The Living Levels Learning Resource

A teacher's resource for primary and secondary education

2020 update

Lefelau Byw
Living Levels

CRONFA DREFTADAETH
HERITAGE FUND

Rationale

What is the Living Levels?

The Living Levels is a National Lottery Heritage Funded Landscape Partnership Scheme which aims to reconnect people and communities to the Gwent Levels landscape and provide a sustainable future for this historic and special area.

What is this resource?

This unique learning resource has been created for teachers who are working with children and young people in primary and secondary education. The information and activities provide you with the context you need for teaching children about their local area, both in the classroom and outdoors.

How is the resource designed for me?

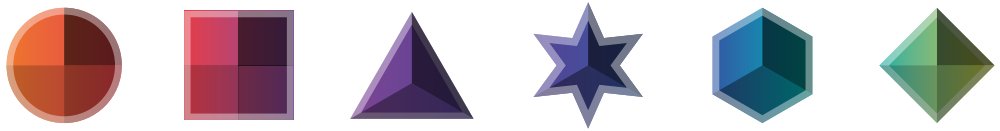
The resource is split into six parts each based on a curious question and theme. Within each part there are sections that cover different aspects of the question. You will find detailed information and background for each question followed by suggestions of activities to do and places to go, related websites to visit and books to read. At the end of each part there is big picture for you to analyse and discuss with your class.

The six curious questions are:

- Part One: How has the landscape of the Gwent Levels changed over time?
- Part Two: How does water on the Gwent Levels affect our lives?
- Part Three: Wildlife on the Gwent Levels – How can we enjoy and protect it?
- Part Four: What lies below the water beyond the sea wall?
- Part Five: How were the Gwent Levels used to produce food?
- Part Six: How have people, past and present, moved around the Gwent Levels?

Activities

Throughout the resource there are activities indicated in a contrasting colour box. At the bottom of each you will find a tab indicating what key skills are involved. You will also see between one and six of **these colour shields** which relate to the **Areas of Learning and Experience**.



Introduction

When beginning to learn about the Gwent Levels there are several inspiring videos and resources to watch to help build imagination.

In the video gallery, **livinglevels.org.uk/video-gallery**, there are two 'Autumn and winter' videos showcasing the wildlife, people and landscapes across the Gwent Levels. Each has a different background music track which may change how you and your students listen and watch the videos.

What feelings do each video evoke? How does the different music change how you view or interpret what you are seeing? How do you feel after each video? What wildlife and features do you remember while watching them?

Starling murmuration
CHRIS HARRIS

Aerial Photography

Prince of Wales Bridge with Black Rock on the right
LIVING LEVELS LANDSCAPE PARTNERSHIP

We have a stunning selection of aerial photos of the Gwent Levels available on the Living Levels website, livinglevels.org.uk/gallery. Here is just a selection which can be used to show the landscape, geography and features of the area.

Facing south-west, Magor Marsh in bottom-right
LIVING LEVELS LANDSCAPE PARTNERSHIP

Facing south-west towards Goldcliff and Newport Wetlands, Cardiff on the horizon
LIVING LEVELS LANDSCAPE PARTNERSHIP

Mouth of the River Usk and Alexandra Docks, Newport
LIVING LEVELS LANDSCAPE PARTNERSHIP

Life on the Levels

Life on the Levels celebrates the cultural heritage of this unique landscape by recording the stories of people who have lived, worked and played on the Levels.

Life on the Levels forms an oral history of one of the country's most hidden and overlooked areas, from the 1930s - 2000s, capturing voices and memories in danger of being lost.

To read personal accounts and watch videos of people's own memories and experiences visit livinglevels.org.uk/life-on-the-levels

"Jason the lion loved ice cream."

Margaret Fin
PHOTO BY EMMA DRABBLE

"I remember the German bombers going over."

Stephanie Davies
PHOTO BY NANETTE HEPBURN

"We spent half our life on the moors."

Iris & Ivy
PHOTO BY EMMA DRABBLE

"Everybody knew everyone else."

Douglas Howells
PHOTO BY EMMA DRABBLE

"You've got to respect the land."

Andrew Prosser
PHOTO BY NANETTE HEPBURN

Sculpture Trail

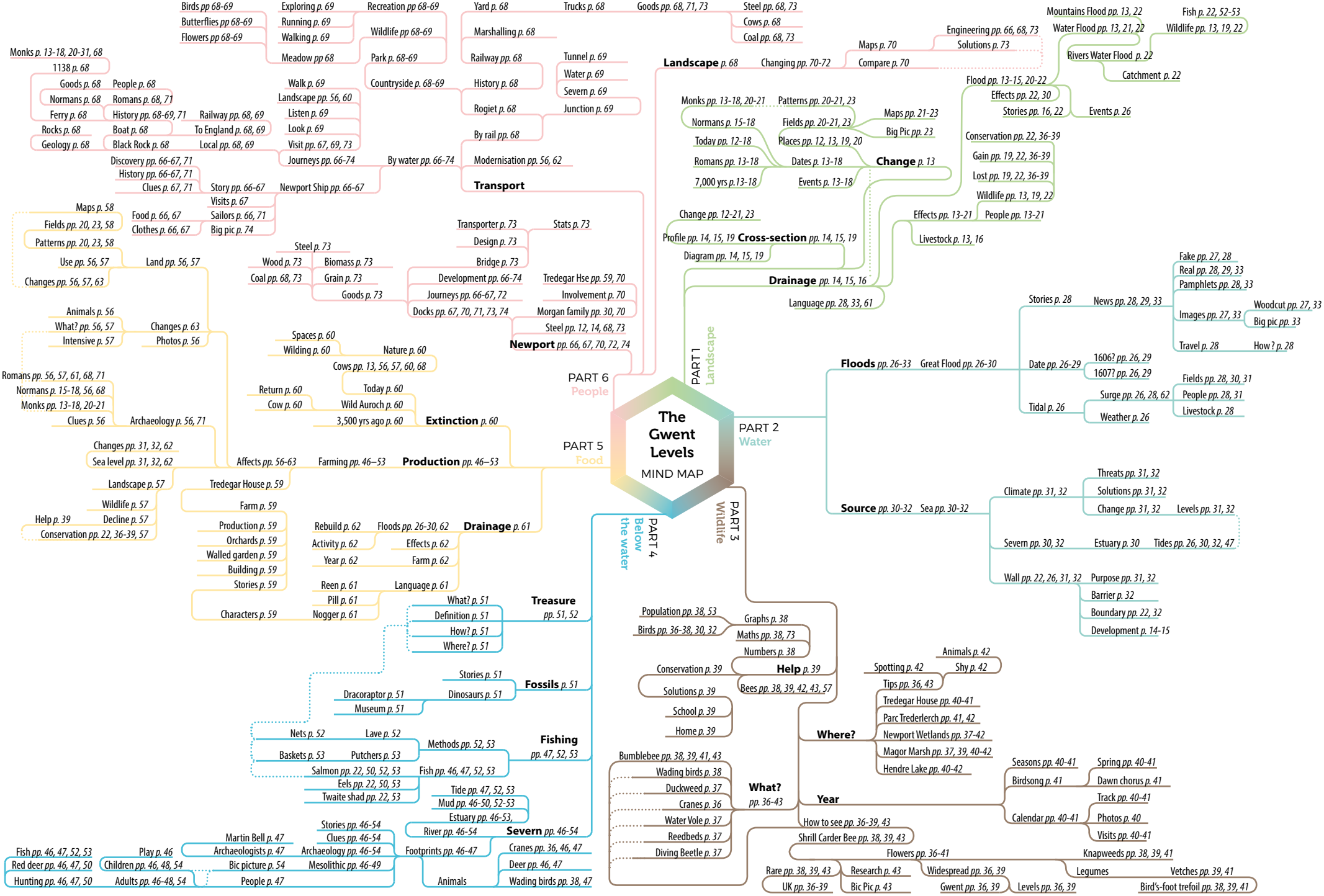
The Living Levels has commissioned a series of six life-sized, or larger than life-sized, human sculptures representing key figures in the history of the Levels.

The figures will bring to life the heritage of the Levels and the stories of the people who have lived, worked, worshipped and played here. They will draw attention to the history and natural heritage of the area and act as visual signposts.

The sculptures will be sited at various locations across the Levels including Black Rock and Magor Marsh. Follow the link below to see how the project is progressing and where to see them **livinglevels.org.uk/sculpture-trail**

The Engineer at Black Rock (designed by Rubin Eynon)
LIVING LEVELS LANDSCAPE PARTNERSHIP

Notes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livinglevels.org.uk/learning-resources

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SECTION THREE

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Show off the Levels' inspiring landscape and wildlife features. ***p. 22***

THE BIG PICTURE

A map of the Gwent Levels in 1830

How similar is Magor and the countryside compared to a modern map? ***p. 23***

THESE FOOTPRINTS ARE THE SANDAL OF A ROMAN SOLDIER

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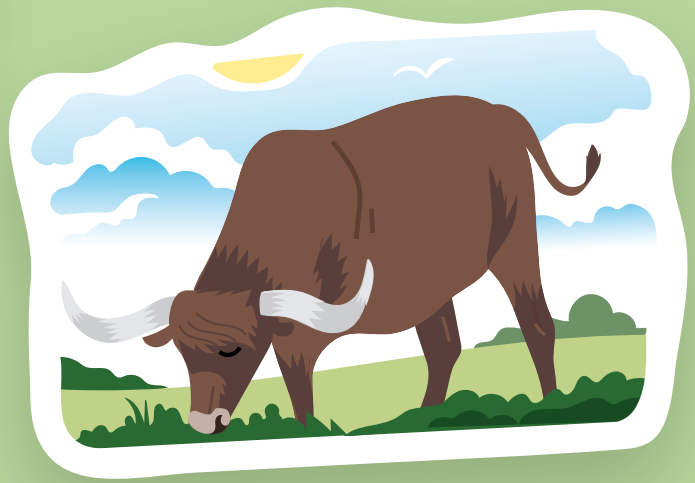
Spot different periods of farmland across the Gwent Levels

Patterns of drainage: which era does a certain pattern belong to? ***pp. 20 – 21***



SECTION ONE

What is still the same? What has changed?

Create a timeline tracking the drainage of the Levels into farmland. ***pp. 12 – 19***

PART ONE

How has the Gwent Levels landscape changed over time?

How has the Gwent Levels landscape changed over time?

What is still the same?

Incredibly, the Gwent Levels look largely the same today as they did back in the 1700s and 1800s. The way in which the ditches (reens) drain the land and the fields, providing rich, fertile grazing for animals, means there has been little need for change. It has always been an area used to raise cows and sheep because the vegetation is so rich and lush.

What has changed?

While much of the remaining farmland remains the same, some of the land has been modified.

- There are new buildings, from farm barns to industrial warehouses. Many areas have been built over, particularly the wet marshy land on the edge of Newport.
- Newport used to be a relatively small town. In the medieval period it had a castle to defend the river crossing, a market, a mill, a few houses and a wharf. Now it is a big city.
- The Llanwern Steelworks were built in 1962 across a large expanse of the Gwent Levels. When it opened there were more than 13,000 workers and contractors on site. It was the first oxygen-blown integrated steelworks in Britain. While steel isn't made on site any more, it is delivered in huge slabs. The hot strip mill then rolls the steel into a continuous strip; it was the first mill to be controlled by a computer.

Windmill Reen during the summer, an important drainage ditch and habitat for wildlife.
CHRIS HARRIS

SECTION ONE

The Gwent Levels landscape

IMAGE: CHRIS HARRIS

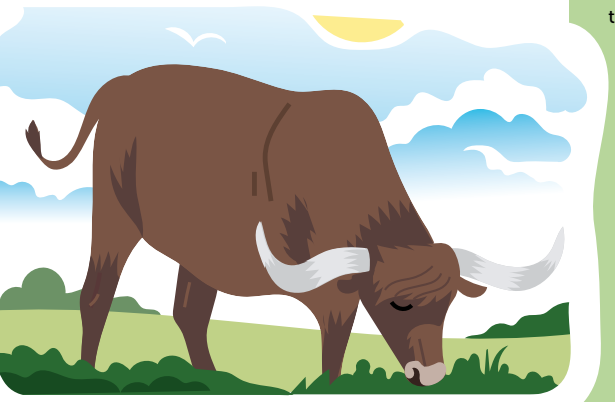
Sheep graze across the Gwent Levels, in this case the foreshore, as they have done for hundreds of years.

