**Conservation of momentum using video tracker**

Case 1 (cart move apart due to magnetic repulsion)-elastic

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Same mass | | | |  | Different mass | | | |
| Before | | After | |  | Before | | After | |
| m1 = 1.0 kg | u1=**0.49** ms-1 | m1 =1.0 kg | v1= 0.0 ms-1 |  | m1 = 3.0kg | u1=**0.36** ms-1 | m1 = 3.0 kg | v1= **0.18** ms-1 |
| m2= 1.0 kg | u2= 0.0 ms-1 | m2= 1.0 kg | v2= **0.49**ms-1 |  | m2= 1.0 kg | u2= 0.0 ms-1 | m2= 1.0 kg | v2= **0.54** ms-1 |
| What quantity is conserved?  *pi*= **0.49**  *pf* =**0.49**  *Kei* = **0.12**  *Kef* = **0.12** | | | |  | What quantity is conserved?  *pi*= **1.08**  *pf* =**1.08**  *Kei* = **0.19**  *Kef* = **0.19** | | | |
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Case 2 (cart stick together due to velco)-inelastic

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Same mass | | | |  | Different mass | | | |
| Before | | After | |  | Before | | After | |
| m1 = 1.0 kg | u1= **0.59** ms-1 | m1 =1.0 kg | v1=**0.29** ms-1 |  | m1 = 2.0 kg | u1=**0.41** ms-1 | m1 = 2.0 kg | v1=**0.27** ms-1 |
| m2= 1.0 kg | u2=0.0 ms-1 | m2= 1.0 kg | v2=**0.29** ms-1 |  | m2= 1.0 kg | u2=0.0 ms-1 | m2= 1.0 kg | v2=**0.27** ms-1 |
| What quantity is conserved?  *pi*=**0.59**  *pf*=**0.58**  *Kei*= **0.17**  *Kef*= **0.084**  50% loss due to sound | | | |  | What quantity is conserved?  *pi*=**0.82**  *pf*=**0.81**  *Kei*= **0.17**  *Kef*= **0.11**  35% loss due to sound | | | |
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Conservation of kinetic energy: 

Principle of conservation of momentum: *mA uA + mB uB = mA vA + mB vB*