Flipping Physics Lecture Notes:
Analyzing the Apollo 15 Feather and Hammer Drop
A Basic Introductory Free-Fall Problem

In 1971 Astronaut David Scott during the Apollo 15 mission on the moon dropped a feather and a hammer from the same height. The video shows that both objects fall at the same rate regardless of their different masses.

Knowns:

$$v_{iy} = 0; \; g_{moon} = 1.62\frac{m}{s^2}; \; a_y = -g_{moon} = -1.62\frac{m}{s^2}; \; \Delta t = 36\,frames \times \frac{1\sec}{29.97\,frames} = 1.201201\sec; \; h_i = ?$$

The acceleration is constant, so we can use the <u>U</u>niformly <u>A</u>ccelerated <u>M</u>otion Equations:

$$\Delta y = v_{iy}\Delta t + \frac{1}{2}a_y\Delta t^2 = (0)\Delta t + \frac{1}{2}(-1.62)(1.201201)^2 = -1.16874 \approx -1.2m$$

For those of you still using English units:
$$\Delta y = -1.16874\,m \times \frac{3.281\,ft}{1m} = -3.8346\,ft \approx -3.8\,ft$$

So the hammer and feather were both dropped from about 1.2 meters or 3.8 feet off the surface of the moon.