The title of this Student Text is
“Variables involved in Cratering”

As you read this student text, answer the “Thinking about Your Learning” questions on the last page of The Process of Crater Formation Report Sheet.

Variables involved in cratering include impact velocity, projectile density, target density, the yield strength of the target, gravity, and projectile mass and the effect of an atmosphere.

Another factor of importance in cratering is the angle of impact. For this variable, there are differences between low energy impacts, such as those in classroom experiments, and high energy Solar System scale impacts.

In low energy impacts, the shape of the crater becomes elliptical as the angle of impact moves away from vertical,

High energy impacts still create a spherical shock wave, and therefore a circular crater, although the intensity of that shock is lessened and the crater will not have as great a depth.

In the next part of the Feel the Impact unit you will investigate low energy impacts by making classroom models by Designing a Crater on Comet Tempel One.

How does all of this apply to the specific problem of designing a crater on Comet Tempel One? The list of variables mentioned above gives us some insight into the problem.

The mission team was able to control the projectile density, the impact velocity, and the projectile mass.

Ideally, to determine what values to choose for those factors, they wanted to know the target variables –comet density, gravity, yield strength, and porosity.

However, these things were not well known during mission planning. In fact, the driving purpose of the Deep Impact mission was to learn about these and other characteristics following the impact.