

HITTING THE MOON



OVERVIEW

In this lesson, students will learn about solar system orbits and how asteroids can become dislodged and sent on a collision course with the Earth.

They will then conduct an investigation into the relationship between impact speed and crater size in the context of Moon impacts. This activity is differentiated for older students to bring in ideas of controlling variables.

Finally, as a class you can simulate different impacts on the Moon using the down2earth impact simulator, and pass around the real Lunar return samples and Moon meteorite.

CURRICULUM LINKS

Recording data and results using tables.

Reporting findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.

Conducting a fair test.

Describe the movement of the Earth relative to the Sun in the solar system.

WHAT YOU NEED

A2 PowerPoint

2.1 Investigating craters worksheet (younger)

2.2 Investigating craters worksheet (older)

Marbles/ball bearings

Deep trays (one per group)

Flour

Cocoa Powder

Metre rulers or tape measure (older students only)

Tea strainer (one per group)

Sieve

Rulers (older students only)

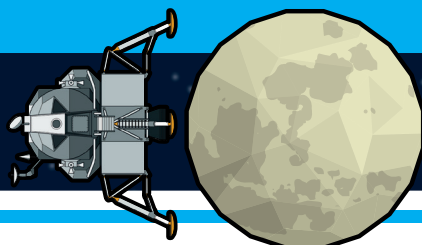
Magnet (optional)

Before the lesson, sieve flour into trays (one per group) and place three tablespoons of cocoa powder into plastic cups (one per group).

Note: for younger groups you may wish to prepare the cocoa powder surface for them



Note – for more information on the Down2Earth simulator and some excellent resources incorporating it, visit <http://education.down2earth.eu/>



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STARTER

Go through the solar system slides on the powerpoint with students and introduce the asteroid belt. Ask students what they think would happen if one of the asteroids were to get pushed out of the asteroid belt towards the Sun. Where would it go? What might it hit?

Go through the Moon introduction slides and explain that the students are going to investigate what affects the size of the impact craters by dropping



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marbles into a 'Moon tray' and observing the size of the craters.



MAIN ACTIVITY

Demonstrate the investigation that the students are going to perform.

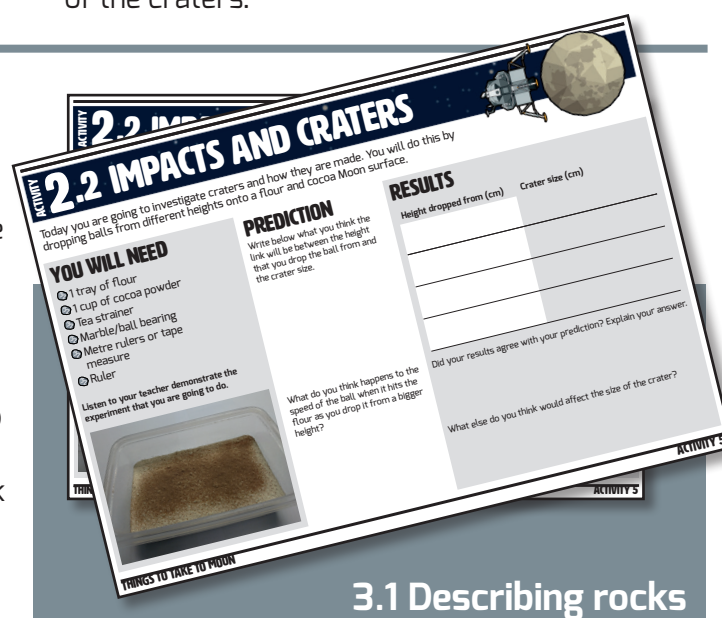
Give each group a tray of sieved flour. Ask them to carefully put a coating of cocoa powder on top, using the tea strainer (you may want to help for younger groups).

Ask students what they think the link will be between the height that they drop their marble and the crater size.

Students predict what the relationship will be between the height the marble is dropped from and the impact crater size (older students will explain why).

Older students will measure the height that they drop the marbles

Note: when students remove the marble it can often cause indentations in the crater. To eliminate this you may wish to use ball bearings which will be attracted to a magnet for easy removal)



3.1 Describing rocks

from (at least 30cm between drops to get a noticeable difference in crater size) using a meter ruler or tape measure. They can also use a ruler to measure the diameter of the craters (going from the edges of the white rings around the crater).



PLENARY

Click on the link to go to the Down2Earth impact calculator and allow students to select the meteorite criteria and where it will land. By changing one variable about the meteorite (either speed or size and

therefore mass) as a class you can get them to predict, based on their own experiment, what the relationships will be and test this prediction out.

Alternatively, you may wish to hand around the lunar returned samples and the Moon meteorite at this point and explain that one impact in the Moon's history was big enough that it threw bits of the Moon out into space, and one of them hit the Earth.