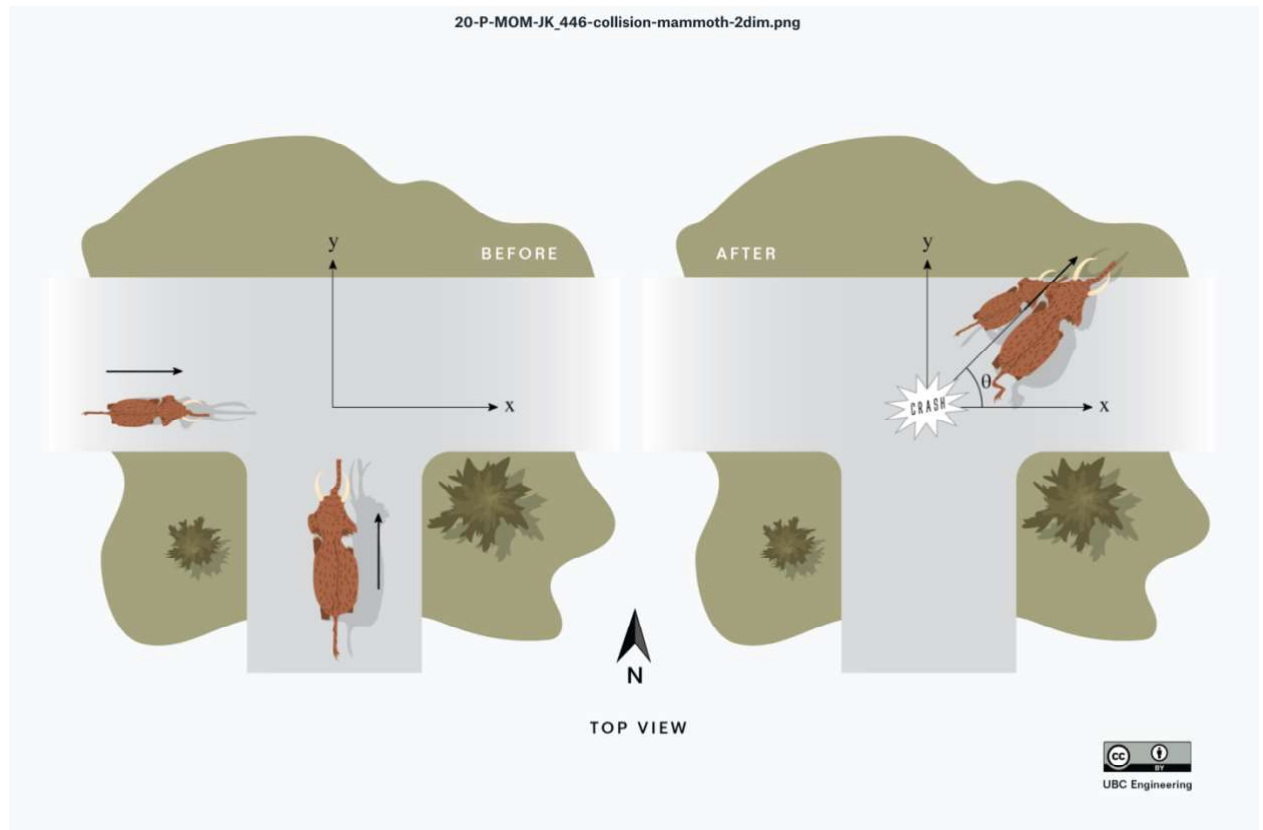20-P-MOM-JK-445a and Mammoth-6
Collisions in two dimensions

The small mammoth A and the bigger mammoth B collided in the middle
of the intersection as shown.

The small mammoth A was initially travelling to the East or in the positive x
direction at a speed of 36 km/h.
Speed in m/s = (36 km/h) (1 m/s) / (3.6 km/h) = 10 m/s
The small mammoth A has a mass of 4000 kg.

The big mammoth B has a mass of 5000 kg.   It is travelling in the +y
direction as shown but has an unknown speed.

After the collision, they stuck together and moved off together at

an angle θ = 35.0° above the x-axis as shown.

What was the *initial* velocity of the bigger mammoth B in metres per
second if the smaller mammoth A had been traveling at 36.0 km/h in
the positive x direction (as shown) before the collision? Assume that
linear momentum was conserved.

Answers:
m mammoth A = 4000 kg
m mammoth B = 5000 kg

initial momentum in the east direction = m mammoth A Vmammoth A
= 40,00 kg m/s

Momentum is conserved, so the final momentum at the angle shown is the
same as the initial momentum.

$$tan\theta = \frac{m_{mammoth\ B}\ v_{mammoth\ B}}{m_{mammoth\ A}\ v_{mammoth\ A}}$$

$$|\overrightarrow{v_{mammoth\ B}}| = \frac{m_{mammoth\ A}\ v_{mammoth\ A}tan\theta}{m_{mammoth\ B}}$$