Unit Two

Introduction to Impact Cratering

The following activities demonstrate the fundamental principles of impact crater formation. The activities are simulations; true impact or volcanic events take place under conditions different from the classroom. Although some aspects of the simulations do not scale directly, the appearance of the craters formed in these activities closely approximates natural, full size craters. These laboratory exercises can be used to stimulate discussions of planetary landscapes, terrestrial craters, and the evolution of planetary surfaces.

In these experiments, students will study the craters formed when objects of different masses and traveling with different velocities strike a target of fine sand. This activity demonstrates important concepts: first, there is a relationship between the velocity and mass of the impactor and the size of the crater formed; and second, craters can be divided into distinct zones: floor, wall, rim, ejecta. The "Rainy Day" experiment illustrates the relation between crater frequency and relative surface age, as well as demonstrating the effect of illumination angle on identifying craters.

On Earth, volcanic explosion craters are often formed when magma rises through water-saturated rocks and causes a phreatic, or steam explosion. Volcanic explosion craters from phreatic eruption often occur on plains away from other obvious volcanoes. Other volcanic eruptions can cause mild explosions, often in a series of events. Some volcanic craters form by collapse with little or no explosive activity. Volcanic craters are typically seen either on the summits or on the flanks of volcanoes. Volcanic craters have also been identified on the Moon, Mars, Venus, and Io. The exercise comparing these cratering processes will help the student learn to identify the differences in the resultant craters.