

# Asteroid Exploration by the Dawn Spacecraft

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**The Dawn spacecraft, with its novel ion propulsion system, has completed its exploration of Vesta and is now in orbit around Ceres. Vesta (~500 km diameter) is a rocky body with a large metallic core, an ultramafic mantle, and a basaltic crust. Large impacts have excavated samples which occur as meteorites, used to calibrate Dawn instruments and improve interpretations. The mapped surface of Vesta reveals unexpected features and contamination by carbonaceous chondrite. The early petrologic evolution of Vesta was surprising complex. Ceres (~940 km diameter) is an icy body with a rocky interior. Craters are under-abundant, and smooth features suggest terrane softening. Thermal alteration has produced hydrous minerals that resemble altered carbonaceous chondrites, although no meteorite samples from Ceres are recognized. Our own planet is thought to have accreted from differentiated protoplanets like Vesta and Ceres, and the Dawn mission allows us to travel back in time.**

**1 West**