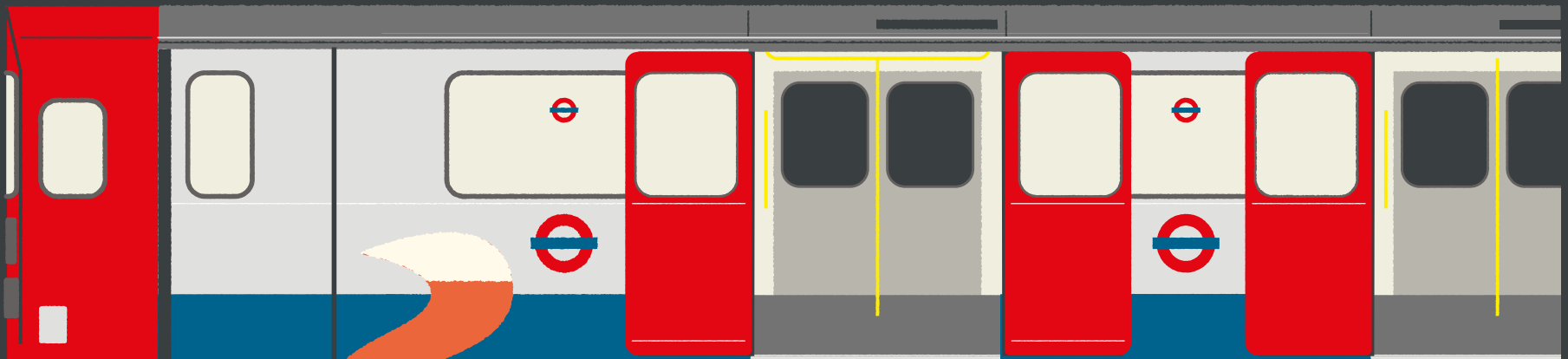


MAYOR OF LONDON

THE LONDON CURRICULUM
KEY STAGE 2

GOING UNDERGROUND

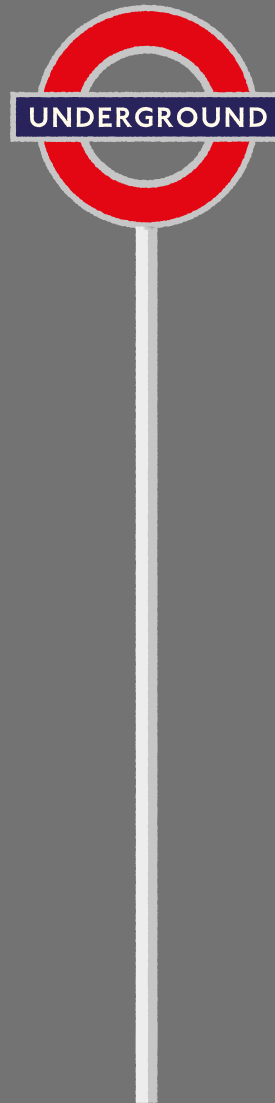


THE LONDON CURRICULUM

PLACING LONDON AT THE HEART OF LEARNING

The capital is the home of innovations, events, institutions and great works that have extended the scope of every subject on the school curriculum. London lends itself to learning unlike anywhere else in the world. The London Curriculum aims to bring the national curriculum to life inspired by the city, its people, places and heritage.

To find out about the full range of free resources and events available to London secondary schools at key stage 3 please go to: www.london.gov.uk/london-curriculum.



I have someone I'd like you to meet...
This is Fen the Fox from Fenchurch Street.
He likes to creep about the city,
To inspect and explore the buildings so pretty.
Join him on his journeys to discover
The secret world of London uncovered.
Look out for him along your way,
He might have something interesting to say!



HOW TO USE THIS PACK

This pack is designed to be flexible, to give you control over what you teach and when. The resources in this learning pack all sit within the Going Underground theme and promote cross-curricular teaching.

This learning pack includes activity plans which address learning objectives across the following subject areas:

- ⊗ **History** (Topics: Roman Londinium; Crime and Punishment through the ages)
- ⊗ **English** (Topic: Poems on the Underground)
- ⊗ **Art & Design** (Topic: Art on the Underground)
- ⊗ **Science** (Topic: Fossilised London)

This learning pack is designed so that you can pick and choose between the topics; you're free to teach whichever topics you'd like and in whichever order you'd like. Each activity plan displays an approximate duration time and highlights specific KS2 learning objectives relating to the activities described.

The activity plans relating to specific topics often follow on from each other, so we'd recommend that you teach these in succession. However, you may choose to teach different topics in whichever order you wish, for example, you might want to teach Poetry on the Underground before Roman Londinium.

The topic-based activity plans follow a similar structure to the lesson plans produced in our Key Stage 3 resources. There are three distinct phases of learning:

- ⊗ **Discover**
(Presenting and analysing background information relating to the given topic)



- ⊗ **Explore**
(Contextualise learning from the Discover activities by exploring the concepts in action through a London-based visit)



- ⊗ **Connect**
(Task-based activities which connect the background information analysed in the Discover activities with the contextual understandings gained on the visit in the Explore activities)

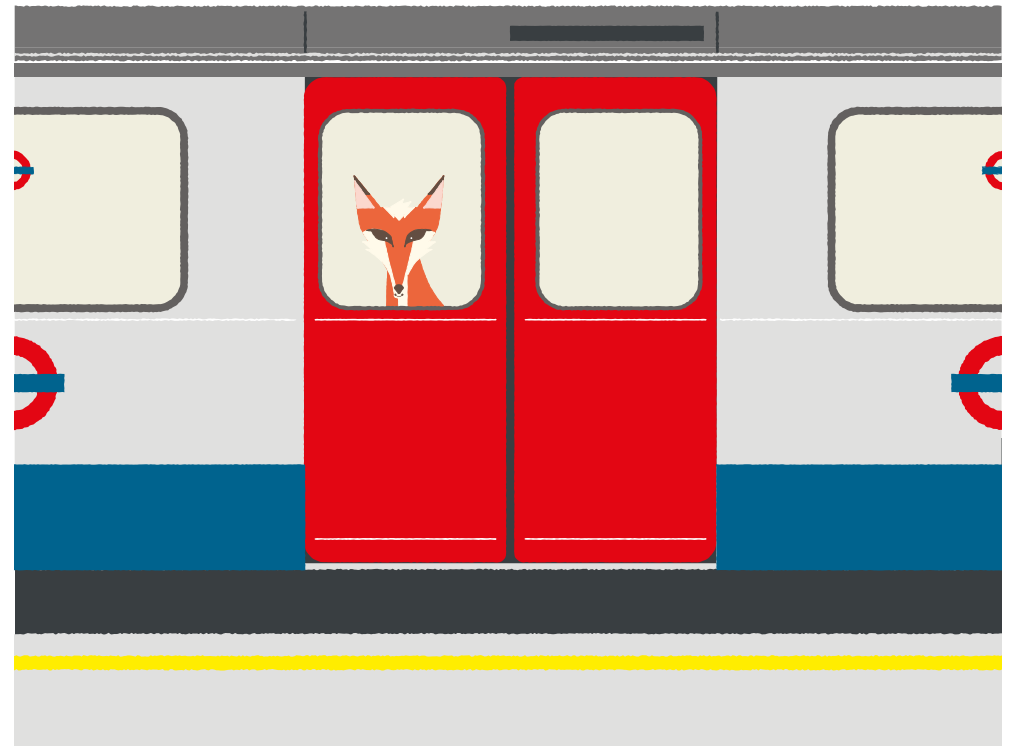


GOING UNDERGROUND

Next time you stand on a London Underground escalator, ask yourself what lies hidden in the earth around you. Perhaps it is the remains of a Roman home, a long buried river, secret war-time bunkers or the bones of an ancient tiger. London's story is told in layers under our feet. Going Underground lets your children take a peak beneath the busy streets of their city, to bring their learning to life.

In History your class will explore life as a child in Roman London and the barbaric world of the Roman amphitheatre. They will examine crime and punishment through the city's underground prisons and dungeons and the most infamous of all London's underground conspiracies – the Gunpowder Plot. In English and Art & Design they will take the London Underground and its poetry and art programmes as a stimulus to inspire their own creativity.

The discoveries that your children will make are designed to spark a new curiosity in their school subjects, inside and outside the classroom. The Going Underground London Curriculum learning pack provides all the ideas, information and resources you need to start teaching, inspired by the underground world of London.



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SCIENCE

FOSSILISED LONDON DISCOVER

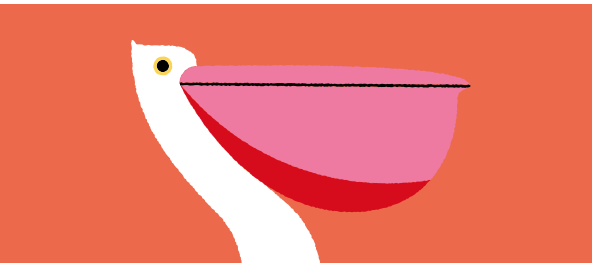
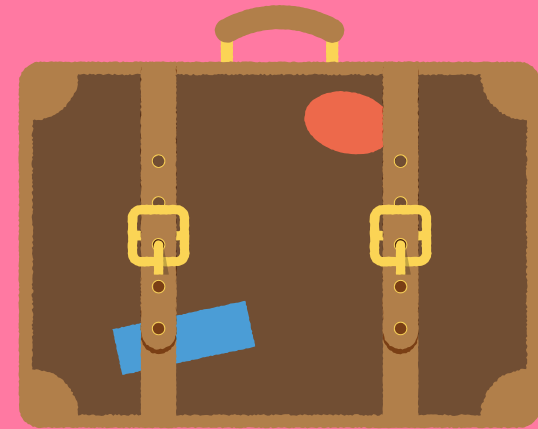
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UNDERGROUND POETRY

ENGLISH

Learning objectives

- ◉ To listen to and discuss a wide range of fiction, poetry, plays, non-fiction and reference books or textbooks.
- ◉ To write poetry.
- ◉ Technical and other terms needed for discussing what they hear and read, such as metaphor, simile, analogy, imagery, style and effect.
- ◉ To draw inferences such as inferring characters' feelings, thoughts and motives from their actions, and justifying inferences with evidence.



UNDERGROUND POETRY

Discover

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UNDERGROUND POETRY

DISCOVER



(Duration: 60 mins)

Setting the scene

Share with the pupils some of the information from the Fact sheet 2: Diversity in London (page 15). Ask them to identify some of the migrant communities that may have settled in their local area, if applicable.

Key questions

- ⦿ What is London Underground?
- ⦿ How old is the London Underground?
- ⦿ Who had the idea for Poems on the Underground?
- ⦿ Can you describe the imagery of the poems you have studied?
- ⦿ Can you identify any themes running through the poems you have studied?

Activity 1: Analysing Poems on the Underground (part 1)

Share with the pupils, the information from Fact sheet 1: Poems on the Underground (page 13). Discuss a brief history of the London Underground and reasons why poems are displayed in tube carriages.

Using Fact sheet 3: Two Poems from Poems on the Underground (page 17) explore the poem *Like a Beacon* by Grace Nichols.

Share the biography information relating to Grace Nichols from Fact sheet 3: Two Poems from Poems on the Underground (page 17).

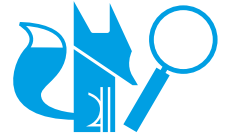
Explain that poets like Grace Nichols choose the words they write in their poems very carefully, and the words Grace used in *Like a Beacon* are going to be explored in this lesson.

Give each child an individual copy of the poem, as well as displaying it on the IWB. Teacher to read out the poem and ask children to circle words that interest them for any reason whilst the poem is read out to them. Once completed ask children to share some examples of words they circled with the class and investigate why they found those words interesting. Was it because:

- ⦿ they didn't understand the word's meaning?
- ⦿ they had an interesting picture in their minds when they heard that word?
- ⦿ they liked the sound of that word?

Explain that the pictures created in our minds when we read or hear poetry is called 'imagery.' Ask students to share some of the imagery that the poem gave them when it was read aloud.

UNDERGROUND POETRY DISCOVER



Like a beacon

*In London
every now and then
I get this craving
for my mother's food
I leave art galleries
in search of plantains
saltfish/sweet potatoes*

I need this link

*I need this touch
of home
swinging my bag
like a beacon
against the cold*

– Grace Nichols

Choose some lines to explore in detail with the class. Examples include:

I get this craving for my mother's food

- ⊗ What does a craving look like/feel like? What is your mother's food like?
- ⊗ Why do you think Grace craves her mother's food?

I need this link

- ⊗ Why do you think this line is separated from the rest of the verse?
- ⊗ What do you think she is separating? i.e. the art gallery and a touch of home

I leave art galleries in search of plantains saltfish/sweet potatoes

- ⊗ How do you feel when leaving an art gallery?
- ⊗ Why do you think she chose to include a reference to an art gallery in the poem?
- ⊗ What are plantains, saltfish, sweet potatoes?

- ⊗ Why do you think Grace is searching for them?
- ⊗ How do you feel when you are searching for something that you want?

I need this touch of home

- ⊗ What does needing something feel like?
- ⊗ How does it feel to touch something we want?
- ⊗ What does the word 'home' mean to you?
- ⊗ Why might Grace want to think of her home?
- ⊗ Where might that be?

swinging my bag like a beacon against the cold

- ⊗ What do you think is in the bag?
- ⊗ Why might her bag be like a beacon?

UNDERGROUND POETRY

DISCOVER



(Duration: 60 mins)

Setting the scene

Remind pupils of the information from Fact sheet 1: Poems on the Underground (page 13), as explored in the previous session. Ask pupils to give a brief history of the London Underground and the reasons why poems are displayed in tube carriages.

Activity 2: Analysing poems on the Underground (part 2)

Using Fact sheet 3: Two poems from Poems on the Underground (page 17) explore the poem *Immigrant* by Fleur Adcock.

Share the biography information relating to Fleur Adcock from Fact sheet 3: Two poems from Poems on the Underground (page 17).

Remind pupils of the concept explored in the last session: 'imagery.' What does it mean? Why is it important?

Display *Immigrant* on the IWB and read aloud to the class.

Immigrant

November '63: eight months in London.

*I pause on the low bridge to watch the pelicans:
they float swanlike, arching their white necks
over only slightly ruffled bundles of wings,
burying awkward beaks in the lake's water.*

*I clench cold fists in my Marks and Spencer's jacket
and secretly test my accent once again:*

St James's Park; St James's Park; St James's Park.

– Fleur Adcock

UNDERGROUND POETRY

DISCOVER



Ask for some suggestions as to imagery that the poem creates for the students. Some examples could include:

November '63: eight months in London

- ⊗ What might London have looked like in the 1960s?
- ⊗ How might Fleur be feeling after having been in London for eight months?

I pause on the low bridge to watch the pelicans

they float swanlike, arching their white necks

over only slightly ruffled bundles of wings,

What does it feel like to 'pause' in your day?

- ⊗ What would the pelicans look like?
- ⊗ What do you think the pelicans might represent with their ruffled wings? i.e. she may be identifying them as immigrants.

I clench cold fists in my Marks and Spencer's jacket

- ⊗ Why might Fleur have chosen to use Marks and Spencer's as the make of the jacket?
- ⊗ What does it look like to clench your fists? How might Fleur be feeling?
- ⊗ Which words suggest her feelings?
- ⊗ Might she feel the cold a lot/a little? Then explain to pupils that they'll be comparing the two poems on the Underground that they have explored.

