Teachers' Notes: KS3 Ingenious Calculators

Content outline

This interactive session explores number systems, calculation, and how changes in society have led to the invention of novel calculating devices from the abacus to the mechanical calculating machines of the 19th- and 20th-centuries.

We introduce Charles Babbage who, inspired by the Industrial Revolution, invented the first large-scale calculating machines and collaborated with the mathematician Ada Lovelace in designing the first large-scale mechanical computer.

Students are involved in breakout activities and discover more about objects from the Museum's collection.

Ada Lovelace: https://commons.wikimedia.org

Learning

Students will:

- Learn about historical number systems and the origins of Hindu-Arabic numerals
- Revisit place value and the concept of number base
- Discover how calculation was able to develop with the invention of place value
- Explore the origin of early counting devices and how they evolved to meet societal needs
- Learn about Charles Babbage, Ada Lovelace, and the introduction of mechanical calculators in the Industrial Revolution
- encounter amazing instruments from the Museum's collection of early mathematical instruments

Curriculum

The session links to the following areas of the curriculum:

Maths:

- number systems and place value
- long addition sums
- the concept of algorithm

History:

- innovation in early societies
- the industrial revolution; innovation and social change

Pre-session activities

Explore online resources:

- ***Geek is Good (online exhibition)***
  https://www.mhs.ox.ac.uk/geekisgood/
- ***The Abacus: A brief history***
  https://www.ee.ryerson.ca/~elf/abacus/history.html

Post-session activities

- Find out about **Napier's bones**: Who was John Napier and what was his invention used for?
  Helpful references:
- Napier's Bones: https://www.nms.ac.uk/explore-our-collections/stories/science-and-technology/napiers-bones/
- Napier's bones (how they work): https://nrich.maths.org/1132

IT set-up requirements and resources

This session would normally be delivered to a whole class using a VDU positioned at the front of the classroom and a link supported by an approved platform such as **Microsoft Teams** or **Google Meet** which can be set up by either the school or the Museum.

The workshop facilitator would normally expect to have a camera view of the classroom and microphone to pick-up sound in order to facilitate Q&A interaction which may need to be supported by the classroom teacher.

The workshop facilitator would normally expect to text the link with the class teacher at an agreed time at least 2 days before the workshop takes place in order to allow time to remedy any IT issues.

Activity resources needing printing would be emailed to the class teacher in advance of the workshop and printed copies should be handed out to the students before the session starts.