

CAREERS THROUGH MATHS: TOWN PLANNER



JOB DESCRIPTION

A Town Planner, often known as a Chartered Town Planner in the UK after achieving professional status, is responsible for shaping the way our villages, towns, and cities develop. They balance the needs of communities, the economy, and the environment to manage land use and create sustainable, attractive, and functional spaces. Their daily work is highly varied, involving site visits to assess development potential, analysing data on population trends and housing needs, writing detailed reports for planning applications, and presenting evidence at public inquiries or local planning authority committee meetings. They work within a strict regulatory framework, primarily the Town and Country Planning Act 1990 and the National Planning Policy Framework (NPPF), ensuring all development complies with local and national policies.

The work environment is equally diverse. Planners are employed by local authorities (e.g., Birmingham City Council, Cornwall Council), private sector consultancies (e.g., Arup, Savills, Lichfields), central government bodies (e.g., the Planning Inspectorate), and charities like CPRE (The Countryside Charity). A typical day might involve using Geographic Information System (GIS) software to map flood risk zones for a new housing estate in Somerset, calculating the required number of affordable homes for a mixed-use development in Manchester, or using statistical models to project future school place demand for a London borough's Local Plan.

Mathematics is absolutely central to the role, providing the objective, quantifiable evidence base upon which all rational planning decisions must be made. It

transforms subjective opinions about a development into measurable impacts. For instance, a planner must mathematically calculate the traffic generation of a proposed supermarket to assess its impact on local junction capacity, or use financial viability appraisals to determine if a developer can realistically provide the required community infrastructure, such as parks or healthcare facilities, whilst still turning a profit. Without strong mathematical skills, a planner cannot robustly defend their recommendations, which are often scrutinised by developers, lawyers, and local communities.

HOW MATHEMATICS IS USED

- **Spatial Analysis and Geometry:** This is the foundation of physical planning. Planners use geometric principles to design efficient land layouts, calculate site areas, plot building footprints, and establish rights of way and boundaries. For example, when assessing a proposal for a new residential estate, planners must calculate plot sizes, ensure buildings conform to minimum distance standards for privacy (e.g., a 21-metre separation between facing windows), and design road geometries that meet safety standards. Using GIS, they perform spatial overlays to analyse constraints, such as mapping a site against flood zone data from the Environment Agency to determine the developable area.
- **Statistics and Demographics:** Planners rely heavily on statistics to understand and forecast population changes, housing needs, and economic trends. They analyse data from the Office for National Statistics (ONS), such as census data, to project future household formation rates for a local authority. This statistical modelling directly informs the housing targets set in a Local Plan. For instance, a planner might use regression analysis to forecast that a borough with an ageing population will need 500 new specialised elderly care homes over the next 15 years, a figure that must then be allocated to specific sites.
- **Financial Appraisal and Viability Modelling:** A critical mathematical function is assessing the financial viability of development projects. Planners must understand development economics to ensure policy requirements (e.g., 30% affordable housing, Section 106 contributions for schools and roads) do not render a project unviable. This involves analysing a developer's costings, projected sales values, and profit margins (typically expected to be 15-20% of gross development value). A planner might model different scenarios to find a

balance, such as reducing the affordable housing contribution from 30% to 20% to ensure the project can still deliver crucial infrastructure.

- **Transport Modelling:** Planners use mathematical modelling to predict and mitigate the transport impacts of new development. This involves applying trip generation rates (e.g., a new supermarket may generate 10 car trips per 100 square metres per hour) from established sources like the Transport Analysis Guidance (TAG) to forecast traffic flows. They then analyse this data against the capacity of existing roundabouts and junctions to determine if a new development requires a financial contribution (a Section 106 agreement) to fund necessary highway improvements.
- **Data Analysis and Mathematical Modelling:** Beyond specific areas, planners constantly use data analysis to make evidence-based decisions. This includes using software to model sunlight and daylight impacts of a new tall building on neighbouring properties, calculating the carbon footprint of different development options to meet sustainability goals, or using multi-criteria analysis to mathematically score and compare different potential sites for a new settlement in the Oxford-Cambridge Arc.

KEY SKILLS & TOOLS

Skill/Tool	Application
Geographic Information Systems (GIS)	GIS software like ArcGIS or QGIS is used for spatial analysis and mapping. Planners perform mathematical operations like buffering (creating a zone of a specific distance, e.g., 500m, around a site to assess access to public transport), overlaying multiple data layers (e.g., green belt, conservation areas, flood zones), and calculating areas and densities to inform planning decisions for UK local authorities.
Data Analysis & Statistical Software	Tools like Excel (for complex formulas, pivot tables, and regression analysis) and R or SPSS are used to process large datasets from the ONS and other sources. A planner might use these to analyse housing market trends, calculate employment land requirements, or create population projections for a council's evidence base.

Financial Modelling Software	Programs like Excel with specialised add-ins are used for development viability appraisals. Planners build financial models that incorporate build costs, land values, sales values, and finance costs to calculate the residual land value and test the capacity for a development to support planning obligations.
Programming Languages	Python is increasingly used for automating data processing tasks, performing complex spatial analysis beyond standard GIS functions, and building custom analytical models to assess environmental impacts or optimise land-use patterns for large-scale UK projects.
Building Information Modelling (BIM)	BIM software is used on major projects to create intelligent 3D models. Planners use these models to analyse massing, scale, and sightlines mathematically, ensuring a proposed building's design is appropriate for its context within a historic UK city like York or Edinburgh.
Communication & Presentation Tools	Planners use CAD software and graphic design tools to create masterplans and visualisations. They must then translate complex mathematical data and modelling results into clear, understandable maps, charts, and reports for non-technical stakeholders, including councillors and the public.
Quality Control & Policy Compliance	A key mathematical skill is ensuring all work is accurate and compliant with national policy. This involves rigorous checking of calculations (e.g., housing density figures, financial appraisals) against the NPPF and local plan policies to ensure the evidence base for a decision is sound and legally defensible.

Typical Pathway: The most common route is completing a Royal Town Planning Institute (RTPI) accredited undergraduate (e.g., University of Manchester, University of Sheffield) or postgraduate degree (for those with a first degree in another subject). Strong GCSEs and A-levels in facilitating subjects like Mathematics, Geography, and Economics are highly beneficial. Graduates typically enter as a **Planning Assistant or Officer** in a local authority or private consultancy. To become a **Chartered Town Planner (MRTPI)**, professionals must complete the RTPI's Assessment of Professional Competence (APC), a period of structured experience and submission of a portfolio demonstrating key competencies. Career progression can lead to roles such as **Senior Planner, Planning Manager, or Director of Planning**.

Industry Demand: Demand for town planners in the UK remains strong, driven by

government housebuilding targets (300,000 new homes per year), major infrastructure projects like HS2 and Thames Tideway, and a focus on urban regeneration and net-zero carbon development. The RTPI frequently reports skills shortages in the sector. Planners with strong mathematical and analytical skills are particularly sought after to handle complex viability assessments and data-driven plan-making.

Real-World Impact: Town Planners have a profound impact on the UK's landscape and quality of life. They were instrumental in the regeneration of London's King's Cross and Liverpool's waterfront, transforming derelict industrial land into thriving, sustainable communities. Their mathematical work ensures new developments are supported by adequate infrastructure, protects the countryside through the green belt policy, and creates more liveable, resilient cities for future generations.