Display both poems on the IWB. Ask pupils for suggestions as to how the poems are similar. Examples could include:

- ⊗ Both poems focus on the theme of immigration
- ⊗ Both poems give a sense of feeling like an outsider/being different (e.g. testing accent, wanting to feel home)
- ⊗ A feeling of cold is described in both
- ⊗ Reference to places in London/ the UK are identified (St James' park, Marks and Spencer's, art galleries)

Then ask pupils to identify differences between the poems, you may wish to use 'talk partners' or small groups for this.

Examples could include:

- ⊗ There are more adjectives (describing words) in *Immigrant* compared to *Like a Beacon*
- ⊗ Homesickness is specifically described in *Like a Beacon* but not in *Immigrant*.
- ⊗ *Like a Beacon* is about connection with a country that is home, *Immigrant* is about trying to appear English.

UNDERGROUND POETRY

EXPLORE

We have recommended a series of visit options here, which will enable students to explore an aspect of London migration in greater detail.

The Museum of London Docklands

**1 Warehouse, West India Quay, E14 4AL
020 7001 9844
info.docklands@museumoflondon.org.uk**

The Museum of London Docklands tells the story of the Port of London and the East End, and includes the London Sugar and Slavery gallery. The galleries support the study of both trade and exploration and migration. The schools' programme has sessions relating to London's links with slavery, but also has a more general session entitled *London: A home from home*, which provides an overview of London as a multi-cultural city. A dual visit with the National Maritime Museum is also available.

museumoflondon.org.uk/docklands

The Museum of London

**150 London Wall, London, EC2Y 5HN
020 7001 9844
info@museumoflondon.org.uk**

The three galleries of Modern London at the Museum of London have a particular focus on migration and diversity. The schools' programme has a number of sessions which support a focus on migration in London, including *Belonging* and *The Impact of Empire*.

museumoflondon.org.uk/museum-london



UNDERGROUND POETRY

EXPLORE

London Metropolitan Archives

40 Northampton Road, EC1R 0HB
020 7332 3820
ask.lma@cityoflondon.gov.uk

The Archives offer a number of sessions on London's multicultural history, covering the migration of various ethnic communities to London. They can be found in the pdf document below. These sessions are, however, popular and tend to fill up quickly so please book early to avoid disappointment.

cityoflondon.gov.uk/things-to-do/london-metropolitan-archives/learning/Documents/school-prospectus-2015-16.pdf

19 Princelet Street

E1 6QH
020 7247 5352
office@19princeletstreet.org.uk

19 Princelet Street is Europe's first museum of immigration and diversity, and group visits can be organised via the website.

Additionally, you may wish to encourage your class to explore migration in their local area through a visit to your local museum or your local high street. You may wish to explore the diversity in type of building and cultures represented through those buildings in your local area. You could ask students to write down words to describe the feelings that the buildings conjure up for them (e.g. homely, familiar, distant, different, belonging).

19princeletstreet.org.uk



19 PRINCELET STREET

© Nangpa UK

UNDERGROUND POETRY

CONNECT



(Duration: 60 mins)

Setting the scene

Explain that the pupils will be writing their own poem. Explain that they'll be using the information that they gathered on their trip to help them with their writing.

Activity: Writing your own poem

Remind pupils of the poems that they explored in previous lessons: *Like a Beacon* by Grace Nichols and *Immigrant* by Fleur Adcock. They described two women's experiences and feelings towards London. You might like to display the two poems in the classroom/on the IWB for familiarity. Also, remind pupils of the specific aspect(s) of London's migration that you studied on your Explore visit.

Ask pupils to share/identify some 'feelings words' that come to mind, to describe the feelings of the people explored in this topic so far, as migrants to London. Ask pupils to expand on their words, if they can, to give a reason why they may have felt that way. Write some of these words on the IWB and begin to scaffold some of these thoughts into lines of a poem.

You might like to display some of the photographs that you took on your trip (if any) to support pupils with expanding their answers. Alternatively, you might like to use Google Maps to explore the buildings visited at street level.

Then bring up Resource 1: Writing your own poem (page 20) onto the IWB. Explain that children will need to complete the sentences to create their own poem describing how London feels to them. Highlight that many of the pupils may have different feelings towards London as the place in which they live. Some may feel as though they belong, others may not, and some may have had positive experiences of living in London, but others may have found it more difficult. Model a couple of sentences on the IWB and then ask children to write their own for the remainder of the lesson.

Differentiation

Resource 1: Writing your own poem (page 19) and Resource 2: Word bank (page 20) are available for students who would benefit from a scaffold to support their writing. If your children are able to write their poem without the use of a scaffold then you may wish to give them the autonomy to write the poems without the template and/or word bank.

FACT SHEET 1: POEMS ON THE UNDERGROUND



30 YEARS
1986-2016
30 POEMS



FACT SHEET 1: POEMS ON THE UNDERGROUND



London Underground

The first London Underground train line was built over 150 years ago and its history has been very eventful. The Underground was the world's very first underground train system, with the first section opening between Paddington and Farringdon back in 1863, on what is now the Circle, Hammersmith & City, and Metropolitan lines. Since then it has grown to a sprawling underground masterpiece of 11 lines, 270 stations, and over 250 miles of rail track.

The Underground has been nicknamed 'The Tube' by many generations of Londoners. It is used by millions of commuters each day, as well as the vast numbers of tourists that London welcomes each year.

Poems on the Underground

Poems on the Underground were first displayed in 1986, and were an idea of the American writer Judith Chernaik. Judith wanted to encourage more Londoners of all ages to read and enjoy poetry and felt that the Underground was a great place to do this.

The poems help to make journeys more interesting and inspiring by showing a diverse range of poetry in Tube train carriages across London. The poems are still selected by Judith Chernaik, with the help of poets George Szirtes and Imtiaz Dharker. Poems are often chosen from less well known poets, but can also be from famous poets. They cover a wide range of topics and represent a range of historical time periods.

The scheme has been a great success and has inspired similar schemes in cities around the world, like the Underground itself, from New York to Shanghai. It has proved to be a great way of introducing the public to poetry, with passengers often wanting to read more.

30 years of Poems on the Underground

2016 marks 30 years of the successful Poems on the Underground programme. To mark this anniversary, five of the poems chosen for the first ever Poems on the Underground were shown in the displays from January 2016, including the poem by Grace Nichols explored in this unit.

The display of poems to mark 30 years of Poems on the Underground was supported by a leaflet of 30 Poems – a select few from the several hundred which have been featured over the 30 years – which is free to the public at central London Tube stations. It can also be downloaded from the TfL website:

content.tfl.gov.uk/30-years-poems-underground.pdf

FACT SHEET 2: DIVERSITY IN LONDON



CONGREGATION OUTSIDE THE HOLLOWAY 7TH-DAY ADVENTIST CHURCH, 1960,
Image credit line: © Henry Grant Collection/Museum of London

FACT SHEET 2: DIVERSITY IN LONDON



London is a hugely diverse city. It is home to over 8.5 million people, who speak over 300 different languages. But London was not always this diverse.

The Industrial Revolution in the 1800s caused a surge in building, engineering and manufacturing in England. Migrants begin to arrive from around the world to settle in the wealthy capital. They came from Africa, the Caribbean, India, China and Europe.

When World War II ended in 1945, much of London was left destroyed and desperately needed to be rebuilt. To help with the rebuilding, many migrants came to London and made it their home. They came from all over Europe and other parts of the British Isles. These included large numbers of Irish and Italian labourers and refugees from Eastern Europe, including Polish soldiers who had fought alongside the allies during the war.

In 1948, an Act was passed in Parliament which meant that all citizens who lived in a country which was a part of the British Commonwealth were able to enter England and live there if they wanted to. This meant that many people came to London from the Caribbean, India and Pakistan.

One way to get a taste for the rich diversity of languages spoken in London would be to jump on London Underground's Victoria Line and get off at various stations along the way. The line runs north to south for 13 miles (21km), passing through rich and poor parts of town and beneath migrant communities new and old.

The south end of the Victoria Line, particularly between Stockwell and Vauxhall, has been home to many migrants who speak Portuguese, which has grown hugely in recent decades and begun to spill over into nearby Brixton.

Many people originating from Bangladesh moved into the area around Euston, a major railway station connecting the capital to the north of the country, to meet hungry travellers' love of Indian food. Over 20% of people in some areas around Euston and King's Cross speak Bengali as their main language.

Turkish is one of the most popular languages along the stretch of the Victoria Line from Finsbury Park to Tottenham Hale. In fact, almost all Turkish people in London have chosen to live across just three boroughs, Hackney, Haringey and Enfield.



FACT SHEET 3: TWO POEMS FROM POEMS ON THE UNDERGROUND



Immigrant

November '63: eight months in London.

*I pause on the low bridge to watch the pelicans:
they float swanlike, arching their white necks
over only slightly ruffled bundles of wings,
burying awkward beaks in the lake's water.*

*I clench cold fists in my Marks and Spencer's jacket
and secretly test my accent once again:*

St James's Park; St James's Park; St James's Park.

– Fleur Adcock



Like a beacon

*In London
every now and then
I get this craving
for my mother's food
I leave art galleries
in search of plantains
saltfish/sweet potatoes*

I need this link

*I need this touch
of home
swinging my bag
like a beacon
against the cold*

– Grace Nichols

FACT SHEET 3: TWO POEMS FROM POEMS ON THE UNDERGROUND



Fleur Adcock

Poet Fleur Adcock was born in Auckland, New Zealand, on 10 February 1934, but spent much of her childhood in England. She worked as a librarian in London until 1979 before becoming a freelance writer. Fleur has written ten books of poetry; she likes to write poems about everyday people, places and activities but often with dark twists! Fleur has won many awards for her poetry, including the Queen's medal for poetry in 2006.



Grace Nichols

Grace Nichols was born in Georgetown, Guyana, in 1950, and grew up in a small country village on the Guyanese coast. She moved to the nearby city with her family when she was eight years old, which was very different to her quiet village life as a small child. It was an experience that inspired her to write her first book, *Whole of a Morning Sky*, in 1986, set during Guyana's struggle to have independence from the United Kingdom in the 1960s.

Grace worked as a teacher and journalist and often spent time in some of the most remote areas of Guyana. Her time in remote areas inspired Grace to write poetry and prose that told exciting stories of traditional Guyanese folk tales and myths. Grace has lived in the United Kingdom since 1977.

RESOURCE 1: WRITING YOUR OWN POEM



My London

When I look at my High Street I feel _____

The buildings are _____

I can see _____, smell _____ and hear

I want _____

I wish _____

London feels like _____

_____ is when I feel most at home.

Name _____ Date _____



RESOURCE 2: WORD BANK



You can use some of the words below to describe your feelings about London and your local High Street:

WARM

JOYFUL

HOMELY

UNSETTLED

LONELY

UNNATURAL

ICY

FRIENDLY

DISTANT

SAFE

SUPPORTED

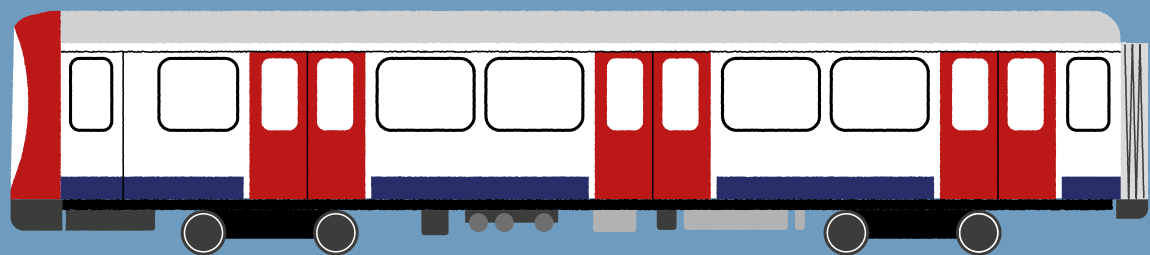
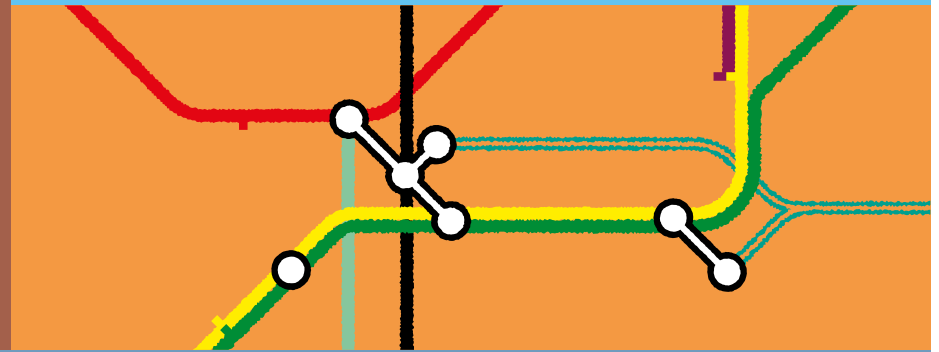
COMFORTING

GOING UNDERGROUND ART AND DESIGN

ART & DESIGN

Learning objectives

- ⊙ Students should aim to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials (for example, pencil, charcoal, paint, clay).
- ⊙ Students should also be given an introduction to great artists, architects and designers in history.



ART & DESIGN ON THE UNDERGROUND

Discover

Activity 1: Art on the Underground 23

Activity 2: Create your own Labyrinth artwork 24

Explore 26

Connect

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Resource 1: Pocket Tube map artworks 34

Resource 2: Analysing Art on the Underground 35

Resource 3: Labyrinth design families 36

Resource 4: Designing an aspect of the
London Underground 37

ART ON THE UNDERGROUND DISCOVER



(Duration: 30 – 45 mins per activity)

Setting the scene

Share the information in Fact sheet 1: Art on the Underground (page 30) with pupils. Ask why they think Art on the Underground is important and what it might bring to travellers on the underground. Ask pupils if they have seen any pieces of Art on the Underground.

Activity 1: Art on the underground

Use the bank of Tube map designs provided in Resource 1: Pocket Tube map artworks (page 34) for this activity. You might like to bring some pocket Tube maps from your local Tube station as additional resources.

Pair children and provide them with two pocket Tube map designs per pairing. Ask students to discuss their thoughts on the different pieces of art and record these thoughts using Resource 2: Analysing Art on the Underground (page 35). You will need one copy of the resource for each pairing.

Ask each pair to share some of their thoughts regarding the different pocket Tube map designs that they studied. Identify common themes across the groups and encourage students to use the terminology shown on the resource sheet.

ART ON THE UNDERGROUND

DISCOVER



(Duration: 45 mins)

Setting the scene

Revisit the information in the Fact sheet 1: Art on the Underground (page 30) particularly in relation to Mark Wallinger's *Labyrinth* work. Share Resource 3: Labyrinth design families (page 36) on the IWB. Facilitate a group discussion and analysis of the designs presented in the resource.

Encourage students to think about the range of aspects that they analysed when looking at the pieces of art that they studied:

- ⊗ Colour
- ⊗ Shape
- ⊗ Lines
- ⊗ Emotions
- ⊗ Meanings

Activity 2: Create your own Labyrinth artwork

Explain that this session will allow pupils to experience the process of creating an artwork to go in the Underground.

