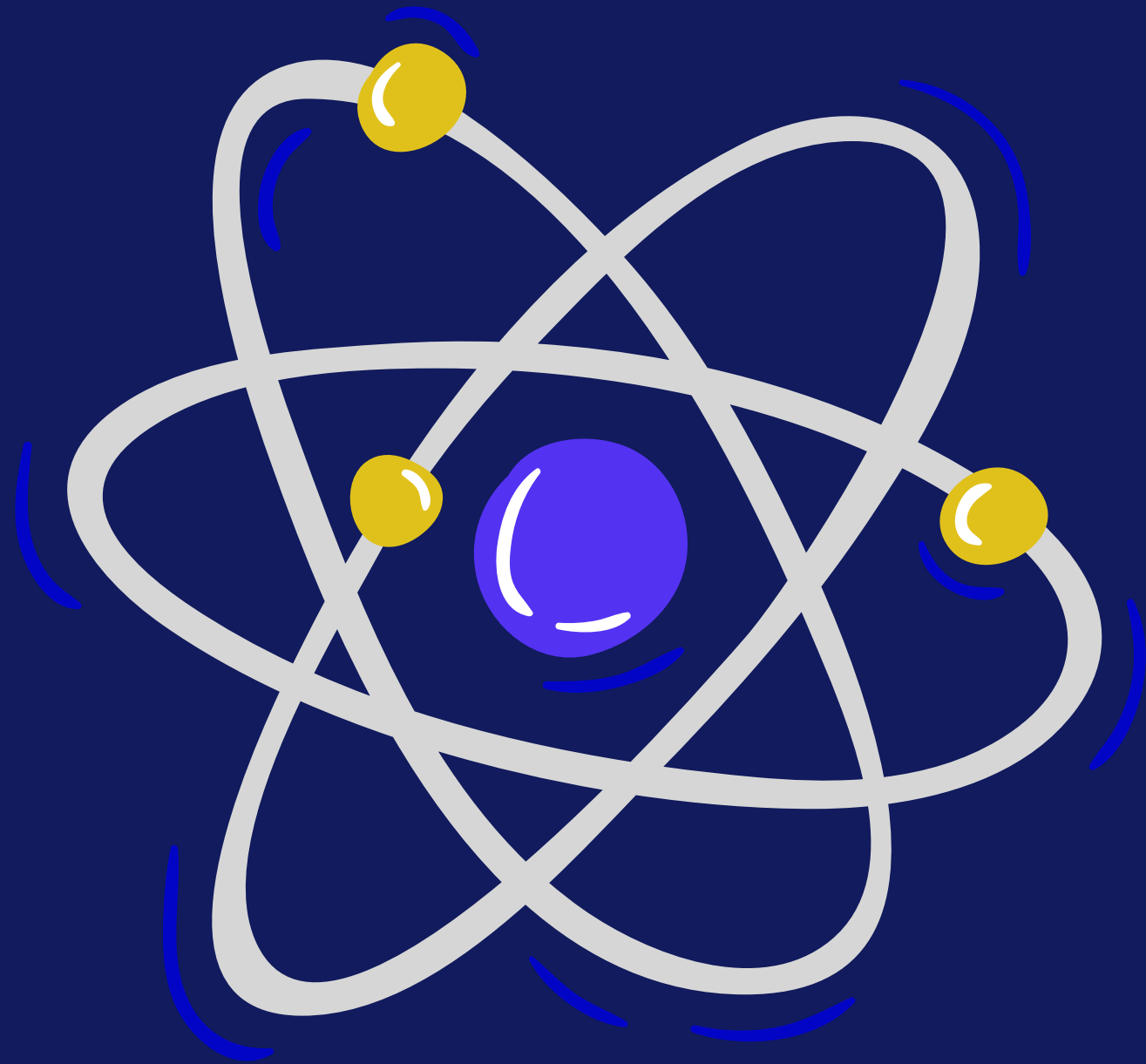




# IB PHYSICS

The Ultimate Study Guide

Updated for the 2025 Syllabus



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Education

# ABOUT THIS GUIDE

This guide was created with one purpose: to give you the ultimate resource for mastering your IB subject. It's built on the invaluable advice of our fantastic Lanterna tutors—the very best in the field.

These tutors not only achieved top grades in the IB themselves but also have years of experience helping students like you succeed. Their insights, strategies, and tips are pure gold—insider knowledge you won't find anywhere else online.

Whether you're a current student or trying to decide if this subject is right for you, this guide has everything you need to thrive.

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# WHY SHOULD YOU TRUST US?

The tutors whose information we compiled to create this guide have not only conquered the IB but they are experts in simplifying the learning journey for you. The most common score for our IB tutors is the full 45 points. More specifically, they have received a 7 in this particular subject.

