

# Scottish School Exam Papers

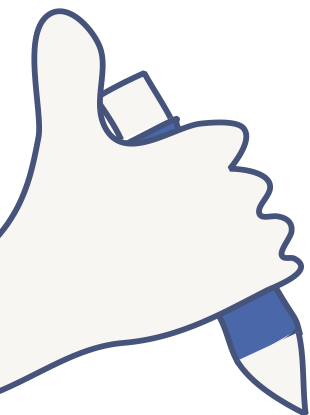


## Group 6

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## Data Holder

Dr. Sarah Ames  
National library of Scotland



# Introduction

## Introduction:

Our project consists of an unexplored dataset of Scottish School Exam papers, from 1888 up to 1963, which reflect how education developed in Scotland over the 75 years. Our aim was to clean and analysis the data to answer the questions provided by the data holder with visualizations.

## Dataset Details:

Images and METS/ALTO (positional XML)

Also available as plain text files

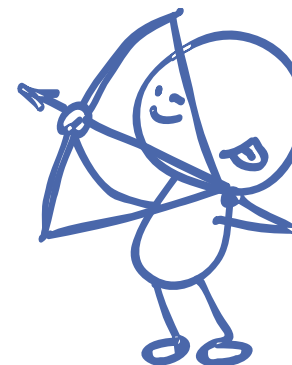
2,849,689 words

OCR – no clean up

Also illustrations within pages

Available on <https://data.nls.uk/>

# Challenges



## Challenges:

- Can we visualize key themes and topics in historical Scottish school exam papers in an engaging way? How do these change over time?
  - How are the genders represented differently in examples given in questions?
  - What topics are in the 'circulars' and what do these tell us about education at this time?
  - What people are referenced – such as authors in the English exam papers – in the exam papers?
- Are Scotland/Scottish places represented in a particular way?

# Our target audience

## The general public

we wanted people of all ages and backgrounds to understand and appreciate our findings.