Over time people have stopped the sea getting to the Gwent Levels by surrounding them with an earthen bank (the sea wall). However, water still comes in from inland rivers and streams, with water flowing down from the mountains and hills. In the past, people have found different solutions to drain the fresh water off the fields, and maps and photos reveal evidence of this.

The Romans (around 1,900 years ago) were some of the first people to start draining the Gwent Levels, providing dry fields especially during the summer for grazing their cattle, sheep and horses. During the Norman period (around 900 years ago) wealthy landowners – including several newly founded monasteries – drained large areas of land. The monks in particular were creative engineers and cleverly modified the water channels in fields, even crossing one over the other, like a mini-aqueduct.

Many of the fields found across the Gwent Levels look very similar now to how they would have looked 200 years ago. Farmers have continued to graze sheep and cows on these fields, relying on the old, traditional drainage channels to keep their fields free from flooding. There have, however, been some changes. Some fields or areas have been drained further and used for horse grazing and recreation, while others have been overgrazed, stopping flowering plants growing or birds nesting. Cow dung and urine being spread onto fields helps the grass to flourish. However, this stops flowers from growing and it also seeps into the drainage ditches, causing algae to spread which kills all the other plants growing there.

Some areas have improved the land for wildlife. For example, Newport Wetlands was once farmland. Holes were dug for the dumping of ash from the power station. This has now been dug out in places to make ponds and reedbeds for waterbirds.



SECTION ONE

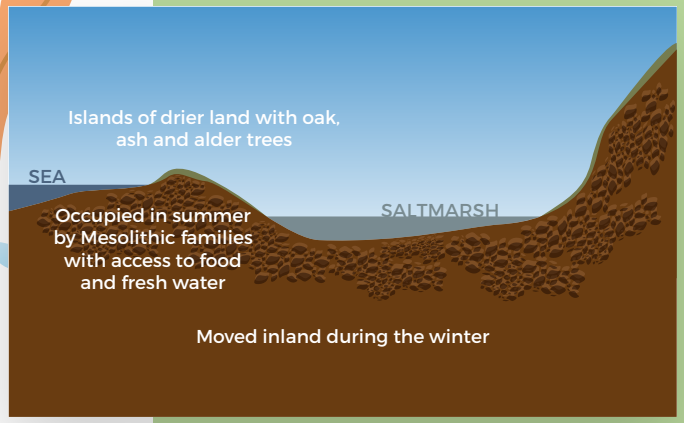
A timeline of changes on the Gwent Levels

...and how the land has been managed by people

Watch the Lost Landscapes film to see how the Gwent Levels has changed over the past 7,000 years. You can choose specific time periods to watch, livinglevels.org.uk/lost-landscapes-intro

This timeline compliments the online version, livinglevels.org.uk/timeline

LIVING LEVELS LANDSCAPE PARTNERSHIP/DEXTRA VISUAL



A cross-section of the Gwent Levels near Goldcliff during the Mesolithic Period (when footprints were made in the mud)

◀7,000 years ago: Mesolithic period

During the Mesolithic period sea levels were lower. The land sloped down from the sea, and a hill at Goldcliff formed an island within the wetlands.

1,900 years ago: the Romans

When the Romans arrived in south-east Wales, they set up a major British legionary fortress at Caerleon, with 5,600 soldiers. The Gwent Levels became an important place for rearing cattle, sheep and horses. Local wild birds appeared on the dinner table of senior Romans, including the common crane (now recently back on the Levels after going extinct in Britain in the 1600s). An effort was made to partly drain the Levels, for example through digging ditches, although large areas will still have been occasionally flooded by the tide. The Goldcliff Stone (displayed at Caerleon's Roman Legion Museum) records some of this work.

A Roman-period boat was discovered during the construction of the large Tesco's distribution warehouse in the 'Europark' development (between the steelworks and Magor). This suggests that a tidal creek flowed inland from Redwick on the coast to a wharf at the back of the Levels where the boat had been moored up.

1,500 years ago

At the end of the Roman period sea levels rose and a saltmarsh once again formed across the Gwent Levels.

800 to 900 years ago (1100s to 1200s): the Normans

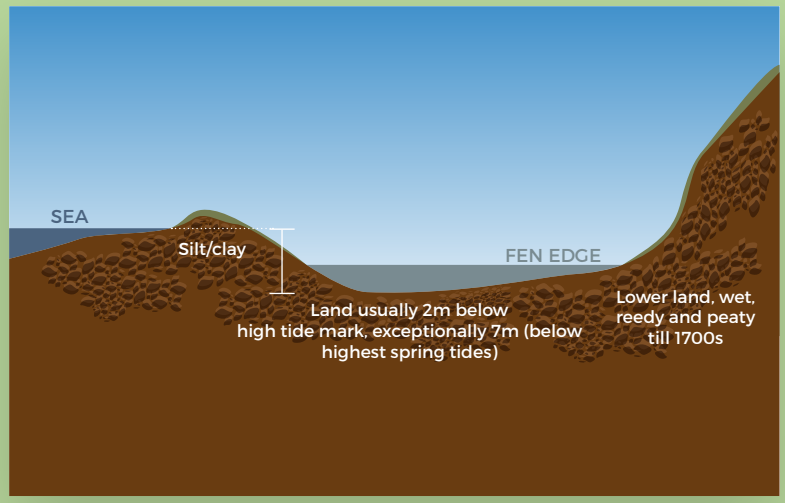
Over 950 years ago, in 1066, the Normans invaded England from France. Over the next 200 years they slowly took over Wales, building castles, occupying the best land for farming and living an affluent lifestyle. The Normans lived in big estates and took the best areas of farmland, leaving the poorer farmland for the monks. The Normans also founded monasteries, several of which held land on the Gwent Levels, and helped to build sea walls and drain the land. One of these was Goldcliff Priory (on the site of Hill Farm), which was established in AD 1113, and dissolved in the 1530s.

About 500 years ago (1400 and 1500s) ▶

From the 1400s onwards the climate deteriorated leading to coastal erosion, which led to the rebuilding of the sea wall inland of where it had been.

500–200 years ago (1500s–1800s)

During the 1530s the monasteries were closed, and their land was sold off (which is known as the Reformation). During the 1600s and 1700s private landowners were experimenting with their farming practices. In the 1700s and the 1800s common land, used by local villagers for fuel, grazing and other materials, was divided up between all the different landowners in order to create more farmland.



A general cross-section of the Gwent Levels from the 1400s onwards

LIVING LEVELS LANDSCAPE PARTNERSHIP/DEXTRA VISUAL

Monastic lands (around Newport and Chepstow)

The monks were given areas of good agricultural land in the coastal areas, and some poorly drained land in inland areas.

The monks probably came up with the more sophisticated drainage systems, including the ability to send one drainage ditch under another without the two mixing.

The former tenants were offered a one-off financial settlement in return for losing their rights in the common land. Many were glad of the money; some, however, were paid and forcibly evicted from their former lands.

This led to lots of social change. This was timely as the industrial revolution was happening. Many commoners moved to Newport to earn money by working in local industries.

In 1850 the railway was built across the Gwent Levels, often slicing through the middle of fields. A bridge was built across the railway in Magor so that farmers could still access their fields.

1900s to today

Many areas of the Gwent Levels remain as farmland, although it may not be owned in blocks by people living next door to it as it once did. As fields have become available, often when landowners have died without anybody to inherit it, land has been broken up into smaller pieces and sold to people further away. Fields today have very mixed ownership, which has its own challenges.

Activities

ACTIVITY

Different ways of life

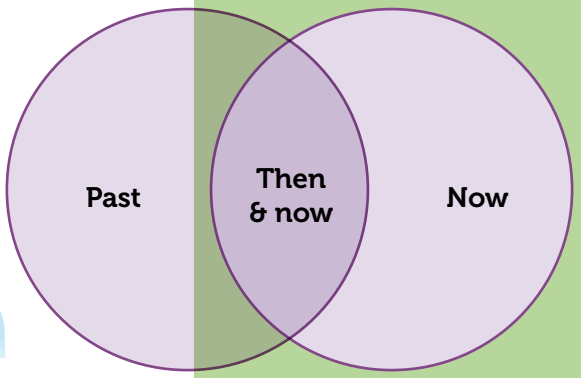
Using the Lost Landscapes (digital reconstruction) film (livinglevels.org.uk/lost-landscapes-intro) and Time and Tide: 12,000 years on the Gwent Levels (livinglevels.org.uk/time-and-tide) choose two periods of time from the list below:

- End of last ice age, around 6000BC.
- Iron age, about 280BC.
- Roman occupation, around AD200.
- Monastic life, around AD1250.
- Industrial revolution, AD1800s.
- Modern day.

Write down some adjectives and adverbs to describe the landscape, the water and the environment in which families lived (or live) during your chosen periods.

Complete a Venn diagram (like below) showing the similarities and differences between the two time periods. Include how the water influences or influenced people's lives, the houses they live or lived in and their use of the land.

APPLICATION OF KNOWLEDGE



ACTIVITY

The Levels through the ages

Watch the Lost Landscapes (digital reconstruction) film (livinglevels.org.uk/lost-landscapes-intro) and Time and Tide: 12,000 years on the Gwent Levels (livinglevels.org.uk/time-and-tide); both reveal how landscapes and life has changed over thousands of years.

Use the information to fill in the table below showing how the land was used, how the people lived and how the water influenced their way of life.

Information for the rows marked with * are found in the Lost Landscapes film.

Following on from completing the table lead a discussion about how the water has influenced people's way of life and how people have tried to change the water's impact on the land.

APPLICATION OF KNOWLEDGE

Age	Describe how the water coverd the land	Describe how and where the people lived	Explain how the people used the land
End of last ice age, around 6000BC *			
Iron age, about 280BC *	Wet marsh lands with some higher drier areas.		
Roman occupation, around AD200AD *		Wetland enclosure. Larger, more substantial dwellings.	
Monastic life, around AD1250 *			Farming the drier areas.
The time of the act of sewers, around AD1500.		Progressively more permanent settlements.	
The flood, AD1607 *		Stone and wooden buildings.	
Industrial revolution, AD1800s	Roads, fields, towns and villages develop.		
Modern day			Industry leisure activities road and rail.

For suggested answers, see p. 75

ACTIVITY

What could it mean?

Watch Time and Tide: 12,000 years on the Gwent Levels (livinglevels.org.uk/time-and-tide) and ask students to listen out for the following quotes and think about what they could mean. Replay the animation and pause following each quote to discuss their significance.

WORKING CREATIVELY

0:45

"They leave footprints in the shore for those that follow, to follow ever more."

There are some physical footprints that have been found at Goldcliff, but what else have the generations who lived on the levels before us left behind and how have we followed them?

1:41

"as sure as tides rise" "change is unending, constant like tide, as ice turns to water and the waters rise"

The narrator thinks there is an inevitability to change, shown by the quote "as sure as tides rise" and "change is unending, constant like tide, as ice turns to water and the waters rise". What do you think is meant by this?

2:11

"turn the wilds of nature to the order of man"

People have had an impact on nature. Do you think that humans ever "turn the wilds of nature to the order of man"?

2:50

"and ingenious mosaic of ditches and drains"

We now have "an ingenious mosaic of ditches and drains" across the Gwent Levels. Why do you think that they have been described like this?

3:33

"the iron horse is thundering forward"

What is being described by "the iron horse is thundering forward; the smog of progress covers the land"?

4:04

"free the people from the tyrannical tide"

Why did the tunnel "free the people from the tyrannical tide"? What does this quote tell us about how the tides governed the societies and what could happen now there is a tunnel.

5:00

"This place is a place for all"

"This place is a place for all." Can you give some examples of it being true and some where is isn't the case?

ACTIVITY

Have people and nature reached an accord?

There are lots of descriptions that describe the conflict between progress and nature. Listen to Time and Tide: 12,000 years on the Gwent Levels (livinglevels.org.uk/time-and-tide) and pick out some quotes that describe this battle between nature and man.

- Describe when and how the water seems to be winning.
- Are there periods of time when humans conquer nature?
- When do man and nature live easily alongside each other?

Write a list of ways that man has tamed the land over the thousands of years shown.

Write a list of ways that nature has reclaimed the land.

Use the evidence that you have gathered from the animation to explain whether you think "Progress is hard" or do you agree more with the idea that "man and nature have reached accord".