42.3

Average IB score of  
our tutors

150K+

Hours tutored

# OVERVIEW: PHYSICS

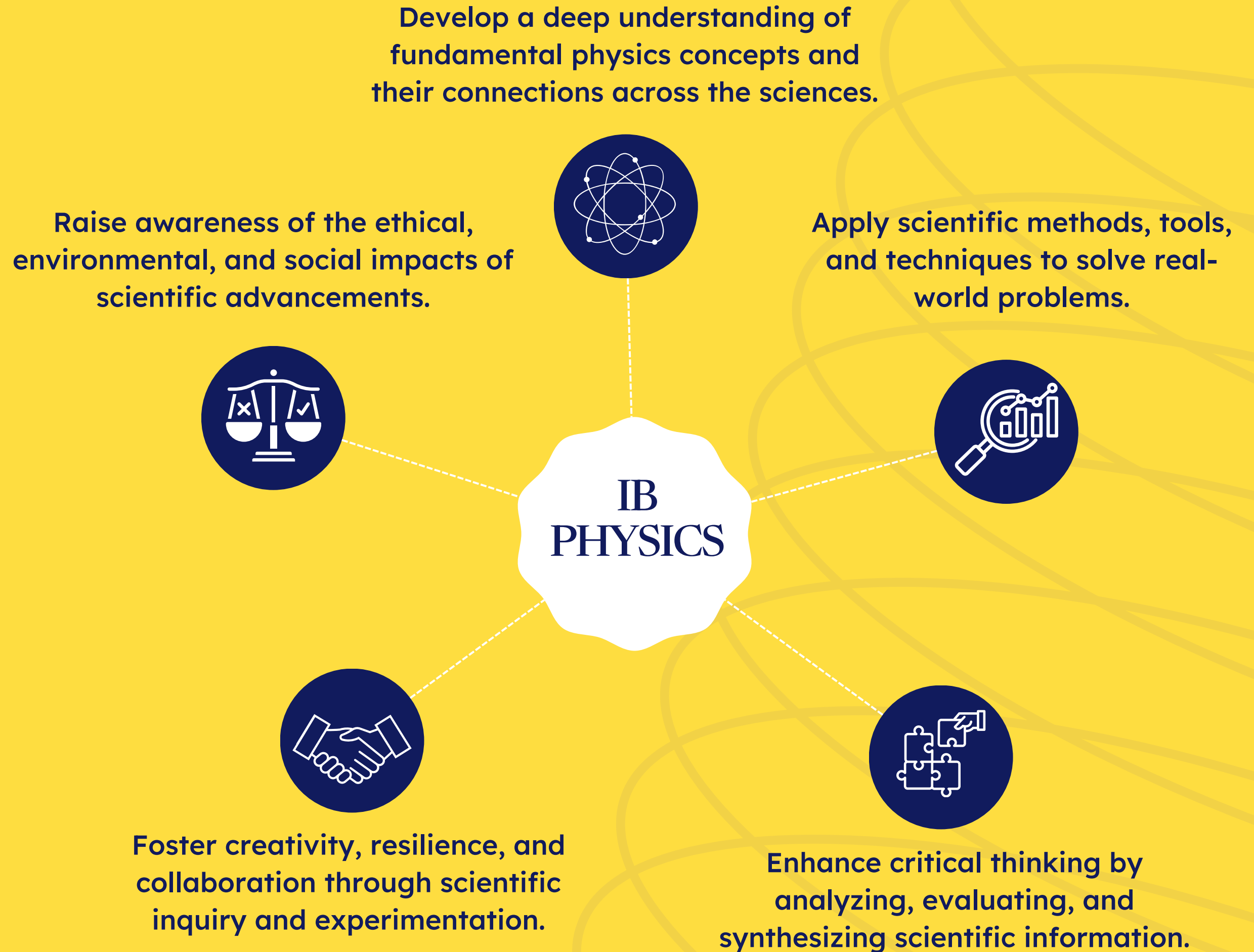
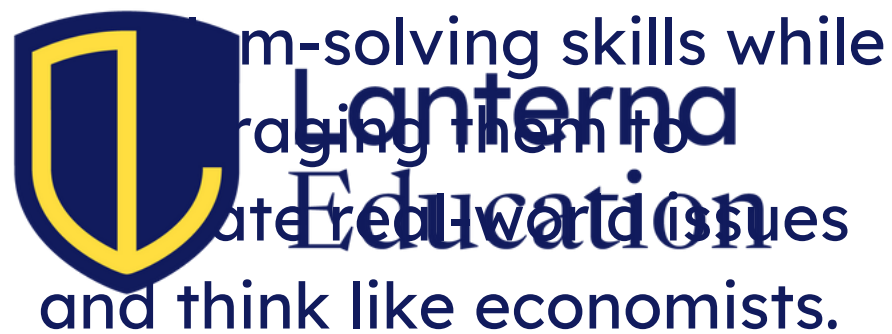
IB Physics focuses on understanding the natural world, from the smallest particles that make up matter to the vast structures of the universe. It explores fundamental principles governing space, time, energy, and forces, aiming to uncover the rules that shape reality.

