

## Visualizing Vesta

### STUDENT ACTIVITY

#### BACKGROUND

Small worlds in the solar system, such as asteroids and comets, tell us about the conditions that existed when the Sun and planets were still forming. Asteroids are among the "original members" of the Solar System. Asteroids are remnants of the process that built the inner planets.

The main asteroid belt lies between the orbits of Mars and Jupiter. Two of its largest bodies are Vesta and Ceres, the targets of NASA's Dawn mission. Scientists think they have remained intact since the earliest stages of their formation. Dawn's goal is to characterize the conditions and processes of the solar system's earliest epoch. How? This will be accomplished by investigating two of the largest objects in the asteroid belt. Even though they are both members of the main asteroid belt, Ceres and Vesta followed very different evolutionary paths.



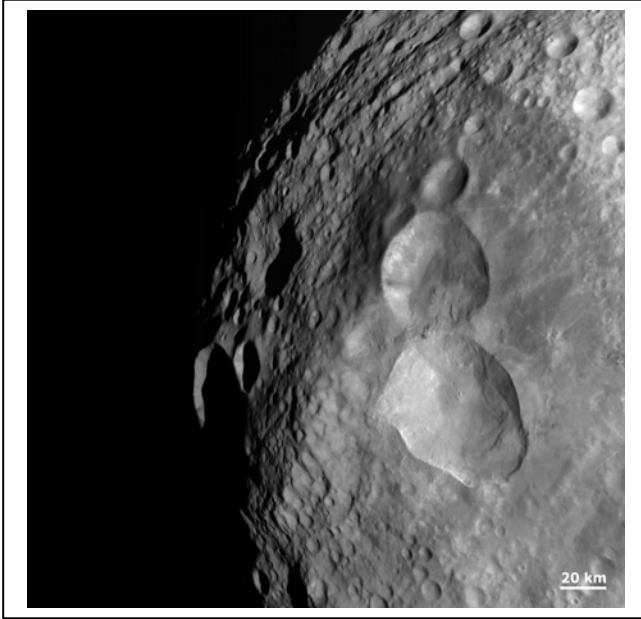
This full view of the giant asteroid Vesta was taken by NASA's Dawn spacecraft, as part of a rotation characterization sequence on July 24, 2011, at a distance of 3,200 miles (5,200 kilometers).

Dawn began orbiting Vesta in mid-July of 2011. The spacecraft imaged one of the largest mountains in the Solar System in the asteroid's southern hemisphere. Science findings also include an in-depth analysis of a set of troughs near Vesta's equator, and a close look at its intriguing craters.

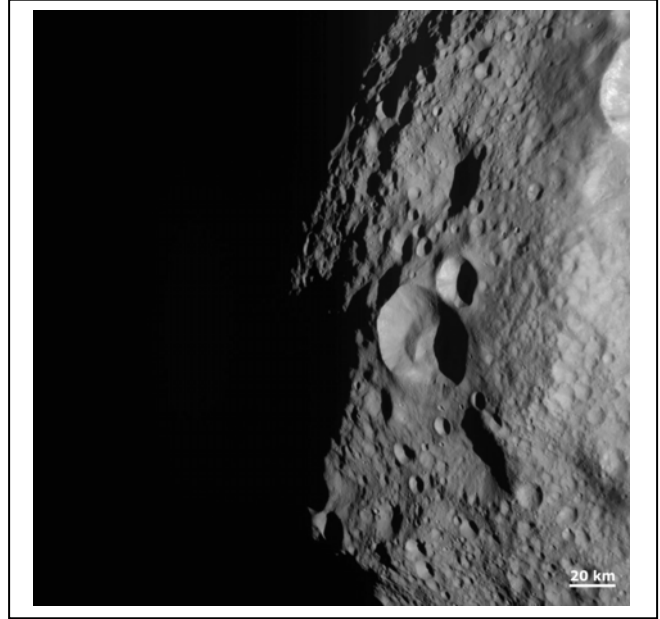
In this activity we will join scientists taking a closer look at some of the first images returned from Dawn.

#### Lesson Objectives

- Compare features of two different areas of Vesta's surface.
- Hypothesize some possible causes for differences between the two images.
- List questions that you have about the surface of Vesta.