Draw a picture or diagram that illustrates the quote "But after all the Levels endures, through countless centuries, man and nature have reached accord" and shows how nature and man now live side by side."

CURIOUS QUESTIONS TO EXPLORE

Activities

ACTIVITY

Levels timeline

Produce a timeline from the Roman occupation to the current day. Different groups can draw the timeline on the same scale and focus on a different aspect of the levels. For example, one group might look at how the water levels have changed as man has drained the land, while another group looks at how man has used the land. Students could illustrate what the Levels would have looked like using pictures, photographs and maps contained in this resource. On completion the timelines can be stuck vertically on the wall so that students can see how the different aspects of the levels have changed. There could be a class discussion about the following questions:

- How has the way humans have used the land been determined by the land and the water?
- Why have humans tried to drain the land over time?
- Why do we continue to try to drain the land, even when it has proved difficult and sometimes failed?
- People have always wanted to live on the levels. Why do you think this is?
- Why do you want to live here?

APPLICATION OF KNOWLEDGE

ED DREWITT

ACTIVITY

Effects of transport

Electrification of the railway line across the Gwent Levels has necessitated rebuilding of many of the bridges and huge visual modifications to the route with the erection of cable supports along the lines.

What has this meant for farmers, local people, businesses and wildlife?

Why does the location of the Levels result in its use for the M4, railway, Llanwern, warehouses and power lines, etc.?

CURIOUS QUESTIONS TO EXPLORE

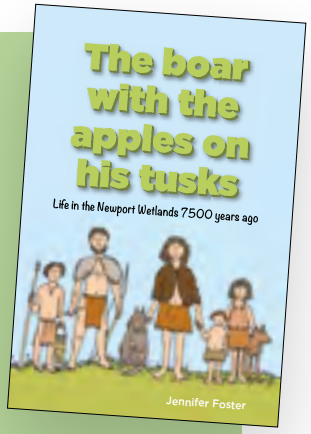
ED DREWITT

A book to read

The Boar with Apple in his Tusks

Jennifer Foster
LIVING LEVELS LANDSCAPE PARTNERSHIP

This story is all about life on the Gwent Levels 7,500 years ago. To download a copy, visit the webpage for this resource.



ACTIVITY

Why does the landscape look like this?

Ask students different questions as you read through the timeline above.

Describe what Newport was like 200 years ago. What is Newport like today? What reasons can you think of for why it changed?

How did the Romans use the land? Why did they drain and clear the land?

The land might have been drained to provide engineering experience and work to keep the legionary soldiers busy whilst barracked at Caerleon.

How did monasteries influence and change the landscape? How did they make best use of the land?

CURIOUS QUESTIONS TO EXPLORE

SECTION TWO

Magor Marsh & Newport Wetlands

For more information on the historic drainage system visit livinglevels.org.uk/the-historic-drainage-system

Stunning aerial images reveal the patterns of fields from the air livinglevels.org.uk/levels-from-the-air

Magor Marsh is a haven for wildlife, close to the railway and lanes, south of Magor
ED DREWITT

The Newport Wetlands centre provides the perfect venue for visiting schools.
RSPB

Newport Wetlands

Newport Wetlands is a National Nature Reserve and was developed to provide homes for wildlife as mitigation when the Cardiff Bay Barrage scheme was undertaken. It is made from lagoons dug out and flooded for wildlife.

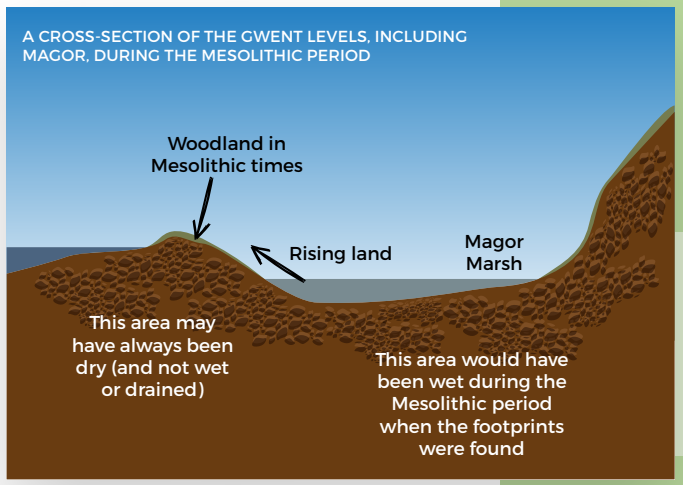
Originally the area was a place for the adjacent power station's ash to be dumped. Fields were dug out into lagoons and fresh ash was pumped into them. At a later date these were then dug out again and the water levels re-established. Today the ash is evident along the paths and molehills! The reserve is the size of 437 rugby pitches. Much of it is reedbed, a rare habitat for a range of animals and plants including otters, reed buntings and bitterns. More open pools and grasslands are home to nesting wading birds such as lapwings, avocets and redshanks.

You can visit Newport Wetlands with your class to experience this important habitat and explore the wildlife; facilitated class sessions are available as well as the opportunity to explore on your own. There is a visitor centre with a classroom, toilets, cafe and shop. It is home to a wealth of wildlife; children can investigate habitats and adaptations by pond dipping or watching the many ducks, geese and swans that visit the reserve.

Magor Marsh

Over the centuries the peaty boglands at the back of Levels were less valuable. They were peat bog/marsh before you got to the higher, drier villages such as Magor. Magor Marsh is still wet and peaty and is at the back of the marsh. The fields between it and the sea are dry and have probably always been dry. Magor Marsh remains an important and rare place for this habitat, and for both rare and common wildlife that needs such a place to live.

You can visit Magor Marsh with your class to experience this rare habitat, explore the trees and birdlife, and go pond dipping in the reens. Facilitated class sessions are available as well as the opportunity to explore on your own.



For more information on Magor Marsh and to download our Memory Treasure Map to accompany a trip there, visit livinglevels.org.uk/magor-marsh

For more information on Newport Wetlands and to download a Memory Treasure Map to accompany a trip there, visit livinglevels.org.uk/newport-wetlands

SECTION TWO

Spot different periods of farmland across the Gwent Levels

The pattern of drainage can show the date when the land was drained. Which era does a certain pattern belong to?

Across the Levels you can still see examples of the different field drainage systems used over the centuries. Modified fields are common across the Gwent Levels although not always easy to see, especially if you are driving, as they are hidden by the hedgerows. From the train between Newport, Severn Tunnel Junction and Chepstow most of the fields along the railway line show signs of low mounds and troughs that help drain the water away. If you are visiting Newport Wetlands then some can be spotted on the right side of the road as you travel along West Nash Road.

Instead of the field looking even and relatively flat, you might notice deliberate, straight lines in the fields which are regularly spaced; because they are draining the water, the soil beneath them is wetter and allows damp-loving plants, such as rushes, to grow along them, making them more visible.

Monks Ditch: an important drainage ditch, or reen, running through the Gwent Levels.
CHRIS HARRIS

ACTIVITY

Spotting ancient drainage patterns

While aerial photos reveal some of the patterns produced by the drainage systems, LiDAR, a special survey technique, shows these patterns of drainage ditches and creeks in more detail. The website livinglevelsgis.org.uk shows maps of the Gwent Levels during the 1830s. By zooming in you immediately see different patterns of fields by size, shape and arrangement.

How to use: If you tick the 'LiDAR' box in the 'View Map Layers' box on the left of the screen and zoom into the maps, you will see black, white and grey patterns – these are the ditches and creeks that drain the water off the fields. Under 'Set Layer Opacity', move the bar on the horizontal line for LiDAR. This will change the contrast and overlap between the patterns and the original maps.

The history of a village can often be worked out by using historical maps and the patterns of the nearby fields.

Look at the fields near the villages of Redwick, St Brides, Whitson, Caldicot and Nash and draw out the pattern of fields. Then use the information in the table to uncover the age of the farm and drainage systems that you can see.

PATTERN OF FIELDS	WHEN FIELDS/ DRAINAGE SYSTEM WERE LAID OUT
REGULAR LONG STRIPS FORM A LINE	1500S AND 1600S
GRID PATTERN WITH RECTANGULAR FIELDS	1800S

Look at the arrangements of the houses and discuss:

- Nucleated and dispersed settlements – how the houses in some of the villages are spread out and some have formed around a centre. Think of some reasons why this might have happened.
- The reasons why the patterns of fields and drainage developed differently over different periods of time.
- How different owners of the land treated and used land in different ways.

INTERPRETING DATA

Field system to the east of Whitson, created in the 1500s and 1600s

LIVING LEVELS LANDSCAPE PARTNERSHIP

Variations in field patterns

Roman fields and evidence of farming and some form of occupation (probably seasonal), have been found at **Rhymney, Peterstone Wentlooge, St Brides Wentlooge, Coedkernew, Nash, Goldcliff, Redwick, Magor and Caldicot** as well as elsewhere. Known Roman farms cluster along the fen edge, e.g. Caldicot, Portskewett, Mathern, Rogiet, Ifton, Bassaleg, Langstone and possibly Bishton and Llanwern.

Whitson (picture above): fields close to Whitson show patterns from the system used in the 1500s and 1600s. They are organised in a regular pattern with long strips of field all coming off the east side of the village in a long line. These may have come from Belgium via similar field patterns found in Pembrokeshire.

Caldicot: fields here are typical of the 1800s – grids of lanes with square or rectangular fields coming off them. Many fields contain undulating traces of former tidal creeks (now silted up). Enclosure of common land (see also Redwick below).

Nash: regular pattern of fields.

Redwick: unlike many places, Redwick still has some of the larger rectangular fields that were once managed by the monks. Maps from 1830s show strips of farmed land neighbouring these large fields. These strips remained because they stayed under common law where the commoners (local people working and living on the land) retained their rights – they weren't handed back to the landowners, unlike most areas when the Inclosure Acts were introduced. Villagers had what bits were left, or they already had them anyway.

To the west of Monksditch – in **Goldcliff** and **Nash parishes** – the fields are very irregular in shape, and settlement is scattered across a wide area. This landscape appears to have been created in the traditional Welsh way. In contrast, to the east of Monksditch, the landscape has a more English feel with compact villages (such as Redwick) and long narrow fields characteristic of 'open fields'.

Where does the water on the Gwent Levels come from?

The sea wall along the coastline of the Gwent Levels now keeps the seawater away from the farmland. So, where does all the water come from?

Some of the water comes from winter rainfall – many fields have channels that drain the water away from them. Other places, such as Magor Marsh, naturally flood. Most of the fresh water comes from higher ground via streams and springs. During really heavy rainfall, so much water reaches the lowlands that the rivers and streams break their banks and flood into the fields.

"Most of the fresh water comes from higher ground via streams and springs."

ACTIVITY

Mapping a river

Map the route of the River Usk from where it begins in the Black Mountains to where it enters the sea at Newport.

- Which places does the river pass where water might be taken for people and farmland animals?
- Are there any obstacles along the river's length that may stop fish such as eels, salmon and twaite shad getting up it to lay eggs (spawn)?

PROBLEM SOLVING

More detail

Water flows down through 45 rivers, streams and canals, forming a catchment area that flows from the Black Mountains to the sea. The main river, the Usk, flows 125km south-east through Brecon, Crickhowell, Abergavenny, Usk and Newport. During heavy rain and snowmelt, more water than usual flows down rivers, naturally flooding fields and marshland known as the floodplain. As the water flows downstream towards the Gwent Levels, some of it is pumped off to feed the Monmouthshire and Brecon Canal and the Llandegfedd water storage reservoir, and it is also used to provide water for factories, fish farms, hydropower, watering crops or feeding animals on farms. On the Gwent Levels, a system of gates known as sluices stop too much water flowing onto the fields. The sluice gates and a sea wall running along the edge of the Gwent Levels stop very high tides from flooding the fields.

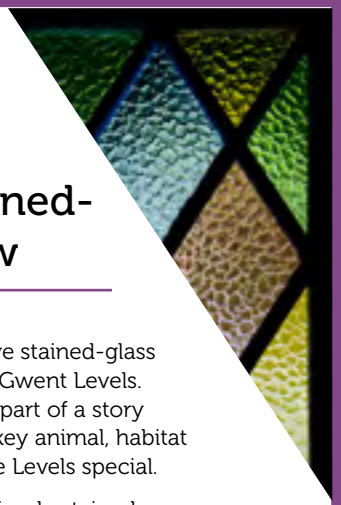
The River Usk is home to many different fish including salmon. It is a healthy river and provides internationally important places for fish such as twaite shad, lamprey, bullhead and brown trout to live. Some of these need to travel upriver to lay their eggs (spawn); some barriers stop them getting very far, such as a weir at Trostrey, a weir at Brecon and bridges at Llanfoist and Crickhowell. Weirs are steep dams that change the speed of the water.

