

The NSAA Guidebook

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General

What is the Natural Sciences Admissions Assessment?

The Natural Sciences Admissions Assessment (NSAA) is a pre-interview assessment for students applying to study Natural Sciences at the University of Cambridge.

What is the purpose of the NSAA?

The NSAA is designed to determine your potential to achieve as a student in a demanding undergraduate Science course. They are assessing your ability to use scientific and mathematical knowledge in unfamiliar contexts. It is therefore designed to test **how you think** using **what you know**. It is designed to be tough and challenging as it is a way for Cambridge Admissions to differentiate between students who otherwise have likely achieved the top grades in school. _

Test Specifics

How is the NSAA structured?

The NSAA is composed of two sections lasting a total of 2 hours;

- Section 1: A multiple-choice assessment consisting of **FIVE** parts, of which you must answer **THREE**. Each part contains 18 questions. You have 80 minutes to spend on Section 1. **Part A is compulsory**, and you are required to answer **two further parts** from **B, C, D** and **E**
 - Part A: Mathematics
 - Part B: Physics
 - Part C: Chemistry
 - Part D: Biology
 - Part E: Advanced Mathematics and Advanced Physics

You should answer 54 questions in total for this section (3x18)

All questions in this section are multiple choice and of equal weighting. You will score 1 mark for every correct answer and not gain a mark for every incorrect or

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unanswered question. You have a total of 80 minutes for this section: it is recommended you split your time equally between the sections.

- Section 2: A hand-written assessment consisting of **SIX** parts of which you must answer **TWO**. There are two each on Biology, Chemistry and Physics.

In this section you may be expected to draw diagrams and analyse data- including drawing graphs. If you can't answer one part of a question, later parts may still be solvable.

You will have a total of 40 minutes to complete this section.

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Do I have to take the subject at A-Level to answer its Part in Section 1?

Technically no. That being said, in order to apply for Natural Sciences, you must take at least two Science/Mathematics A-Levels and so it makes sense to do the sections corresponding to you A-Level choices.

If I do Maths A-Level and 1 other Science, will I be able to sit the NSAA?

Although Cambridge says you can apply for Natural Sciences with Maths and 1 Science A-Level, you will most definitely struggle with the NSAA Section 1. If you are planning to study Natural Sciences it is advisable that you take **THREE** Maths/Science A-Levels to not only help you with the NSAA but to prepare you for a demanding Natural Sciences undergraduate degree.

The only exception to this is if you study Maths and Physics A-Level.

Do I have to do both questions from the same subject in Section 2?

No. The exam paper states 'There are six questions in this paper, of which you should answer **ANY TWO**'.

Will I struggle with the NSAA Section 1 Part E (Advanced Maths and Advanced Physics) questions if I didn't take Further Maths A-Level?

Not necessarily. You are not expected to have knowledge further than A-Level content to sit the NSAA. If you have just finished 1st Year A-Level Maths, there may, however, be some topics you have not met before or still struggle with. It is advised that you get to grips with these topics well before you sit the NSAA.

What is the difference between Part A (Mathematics) and Part B (Physics) and Part E (Advanced Maths and Advanced Physics)?

Mainly the content covered. The topics covered by the Advanced Section aren't necessarily harder, just different. You may find that some of the questions on the Advanced section (Part E) are actually easier than questions in Part A and B. Generally speaking, the topics in Advanced tend to be those covered later on in the A-Level syllabus and therefore assumed to be tougher but that is not always the

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case. If you are planning on taking Part E, ensure you are comfortable with all the content as it will likely cover Year 13 content you may not have studied before.

What topics are covered in Section 1 Part A (Mathematics)?

The Maths topics covered include:

- Numbers: BIDMAS (Whole Numbers, Integers, Fractions, Decimals, and Numbers in Index Form), Factors and Multiples, Indices and Roots, Index Laws, Fraction Manipulation, Percentages, Direct and Indirect Proportions, Ratio Notation, Number Operations, Upper and Lower Bounds, Number Operations, and Approximations.
- Algebra: Expression Manipulation, Index Laws, Linear Equations (including simultaneous), Factorisation, Substituting Formulas, Inequalities, Sequences, Cartesian Coordinates, Straight Line Equations, Graph Intersections, Simultaneous Equations, Interpreting Graphs, Real-Life Problems
- Geometry: Angle Properties, Sum of Exterior and Interior Angles, Quadrilateral Properties, 2D Symmetry (reflectional and rotational), Similar Shapes, Pythagoras, Geometric Proofs, Circle Theorems, 2D Transformations
- Measures: Perimeters, Areas and Circumferences, Volumes and Surface Areas, Vectors, Map Interpretation, Shape Enlargement, Unit Conversion, Standard Index Prefixes, Compound Measures, Three-Figure Bearings, Measurement Inaccuracies.
- Statistics: Bias, Flaws, Discrete and Continuous Data, Data Extraction, Interpret Charts and Graphs, Calculate Averages and Ranges, Correlation, Compare using Statistical Measures.
- Probability: Relative Frequency and Theoretical Models, List Outcomes, Mutually Exclusive Outcomes, Venn Diagrams, Add/Multiply Probabilities, Tree Diagrams, and Comparing Experimental and Theoretical Probabilities.

