C.1

Graphing Simple Harmonic Motion

IB PHYSICS | WAVE RESONANCE

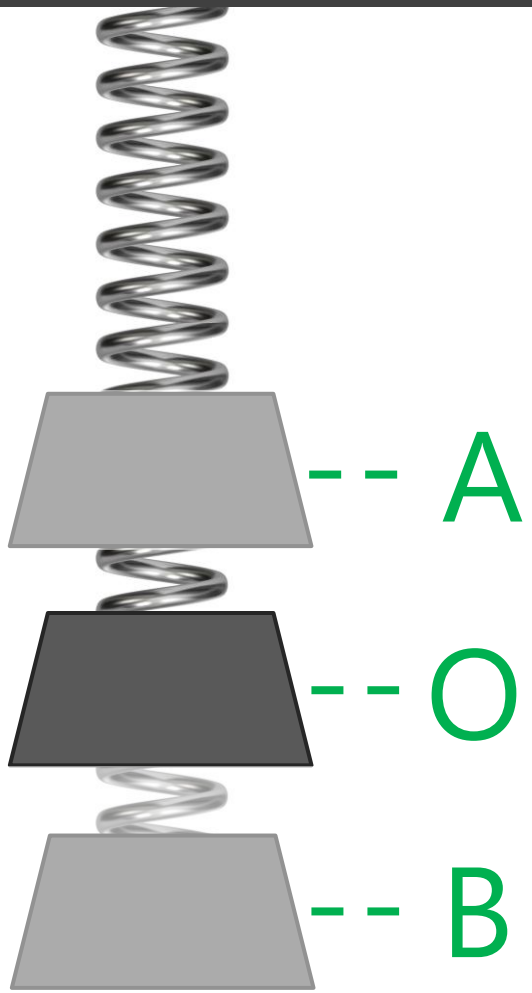
IB Physics Data Booklet

C.1

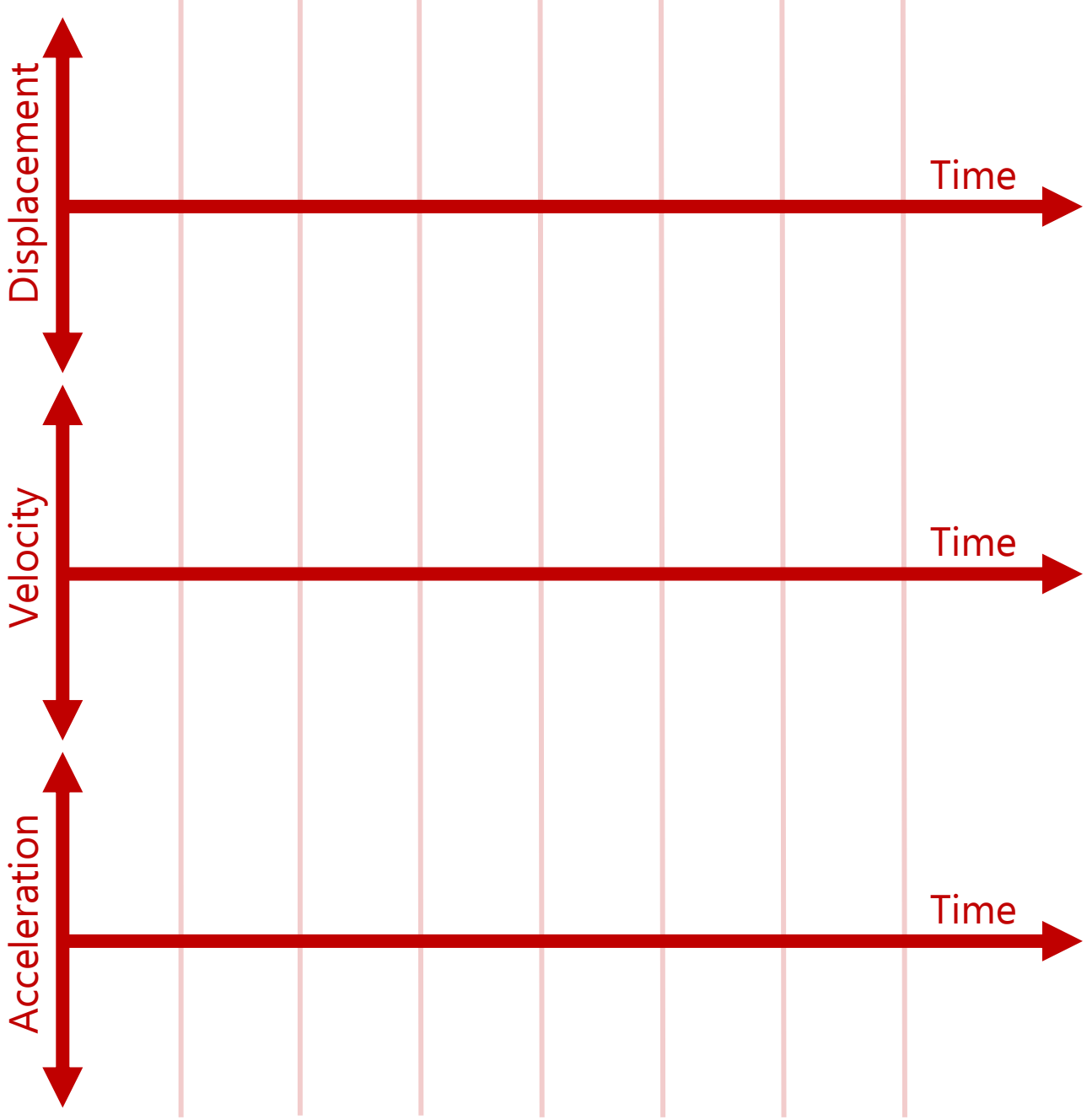
C.1 Simple harmonic motion	$a = -\omega^2 x$ $T = \frac{1}{f} = \frac{2\pi}{\omega}$ $T = 2\pi\sqrt{\frac{m}{k}}$ $T = 2\pi\sqrt{\frac{l}{g}}$