To ensure clean and healthy water for people and wildlife, the whole river catchment area is cared for in a way that helps:

- habitats be better connected and form corridors for wildlife such as otters, water voles and kingfishers;
- provide more places for wildlife to live;
- remove or control non-native and invasive species;
- clean up, stop or reduce pollution;
- remove or alter barriers so fish are better able to travel upstream to spawn.

During heavy rainfall or snowmelt, the increase in water causes the rivers to overflow into nearby fields. When the water flows over the riverbanks, friction causes it to slow down and leave behind materials such as rocks and clay. This results in the build-up of a natural wall or embankment known as a levee.

ACTIVITY



Design a stained-glass window

Design a commemorative stained-glass window celebrating the Gwent Levels. The glass might include part of a story from this resource, or a key animal, habitat or person that makes the Levels special.

It is possible to make a simple stained-glass window using coloured boiled sweets, by crushing similar colours together. A simple frame can be created out of pastry and the boiled sweets put inside. This can then be baked to create the design. If done in hygienic conditions this can then be eaten.

WORKING CREATIVELY

The Gwent Levels in 1830

For more background and other examples of the 1830s maps visit **livinglevels.org.uk/mapping-the-levels**

This map is of Magor and its surrounding countryside in 1830. During this period, very detailed maps were drawn up by the Commissioners of Sewers of the Gwent Levels, revealing how the land was laid out and recording field boundaries, drainage and sea defences. Two books of maps were produced, one for the Caldicot Levels and one for the Wentlooge Levels. The works costs around £440 (£27, 000 in 2018). These beautiful maps are now stored in the Gwent Archives. When overlain on modern Ordnance Survey maps or aerial photographs, they are remarkably similar. The colours relate to different owners of the land at the time.

Look closely at this map. How does it differ to a modern map, such as Google Maps or an Ordnance Survey map? Compare where fields and their boundaries are today; look for similarities and differences. What is present today on a modern map that is missing from the 1830s version? (for example, roads, a railway...)

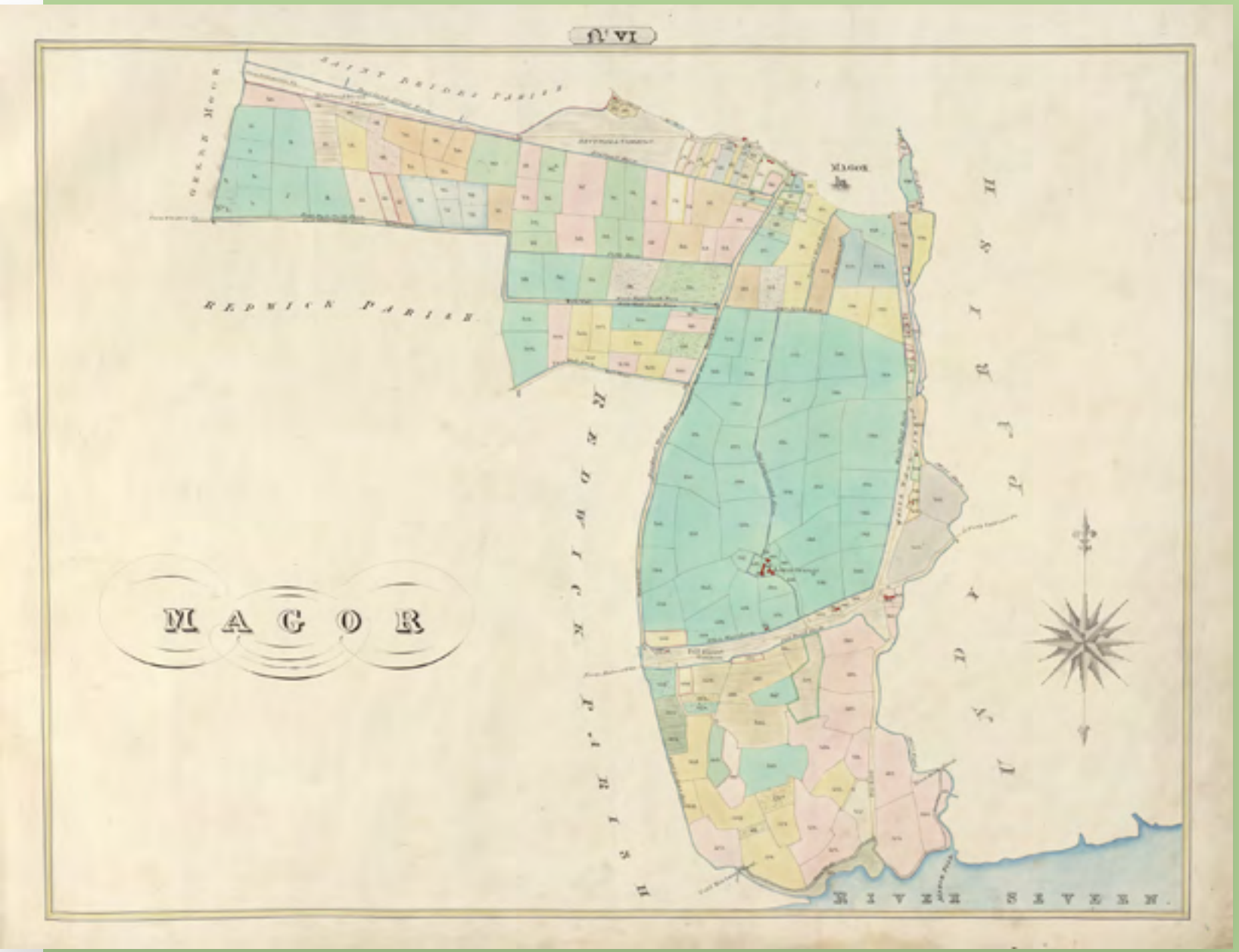


IMAGE: GWENT ARCHIVES

SECTION ONE

The Great Flood, 1607

Plot on a map how far inland the water reached. Design your own woodcut picture to show the 1607 flood. Fake news? ***pp. 26 – 29***

FOOTPRINTS MADE BY A WANDERING ROE DEER

SECTION TWO

How did the Levels flood so easily?

And why were some villages safe from the floods? ***p. 30***

SECTION THREE

Rising sea levels

How will rising sea levels affect the Gwent Levels in the future? ***p. 31***

SECTION THREE

Climate change and sea wall

Why does the Gwent Levels have a sea wall? Write your findings up as a report. ***p. 32***

THE BIG PICTURE

Image: of the woodcut picture of the Great Flood *p. 33*

PART TWO

How does the water on the Gwent Levels affect our lives?

IMAGES FROM LEFT TO RIGHT: ED DREWITT; GEORGE REDGRAVE; CHRIS HARRIS; JEREMY WHITE; STEPHEN RIPPON

SECTION ONE

The Great Flood, 1607

Watch this short film showing how the landscape changed during the rising waters of the Great Flood and how local people were affected, livinglevels.org.uk/ad1600

The Gwent Levels can be a wet place, particularly during the winter. While many fields have been shaped to let water run off into ditches (reens) and out to sea, heavy rainfall and snowmelt in the winter can mean some fields flood.

This can be good for wildlife such as ducks and waders, and more challenging for farmers and their grazing animals.

In 1607, a huge tidal flood covered the Gwent Levels, inundating farmland, low-lying houses, churches, and grazing areas for sheep and cows. Sea walls were unable to hold the water back. Today, you can visit some of the churches and see where local people marked the height of the floodwater (see 'flood marks and plaques' on p. 29).

ACTIVITY

Where did the waters flood?

Plot on a map how far inland the water might have reached.

- Low-lying villages or hamlets such as Peterstone, St Brides, Goldcliff, Whitson and Nash became flooded.
- Settlements on higher ground above the Gwent Levels didn't flood – they included Marshfield, Bassaleg, Magor and Undy – but their low-lying farmland did.

INTERPRETING DATA

ACTIVITY

Evidence for the storm surge

This provides a great opportunity to discuss the differences between a tidal surge and a tsunami – both of which have been in the mainstream news in recent years in different parts of the world. Look at the definitions of the two types of events that could cause flooding and discuss why the 1607 event is thought to be a storm.

- A **tsunami** is caused by a sudden movement of water which travels as a large wave across its surface. The movement could be due to a landslide, falling ice from an ice sheet, a volcanic eruption or an earthquake.
- A **tidal surge or storm surge** is where a combination of events causes the sea to be higher than normal, sometimes flooding places where it would not usually reach.

PROBLEM SOLVING

A tidal surge

There have been claims in the past that the Great Flood was caused by a tsunami following an underwater earthquake off the coast of southern Ireland. However, the clues point overwhelmingly to a powerful storm with a combination of:

- A very high 'spring' tide just after a new moon;
- Strong westerly/south-westerly winds;
- Low-pressure weather allowing the sea to be higher than usual.

Today, floods such as this may become more frequent, and while we are good at getting the water out through the ancient drainage systems, a big flood can still cause problems for people and their grazing animals. Wildlife is much better able to cope and can recover more quickly.

Did the Great Flood happen in 1607 or 1606?

The great tidal flood of 20 January happened at a time when the annual calendar in Wales and England began on 25 March (Julian Calendar), and so many people refer to this as the year 1606 rather than 1607. To the French the flood happened on 30 January 1607. France used the Gregorian Calendar, which forwarded the old-style Julian Calendar dates by ten days; France started its official year on the 1 January, its New Year's Day. Since changes to the UK calendar in 1752, today we would also record the date of the flood as 30th January 1607.

News of the Great Flood

After the Great Flood, news slowly reached other parts of the UK and Europe. In the 1600s there were no phones, email or televisions.

News travelled on horseback or by carriage back to London. A report was written and an artist made an illustrative picture using wood carvings. These same pictures were replicated in different countries with slight differences. Like today, news stories became exaggerated or altered, and fake news found its way into some of them.

The story of the Great Flood was told through four printed pamphlets which came out once a week and covered different parts of the west of Britain such as Somerset, Gloucestershire and the Gwent Levels.

An image of the flood in 1607

One of these pamphlets told stories from Monmouthshire in South Wales, which included the Gwent Levels. The front cover included the woodcut image shown in this resource (p. 33). This had previously been used in a pamphlet about the floods in Somerset and through the use of the tower and spire depicts all churches. The imagery is deliberately exaggerated to get across the message of an exceptional flood. This helped to sell the pamphlet, and also tell the story to those who could not read.

A good book to read

The Candle Man
by Newport-born author Catherine Fisher (9–11 years)

This fiction book includes lots of local places and geography.

Meurig, the fiddler, is a haunted man. Hafren, the evil spirit-woman of the Severn, has captured his soul and now possesses the key to his life – a small candle stub. Hafren taunts and torments Meurig but with help from Conor and Sara, he CAN take back his life from her watery grasp – at the cost of flooding the land. Meurig must make his choice – his life or the village…

ACTIVITY

Designing a woodcut picture

Students could design their own woodcut to tell the story of the 1607 flood; this could then be created as an art project. Sheets of 5mm thick polystyrene and a biro, a lino cutter and a piece of lino, or a clay tile could all be used to create a relief and print, in a similar way to a woodcut. Students will need to remember to cut out the sections that they don't want to show up on the final print.

WORKING CREATIVELY

ACTIVITY

Woodcutting

How did woodcutting work? How long would a woodcut image have taken to produce? How would we produce an image today?

CURIOUS QUESTIONS TO EXPLORE

Flooded farmland on the Somerset Levels on the other side of the Severn.
ED DREWITT

Writing in the pamphlets

Below are some examples of the writing from a pamphlet to give an idea of the language and the stories being told.

The pamphlet begins with a message from the unnamed author, which is followed by a long, mainly religious, introduction. This was quite usual as disasters such as floods, fires and earthquakes were regarded by many people as punishments sent by God, while others put the surge down to the state of the tide, the phase of the moon and the storm.

LAMENTABLE NEWS OUT OF MONMOUTHSHIRE IN WALES

containing the wonderful and most fearful accidents of the great overflowing of waters in the said county, drowning infinite numbers of cattle of all kinds, as sheep, oxen, kine and horses, with others: together with the loss of many men, women and children, and the subversion of 26 parishes in January last 1607.

