How High Could You Jump on the Moon?

Introduction

Gravity is an important scientific concept, but one that is difficult to understand, even for adults. Having children use their own bodies to test gravity, and then compare how they would perform against gravity on the Moon is a great jumping off point for understanding that the effects of gravity are different in different parts of our solar system.

Supplies

- Large colored markers
- Measuring tape
- Chart paper, adhesive (PostIt® style) if possible
- Blue masking tape
- Small ball or beanbag (optional)

Get kids thinking

ASK KIDS: What is gravity? Does anyone know how gravity affects us on Earth? Kids might say: "It's what pulls you back down to Earth when you jump up." Or "It's what keeps us on the ground."

GRAVITY IS A FORCE THAT "PULLS" PEOPLE AND OBJECTS TOWARDS THE GROUND.

Do you think gravity on the Moon is the same, stronger, or weaker than it is on Earth? After a few guesses, if you can, show them this NASA video of an astronaut jumping on the Moon (youtube.com/watch?v=g5aPoRtF2vw) and then have them guess again.

How High Could You Jump on the Moon?

The Moon's gravity is weaker than the Earth's — in fact it is 1/6th as strong as on Earth. When you're on the Moon, you are 1/6th as heavy. So if you weigh 75 pounds on Earth, you would only weigh about 12 pounds on the Moon. But your muscles are as strong as they are on Earth, so you can jump 6 times farther!

SEE YOUR WEIGHT ON OTHER WORLDS: exploratorium.edu/ronh/weight/

Using the same force of a jump on Earth, you could rise 10 feet off the ground and stay in the air for about 4 seconds.

HERE'S HOW HIGH YOU COULD JUMP ON OTHER WORLDS IN THE SOLAR SYSTEM:
sciencealert.com/here-s-how-high-you-could-jump-on-other-worlds-in-the-solar-system

Let's get started!

MAKE THE JUMPING CHART AHEAD OF TIME

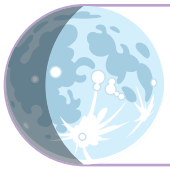
Tape or stick two pages of the chart paper on the wall, one above the other so that they make one long sheet. The highest point of the top piece should be higher than any of your kids can jump, and the bottom of the lower sheet should be no higher than your shortest child's head. (You may need a third sheet of paper to cover this range.)

Place a long piece of tape alongside the paper and label it with inches, from the floor to the top of the chart paper. This will help you quickly determine how high each student jumped in this activity, rather than having to measure after each jump.

In this jumping challenge, kids will see how high they can jump, and then calculate how high that jump would be on the Moon!

THE JUMPING CHALLENGE!

Each child who wishes to try should get a turn to jump. For kids who have difficulty jumping, you can challenge them to throw a ball or beanbag up as high as they can, and measure that distance instead. You can also try a standing long jump, using the masking tape to measure out lengths on the floor.



Start with a Book: Space Rangers

How High Could You Jump on the Moon?

1. Have a child stand facing the chart paper on the wall, holding a marker.
2. Ask the child to reach his hand over his head, as high as he can, and make a mark on the paper with the marker. This is the child's starting point.
3. Tell the child to take a small step back (no running starts!), bend his knees and jump as high as he can, making a mark on the paper at the highest point.
4. Have the child measure the distance between his starting mark and his jumping mark. This is how high he jumped. Have him write down his measurement.
5. After every child who wants to try has had a turn to jump, have your students calculate how high their jump would have been on the Moon by multiplying their measurement by 6.

For older children, encourage them to do the math on paper. For younger children who have not yet learned how to multiply, you can use a calculator. The resulting Moon jump measurement is how high their feet would be off the ground if they had jumped on the Moon. You can have each child record this height on the paper on the wall, measuring from the floor to their Moon jump measurement.

ASK KIDS:

- Were you surprised by the results?
- Could anyone jump over their own head on the Moon, or farther than their own height?
- Who jumped the highest/farthest?
- What do they think it would be like to walk on the Moon?
- What would it be like to play basketball, soccer, or another sport?

Reinforce the idea that the reason they can jump higher on the Moon is because gravity is weaker there; and the reason that they can't jump as high on Earth is because gravity is stronger.