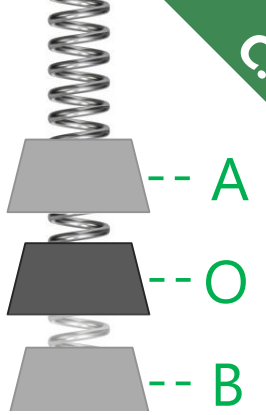
Where is the Greatest…

C.1



Displacement	Velocity	Acceleration





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Energy for SHM

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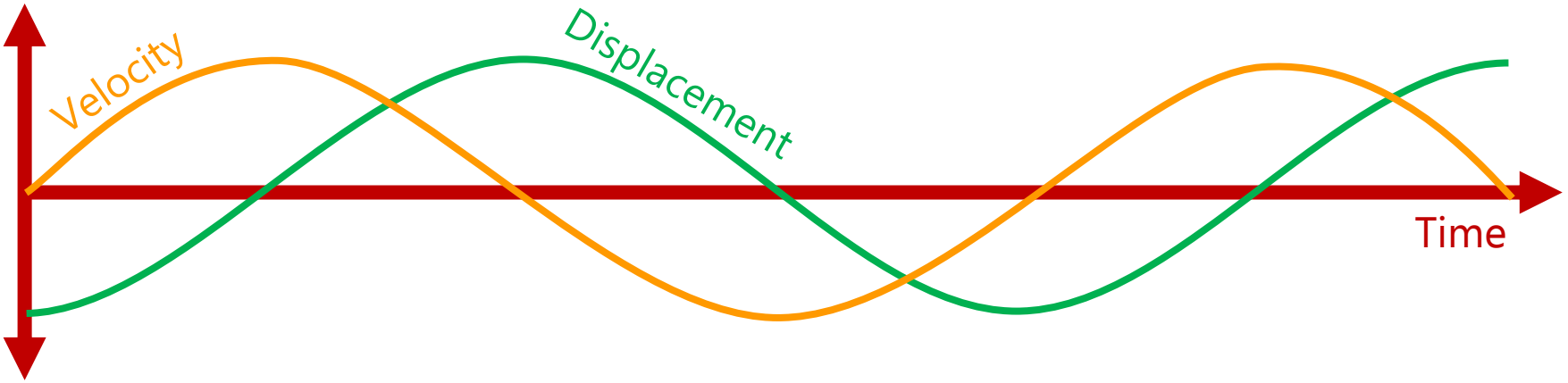
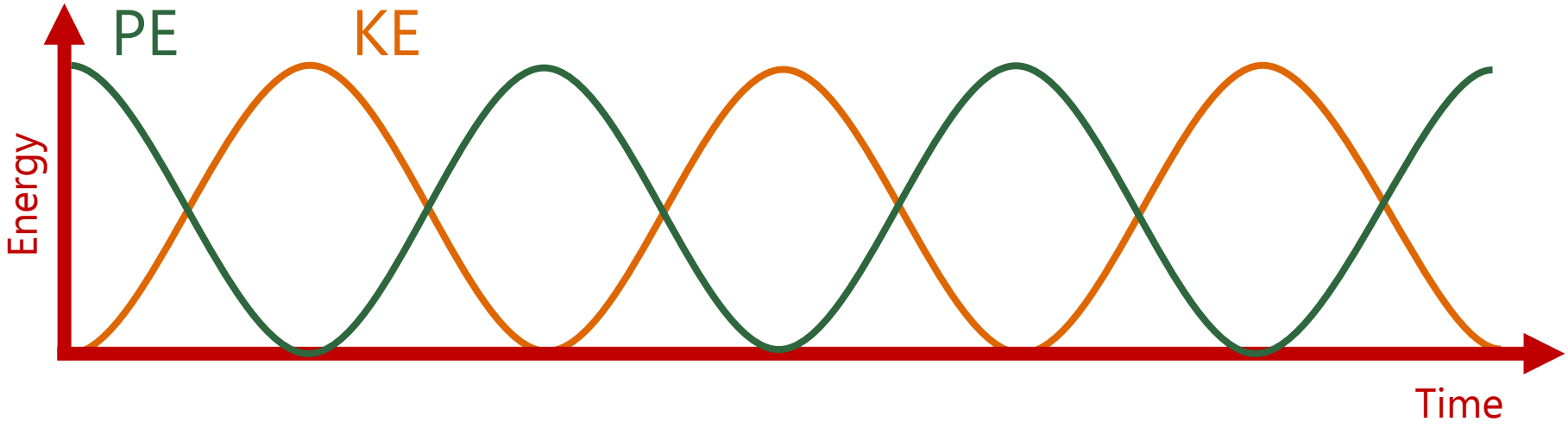
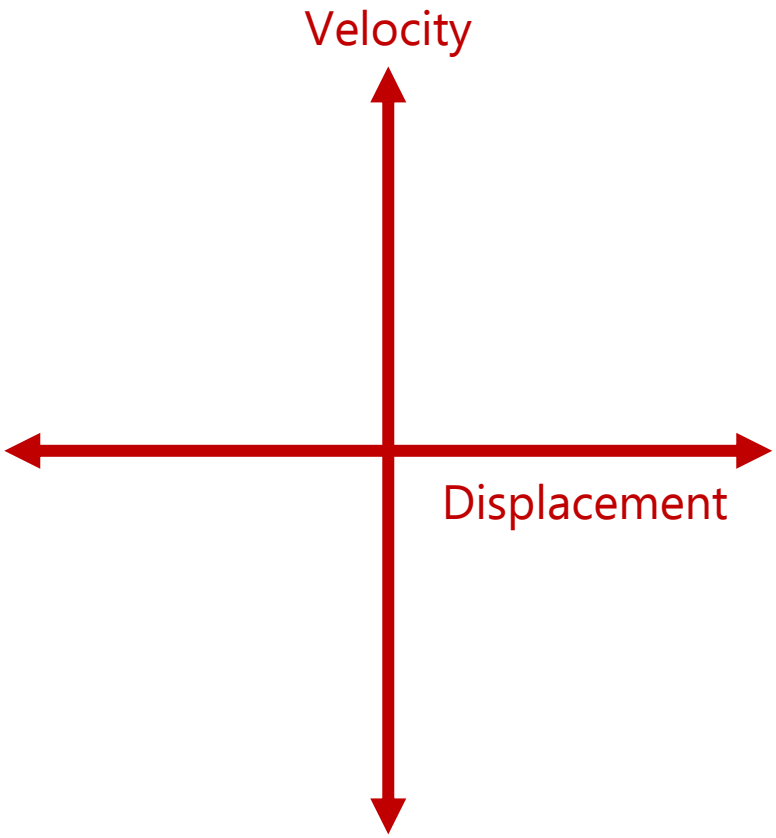
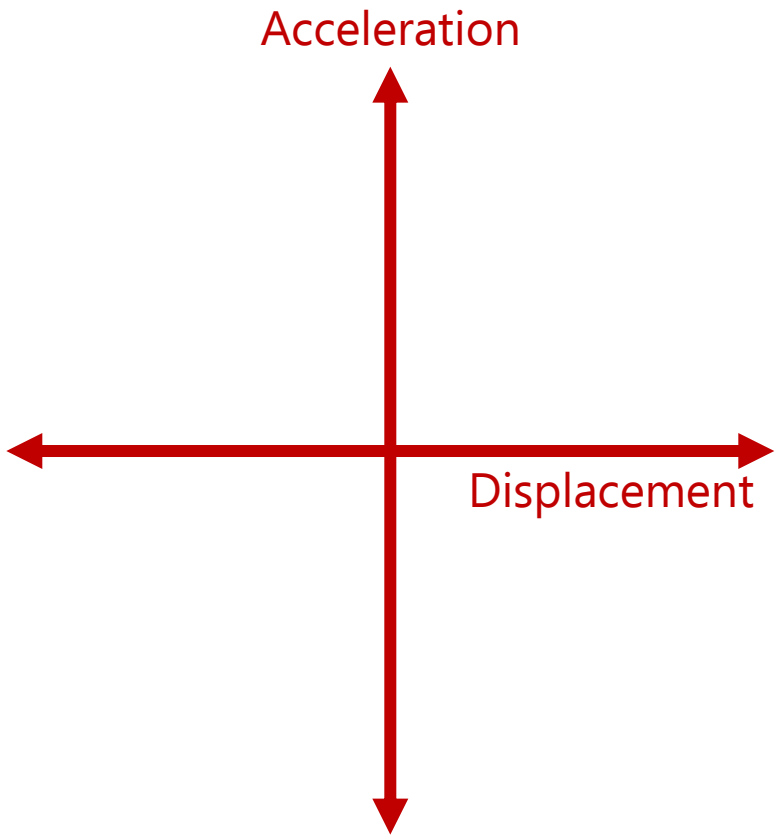




