January 20, 2018

Galileo Experiment Re-created in Space

Cross-Curricular Discussion: Q

Directions: The following list of discussion questions is provided to help you take notes, brainstorm ideas and test your thinking in order to be more actively engaged in class discussions related to this article. All questions in this section are related to topics covered in "[Galileo experiment re-created in space](#)."

PHYSICAL SCIENCES

Discussion questions:

1. What is the equivalence principle?

2. What are aerodynamic drag and terminal velocity?

Extension prompts:

3. What is quantum gravity?

CHEMICAL AND BIOLOGICAL SCIENCES

Discussion questions:

1. The article mentioned that the two cylinders are made of alloys of platinum and titanium. What are the densities of pure platinum and pure titanium? Why is it possible that scientists used these materials for this experiment?

Extension prompts:

2. What are some ways that microgravity (the condition in which people or objects can achieve weightlessness) could be used for chemistry and materials science applications?

3. What are the effects of long-term weightlessness on the human body? How is artificial gravity created for the astronauts on the space station?

ENGINEERING AND EXPERIMENTAL DESIGN

Discussion questions:

1. Name the independent and dependent variables in the MICROSCOPE experiment described in "Galileo experiment re-created in space."

2. What sorts of confounding variables can limit the precision of the MICROSCOPE experiment and other previous experiments testing the equivalence principle?

3. On Earth, you can measure the mass of an object using a two-pan balance, a triple-beam balance, a spring scale or a digital scale. If you used those same tools on the moon or Mars, would you get the same results?

Extension prompts:

4. How else might measuring gravitational acceleration with high precision be useful?

5. Imagine that you could use some process to alter the inertial mass (or possibly the gravitational mass) of an object. How would those alterations affect the object's acceleration?