

★Reading: chapter 8.

- Momentum conservation and collisions. Elastic and inelastic collisions. Note that the kinetic energy is not conserved in an inelastic collision: energy is lost to heat, so the accessible energy afterwards is reduced.

- Ballistic pendulum example again, using conservation of energy to find the velocity after collision, and using conservation of momentum to find the velocity of the ball before collision. Take collision to be completely inelastic.

- More on elastic collisions, in 1d. $m_1v_1 + m_2v_2 = m_1v'_1 + m_2v'_2$ and $\frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2 = \frac{1}{2}m_1v'^2_1 + \frac{1}{2}m_2v'^2_2$. Example: $v_1 = v$, $v_2 = 0$, $v'_1 = \frac{m_1 - m_2}{m_1 + m_2}v$, $v'_2 = \frac{2m_1}{m_1 + m_2}v$, consider cases $m_1 \ll m_2$, and $m_1 \gg m_2$ and $m_1 = m_2$. Relative velocity changes sign before and after collision.