



Physics Formulas

Guidance for Teachers

This resource is provided free of charge under a non-exclusive licence to assist schools and students in their teaching and learning. It may not be copied, sold, or transferred to or by a third party. This resource will be available from GCSEPod's website and at associated events and conferences. It may be freely distributed and used within and by schools and their students only for the purposes intended. Paper copies printed off and digital downloads of this resource must not be modified in any way.

© 2021. Soundbitelearning UK Ltd in collaboration with the Association for Science Education. All Rights Reserved.

® gcsepod and GCSEPod are registered trademarks of Soundbitelearning UK Ltd 2019. All Rights Reserved.



Guidance for teachers

These support documents have been commissioned by GCSEPod from the Association of Science Education, and written by experienced teachers and subject leads.

We hope that they are a useful addition to your students' revision. The idea is not to replace the teaching of formulas in Physics, but to provide a quick reference guide to what they need to learn, and how to use any formula as a tool for understanding. It can be really helpful to come back to these points each time you use formulas in school, as they address common misconceptions held by students.

Many teachers and researchers have spent a great deal of time looking at how students use their maths skills - or don't - in the science classroom. A really useful resource is the [Language of Maths in Science \[LoMiS\] project](#) from the Association for Science Education. It's a set of free downloads and is well worth looking at, especially if you can refer to particular sections as a department to agree a common approach. Even better is to work with colleagues in the Maths department, to see what students study and when, and how things are phrased. We know that 'rearrange the formula' and 'change the subject of the equation' mean the same thing, but students might not.

Finally, never forget that the maths we use in science lessons should always follow a clear explanation in words. There is a story behind every formula, a narrative that explains every relationship. Students can often predict or express these patterns in words before they are confident with the maths; it makes intuitive sense that increasing the force applied to an object will increase the effect of that force by the same proportion. As long as we can turn that recognition into the correct relationship, that doubling the force doubles the acceleration, (not the velocity), our students have just suggested part of Newton's second law.

Guidance provided by Ian Horsewell

Ian is an experienced physics teacher who has spent the last few years supporting teacher development as part of the IOP Education team. He has also written several teaching guides, contributed to textbooks and classroom resources on a range of topics, and probably spends more time on Twitter than he should.