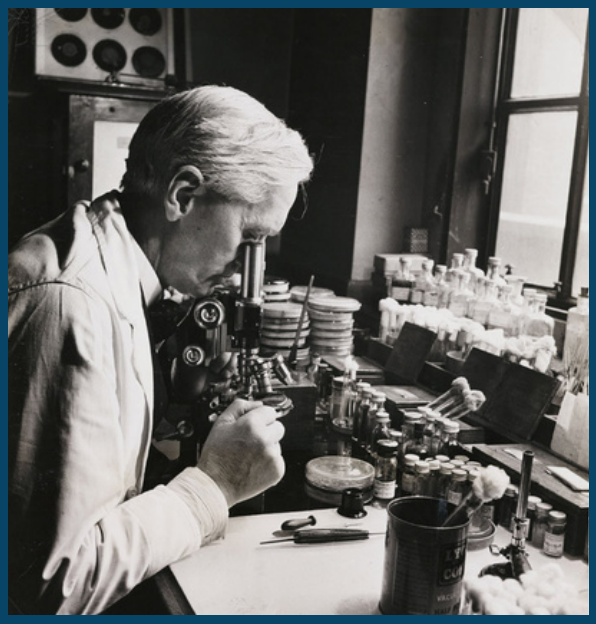
Britannica IMAGEQUEST



TEACHING KIT

Inventors & their Inventions through Visual Texts

Exploring the use of primary visual sources for research and investigation.

Why is Visual Literacy Important?

Visual literacy is the way students make meaning from still or moving visual texts. It involves the use of photographs, posters, artworks, film and other visual texts in learning.

Visual text is the new language we use today to communicate and learn. Since it was founded in October 2010, more than 50 billion photos have been uploaded to Instagram alone*.

Visual literacy not only improves creative and critical thinking skills, but also nurtures our ability to empathise with others and understand technology.

Nearly 30% of the brain's cortex is devoted to visual processing and 90% of information transmitted to the brain is visual. With so much of the brain wired to visual processing, it is essential that visual literacy plays a more important role in our teaching and learning.

When examining visual texts with your students, there are a few considerations:

Examine the Visual Text as a Whole

By asking a range of questions you can determine the context for a visual text and examine it as a whole.

- What is the purpose of the visual text?
- Where does this visual text come from? E.g. Part of a sequence
- Who is the intended audience?
- What is it about?
- What are your thoughts about it? Why?
- What are your feelings about it? Why?
- Does it remind you of anything?
- Can you connect it to any experience or previous knowledge?
- How do you think the visual text positions the viewer/reader?

Making Meaning from a Visual Text

Three levels can be used when making meaning from a visual text:

1. **Literal:** At this level a student locates information, the answer appears in the image.
2. **Inferential:** At this level the student infers information using their previous knowledge to make an inference about the visual text.
3. **Evaluative:** At this level the students will hypothesise and evaluate. This will require them to think both critically and creatively.

Omnicore, 2020 "Instagram by the Numbers: Stats, Demographics & Fun Facts", Omincore Agency via Instagram press release, last updated 25 Jan 2020, https://www.omnicoreagency.com/instagram-statistics/

This activity series explores "Inventors and their Inventions" through an in-depth study of Primary Source visual texts from Britannica ImageQuest™.

The world's progress is due largely to inventions. Whenever a new method, machine, or gadget is invented, it helps humankind to live a little easier or better or longer. Today inventions are being made in all fields.

The following activities will look at past inventors and some of their inventions through the analysis of Primary Sources as visual texts.

Primary Source materials are an excellent way to engage learners in the study of past subjects, by giving them a very real sense of living in another time, place or perspective.

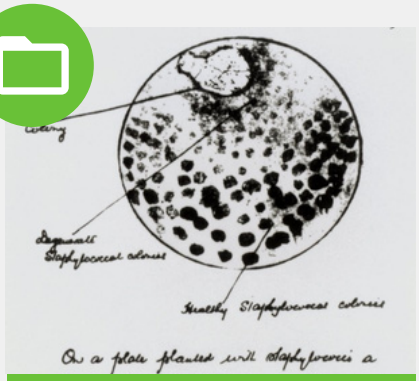
The use of Primary Sources will help develop critical thinking and encourage learners to move from observing to questioning and making inferences about the materials being studied.

Learning Outcomes

- Explain how images such as figures, diagrams, tables, maps and graphs contribute to understanding of factual information in texts.
- Understand how visual elements create meaning.
- Analyse the effects of different visual elements upon the viewer.

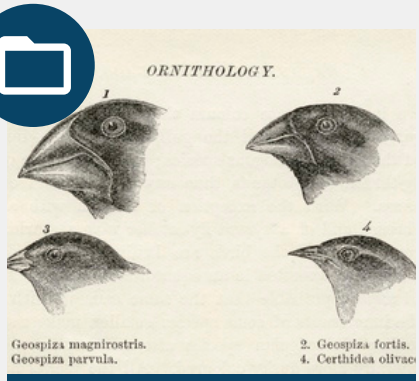
Activities

Each activity includes a selection of Primary Source visual texts from Britannica ImageQuest, as well as suggested questions to inspire inquiry and visual literacy.



