CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J0808

Project Title
Impact in Three, Two, One: Determining if the Mass or Circumference of an Impactor Creates a Larger Impact Crater

Abstract

Objectives/Goals
Does the circumference or the mass of an impactor cause a larger impact crater as measured by the crater diameter, depth, and/or longest ejecta ray?

Methods/Materials
6 impactors were tested a total of fifteen trials per impactor. The impactors were divided into two groups; the small group had the same circumference size but each impactor increased in mass. The large group had the same circumference that was larger than the small group and each impactor increased in mass. Tests were completed by placing a large black covering on the floor and a tray was placed in the center of the cover. The tray was filled to the rim with flour and was compacted with another container. A meter stick was placed vertical to the lip of the tray and the impactor was placed at the one meter mark. The impactor was released and after impact, the impactor was removed from the crater with forceps. A ruler was used to measure the impact crater diameter, depth, and a meter tape was used to measure the length of the longest ejecta ray. The process was repeated in a new area of the tray for a total of fifteen trials. A new tray was used for each impactor.

Results
My results showed that the impactor with the greatest circumference and mass created the longest ejecta ray by an average of 7.5 cm. The deepest crater was created by the larger impactor with the second greatest mass; this impact crater measured at an average depth of 2.8 centimeters which was 0.1 centimeters deeper than the other impact craters. The largest diameter measured at an average of 2.8 centimeters and was created by the two largest impactors. My results from the small impactors consistently showed the impactor with the second greatest mass caused the longest ejecta ray, deepest crater, and widest diameter.

Conclusions/Discussion
In conclusion, the damage caused by impactors (ejecta ray length, crater depth, and crater diameter) does vary based upon the impactor size. Crater depth, diameter, and ejecta ray length can be correlated to the mass and circumference of an impactor but one also has to consider the surface that the impactor strikes and the velocity at which the impactor travels.

Summary Statement
This project investigates if the circumference or mass of an impactor causes a larger impact crater as measured by crater diameter, depth, and longest ejecta ray length.

Help Received
My science coach supplied testing materials and supported research; my father clarified how to measure for data.