TO THE READER

Reader, when this news was brought to London, I was given less than one day to write it in this pamphlet. I am sure that you will benefit from it, and will remember that God sends such floods to punish the sinful people who enjoy pleasures and pastimes rather more than the worship of God. Amen.

WOEFUL NEWS FROM WALES

...In the month of January last past upon a Tuesday, the sea being very tempestuously moved by the winds, overflowed his ordinary banks, and did drown 26 parishes adjoining on the coast side, in the county of Monmouthshire, the particulars whereof do follow: all spoiled by the grievous and lamentable fury of the waters.

Stories from the pamphlet

"Now all kinds of cattle for 24 miles in length and 4 in breadth were drowned. Ricks of corn were carried away. The sea damaged many houses and caused great hardship for the inhabitants. This damage, together with the loss of animals and crops, is said to be valued at more than £100,000. The flood has happened in the most fruitful place in the whole country for the soil is very rich."

"A man and woman climbed a tree to escape the waters, and a four-year-old girl was put up into the rafters of her house to keep dry. A cradle containing a baby and a cat floated on the waters like it was a small boat... At Llandaff, Mistress Mathews lost 400 sheep in the floods." The 400 sheep lost by Mistress Mathews at Llandaff are likely to have been inside a sheephouse where the animals were often put during the winter months."

"The number of people drowned does not exceed 2,000. Many were saved by the kind efforts of Lord Herbert (son and heir to the Earl of Worcester), and Sir Walter Montague who dwell nearby. They sent rescue boats and food. Lord Herbert and Sir Walter Montague were among the wealthiest men in the area and they deployed rescue boats and food to those stranded by the floods."

Fake news or the truth?

As news of the flood had to travel to London by word of mouth or letter, sometimes the facts were distorted. The author was not entirely sure of the date, although he knew it happened on a Tuesday in January. He mentions the strong winds 'tempestuously' moving the sea; these are noted in several other accounts written by pamphleteers and chroniclers, and also by vicars who witnessed the event. The storm associated with these south-westerly winds coincided with an extremely high spring tide, and the well-educated vicars of Almondsbury and Arlingham (Gloucestershire) make mention of this.

ACTIVITY

How accurate are reports of the flood?

The pamphleteer's job was to sell pamphlets, and sensational reporting was quite normal.

Encourage students to look at the picture on the pamphlet and read some of the stories. The person producing the pamphlet would want to sell as many as possible. How would the pictures and the stories make people want to buy the pamphlet? Read the text carefully. What can you find to show you that the writer could be exaggerating for effect? What questions would you like to find out the answers to, in order to assess whether the information is accurate?

Find a modern newspaper article that reports on an event. How is the story written differently? How does the reporter convince you that the story is true? This could develop into a discussion about how students can trust information that is presented to them in newspapers and on the internet. More able learners could be taught about how to assess which websites are reliable and where they can get their information from.

Further information

- The stories related in the pamphlet generally give no location. They are similar to those told in other pamphlets.
- 'Cattle' was a description used for all livestock, so the animals lost would have included sheep, horses and oxen too (the latter being used for transport and to work the land).
- The estimate of £100,000 for the losses and damages is a guess; the parish losses at Goldcliff were £5,000 according to the plaque in its church. Similarly, the number of people drowned is an estimate, one that was revised in a later pamphlet to 500.
- Insufficient records survive to verify the extent of the fatalities, but these were relatively sparsely populated areas, and the number of people who lost their lives at Goldcliff was 22.

CURIOUS QUESTIONS TO EXPLORE

Rose Hewlett
UNIVERSITY OF BRISTOL

Rose is researching the Great Flood for her PhD. Using original manuscript records created at local level in its aftermath, she will provide the most representative account of its cause, and the effect it had on people and the local economy.

ACTIVITY

Writing a leaflet

Write and design a modern-day leaflet telling the story of the Great Flood. Include:

- Key features that made it a storm surge and not a tsunami;
- How people were affected;
- How farm animals and wildlife were affected;
- A picture showing the Great Flood.

WORKING CREATIVELY

Cardiff

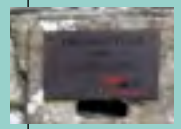
Cardiff was also affected by the Great Flood of 1607. The River Taff surged inland and flooded St Mary's parish, north-west of the city centre. The tidal surge pushed into the church which eventually collapsed and was rebuilt elsewhere in 1840. Churchgoers had to move to St John's Church for 200 years – this would have been a big thing back then and everyone would have been aware of why.

1607 flood marks and plaques

The great tidal flood of 20 January happened at a time when the annual calendar in Wales and England began on 25 March, and so many people referred to the year as 1606 rather than 1607.

Many of the churches on the Gwent Levels have plaques which commemorate the Great Flood in detail. Those at Goldcliff and St Brides go into detail and were made soon after it happened. Not all church plaques (for example, at Nash) reveal the true depth of the flood water and some were put up at a much later date.

The depth of water is best understood in relation to the churches and the ground level outside them. During the flood the depth of the water was between 1.2m and 1.5m in the immediate vicinity of some churches, and then higher or lower than that depending on the local landscape. It is difficult to be more precise because of the topography. Churches tended to be built on slight rises of land, as did farmhouses.



Nash
At Nash there is a tradition of parish children being taught that a slot in the wall of the church marked the height of the 1607 floodwater. A commemorative plaque was installed on the 400th anniversary of the flood.

Redwick
Redwick church has two flood marks at slightly different heights; that at the end of the chancel wall is older and thought to relate to the actual height of the 1607 flood. The plaque on the porch is twentieth century.

Goldcliff
This plaque at Goldcliff church shows the true height of the floods at this location in 1607.

Why were some villages safe from the floods, and how did the Levels flood so easily?

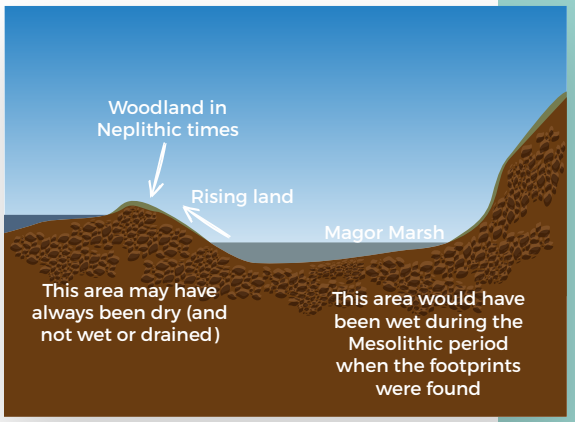
On the Gwent Levels, as you move inland from the sea, the land doesn't rise upwards at first. Instead the land slopes downwards. Therefore, those fields closest to the sea are naturally drier than fields several kilometres inland, where the water collects.

For example, while Magor village is on higher ground, an escarpment, Magor Marsh is on lower ground and at the base of where the fields slope downwards. Here the water collects, forming pools and bogs, which are important for rare plants and animals. Closer to the sea, the fields are dry. When floods have occurred in the past, it has been very difficult to get the water back to the sea again. Once the sea floods over the sea wall, it collects in the downward-sloping areas.

Tredegar House, Newport

Some historic evidence relating to flooding at Tredegar House might spark some further ideas or an opportunity for a visit:

- Evidence of historic flooding in the house still exists with steps leading up to the ground floor family rooms suggesting they wanted these above ground levels where water could accumulate.
- The park here still flooded until relatively recently (1980s/1990s) when a watercourse was changed. The estate cottages would regularly flood. The estate also has a man-made lake.
- There is reference to the Morgan family, who lived here, being involved in the construction of the sea wall in the medieval period.



A cross section of the Gwent Levels, including Magor, during the Mesolithic Period

Severn Estuary at low tide
JEREMY WHITE

Severn Estuary and its high tides

The Seven Estuary, which borders the south-west side of the Gwent Levels, has the highest tidal range in Europe and the second highest tidal range in the world – the highest is in the Bay of Fundy, Canada.

Low tide is when the water drains out of the Severn Estuary, exposing the mud, rocks and seaweed. High tide is when the water rises and covers everything back over. Two of each occur in every lunar day, 24 hours and 50 minutes.

The tidal range is the difference in the water height between low tide and high tide. When the tide is high, for example on a spring tide, the Severn Estuary's sea can be really high – up to 14m or more above that at low tide. Saltmarsh, a habitat covered in salt-loving plants, will become partially covered by the sea and fully covered during very high tides. Without sea walls, spring tides would flood onto farmland too.

A spring tide happens when the moon is full or new; the moon, alongside the sun, affects the difference between high and low tide. A full or new moon creates the greatest upward pull on the sea, like a magnet, generating very high levels of water at high tide, and very low levels at low tide. They occur twice in each lunar month.

Sea wall and rising sea levels

Ducks, such as wigeon, rest and feed on flooded farmland.
ED DREWITT

Rising sea levels

Many towns and cities in Wales are on the coastline and 60% of the population in Wales lives by the sea (1.9 million people). Many settlements were originally built in places where the high tide was much lower than it is today. With sea levels and high tides now much higher, some places are vulnerable to flooding compared to 1,000 to 2,000 years ago.

Our changing climate is linked to global warming, melting glaciers, rising sea levels and greater (and heavier) rainfall. This means there are big changes for us and wildlife ahead

Things to consider:

- More frequent and severe storms;
- Heavy downpours;
- Higher tides;
- Rising water levels;
- Effects on people – flooding of properties and farmland (and effects on people and their wellbeing), erosion of beaches, roads and railway lines, tourists not visiting affected areas, costs of making changes to the coastline;
- Effects on the environment – changes to places where wildlife lives, providing new places for some wildlife and fewer places for others;
- Archaeology – peat cuttings and submerged ancient forests being revealed and uncovered. Drier summers revealing ancient medieval and Roman settlements on farmland;
- Solutions – use of sea walls and other coastal defences, allowing farmland to flood and return to nature (planned retreat), monitoring changes in how the coastline looks, removing large amounts of litter that build up on beaches after storms, forecasting/modelling the impacts of storms;
- Building sea walls may seem like a good solution – however, sea walls are costly, and if they are too high a freak storm can make getting water back out again incredibly difficult.

SECTION THREE

For more information on the historic drainage system and the sea wall visit livinglevels.org.uk/the-historic-drainage-system

ACTIVITY

Sea wall

- Why does the Gwent Levels have a sea wall? Discover what it has been made from over different periods of time.
- Write your findings up as a report. How would you build a sea wall today and why?
- You can walk some of the sea wall along the Newport Coast Path, newport.gov.uk/documents/Leisure-and-Tourism/Newport-Coast-Path-Map-English.pdf

APPLICATION OF KNOWLEDGE

ACTIVITY

Thinking about climate change

Chair a class debate about how flooding is now more frequent, why and what we should and could do to stop this.

- What can we all do to reduce global warming?
- How will our changing climate affect sea levels here in South Wales?
- Will sea walls be able to hold back the sea?
- What is Natural Resources Wales doing to reduce flooding?
- What might happen in a modern flood?
- How might this area look flooded today and who would it affect?
- How would wildlife cope? Many animals are adapted to this regular flooding, although not to this extreme.
- What causes such floods?
- Where does water from inland come from? (mountains/Brecons)
- Why did people build where they did?
- What would happen if the Gwent Levels didn't have the drainage ditches such as reens?

What might this mean for us and how we build our homes?

- In the Netherlands, which is built on land that was once covered in sea, homes have the living space on the first floor above the garage on the ground floor. If there is a flood only the garage and garden are affected. Explore other technologies being developed to raise homes above the ground.
- Locally, storage warehouses have everything above ground on shelving units so if there is a flood, the water can be easily mopped up and the ground dried.
- A new hospital for Newport is being built on higher ground to avoid future floods and high tides.

CURIOUS QUESTIONS TO EXPLORE

Fascinating facts/stories to add in this section

In the 1846 flood a mail coach tried to cross the bridge over the River Rhymney. One horse drowned and the main route to Cardiff was blocked. People in Swansea were unable to receive their post.