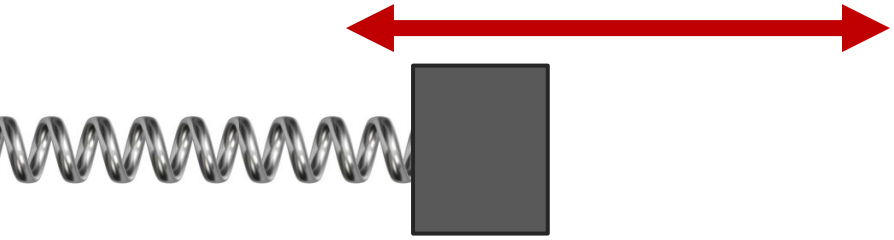
_____ vs Displacement

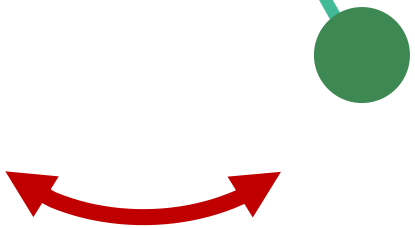
C.1





Resonance





$$T = 2\pi\sqrt{\frac{m}{k}}$$

$$T = 2\pi\sqrt{\frac{l}{g}}$$

Every object that can oscillate has a **natural frequency** that it is "tuned" to