SCOTTISH EDUCATION DEPARTMENT

## SCOTTISH LEAVING CERTIFICATE EXAMINATION

EXAMINATION PAPERS

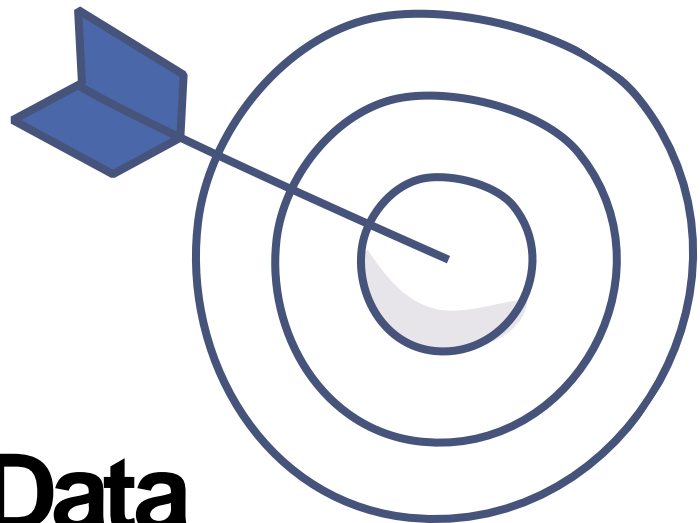
1951



EDINBURGH: HIS MAJESTY'S STATIONERY OFFICE

1951

TEN SHILLINGS NET



# Data Analysis

From word frequency analysis

## Gender

Potential gender bias in the exam papers and its patterns throughout the time

## Exam Topics

Different areas of examination subjects

## Location & Authors

The most frequent writer and Scottish cities mentioned

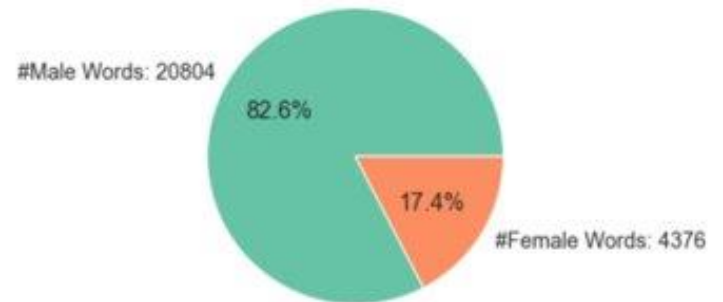
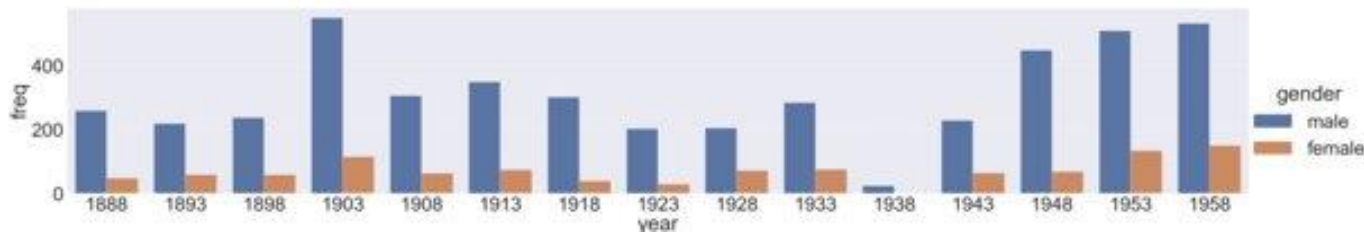
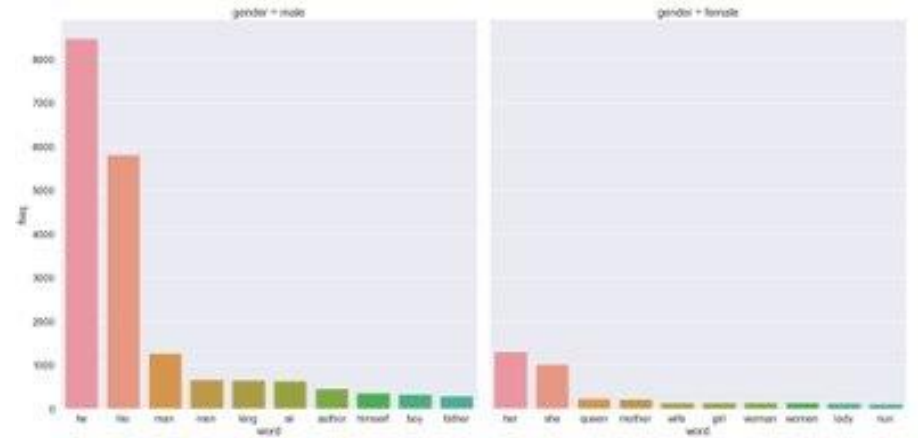
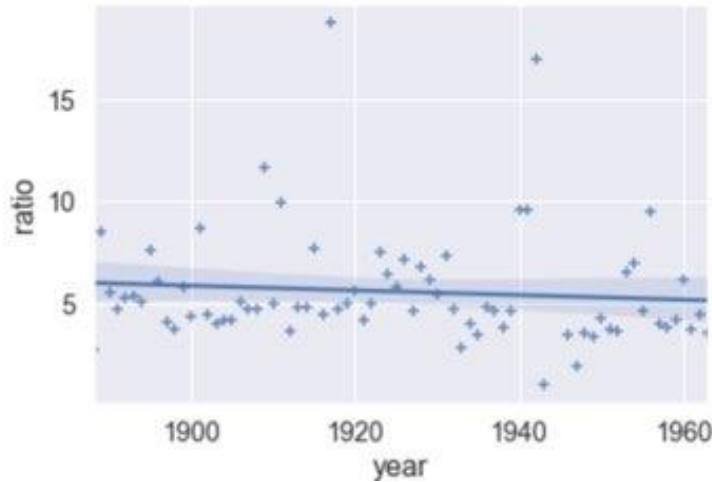
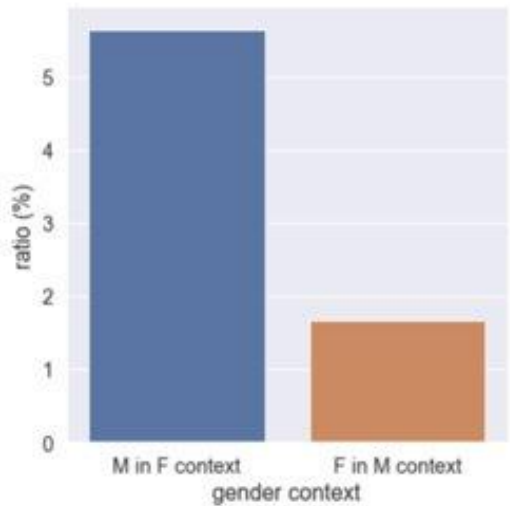
## Circulars

Policy and guidance on many subjects including the raising of the school age, introduction of school milk, broadcasting in schools and the effect the war had on staff and pupils.