There have been other floods in: 1258, 1483, 1703, 1846 and 1883. **Are you able to list and find out about floods in the 1900s and 2000s?**

History of the sea wall

During the early medieval period (1,500 to 1,000 years ago), the sea wall on the Gwent Levels started life as a succession of raised banks. People built their own small islands of protected land slightly above the watery channels, where they were able to have a small settlement – a home and area for grazing – during the summer months. These still flooded in the winter. Over time, the small islands of land grew in size allowing people to remain all year; gradually the raised banks amalgamated and formed one long barrier to keep the sea out. Some of the Levels' original sea wall is kilometres out into the Severn Estuary and would have been wiggly rather than today's smooth, relatively straight wall. As the sea has risen the sea wall has been rebuilt several times in new places. Today, where the sea wall runs you can see where fields have a triangular shape – look on Google maps to see. They would have extended further out into the estuary and parts of them have since been washed away by the tides.

Image of the woodcut picture of the Great Flood

This front cover was used in a pamphlet about the floods in Somerset with the tower and spire representative of all churches. It was used again for the pamphlet about the floods in Monmouthshire. The imagery was used to convey as many aspects of the contents of the pamphlet and an exceptional flood.'

Discuss what different things are happening in the picture. What animals are shown? What are different people doing?

How does the language differ to ours today?

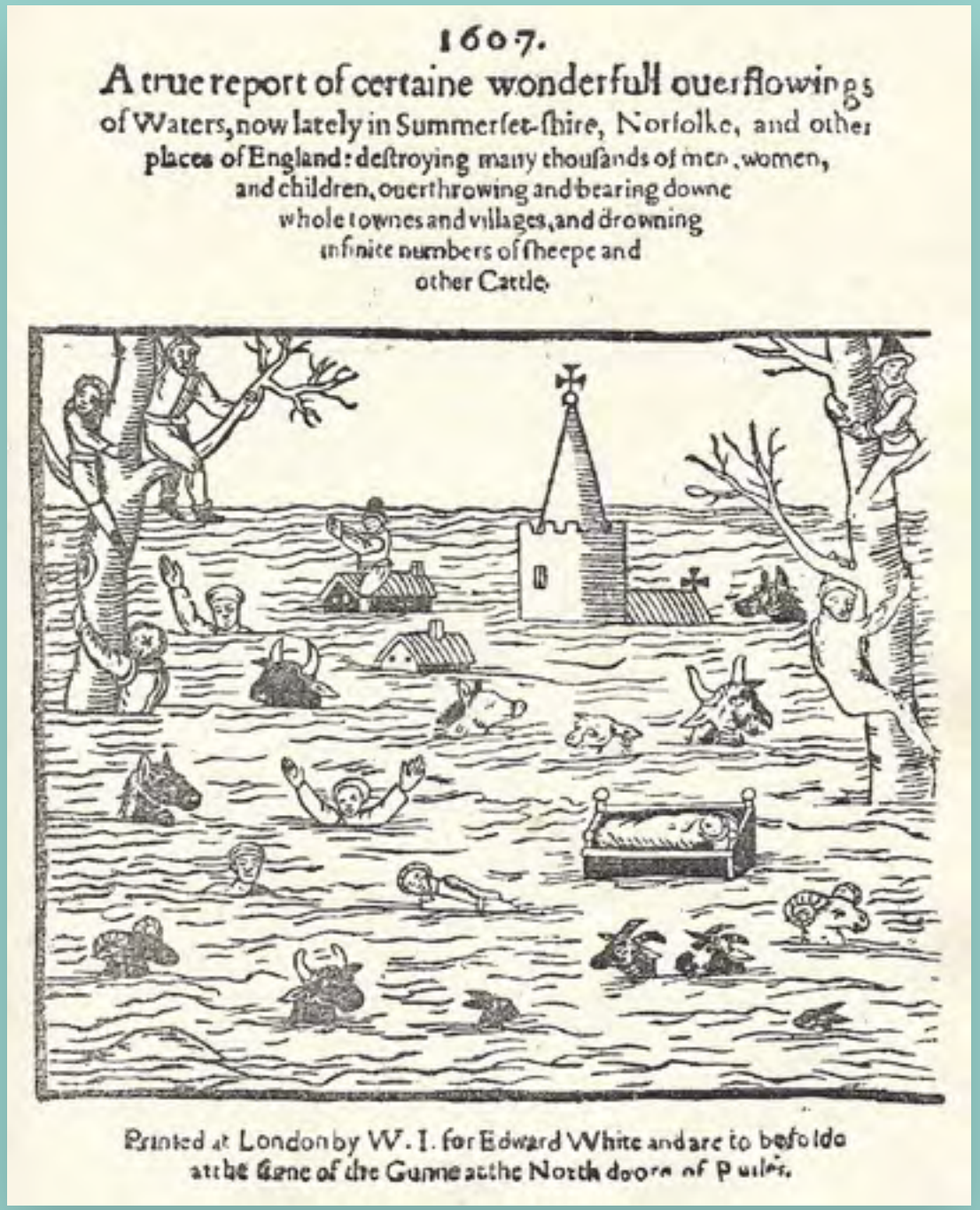


IMAGE COURTEST OF STEPHEN RIPPON

THESE FOOTPRINTS WERE MADE BY A COMMON CRANE, ILLUSTRATED BELOW-LEFT

SECTION ONE
Special places for wildlife
What rare animals and plants live on the Gwent Levels? ***pp. 36 – 38***

SECTION ONE
Wild maths
Make graphs using recent counts of water birds found at Magor Marsh. ***p. 38***

SECTION TWO
Helping bumblebees
How to see and care for our bumblebees. ***p. 39***

SECTION THREE
Wildlife watching
How to spot shy wildlife on the Gwent Levels. ***p. 42***

SECTION FOUR
Outdoor learning
Where and when to look for wildlife throughout the year. ***pp. 40 – 41***

THE BIG PICTURE
Why is the shrill carder bee no so rare? *p. 43*

PART THREE

Wildlife on the Gwent Levels – How can we enjoy and protect it?

IMAGES FROM TOP-RIGHT TO BOTTOM-LEFT: NORMAN WEST; JOHN CRISPIN; CHRIS HARRIS; BEN ANDREW; NIGEL PUGH; ED DREWITT

The Gwent Levels and its special wildlife

Special places for wildlife

The Gwent Levels have changed relatively little over the past few hundred years compared to countryside elsewhere. The wider countryside is suffering from intensive farming, producing food on a large scale while wild flowers, birds, insects and mammals have fewer places to live and feed. The Gwent Levels still has places where wildlife thrives including rare species such as the shrill carder bee and the water vole, which were once abundant across Britain. Many of the traditional fields here allow the flowers, that bees need, to grow, and the waterways are clean and generally undisturbed.

For further information and links visit **livinglevels.org.uk/nature-wildlife**

Cranes in flight
JOHN CRISPIN

ACTIVITY

How to see cranes

The best place to see cranes is at Slimbridge Wildfowl and Wetlands Trust in Gloucestershire where more cranes live and can be seen from bird hides. On the Gwent Levels listen out for their bugling call; the sound carries for up to 3 miles. They look like a very large heron and have a long, straight neck rather than a kinked neck.

EXPLORING THE ENVIRONMENT

The common crane

Around 7,500 years ago, a large heron-like bird, the common crane, was feeding on the Gwent Levels. Its footprints have been preserved in the mud. Cranes disappeared from Britain 400 years ago after they were hunted and eaten as a delicacy at banquets. Their habitat, watery places such as marshes, flooded fields and pools, was also being drained and turned into farmland. Back in Roman times there was another crane called the great crane – it is thought the Romans may have caused them to go extinct in the UK by eating too many. However, it is possible that common cranes have become generally smaller since Roman times. If so, the larger cranes from Roman archaeological contexts might represent larger common cranes than might be expected today. We know that at least three large cranes were served as meals for a senior officer at the nearby legionary fortress of Isca (Caerleon). The crane had a significance for some Romans, probably a religious one for they are often depicted on altars, especially in Britain, and with very short people (pygmy characters).

During the summer of 2016 a pair of cranes, named Lofty and Gibble, nested on the Gwent Levels and raised a chick called Garan (the Welsh word for crane). The adult birds originate from the Great Crane Project reintroduction scheme which released 93 hand-reared cranes between 2010 and 2014 on the RSPB West Sedgemoor Reserve in Somerset.

This is the first pair of cranes to breed on the Gwent Levels since their extinction.

For more information about common cranes and their history on the Gwent Levels visit **livinglevels.org.uk/common-cranes**

Reed Warbler
ANDY KARRAN

Reedbeds

Reedbeds along the ditches (reens) at Newport Wetlands and Magor Marsh provide habitats for birds such as reed warblers, cuckoos and reed buntings. The open water is ideal for ducks such as tufted ducks, pochards and mute swans. This is where water voles might be hiding too. In the winter thousands of starlings fly around in mesmerising patterns called murmurations before sleeping in the reedbed – many come here from eastern Europe and Russia for the winter to escape the freezing winters there.

King Diving Beetle at Magor Marsh
DAVID SANKSON

King diving beetle

In the clean and relatively unpolluted waterways across the Gwent Levels there is a myriad of underwater creatures, from young dragonflies known as larvae or nymphs, to tadpoles of frogs and newts. There are diving beetles too. Suited to life underwater, diving beetles have extra hairs on their legs to help them swim and store bubbles of air to breathe. Alongside the common great diving beetle, the Gwent Levels is home to a rare relative, the large king diving beetle. The larvae are so similar that they can only be identified by looking at them closely under the microscope or using DNA barcoding – checking which genes are shared and which are different. There have been only 12 sightings of the king diving beetle in Wales, the most recent at Magor Marsh in 2015.

ACTIVITY

How to see a diving beetle

While the king diving beetle is rare, the great diving beetle is common. Take part in reen or pond dipping at Magor Marsh and Newport Wetlands and find some for yourselves.

Ask permission from the Gwent Wildlife Trust or the RSPB before doing this. You don't want to spread any water-bourne diseases to these special nature reserves.

EXPLORING THE ENVIRONMENT

Water voles

The water vole, although rat-like, has a short, blunt nose, less obvious ears, a hairy, shorter tail and a rounder, compact body. They love the ditches or reens that are found all the across the Gwent Levels, digging tunnels into the banks where they nest and sleep.

They feed on water plants and you can look for their tell-tale nibbles – a 45° diagonal cut with their orange front teeth. The clean water, lots of water plants and absence of mink all help them to survive here. The mink is a long, otter-like animal that eats water animals; it escaped from fur farms.

For more information about the water vole's story on the Gwent Levels and what field signs to look for their presence visit **livinglevels.org.uk/water-vole**

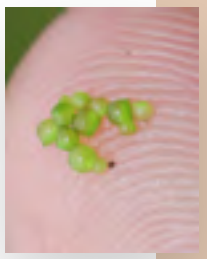
ACTIVITY

How to see a water vole

With a maze of connecting reens and places to hide, the water vole is doing well on the Gwent Levels; one of the best places to the see them is Magor Marsh. If you are quiet you might hear the voles chewing some plants or sploshing into the water as they dive away for cover.

EXPLORING THE ENVIRONMENT

Water Vole
ANDY KARRAN



Rootless Duckweed
ANDY KARRAN

Rootless duckweed

This plant is the smallest flowering plant in the world and is found on the Gwent Levels. Everything about duckweed is small – their leaves and flowers are minute. Other duckweeds in the UK, such as the greater, common and ivy-leaved duckweed, have tiny roots too. They grow across the surface of a pond, turning it bright green! However, the rootless duckweed, as its name suggests, doesn't have any roots. The leaves look like very tiny grapes and are only 0.5–2mm long. Ducks and other waterbirds help spread duckweeds between ponds and ditches; the duckweeds stick to the legs and feet of the birds as they take off to fly. **opalexplorenature.org/sites/default/files/7/file/water-survey-duckweed-guide-A5-2014.pdf**

ACTIVITY

How to see duckweed

This particular duckweed is hard to see. However, a visit to a reen or pool on the Gwent Levels will reveal all manner of water plants including common duckweed, with its tiny round leaves, floating and covering the water's surface.

EXPLORING THE ENVIRONMENT

Redshank
ANDY KARRAN

ACTIVITY

How to see waders

Look out for waders feeding on the mud from the sea wall at Goldcliff, Newport Wetlands and Cardiff. You might need binoculars as they are often far away. At Goldcliff there are hides on the east side of Newport Wetlands where lapwings, redshanks and avocets can be seen – contact the RSPB centre at the wetlands for details.

