



NEW COLLEGE OXFORD

Dear New College Physicists,

Congratulations on obtaining a place at New College! The Physics Tutors look forward to welcoming you in October and teaching you over the next years.

After the stresses of A-level exams you probably want some break from study. However during the summer your natural intellectual curiosity may return leading to a desire to learn more about physics before arriving at Oxford. Below we have provided some suggestions for summer reading in preparation for starting the Oxford physics course.

Three strands make up a successful degree in physics. These are physical insight and intuition, mathematical competence and experimental skills. The first makes the subject tractable. The second makes problems soluble. The third raises the subject from idle speculation to first among the sciences.

Here are some suggestions for the summer that will enable you to improve your skills at the first two strands of the subject before you arrive at New College.

One of the best ways to develop physical insight and intuition is through what are often called Fermi questions. These are short estimation questions where the aim is to grasp the essence of the problem (the classic original being 'How many piano tuners are there in Chicago?'). Posing and solving such questions regularly will keep your physics brain sharp and will train you in the ability to get an approximate and sensible answer without drowning in detail. There are very many examples of Fermi questions available on the web.

For general inspiration, the Feynman Lectures on Physics provide a classic if personal take on physics. Note however that these do not contain problems. You will no more become a physicist without solving problems than become a musician without practising. The more mathematics you have, the better prepared you will be for the physics course. If you have not done two full A-levels in mathematics, or have done so with a lot of focus on Decision Maths/Statistics, time spent over the summer learning more Mechanics or Further Pure will not go unrewarded.

A book which will cover much of the mathematics you need during the Oxford physics course is 'Mathematical Methods for Physics and Engineering' by Riley, Hobson and Bence. Read at least the first two chapters. If you would like to read more on particular further topics, we suggest calculus and differential equations. There will be vacation work related to this material, which you will receive in August and the first tutorials of term will be based on this work.

If you find Riley, Hobson and Bence difficult at first then a transition text -- "Further Mathematics for the Physical Sciences" by Tinker and Lambourne — may be useful.



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We also have a final suggestion on summer reading. An excellent reason to study physics is because you are excited and motivated by the big questions and the big experiments: astrophysics and cosmology, black holes, gravitational waves and the depths of quantum mechanics. You are embarking on a path that will enable you, in a few years time, to understand these topics deeply and honestly. Now is the time to move beyond the popular science books which might originally have sparked your interest in physics. By first mastering the basics of the subject thoroughly, you will be rewarded by a full and genuine understanding of the big questions that may have brought you into physics in the first place.

Enjoy the summer, and we look forward to welcoming you to New College and Oxford!

Joseph Conlon and Adrianne Slyz