# Gender Bias

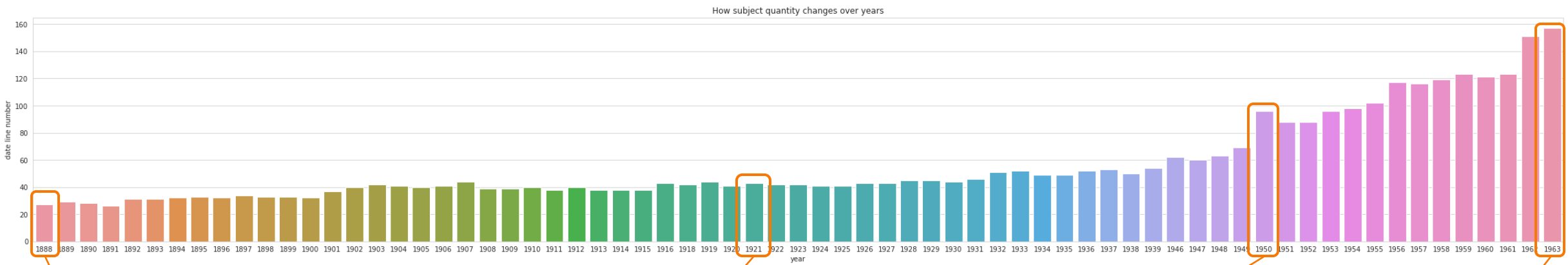
## Gender Bias Analysis

- General analysis: manually collected two gender lexicons from the web, and calculated the frequency of male words V.S. female words
- Temporal analysis : the dynamics of gender word frequency over time and observed a negative correlation between years and the ratios of male to female word frequency
- Sentential context analysis : via dependency parsing, and identified gender bias clues by quantifying gender dependency (i.e., male->female and female->male)



# Exam Topics

## Exam Topics Analysis



•A continuous increase of subjects throughout the 75 years of exams. The increase of tested fields was slow in the first 40 years but around 1950 the rate rapidly increased.  
 •Extract 4 years for analysis

•12 subjects in Languages, Math and Science

•16 subjects in Languages, Math and Science

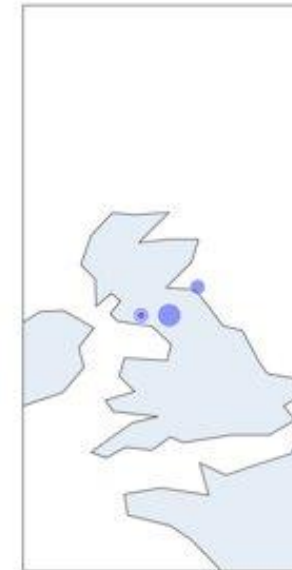
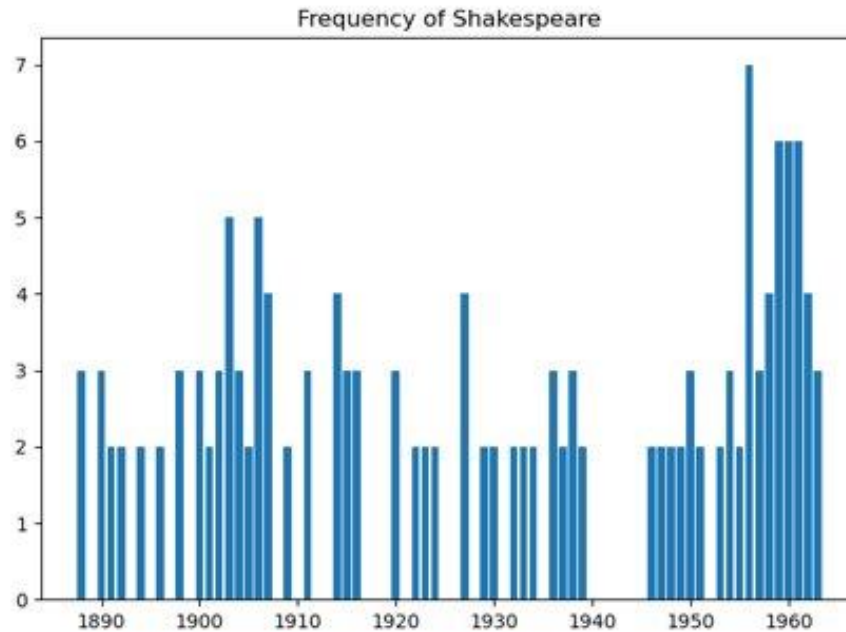
•32 subjects in Languages, Math, Science, Music and Liberal Arts

