Momentum

p = M \* V

(Kg\*m/s) (Kg) (m/s)

1. A 15 kg dog is running at a rate of 7m/s. What is the momentum of the dog?
2. If a 90kg bear is chasing you with a momentum of 310kg\*m/s, how fast is that bear traveling?
3. How much momentum does a 2kg Frisbee have if it is traveling at a rate of 25 m/s?
4. If a 19kg bike is traveling at 12m/s. What is the momentum of the bike?
5. What is the speed of a 2,000 kg truck that is traveling with a momentum of 11,600 kg\*m/s?

Conservation of Momentum

M1 \* V1 = M2 \* V2

(Kg) (m/s) (Kg) (m/s)

*Assume a perfect conservation of momentum, a 1-dimensional situation, and that we are ignoring frictional forces for the following problems.*

1. There is a group of kids playing tee ball in front of your house. If the bat is 5kg traveling with a velocity of 8m/s, with what velocity will the 1.5 kg ball travel after it is hit by the bat?
2. Phillip is driving a bumper car. He spots another stopped bumper car with Terrance in it across the rink and heads straight for it at 3.5m/s. Assuming the mass of Phillip and his car combined have a total mass of 130 kg, with what velocity will the stationary bumper car travel if it has a combined mass (car + Terrance) of 105kg?
3. A 115kg lineman is working on tackling drills with his coach. If he is running at 2.8m/s and hits a tackling dummy that has a mass of 55kg, what is the momentum of the tackling dummy after the hit assuming the lineman stops instantly upon impact?
4. A kid is shooting a pellet gun at empty bottles. If the .025kg pellet is traveling at 75m/s, what is the mass of the bottle that is hit if it falls backwards at 2.8m/s?
5. Jill is figure skating on a pond. She stops, and her 45kg dog runs at 3.4m/s and jumps on her. Assuming Jill has a mass of 75kg, what is the momentum of Jill after the dog hits her?
6. Tommy is riding a bike at 2.5 meters per second. He and his bike together have a mass of 120kg. Tommy’s breaks snap and he runs into Billy that is standing on the sidewalk. Assuming Billy has a mass of 75 kg, with what rate will he fly backwards when hit if Tommy stops instantly upon impact?
7. Jane got her 2kg basketball stuck in a tree. Her friend Robert is trying to knock it out with a football. He throws a football with a mass of 1.5 kg traveling at 8m/s at the basketball and hits it directly. Assuming that the football stops on impact, what is the momentum that the basketball will have as soon as it starts to move again?
8. A kid is shooting a nerf gun at empty bottles. If the .045 kg nerf dart is traveling at 35m/s, what is the mass of the bottle that is hit if it falls backwards at 2.1m/s?
9. Andrew is running around a track. He stops, and is 75kg friend runs at 3.4m/s and tackles him. Assuming Andrew has a mass of 95kg, what is the momentum of Andrew after his friend hits him?