Resonance

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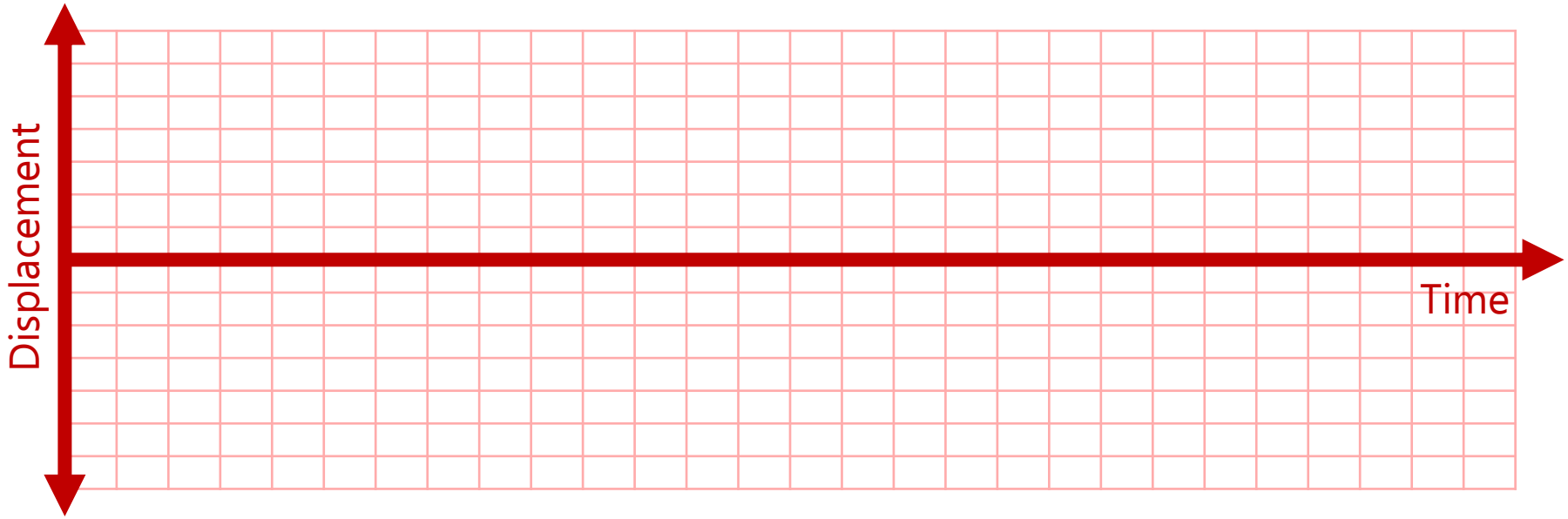
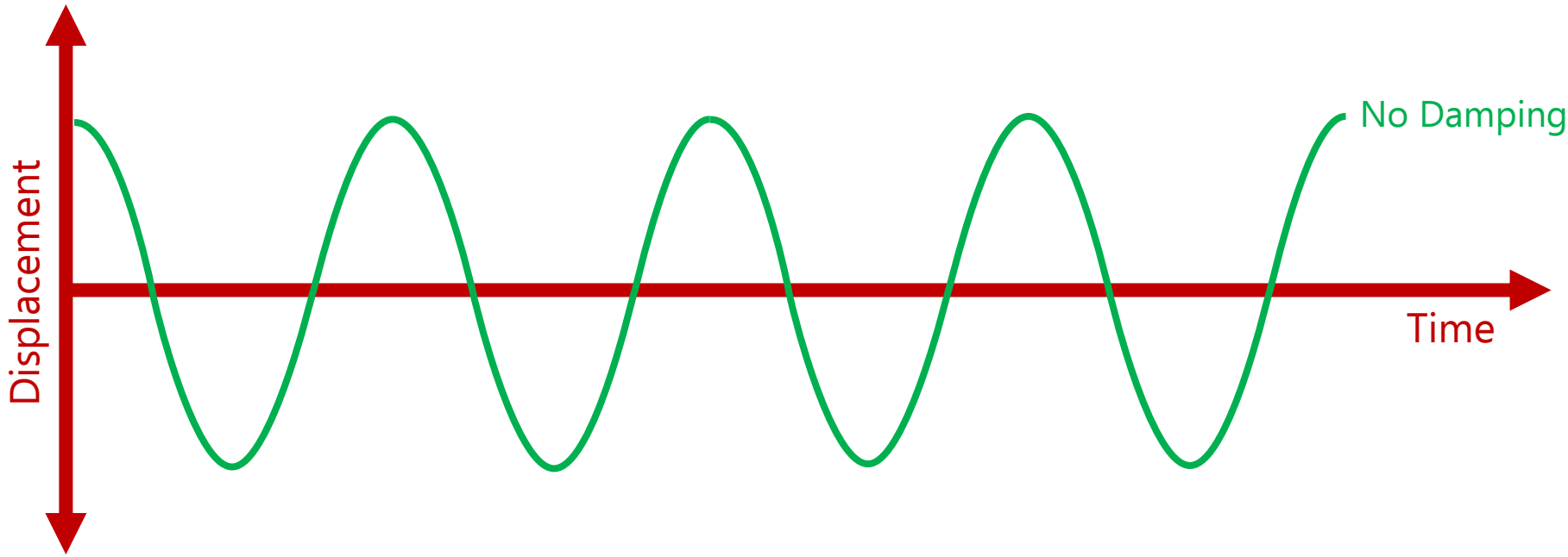
If an object's natural frequency is matched with a periodic driving force, it can start to resonate with large amplitudes