Primary
Laboratory Notebook of Alexander Fleming

Middle
Ancient Chinese Inventions

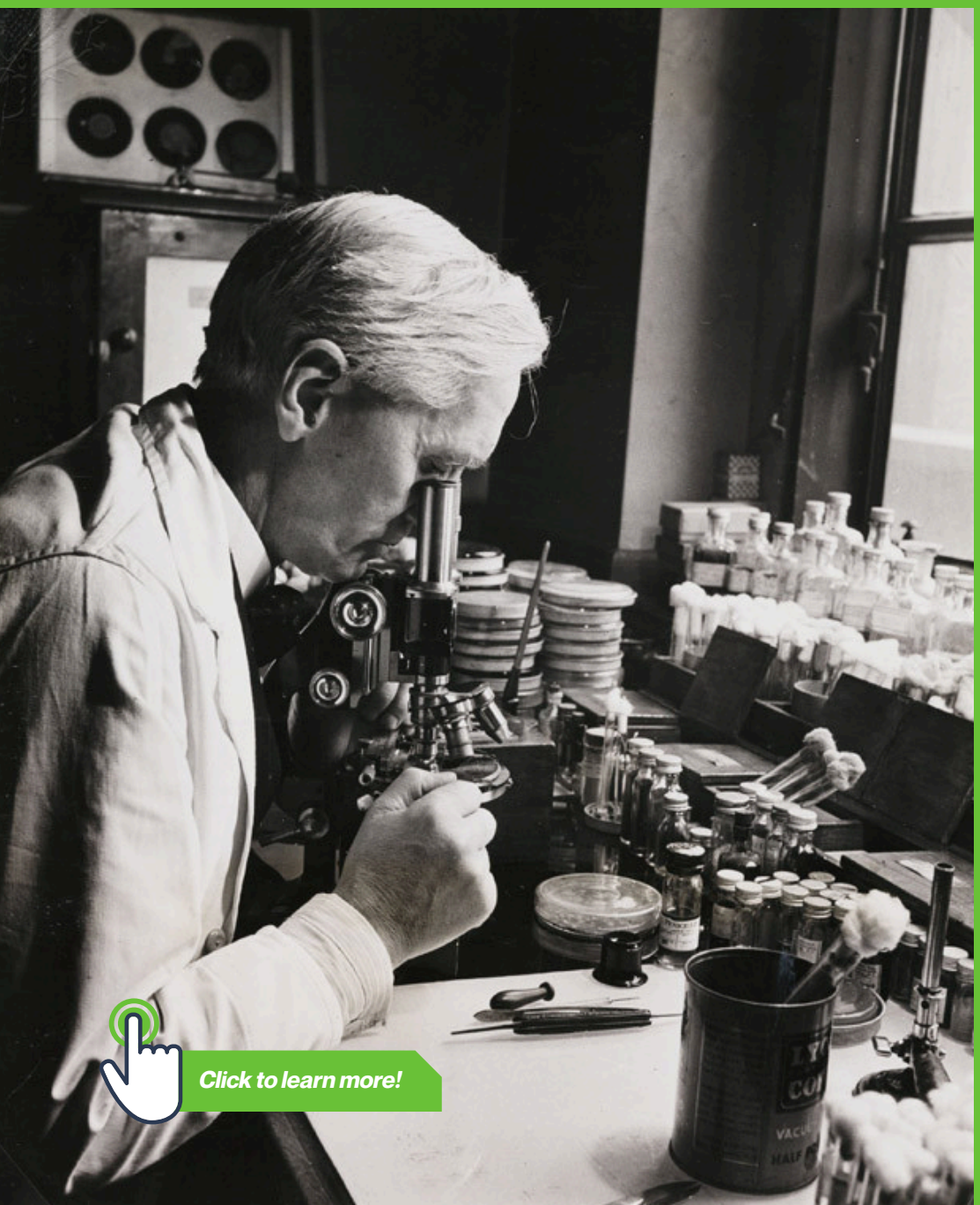


High
The Theory of Evolution by Natural Selection

Laboratory Notebook of Alexander Fleming

Primary Level Activity

The first part of our activity series looks at pages from the laboratory notebook of Sir Alexander Fleming, in order to discover the elements of the scientific method.