What topics are covered in Section 1 Part B (Physics)?

The Physics topics covered include:

- Electricity: Current, Symbols and Diagrams, and Power and Energy.
- Motion and Energy: Kinematics, Forces and Motion, Energy, and Energy Conversion.
- Thermal Physics: Conduction, Convection, Radiation, and Matter
- Waves: Nature and Sound Waves.
- Electromagnetic Spectrum: EM Waves and The Spectrum.
- Radioactivity: Atomic Structure, Radioactive Decay, Ionising Radiation, Half-Life, and Nuclear Fission/Fusion.

What topics are covered in Section 1 Part C (Chemistry)?

- Atomic Structure: Protons, Neutrons and Electrons, Relative Masses and Charges, Atomic Number, Mass Number, Standard Notation, Electronic Configurations, Isotopes, Relative Atomic Mass, Relative Molecular Mass.
- The Periodic Table: Periods and Groups, and Metals and Non-Metals, Displacement Reactions, Uses of Metals, Reductions and Extraction, Position of Groups 1, 2, 17 and 18, Relationship between Position and Electronic Configurations, Physical and Chemical Properties, Transition Metals, and Calculate Relative Atomic Mass.

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- Chemical Reactions and Equations: Word Equations and Symbols, Law of Conservation of Energy, Covalent and Ionic Compounds, and Common Compound Name Recall.
- Quantitative Chemistry: Moles, Molar Volume, Percentage Composition, Empirical Formula of a Compound, Balanced Chemical Equations, Concentration, and Percentage Yield
- Oxidation, Reduction and Redox: Identify Reactions and Link to the Transfer of Electrons
- Chemical Bonding, Structure and Properties: Define Elements and Compounds and Reasons for Reactions
- Group Chemistry: Properties of Groups 1, 17, 18 and transition metals
- Separation Techniques: Chemical Procedures to split Compounds and Mixtures and Types of Mixtures
- Acids, Bases, and Salts: Definitions, Properties and Reactions of Strong and Weak Bases and Acid Categorisations
- Rates of Reaction: Qualitative Effects on a Rate of Reaction of Various Stimulus, Practical Procedures to Measure Change in Chemical Reactions, Interpret Data, Collision Theory, and Catalysts
- Energetics: Exothermic and Endothermic Reactions
- Electrolysis: Explain Key Terms, Process of Electrolysis in Context, Half Equations.

What topics are covered in Section 1 Part D (Biology)?

The Biology topics covered include:

- Cells: Structure and Function of Animal, Plant and Bacterial Cells.
- Movement: Diffusion, Osmosis and Active Transport
- Cell Division and Sex Determination: Mitosis, Meiosis, Asexual and Sexual Reproduction
- Inheritance: Key terms and Monohybrid crosses
- DNA: Structure, Function of Chromosomes, Protein Synthesis and Mutations
- Gene Technologies: Genetic Modification/Engineering and Stem Cells
- Variation: Natural Selection, Evolution and Extinction
- Enzymes: Functions, Mechanisms, the Effect of Certain Factors, and Digestive Enzymes
- Animal Physiology: Respiration and the Central Nervous System
- Plant Physiology: Photosynthesis and Phototropism
- Environment: Food Chains, Population Growth, Cycles, Pollution, Variety, Biodiversity

What topics are covered in Section 1 Part E (Advanced Maths and Advanced Physics)?

The Maths topics covered include

- Algebra and Functions: Indices Laws, Surd Manipulation, Quadratic Functions, Inequalities, and Algebraic Manipulation of Polynomials.
- Sequences and Series: Arithmetic and Geometric Series, Recurrence Relations, and Binomial Expansion
- Coordinate Geometry: Straight Line, and Circle Equation/Properties
- Trigonometry: Sine/ Cosine Rules, Area of a Triangle using Sine, Radian Measure, Special Triangles/Angles, Sine, Cosine and Tangent Graphs

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(symmetry and periodicity) and Functions, Trigonometric Identities, Solution to Trigonometric Equations in Intervals, and CAST

- Exponentials and Logarithms: Graphs, Log Laws, and Solving Equations with Unknown Indices
- Differentiation: Tangent/Normal Gradients, Second Order Differentiation, Stationary Points, and Increasing/Decreasing Functions
- Integration: Definite/Indefinite Integration, Fundamental Theorem of Calculus, Combining Integrals, Trapezium Rule, Differential Equations
- Graphs of Functions: Sketch Graphs, Transformations, Altering Values, Differentiation, Intersections, and Geometric Interpretations

