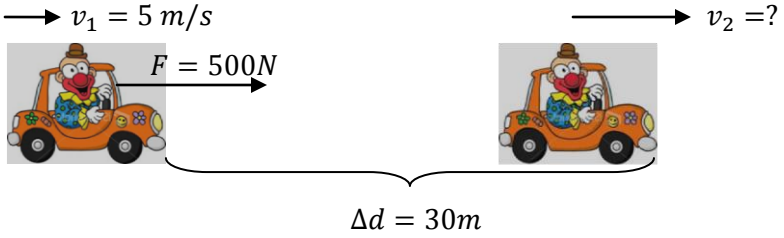
Work & Kinetic Energy – "A Tale of two Methods"

A *400 kg* clown car is travelling at *5 m/s* when the clown pushes the accelerator which causes the engine to apply an unbalanced force of *500 N* on the car which accelerates the car over a distance of *30 m*. Calculate the final speed of the car.



Method 1 : Newton's Laws & Kinematics	**Method 2:** Work-Energy Theorem

Work-Energy Theorem

Consider now the situation where the clown car undergoes a series of accelerations and decelerations. Calculate the final speed of the clown car if the following work is done on the car by the engine and via braking or friction.

Q: A *400 kg* clown car starts from rest and *100 J* of work is done by the engine to accelerate it. At that point another *50 J* of work is done by the engine to speed it up. The clown then presses the brakes (frictional braking) which does *120 J* of work on the car. At this point the clown presses the gas peddle once again which causes the engine to exert a force of *20 N* over a distance of *40 m*. Calculate the final velocity of the car at this time? Also, why is the work-energy theorem a much "nicer" way of solving this problem rather than using Newton's laws and kinematics?