
Nov 12	Constellations claimed
Dec 3	Models and HTML reports due
Dec 10	Oral presentations (final exam)

## **Scoring**

### ***Spatial Model (20 points)***

The model should show the positions of all prominent stars in the constellation. Construction of the model will be addressed in class.

0–10	Messy or substantially incomplete.
14	Well-constructed and neat. Contains a linear distance scale. Missing no more than one prominent star.
16	As previous, plus star distances are correct and consistent with the scale.
18	As previous, plus all prominent stars are present.
20	As previous, plus exceptional finish, craftsmanship, or visual appeal.

### ***Report (10 points)***

The report describes the constellation and its stars that determine its visual appearance. Four objects of interest in the constellation are described in detail. The report concludes with an annotated list of sources.

Your description of the constellation should be engaging, accurate, and interesting. It should be written at a level suitable for a newspaper reader or Internet surfer. If you choose instead to write something geared toward an elementary school student, make sure that the astronomical content is still accurate and complete (not oversimplified or “dumbed down”).

Since the report will be posted on the class web page, it must be submitted as an HTML file. If your report contains graphics (as it should), include them also as separate files. In your HTML file, include links to the graphics. Reports not conforming to this format will not be accepted. (That means zero credit.)

The report must meet the highest standards of Edited Standard Written English (ESWE). Consequently, the score for the written report is adjusted by its ESWE multiplier. See the separate document for description of the ESWE rules and the application of the ESWE modifier.

### **Overview (10 points)**

Begin the report with a brief description of the constellation: where it is in the sky, where and when on Earth it is visible, and its appearance. Also report how the constellation received its name, including who named it.

Following this general introduction, all stars prominent in the appearance of the constellation should be catalogued, with their celestial coordinates, apparent magnitude, spectral class, absolute magnitude, and distance from Earth. The presence of these data are credited as follows.

+1	Correctly reports right ascension and declination.
+1	Correctly reports apparent magnitude.
+1	Correctly reports spectral class.
+1	Correctly reports absolute magnitude.
+1	Correctly reports distance from Earth.

The overall score for the table is the average of the scores for the stars. Stars not reported that should be receive a score of zero.

In addition, points for presentation of the overview are as follows.

0	Unintelligible, incomprehensible, or missing required information.
1	Understandable. Contains both overview and bright star catalogue.
3	As previous, plus both overview and catalogue are complete and correct.
5	As previous, plus presentation is clear, organized and concise.

### Detailed feature (4 × 20 points each)

The bulk of the report consists of detailed descriptions of four members of the constellation. One of the members must be a star, one must be a galaxy, and the other two may be any other object of your choosing: stars, star clusters, nebulae, galaxies, galaxy clusters, X-ray sources, radio sources, voids, and so on.

The information you must report on a feature depends on what type of feature it is. Specific information is apportioned ten points, and presentation ten points.

**Star:** Name (proper name, official designation, or both), coordinates, distance from Earth, spectral class, apparent magnitude, absolute magnitude. Describe something interesting about the star. Include an H-R diagram (graphics file) plotting the star's temperature and absolute magnitude.

+1	Name or catalogue designation reported.
+1	Right ascension and declination correctly reported.
+1	Distance from Earth correctly reported.
+1	Spectral class correctly reported.
+1	Apparent magnitude correctly reported.
+1	Absolute magnitude correctly reported.
+2	Interesting fact about the star correctly reported.
+2	Star is correctly plotted in the H-R diagram.

**Galaxy:** Name (common name, official designation, or both), coordinates, type, apparent magnitude, mass or number of stars if known, photograph (with attribution). Describe something interesting about the galaxy.

+1	Name or catalogue designation reported.
+1	Right ascension and declination correctly reported.
+1	Galaxy correctly classified.
+1	Apparent magnitude correctly reported.
+1	Mass or approximate number of stars in the galaxy correctly reported.
+1	Photograph of galaxy included.
+2	Photograph is properly attributed.
+2	Interesting fact about the galaxy correctly reported.

