Q- A 5 kg fish swimming at 2 m/sec swallows an absent minded 1 kg fish swimming toward it at a velocity that brings both fish to a halt immediately after lunch. What is the velocity of the smaller fish before lunch?

Momentum of the first fish in magnitude is given by

$P_1 = (m*v) = 5*2 = 10$ kg.m/s

If the velocity of the second fish is v then its momentum will be

$P_2 = (m*v) = 1*v = v$ kg.m/s

Total momentum of the system will be $P_1 + P_2 = 10 + v$

As there is no external force is acting on the system of the two fish, the momentum will remain conserved and hence

Initial momentum = final momentum

Gives $10 + v = (5 + 1)*0$

Gives $v = -10$ m/s

The negative sign shows that the second fish was moving in opposite direction with speed **10 m/s**