Damping

C.4

For an oscillating object in real life there are forces opposing motion and removing energy from the system over time



Classes of Damping

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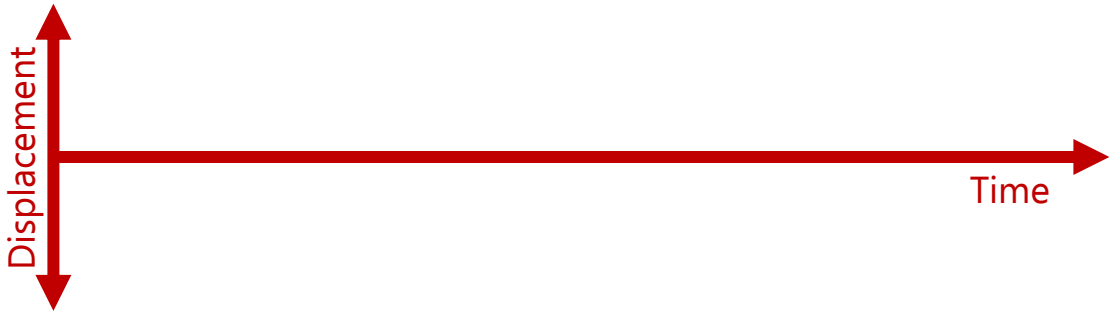
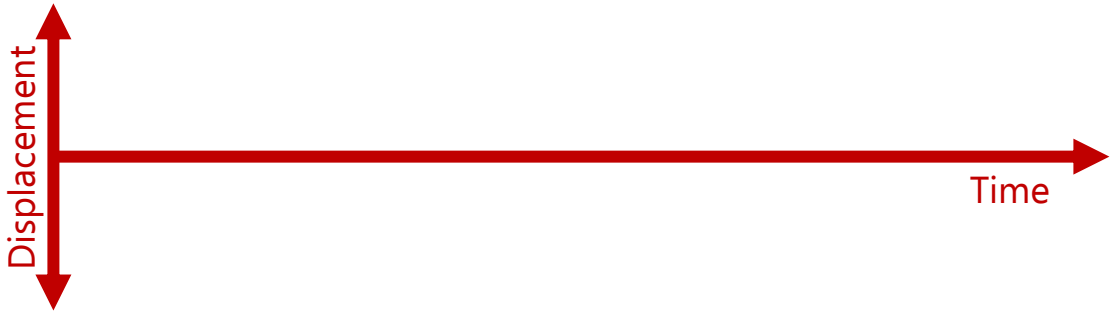
Underdamped





Overdamped

Lesson Takeaways

C.1

- ❑ I can graph displacement, velocity, and acceleration vs time for simple harmonic motion
- ❑ I can graph kinetic and potential energy vs time for SHM
- ❑ I can graph acceleration and velocity vs displacement for simple harmonic motion
- ❑ I can describe the phenomenon of resonance
- ❑ I can describe the effect of damping and recognize scenarios where an oscillation is underdamped, overdamped, or critically damped