The course emphasizes both conceptual understanding and practical experimentation, encouraging students to develop critical thinking, problem-solving skills, and scientific inquiry. Through hands-on investigations and theoretical modeling, students learn how to analyze data, evaluate scientific claims, and design solutions to real-world problems.

With its focus on innovation and technology, IB Physics equips students with the tools to engage meaningfully with scientific challenges, from exploring cutting-edge discoveries to addressing global issues.

# COURSE AIMS

Economics is the study of how individuals, businesses, and governments make choices in a world of scarcity. It explores the allocation of resources, the functioning of markets, and the impact of economic policies on growth, inequality, and sustainability. The course develops students' analytical and problem-solving skills while raising them to grapple with real-world issues and think like economists.



# WHO SHOULD CHOOSE IT?

IB Physics is perfect for students who are fascinated by understanding how the universe works—from the motion of objects and the nature of energy to the mysteries of time and space. It's a great choice if you:

- Love problem-solving and logical thinking
- Are curious about how scientific models explain natural phenomena
- Enjoy designing and conducting experiments to test scientific ideas
- Are considering careers in engineering, physics, computer science, or other technical fields



# SL

Teaching Hours **150**

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Exams **3 hours**

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focuses on foundational concepts.

# HL

Teaching Hours **240**

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Exams **4.5 hours**

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deeper exploration of core themes & additional topics

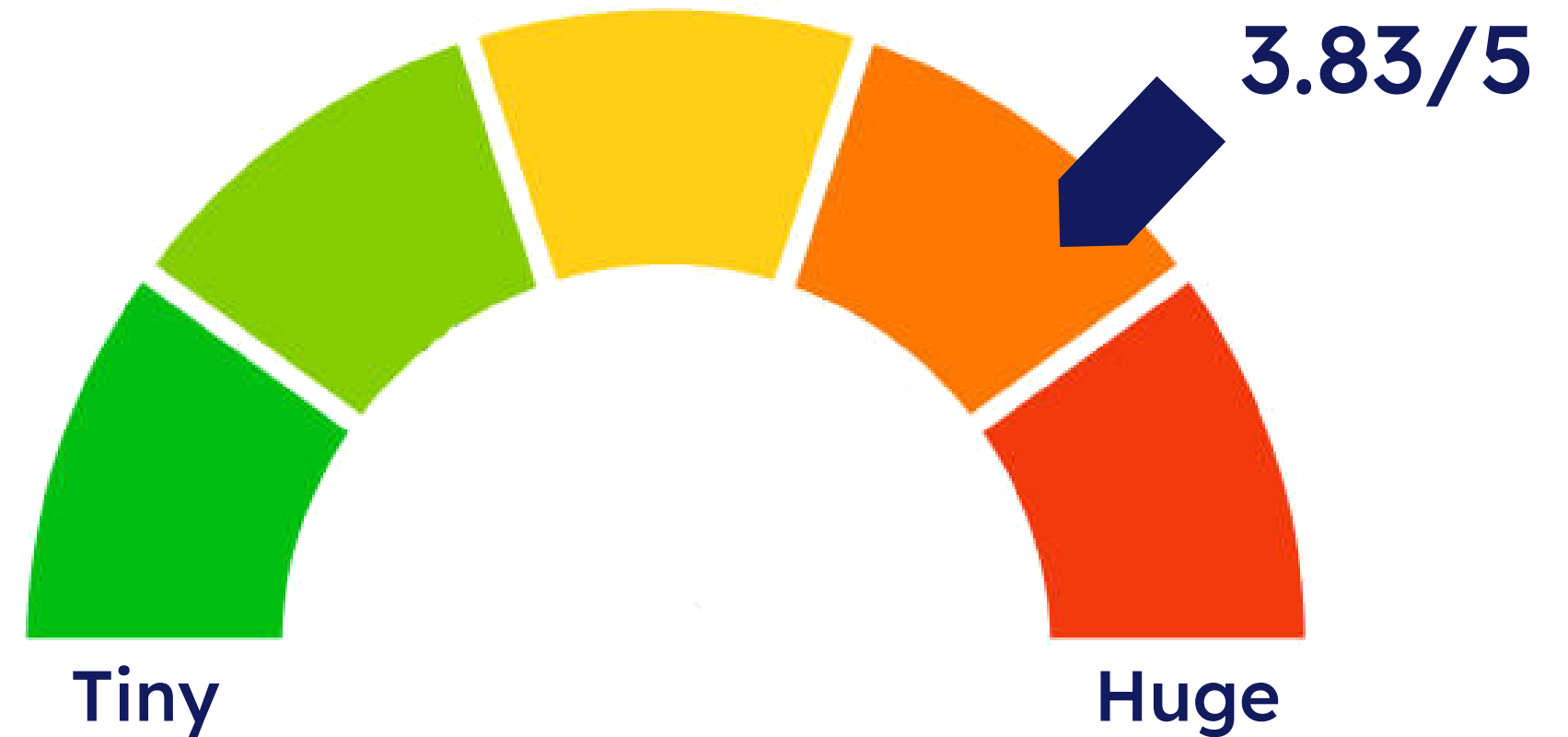
- Rigid body mechanics
- Galilean and special relativity
- Thermodynamics
- Induction
- Quantum physics

# 02

# HOW BIG IS THE **JUMP** FROM SL → HL

The jump from SL to HL Physics is significant, with tutors rating it 3.83 out of 5.