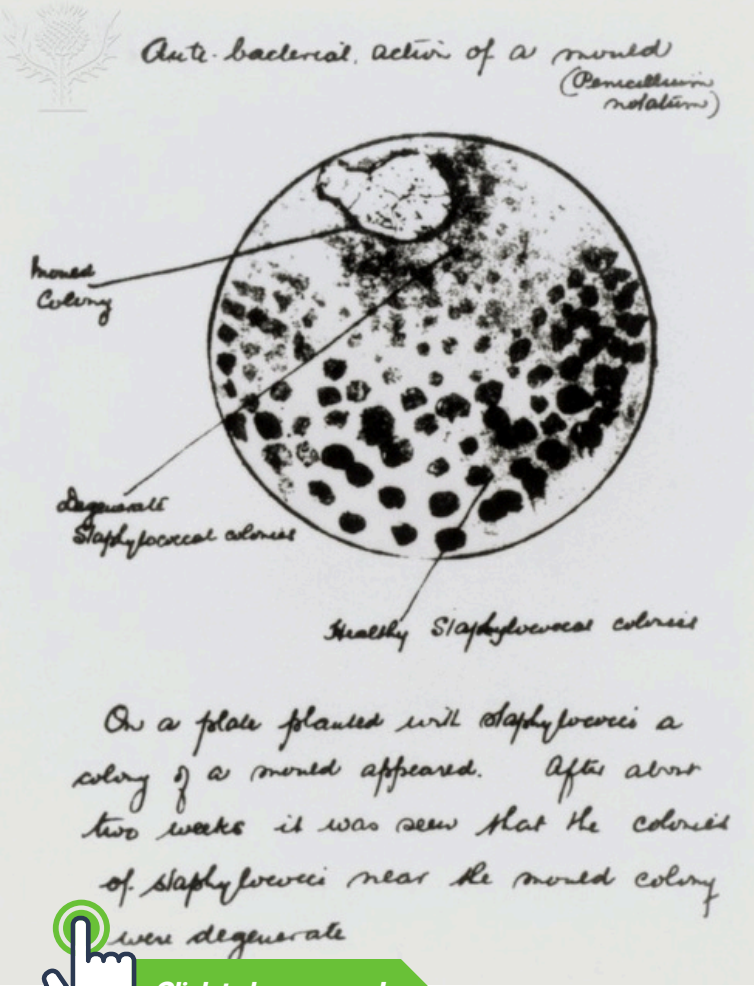


Sir Alexander Fleming was a Scottish scientist who discovered the first antibiotic drug, penicillin. His research helped pave the way for all modern antibiotics, which have proved to be effective drugs for the treatment of many diseases, including pneumonia and meningitis.

This image is of Professor Alexander Fleming (1881-1955) at work in his laboratory, taken by James Jarche for 'Illustrated' magazine, in 1943.

Science and Society Museum/ Universal Images Group. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Explore these primary source visual texts from ImageQuest using the suggested questions.



Click to learn more!

Notes on the discovery of antibiotics by Fleming.
Britannica ImageQuest,
Encyclopædia Britannica

Click to learn more!

Fleming's petri dish culture rephotographed after 25 years, in 1928.
Britannica ImageQuest,
Encyclopædia Britannica

Suggested Questions

Literal

1. What do you notice first? Describe what you see.
2. Find something small but interesting.
3. How much of the text can you read? What does it say? Circle any unfamiliar words.
4. What do you see on the page besides writing?
5. When do you think this page was created?
6. What do you notice that you didn't earlier?

Inferential

1. Who do you think created these notes?
2. Why do you think these notes were made?
3. Who do you think was intended to read it, if anyone?
4. Why do you think this item is so important?
5. If somebody made this today, what would be different?

Evaluative

1. What do you want to know more about when you look at it?
2. Who is the scientist who wrote these notes?
3. Which important medicine does this scientist document the process of inventing on these pages?

The images in this activity have been sourced from Britannica ImageQuest. Below is citation information for each image.

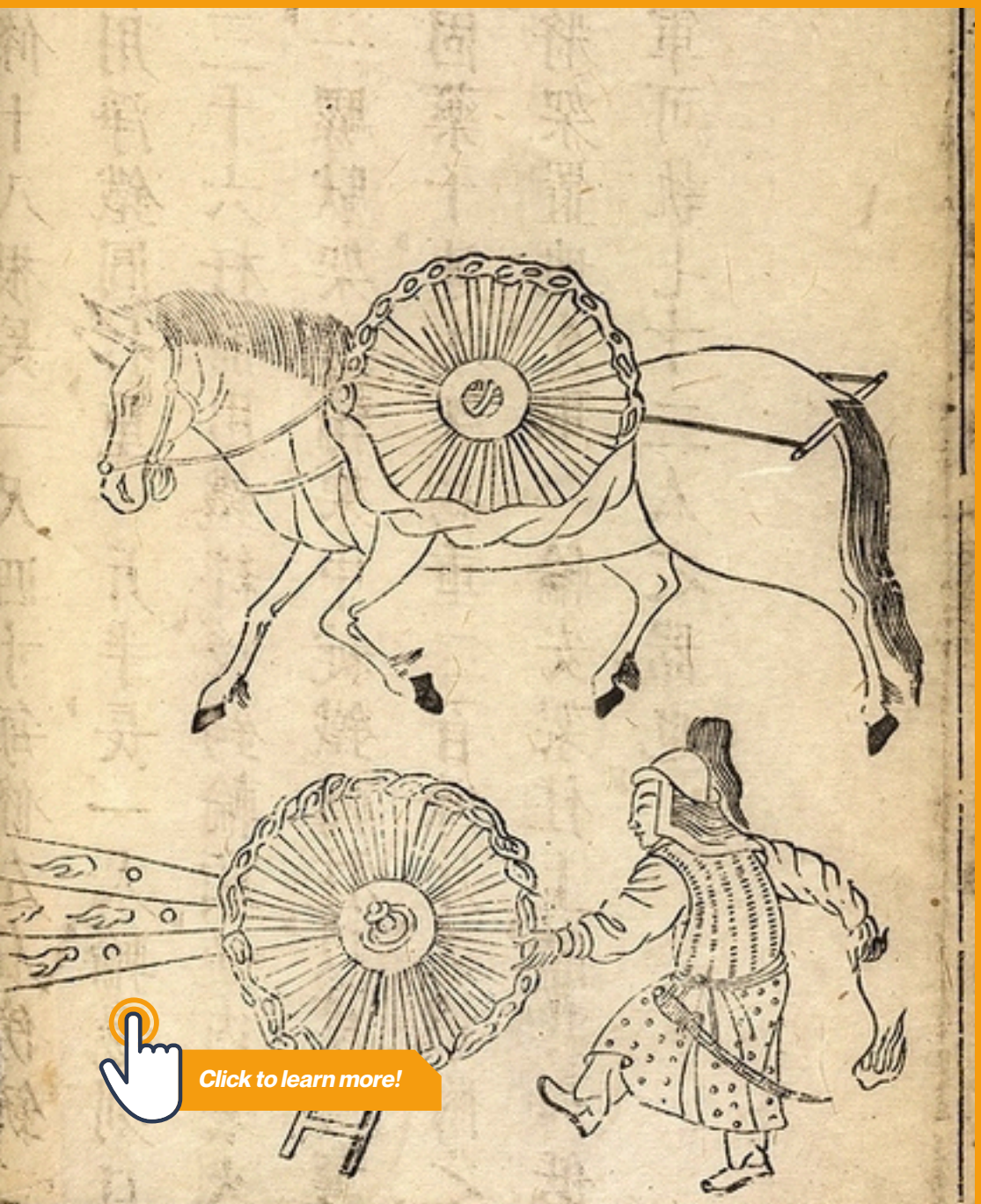
Notes on and a drawing of the original culture plate of the fungus Penicillium notatum, made by the Scottish bacteriologist Sir Alexander Fleming whilst working at St. Mary's Hospital, Paddington, London. ST MARY'S HOSPITAL MEDICAL SCHOOL / SCIENCE PHOTO LIBRARY / Universal Images Group. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Photograph of the original culture plate of the fungus Penicillium notatum , made by the Scottish bacteriologist Sir Alexander Fleming whilst working at St. Mary's Hospital, Paddington, London. The image seen here was rephotographed 25 years after the discovery in 1928. ST MARY'S HOSPITAL MEDICAL SCHOOL / SCIENCE PHOTO LIBRARY / Universal Images Group. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Ancient Chinese Inventions

