YEAR 12 STARTER KIT | 2027

Physics

From projectile motion to the structure of the atom

SACE Stage 2 | South Australia

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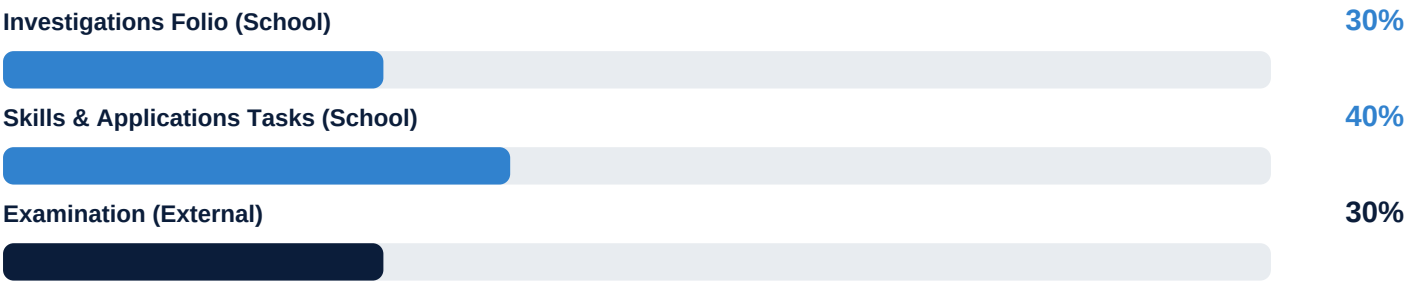
What You Should Know from Stage 1

Before diving into Stage 2 Physics, make sure you're confident with these Stage 1 foundations. If any feel shaky, revise them in the holidays — it'll make your Year 12 start so much smoother.

- [x] Linear motion (SUVAT equations)
- [x] Newton's laws and forces
- [x] Energy, work, and power
- [x] Electric circuits (Ohm's law, series/parallel)
- [x] Wave properties (frequency, wavelength, speed)

How You'll Be Assessed

Stage 2 Physics is assessed through school assessment (70%) and external assessment (30%). Here's the breakdown:



Topics You'll Cover

Stage 2 Physics is organised into 3 main topics. Each topic builds on the last, so staying on top of the content week by week is crucial.

1 Motion and Relativity

- Projectile motion (2D kinematics)
- Forces and momentum (impulse, conservation)
- Circular motion and gravitation
- Special relativity (time dilation, length contraction)

2 Electricity and Magnetism

- Electric fields and Coulomb's law
- Motion of charged particles in electric fields
- Magnetic fields and forces on conductors
- Motion of charged particles in magnetic fields
- Electromagnetic induction (Faraday's law, Lenz's law)

3 Light and Atoms

- Wave behaviour of light (interference, diffraction)
- Wave-particle duality (photoelectric effect)
- Structure of the atom (Bohr model, spectra)
- Standard Model of particle physics

Key Formulas and Concepts

These are some of the most important formulas and concepts you'll use throughout the year. Bookmark this page — you'll come back to it often.

F = ma

Newton's second law of motion

p = mv; impulse = F x delta t

Momentum and impulse

v = 2 x pi x r / T

Speed in circular motion

F = k q1 q2 / r^2

Coulomb's law

EMF = -N x delta phi / delta t

Faraday's law of induction

E = hf; Ek = hf - W

Photoelectric effect

Insider Tips from Our Tutors

Vector Components Are Everything

In projectile motion and forces, always resolve into horizontal and vertical components first. Draw a diagram for every problem — it's the single best habit you can build.

Relativity Isn't Scary

Special relativity questions follow a pattern: identify the proper time/length, apply the Lorentz factor, and check your reference frames. Practice with the formulas until they're automatic.

Link Electricity to Magnetism

Topic 2 flows logically: electric fields → charges in E fields → magnetic fields → charges in B fields → induction. Understanding each transition makes the whole topic click.

Common Mistakes to Avoid

Our tutors have seen these mistakes cost students marks year after year. Learn from others' errors so you don't repeat them.

X Forgetting to resolve vectors into components

Nearly every mechanics question requires horizontal and vertical components. Students who skip this step get the wrong answer even when they know the physics.

X Sign errors in momentum and energy

Define your positive direction at the start and stick with it. Momentum is a vector — direction matters. Energy is scalar — it does not have direction.

X Confusing proper time/length in relativity

Proper time is measured by the observer in the same frame as the event. Proper length is measured by the observer at rest relative to the object. Getting these backwards reverses your answer.

Your Year 12 Study Timeline

A term-by-term plan to stay on top of Stage 2 Physics. Adapt this to your school's order of topics, but keep the revision schedule tight.

Term 1 (Weeks 1-10)

- Master projectile motion and momentum
- Complete circular motion and gravitation
- Start first Investigation Folio task

Term 2 (Weeks 1-10)

- Complete Topic 2 (Electricity and Magnetism)
- This is the densest topic — allocate extra study time
- Practice linking E-fields to B-fields to induction

Term 3 (Weeks 1-10)

- Complete Topic 3 (Light and Atoms)
- Finish all school assessment tasks
- Start past paper practice — weekly timed sessions

Term 4 / Exam Prep

- Complete 5+ full past exams under timed conditions
- Review formula sheet — know every formula and when to use it
- Focus weak topics: most students struggle with induction and relativity

Exam Day Strategies

When exam day arrives, these strategies will help you maximise your marks. Print this page and stick it on your wall in the weeks leading up.

Strategy 1

Always draw a diagram — force diagrams, circuit diagrams, ray diagrams. They clarify the problem and earn marks.

Strategy 2

State the relevant physics law or principle before applying it (e.g. "By conservation of momentum...").

Strategy 3

Check units at every step. If you end up with kg.m/s when you expected Newtons, you have made an error.

Strategy 4

For relativity questions, clearly identify the reference frames and state which observer measures what.

Ready to Ace Physics?

- All tutors are med students with 99+ ATARs
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