Name(s)

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Project Number

J0605

Project Title

What An Impact! How Does Mass and Velocity Affect the Size of an Impact Crater?

Abstract

Objectives/Goals

Impact craters are formed when pieces of asteroids, meteors, or debris strike the surface of a planetary body. This project is to find how both the mass and velocity of an impactor affect the impact crater size. My experiment looked at what the effects of dropping balls of different mass size at a fixed height (constant velocity) will have on the diameter size of the crater that is formed. I also looked at what the effects of dropping these balls at different heights (varying velocity) will have on the crater diameter. My hypothesis is that balls with more mass will create larger impact craters and balls dropped at a higher height will create larger impact craters.

Methods/Materials

Four balls of different weights (23g, 73g, 126g, and 143g) but same size (71mm) were dropped at a fix height and at different heights (0.5m, 1m, and 1.5m) onto a layer of flour covered with cocoa. Measure the diameter of the crater formed each time. There were five trials for each ball drop.

Results

In all three different height drops, ball 1 had the smallest impact crater diameter formed, while ball 4 had the largest impact crater diameter formed. Thus, as the masses of the balls increased, so did the diameter of the crater produced. The second part of my results was looking at each ball dropped at three different heights. For each ball, the crater diameter increased as the height of the ball drop increased.

Conclusions/Discussion

My conclusion is that crater diameter increases with increasing mass. Also as the height of the ball increases, so does the crater diameter. Thus crater diameter is proportional to the mass and velocity of the impactor. Based on the kinetic energy equation, kinetic energy$=1/2mv^2$, velocity increases have more effect on a crater diameter than mass increases since velocity is squared.

Summary Statement

My project is to show how mass and velocity of an impactor affect the size of an impact crater.

Help Received

My parents supervised me during the set up and the experiment. My mom showed me how to design the graphs.

Ap2/03