Middle Level Activity

Use these visual texts to examine the many advancements China made in science, mathematics and technology that were unknown in the Western world.



Chinese explosives, showing revolving wheel explosives being used in China.

This woodblock print is from an 18th/19th-century edition of Wubei Zhi ('On Warfare'), a military encyclopedia originally compiled in the 17th century.

Explosive devices had been used in China for centuries since the invention of gunpowder in the 10th century or earlier.

BRITISH LIBRARY / SCIENCE PHOTO LIBRARY. Britannica ImageQuest, Encyclopædia Britannica, 2 Mar 2017.

Explore these primary source visual texts from ImageQuest using the suggested questions.

Chinese explosives, showing the making of explosive bullets in China. Britannica ImageQuest, Encyclopædia Britannica

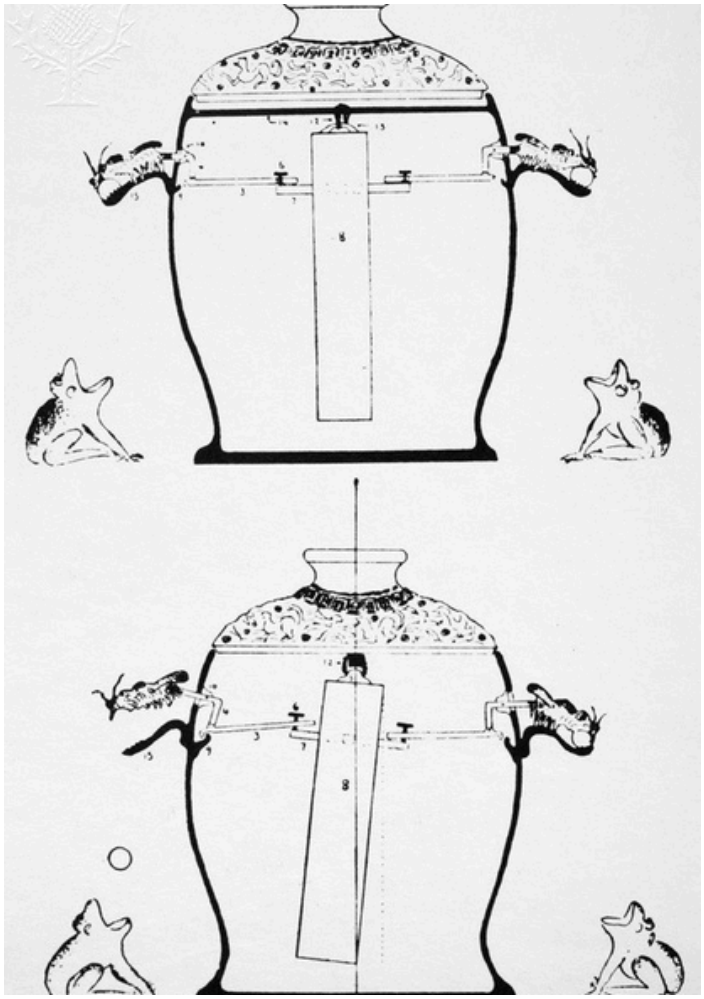


Diagram of a Chinese seismometer developed by the 1st or 2nd century A.D.
Britannica ImageQuest, Encyclopædia Britannica

Chinese 'south-pointing' chariot, c 2700-1100 BC.
Britannica ImageQuest, Encyclopædia Britannica

Suggested Questions

Literal

1. What do you see in the image?
2. Where does your eye go first?
3. What do you think about each image?
4. What do you notice that you didn't expect?
5. What do you notice that you can't explain?
6. What do you notice that you didn't earlier?