The remainder of this Discover activity plan gives details on three separate practical activities for you to choose from. They all involve creating a Labyrinth but vary in materials required and grouping employed. You can display the Resource 3: *Labyrinth* design families (page 36) on the IWB to help with the planning of your activity.

You may choose to undertake one, two or all of the options described here:

A: Create a large-scale floor Labyrinth

You will need:

- ⊗ tape
- ⊗ chalk
- ⊗ pebbles
- ⊗ rope

- ⊗ sticks
 - ⊗ variety of objects
 - ⊗ paint
1. Using your class's favourite design, decide on your preferred/possible location and then map out and create a large-scale floor Labyrinth. This could be in your school hall, in the playground or on the playing field. Depending on the resources that you use, it could be temporary or a more permanent Labyrinth.
 2. Once finished, take it in turns to walk the Labyrinth alone and then with others. Invite other students/classes to walk the Labyrinth. How does it feel? What would you like to place at the centre of your Labyrinth?

You may wish to pre-draw the Labyrinth for less able pupils or select a group of more able pupils to map it out with you.

ART ON THE UNDERGROUND

DISCOVER



B. Making 3D Labyrinths

You will need:

- ⦿ For the base: Cardboard, masking tape
- ⦿ For the papier maché: strips of newsprint or thin white paper, tissue paper, PVA (or any liquid white glue)
- ⦿ To finish: Tissue paper and PVA glue or paint

Cut a square base out of a thick piece of cardboard, hardboard or plywood. Draw a Labyrinth on the base following the instructions below. Cut strips of card and tape them, like a curved wall, onto the base.

To make them thicker use several layers and tape together. If the walls wobble, bend small rectangles of cardboard in two and tape one half to the bottom of the wall and the other to the base at a right angle. Mix 20% water with 80% PVA (single-cream consistency) and brush strips of paper all over the structure.

1. Add a layer or two of strips of white tissue paper (again brushed on with PVA).
2. When dry, paint or papier maché with coloured tissue paper, paying particular attention to the outside wall.

Note: Students can work in groups. The Labyrinth design can be drawn out beforehand by the teacher or selected students.

C. Decorated Labyrinths

You will need:

- ⦿ Pencils
 - ⦿ black fine-liners
 - ⦿ A4 sketchbooks or cartridge paper
 - ⦿ photocopy of Resource 3: Labyrinth design families (page 36)
1. Choose one of the Labyrinth designs.
 2. In your sketchbook or on a rough piece of paper practice drawing a Labyrinth.
 3. Experiment with elaborating on the design, just as Mark Wallinger has in each station. This could include thickening the line with loops, zigzags or any other pattern or detail you can think of.
 4. When you're happy with your design, draw a large labyrinth in your sketchbook in pencil and carefully add your patterns.
 5. Take a black pen and go over your pencil outline.

ART AND DESIGN ON THE UNDERGROUND

EXPLORE

You may wish to use your visit to expand pupils' experiences of design on the London Underground. These experiences could focus on the design of a Tube carriage, the design and pattern of the seat covers, the placement of the hand rails, the design of the London Underground logo, etc.

Before your visit, you could share information in Fact sheet 2: A History of Design on the Underground (page 32) with pupils.

Pupils can use Resource 2: Analysing Art on the Underground (page 35) to record what they see and use as a discussion point back in the classroom.

You may wish to take a digital camera with you to help with post-trip discussions on the pieces of art you study.

Some options for visits are given here:



MUSEUM DEPOT
© London Transport Museum

London Transport Museum

Covent Garden Plaza, WC2E 7BB

020 7379 6344

bookings@ltmuseum.co.uk

The London Transport Museum run KS2 specific school visits. You can find information here:

**[ltmuseum.co.uk/learning/schools/
key-stage-2](http://ltmuseum.co.uk/learning/schools/key-stage-2)**



LONDON DESIGN MUSEUM
© Oxyman

Design Museum

28 Shad Thames, SE1 2YD

020 7403 6933

The Design Museum, which explores 'London Transport;' focusing on the design features of tube carriages, the emergence of the Tube logo and early tube maps. Find out more here:

**[designmuseum.org/move-with-us/
new-design-museum](http://designmuseum.org/move-with-us/new-design-museum)**



ART AND DESIGN ON THE UNDERGROUND

EXPLORE

You might like to consolidate existing learning by visiting your local Tube station to explore the Art on the Underground displayed there.

There will be a Labyrinth on display at your local station, so you may wish to take children to view this piece, or a range of Labyrinth pieces at different local stations. Your discussions could focus on the following:

Touch

- Ⓢ How does the surface feel? Cold/warm, raised/flat?
- Ⓢ Is it magnetic?
- Ⓢ Trace your finger around the Labyrinth's path. Is the path easy to follow? Why?

Sight

- Ⓢ How many colours are on the Labyrinth?
- Ⓢ Do you like the design?
- Ⓢ What number is written on the artwork? The number of each artwork is specific to its station and each Labyrinth is totally unique so no two paths are the same.

Alternatively, you could visit the Art on the Underground website

art.tfl.gov.uk

and choose various pieces of art to view with the students, for example, *Design Work Leisure* by Giles Round at Blackhorse Road station or *Wrapper* by Jacqueline Poncelet at Edgware Road.



DESIGN WORK LEISURE

© Giles Round



WRAPPER

Jacqueline Poncelet © Thierry Bal

ART AND DESIGN ON THE UNDERGROUND

CONNECT



(Duration: 45 mins)

Setting the scene

Remind pupils of the design features of the London Underground that they have explored to date. These can include the specific pieces of Art on the Underground that they analysed in the Discover activities, as well as the design of the carriages' exteriors and interiors, or anything else that they studied on the Explore visit.

Activity: Design an aspect of the London Underground

Explain to pupils that their task will be to think about a new design of an aspect of the London Underground. Pupils will be required to choose one of the following three design tasks, with accompanying briefings, and then plan an appropriate design to meet the brief.

Give each pupil a copy of Resource 4: Designing an aspect of the London Underground (page 37) to support this activity.

Before drawing their designs, encourage students to think about the range of aspects that they analysed when looking at the pieces of art that they studied:

- ⊗ Colour
- ⊗ Shape
- ⊗ Lines
- ⊗ Emotions
- ⊗ Meanings

ART AND DESIGN ON THE UNDERGROUND

CONNECT



A: Logo

All good brands have a unique logo. The logo for the London Underground (known as the 'roundel') has stood the test of time, having been first designed in 1908.

Imagine you're creating a new logo for the London Underground. Your logo is required to:

- ⊗ Be eye-catching
- ⊗ Memorable
- ⊗ Simple
- ⊗ Easy to read
- ⊗ Easy to use on other branding materials

B: Tube map design

As you've already explored, there have been a lot of different tube map designs over the years. Your design will need to:

- ⊗ Be eye-catching to people moving through the station quickly
- ⊗ Be interesting to a diverse range of people
- ⊗ Use colours that fit with those used across the tube lines
- ⊗ Fit on to the small space available on the front of the tube map leaflet without looking crowded

C: Poster

Over the years, many pieces of art by a range of artists have been displayed on the walls of the London Underground carriages and stations. Your task is to design a piece of art for an underground station. Your artwork should:

- ⊗ Be eye-catching to people moving through the station quickly
- ⊗ Be interesting to a diverse range of people
- ⊗ Easy to view from a distance
- ⊗ Fit within the theme of 'London'

FACT SHEET 1: ART ON THE UNDERGROUND



DESIGN WORK LEISURE
© Giles Round



LABYRINTH AT KINGS CROSS ST PANCRAS
© Thierry Bal

FACT SHEET 1: ART ON THE UNDERGROUND



Art on the Underground is London's largest art programme, bringing some of the world's best artists to everyone travelling across London. In all our projects, large and small, temporary and permanent, we help connect Londoners to their environment, community, history and future.

With artworks in all 33 London boroughs and in every one of London's 270 Tube stations, Art on the Underground provides an opportunity for people of all backgrounds to have their lives made richer and more enjoyable through art.

For London Underground's 150th Anniversary in 2013, Art on the Underground commissioned Turner Prize winning artist Mark Wallinger to create *Labyrinth*, a permanent artwork for every single Tube station on the network – that's 270 different pieces of art! Each piece shows a unique circular Labyrinth and uses bold black, white and red graphics.

Mark's idea had many influences:

- ⊗ It uses some of the same designs that are used in the Tube stations both in terms of graphics and materials (it is made of enamel like lots of the Tube signs).
- ⊗ Millions of people take journeys by Tube into the centre or to a destination and back out again, like in a Labyrinth.
- ⊗ We are all unique and have our own patterns and habits. Mark's aim was to represent these ideas in the Labyrinth artworks.

Each Labyrinth has a number handwritten by the artist in the bottom right corner. The numbers from 1 to 270 refer to the order of stations visited in the Guinness World Record 'Tube Challenge 2009'.

As you can see in the example of a *Labyrinth* at Kings Cross, at the bottom of each Labyrinth is a red X. This simple mark is a cue to enter the pathway– this pathway represents a Tube traveller's journey. Why not try tracing the pathway with your finger next time you're at your local tube station? A Labyrinth only has one route to the centre!

FACT SHEET 2: A HISTORY OF DESIGN ON THE UNDERGROUND



INTERIOR OF AN OLD UNDERGROUND CAR
Image by Paul Hudson



INTERIOR OF A MODERN UNDERGROUND CAR
Image by S. Miler

FACT SHEET 2: A HISTORY OF DESIGN ON THE UNDERGROUND



The creation of the London Underground not only involved new ways of planning and building, the design of the carriages and stations required some exciting new thinking too!

A man called Frank Pick was responsible for providing guidance and inspiration for the design of the London Underground in its early days. He was Chief Executive of the London Underground between 1913 and 1938 and brought about a brand new logo for the Underground, created signs and posters for the stations and even helped with the design of the trains themselves. Frank believed that the design work should always aim to make journeys look good and feel comfortable.

Design of Tube Carriages

There is an awful lot to think about when designing a tube carriage. In an ideal world, it would hold as many passengers as want to use it and everyone would have a comfortable seat to sit on. However, this is not always possible due to the severe space restrictions of the tube tunnels.

The carriages should also look nice, be resistant to wear and tear and be easy to clean at the end of a busy day. Tube carriage design involves a lot of creative thinking!

Over the years, there have been many different designs of the tube carriages, both of the carriage structure and interior design. The photographs overleaf show how much the interior design of the carriages has changed from 1930 to present day.

A new form of train line is currently in development across London. It is called 'Crossrail' and is being built to help ease the pressure on existing services by carrying more passengers into London from further afield in super quick travel times. It will involve both overground and underground travel and is due to carry the first passengers in 2018. Each train will carry 1500 passengers, significantly more than our current tube trains.

The Tube Map

Up until the 1930s, the map showing the London underground lines was geographic, showing the stations in relation to streets on a typical map of London. However, in the 1930s, the network of lines and stations had expanded so much that it wasn't possible to squeeze them all on to a geographical map – it looked too crowded and was difficult to read.

Something radical was needed and Harry Beck was the man for the job. In 1931, Harry spent his spare time designing a new type of map for the underground which turned it into a simple diagram. At first, his design was rejected because it was thought to be too radical but, after a bit of persuasion, Harry's design was accepted and first produced in 1933 as a pocket map.

His design has remained largely unchanged since and has inspired maps of underground networks all over the world – from New York to Sydney!



RESOURCE 1: POCKET TUBE MAP ARTWORKS



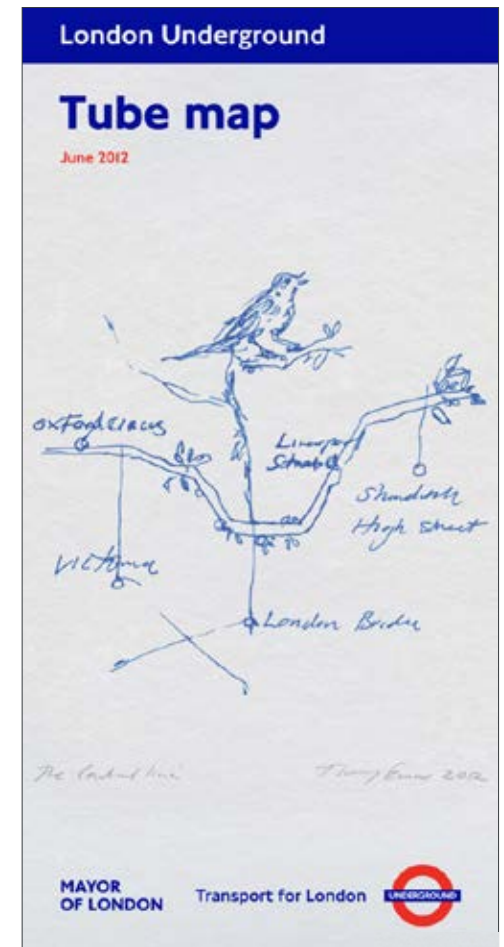
FRAGMENT OF A MAGIC CARPET,
CIRCA 1213, 2008
Pae White © London Underground



DESIGN FOR A MAGNIFICENT LONDON
UNDERGROUND GRAND PENDULUM IN
GILT BRONZE, 2015
Pablo Bronstein © London Underground



MAP OF LONDON UNDERGROUND,
2006
David Shrigley © London Underground



THE CENTRAL LINE, 2012
Tracey Emin © London Underground

RESOURCE 2: ANALYSING ART ON THE UNDERGROUND



Which colours are used?

Which shapes can you see?

What do the lines look like?
(e.g. thick, thin, bold, delicate,
curved, straight)

What do you think the artist
wants to show with their piece?

How does this piece make you feel?

Which piece do you prefer?
Why?

Artist chosen:

Artist chosen:



Name:

Date

RESOURCE 3: LABYRINTH DESIGN FAMILIES



Medieval



Cretan



Native American



Turf



Opposed



Chamfered



Organic



Woodcut



Emboss



East



Square

No need for a map here, unlike a maze, it looks like there's only one way you can go!



RESOURCE 4: DESIGNING AN ASPECT OF THE LONDON UNDERGROUND



Draw your design on this page. You can annotate your drawing to highlight the key features of your design:



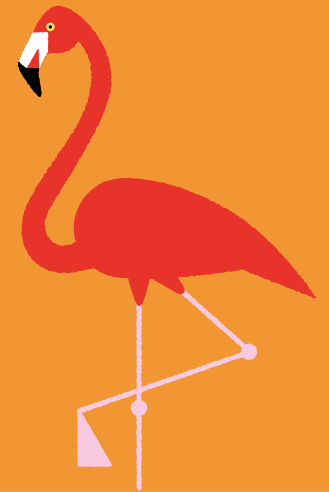
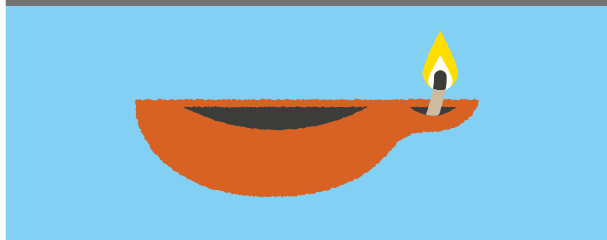
Name: _____ Date _____

UNDERGROUND LONDINIUM

HISTORY

Learning objectives

- After this lesson students should know about The Roman Empire and have an understanding of its impact on Britain.



