Objectives Oscillations

Topic	Objectives
Oscillation	characterise an oscillation in words know two examples for mechanical oscillations (10.2, 10.4)
Simple harmonic motion	know the laws of motion for a simple harmonic motion (including the relations between the peak values) (10.2) graph displacement, speed and acceleration vs. speed read amplitude, displacement, etc. from a diagram and calculate angular frequency, frequency, etc. derive the characteristic equation for a simple mechanical system from fundamental principles and find a formal expression for the period simple calculations with the period of a mass on a spring
Oscillation energy	simple calculations with conservation of energy for a simple harmonic motion (10.3) graph kinetic and elastic energy during a harmonic motion know different damping effects (10.5) explain the difference between under- and overcritical damping and know examples of both describe (both mathematically and graphically) a damped oscillation with the help of an envelope
Feedback and driven oscillation	explain the difference between feedback circuit and driven oscillation know a practical example of a feedback circuit sketch the resonance curves for different damping strengths know both positive and negative examples of resonance (10.6)

Constant	Value
period of a mass on a spring	$T = 2\pi\sqrt{m/D}$
period of a mathematical pendulum	$T \cong 2\pi\sqrt{\ell/g}$ (small amplitudes)
„scouts' clock" (period of a mathematical pendulum 1 m long)	$T = 2$ s