•38 subjects in Languages, Math, Science, Music and Liberal Arts

# Scottish Locations & Historical Names

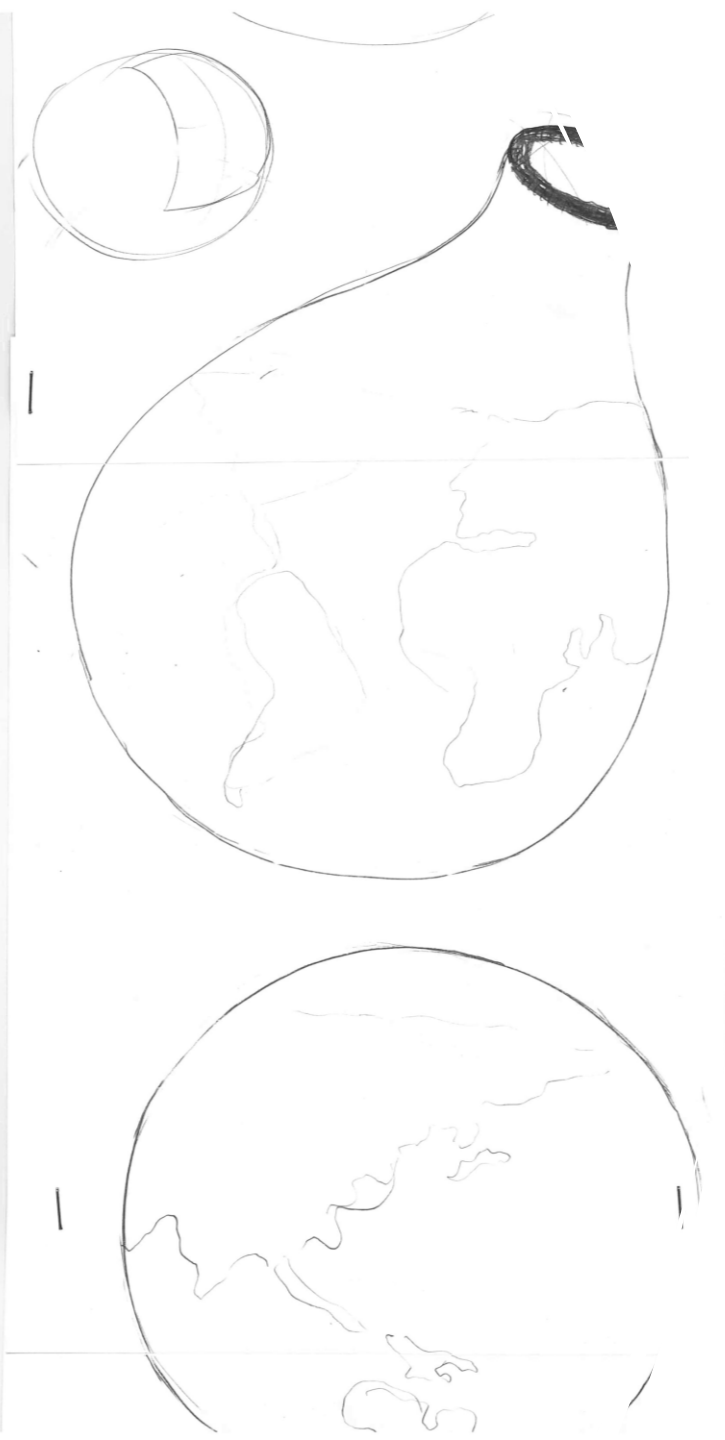
## Analysis

- The most frequent writer mentioned in the exam papers is Shakespeare.
- The frequency of the word “Scotland”, to find out how Scotland was represented in the dataset.
- An animated bubble map showing all the Scottish cities mentioned in the exam papers from 1888 to 1963.







