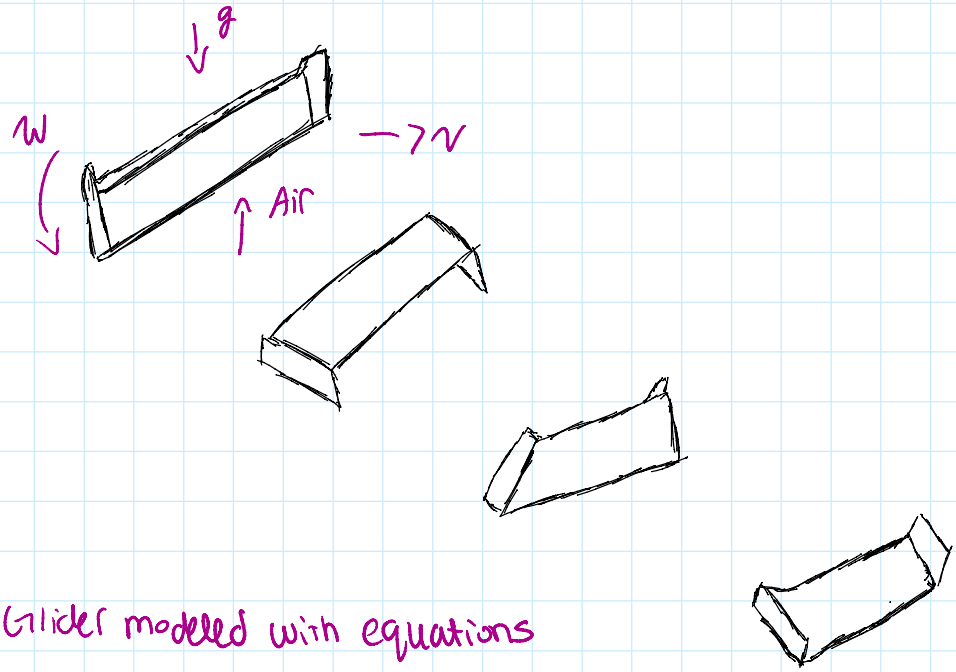
Friday, March 5, 2021 6:47 PM



Glider modelled with equations

Translation (without cardboard)

Object in free fall, so

acceleration:

$$a = -g$$

Velocity:

$$a = \frac{dv}{dt} \Rightarrow -g = \frac{dv}{dt}$$

Separation of variables,

$$-9.8\,dt = dv$$

Integrate,

$$\int -9.8\,dt = \int dv$$

Result,

$$-9.8t + C = v$$

↳ Since released from free fall, initial velocity (v_0) is equal to zero. Therefore $C = 0$

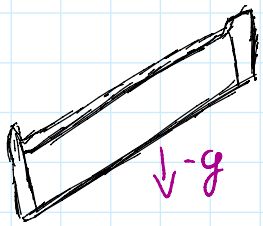
Position:

$$v = \frac{ds}{dt} \Rightarrow -9.8t = \frac{ds}{dt}$$

$$-9.8t\,dt = ds$$
$$\int -9.8t\,dt = \int ds$$
$$-4.9t^2 + C = s$$

↳ C is initial start position (height

Going back,



IMG-7189 (1)

Bernoulli's principle

As you push the cardboard, air shoots up and spins the glider. In video, the glider fully rotates $6.\overline{66}$ times in 1 second.

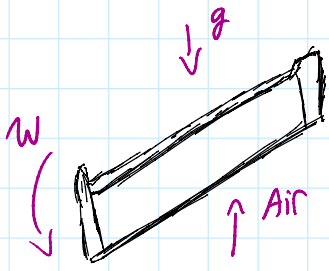
ω - angular velocity = revolutions/s

$\omega = 6.\overline{66}$ rps (rotations per second)

In SI units:

$\omega = 41.88$ rad/s

Going back,



Free body diagram of Forces acting on glider