

11 TIPS

TO NAIL PHYSICS



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THE FOUNDATION OF SUCCESS

Every great achievement starts with a simple decision: the decision to begin and to stay with it no matter how tough the journey feels. So, first of all, remind yourself every day: success demands unwavering consistency.

Physics may feel overwhelming at times, but with persistence, no challenge is insurmountable. Embrace the process of learning, because every small effort you put in now, builds towards something greater. Reflect on your goals and commit to making progress one step at a time. Great achievements begin with accepting the challenge ahead—*you have the potential to conquer it*

D O U B T

1. MAKE CONSISTENT EFFORT

...Consistent effort sets the foundation for success!

Start by mastering the theory before attempting numerical problems. This means going beyond reading your textbooks—immerse yourself in videos, explore multiple channels, and actively engage with the material. Use interactive simulations like PHET from the University of Colorado to deepen your understanding in a hands-on way. If you're ready to go the extra mile, watch lectures by Walter Lewin from MIT for incredible physics demonstrations, or Shankar Ramamoorthy from Yale for engaging lessons. *(Resource list and links on the last page)*



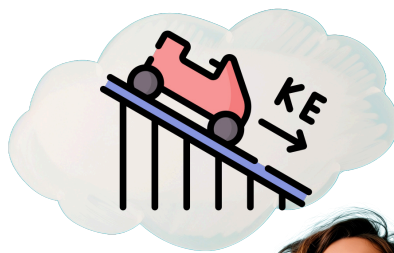
Shankar, Yale

If you put your hand on a hot plate, you should say 'Wow, these molecules are fast!' That's what I want you to say from now on, not 'Ouch!'

2. VISUALIZE PHYSICS

... You'll grasp the concepts faster

The second one is to visualize physics. Visualize the concepts as they might happen in real life, and you'll see that this can really speed up understanding of the topic. For example, if you are reading about static and dynamic friction, imagine what is happening to a block placed on an inclined plane. As the incline is increased, imagine from your experience that the block tends to stick to the inclined plane initially but then starts moving as the incline increases. Relate these visualizations to what the concept of physics is saying, and you will often end up making useful connections and internalizing the concept a lot better.



3. ABSORB CONTENT IN SMALL CHUNKS

...sometimes you can go fast by going slow

Third, absorb the contents of a tutorial in small chunks. Do not try to read everything in one go and expect that you'll understand everything. You'll really need to pause, visualize, ponder over what you read, and sometimes scribble your thoughts, equations, or diagrams on a piece of paper. You'll see how much faster you will understand by going slow.



4. UNDERSTAND DERIVATIONS OF IMPORTANT EQUATIONS

...Know the 'why' behind the formula

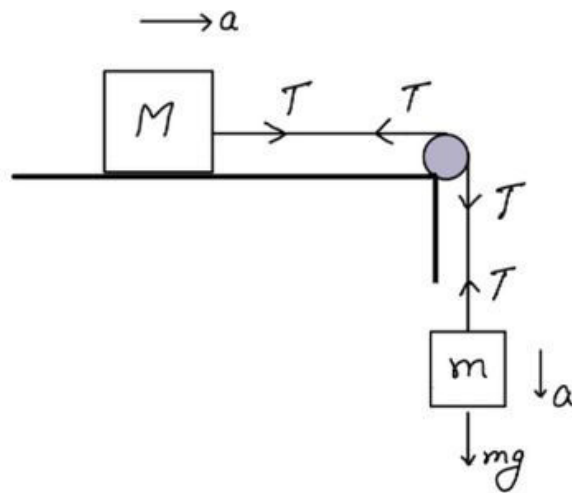
Number four is to understand the derivation of important equations. It is easy to memorize equations and use them to solve basic problems, but if you really want to tackle tough questions, see how the equations are derived. This makes things a lot clearer and helps you solve harder questions while relating to the problems and their solutions in a better way.



5. MAKE NEAT DIAGRAMS

... A clear picture leads to clear solutions

Number five is to make neat diagrams and deconstruct the problem. Making neat diagrams and putting all the available information around them can accelerate you towards writing the correct equations and discovering the answers. A diagram converts the question into a picture that is so much easier for the brain to absorb and organize. Even simple, well - labeled diagrams can make a big difference.



6. DON'T RUSH THROUGH PROBLEMS

... Step-by-step wins the race

Number six is to be disciplined about not rushing through numerical problems. Physics problems are not fiction novels, so do not jump steps while solving a problem. Write each step clearly as you move ahead. Skipping steps may lead to confusion and eventually to wrong answers, causing you to redo the problem. Once you're confident about the topic, you can start skipping a few steps here and there.