UNDERGROUND LONDINIUM

Discover

Activity: Roman London's amphitheatre 40

Explore 41

Connect

Activity: A day in the life of a Roman child 42

Resources

Fact sheet 1: Roman Londinium AD43 – AD450 43

Fact sheet 2: A Roman child's life 46

Resource 1: Planning a diary entry 48

Resource 2: Diary template 49

UNDERGROUND LONDINIUM DISCOVER



(Duration: 30 mins)

Setting the scene

Share some of the information from Fact sheet 1: Roman Londinium, AD43 – AD450 (page 43) with your pupils. Discuss the Romans settling in Britain and the founding of Londinium.

Key questions

- ◉ Why did the Romans choose the banks of the River Thames as a place to settle?
- ◉ Why did Romans build amphitheatres?
- ◉ How would it have felt to be a Gladiator?
- ◉ How many spectators did the Guildhall Amphitheatre hold?

Activity: Roman London's amphitheatre

Introduce the concept of an 'amphitheatre.' Ask pupils if they have heard the word before, and if they know what it means.

Explain that archaeologists uncovered Roman London's one and only amphitheatre under the ground of the Guildhall Yard, in the modern City of London, in 1985. Archaeologists had been searching for it for over 100 years; in the end they stumbled across it by accident!

The amphitheatre seated over 7,000 spectators on tiered wooden benches, who attended to experience the bloody and sometimes barbaric spectacles that took place in it.

Amphitheatres were built for Romans' entertainment. The Guildhall amphitheatre was 80 metres (262 feet) wide and the centre was filled with sand to soak up the blood from the savage battles held there. Public executions also took place there.

Battles were held between Gladiators. These gladiators were often prisoners, slaves or criminals, condemned to gladiator school. However, some were sons of rich men looking for fame, or were poor men hoping to win lots of prize money. Gladiators entered the arena (the area in the middle of the amphitheatre covered in sand) and fought each other, or wild animals such as bears or bulls. They often fought to the death.

Explore the 360 degree tour of the Guildhall amphitheatre from:

360.visitlondon.com/#?scene=amphitheatre.

Discuss what it might have felt like to be a Gladiator in the Guildhall amphitheatre.

UNDERGROUND LONDINIUM EXPLORE



Roman London Gallery, Museum of London

150 London Wall, EC2Y 5HN
020 7001 9844
info@museumoflondon.org.uk

You could visit the Roman London Gallery at the Museum of London, which encourages you to discover what it was like in Londinium. You can view everyday Roman objects, from hardware to precious jewellery. You can even see a Roman leather bikini!

This display also features a video of a Gladiatorial battle re-enactment at the Guildhall's Roman Amphitheatre. We strongly advise visiting this exhibition before going to the Guildhall Amphitheatre itself.

www.museumoflondon.org.uk/london-wall/whats-on/galleries/roman-london

Guildhall Art Gallery and Amphitheatre

Guildhall Yard, EC2V 5AE
020 7332 3700
pro@cityoflondon.gov.uk

You could visit the Guildhall Art Gallery and Amphitheatre, at which you can explore the uncovered structure of the amphitheatre. More information can be found here:

www.cityoflondon.gov.uk/things-to-do/visit-the-city/attractions/guildhall-galleries/Pages/londons-roman-amphitheatre.aspx

The City of London Archaeological Trust has put together a booklet, which can be found online, entitled *Roads to Rome*, which shows a walking route around London to visit many of the buildings and sites of Roman Londinium.

www.cityoflondon.gov.uk/things-to-do/visit-the-city/Documents/Roads-to-Rome.pdf

All Hallows by the Tower

Byward Street, EC3R 5BJ
020 7481 2928
parish@ahbtt.org.uk

You could visit All Hallows by the Tower, which has a wide range of Roman and Saxon artefacts. Particularly impressive is their Roman tessellated floor of a domestic house in the late 2nd Century.

www.allhallowsbythetower.org.uk/visiting/crypt-museum

UNDERGROUND LONDINIUM CONNECT



(Duration: 60 mins)

Setting the scene

Remind pupils of the artefacts/buildings that you may have seen on your Explore visit. Ask children to imagine that they are living their lives in Roman Londinium.

- ⦿ What might it have looked like?
- ⦿ What might it have smelled like?
- ⦿ What do you think you would have spent your days doing?

Activity

Share Fact sheet 2: A Roman child's life (page 46) with the pupils on the IWB. Once you have read it as a class, ask pupils to decide whether their imaginings from the Setting the scene activity were correct or not:

- ⦿ What do you think you would be spending your days doing as a Roman child?
- ⦿ What did Roman children eat?
- ⦿ What did Roman children play with?
- ⦿ What do you think life would be like for Roman girls and boys?

Explain to pupils that they are going to use all that they have learned about the Romans to write a diary entry, describing what they would be doing as a child in Roman times. A diary entry usually includes events, feelings and experiences. Explain that children must refer to at least one of the artefacts/buildings that they studied on their visit in their writing.

Bring up Resource 1: Planning a diary entry (page 48) on the IWB. Use this to model the planning of a diary entry with the whole class.

Then show pupils Resource 2: Diary template (page 47). You may wish to write a whole entry from start to finish as a class before asking children to write their own, or you may wish to model a few sentences and then set children off independently.

Differentiation

You may wish to ask children of higher ability to write their diary entry independently, without following the rigidity of the diary entry template. For less confident children, you may wish to highlight some key words describing activities/events. Use Fact sheet 2: A Roman child's life (page 45) to help as a framework for their writing.



FACT SHEET 1: ROMAN LONDINIUM, AD43 – AD450



THE ARRAS MEDALLION
© Roman Society

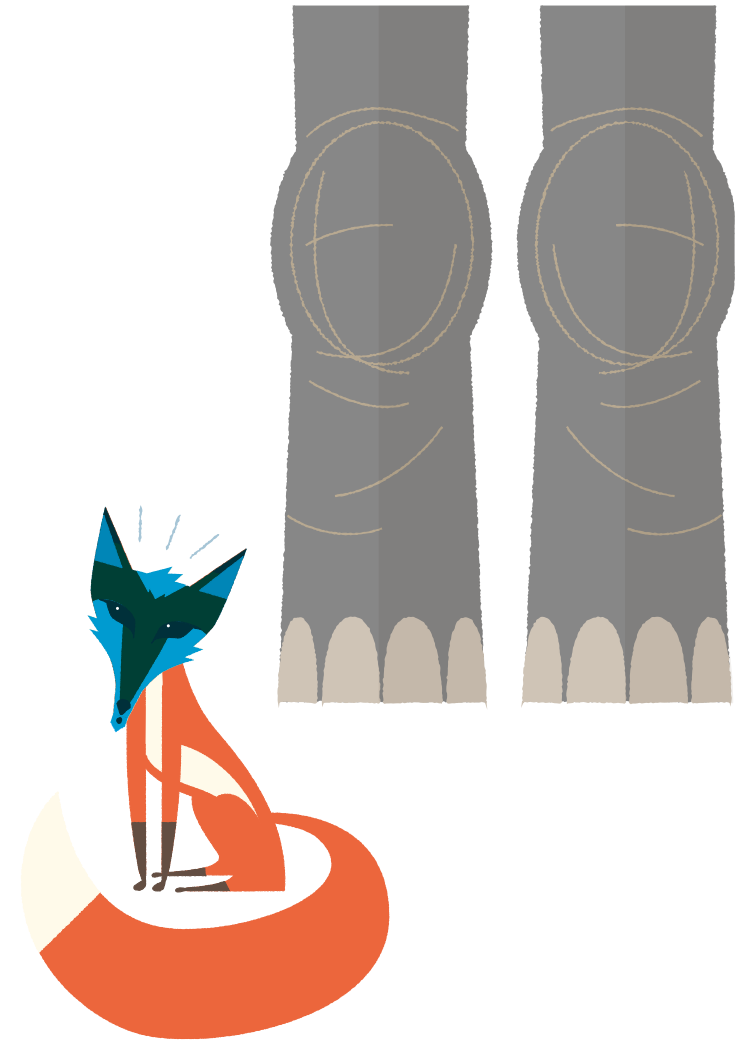
FACT SHEET 1: ROMAN LONDINIUM, AD43 – AD450



Two thousand years ago, Roman Emperor Claudius built a camp in the damp marshes around the banks of the river Thames. Using elephants to terrify them, he had successfully fought against the blue-painted Celts, who had occupied Britain for the previous 500 years. He chose his spot, upstream close to the river's edge, because it was easy to defend and easy to trade from. Soon his town began to thrive. Ships arrived with cargoes of wine, wool, tin, figs, olive oil and slaves.

By AD100, Claudius' town had become the capital city of Roman Britain; it was named Londinium. It had imposing buildings, temples, a fort, an amphitheatre and a marketplace. There were also public baths at Cheapside and at Upper Thames Street. The city was wealthy and sophisticated.

The first ever picture of London is on a Roman gold coin, called the Arras Medallion, dug up in a great hoard of treasure in 1922. It dates back to AD296 and shows a man on horseback carrying a spear being welcomed in front of the gates of London. It is the only portrait of Roman London that exists.





FACT SHEET 2: A ROMAN CHILD'S LIFE



FOUNDATIONS OF THE WARM ROOM OF BILLINGSGATE BATHHOUSE

© Sophie Mills



FACT SHEET 2: A ROMAN CHILD'S LIFE

Romans had high expectations of their children. A Roman child was expected to learn Latin and Greek and the art of public speaking and debate. Roman boys were often encouraged to be lawyers, teachers or writers, with girls usually working in the home and sometimes making clothes. Roman children did their homework on a soft wax tablet.

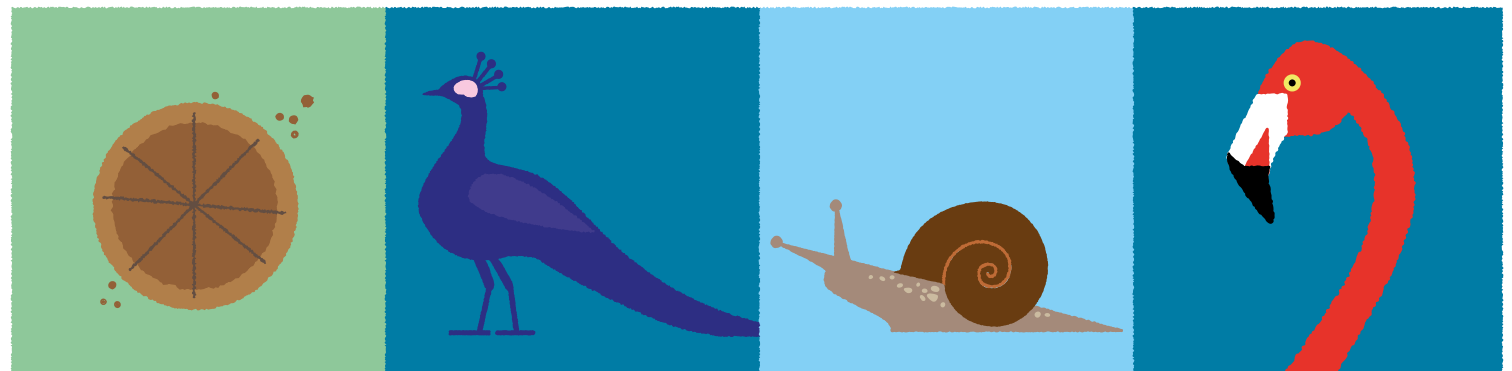
Roman girls often married at the age of 13. Boys wore togas from the age of 16 to show maturity.

Roman children mainly ate bread, wheat pancakes and porridge. Sometimes meat, fish or fruit was served, but not every day. Some favourite foods of Roman children on special occasions included snails that were fat with milk, peacocks' brains, flamingo tongues and honey-sweetened cakes.

The games that Roman children played are similar to games that you might play today, such as toy soldiers, rattles, dolls' houses, board games with pebbles and wooden dolls.

After school, boys and their fathers would go to the baths, which required a small fee to enter. Here, people were able to wash and to talk to their friends and relatives. The bathhouses contained gardens, gymnasiums and libraries.

Religion was a big part of Roman daily life. Although some families did not visit temples often, many had small shrines in the home dedicated to specific gods and goddesses. Like the Greeks, early Romans believed that gods and goddesses lived on top of Mount Olympus. Children would be encouraged to pray to these gods to ask for protection and guidance.





RESOURCE 1: PLANNING A DIARY ENTRY



Date of the diary entry _____

Time connectives you will use

What has happened today?

How do you feel?

Have your feelings changed through the day? If so, how?

How are you feeling about tomorrow?

Name: _____

Date: _____



RESOURCE 2: DIARY TEMPLATE



Dear Diary,

Today I have felt _____

When I woke up I _____

Then I went to _____

When I was there I felt _____ because _____

I played with _____

Today, I ate _____

The food tastes _____

Tomorrow, I think I will _____

(Your name)