**Star cluster:** Name (common name, official designation, or both), type (open or globular), coordinates, diameter, number of stars, apparent magnitude, distance from Earth, age, photograph (with attribution) if available. Describe something interesting about the cluster.

+1	Name or catalogue designation reported.
+1	Right ascension and declination correctly reported.
+1	Type of cluster correctly identified.
+0.5	Diameter of cluster correctly reported.
+0.5	Approximate number of stars in cluster correctly reported.
+1	Apparent magnitude correctly reported.
+0.5	Distance of cluster from Earth correctly reported.
+0.5	Estimated age of cluster correctly reported.
+1	Photograph of cluster included.
+1	Photograph is properly attributed.
+2	Interesting fact about the cluster correctly reported.

**Nebula:** Name (common name, official designation, or both), coordinates, type (dark, emission, reflection, supernova remnant), description of appearance, photograph (with attribution). Describe something interesting about the nebula.

+1	Name or catalogue designation reported.
+1	Right ascension and declination correctly reported.
+2	Type of nebula correctly identified.
+1	Appearance of nebula correctly described.
+1	Photograph of nebula included.
+2	Photograph is properly attributed.
2	Interesting fact about the nebula correctly reported.

**Other object:** name, coordinates. Describe something interesting about the object.

+2	Name or catalogue designation reported.
+1	Right ascension and declination correctly reported.
+7	Interesting characteristics and significance of the object fully reported.

**Presentation.** In addition, points for presentation are as follows.

6	The information is easy to follow at the appropriate reading level.
8	As previous, plus description is concise and interesting.
10	As previous, plus description is especially engaging: graphics are informative and arresting, phrasing is clever and lively.

### **Annotated bibliography (10 points)**

This is a record of all the sources you found valuable in researching your constellation. It contains:

- Standard bibliographic look-up information, complete enough for someone else to be able to find the source. For different types of source, this comprises:
  - Book: title, authors, city, publisher, and year of publication.
  - Chapter in an edited book: chapter title, chapter authors, book editors, book title, city, publisher, and year.
  - Journal or magazine article: authors, title, journal title, year, volume number, issue number, and page range.

- Web site: Author and publishing organization (if this information is not available, explicitly state this), title of main site, title of specific page or section used, URL *with active link*, most recent access date.
- A brief summary of the topic, contents and creator (“Max Planck’s original derivation of the black-body radiation formula written in German,” “A medieval Senegalese epic about the constellation Aquila,” etc.);
- A justification of why the source makes worthwhile further reading (“this article explains how Henrietta Leavitt recognized the period-luminosity relationship of the Cepheid variable stars,” etc.); and
- An assessment of the readability, usefulness, and interest level of the source.

0–5	Fewer than three sources, sources all from the Internet, or incomplete citations.
7	Contains at least three sources including one non-Internet source. Contents of all sources are adequately summarized.
8	As previous, plus all sources are assessed for readability, usefulness, and interest.
10	As previous, plus all descriptions are brief, crisp, and believable.

### ***HTML (10 points)***

The HTML code of your file should be standard and correct. The file should contain one head and one body; there should be a title declared in the head; all other text should be in the body; all structures should be properly opened and closed.

The file should employ the ClassStyle.css external style sheet, and your report should contain a Creative Commons license statement.

3	Uses the ClassStyle.css style sheet on the class web site.
7	As previous, plus HTML errors are rare.
10	As previous, plus contains an appropriate Creative Commons statement.

### ***Oral Presentation (20 points)***

Your presentation includes a description of where and when the constellation is visible, its general appearance, and how the constellation was named. Briefly describe your spatial model of the constellation, and briefly report on one of the four noteworthy members of the constellation.

Your presentation shall be understandable and factually correct. Speak audibly and with animation, and maintain eye contact with your audience.

0–10	Inaudible, unintelligible, or incomprehensible.
12	Speaks clearly and understandably; presentation contains all components.
14	As previous, plus all reported facts are correct.
16	As previous, plus presentation is clear, organized and concise.
18	As previous, plus maintains eye contact with class.
20	As previous, plus conveys enthusiasm.