



CRATER MAKERS

7-12 yrs | 20 min | Stage 2 to 3

Why are some Moon craters tiny while others are enormous?



? Wonder & Predict

Why do you think some Moon craters are much bigger than others?

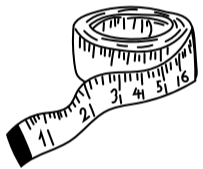
- The object that hit was bigger
- It fell from further away
- It was moving faster
- Something else: _____

WHY DO YOU THINK THAT?

What you will need



- 1 marble



- Ruler or tape measure



- Tray with sand



- Optional: larger and smaller marbles for extension investigations

Observe & Record

What clues did you discover?

- Higher drops made larger craters
- Higher drops made deeper craters
- Sand was pushed away from the impact point
- Different heights produced different results
- Height affected crater size
- Some craters were wider than expected
- I noticed a pattern



Investigate

Follow the steps carefully while observing.

1 Prepare the Surface

- Smooth the damp sand with your hand to create a flat, level surface.
- Scientists need a fair test, so start with the same conditions each time.

2 Predict the Impact

You are about to drop the marble from your first height.

- The marble will make a hole in the sand The marble will bounce off The sand will stay flat

3 Drop the Marble

- Use a ruler or tape measure to set your first drop height. (30 cm)
- Hold the marble directly above the sand. Release it without pushing.

4 Examine the Evidence

- Look closely at the crater. Is it shallow or deep?
- Wide or narrow? What clues can you see around the edges?

5 Measure the depth of the crater

- Use a ruler to measure the depth of the crater.
- Record your measurement.

6 Predict Again

You are about to increase the drop height. What do you think will happen?

- The crater will stay about the same size The crater will become larger More sand will be thrown out

7 Test Your Prediction

- Increase the drop height by about 15 cm.
- Release the marble again.
- Observe the new crater.

8 Compare the Evidence

- Measure the second crater.
- Compare both results.
- Did your prediction match what happened?



What happened?

Fill in the sentences using words from the box.

energy | crater | impact | deeper | larger | gravity |

1. When the marble is released, _____ pulls it towards the ground.
2. The higher the marble starts, the more _____ it gains before hitting the sand.
3. When the marble hits the surface, the _____ pushes sand away from the landing point.
4. The hole left behind is called a _____.
5. A higher drop usually creates a _____ crater.
6. A higher drop often creates a _____ crater too.



The science behind it

When a marble is held above the sand, gravity pulls it towards the Earth. As it falls, it speeds up and gains energy.

The higher the marble starts, the faster it is moving when it reaches the sand. Faster impacts transfer more energy into the surface.

That energy pushes sand outwards and downwards, creating a crater. Scientists call this an impact crater.

Planetary scientists use the same clues when studying craters on the Moon, Mars and other worlds. By measuring the size and shape of craters, they can estimate how large or fast the original impact object might have been.

Moon Mystery

Some craters on the Moon are more than 100 kilometres wide.

If you discovered a giant crater like that, what clues might help you work out what caused it?



Take it further - Professor Picklebottom's Question

Does Speed Matter?

Instead of dropping the marble straight down, build a simple ramp using a book and a piece of cardboard.

Roll the marble down the ramp so it hits the sand at an angle.

My prediction:

What happened?

Try:
Low ramp
High ramp
Different marble sizes



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THE GIANT CRATER MYSTERY

Two craters. Same Moon. Very different sizes. Why?

Compare clues
 Test ideas
 Solve the mystery

THE OVAL IMPACT MYSTERY

Most craters are round. This one isn't. What happened?

Observe evidence
 Run investigations
 Think like a scientist

COULD YOU SOLVE THESE MYSTERIES?

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