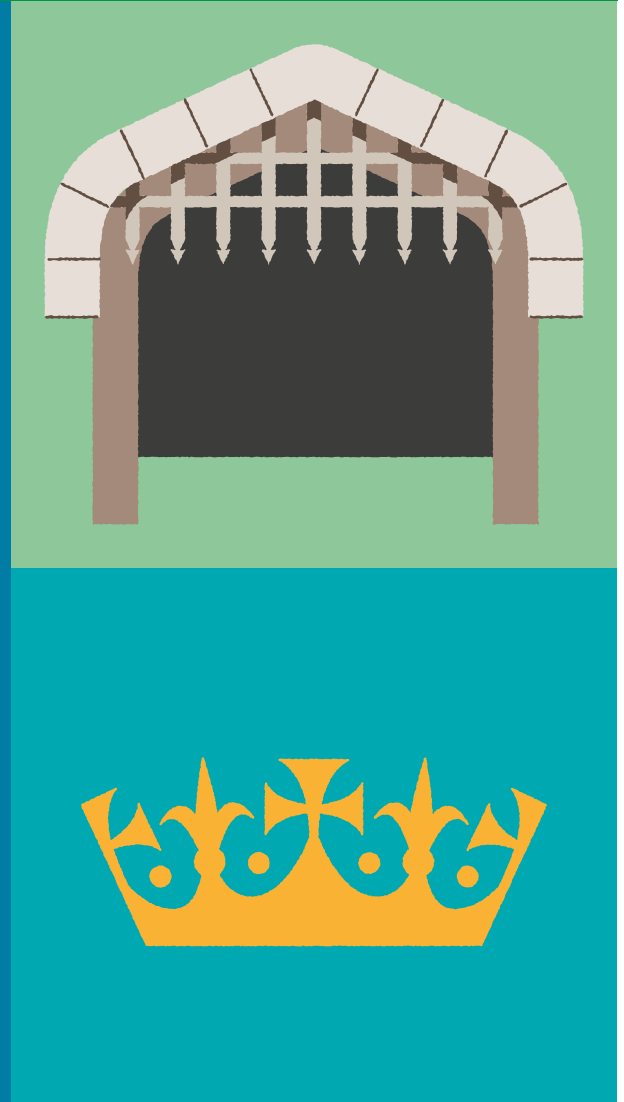
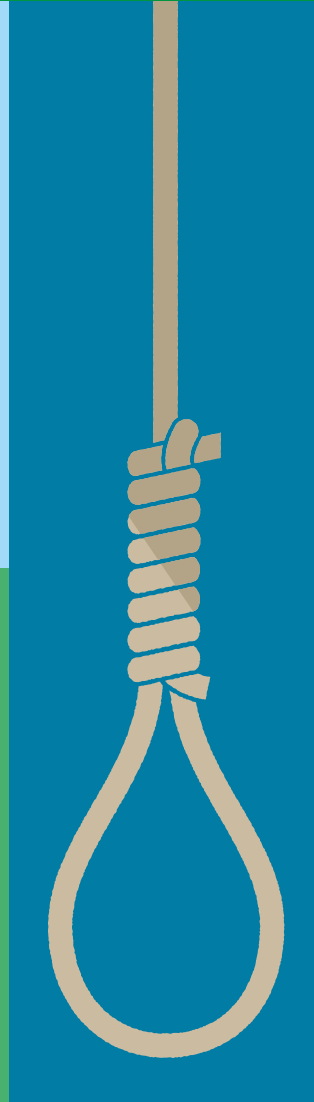
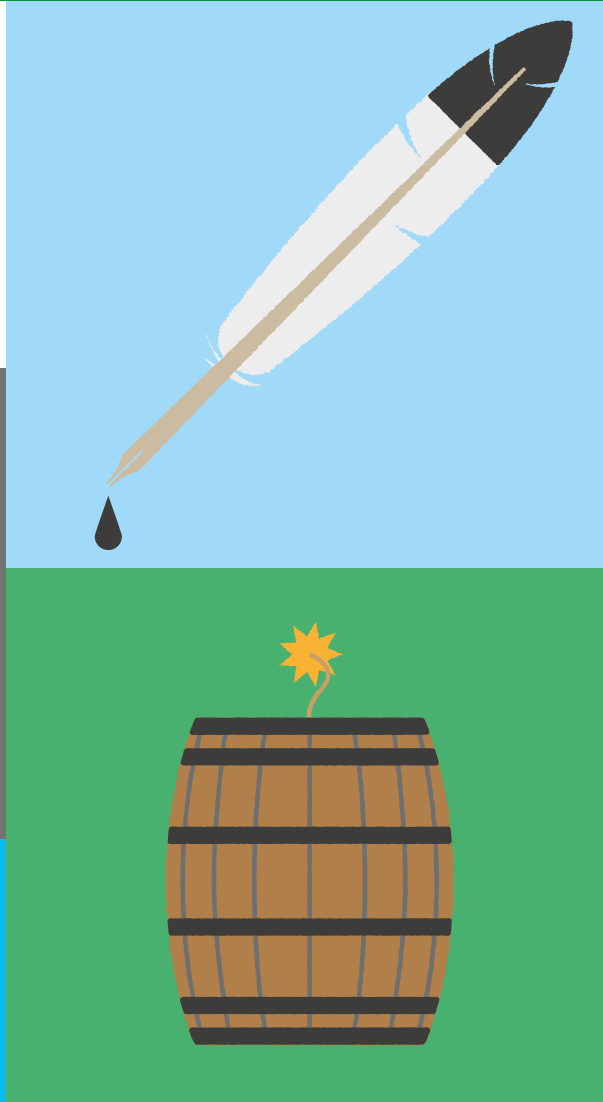
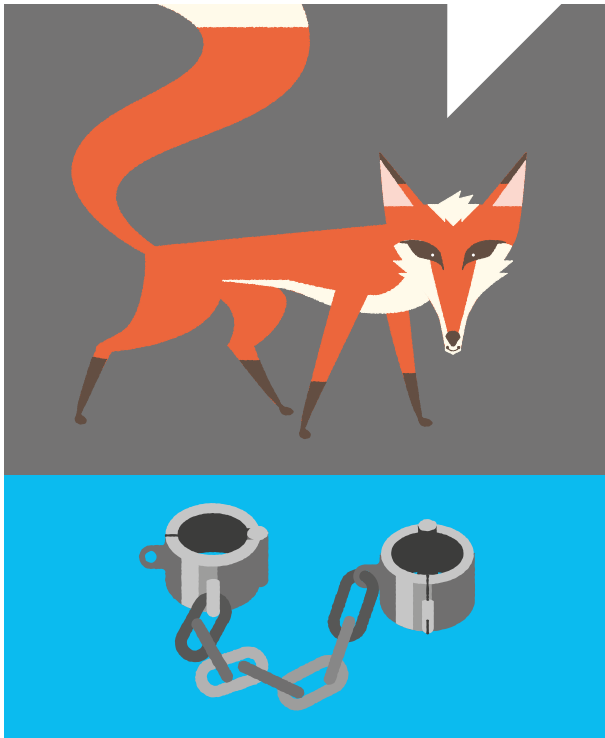
Name: _____ Date: _____

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

HISTORY

Learning objectives

- ® After this lesson students should have a chronologically secure knowledge and understanding of British, local and world history.



THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

Discover

Activity 1: Guy Fawkes and the gun powder plot 51

Activity 2: Elizabeth Fry and Newgate Prison 52

Explore 53

Connect

Activity: Changes in crime and punishment 54

Resources

Fact sheet 1: The history of lawmaking in London 56

Fact sheet 2: Guy Fawkes and the gunpowder plot 58

Fact sheet 3: Elizabeth Fry and Newgate Prison 60

Resource 1: Storyboarding the gunpowder plot 62

Resource 2: Crime and punishment through
the ages 64

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

DISCOVER



(Duration: 45 mins per activity)

Note: Three fact sheets have been produced as teaching aides for this session, Fact sheet 1: The history of lawmaking in London (page 56), Fact sheet 2: Guy Fawkes and the gunpowder plot (page 58) and Fact sheet 3: Elizabeth Fry and Newgate Prison (page 60). They present the stories of two famous London-based experiences of crime and punishment. You may wish only to focus on one story in your teaching, or teach both in separate lessons.

Setting the scene: Stories of crime and punishment

Explain that in this series of activities, pupils will learn about crime and punishment in different time periods and will explore how appropriate different methods of punishment are/were.

Share the information on the Fact sheet 1: The history of lawmaking in London (page 56). Check understanding by asking pupils what the role of Parliament is and how it came to be created.

Activity 1: Guy Fawkes and the gunpowder plot

Share the information on the Fact sheet 2: Guy Fawkes and the gunpowder plot (page 58) with the whole class. Key Questions to ask the pupils:

- ⊗ Why was Guy Fawkes trying to blow up the House of Lords?
- ⊗ How was his plan discovered before he could carry it out?
- ⊗ How were Guy and his friends punished?

Give the children Resource 1: Storyboarding the gunpowder plot (page 62). You may wish to group children in pairs or small groups, or have children complete this activity independently. Ask children to cut out the text boxes and order them, to represent the sequence of events in the gunpowder plot story.

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

DISCOVER



Activity 2: Elizabeth Fry and Newgate Prison

Share the information on Fact sheet 3: Elizabeth Fry and the Newgate Prison (page 61) with the whole class. Key Questions to ask the pupils:

- Ⓢ What does 'execution' mean?
- Ⓢ Who was the lady known as 'the angel of prisons'?
- Ⓢ What kind of person do you think she was?
- Ⓢ Why was her face put onto the English £5 bank note?
- Ⓢ What would it have been like to be in Newgate prison?

Focus the discussion on the reasons why Elizabeth Fry fought for prisoners to be kept in better conditions. Encourage pupils to explore the morality of the conditions in which prisoners were kept.

- Ⓢ Do you think it is right to keep prisoners in basements?
- Ⓢ Should they be treated differently for being criminals?
- Ⓢ Do you think Elizabeth was right that criminals should be treated with 'kindness'?

(Morality will be further explored in the Connect activity for this topic).

Undertake a role play activity which will test the pupils' persuasive argument skills. Ask the pupils to work with a partner. One person to play the part of Elizabeth Fry, arguing for better conditions for the prisoners, the other person to act as the Governor of the prison who is against making changes. Give the students five minutes to think through some of their arguments and then have a five minute debate in pairs.

Then choose some pairs to demonstrate their persuasive argument skills to the whole class, and repeat the exercise with one pair at a time.

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

EXPLORE

Your visit should allow pupils to build on their existing knowledge about the history of crime and punishment.

You might like to focus your visit on learning more about crime and punishment in your local area. You could explore one or more of the following:

- ⊗ Your local police station
- ⊗ Your local museum to explore policing artefacts
- ⊗ Invite a local police officer to come into your school and give a talk on modern methods of policing

You might like to explore more about the history of law-making in London by visiting:

The Royal Courts of Justice

Strand, WC2A 2LL
0115 9939 811
london@nccl.org.uk

The National Centre of Citizenship and the law offer a range of visits tailored to KS2 pupils

www.nccl.org.uk/primary-school/?location=london

The Houses of Parliament

Westminster, SW1A 0AA
0207 219 4496
education@parliament.uk

www.parliament.uk/education/visit-parliament-with-your-school/



The Supreme Courts

Parliament square, SW1P 3BD
020 7960 1500
enquiries@supremecourt.uk

www.supremecourt.uk/visiting/school-and-college-tours.html

Essex Police Museum

Chelmsford, CM2 6DN
01245 457150
museum@essex.pnn.police.uk

www.essex.police.uk/museum

Metropolitan Police

secure.met.police.uk/enquiries/

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

CONNECT



(45 mins – 60 mins)

Setting the scene: Changes in crime and punishment

Recap on the learning during both phases of this topic – discuss Roman London and the role of the Amphitheatre in Crime and Punishment. Discuss methods of punishment in Newgate Prison and of Guy Fawkes and his friends involved in the Gunpowder Plot. Also discuss any methods of punishment that you may have explored in your visit.

Activity: Guy Fawkes and the gunpowder plot

Focus a class discussion on how the methods of punishment were different/changed over the time periods chosen. You might like to discuss why the methods changed over time.

Perhaps introduce ethical debate around some of the following questions:

- ⊗ Which methods were/are more humane?
- ⊗ Which do you think were/are fair?
- ⊗ How do you think prisoners should be treated?
- ⊗ Which types of crimes should be punished?
- ⊗ How do you think Crime and Punishment might change in the future?

You may wish to use talk partners/small groups for these discussions and feed back to the whole class.

THE UNDERGROUND WORLD OF CRIME AND PUNISHMENT

CONNECT



Present Resource 2: Crime and punishment through the ages (page 64) on the IWB.

Note: You will need to add some events/dates of relevance to this resource, based upon the areas(s) studied in your visit.

Model how to order the events/dates on the IWB and then give students the resource to complete independently.

You can either give students the events/dates appropriate to your crime and punishment visits to add to their timelines, or you might like to ask students of higher ability to create their own dates.

Close the session by discussing, as a class, the key features of how crime and punishment appear to have changed over time, according to the key events/dates on your timeline e.g.

- ⊗ The death penalty has been abolished
- ⊗ Torture of criminals is no longer legal
- ⊗ The police force is now responsible for enforcing laws
- ⊗ Types of crimes have changed e.g. cyber bullying is a relatively new crime



FACT SHEET 1: THE HISTORY OF LAWMAKING IN LONDON



THE HOUSES OF PARLIAMENT

Image by Adrian Pingstone



FACT SHEET 1: THE HISTORY OF LAWMAKING IN LONDON

When someone commits a crime, it is said to be 'against the law.' This means that they have done something that isn't allowed according to the laws of where they live.

London has been at the centre of making laws that cover England since the middle Ages. Making something into a law is a very long process, involving a lot of different stages. The process begins with a proposal to the Houses of Parliament which address a problem that should be solved. These proposals are usually put forward by the Government, which is an elected group of local people who are responsible for making and enforcing laws.

It took many, many years for Parliament to be created, and even more before it became the Houses of Parliament that we have now.

The word 'Parliament' was first used during the reign of King Henry III. In 1264 Henry was captured during a civil war and was forced to set up a 'Parlement' (from the French "parler", to talk) at Westminster, the start of the House of Commons. He expanded the council of his advisors to include certain members of the clergy and important members of the various cities and towns.

King Henry III's son, King Edward I, expanded Parliament still further, and began to rely on Parliament for guidance. He encouraged them to meet often to debate important issues, and to give him suggestions as to which laws should be passed and in what direction the kingdom should be taken.

By 1400 Parliament had been divided into two separate houses. The clergy and nobles met in the House of Lords, while knights and important townspeople met in the House of Commons. It has been this way ever since.



FACT SHEET 2: GUY FAWKES AND THE GUNPOWDER PLOT



"REMEMBER, REMEMBER THE FIFTH OF NOVEMBER, GUNPOWDER, TREASON AND PLOT,
I KNOW OF NO REASON WHY THE GUNPOWDER TREASON SHOULD EVER BE FORGOT"



FACT SHEET 2: GUY FAWKES AND THE GUNPOWDER PLOT

Down in the basement cellars of the Houses of Parliament, Guy Fawkes prepared to commit a terrible crime. He was laying down barrels of gunpowder in an attempt to blow up the House of Lords at the State Opening of Parliament, by King James I, on 5th November 1605.

Guy Fawkes was a Catholic and was very unhappy about the laws being passed at the time, which he argued were not sympathetic to Catholic beliefs. James I had become King of England in 1603; he was also King of Scotland and so was the first monarch to unite England and Scotland. Guy was recruited by his friend, Thomas Winter, into a group who wanted to rebel against the King. They hatched a plan to blow up the House of Lords.

Robert Catesby led the rebellion and rented a house near to Parliament to help with their plan. He planned to dig a tunnel between his rented house and Parliament and plant the gunpowder. However, a space in the cellars of the House of Lords came up for rent before they had finished the tunnel so they instead rented that and filled it with gunpowder. Guy Fawkes was put in charge of lighting the gunpowder.

A few of the plotters were worried that some of their Catholic friends would be at the opening and might be harmed in the explosion. To warn them, the plotters decided to write and warn some of their friends not to be there that day. Lord Monteagle received a letter warning him to get out of London and to the countryside that day, because Parliament would "receive a terrible blow".

Unfortunately for the plotters, Lord Monteagle showed the letter to the King, the cellars were thoroughly searched and Guy Fawkes was caught. He was taken to the basement of the White Tower at the Tower of London. After several days of horrible torture Guy gave up the names of his fellow plotters and eight of them went to trial in January 1606. All were found guilty and executed. Guy himself jumped off the gallows before he could be executed and broke his own neck to avoid the horror of being cut down while still alive and tortured.

