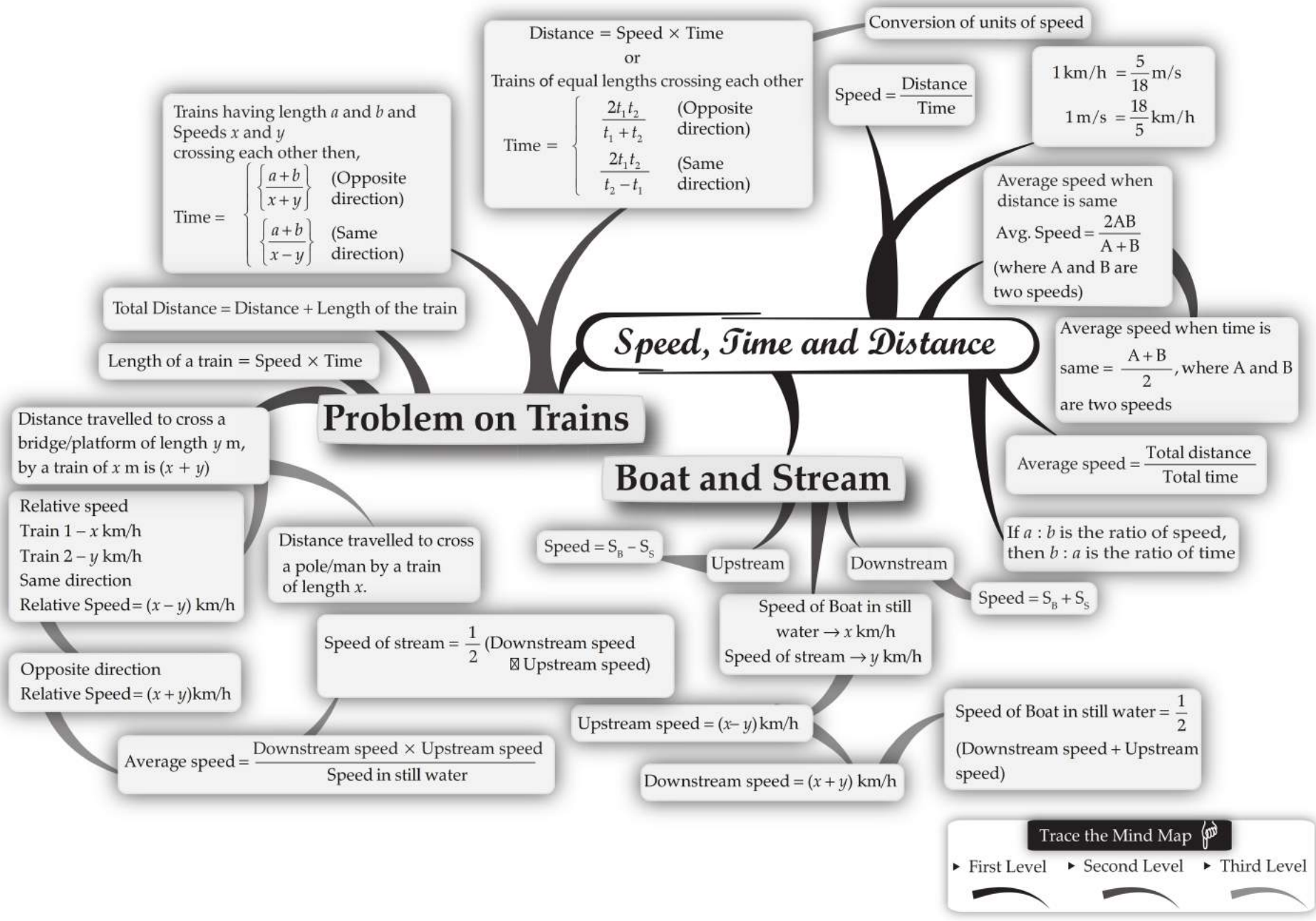
Speed, Time and Distance
Problem on Trains
Boat and Stream
Distance = Speed × Time
or
Trains of equal lengths crossing each other
Time = { 2t1t2/(t1+t2) (Opposite direction); 2t1t2/(t2−t1) (Same direction) }
Conversion of units of speed
1 km/h = 5/18 m/s
1 m/s = 18/5 km/h
Speed = Distance/Time
Trains having length a and b and Speeds x and y crossing each other then,
Time = { (a+b)/(x+y) (Opposite direction); (a+b)/(x−y) (Same direction) }
Average speed when distance is same
Avg. Speed = 2AB/(A+B)
(where A and B are two speeds)
Total Distance = Distance + Length of the train
Length of a train = Speed × Time
Average speed when time is same = (A+B)/2, where A and B are two speeds
Distance travelled to cross a bridge/platform of length y m, by a train of x m is (x + y)
Average speed = Total distance/Total time
If a : b is the ratio of speed, then b : a is the ratio of time
Relative speed
Train 1 – x km/h
Train 2 – y km/h
Same direction
Relative Speed = (x – y) km/h
Distance travelled to cross a pole/man by a train of length x.
Speed = SB – SS
Upstream
Downstream
Speed = SB + SS
Speed of Boat in still water → x km/h
Speed of stream → y km/h
Speed of stream = 1/2 (Downstream speed − Upstream speed)
Opposite direction
Relative Speed = (x + y)km/h
Upstream speed = (x– y) km/h
Speed of Boat in still water = 1/2 (Downstream speed + Upstream speed)
Average speed = Downstream speed × Upstream speed / Speed in still water
Downstream speed = (x + y) km/h
Trace the Mind Map
First Level
Second Level
Third Level