HL covers more advanced topics like relativity and quantum physics, with increased focus on data analysis and problem-solving. It's challenging but manageable with consistent effort and solid math skills.



Compiled from our best IB Physics tutors

# WHO SHOULD PICK HL?

## **If You're Interested in Engineering, Physical Sciences, or Technology**

Physics HL is crucial for students aiming for careers in engineering, computer science, astrophysics, or related fields.

## **If You Enjoy Problem-Solving and Hands-On Investigation**

HL dives deeper into advanced topics, combining theory and experiments to develop practical scientific and analytical skills.

## **If You're Strong in Math and Enjoy Applying Concepts**

Physics HL involves mathematical problem-solving and modeling. Students with strong math skills will thrive.

## **If You're Up for a Challenge and Ready to Think Critically**

HL demands more time and effort, but it builds resilience and critical thinking, preparing students for top university courses.

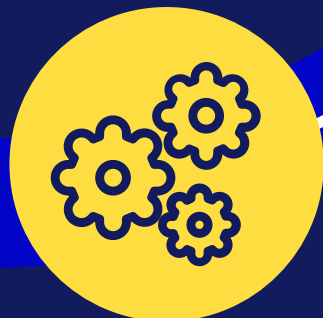


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# CORE SKILLS FOR SUCCESS

## Conceptual Understanding

Physics is all about understanding the principles that govern how the universe works. Focus on grasping core concepts before diving into complex topics to build a solid foundation.



## Problem-Solving Skills

Break problems into smaller steps, apply mathematical reasoning, and articulate your process clearly to earn both method and final marks.



## Critical Thinking and Logical Reasoning

Success in physics depends on your ability to think critically and logically. Analyze situations, identify relevant concepts, and apply the correct methods to solve unfamiliar problems

## Organized and Methodical Approach

Being methodical in both written work and practical investigations is key. Stay organized to manage the challenging demands of the subject effectively.



## Real-World Application

Think conceptually and connect theoretical ideas to practical situations. This will help you better understand and solve complex, real-world problems.



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03

# “WHAT IS THE MOST IMPORTANT SKILL FOR A STUDENT TO DEVELOP?”

“



“Physics is about understanding, not memorization—grasp the underlying principles, and you’ll be able to solve any problem.”

“Think critically and connect concepts to real-world applications. It’s the key to mastering even the most challenging topics”

“Break problems into steps. Logical reasoning and clear articulation will help you earn method marks and reach the correct answer.”

“Focus on understanding the theory behind concepts—this will allow you to tackle unfamiliar questions with confidence.”



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# MEMORIZATION



**4.75 OUT OF 10**

The average rating that our tutors give for the importance of **memorization** in IB Physics

Great news for those with bad memory!

# ASSESSMENT STRUCTURE

## PAPER 1

External — 36% final grade

Two sections – Part A features multiple-choice questions, while Part B includes data-based questions covering all themes in the syllabus.

This paper tests recall, data analysis, and interpretation skills.

## PAPER 2

External — 44% final grade

A combination of data-based and short-answer questions, followed by extended-response questions.

This paper requires deeper understanding and critical analysis of core syllabus content.

## INTERNAL ASSESSMENT (IA)

Internal — 20% final grade

An open-ended scientific investigation where students design and conduct an experiment to answer a research question.

The final output is a detailed written report (up to 3,000 words) that analyzes and evaluates the findings.

# TRICKS FOR YOUR PAPER 1

## Do's

- READ THE QUESTION CAREFULLY, especially when it includes words like "not" or "except."
- READ ALL OPTIONS BEFORE CHOOSING, and eliminate obviously incorrect answers to improve your chances.
- USE YOUR TIME WISELY, aim for about one minute per question and return to difficult ones later.
- PRACTICE QUICK CALCULATIONS, as there is no calculator allowed, so mental math and estimation skills are key.

## Don'ts

- DON'T WASTE TOO MUCH TIME on a single question—move on and come back later.
- DON'T LEAVE ANY QUESTION BLANK, as there are no penalties for wrong answers.
- DON'T FALL FOR COMMON TRAPS, especially in questions with distractors that seem correct at first glance.
- DON'T RELY ON MEMORY ALONE, base your answers on logical reasoning and fundamental concepts.



