

The Mechanical Universe
**THE APPLE AND
THE MOON** 13min



Read the following questions before the video begins. Answer them while the video is in progress. Make note of when you are asked to pass this paper forward for collection. This is an *individual* effort. That means you **DON'T ASK OTHERS FOR ANSWERS** *It may* count as 10 lab points.

LISTEN! CONCENTRATE ON THE WORDS! DO NOT BE DISTRACTED BY THE IMAGES! IF YOU ARE EASILY DISTRACTED BY VISUALS, CLOSE YOUR EYES AND JUST LISTEN!

1. Where is the trio of explorers headed?
2. Before Newton, no one knew why (circle all that apply)
A. all bodies fall at the same rate. B. the earth orbits the moon.
C. the earth orbits the sun. D. the sun orbits the moon.
3. The video shows the equation for universal gravitation with a negative sign. What does the negative sign indicate?
4. Acceleration of gravity on the moon is _____ what it is on the earth.
5. A cannonball dropped from 16ft above the earth's surface reaches the ground in _____
6. If a cannonball traveled so fast that the earth curved away beneath it before it could hit the ground, the cannonball would be _____
7. The astronauts (ARE / ARE NOT) held in their lunar orbit by gravity.
8. How far does the moon fall in one second (by the prediction made by Newton's theory of gravity)?
9. By applying UCM kinematics and Pythagorean geometry, Newton found how far the moon actually falls away from the straight line it wants to travel. What is this distance?
10. How long did Newton wait to publish his theory of universal gravity?