It's not that I'm so smart, it's just that I stay with problems longer. Albert Einstein



7. GET THE BASICS OF MATH

...Master the language of physics

Number seven is to get the basics of math. Specifically, focus on understanding fundamental calculus concepts like differentiation and integration, as well as having a solid grasp of algebraic manipulation, trigonometric identities, and geometric relationships. Math is the language of physics. While you do not need to master math, you do need conceptual clarity around calculus and a reasonable grip on algebra, trigonometry, and geometry. A good understanding of these topics can make physics much easier and save hours of time.

$$\frac{d}{dx} \text{ chicken} = \text{egg}$$
$$\int \text{egg} = \text{chicken}$$

8. FIND THE BEST WAY OF SOLVING PROBLEMS

... Efficiency gives you speed

Number eight is to find the best way of solving a problem. When you're doing high-level problems, start finding the best and most efficient way to solve them. Sometimes there are multiple ways to approach a problem, so explore them and determine the most effective method.



9. DON'T LEAVE DOUBTS UNRESOLVED

... Clear doubts, build confidence

Number nine is to not leave a problem with any doubts in mind. If you have any doubts about some part of the solution, take the time to clear them. Read the topic again, think deeper, or ask someone who knows the subject better. This will boost your confidence and deepen your understanding of the topic.

"Doubt is the origin of wisdom." – René Descartes



10. REVISIT THE CHAPTER AFTER SOLVING PROBLEMS

... and crystalize your understanding

Number ten is to revisit the chapter after solving a bunch of numerical problems. Once you've attempted enough problems, go back and read the chapter again. You'll find that your understanding of the topic has improved significantly.



11. PRACTICE, PRACTICE, PRACTICE

... Repetition is the mother of mastery

Finally, tip number eleven is to practice. Commit yourself to practicing daily with focus and determination. The more you challenge yourself with diverse problems, the sharper and more confident you'll become in mastering the topic. *Practice is the most important tip of all.* The more you practice, the more you learn, even from incorrect answers. You'll discover new things and better ways of solving problems, reinforcing your understanding of the subject.

"Practice isn't the thing you do once you're good. It's the thing you do that makes you good." - Malcolm Gladwell



YOUR NEXT STEPS ...

Learning something new is never easy, and physics is no exception. As a Grade 11 or Grade 12 student, it's natural to struggle at times—everyone does when faced with challenges. But every concept you try to understand, every resource you engage with, and every problem you tackle is an opportunity to strengthen your understanding, develop resilience, and build confidence in your ability to master physics. *Success isn't about being naturally gifted; it comes to those who are relentless in their pursuit of understanding and improvement.* Physics isn't just about solving equations or memorizing formulas for exams. It's about understanding how the world works, applying what you learn in class to practical problems, and finding patterns in the universal laws that govern everything around us.

There will be times when the concepts feel tough, or you're preparing for exams and problems seem overwhelming. In those moments, remind yourself that persistence, curiosity, and a positive mindset are your greatest allies. Celebrate every small victory, whether it's understanding a tough concept in class or solving a tricky problem during practice. Learn from your mistakes, and trust that every effort you make is building your path to success.

Ultimately, physics is your journey of discovery—mastering the subject for your exams while building skills that will help you excel in the future. Keep exploring, questioning, and believing in your ability to grow stronger with each challenge. You've got this!

What seems hard now will one day be your greatest strength. –
Unknown

HELPFUL PHYSICS LINKS

...Recommended, because I use them myself

Phet - Learn with Simulations (All Levels)

[HTTPS://PHET.COLORADO.EDU/](https://phet.colorado.edu/)

Prof. Shankar's Lectures (Middle to High Level)

[HTTPS://WWW.YOUTUBE.COM/PLAYLIST?LIST=PLFE3074A4CB751B2B](https://www.youtube.com/playlist?list=PLFE3074A4CB751B2B)

Khan Academy Physics (Beginner- Mid Level)

[HTTPS://WWW.YOUTUBE.COM/@KHANACADEMYPHYSICS7609](https://www.youtube.com/@khanacademyphysics7609)

Prof. Walter Lewin (Mid to High Level)

[HTTPS://YOUTUBE.COM/PLAYLIST?LIST=PLUDYLQFO_SSSB2TNCA3GTGOT8LGH6TJBR&SI=AXI6KHKYKACJL-RD](https://youtube.com/playlist?list=PLUDYLQFO_SSSB2TNCA3GTGOT8LGH6TJBR&SI=AXI6KHKYKACJL-RD)

Geogebra - Learn with simulations (All Levels)

[HTTPS://WWW.GEOGEBRA.ORG/](https://www.geogebra.org/)

The Science Cube (All Levels)

[HTTPS://WWW.THESCIENCECUBE.COM/](https://www.thesciencecube.com/)

BBC Bitesize (Middle to High Level)

[HTTPS://WWW.BBC.CO.UK/BITESIZE/SUBJECTS/ZPYB4WX](https://www.bbc.co.uk/bitesize/subjects/zpyb4wx)

Crsah Courses (Beginner to High Level)

[HTTPS://THECRASHCOURSE.COM/TOPIC/PHYSICS/](https://thecrashcourse.com/topic/physics/)

Comprehensive List of Equations (All Levels)

[HTTPS://PHYSICS.INFO/EQUATIONS/](https://physics.info/equations/)

Java Lab - Learn With Simulations (All Levels)

[HTTPS://JAVALAB.ORG/EN/](https://javalab.org/en/)