



Free Fall Argument-Based Assessment

*I'm gonna free fall, out into nothin'
Gonna leave this world for awhile
I'm free, free fallin'
-- Tom Petty (1989)*

Directions

You will make two scientific arguments on the physics of free-falling objects.

Argument 1

In Galileo's famous demonstration, a 10-kg cannonball and a 1-kg stone strike the ground at practically the same time.

Make an argument addressing the question, Will a heavier cannonball and a lighter stone dropped from a height into free fall strike the earth at approximately the same time or at different times?

Claim

Evidence

Evidence in a scientific argument is typically quantitative: for example, a portion of a data set created by an experiment or mathematical computation based on a formula.

Reasoning

Explain why the math and/or data you provided in your evidence is applicable and has been properly applied. Also, explain why it is proof of the claim.

Argument 2

We now drop a very small square-shaped, flat rock that weighs 10 grams and is approximately 2 cm X 2 cm, and a piece of paper that has the same mass of 10 grams with a surface of 28 cm X 43 cm (11" X 17"). They are dropped from the same height on Earth with normal air resistance. Would both objects hit the ground at practically the same time?

Claim

Evidence

Evidence in a scientific argument is typically quantitative: for example, a portion of a data set created by an experiment or mathematical computation based on a formula.

Reasoning

Explain why the math and/or data you provided in your evidence is applicable and has been properly applied. Also, explain why it is proof of the claim. Think of how this scenario on earth would be different than applying it to the moon, where there is negligible air resistance.