Inferential

1. Form a hypothesis about what event or discovery is displayed in this primary source.
2. Hypothesise what might have happened before the events recorded in the primary source?
3. What might have happened next?
4. What do you think was happening when this was made?
5. Who do you think was the audience for this item?
6. What can you learn from examining this?

Evaluative

1. What questions do you have about the photograph that you cannot answer through analysing it?
2. Where could you go next to answer these questions?
3. What biases or stereotypes do you see?
4. Provide evidence to support your conclusions.
5. Is this type of invention still being made today? Is it still in use? If not, why do you think it isn't used today?

The images in this activity have been sourced from Britannica ImageQuest. Below is citation information for each image:

Chinese explosives, 18th-19th century. Photograph. BRITISH LIBRARY / SCIENCE PHOTO LIBRARY. Britannica ImageQuest, Encyclopædia Britannica, 2 Mar 2017.

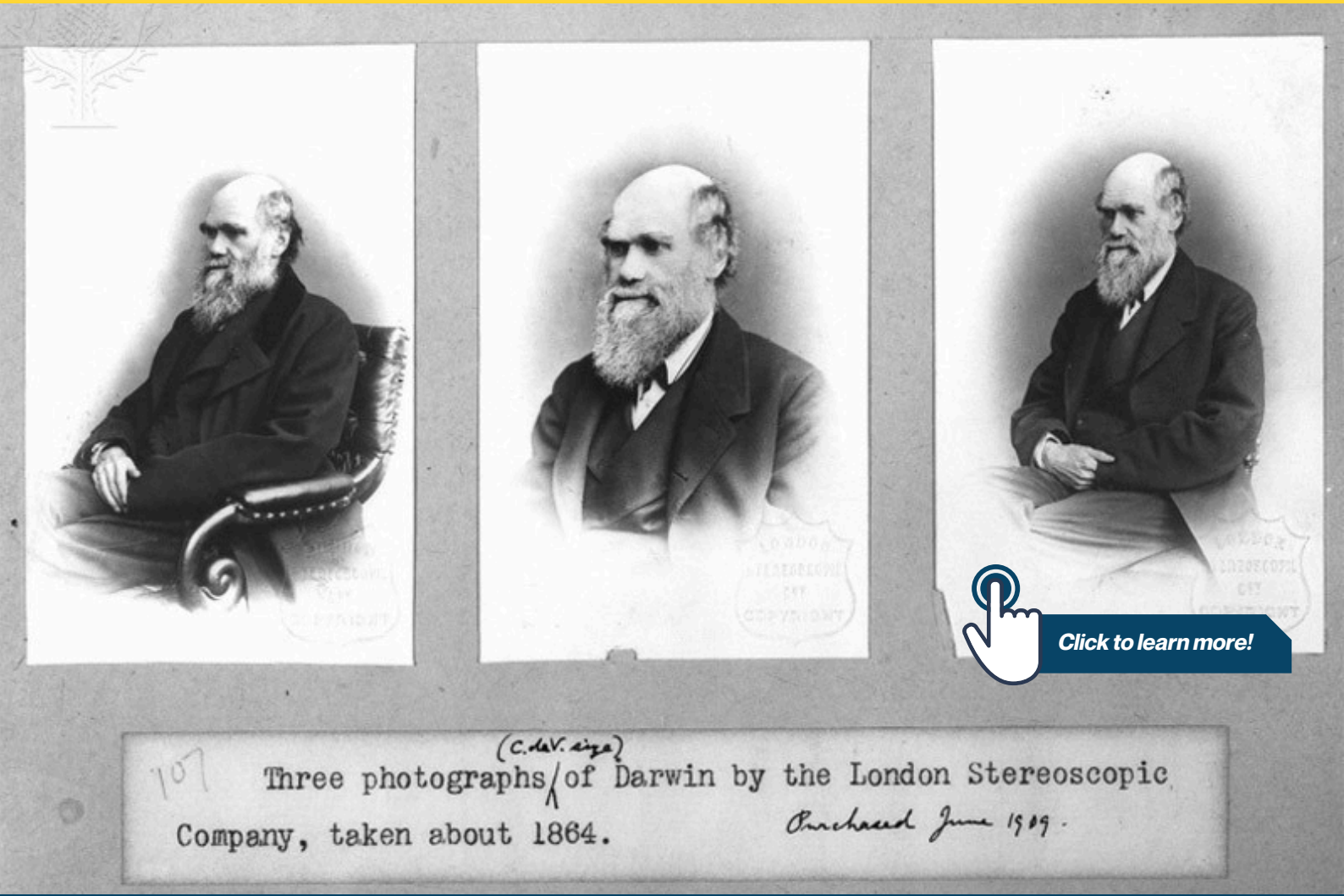
CHINA: SEISMOMETER. Diagram of a Chinese seismometer developed by the 1st or 2nd century A.D. Photograph. Granger, NYC / The Granger Collection. Britannica ImageQuest, Encyclopædia Britannica, 31 Aug 2017.

Chinese 'south-pointing' chariot, c 2700-1100 BC. Photograph. Science and Society Museum/ Universal Images Group. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

The Theory of Evolution by Natural Selection

High Level Activity

Study the visual texts related to Charles Darwin's "Origin of Species". Examine how Darwin revolutionised the study of living things and provided a scientific explanation of how diverse species of plants and animals have descended over time from common ancestors.