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# TRICKS FOR YOUR PAPER 2

## Do's

- LOOK AT THE MARKS FOR GUIDANCE, the number of marks indicates the depth of explanation required.
- USE DIAGRAMS WHERE POSSIBLE, a well-labeled diagram can earn marks even if your explanation is incomplete.
- WRITE CLEAR, STRUCTURED ANSWERS, following a logical flow (definitions, equations, explanations).
- USE PROPER UNITS AND SIGNIFICANT FIGURES, as marks are often lost due to missing or incorrect units.

## Don'ts

- DON'T OVERWRITE SHORT ANSWERS, be precise and answer only what is asked.
- DON'T IGNORE IB COMMAND TERMS, like "explain," "derive," or "compare"—they define how much detail is needed.
- DON'T FORGET TO CHECK YOUR WORK, especially calculations and units.
- DON'T WRITE ILLEGIBLY, clear and organized handwriting makes it easier for the examiner to award marks.



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# HOW TO ACE YOUR IA

## PERSONAL ENGAGEMENT

Relate your research to personal or local experiences, and choose a unique research question that reflects your genuine interest.

Avoid generic topics—make it personal and creative to stand out.

## CRAFT A STRONG RESEARCH QUESTION

Research common IA topics for inspiration, then adapt one to match your personal interests. A focused question with clear, measurable variables will make your investigation unique and engaging.

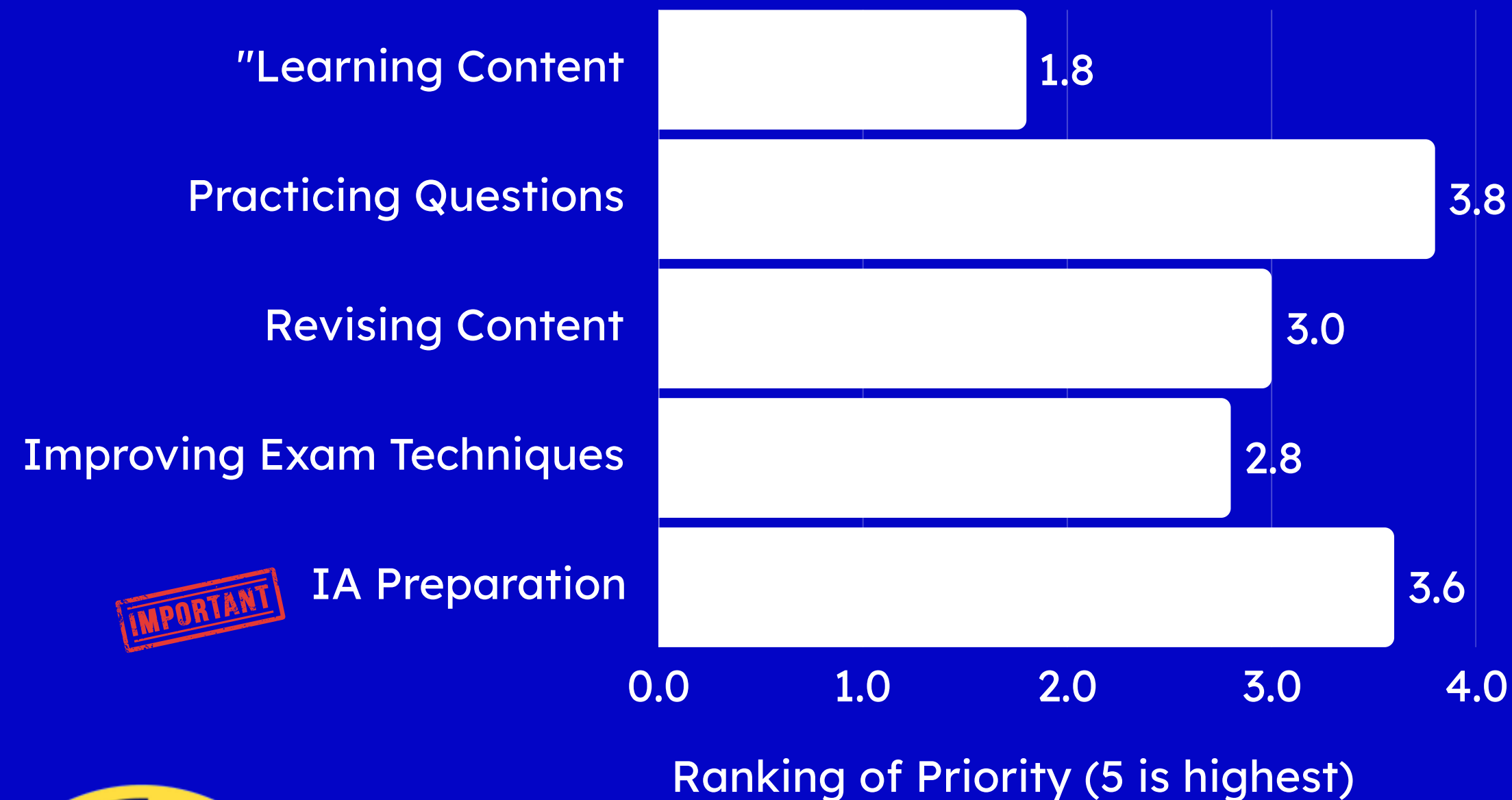
## COLLECT 1ST HAND (QUALITY) DATA

Aim for at least 25 data points by conducting five trials for five different values of your independent variable. Accurate, repeatable data is key to producing reliable and high-scoring results.