EXPLORING THE ENVIRONMENT

Wading birds

Wading birds or waders are a group of birds that are suited to wet places. Some have long beaks for probing mud to catch worms while others have shorter beaks for picking tiny snails from the surface of the mud. The Gwent Levels is an important place for nesting waders such as lapwings, redshanks, snipe and avocets. They are common on the estuary mud and wet farmland fields around Newport and Cardiff too.

As farmland across Britain has been drained, drier fields with greater densities of grazing cows and sheep has meant waders have fewer places to feed and nest. Although parts of the Gwent Levels have been drained for thousands of years, many areas remain damp, often all year round, perfect for waders to nest. At Newport Wetlands, waders are successfully nesting and rearing chicks each year thanks to damp fields with some cover to hide, islands surrounded by pools of water, and electric fences to keep ground predators, such as foxes and badgers, out.

Out on the mud of the Severn Estuary, thousands of waders feed on the millions of invertebrates living there, from shellfish to worms. Many winter on the estuary to escape the cold in the Arctic and northern Europe where they nest in the summer. Others use it to pass through on migration from parts of Africa and southern Europe on their way north. Long-billed waders such as curlews, godwits and redshanks have a special way of catching their food. When they probe their beak into the mud, they are unable to see what is there. The tip of their beak is highly sensitive and when they detect something just the very tip of the beak opens and shuts quickly, catching the prey. This is known as rhynchokinesis.

ACTIVITY

Bird populations: making graphs

Each year the numbers of birds living on the Gwent Levels are counted. This helps organisations such as the RSPB and Gwent Wildlife Trust know how well they are doing and whether they need more help, for example, by providing better habitat.

Here are some true population counts of mute swans, little egrets and common gulls from Magor Marsh over winters between 2012 and 2017. These numbers are from the Wetland Bird Survey run by the British Trust for Ornithology.

Use these numbers to produce population graphs, work out a five-year average of each species and describe how the populations are changing. Find out more about each species and why these changes may be happening. Use the BTO's Bird Trends to look at population graphs of different birds and why they are changing, bto.org/about-birds/birdtrends.

Note: Up until the mid-1990s, the little egret didn't live in Britain. They started to arrive naturally from France and have spread across the UK, including Wales.

SPECIES	2013	2014	2015	2016	2017
LITTLE EGRET	1	6	9	24	33
MUTE SWAN	14	21	17	39	48
COMMON GULL	0	0	28	210	540

INTERPRETING DATA

ACTIVITY

How to see a shrill carder bee

This bee can be seen on flowers outside the learning centre at Magor Marsh and on flowers across Newport Wetlands. Three tips: (1) look for their relatives, the common carder bees, first for familiarity; (2) know your bee anatomy, in particular the thorax, and the colour of hairs for each; (3) look for flowers including knapweed, vetches and bird's-foot trefoil.

EXPLORING THE ENVIRONMENT

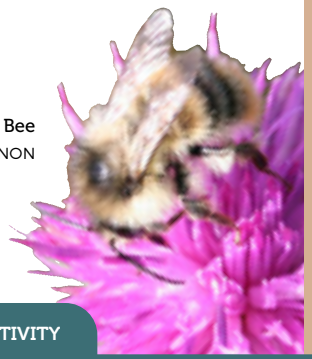
Watching and helping bumblebees

Shrill carder bee

The shrill carder bee is one of Britain's rarest bees. This bee gets its name both from making a high-buzzing sound and by weaving material from plants into its underground nest. Like other bees it is an important pollinator of flowers and loves pea-like plants such as bird's-foot trefoil and vetches. With its long tongue it is able to delve deep into flowers where the nectar is harder to reach. Its back, the thorax, is yellow-brown with a distinctive dark band across it. Unlike common bumblebees, such as the buff-tailed, the shrill carder bee doesn't like to move very far from its nest, a burrow in the ground. This has made it very rare across Britain as changes in farming have meant there are fewer or no wild flowers growing in fields. Unable to travel far, most shrill carder bees have simply starved and died out. However, on the Gwent Levels, fields, hedgerows and reens have remained largely unchanged over the past 100 years despite changes in farming methods; there are still plenty of flowers close to where shrill carder bees nest and they can be found here in late summer and early autumn.

The Gwent Levels is a fabulous place full of buzzing bees during the summer

In the wider countryside many bumblebees, along with honeybees and other insects, are starving. They need more food and shelter. On the Gwent Levels the Bumblebee Conservation Trust works closely with those looking after the land to provide more food for bees, and you can do the same at school and at home.



Shrill Carder Bee
HANNAH BEYNON

ACTIVITY

Researching the shrill carder bee

Investigate how farmland across the UK once supported the shrill carder bee. Find out what has changed and how they can be helped.

Produce an information flyer for landowners, such as farmers, suggesting how they can help shrill carder bees and other pollinating insects.

APPLICATION OF KNOWLEDGE

ACTIVITY

Helping the bees

The Bumblebee Conservation Trust has this webpage for you to use with your classes to identify common bumblebees around your school and at home bumblebeeconservation.org/bumble-kids/spotting-bumblebees

And an information sheet on the rare shrill carder bee, found across the Gwent Levels. You can look for it at Magor Marsh and Newport Wetlands, tinyurl.com/ybbo4kn4

Whether your school is in the middle of Cardiff or Newport, or on the Gwent Levels itself, there are simple things you can do with your children to help bees and other insects. They need flowers that have lots of nectar to drink, and places to live that haven't been sprayed with lots of pesticides.

- Plant a range of wild flowers, from bird's-foot trefoil to clover and knapweed. There are a range of wild flower shops online that sell seeds and young plants, ideal for bumblebees. This webpage gives all sorts of further ideas and photos of flowers and plants, bumblebeeconservation.org/gardeningadvice. Seeds are available from Monmouthshire Bee Friendly Society, beefriendlymonmouthshire.org/gardenershelp
- Leave parts of the school grounds or your garden unmown, allowing plants to flower. Cut just once a year in late summer and remove the vegetation so it doesn't fertilise the soil.
- If you live on a farm, grow strips of wild flowers along fields that connect together.
- Avoid using pesticides – caterpillars and aphids will provide food for other insects and birds.
- Plant flowering plants that bloom earlier and later in the year providing food throughout the flying period of bees and other pollinating insects (not just June and July). For example, sallow for early blossom and ivy/brambles for autumn food.

EXPLORING THE ENVIRONMENT

SECTION FOUR

What to look for at different times of the year

To find out more about the birds below and their songs, look up the RSPB A–Z of birds **rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z**

And for other animals, visit the Gwent Wildlife Trust **gwentwildlife.org/wildlife/species-a-z**

For recording your local wildlife sightings use the LERC (Local Environmental Records Centre) Wales app, **lercwales.org.uk/app.php**

For finding out what you are most likely to see in your area visit, **aderyn.lercwales.org.uk**

January

Watch thousands of starlings flocking together in mesmerising flocks called murmurations as they come to sleep in the reedbeds at dusk at Newport Wetlands. If you hear a strange sound, a little like a squealing piglet, coming from the reeds, it will be a secretive bird called a water rail.

Take parts in the RSPB's Big Schools' Watch and count the birds visiting your school or nearby green space, rspb.org.uk/fun-and-learning/for-teachers/schools-birdwatch/

February

The ditches (reens), pools and ponds across the Gwent Levels are ideal for spawning frogs, toads and newts. Magor Marsh and Newport Wetlands have children-friendly pond-dipping sites which are great for peering down to look for small masses of frogspawn.

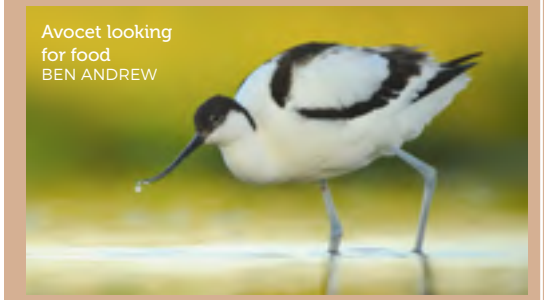
Take part in the PondNet Spawn Survey freshwaterhabitats.org.uk/projects/pondnet/spawnsurvey2020/

Get involved in the Big Pond Dip during the summer, freshwaterhabitats.org.uk/get-involved-2/big-pond-dip

March

Around Tredegar House listen for singing robins, blackbirds and wrens as they sing during the day to protect their partners and nests. At Newport Wetlands, Magor Marsh, Parc Tredelerch and Tredegar House, coots, moorhens and mute swans will be making nests and laying eggs. Listen for the song of the chiffchaff, a tiny green-yellow bird that arrives in late March. It says its name, chiff-chaff chiff-chaff, and is common across the Gwent Levels.

Mute Swan with young
ED DREWITT



Avocet looking for food
BEN ANDREW

April

The sallow tree or goat willow will be flowering; its yellow flowers across wet, boggy places, such as Newport Wetlands and Magor Marsh, attract insects and insect-eating birds such as willow warblers, chiffchaffs and blue tits, which end up with yellow foreheads from the pollen. You might spot the first swallow arriving from Africa. They love the Gwent Levels, feeding on insects attracted to grazing cows and their poo, and nesting in farmyard barns and horse stables.

At Newport Wetlands, towards Goldcliff, uncommon wading birds such as lapwings, redshanks and avocets will be busy hatching chicks on damp meadows and islands, protected by predator-proof fencing.

Look out for the green-blue hairy dragonfly livinglevels.org.uk/hairy-dragonfly

May

Listen for the song of the cuckoo, cook-oo cook-oo, like its name. Cuckoos are often heard at Newport Wetlands and Magor Marsh, visiting for just six weeks from the tropical forests of central Africa. They lay eggs in the nests of other birds such as reed warblers. If your school is near these sites you may even hear one from your school playground.

Watch out for butterflies such as the brimstone, orange-tip and holly blue feeding on spring flowers. May is a great time to spot baby waterbirds, ducklings, goslings and cygnets (baby swans) in family groups.

Common (Cuculus caronus) Cuckoo
BEN ANDREW, RSPB

ACTIVITY

Create a calendar

Using the information featured each month, create an image for each month of the year to make a calendar. The image might be a drawing and could be accompanied by a poem. Students could also use cameras and take a photograph for each month as the year goes by. If started in September why not produce an academic year calendar as an end of year project?

WORKING CREATIVELY

June

Great crested grebes, with their impressive headdresses, will be nesting at lakes such as Hendre Lake Park and Parc Tredelerch. Look for their stripy black and white chicks. Water voles will be busy breeding and feeding at Magor Marsh; they leave distinctive diagonal bite marks at a 45° angle. Apples put out on floating platforms encourage the voles to come out in the open for you to see them.

The oak avenue at Tredegar House will be in leaf, providing foliage full of invertebrates for birds, bats and parasitic insects to feast upon. Visit flowering meadows at Rogiet Countryside Park and count how many species you can find; compare with your school field.

July

Dragonflies love water; their young, known as larvae, live in ponds across the Gwent Levels, feeding on other animals such as tadpoles. In the summer adults emerge from the water and fly around hawking for insects to eat. They often come back to the same perch, allowing for a closer view of their red, green, blue, brown or multicoloured bodies. Hobbies, a type of falcon, visits the Gwent Levels during the summer from south-west Africa. They love feeding on dragonflies, catching and eating them while flying.

Emperor Dragonfly
CHRIS HARRIS

August

Insects are in abundance during August across the Gwent Levels. With plants in full flower, bees, hoverflies, butterflies and beetles can be found feeding on their nectar and getting a face full of pollen which they transfer to other flowers, helping to pollinate them.

Keep your eyes peeled for grass snakes – they usually slither away before you've spotted them and can be seen swimming across water.

Visit the sequoia redwood trees at Tredegar House; these impressive tall coniferous trees have spongy bark and provide places to nest for treecreepers and nuthatches, and homes for insects.

September

One of Britain's rarest bumblebees, the shrill carder bee, is out much later than other bees. Look for it at Newport Wetlands and Magor Marsh, feeding with its long tongue on flowers such clover, common knapweed and pea-like plants such as bird's-foot trefoil and tufted vetch. Its back or thorax is covered in yellow or pale hairs, with a distinctive black or dark stripe through the middle.

