Making an Impact

M7-11

Question

Does the material of a surface effect the size of its impact zone?

Abstract

Meteors come into Earth's atmosphere every day. Although most do not actually reach Earth's surface, as they burn up in the atmosphere. Some do reach Earth's surface though, and they often can create an impact. But, does the material it is landing on effect the size of said impact zone.
To represent most of Earth's surfaces, water, sand, dirt and gravel surfaces where tested. Water, being the lest dense, will most likely have the largest impact zone. Sand, was predicted to have the second largest impact zone, followed by dirt, and gravel last. My hypothesis was partially supported as water ended up having the largest splash area, but sand actually had no splash area as the rock only compacted the sand, as it was predicted to have the second largest splash area. Gravel actually had the second largest splash area, due to the fact that sometimes a couple rocks where sent flying. Dirt was somewhat similar to sand but instead of absorbing the impact it was kind of bouncy.

Hypothesis

If a rock is dropped on water, dirt, sand and gravel, then the water will cause the largest splash area, because it has the weakest and loosest make up, and will let the rock pass through it more easily and let the rock move more water.

Materials

Water, Dirt, Gravel, Sand, Non-Glass Bowl, Granite Counter Top, Measuring Tape, Notebook, Rock Approximately 5 Centimeters in Diameter, One Cup Measuring Cup, Eye Protection

Variables

Independent- The independent variable is the material of what the rock is being dropped on.

Dependent- The dependent variable is the area of the impact zone.

Controls- The controls are how high the rock is being dropped from, the material being dropped, the surface under the material being dropped on, and the amount of force applied to the rock.

Procedure

1. Gather all materials.
2. Put eye protection on.
3. Fill non plastic bowl with water.
4. Place water filled bowl on granite counter top.
5. Extend measuring tape to one meter and lock it in that position.
6. Place the measuring tape perpendicular to granite counter top and next to the bowl.
7. Hold rock above water directly adjacent to the top of the measuring tape.
8. Remove measuring tape.
9. Drop rock.
10. Record length and width of the splash zone created in note book.

Wipe up water.

Procedure

11. Repeat steps 2 through 10, 19 more times.
12. Fill the measuring cup with Dirt.
13. Place dirt in the center of counter.
14. Extend measuring tape to one meter.
15. Place the measuring tape perpendicular to granite counter top and next to the dirt.
16. Hold rock directly adjacent to extended measuring tape and above pile of dirt,
17. Repeat step 8 and 9.
18. Wipe up dirt and place back in cup.
19. Repeat steps 13 to 19, 19 more times.
20. Repeat steps 12 to 20 for sand and gravel.

Results

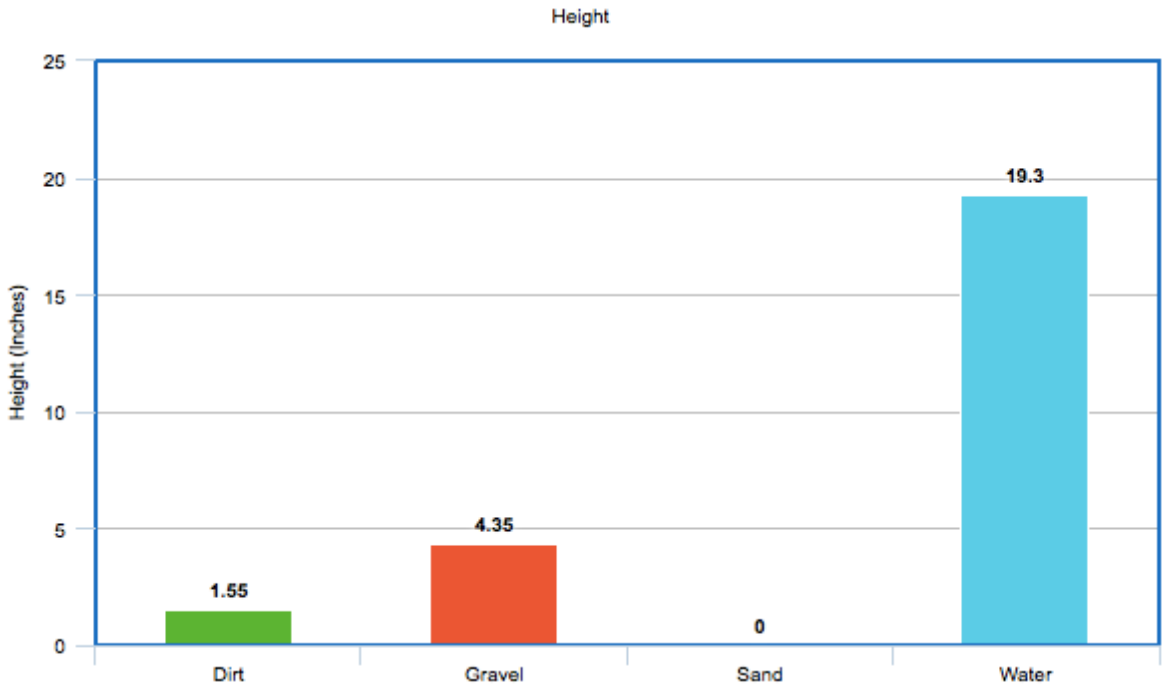
Water Average
Height- 1 foot and 7.3 inches
Width- 1 foot and 6.7 inches