## HAVE A DELIVERABLE CONCLUSION

Your conclusion should answer your research question and address your hypothesis. Clearly state whether your hypothesis was supported, explain your findings, and suggest improvements for accuracy and reliability in future experiments.

# EFFECTIVE STUDY STRATEGIES



## WHAT SHOULD YOU PRIORITIZE IN YOUR STUDY TIME?

Based on tutor insights, IA preparation and improving exam techniques are the top priorities for success in IB Physics. Focus on mastering problem-solving strategies and understanding how to approach data-based and extended-response questions. For the IA, dedicate time to designing a strong investigation, collecting reliable data, and analyzing your results thoroughly. Prioritize conceptual understanding and applying knowledge over rote memorization.

UNDERSTAND  
THE CONTENT

1

MEMORIZE  
SMARTLY

2

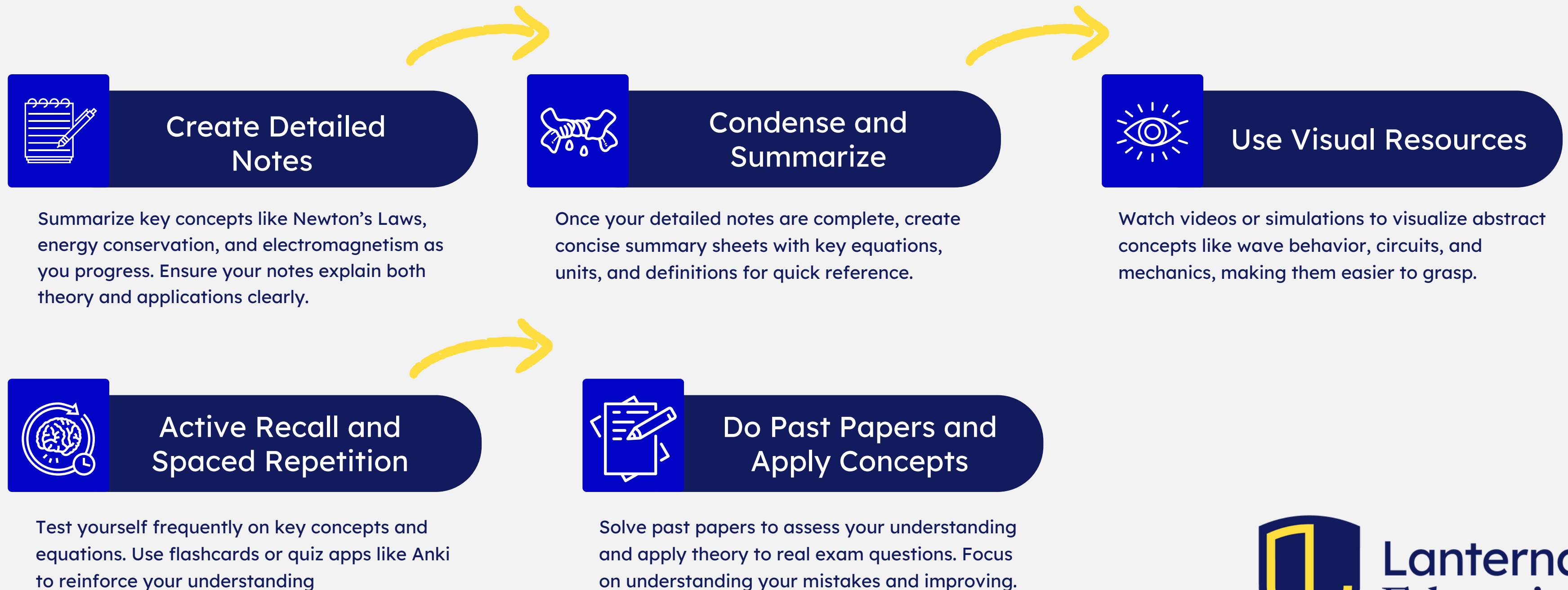
PRACTICE,  
PRACTICE,  
PRACTICE!

3

# THE 3-STEP REVISION STRATEGY

# 1. UNDERSTAND THE CONTENT

The first step in your revision is mastering the fundamental concepts. Physics is highly conceptual, so it's crucial to build a solid understanding before moving on to problem-solving.



# STRUGGLING WITH CONTENT?

## WE CAN HELP

Using a tutor is a great way to understand complex content and prepare effectively.

Lanterna Tutors have received a 7 in the subject they are teaching and are able to break-down complex tasks so that they become more understandable and relatable.