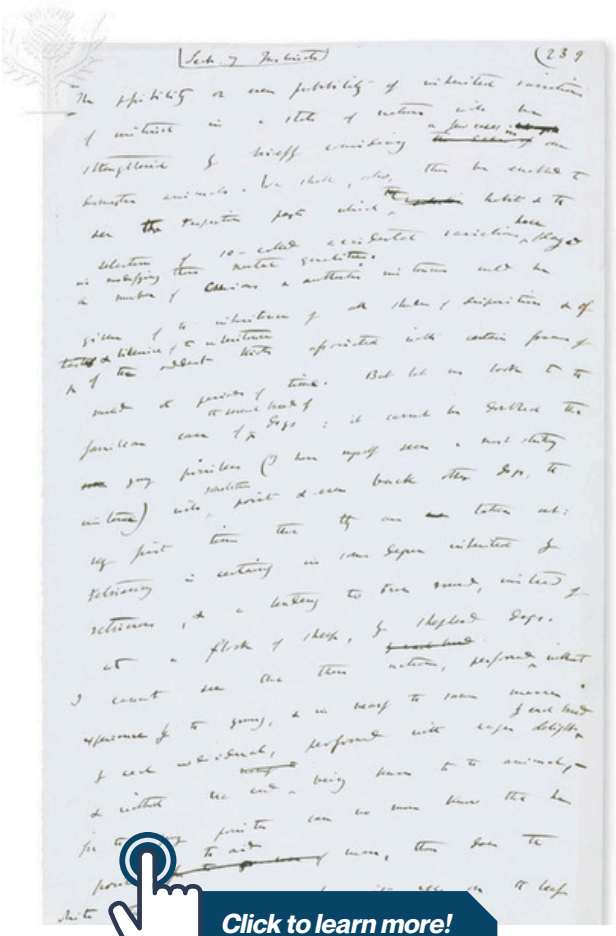
Charles Robert Darwin (1809-1881), British born naturalist on board H.M.S. Beagle and author of 'On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life' (1859). Portrait c. 1864 - Darwin

The Natural History Museum, London / Universal Images Group. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Explore these primary source visual texts from ImageQuest using the suggested questions.

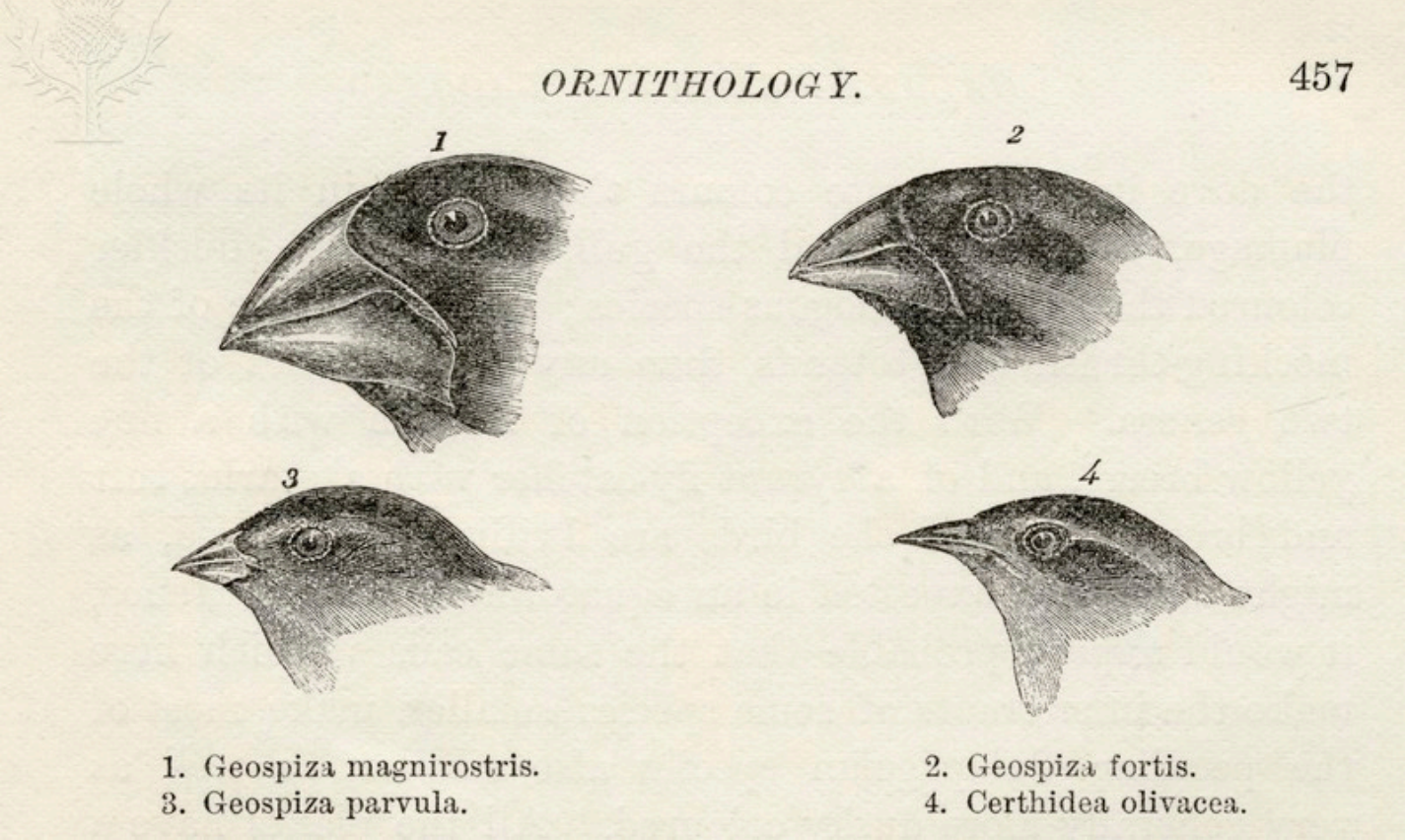
Click to learn more!