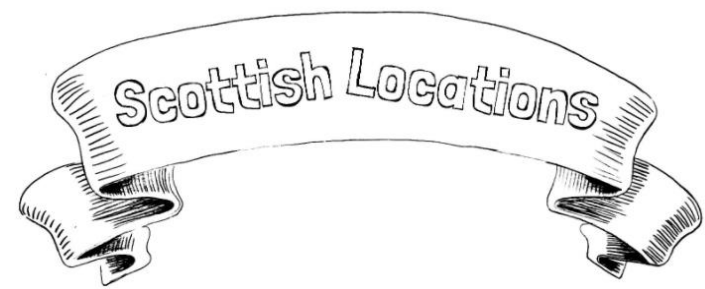
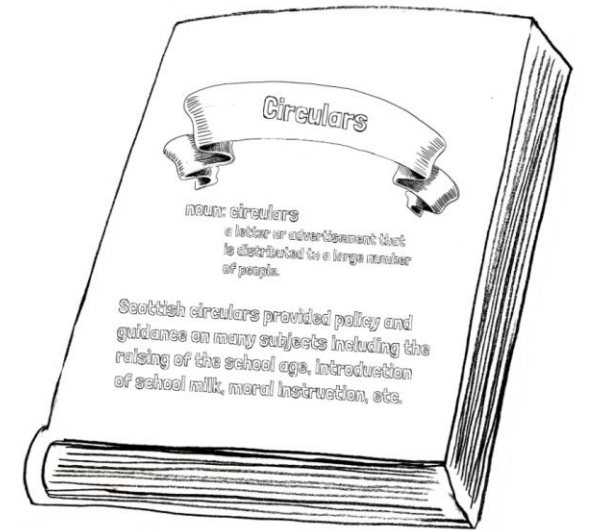
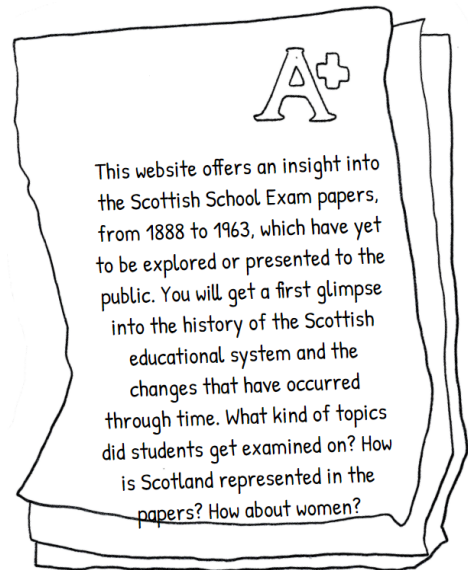
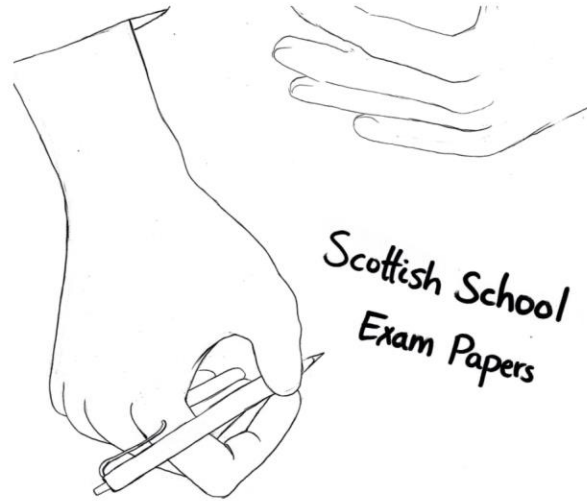


# Design Process

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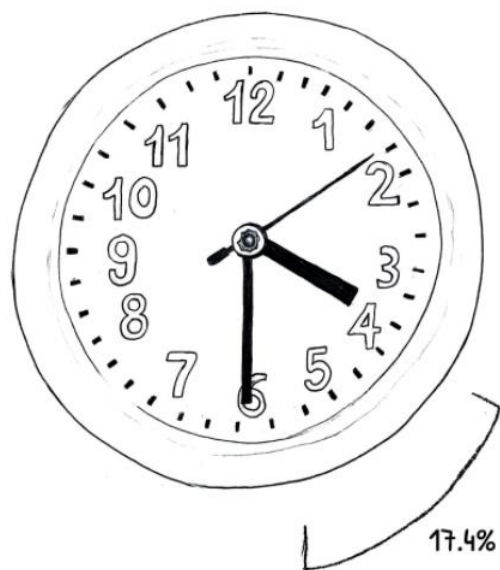
# The style we chose

Infographic visualization



Decision: Pencil-sketched illustration so that it fits in with the Exam theme.