They also know exactly what the IB requires and can guide you on what's most important for exams.



## 2. MEMORIZE SMARTLY



### Active Recall

The most effective way to memorize. Test yourself regularly on key concepts without looking at your notes.

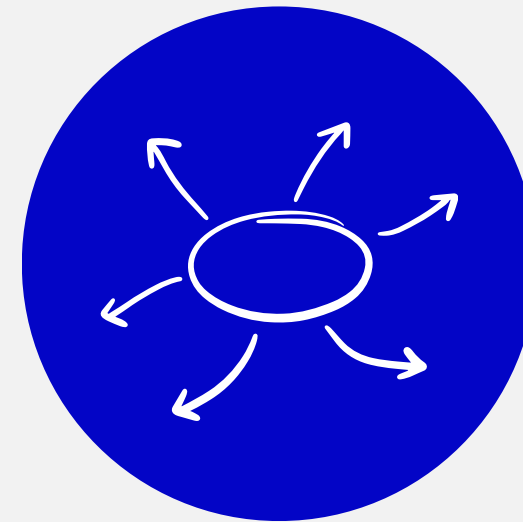
Use apps like Anki or Quizlet to quiz yourself on processes and definitions



### Spaced Repetition

Spread your review sessions over increasing intervals to transfer information into long-term memory.

Example: Study a topic today, review it after 3 days, then after a week, and so on.



### Mind-Maps

Organize and link key concepts visually to see the "big picture" and how topics connect.



### Teach Someone Else

Teaching forces you to explain concepts clearly and identify areas where you lack understanding.

Pro Tip: Even talking out loud to yourself works!



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# 3. PRACTICE, PRACTICE, PRACTICE!



The most important part of your revision is practice. 80% of your entire grade comes down to just a few hours of exams, so mastering how to answer questions is key. Think of exams like video game levels—repeat them enough, and they’ll become second nature. The more past papers you practice, the more confident and efficient you’ll be. Start with topic-based past papers, then move to full-length exams

## LEARN IB’S “CRYPTIC” LANGUAGE

This is where the markscheme is your best friend. It shows you exactly what the examiners expect in each answer. If you train yourself to write responses based on the markscheme, you’ll know precisely how to get full marks every time. Our tutors fast-track students to master this skill, teaching them how to break down questions, understand command terms like describe, explain, and evaluate, and write answers that hit full marks every time.

## TIMING MATTERS TOO

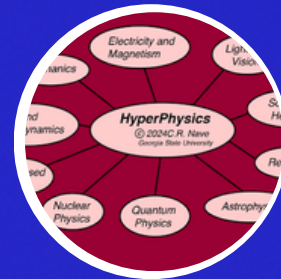
Simulate real exam conditions by practicing under timed settings, focusing on data-based questions and longer responses. Review your mistakes, check how your answers compare to the markscheme, and adjust your strategy. With enough practice, exams will no longer feel like a challenge—they’ll feel like second nature.

# BEST RESOURCES: WEBSITES



## Physics Classroom ([physicsclassroom.com](http://physicsclassroom.com))

Interactive tutorials and simulations that make abstract physics concepts more intuitive.



## HyperPhysics ([hyperphysics.phy-astr.gsu.edu](http://hyperphysics.phy-astr.gsu.edu))

Quick, easy-to-understand explanations and diagrams for a wide range of physics topics. Great for reviewing tricky concepts.



## Grade Gorilla ([gradegorilla.com](http://gradegorilla.com))

Topic-specific IB Physics questions with instant feedback—excellent for practice and assessment.



## Revision Village ([revisionvillage.com](http://revisionvillage.com))

Comprehensive resource for past paper questions, topic-specific practice, and video explanations—perfect for targeted revision.



## ibphysics.org

Concise summaries of IB Physics topics, useful for formula reviews and last-minute revision.



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07

# BEST RESOURCES: YOUTUBE



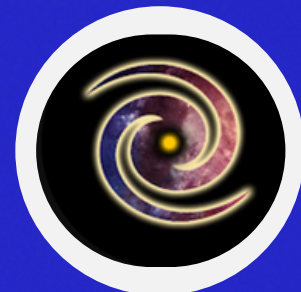
## Chris Doner

Comprehensive IB Physics explanations with playlists organized by topic, covering both SL and HL content.



## Khan Academy

Offers clear, concise explanations of physics concepts, from basic to advanced. Great for filling in knowledge gaps.



## Physics Galaxy

Detailed explanations and visualizations for complex HL topics. Excellent for in-depth understanding.



## Flipping Physics

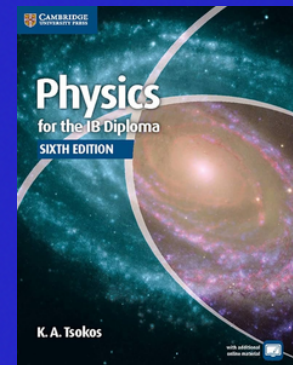
Advanced-level explanations, especially useful for HL topics like respiration and glycolysis.