Gravel Average
Height- 4.35
Width- 5.2

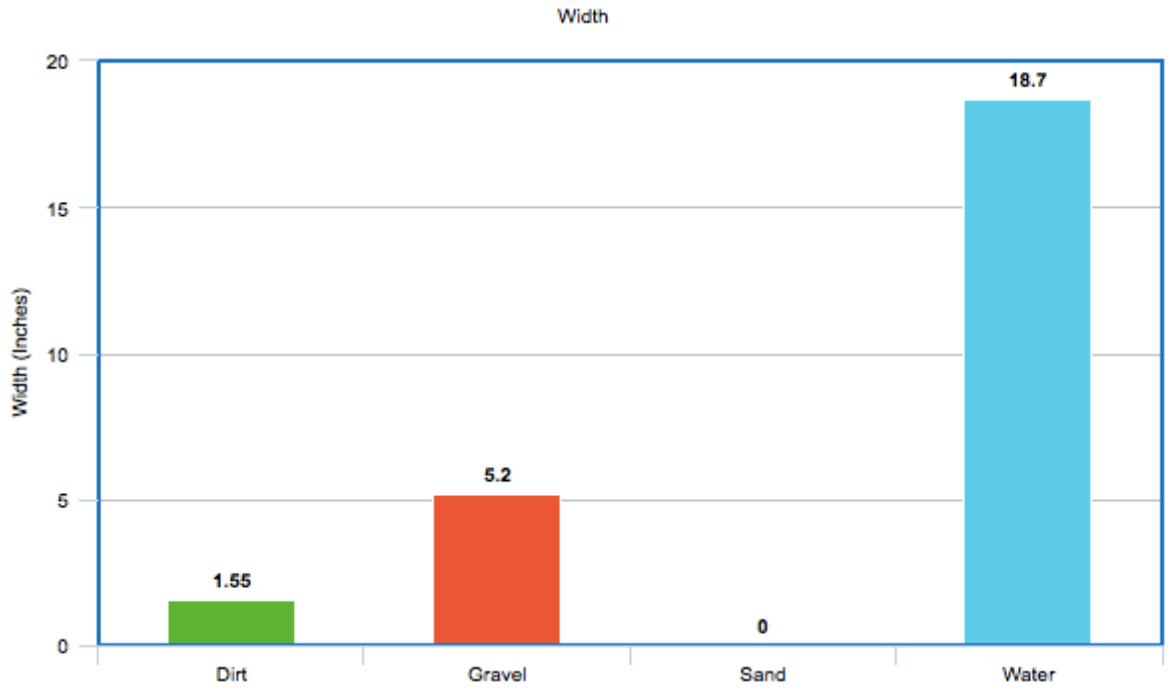
Sand Average
Height- 0 feet and 0 inches
Weight- 0 feet and 0 inches

Dirt Average
Height- 1.55
Width- 1.55

Graph- Height



Graph- Width


Width
Width (Inches)
20
15
10
5
0
1.55
5.2
0
18.7
Dirt
Gravel
Sand
Water

Conclusion

My hypothesis was partially correct. The water did have the greatest splash area, but didn't have as even and circular splash zone as expected. It was more of a speckled amount of splashes. Contrary to the hypothesis, the sand instead of having the second largest splash area, it ended up having the smallest. In fact, it had no impact zone as instead of the rock sending the sand flying, it only absorbing the impact and compacted the sand. The actual second largest impact zone was actually gravel, which was expected to have the smallest impact zone. As predicted, of the heavy bits of rock where offset only a little, but there where outliers as some individual bits where sent farther distances. Lastly, the dirt had the third largest impact zone. Similar to the sand, the dirt absorbed the impact, but it did have a but of recoil, bouncing some sediments farther away. Overall, the hypotheses was partially correct, an much new information was found.

Works Cited

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