

11-14 age group Winner: Finn Bradley, Limerick Educate Together National School, Ireland

All three targets are very interesting but if I had to choose one to study it would be target one Rhea. Mainly because there are lots of mysteries to be solved there, such as wispy features, a possible ring system and a relatively young crater.

In 1980 a Voyager probe first photographed Rhea but at a great distance of 580,000 Km. Since then Cassini has passed much closer and in March this year it passed Rhea at 100 Km and took some amazing photos.

Rhea is Saturn's second largest moon at 1,528 Km across. It has a very low density because it is mainly composed of water ice, it has no atmosphere. One side is bright and heavily cratered and the other side is dark with fewer craters. The widest crater is called Inktoma (nicknamed 'the splat') and is 48 Km wide. Inktoma may be one of the youngest craters on the inner moons of Saturn.

Rhea also has huge impact basins, some of which are 400 and 500 Km across. One of the northerly impact basins called Tirawa is roughly comparable to the basin Odysseus on Tethys (my favourite moon of Saturn!). Tirawa and other impact basins are covered in impact craters suggesting they are very old.

Rhea's surface can be divided into two geologically different areas based on crater density. The first area contains craters which are larger than 40 Km in diameter, the second area which is the area of the poles and equator, has craters under 40 Km diameter. This might indicate that a major resurfacing event occurred sometime during its formation.

As on Callisto, a moon of Jupiter, the craters lack the high relief features seen on our moon and on Mercury. But an interesting thing is that many of Rhea's craters are polygonal, which means they aren't in a smooth circular shape but rather rough angular shapes. On the dark side of Rhea there is a network of bright swaths on a dark background. It is thought that these bright swaths may be material ejected from ice volcanoes early in Rhea's history, when its centre was still liquid. However when Cassini studied Dione, another of Saturn's moons, which had similar streaks, it was found out that they were really ice cliffs made from extreme pounding of the moon's surface. It is possible that the bright streaks on Rhea's surface are also ice cliffs. When Cassini spacecraft flew down low, it got a picture of what appears to be ice cliffs on Rhea.

In 2008 the Cassini team found evidence of material orbiting Rhea, which may indicate that Rhea may have a ring system, like its parent planet Saturn. This would be the first time a ring system has been found around a moon. However in August 2010, this claim was withdrawn and the cause of Cassini's 'Magnetospheric Imaging' instrument detecting sharp, brief drops in electrons on both sides of the moon remains a mystery.

So many wonderful, mysteries reside in Rhea. Hope it's picked!