## Ninja Nerd

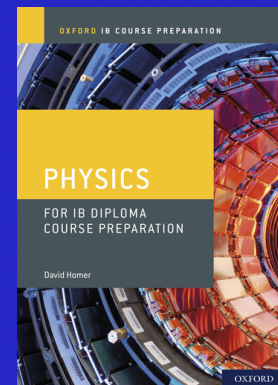
Advanced-level explanations, especially useful for HL topics like respiration and glycolysis.

# BEST RESOURCES: BOOKS



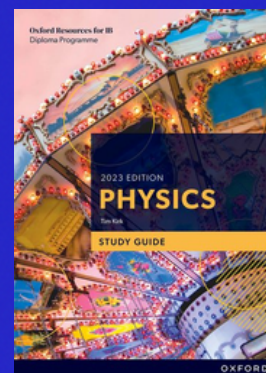
## Physics for the IB Diploma by K.A. Tsokos

Highly recommended for thorough explanations and practice problems aligned with the IB syllabus.



## Oxford IB Physics Course Companion

Well-organized resource with clear explanations, practice questions, and exam tips for both SL and HL.



## IB Physics Study Guide (Oxford & Cambridge)

Great for quick review and concise explanations during exam preparation.

# BEST APPS & TOOLS

## MASTER ACTIVE RECALL

Use these flashcard apps to memorize biological terms and processes effectively. Spaced repetition ensures key concepts stick in your long-term memory. Perfect for mastering definitions and tricky processes.



Quizlet



Anki

## PRACTICE MAKES PERFECT

Familiarize yourself with IB-style questions and learn how mark schemes are structured. Regular practice will help you refine your answers and boost confidence for exam day.



IB Questionbank & Past Papers

## SIMULATIONS

Fun and interactive simulation software for visualizing physics concepts as well as for conducting virtual experiments and visualizing physics phenomena in real-time.



Pocket Lab



Algodoo



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# ADVICE FROM EXPERT TUTORS

“

“Do as many past papers as you can. The more you practice, the more familiar the questions will feel—making the actual exam just another paper, reducing nervousness and improving performance.”

**FAMILIARIZE YOURSELF WITH PAST PAPERS**



# ADVICE FROM EXPERT TUTORS



“

“Physics is all about understanding, not just memorization. Focus on why concepts work the way they do. Visualize real-world applications and teach them to someone else to solidify your knowledge.”

**UNDERSTANDING OVER  
MEMORIZATION**

# ADVICE FROM EXPERT TUTORS

“

“Don’t fear failure—see it as an opportunity to learn. Every mistake helps you improve. Take time to review errors, identify why they happened, and prevent them in future problems.”

**EMBRACE FAILURE**



# ADVICE FROM EXPERT TUTORS



“

“Master the fundamentals early: uncertainties, units, resolving vectors, and reading graphs. These ‘Topic 0’ concepts are crucial for every other topic, and getting them wrong can derail your answers.”

**MASTER THE BASICS**

# FINAL THOUGHTS

IB is challenging but totally achievable if you work smart. It's a content-heavy subject that requires consistent effort, but with the right strategies—like understanding concepts, building connections, and practicing effectively—you'll be on track for success.

## WHAT IF I FEEL STUCK?

Sometimes all you need is a little extra guidance to save countless hours of frustration. Lanterna's tutors are IB experts who've been exactly where you are. More than just teaching content, they'll coach you on how to study smarter, manage your time, and build habits that lead to top marks. We've helped students go from 4s to 7s in a few months, and you can do the same with the right support.

# WHO IS TUTORING FOR?

1

## IF YOU FEEL STUCK AND DON'T KNOW HOW TO CATCH UP

When you've fallen behind, it can feel overwhelming. Having a tutor who's recently done your subject—and aced it—means you get targeted, personal guidance to catch up quickly and focus on what matters most. They'll help you minimise wasted time and maximise your chances of top grades.

2

## IF YOU LACK GUIDANCE ON HOW TO STUDY OR TACKLE IAS

If you're unsure how to approach your IA, EE, or even how to revise effectively, a tutor can make all the difference. A lot of stress and time-waste comes from not knowing exactly what you're supposed to do and how to do it. Our tutors guide you step by step and make sure that things are done right the first time, and avoid the frustration later on.

3

## IF YOU STRUGGLE WITH MOTIVATION, STUDY SKILLS, OR HABITS

Sometimes it's not about content—it's about knowing how to work efficiently. That's where our tutors at Lanterna stand out. With over 300 tutors, all recent IB graduates who scored 7s in their HL subjects, we know exactly how to help you best.

We don't just teach content—we coach you on building smart habits, managing your time, and studying effectively.

# SEE YOU AT THE TOP!

We hope you found this guide  
useful.

Be sure to check out other our study  
guides, as well as our world class  
tutors.



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