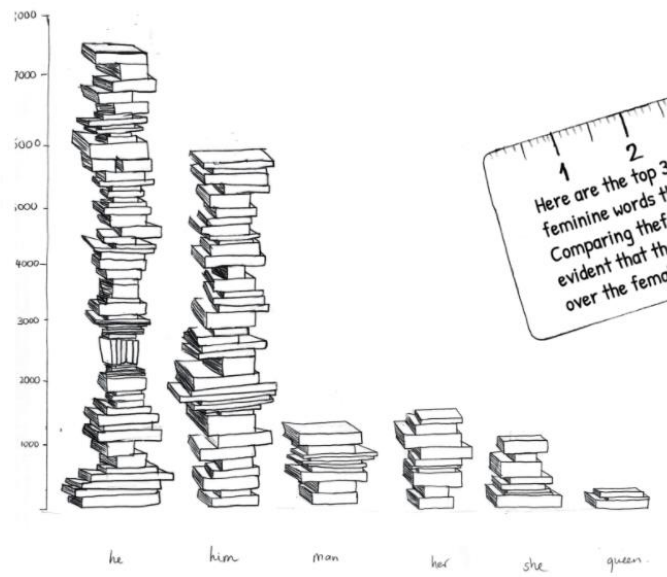
# Gender Bias



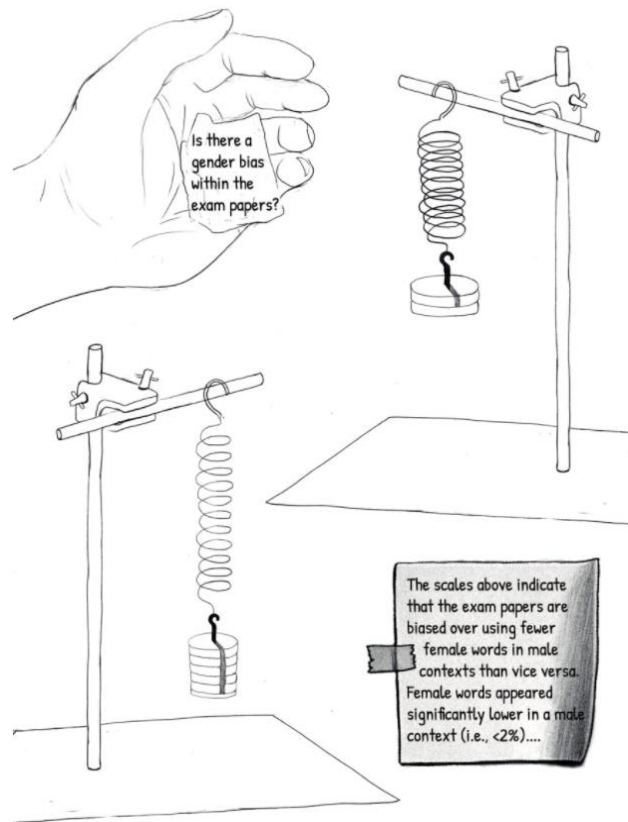
The clock is used as a pie chart to present the ratio of male and female words across all the exam papers in the data set, with 82.6% male words and 17.4% female words. The data shows that there is a significant difference in the total number of male and female words within the exam papers, with a ratio of approximately 5:1.

Do female words appear more often in male context or vice versa?

The top female word 'her' was repeated just over 1200 times, while 'he' was repeated over 8500 times. This presents a clear indication of the gender bias across this particular time.

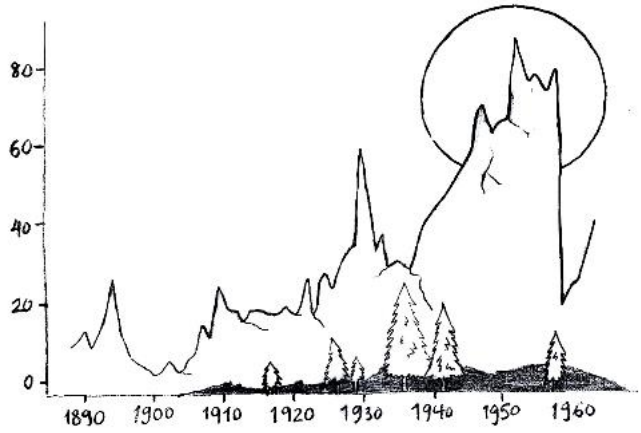


Here are the top 3 most used masculine and feminine words throughout the exam papers. Comparing the frequencies in this image, it is evident that the male word frequencies tower over the female words.



The scales above indicate that the exam papers are biased over using fewer female words in male contexts than vice versa. Female words appeared significantly lower in a male context (i.e., <2%)....