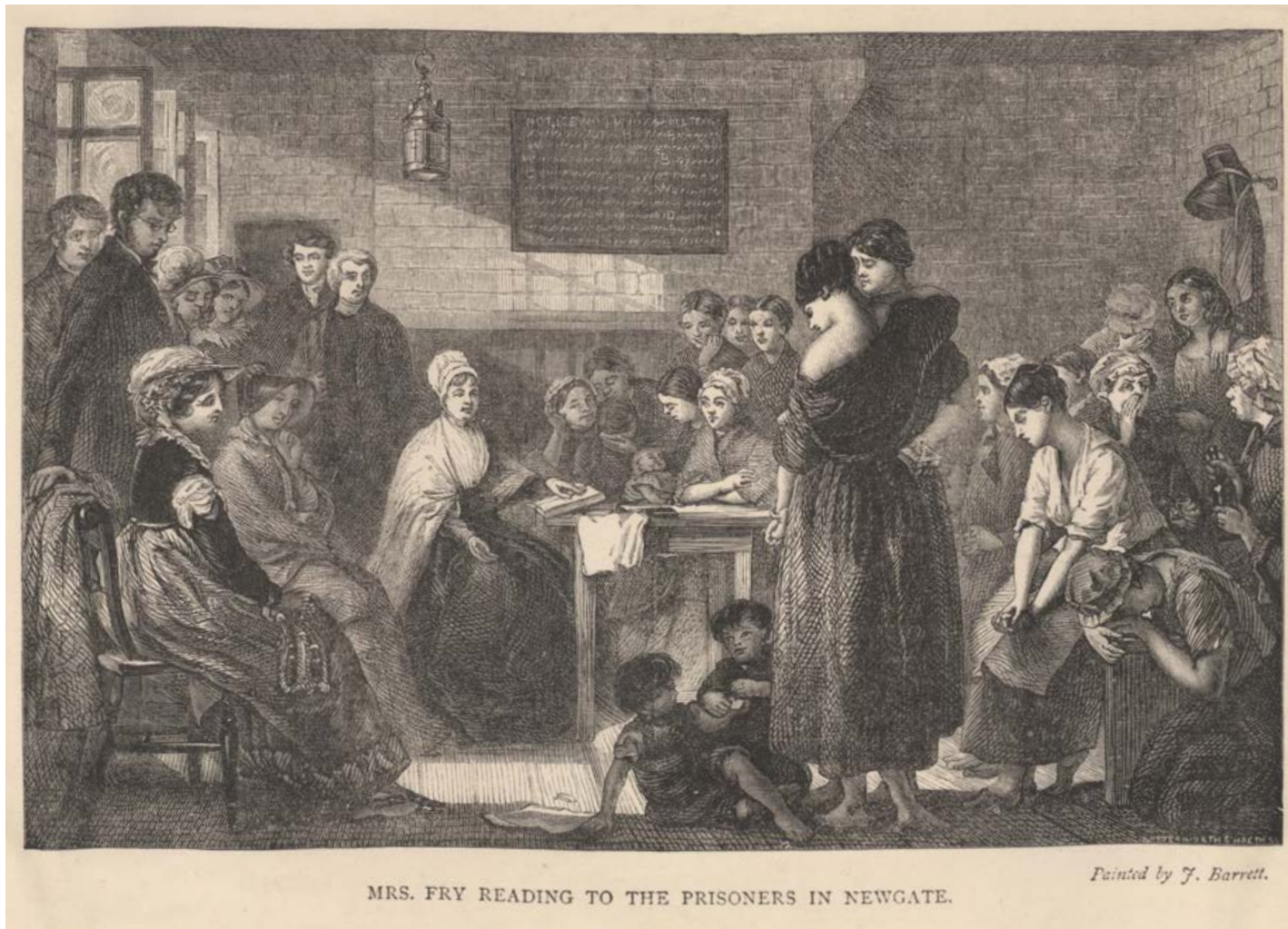
On 5th November 1605 Londoners were encouraged to celebrate the King's escape from assassination by lighting bonfires, provided that:

"this testimonye of joy be carefull done without any danger or disorder."

An Act of Parliament was passed soon afterwards, declaring 5th November as a day of thanksgiving throughout the country for "the joyful day of deliverance". This is why we still light bonfires and have lit fireworks on 5th November every year since. Many people even build models of Guy to burn on the bonfire.



FACT SHEET 3: ELIZABETH FRY AND NEWGATE PRISON



MRS FRY READING TO THE PRISONERS IN NEWGATE
Jerry Barrett © Bodleian Libraries CC4.0



FACT SHEET 3: ELIZABETH FRY AND NEWGATE PRISON

Elizabeth Fry (nee Gurney) was born in 1780 into a well-to-do Quaker family in Norwich. The Quakers are religious people, a Christian movement founded in 1650 and devoted to peace. Elizabeth grew up in a very strict household and left home when she married a banker. She was very wealthy and had 11 children.

Elizabeth became well-known because of her work in prisons, especially Newgate Prison. Elizabeth often visited prisoners in Newgate, and encouraged other ladies to do as well. She viewed prisoners as people, not just people who broke the law, and felt that they should be treated with kindness.

Newgate Prison was once the most notorious prison in London. It was first built in the 12th Century by King Henry II but remained in use all the way through to 1902. The prison itself was originally built onto a gate on the old Roman wall (hence the name "Newgate") although it was rebuilt numerous times during its lifespan.

For over 600 years the prison was renowned for its appalling conditions. Many prisoners were kept in underground, basement holding areas with no light or ventilation. It was said that the prison was so dirty that the floors crunched as you walked due to all of the lice and bedbugs. The women's area was said to be equally as awful, crowded with drunk women, sometimes deranged, in leg irons and often with their children.

Public executions were often held in Newgate Prison, drawing large audiences until they were abandoned in 1868. It is said that between 1790 and 1902 over one thousand people were put to death outside of Newgate prison, on the Old Bailey Road.

The church of St Sepulchre-without-Newgate also had a part to play in the executions. At midnight on the eve of an execution, a bellman would walk along the prison tunnels ringing 'twelve solemn towels with double strokes' on his hand bell whilst chanting:

*"All you that in the condemned hold do lie,
Prepare you, for tomorrow you shall die;*

*Watch all and pray, the hour is drawing near
That you before the Almighty must appear;*

*Examine well yourselves, in time repent,
That you may not to eternal flames be sent:*

*And when St. Sepulchre's bell tomorrow tolls,
The Lord above have mercy on your souls."*

Elizabeth was so upset by the conditions at Newgate prison that she decided to try and reform the system. She was the first woman ever to campaign for better prisons. In 1817 Elizabeth founded the 'Ladies' Association for the Reformation of the Female Prisoners in Newgate'. They visited the prison and provided materials for the women to make clothes and items to sell.

From 2001 to 2016 Elizabeth Fry was depicted on the Bank of England £5 note, reading to prisoners at Newgate.



RESOURCE 1: STORYBOARDING THE GUNPOWDER PLOT

The Tower

The King is furious. He demands that Guy Fawkes reveals the names of anyone else involved with the plot but Guy refuses. He is sent to the basement of the White Tower at the Tower of London where he is tortured until he eventually gives the names of the others involved in the plot.



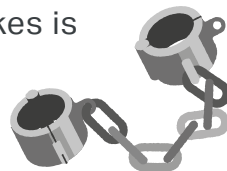
Renting a house

In May 1604 Guy Fawkes and Thomas Percy find a house very near to Parliament and rent it. They then begin to dig a tunnel underground from their rented house to Parliament to smuggle in the gunpowder. They dig, and they dig and they dig...



Guy Fawkes is caught

On the afternoon of 5 November 1605, Guy Fawkes takes up his position in the cellar with his matches and waits for the ceremony to start. Having read the letter to Lord Monteagle, soldiers come to check the cellar. At first they find nothing and question Guy Fawkes. But they return to check again and find the gunpowder. Guy Fawkes is arrested and taken to see the King.



The letter

Lord Monteagle is given a letter at dinner on October 26th 1605. A tall, mysterious stranger had handed it to his servant in the street earlier in the evening. He takes his mystery letter to show to friends in Government, but they are slow to act. King James I is away hunting and many Ministers are suspicious that it is a fake.





RESOURCE 1: STORYBOARDING THE GUNPOWDER PLOT CONTINUED

Laying the gunpowder

In March 1605 the plotters have a stroke of luck. A cellar underneath the House of Lords comes up for rent. They abandon their digging and rent the cellar. They put 36 barrels of gunpowder in the cellar ready for the Royal State Opening of Parliament.



Plotting

Robert Catesby gathers a group of Catholic men to help him create a plot to blow up King James I and the House of Lords at the Royal State Opening of Parliament on 5 November 1605.



Trial and executions

The trial of eight of the plotters begins on Monday 27 January 1606. They are all found guilty and sentenced to death. All are executed, after being hung, drawn and quartered. All except Guy Fawkes who jumps off the gallows before he can be executed and breaks his own neck to avoid being cut down while still alive and tortured.





RESOURCE 2: CRIME AND PUNISHMENT THROUGH THE AGES

Cut out the different events and place them into a timeline. Blank event boxes have been supplied so you can add other things you may have learned on your visit.

1605

Guy Fawkes is tortured in the White Tower basement.



1606

Guy Fawkes is executed.



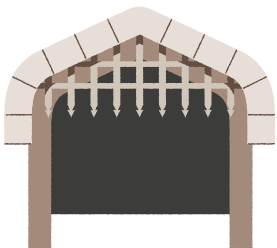
1817

Elizabeth Fry founded the 'Ladies' Association for the Reformation of the Female Prisoners in Newgate'.



1100s

Newgate Prison was built.



1868

Executions were abandoned at Newgate Prison.



1264

King Henry II creates 'Parlement'.



1400

Parliament is divided into two Houses: The House of Commons and the House of Lords.





RESOURCE 2: CRIME AND PUNISHMENT THROUGH THE AGES CONTINUED

<p>Date</p> <hr/> <p>Event</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>Date</p> <hr/> <p>Event</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>Date</p> <hr/> <p>Event</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>Date</p> <hr/> <p>Event</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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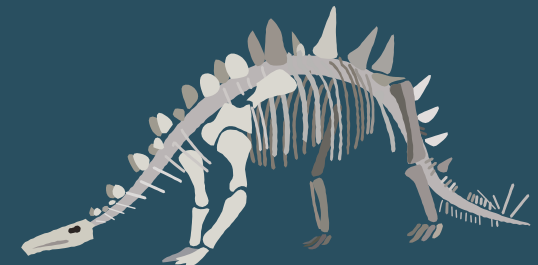
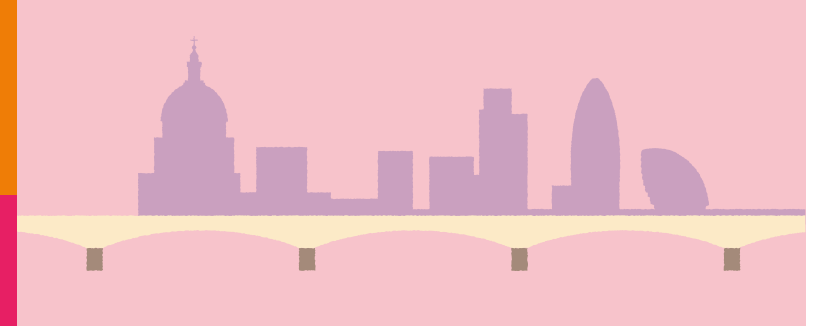


FOSSILISED LONDON

SCIENCE

Learning objectives

- ◉ To describe in simple terms how fossils are formed when things that have lived are trapped within rock.
- ◉ To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
- ◉ To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- ◉ To report on and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.



FOSSILISED LONDON

Discover

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Resource 1: Fossil Photographs 78

Fact sheet 2: Charles Darwin and Natural Selection 88

Factsheet 3: Scientific Posters 93

Resource 2: Scientific Poster Template 94

FOSSILISED LONDON DISCOVER



Activity 1

(Duration: 60 mins)

Setting the scene

Share the information on the factsheet 'Fossilised London' with the pupils. Discuss the formation of fossils and the work of a palaeontologist.

Ask pupils to share any examples of fossils that they have seen before.

Do any of them own fossils?

Where were they found?

What can they tell you about the animal it came from?

Activity: Analysing London's fossils

Share the first photograph from the Resource 1: Fossil Photographs (page 78) on the IWB. Invite and scaffold suggestions from pupils that contribute to answering one or more of the following questions, relating to what the photograph tells us about:

- ⦿ What kind of animal do you think this fossil belonged to?
- ⦿ What do you think this animal ate?
- ⦿ What kind of environment might it have lived in?
- ⦿ Where in the world do you think this fossil came from?

Focus on exploring the skeletons of the animals presented, as well as any visible teeth, to encourage pupils to explore ways in which the animal hunted for food, and what kind of food the animal might have eaten.

Group the pupils and distribute the remaining photographs from the 'Fossil Photographs' resource, one for each table. Display the above questions on the IWB and ask pupils to discuss answers to them in their groups. Then feedback via the whole class so that each pupil is able to see the array of fossils explored in the group activity.

Share the information given at the end of the 'Fossils Photographs' resource about each animal and discuss how many characteristics about the animal they identified correctly.

FOSSILISED LONDON DISCOVER



Activity 2

(Duration: 90 mins)

Setting the scene

Revisit the information explored in the previous session regarding fossilisation. What can pupils remember about how fossils are formed? What can they tell you about the animal that has been fossilised?

AN INTRODUCTION TO EVOLUTION

Explain that in this session, pupils will learn about the theory of evolution and the way in which fossils can be used to explore ways in which animals have adapted to their environments.

Share the resource Factsheet 2: Charles Darwin and Natural Selection (page 88) with the pupils. Explain theory of natural selection leading to evolution – species have changed over time to adapt to their changing environments and survive.

Share the example of the Orchid Mystery on page 91. Explain that we can identify changes in species through comparing fossils that we know show animals/plants from different time periods.



FOSSILISED LONDON EXPLORE

Explore activities: Fossilised visits

We would encourage you to focus your visit on enabling the pupils to experience a range of different fossils, of both plants and animals. We recommend that your visit allows some opportunity for pupils to handle fossils, as so far they might have only analysed fossils through photographs.

Some options for visits are given here:



WATERLOO BRIDGE FOSSILS
©Everything Dinosaur



Horniman Museum

100 London Road, Forest Hill, SE23 3PQ
020 8291 8686
schools@horniman.ac.uk

This museum has a large collection of fossils, many of which can be viewed in their general exhibitions. However, the museum also offers a wide-ranging educational offer to schools. There is a particular learning session for KS2 pupils on 'Fantastic Fossils,' which includes object handling.

www.horniman.ac.uk

FOSSILISED LONDON

EXPLORE



Natural History Museum

Cromwell Road, SW7 5BD
Bookings 020 7942 5555

The Natural History Museum has one of the largest collections of plant and animal fossils with a large number of fossil exhibitions, from fish to dinosaurs. There are also fossil-focused educational workshops for schools, all of which involve fossil handling. Some topic-appropriate sessions include Super Stegosaurus Workshop for KS1, 'Dino Scene Investigation for KS2,' and Evolution for year 6. The Natural History Museum also has an exhibition on Human Evolution.

www.nhm.ac.uk



ERYOPS MEGACEPHALUS

© The Trustees of the Natural History Museum, London

FOSSILISED LONDON EXPLORE



London Landmarks

Fossils can be seen from a number of London's landmarks, which could form a nice walking tour visit.