Mollusc specimen draw, the shells were collected between 1831 and 1836.
Britannica ImageQuest, Encyclopædia Britannica

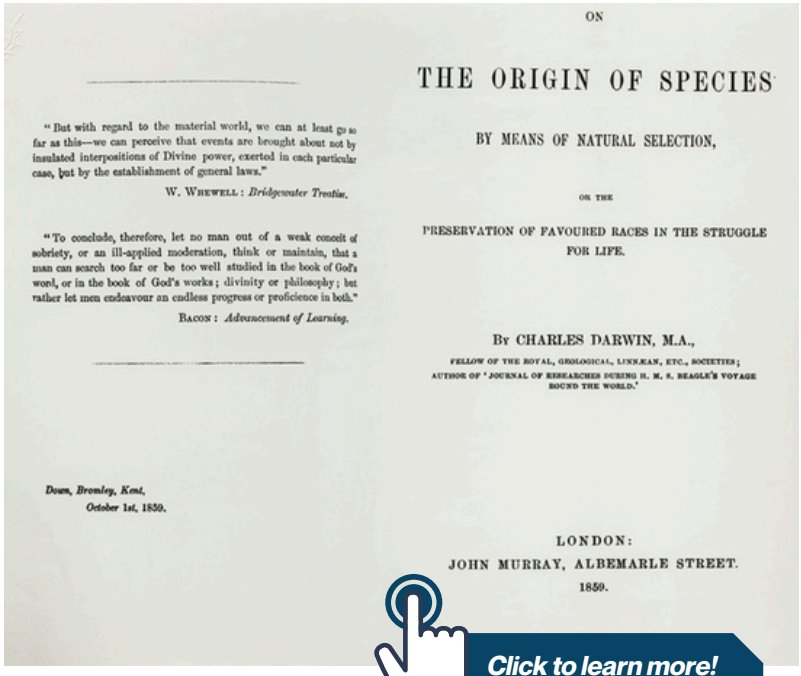


Click to learn more!

One of five hand written pages for Darwin's book On the Origin of Species.
Britannica ImageQuest, Encyclopædia Britannica



Finches with beaks adapted to different diets observed by Charles Darwin.
Britannica ImageQuest,
Encyclopædia Britannica


ON

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE

PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNEAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD.'

"But with regard to the material world, we can at least go so far as this—we can perceive that events are brought about not by insulated interpositions of Divine power, exerted in each particular case, but by the establishment of general laws."

W. Whewell: *Bridgewater Treatise.*

"To conclude, therefore, let no man out of a weak conceit of sobriety, or an ill-applied moderation, think or maintain, that a man can search too far or be too well studied in the book of God's word, or in the book of God's works; divinity or philosophy; but rather let men endeavour an endless progress or proficience in both."

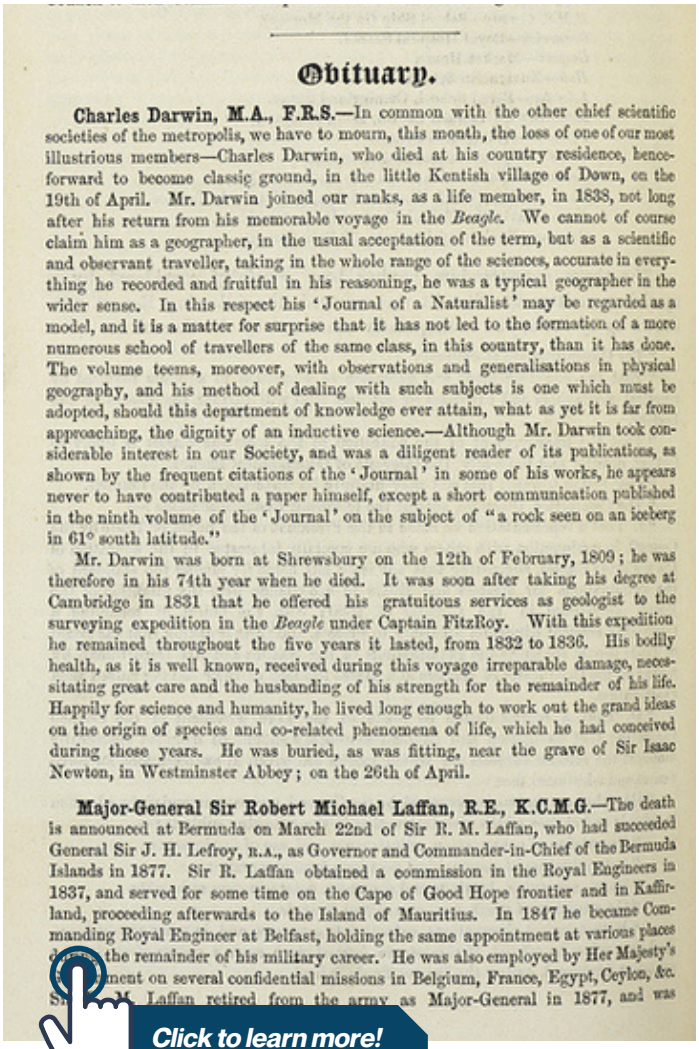
Bacon: *Advancement of Learning.*

Down, Bromley, Kent,
October 1st, 1859.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

Frontispiece of the Origin of Species by Charles Darwin, published in 1859.
Britannica ImageQuest,
Encyclopædia Britannica

Click to learn more!