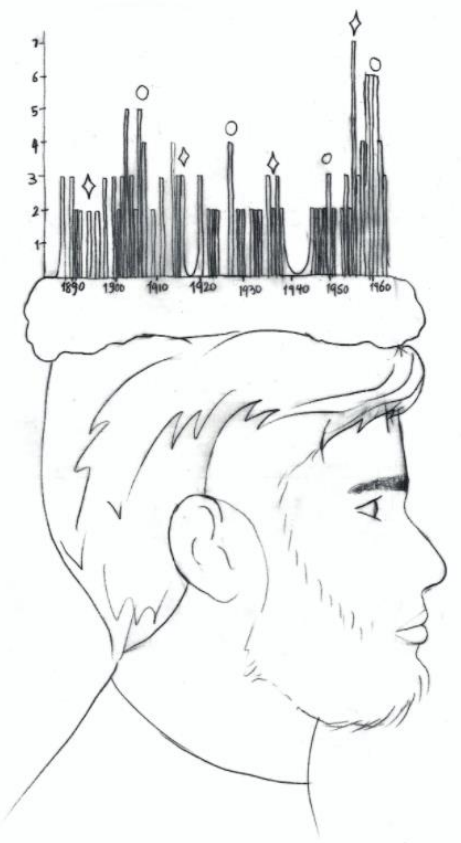


This graph visualized the frequency of the word "Scotland". It is increasing and peaked in 1953. It featured the degree of localization.

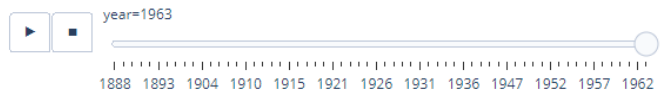
The scottish cities in the exam. The size of the bubble represents how many times the city was mentioned in the particular year. Most of the major cities are referred to in the exam papers, e.g. Edinburgh, Glasgow, Aberdeen, etc. and Edinburgh is in a dominant position.



# Names & Locations

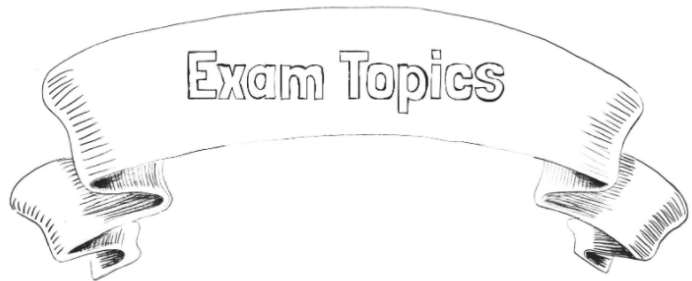


Shakespeare is the most common writer in the exam papers. The crown represents the frequency of Shakespeare. His work is in almost each year's exam. Students should be very familiar with him.

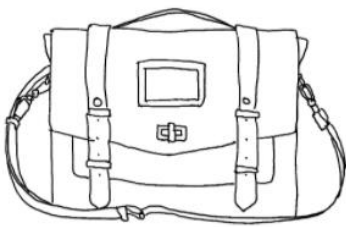




# Exam Topics

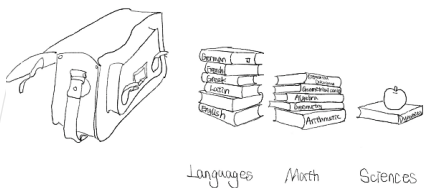


## Exam Topics



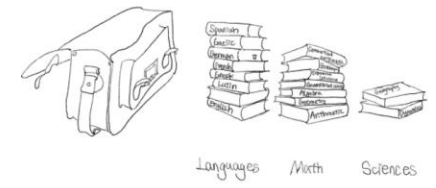
What textbooks are in this bag?

1888 12 Subjects



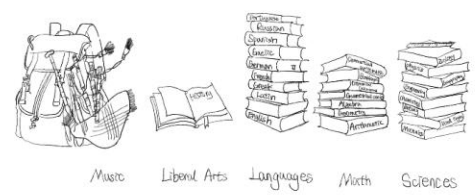
The 1888 student bag contained textbooks for 12 subjects, distributed in three different areas: languages, math and sciences.

1921 16 Subjects



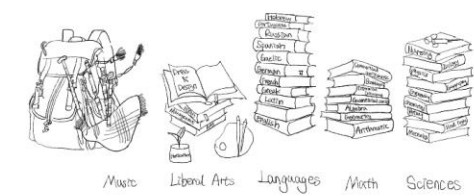
After 1888, the number of subjects gradually increased. By 1921, a total of 16 courses had been included. More and more courses were added to the fields of languages, maths and sciences. Gaelic, for example, was a new course that was not in 1888.