Also students should look out for fossil sea-creatures in the floors of many local shopping malls, (such as the St Anne's Centre in Harrow) or other buildings and monuments. The below video link gives a good overview of the London Landmark fossils described above:

www.bbc.co.uk/news/science-environment-19574619

The following places are recommended for fossil viewing:

Waterloo Bridge

There are good examples of oyster shells and algae in the limestone on the bridge itself.

en.wikipedia.org/wiki/Waterloo_Bridge

St Paul's Cathedral

The steps leading up to the Cathedral display some good examples of fossilised cephalopods.

www.stpauls.co.uk

The Guildhall/BBC Broadcasting House

Careful examination of the stone blocks that make up the face of the building opening out into the main courtyard offers fossils of 'Portland screws' (a type of snail).

www.bbc.co.uk/broadcastinghouse

Paddington Station

The paving stones display many good examples of cephalopods (ancient relatives of squid).

en.wikipedia.org/wiki/London_Paddington_station



ST PAUL'S CATHEDRAL
©Everything Dinosaur



BBC PORTLAND PLACE
©The Royal Geographical Society

FOSSILISED LONDON

CONNECT



(Duration: 2x 60 min sessions)

Setting the scene

Explain that in this session, pupils will choose an aspect of their learning so far in this topic, research it further and produce a scientific poster in groups. Recap on the learning covered so far in this topic – the formation of fossils, Charles Darwin and Evolution, the theory of Natural Selection and whatever you may have studied in your explore visit.

Activity: Making a scientific poster (Session 1)

Share the information on Resource Factsheet 3: Scientific Posters (page 93) with the pupils. You may like to show pupils some examples of scientific posters online/have collected some for the classroom to look at with the pupils. You might like to follow the weblink in the factsheet and explore some examples of scientific posters and run through some general presentation guidelines.

The factsheet has information about the task that you can share with pupils. You'll need to group them into small groups of about 6 – 8 and they'll need to work together to design and produce the poster.

Ask the groups to identify and share what they're going to focus their poster on and to make a plan as to how they're going to work together to create it. Share the resource Resource 3: Scientific Poster Template (page 95) with the pupils – give each group a copy of the template to fill in. You might like to give each group two copies of the template, one for drafting the content and one for the final design.

Pupils to use the rest of the time available in this session to plan their poster and begin designing the poster. You might like to assign the pupils homework to continue working on the poster before the next session.

FOSSILISED LONDON

CONNECT



Activity: Making a scientific poster (Session 2)

Pupils to spend the first 30 minutes of this session finishing their posters. Remind pupils of the criteria outlined in Factsheet 3: Scientific Posters (page 93).

After 30 minutes, explain that the pupils will host a conference in the classroom through which groups will be able to ask and answer questions relating to the posters created. Display the set of posters at different locations in the classroom – you might like to display them on the classroom walls or on different tables.

Pupils to move around the classroom, look at each other's posters and provide feedback relating back to the criteria outlined in Factsheet 3: Scientific Posters (page 93). This could be done with pupils writing a 'what went well' and 'even better if' on a Post-it note as they rotate around the different posters. In addition, at all times one student from the group should stay with the poster, to answer questions from their peers. This can be rotated, so all pupils get a chance to be the 'researcher' who fields questions and also to view others' posters and ask their peers questions.

FACT SHEET 1: FOSSILISED LONDON

London might not be the first place that springs to mind when thinking of great places to see fossils of plants or animals. However, many fine examples of fossils can be found in our capital.

Beneath the skyscrapers and impressive buildings, lie many layers of the fossilised remains of plants, animals and humans which are waiting to be uncovered.

Over the years, many exciting fossils have been uncovered in some of the most unlikely places across London. There are also many examples of fossils that have been uncovered across the UK in London's buildings – we can see lots of them just walking across Waterloo Bridge or in Paddington station!

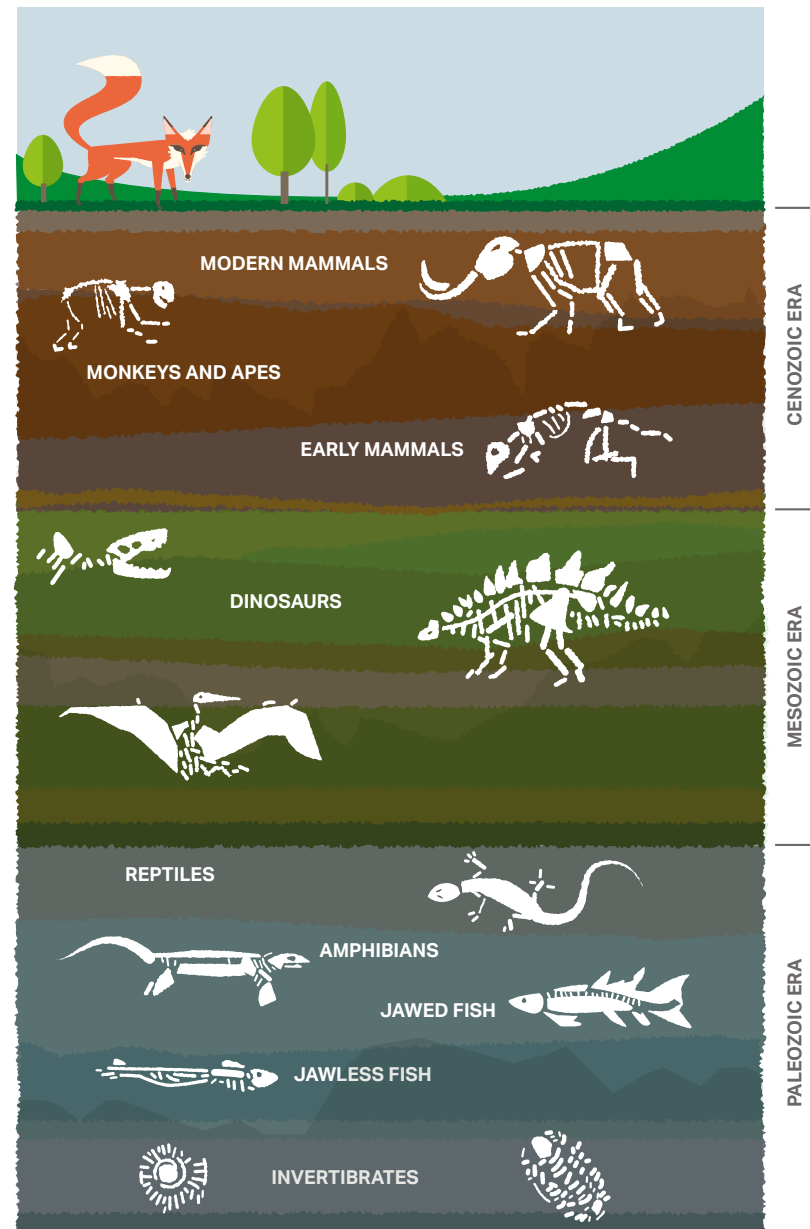


Diagram not to scale





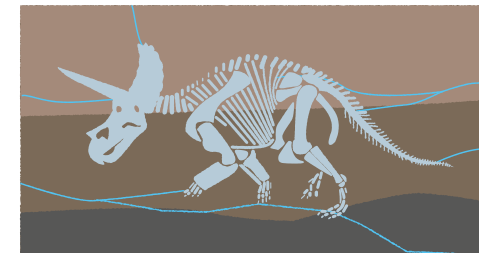
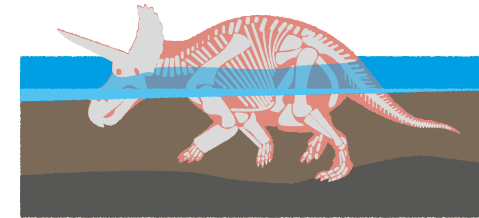
FACT SHEET 1: FOSSILISED LONDON

What are fossils?

Fossils are formed from the remains of plants or animals which have died and been buried in specific conditions. When an animal or plant dies it usually decays and rots away. However, sometimes if the conditions are just right it can be buried quickly and it can be fossilised.

There are many different types of fossils but the most common type is a 'mould and cast' fossil. The steps that make this type of fossil with an animal are:

1. The animal dies and its body settles on the floor of a marsh, or the sea, usually in a place where there is lots of water. The body usually decays and leaves behind the animal's skeleton
2. Over time, sediment (mud or sand) begins to cover the animal's skeleton
3. When the skeleton is completely covered, it begins to harden and form a 'cast' around the animal
4. Over many more years, the water surrounding the cast begins to dissolve the bones of the skeleton, leaving a cavity, or hole, which follows the exact shape of the skeleton.
5. Water that is rich in minerals enters the cavity and the mineral deposits begin to form a second 'cast' of the skeleton, which looks and feels like hard rock and is known as a 'fossil.'
6. Millions of years later the land above the fossil may erode away, exposing the fossil at the surface. Palaeontologists analyse it to learn about the animal that died millions of years ago.



FACT SHEET 1: FOSSILISED LONDON



What is a Palaeontologist?

Palaeontologists are scientists who study the history of human, plant and animal life. They spend lots of time looking for and carefully digging up fossils to find out what it can tell us about where the fossil came from, what kind of animal it might have belonged to, what kind of environment it might have lived in and what it can tell us about the Earth. Because animals/plants are fossilised underground, the deeper we dig the older the fossils are. So, by comparing fossils from different depths in the Earth's surface, we can discover how animals/plants have changed over time.

We can also use other types of fossils, such as footprints, to give us valuable information about how an animal lived.

Crossrail Fossils

Since 2009, Europe's biggest single construction project, Crossrail, has been underway. Engineers have been digging vast tunnels to build a new underground train line in and out of London. Their digging has resulted in many interesting finds. In 2011, over 4,000 prehistoric mammal fossils were found under some sewers in hidden tunnels deep under the city.







RESOURCE 1: FOSSIL PHOTOGRAPHS

The photographs of these fossils have all come from the Natural History Museum here in London. They show fossils of animals found all over the world, living in very different conditions. Your task is to study the photograph(s) given to your group and try to answer the following questions by looking at its features:




- ® What kind of animal do you think this fossil belonged to?
- ® What do you think this animal ate?
- ® What kind of environment might it have lived in?
- ® Where in the world do you think this fossil came from?



RESOURCE 1: FOSSIL PHOTOGRAPHS: INFORMATION

	What kind of animal do you think this fossil belonged to?		What do you think this animal ate?	What kind of environment might it have lived in?	Where in the world do you think this fossil came from?
1	Ichthyosaurus Intermedius: Meaning 'fish lizard,' this mammal originates from the late Triassic and early Jurassic period.		Its diet mainly consisted of fish and squid. It had huge sensitive eyes which enabled it to hunt by sight.	Ichthyosaurus lived in water and had a fleshy fin which allowed it to swim easily.	Fossils have been found in England, Germany, Greenland, and Alberta, Canada.
2	Tuojiangosaurus , meaning "Tuo River lizard": herbivorous and had armour plates. From the late Jurassic period.		Enormous plant eater. It would have eaten low-lying, ground vegetation.	Regularly roam in herds of up to 40 individuals or more.	Fossils have been found in China.
3	Tsintaosaurus , meaning "Qingdao lizard" or often called, "the Unicorn Dinosaur."		It had a battery of powerful teeth which it used to chew vegetation and tough foliage.	Tsintaosaurus was a heavily-built dinosaur that stood upright on its hind legs and probably lived in herds.	Fossils have been found in China.
4	Stalk-eyed trilobite . The specimen dates back to the Middle Ordovician period.		Its mouth was on the underside which meant that it ate what it could find on the sea floor.	They all lived in the sea: some burrowed in the mud, some crawled on the surface of the seabed and others swam about in open water or inhabited reefs.	Fossils have been found in Wolchow River, near St Petersburg, Russia.

RESOURCE 1: FOSSIL PHOTOGRAPHS: INFORMATION CONTINUED

	What kind of animal do you think this fossil belonged to?		What do you think this animal ate?	What kind of environment might it have lived in?	Where in the world do you think this fossil came from?
5	Pterodactyl meaning "winged finger." It had wings formed by a skin and muscle membrane stretching from its elongated fourth finger to its hind limbs. Dated to the late Jurassic Period.		It was a carnivore and probably preyed upon fish and other small animals.	It was a flying reptile.	Fossils have been found in Bavaria, Germany.
6	Eryops Megacephalus , an extinct amphibian that lived during the Early Permian period.		It fed on a mixture of fish and invertebrates, which it captured and held using inward-facing teeth.	Primitive amphibian that lived in swamps.	Fossils have been found in North America.
7	Cryptoclidus Eurymerus . Its name, meaning "hidden clavicles", refer to its small, practically invisible clavicles buried in its front limb girdle. Lived during the Middle Jurassic Period.		Ate a diet of small, soft-bodied animals such as squid and shoaling fish. May have used its long, inter-meshing teeth to strain small prey from the water, or perhaps sift through sediment for buried animals.	Aquatic carnivore. Divided its time between the water and land.	Fossils have been found in England, France, South America

RESOURCE 1: FOSSIL PHOTOGRAPHS



ICHTHYOSAURUS INTERMEDIUS

© The Trustees of the Natural History Museum, London

RESOURCE 1: FOSSIL PHOTOGRAPHS



TUOJIANGOSAURUS

© The Trustees of the Natural History
Museum, London

RESOURCE 1: FOSSIL PHOTOGRAPHS



TSINTAOSAURUS

© The Trustees of the Natural History Museum, London

RESOURCE 1: FOSSIL PHOTOGRAPHS



STALK-EYED TRILOBITE
(ASAPHUS (NEOASAPHUS)
KOWALEWSKII)

© The Trustees of the Natural
History Museum, London

RESOURCE 1: FOSSIL PHOTOGRAPHS



PTERODACTYL KOCHI

© The Trustees of the Natural History Museum, London

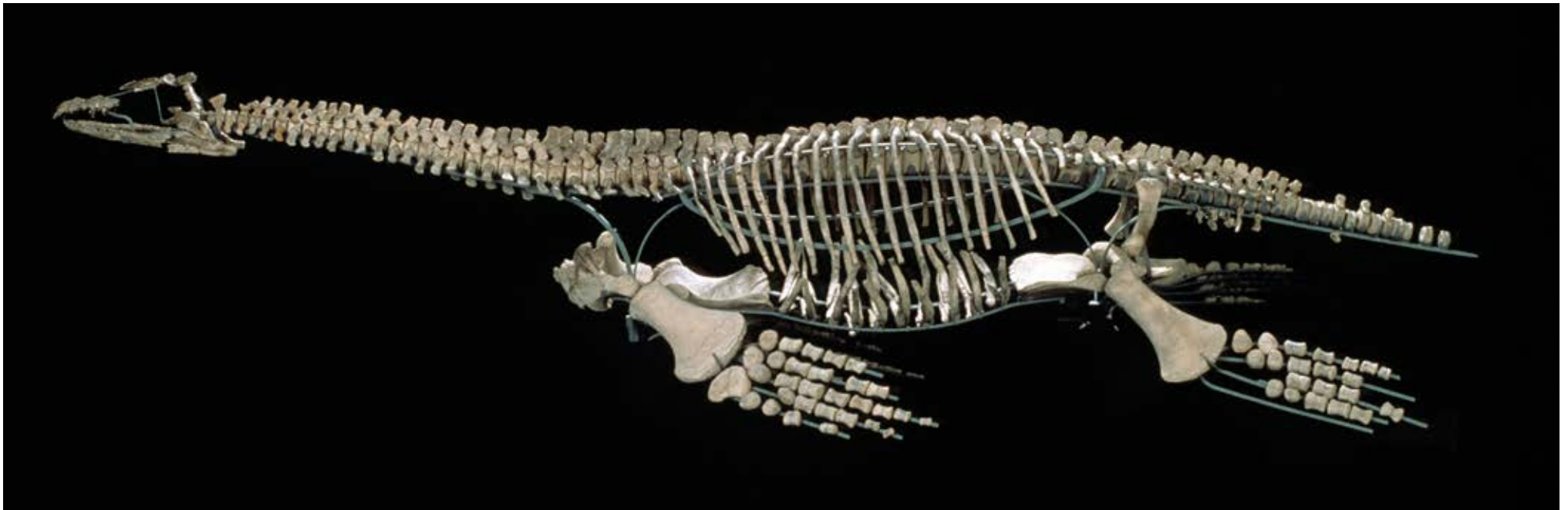
RESOURCE 1: FOSSIL PHOTOGRAPHS



ERYOPS MEGACEPHALUS

© The Trustees of the Natural History Museum, London

RESOURCE 1: FOSSIL PHOTOGRAPHS



PLESIOSAUR (CRYPTOCLIDUS EURYMERUS)