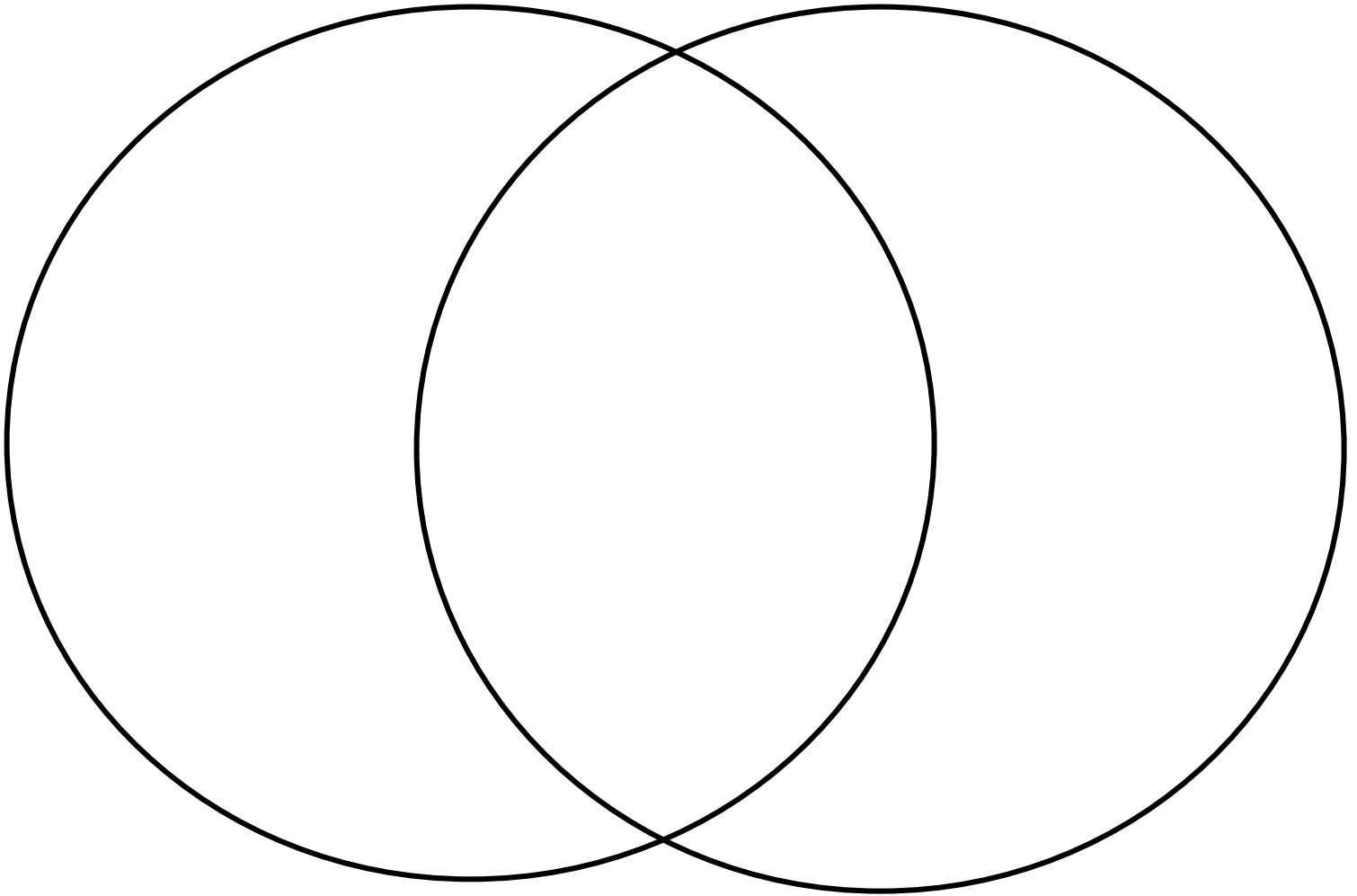
NASA's Dawn spacecraft obtained this image with its framing camera on **August 20, 2011**. This image was taken through the camera's clear filter. The image has a resolution of about 260 meters per pixel.



NASA's Dawn spacecraft obtained this image with its framing camera on **August 11, 2011**. This image was taken through the camera's clear filter. The image has a resolution of about 260 meters per pixel.

## Procedure

Based on your observations of these images, how are the surfaces similar? How are they different? Use the Venn Diagram on the next page to help organize your descriptions. Write descriptions that are unique to the **August 20** image on the **left**. Write your descriptions that are unique to the **August 11** image on the **right**. For those features that are common to both images, write the descriptions in the middle, where the two circles intersect. Observations can be qualitative (using word descriptions) or quantitative (using numbers and measurements).



August 20, 2011 Image

August 11, 2011 Image

**Note**

In comparing the surfaces:

- We suggest including observations (descriptions of what you see) first, then adding interpretation afterward.
- Once you have completed making detailed observations, choose several observations and interpret what may have caused surface feature or characteristic you observed.



In the assessment that follows you will make careful observations and interpretations of a new image from Vesta using the same skills you practiced above.

### **Assessment**

Examine Vesta images from Dawn. Choose one to observe and interpret. Images can be found in the Vesta Image of the Day Gallery located here: <https://dawn.jpl.nasa.gov/>

Use the rubric provided on the next page as a guide.

Indicate the name and date of the image.

Observations:

Interpretations:

## Scoring Rubric

Criteria	4	3	2	1
Makes accurate observations	Clearly describes almost all of the features of the image in detail. Includes great clarity of the entire surface as a whole.	Clearly describes the features of the image in detail.	Describes a few of the features of the image but doesn't provide many details.	Describes only one or two features in the image, but provides so few details that the reader has trouble distinguishing them
Interprets and synthesizes information	Explanations of observations about the features of the Vesta image are reasonable and thorough.	Explains observations about the features of the Vesta image in ways that are reasonable.	Provides explanations about observations of the features of the Vesta image which may not be reasonable.	Explanations about the features of the Vesta image do not match the observations.

### Asteroid Mappers Extension

[http://dawn.jpl.nasa.gov/DawnCommunity/asteroid\\_mappers.asp](http://dawn.jpl.nasa.gov/DawnCommunity/asteroid_mappers.asp)

**Asteroid Mappers:** In this project the students can access and analyze high-resolution Dawn images of Vesta including craters and other features from your own computer.