HOW HIGH CAN YOU JUMP?

KEY QUESTION How high can you jump on another planet?

MATERIALS yardsticks, pencils, paper

VOCABULARY gravity, mass, weight

BACKGROUND Gravity

THE MODEL Ask a student to jump as high as he or she can. This is one example of how high one person can jump on one planet (the Earth).

OBSERVATION Give another student a yardstick to hold vertically, touching the floor. And have another student kneel so that he or she can see the yardstick in order to measure the height of the first student's jump. Have the first student repeat the jump, and ask the third (kneeling) student to observe the height of the jump.

_____ height you jumped

SPECULATION Ask your students to speculate about factors that would influence the height of the jump. (gravity, stregth)

EXPERIMENT Have your students record the heights of their jumps, and use the following table to calculate how high they could jump on other planets.

OBJECT	PROCEDURE FOR HEIGHT OF JUMP	Height you could jump
Sun	divide by 30	_____
Mercury	multiply by 5 then divide by 2	_____
Venus	multiply by 10 then divide by 9	_____
Mars	multiply by 5 then divide by 2	_____
Jupiter	multiply by 2 then divide by 5	_____
Saturn	multiply by 7 then divide by 8	_____
Uranus	multiply by 11 then divide by 12	_____

continued

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OBJECT	PROCEDURE FOR HEIGHT OF JUMP	Height you could jump
Neptune	multiply by 5 then divide by 7	
Pluto	multiply by 30	
Earth's moon	multiply by 6	

The surface gravity of a star, planet, moon, etc. depends upon the object's mass (the amount of stuff present), and the object's radius. The radius is a factor because (1) an object's gravity acts as though its source is at the object's center, and (2) the "strength" of an object's gravity diminishes with distance. For example, suppose that two planets have the same mass, but unequal radii. The planet with the smaller radius will have a stronger surface gravity.

ADDITIONAL How Much Do You Weigh?