© The Trustees of the Natural History Museum, London

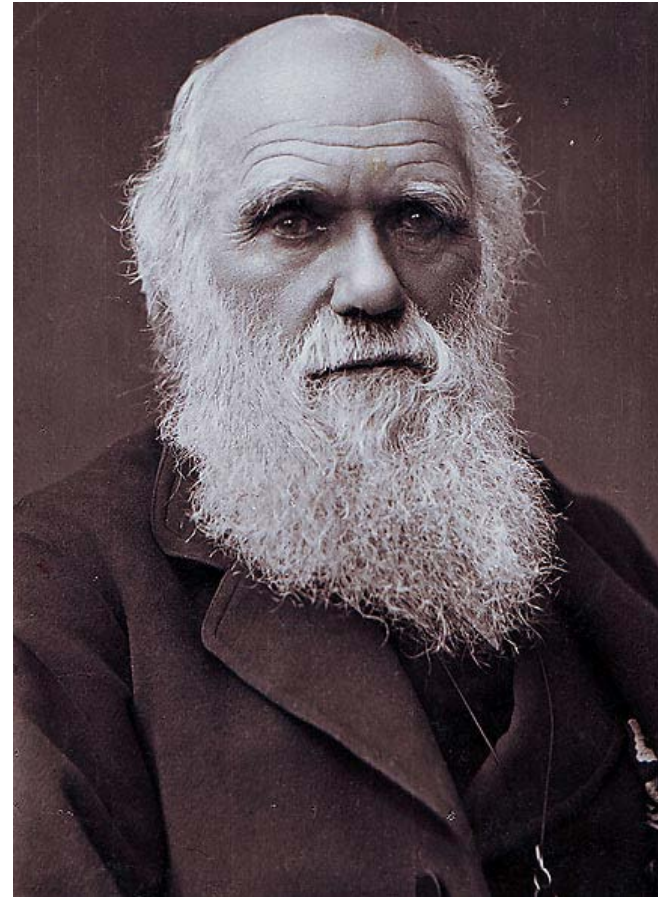


FACTSHEET 2: CHARLES DARWIN AND NATURAL SELECTION

Who was Charles Darwin?

Charles Darwin was born in Shrewsbury, England on 12th February 1809. He was born into a wealthy family as his father was a Doctor. Charles was one of six children, with four of his siblings older than him. Unfortunately, his mother died when he was 8 years old; she had been suffering with stomach problems for a number of months. Charles was interested in experimenting at a young age. When he was still a boy, Charles set up a chemical laboratory with his best friend Erasmus in his garden.

Charles' father wanted him to be a doctor but he was afraid of blood! Instead, his father sent him to Cambridge University to study Theology and become a priest, but Charles wasn't interested in that either. Some of the professors at Cambridge recognised his interest in nature, mainly because he was fascinated with collecting beetles, and encouraged him to study geology. He did very well in his exams and went on to accomplish great things as a scientist.



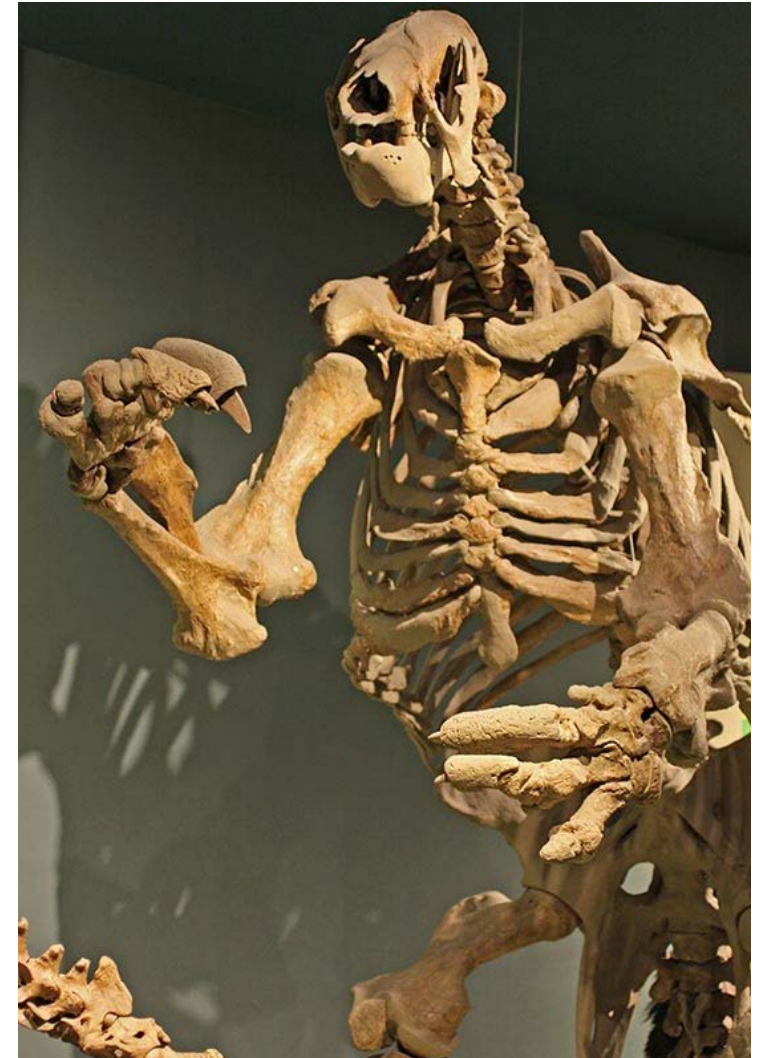
CHARLES DARWIN, 1881
photo Herbert Rose Barraud

FACTSHEET 2: CHARLES DARWIN AND NATURAL SELECTION



Voyage on the Beagle

In 1831, at the age of 22, Charles was asked if he would like to take part in a 5 year voyage on the Beagle, which was a survey ship owned by the Navy. Charles accepted and went on to visit numerous exotic countries, from Brazil to Australia. Charles spent some of his time exploring the Galapagos Islands and analysing the wide variety of animal and plant life living on the islands. He was fascinated by the rich and diverse life on the islands and wanted to find out how so many different species could survive there. Across his many voyages, Charles thought it was strange that he was seeing so many new types of plants and animals that he had not come across anywhere before. He also found some very interesting fossils of 10 foot tall sloths and huge cow-sized armadillos that provided the idea that life on Earth was very old.



GIANT GROUND SLOTH
© Abby Telfer

FACTSHEET 2: CHARLES DARWIN AND NATURAL SELECTION



Darwin's Theory of Natural Selection

When Darwin returned home from his voyage on the Beagle he spent many months examining the specimens he had collected during his time away. He had drawn over 300 sketches and written over 1000 notes about the life that he had observed!

It took Darwin until 1859 (23 years since his return from the voyage) to publish a book describing what he had seen. His book was called *The Origin of Species*, and it presented an explanation of why there seemed to be so much diversity across the countries and islands that he had visited. His theory was called 'Natural Selection.'

The theory suggested that species were forced to adapt to survive in changing environments and those that were able to adapt most successfully survived, whilst those that failed to adapt died out – known as 'survival of the fittest.' Species that fail to survive because they're unable to adapt to their surroundings 'become extinct.' Palaeontologists can use fossils from different time periods to explore how an animal might have adapted to survive, by comparing similar fossils and looking for changes in the animals' remains.

Darwin's theory was very controversial at the time it was published because most people believed that God created the earth and the species living on it. He received a lot of criticism from people who felt that his views were anti-Christian.

However, Darwin's theory of Natural Selection is now one of the most widely accepted theories in science and he has received many awards and prizes for his work. In fact, one of the colleges at Cambridge is now named after him and he is on the English £10 note! Charles spent his later years living in Down, which is now part of the London Borough of Bromley and is buried in Westminster Abbey.



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An Example of Natural Selection

The Orchid Mystery

It's a well-known idea that "There's no such thing as a free lunch."

For example, when flowers expend the energy to produce a sugary nectar drink for insects, or even for small vertebrates, then you can bet there is a motive for the plants to do this. Sometimes the nectar is in a little 'well' called a nectary and must be sipped up.

The nectar is a lure to tempt organisms to come in close to the flower, often to a very specific spot, so that the drinker gets brushed with pollen from that flower. When the drinker leaves, the pollen gets a lift, hopefully to another flower of the same kind, so that the flower's work (pollination) is done.

So why would an orchid produce flowers with nectaries so long and thin that no animal can possibly reach down to the very base where the nectar is, and actually drink it?

One orchid which does just that grows up trees in Madagascar and is called *Angraecum sesquipedale*. "Angraecum" is from a local word for orchid. "Sesquipedale" means "one-and-a-half foot long" although the nectaries are really between 27-43cm long.



ANGRAECUM SESQUIPEDALE, MADAGASCAN ORCHID
© The Trustees of the Natural History Museum, London

FACTSHEET 2: CHARLES DARWIN AND NATURAL SELECTION

In 1862 Charles Darwin received a box of various orchids from a well-known grower, and he was fascinated by the strange sesquipedale. Darwin reasoned that there must be an organism which could drink from such a nectary. Since the orchid's blooms were white and only fragrant at night, he predicted that the pollinator must be a kind of moth, one which had a proboscis (tube-shaped mouthpart) even longer than these strange nectaries.

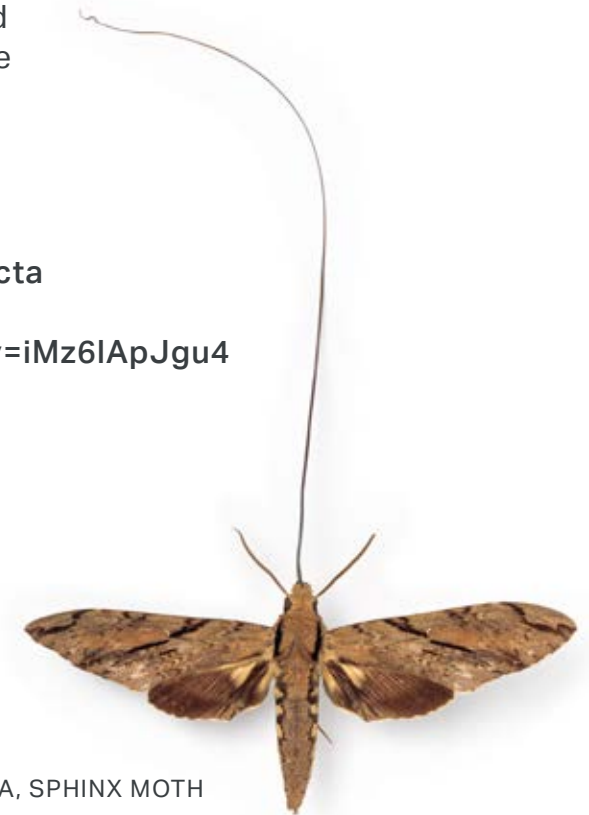
No such moth was known and not everyone agreed with Darwin's prediction. He reported that he had been ridiculed by some other scientists. He suggested that perhaps the nectary and the proboscis had not always been so long- it could have been that the nectary and proboscis each got longer over many generations so that the moth could reach the nectar. Today we call this kind of evolutionary relationship between two organisms "coevolution" but at the time, no evidence for this relationship had been found.

In 1903, years after Darwin's death, a new type of moth was discovered and named as *Xanthopan Morganii Praedicta*. The wingspan was 16cm maximum, but its proboscis was gigantically long compared with its own body size, certainly long enough to drink from the sesquipedale nectary. Finally there was an insect that could be the pollinator Darwin had imagined. It is believed that the moth's name "praedicta" was chosen in honour of the idea that it had been predicted before it was actually found.

It was not until 1992 that the praedicta moth was actually observed drinking from, and pollinating, the sesquipedale orchid. Night vision equipment was used to film the process, and it recorded something unexpected. The moth behaved strangely while drinking from the nectary. It hovered, moving from side to side very rapidly. This was called "swing-hovering" and scientists had no idea why it behaved this way.

So why has this nectary and this proboscis evolved to be so very long? And why the strange behaviour while drinking? You can go to this website to learn more:

Xanthopan morgani praedicta
The Darwin's Moth:
www.youtube.com/watch?v=iMz6lApJgu4



XANTHOPAN MORGANII PRAEDICTA, SPHINX MOTH
© The Trustees of the Natural History Museum, London

FACTSHEET 3: SCIENTIFIC POSTERS



A scientific poster is a visual presentation of scientific research, usually including a heading, name of researcher, name of research institute, text, tables and illustrations displaying the results of the research. It is used at scientific conferences, as well as in lectures at Universities. A special session is usually set aside for the presentation of posters at conferences. The researchers often stand nearby to answer questions from other conference participants about their poster and their piece of research.

A scientific poster format is an excellent way of presenting pupils' scientific work. It sets out all the stages of the research and the findings gathered in a clear and interesting way. The process requires thought and planning on selection of information and on design. Also when displaying their posters in a 'conference' style, pupils can answer and ask questions.

More information about scientific posters can be found here:
bit.ly/1LFEc57

Your Task

You are asked to design and create a scientific poster to explain an aspect of fossilisation that you have explored in this topic. You might like to explain the theory of Natural Selection, or explain how fossils are created, or you might like to choose something that you explored on your visit. Alternatively, you might like to research something new in your group and report back your findings.

Your poster will need to be:

- ⊗ Clear and easy to read
- ⊗ Have a clear title and sections
- ⊗ Be designed to be read from left to right (like a newspaper)
- ⊗ Include your names and your school name
- ⊗ Involve input from everyone in the group
- ⊗ Include scientific terms and descriptions

It is important to choose websites that you know give reliable information. You might like to start with the websites of some museums or scientific organisations, for example the RGS geological timeline:

www.bgs.ac.uk/discoveringGeology/time/timeline/entertimeline.html

or the Natural History Museum website, particularly the Dino-Directory:

www.nhm.ac.uk/discover/dino-directory/index.html



RESOURCE 2: SCIENTIFIC POSTER TEMPLATE

TITLE		Logo (School or team logo)
Authors (the names of the people in your group)		
Background information (a line or two about the topic you're discussing)	Research process (where did you conduct your research, online (if so, which sites?) On your explore visit? How did you look for relevant information?)	More detailed information (a line or two about the topic you're discussing)
Illustrations (you might like to use photographs or you can draw your own illustrations to help with your discussion)	Conclusions (what have you learned from your research? Provide a summary of your key points).	

CREDITS

The GLA would like to thank the following organisations for their contribution:

Our collaborators on
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**ART ON THE
UNDERGROUND**



**Poems on the
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Special thanks to **Sarah Jane Taylor**

Design by **www.thirteen.co.uk**

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June 2016

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