

CAREERS THROUGH MATHS: ARCHIVIST



HOW MATHEMATICS IS USED

- **Statistics and Data Analysis:** Archivists use statistics to make evidence-based decisions about collection management. For example, they analyse user engagement data from their online catalogue (like Discovery at the National Archives) to identify which collections are most frequently accessed, guiding prioritisation for digitisation projects. They also use statistical sampling to appraise large, modern collections; rather than reviewing every single file, they might assess a statistically significant sample to determine the overall value and retention schedule for a series of administrative records from a local council.
- **Boolean Logic and Set Theory:** The fundamental principles of organising and retrieving information in archival databases are rooted in Boolean logic. When an archivist creates a catalogue using standards like ISAD(G), they define hierarchical relationships (fonds, series, file, item) which are applications of set theory. A researcher searching for "World War I AND soldiers' letters NOT official dispatches" is using Boolean operators (AND, OR, NOT) designed into the search interface by the archivist to precisely narrow down results.

- **Geometry and Spatial Reasoning:** Effective storage is a critical and costly aspect of archival work. Archivists must use geometry and spatial reasoning to maximise storage capacity within a strongroom. This involves calculating the cubic footage of a storage area, designing compact shelving layouts that allow for safe access, and modelling how to stack different-sized boxes efficiently. When planning a move to a new facility, such as The Archives at the Museum of London, precise calculations are essential to ensure the new space can accommodate all existing collections with room for growth.
- **Financial Mathematics and Budgeting:** Archivists, particularly those in managerial roles, are responsible for budgets. They must calculate the costs of conservation supplies, digitisation equipment, and staff hours. They use financial mathematics to prepare funding bids to bodies like the National Lottery Heritage Fund, creating detailed projections for multi-year projects. This includes calculating cost-benefit analyses for different preservation strategies, such as the long-term cost of digital preservation versus physical storage.
- **Risk Assessment and Probability:** Preserving materials for centuries requires a proactive approach to risk. Archivists conduct quantitative risk assessments, calculating the probability and potential impact of threats like fire, flood, or pest infestation. They might use probability models to determine the likelihood of a pipe bursting in a storage area or calculate the degradation rate of acidic paper to prioritise conservation work on the most vulnerable items in a collection, such as 19th-century company ledgers.

KEY SKILLS & TOOLS

Skill/Tool	Application
Archival Database Management (e.g., Calm, AtoM)	These are the primary tools for cataloguing. Archivists use them to create hierarchical, mathematical descriptions of archives. They apply logical data structures to define relationships between records and use the systems' reporting functions to generate statistical data on the size and use of collections.
	This cloud-based service, widely used in the UK, uses complex checksums (mathematical algorithms) to verify the integrity of

Digital Preservation Software (e.g., Preservica)	digital files over time. Archivists monitor these checksums to ensure that a digitised copy of the Domesday Book or a born-digital government report has not been corrupted, a process entirely reliant on mathematical verification.
Spreadsheet Software (e.g., Microsoft Excel)	Used for a multitude of analytical tasks, from tracking accession statistics and budgeting for a new project at a university archive, to analysing survey data from visitors. Pivot tables and formulas are used to summarise and interpret data on collection growth and user demographics.
XML (eXtensible Markup Language)	Archivists use XML to create and manage structured data, particularly for exporting and sharing catalogue descriptions. The language itself is a logical, mathematical structure. They may use it to contribute records to the UK's national archival network, ensuring interoperability between different systems through standardised schemas.
Environmental Monitoring Equipment	Archivists use dataloggers to continuously monitor temperature and relative humidity in storage areas. They analyse the time-series data collected to ensure the environment remains within strict parameters (e.g., 16°C \pm 1° and 50% RH \pm 3%), using statistical process control to identify trends that could threaten collection preservation.
Reporting and Presentation Tools	Archivists must often present complex, data-driven cases to non-specialists. For instance, they might create a report for a museum trust's board of trustees, using charts and graphs derived from usage statistics to justify funding for a new digitisation scanner.
Standardised Metadata Schemas (e.g., ISAD(G))	Applying these international standards is an exercise in logical consistency and structured data entry. It requires the archivist to think mathematically about the relationships between different levels of description and to populate defined fields in a uniform way, creating a predictable and searchable database.

Typical Pathway: The most common route into the profession is via a postgraduate qualification. After obtaining GCSEs and A-levels (where subjects like History, English, and Mathematics provide a good foundation), candidates must complete a first degree in any subject, though History, Information Science, or a related field is common. They must then undertake a postgraduate diploma or Master's degree in Archives and Records Management, accredited by the Archives and Records

Association (ARA). Key providers in the UK include the University of Dundee, University of Glasgow, and University College London. Entry is competitive, and pre-course experience as a volunteer or archive assistant in a local record office or museum is highly valuable. After qualifying, professionals typically start as an Archivist or Assistant Archivist and can progress to senior, management, and policy-making roles. Many pursue ongoing professional development and accreditation through the ARA to achieve Registered status.

Industry Demand: The UK job market for archivists is stable but competitive, with roles concentrated in the public and charitable sectors (national archives, local government, universities, and heritage organisations). Demand is driven by the ongoing need to manage both historical and the ever-growing volume of digital records, creating a need for specialists in digital preservation. According to the Archives and Records Association, while the number of traditional roles may not be growing rapidly, the skillset is evolving and remains essential for organisational accountability, cultural heritage, and academic research.

Real-World Impact: Archivists are the guardians of the UK's collective memory, ensuring the survival of records that underpin democracy, identity, and history. Their work enables high-profile projects like the UK Parliament's Historic Hansard digitisation, which makes centuries of parliamentary debates publicly accessible. They support major historical research, from academics studying medieval manorial records to authors and television producers creating documentaries. By applying mathematical rigour to preserve and organise our history, they ensure that records—from the Magna Carta to the modern digital footprint—remain authentic, accessible, and meaningful for future generations.