Obituary.

Charles Darwin, M.A., F.R.S.—In common with the other chief scientific societies of the metropolis, we have to mourn, this month, the loss of one of our most illustrious members—Charles Darwin, who died at his country residence, henceforward to become classic ground, in the little Kentish village of Down, on the 19th of April. Mr. Darwin joined our ranks, as a life member, in 1838, not long after his return from his memorable voyage in the *Beagle*. We cannot of course claim him as a geographer, in the usual acceptation of the term, but as a scientific and observant traveller, taking in the whole range of the sciences, accurate in everything he recorded and fruitful in his reasoning, he was a typical geographer in the wider sense. In this respect his 'Journal of a Naturalist' may be regarded as a model, and it is a matter for surprise that it has not led to the formation of a more numerous school of travellers of the same class, in this country, than it has done. The volume teems, moreover, with observations and generalisations in physical geography, and his method of dealing with such subjects is one which must be adopted, should this department of knowledge ever attain, what as yet it is far from approaching, the dignity of an inductive science.—Although Mr. Darwin took considerable interest in our Society, and was a diligent reader of its publications, as shown by the frequent citations of the 'Journal' in some of his works, he appears never to have contributed a paper himself, except a short communication published in the ninth volume of the 'Journal' on the subject of "a rock seen on an iceberg in 61° south latitude."

Mr. Darwin was born at Shrewsbury on the 12th of February, 1809; he was therefore in his 74th year when he died. It was soon after taking his degree at Cambridge in 1831 that he offered his gratuitous services as geologist to the surveying expedition in the *Beagle* under Captain FitzRoy. With this expedition he remained throughout the five years it lasted, from 1832 to 1836. His bodily health, as it is well known, received during this voyage irreparable damage, necessitating great care and the husbanding of his strength for the remainder of his life. Happily for science and humanity, he lived long enough to work out the grand ideas on the origin of species and co-related phenomena of life, which he had conceived during those years. He was buried, as was fitting, near the grave of Sir Isaac Newton, in Westminster Abbey; on the 26th of April.

Major-General Sir Robert Michael Laffan, R.E., K.C.M.G.—The death is announced at Bermuda on March 22nd of Sir R. M. Laffan, who had succeeded General Sir J. H. Lefroy, R.A., as Governor and Commander-in-Chief of the Bermuda Islands in 1877. Sir R. Laffan obtained a commission in the Royal Engineers in 1837, and served for some time on the Cape of Good Hope frontier and in Kaffirland, proceeding afterwards to the Island of Mauritius. In 1847 he became Commanding Royal Engineer at Belfast, holding the same appointment at various places during the remainder of his military career. He was also employed by Her Majesty's Government on several confidential missions in Belgium, France, Egypt, Ceylon, &c. Sir R. M. Laffan retired from the army as Major-General in 1877, and was

Obituary for Charles Darwin.
Britannica ImageQuest, Encyclopædia Britannica

Suggested Questions

Literal

1. What observations can you make about the image?
2. What evidence do you see that makes you assume your response to Q1?
3. Where does the image originate from?
4. Is there text in the image and how much of the text can you read? What does it say?
5. Who is the intended audience? How do you know?
6. What symbols are used in this image? What do you think they represent?
7. Are there any clues to when it was taken? What was happening at this time in history?

Inferential

1. What characteristics in the image prove that Darwin was especially suited to science?
2. What is the image trying to tell the audience? How do you know?
3. Why do you think these notes were made?
4. Why do you think this item is so important?
5. If somebody made this today, what would be different

Evaluative

1. What observations did Darwin make?
2. What hypothesis did Darwin form?
3. What impact did this hypothesis have on the scientific community?
4. What do you want to know more about when you look at it?

Research Opportunities

1. Explain Darwin's Theory of Evolution
2. What is the Origin of Species? Summarise its importance to the Theory of Evolution
3. What evidence stands against the Theory of Evolution?
4. What is your personal view about evolution?

The images in this activity have been sourced from Britannica ImageQuest. Below is citation information for each image:

Mollusc specimen drawer. NATURAL HISTORY MUSEUM, LONDON/SCIENCE PHOTO LIBRARY / UIG. Photograph. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

On the Origin of Species manuscript. NATURAL HISTORY MUSEUM, LONDON/SCIENCE PHOTO LIBRARY / UIG. Britannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Finches with beaks adapted to different diets observed by Charles Darwin in September-October 1835 in Galapagos Islands Ecuador during his voyage on HMS Beagle. From the book Journal of Researches by Charles Darwin also known as Darwin's Journal of a Voyage Around the World published 1890. Illustration. Design Pics Historical Collection / Universal Images GroupBritannica ImageQuest, Encyclopædia Britannica, 25 May 2016.

Frontispiece of C. Darwin's Origin of Species. Photograph. Science Photo Library. Britannica ImageQuest, Encyclopædia Britannica, 22 Oct 2018.

Obituary for Charles Darwin. Photograph. Science Photo Library. Britannica ImageQuest, Encyclopædia Britannica, 31 Aug 2017.

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