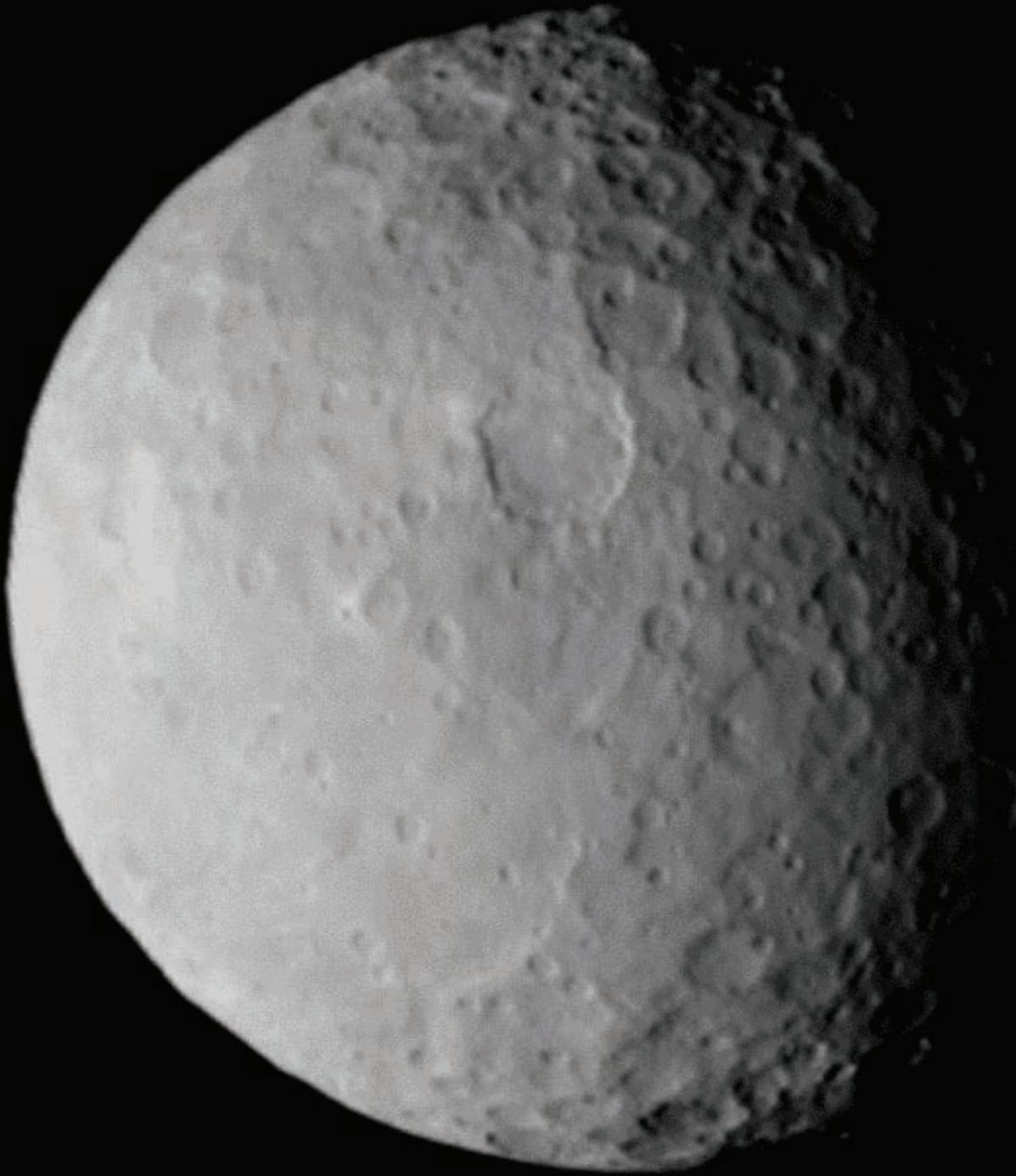


Exploring Dwarf Planet Ceres



Exploring Dwarf Planet Ceres

One of the most exciting events that astronomers can experience is to see a celestial object clearly for the first time. That's what recently happened with the dwarf planet Ceres. This image of Ceres was taken by NASA's Dawn spacecraft on May 23, 2015, from a distance of 3,200 miles (5,100 kilometers). Astronomers were amazed to see that its surface is heavily cratered and shows spots of mysterious white material in several locations.

Ceres' surface – untouched by erosion or internal melting and volcanism, as Earth's surface has been – is believed to be 4.6 billion years old, as old as our solar system. Most of the impacts that produced the craters on Ceres probably occurred during a period in solar system evolution that scientists call the Late Heavy Bombardment Era, which ended about 3.8 billion years ago. Heavily cratered surfaces like that of Ceres are seen all across the solar system, most notably on our own moon, Mercury and even the recently mapped asteroid Vesta.

Counting and measuring craters on Ceres can provide insights into the cratering process that created its surface. It appears to have fewer large craters than scientists had expected to see, a possible indication that most of the material that came together to form Ceres was smaller asteroids.

The new images also tell us that the surface of Ceres has more than just craters and mountains. Brilliant white spots can be found near the bottoms of several craters. Such features have never before been seen on an asteroid or a dwarf planet.

What is it? How can we find out? The scientific exploration of this world continues!

Space Math Challenge!

The surface of Ceres is covered by approximately 10,000 craters larger than 10 km across. If they formed during the 600-million-year-long Heavy Bombardment Era, about how long would you wait between the impacts? **Now try this:** With the help of a millimeter ruler, a printed copy of the image, and knowing that the diameter of Ceres is 938 km, what is the diameter, in kilometers, of the largest crater you can see in this image?

Answer: Time = 600 million years/10,000 impacts = 60,000 years!

Now try this: Solve the proportion for X, the diameter of the crater: $(938 \text{ km}/184\text{mm}) = (X/23\text{mm}) = 120 \text{ km}$