The Physics topics covered include:

- Forces and Equilibrium: Vector Nature, Components and Resultants, Moments, Normal and Frictional Components, Equilibrium, Coefficient of Friction, and Gravity
- Kinematics: Graphical Methods, 1D Motion, and Equations of Motion
- Newton's Laws: Linear, Vertical or Inclined Motion, Problems Involving Two Bodies Connected
- Momentum: Linear Momentum, Conservation, and Coalescence
- Energy: Gravitational Potential Energy, Kinetic Energy, and Conservation of Energy

For this section knowledge from Part A (Maths) and Part B (Physics) will also be useful.

For help applying all this content to the NSAA, watch our FREE revision videos at: stepmaths.co.uk/free-nsaa

What additional content do I need to know for Section 2 Biology?

The additional content you need to know for Section 2 Biology includes:

- Biodiversity: Variety and Complexity of Life, Classification, Adaptation, and Selection
- Exchange and Transport: Definition, Effect of Certain Factors (Size, Metabolic Rate etc.), Passive/Active Transport, and Plasma Membrane Structure
- Cells: Cell Theory, Prokaryotic and Eukaryotic Cells, Multicellular Organisation, and Cell Cycles
- Biological Molecules: Polymers, Functions of Various Molecules, Sequence of bases in DNA, Enzymes, and ATP

What additional content do I need to know for Section 2 Chemistry?

The additional content you need to know for Section 2 Chemistry includes:

- Formulae, Equations and Amounts of Substance: Empirical and Molecular Formulae, Balanced Equations, Avogadro Constant, Relative Atomic Mass, and Acid-Base Titrations
- Atomic Structure: Structure and Configuration of Atoms, Ions, and Isotopes
- Bonding and Structure: Ionic and Covalent Bonding, Permanent and Induced Dipole-Dipole Interactions, and Shapes of Simple Molecules
- Energetics: Enthalpy Changes and use of Hess's Law
- Kinetics: Collision Theory, Activation Energy, Boltzmann Distribution, and Catalysts
- Equilibria: Dynamic Nature of Equilibria, Equilibrium Constants
- Redox: Oxidation States, Oxidation and Reduction as Electron Transfer

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- Inorganic Chemistry and the Periodic Table: Organisation of Elements, Metallic and Non-Metallic Group Properties, Trends in Properties
- Organic Chemistry: Functional Groups, Structural Isomers and Stereoisomers, Reaction Classification, Covalent Bonds, Organic Synthesis, and Analytical Techniques

What additional content do I need to know for Section 2 Physics?

The additional content you need to know for Section 2 Physics includes:

- Vectors and Scalars: Distinction, Resolution, Addition Rule, and Perpendicular Vectors
- Mechanics: Kinematics, Dynamics, Energy, and Momentum
- Mechanical Properties of Matter: Stress/Strain and Young's Modulus
- Electric Circuits: Current, EMF, Potential Difference, Resistance and DC Circuits
- Waves: Polarisation and Diffraction, Path Difference, Phase and Coherence/Interference, and Superposition and Stationary Waves
- Quantum and Nuclear Physics: Photons and Particles, Wave-Particle Duality, Particle Diffraction

What is the difference between the questions in Section 1 and Section 2?

The main difference in the two sections is that Section 1 is Multiple Choice and Section 2 is not. Although there is significant overlap in the content for Section 1 and Section 2, Section 2 will likely involve you applying your knowledge in unfamiliar contexts. This is designed to test your problem solving and creative thinking skills as well as your subject knowledge.

What do I do if I am struggling for time on the NSAA?

As Section 1 is multiple choice and is marked positively, you can guess answers if absolutely necessary. It is recommended that you work through the section at a steady pace to ensure you have time to answer all the questions. If you are feeling more confident about one part, it is a good idea to do that part first and work through it quickly (but don't rush it!), and then spend the remaining time on the other parts. If you have a number of questions left and less than 30 seconds it may be advisable to guess answers.

Given that Section 2 is hand-written and not multiple-choice, it doesn't really allow you to guess if you find you are running out of time. Similarly, as some parts may be dependent on the answer to previous parts, you are unable to skip out questions you may struggle with. You must work quickly through this section to avoid running out of time.

How to Apply

Where can I take the NSAA?

The NSAA can only be taken at an authorised test centre. You can ask the Examinations Officer of your current school or college to register you and you will be able to take the exam on site. If you have already left school or college, you could go back to your old school and sit the paper there. If neither of these options are

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available to you then you will have to search for an authorised test centre to register you.

When can I take the NSAA?

You will have to register for the NSAA by 15th October in Year 13. You will sit the test just after the October half-term.

