

Making Craters

Activity Mission 3

Objectives

Understand how size of a meteor influences crater formation
Understand how speed of a meteor influences crater formation

Initial Questions

Which would make a larger crater (in diameter) if it hit the Moon? – a meteor with 6” or 12” diameter? Why?

Would a 6” meteor make a larger crater (in diameter) if it hit the Moon at 100 km/hr or 200 km/hr? Why?

What factors might affect the height of the crater walls?

Materials

- Shallow basin at least 1 square foot (30 centimeters) - cat litter boxes work well
- bags of unbleached flour
- box of instant cocoa
- several pebbles of various sizes -1/3 to 1 1/2 inches (1 to 4 centimeters)
- old newspaper
- ruler
- pen or pencil
- chair
- data sheet

Procedure

Meteor Size

1. Spread old newspaper out in an area where you will conduct this activity.
2. Fill a basin with flour about 1 1/4 to 1 1/2 inches (3-4 centimeters) deep. Sprinkle a little cocoa on the surface. This will make the changes caused by the pebbles more visible. Gather the various pebbles; they will be the "meteoroids."
3. Pick out one of the smallest pebbles and measure its diameter in cm. Record this number on the chart below.
4. Have a student volunteer to drop (not throw) the pebble from about eye level into the basin.
5. Measure the diameter and height of the crater and record your data in the chart below. Also describe any other observations. Now, try to predict the appearance of a crater formed by a larger pebble dropped from the same height.
6. Aiming for a different area of the pan, have the same student volunteer drop a medium size pebble from about the same height. What is different about the crater? Record the same information on the chart as you did above.

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7. Have the same student volunteer drop the largest pebble from the same height. Record your results.

Meteor Speed

8. You will use the same pebble for each step of this activity. Select a medium-size pebble and measure its diameter.
9. Have a student volunteer to drop (not throw) the pebble from about knee level into the basin.
10. Measure the diameter and height of the crater and record your data in the chart below. Also describe any other observations. Now, try to predict the appearance of a crater formed by the same pebble but dropped from a higher place.
11. Have the same student volunteer drop the medium size pebble from eye level. What is different about the crater? Record the same information as before in the chart below.
12. Have the same student volunteer to stand in a sturdy chair, raise his or her hand straight up, and drop the medium size pebble from that level. What is different about the crater? Record your results.

Questions

Use the charts below to record your data.

Size of Meteor

| | Diameter of pebble (in cm) | Diameter of crater formed (in cm) | Height of crater formed (in cm) | Other Observations |
|---------------|----------------------------|-----------------------------------|---------------------------------|--------------------|
| Small pebble | | | | |
| Medium pebble | | | | |
| Large pebble | | | | |

Speed of Meteor (medium pebble only)

| | Diameter of pebble (in cm) | Diameter of crater formed (in cm) | Height of crater formed (in cm) | Other Observations |
|-------------------------------------|----------------------------|-----------------------------------|---------------------------------|--------------------|
| Knee level | | | | |
| Eye level | | | | |
| Standing on chair with extended arm | | | | |

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Describe in one or two sentences the relationship between meteor size and craters.

Describe in one or two sentences the relationship between meteor speed and craters.

Locate a map of the Moon. Relate your data to the various craters that you see on the Moon, and try to predict what type of meteor may have caused some of the craters