1950 32 Subjects

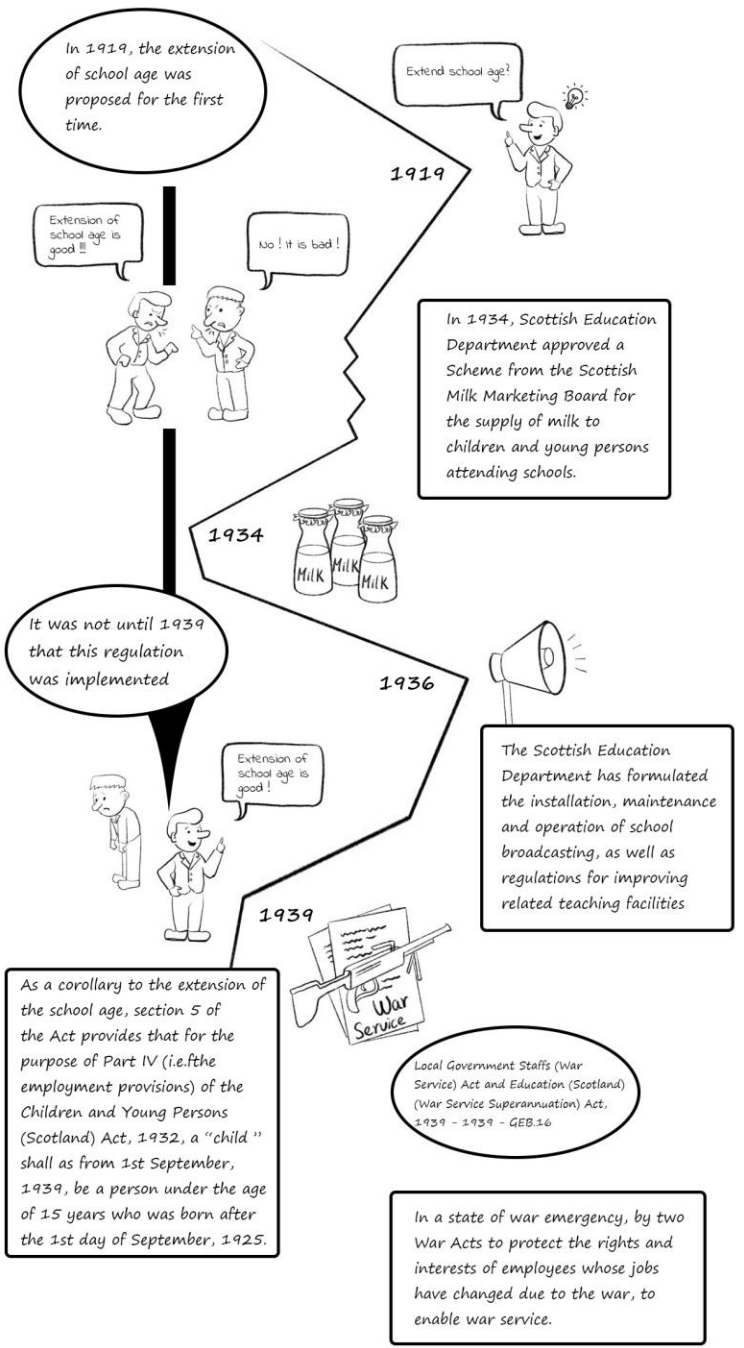


Around 1950, the number of courses increased dramatically. It has doubled in less than 30 years. In addition to the original three areas, other areas were added. Like music and liberal arts. Meanwhile, the number of sciences-related subjects was also increased. This has been supplemented by zoology, chemistry, etc. The modern curriculum design is emerging!

1963 38 Subjects



Then, the course began to develop in new areas. Dress and Design, Home Management courses were also being added to the mix. Eventually, by 1963, there were already 38 subjects in the exam!



# Circulars

## • About school age

In 1919, the extension of school age was proposed for the first time. It was not until 1939 that this regulation was implemented.

## • About school milk

In 1934, Scottish Education Department approved the supply of milk to children and young persons' attending schools.

## • About school broadcasting

The Scottish Education Department has formulated the installation, maintenance and operation of school broadcasting, as well as related teaching facilities

## • About World War 2

In a state of war emergency, by two War Acts to protect the rights and interests of employees whose jobs have changed due to the war, to enable war service.

<https://relic-dyebt.github.io/scottish-exam/>



# Thanks for watching!

Group 6 Anastasia Athanadou, Jingyi Chu, Yidan Yuan, Yongchang Zhu