

This 1943 Merrie Melodies cartoon, with Bugs Bunny, has a scene where Bugs and a gremlin are in an airplane that is headed straight towards the ground. The plane is in freefall for over 1 minute. You can have your students calculate the distance the plane covers in that time (disregarding air resistance):

$$y = y_0 + v_0 t + \frac{1}{2} a t^2$$

$$y = 0 \text{ m} + 0 \frac{\text{m}}{\text{s}} 60\text{s} + \frac{1}{2} \left(-9.8 \frac{\text{m}}{\text{s}^2} \right) (60\text{s})^2 = -17000 \text{ m}$$

and the plane's final velocity:

$$v = v_0 + a t = -560 \frac{\text{m}}{\text{s}}$$

which is approximately 1300 mph despite what the airspeed gauge says.

In a more general sense, use this clip to introduce freefall motion. Ask your students some of these questions:

- What happens to the speed of the plane as it drops?
- What is the effect of air resistance?
- What causes the acceleration? If the plane's engines stop, will the plane stop?
- What would happen to the plane if the force due to gravity went away? Would the plane stop (since there is no force), or would it keep going?