How can I apply for the NSAA?

You cannot register yourself to take the NSAA; the test centre is responsible for registering you. If you are currently attending a school or college you can ask the Examinations Officer to register you.

If, however, you are not attending a school or college, then you can visit your old school and talk to the Examinations Officer there and they may register you for the NSAA. If not, you may need to look for other test centres nearby and ask them to register you.

Will I be charged to take the NSAA?

Cambridge University does not charge candidates registered at an official test centre.

Results

When will I get my NSAA score?

Exact dates will vary from college to college, but you will usually hear back in January.

Can I receive feedback on my NSAA score?

Yes, feedback will be provided as part of Cambridge's usual feedback process.

How important is my NSAA score?

The NSAA is fairly important as it is one of the few quantitative measures of a student's academic potential used in the admissions process. Given that most applicants will have received high numbers of A and A* grades, the NSAA helps differentiate students who may otherwise appear very similar. Given the recent scrapping of AS exams, the NSAA is even more important as a way to highlight your academic capabilities to Admission Tutors. Alongside your personal statement and references, it helps provide a more holistic view of you as a student and your potential at university. However, it is important to remember that there are other indicators of your academic capability throughout your application and the NSAA is only one of the parts.

A strong NSAA score is often a good indicator of whether or not you will be called to interview.

How is the NSAA graded?

The NSAA is graded on a scale from 1.0-9.0. The test is graded so that the average candidate scores a 4.0.

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What is a 'good' NSAA score?

Generally speaking, around 60% or a score of 6.0+ is seen as a respectable score. Given that Natural Sciences is such a competitive course, gaining a score of 6.0+ is in no way a guarantee for an interview. There is no set score necessary to gain an interview, but some Admissions Tutors may set specific base scores for their college when calling applicants to interview. Obviously, the stronger your score the better, but it is designed to be difficult and for few applicants to achieve a perfect score of 9.0.

Can I re-sit the NSAA if I am not happy with my score?

Given that the NSAA is only sat once a year, there is no opportunity to re-sit the paper for application in the same year. If you desperately feel a re-sit is necessary, you will have to re-apply to Cambridge the following year.

Revision

Where can I find past papers?

Past Papers can be found here: stepmaths.co.uk/free-nsaa

It is recommended you do as many as possible before the test so you are familiar with the types of questions asked and the time pressure faced. Although you may be confident with the content of the NSAA, the style of the paper is likely to be very different from anything you have sat before. Doing past papers will ensure that, come test day, your exam technique won't hold you back and you can perform your very best.

When should I start revising for the NSAA?

It is recommended you start revising for the NSAA in the summer before Year 13. The NSAA is unlikely to be similar to any test you have sat in the past and it will take time to familiarise yourself with the format and the skills necessary to sit the exam. This makes cramming just before the test largely unhelpful and, to an extent, counterproductive.

How should I revise for the NSAA?

The best way to revise for the NSAA is to sit [past papers](#) in timed conditions. It is a highly time-pressured test and so it is necessary to get used to the timings before you sit the exam.

For help revising for the NSAA, you can access our collection of FREE revision videos at: stepmaths.co.uk/free-nsaa

Other

What equipment is needed to sit the NSAA?

For Section 1, a soft pencil is required, and a rubber is also recommended. Calculators are **not** permitted.

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For Section 2, a black ink pen is recommended and a pencil for diagrams. Calculators are permitted but must follow strict guidelines that can be found on the Cambridge NSAA website.

Is extra time allowed for candidates whose first language is not English?

No. Extra time is not permitted for candidates whose first language is not English.

What do I do if I need Access Arrangements?

Access Arrangements are available if you have a disability or a special requirement entitling you to support for other exams.

You will need to inform the test centre of your condition before they register you for the NSAA. You may need to provide details and medical evidence of your disability or special requirement.

What are the guidelines for laptop use?

A candidate using a laptop must not be able to disturb the other candidates and the laptop screen must not be visible to them.

If the candidate requiring a laptop is taken to a separate room then they will require an individual invigilator.

Candidates using a laptop should format their work in Arial font, size 11, single-spaced. For Section 2 of the NSAA there is no word limit. Automatic spell checkers and grammar checkers must be disabled.

At the end of the test, the candidate using the laptop must be present when their script is printed off, to confirm that the work is theirs. The candidate's name, candidate number, candidate initials and centre number should be clearly written on the printout.

Can I apply for Special Consideration?

Should you feel that temporary illness, injury or other issues affected your test score, you can ask for this to be taken into account as special consideration. A special consideration form must be completed within seven days of sitting the test. If you want to apply for special consideration, talk to the Examinations Officer at your test centre as soon as possible.

Good luck with your NSAA preparation; if you have any questions, please visit stepmaths.co.uk and contact us!

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