October

After heavy dew or frosty mornings look for the delicate webs of money spiders on the grass at school or nearby green spaces such as Tredegar House, Black Rock or Hendre Lake Park; they spin their hammock-like webs overnight. Butterflies such as the red admiral can be seen on sunny afternoons, feeding on late-flowering plants or ripe fruits. Berry-laden bushes at Black Rock, Parc Tredelerch and Rogiet Park are good places to look for newly arrived redwings from Scandinavia, and blackcaps migrating south to the Mediterranean. Roving tit flocks will move though hedges and woodlands in a hive of activity and contain blue tits, great tits, long-tailed tits, coal tits, goldcrests and chiffchaffs.

Red Admiral Butterfly
JENNY TWEEDIE

November

Hendre Lake Park is a great place for spotting little egrets, a small white heron. They first arrived in the UK in the 1990s and are now a common fish-eating bird across the Gwent Levels and Severn Estuary. Many sleep in the trees on the lake's island. Balls of mistletoe with white, sticky berries grow on high tree branches at Magor Marsh and attract the mistle thrush. The damp, muddy ground provides the opportunity to look for footprints – amongst your own look for roe deer prints (slots) or the rounded, five-toed prints of badger or four-toed prints of fox.

December

Look out for mallard and tufted ducks on Hendre Lake Park and Parc Tredelerch amongst the black-headed gulls. If you are quick you might spot a kingfisher flash past, or a grey heron quietly fishing by itself. Listen for the 'pinging' calls of the bearded tits at Newport Wetlands; these secretive colourful birds are best found by their calls on calm, bright days. On bright, sunny days robins will be singing, both males and females, to defend small feeding areas.

ACTIVITY

Listening to birdsong and the dawn chorus

Listening to birdsong is good for our health and wellbeing and for reducing stress. It gets us outdoors and gives us the chance to focus and listen.

Meet at school early one morning in April and listen to the birdsong – don't worry if you don't know what the birds are; experiencing the sound is a wonder in itself. An ideal time to hear early birdsong is 7am or 8am, although the true dawn chorus, when everything all sings at once, begins much earlier. However, birds continue to sing throughout the morning. They also have a mini evening chorus.

If you did want to listen to the dawn chorus itself: Between late March and early May the dawn chorus starts really early. You would need to be listening around 6am at the end of March, 5.30am early April, 5am late April and 4.30am early May.

EXPLORING THE ENVIRONMENT

Spotting Shy Wildlife

ACTIVITY

Spotting Shy Wildlife

Discuss how you would explore a wild place in a way that increases your chances of seeing or hearing animals.

At Newport Wetlands and Magor Marsh the wildlife can be shy and hard to see; students could come up with a list of how to be good observers of nature.

Things to consider:

- How much noise to make;
- Keeping close together or spread out;
- Where to look;
- Where to walk.

Ideally, creeping or walking slowly like mice, with eyes and ears looking and hearing all around, is best for looking for shy wildlife. Keeping voices low and walking along regularly used paths means mammals such as water voles are likely to carry on as normal.

The reeds at both sites make seeing birds quite difficult. Listen instead for birds singing in the spring such as cuckoos, reed warblers, sedge warblers and blackcaps. You can hear and check their songs by finding them on the RSPB's A–Z of birds, rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z

Mute swans, moorhens, coots and little grebes at both sites are more used to people and more likely to stay nearby.

At places such as Hendre Lake Park and Parc Tredelerch, the wildlife that is easiest to see are birds, especially those living on the water. These include mute swans, mallard ducks, tufted ducks, great crested grebes, black-headed gulls, moorhens and coots. The birdlife here is more used to people and dogs – if you want to feed the ducks and swans then use wheat grain (a duck mix) from the pet shop. This is much better for them than bread.

Location details for the two parks:

Hendre Lake Park,
Water Avens Close,
St Mellons, Cardiff CF4 0RG

Parc Tredelerch,
Lamby Way, Rumney,
Cardiff CF3 2HP

Little Egret in flight
CHRIS HARRIS

EXPLORING THE ENVIRONMENT

Inspiration for reading and drawing

Bee

BRITTA TECKENTRUP (ILLUSTRATOR) AND PATRICIA HEGARTY
LITTLE TIGER PRESS

A wonder of nature is about to unfold. Turn the pages to follow the miraculous little bee and its journey from flower to flower in this delightful peep-through picture book. Brought to life by the lyrical text and stunning artwork from the award-winning Britta Teckentrup, the miracle of pollination will amaze and entertain.

Bugs

SIMON TYLER
PAVILION

Bugs are fascinating, and in this book we get close to over 50 different and fantastic bugs including the biggest, smallest and most amazing bugs in the world, the most beautiful and the ones with the strangest habits. This book shows all types of insects in colourful detail and tells you all about their senses, defences, camouflage, how they catch prey, where they live and more. Become a bug expert and see their real beauty with this stunning book.

THE BIG PICTURE

Shrill Carder Bee

This is the rare shrill carder bee. It is only found in a few places in the UK; **one of those is the Gwent Levels**.

Compare it to the common carder bee and a buff-tailed bumblebee. What are the differences? What features would you use to spot one?

IMAGE: ED DREWITT

PART FOUR

What lies below the water beyond the sea wall?

IMAGES FROM TOP-LEFT TO BOTTOM-RIGHT: NATIONAL MUSEUM WALES; BLACK ROCK LAVE NET FISHERMEN'S ASSOCIATION (2 & 4); CHRIS HARRIS; ALEXANDER MALEEV/NATIONAL GEOGRAPHIC CREATIVE

SECTION ONE

The Gwent Levels 7,000 years ago

Discover the clues that tell past stories of people's lives on the Gwent Levels. ***pp. 46 – 49***

SECTION ONE

Make a timeline of the Gwent Levels' history

What big changes and events have happened since the last ice age? ***pp. 46 – 49***

SECTION TWO

What is treasure?

Explore treasure and important non-treasure finds around the Gwent Levels, including dinosaurs! ***p. 51***

SECTION THREE AND FOUR

Lave fishing and putchers

Traditional ways of catching fish. ***pp. 52 – 53***

THE BIG PICTURE

Mesolithic life on the Gwent Levels ***p. 54***

THESE FOOTPRINTS WERE TRODDEN BY A MESOLITHIC HUNTER GATHERER, SEARCHING FOR FOOD

Forgotten footprints

For more information on the area's archaeology visit livinglevels.org.uk/archaeology

The Gwent Levels 7,000 years ago

7,000 years ago, children played on land on the Gwent Levels that today is covered by the sea. Sea levels were lower back then and roaming groups of people set up temporary homes on the Gwent Levels during the summer when wet areas dried out. Footprints in the mud are still being found at low tide at Goldcliff by people researching how people lived on the Gwent Levels. Their footprints dried and hardened, were later covered in sandy mud, and then preserved for thousands of years. Small families were setting up home for a short period, fishing, hunting and gathering plants and summer fruits. They were hunting wild boar, red deer and aurochs.

Looking inland these people would have seen oak woodland beyond the peaty, boggy wet grasslands. On the mud where children played, and adults hunted during the summer months, reed deer and aurochs – the original wild cow which is now extinct – roamed. They provided food for these people. Wading birds such as avocets that we see today on the Severn Estuary would have been walking through the mud, while cranes, tall, heron-like birds, which went extinct, were common. Today, they have been reintroduced into Somerset and are beginning to use the Gwent Levels once again.

Mesolithic footprint found in the mud at Goldcliff
CHRIS HARRIS

ACTIVITY

Stories told by footprints

Give students a material that they can press different shapes into to make patterns. This could be sand, mud, plasticine or air-dry clay. Students could recreate some of the scenes from the Mesolithic times by making different sized footprints or animal marks in the mud.

- There could be places in the mud that are more disturbed, showing where people gathered or showing pathways that were often taken to find food.
- Alternatively, students could recreate marks that we might leave on our environment, possibly as locally as the school playing field.
- They could then think about what people in the future would be able to tell from those marks.

WORKING CREATIVELY

Crane footprint preserved in the mud at Goldcliff
CHRIS HARRIS

How have child and adult footprints been preserved?

The estuary has preserved footprints of both animals and people. 7,650–6,750 years ago the sea levels were lower and during the summer people were walking on mud which dried and baked in the sunshine. When the sea came in on higher tides during the winter, the footprints were covered in a layer of sandy mud. This happened year on year, until thousands of years later the footprints were preserved in the mud, almost fossilised. For a lot of this time the mud itself was covered in a protective layer of saltmarsh vegetation, plants that grow in the salty water and bind the mud together. Today, the saltmarsh has virtually gone and changing tides are removing layers of ancient mud, revealing the footprints. There is little time to study the footprints and as each tide comes in and out those footprints disappear.

What do we know?

Human footprints have a particular shape; they show a pattern related to walking on two feet. The footprints from this time tell us that people were walking in a certain direction, along a pathway over the mud. They were perhaps heading out fishing or returning from a hunting trip. There are many child-size footprints too.

Alongside the human footprints, those of deer, aurochs, cranes, herons and wading birds, such as oystercatchers, have also been found, telling us what animals were feeding on the saltmarsh.

Martin Bell

Martin has been studying the footprints at Goldcliff for 28 years. He goes out each year with students to photograph, measure and uncover more footprints. Martin's work has revealed the stories we now know about the wildlife and people who were living here thousands of years ago.

Are we able to visit the footprints with our class?

The footprints are only visible during very low tides, and sometimes for a short period. It is a slippery, muddy area and challenging for a class. At the moment there are not any arranged visits for schools due to the risks.

SECTION ONE

Timeline of events on the Gwent Levels

11,500 years ago – end of the Ice Age

- Severn Estuary didn't exist; the area where it is now was a huge gorge.
- Britain was connected to mainland Europe by an area called Doggerland, now covered by the North Sea and the English Channel.
- After the Ice Age, soil and land began to appear as a flat plain; large oak trees grew, and people started to live here.

10,000 years ago

Rising sea levels as ice in Canada melts, leading to the development of an estuary.

8,100 years ago

- A forest of oak trees grew by the Gwent Levels.
- Sea levels rose by over 5m.
- Reed swamp formed peat bog and then saltmarsh; salty seawater covered the forest floor and the trees died. For a while the skeletons of the trees projected through the saltmarsh.
- Goldcliff – a low-lying hill – became an island and was 6km from dry land as sea levels rose. Today, raised ground at Hill Farm is all that is left.

7,750 years ago

The estuary covered the current Gwent Levels and went inland by a further 6km to Magor and Llanwern.

7,650–6,750 years ago

- People lived in seasonal camps on the edge of the island.
- Children and adults walked on the mud – their footprints were covered in thin layers of mud that built up over hundreds of years, preserving them.

LIVING LEVELS LANDSCAPE PARTNERSHIP/DEXTRA VISUAL

LIVING LEVELS LANDSCAPE PARTNERSHIP/DEXTRA VISUAL

Goldcliff Stone

This stone, found in the mud at Goldcliff Pill, dates back to the 2nd or 3rd century (1,900–1,800 years ago). Letters from the inscription found on it have been used on the front entrance of the Millennium Centre in Cardiff Bay. A legionary inscription by a person in command is found on the stone; it mentions a number of men and describes 33.5 paces. It names a centurion called Statorius Maximus from the First Cohort of the legion from Caerleon and commemorates work undertaken at Goldcliff by his century of men.

6,200 years ago

The rate of sea level rise slowed, peat built up and an oak woodland grew once again on the Gwent Levels. Then the trees died, and a great raised bog developed.

4,000 years ago

- Sea levels rose.
- The raised bog became swampy reedbeds followed by saltmarsh and estuarine silts.
- Magor Marsh, a peaty bog with reedbed and water-loving trees, gives an idea of how the area would have looked around 8,000 years ago and again about 6,000 years ago.
- The reedbeds at Newport Wetlands and Magor Marsh give an idea of what the landscape would have been like in the reed swamp phases.

2,000 years ago

The Romans drained the saltmarsh at Goldcliff by making banks and ditches. The Goldcliff Stone (dispalyed at the National Roman Legion Museum, Caerleon) records the Roman work. There were Roman farms at Nash (sewage works, Goldcliff Hill Farm and Llandevenny).

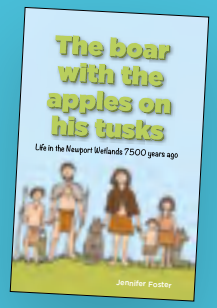
1,500 years ago

At the end of the Roman period saltmarsh again formed, covering the Roman-ditched landscape.

800 years ago

The Levels were again drained and seabanks built in part by monks at Goldcliff Priory (on the site of Hill farm), which was established in AD 1113 and dissolved in 1450.

Books to read



The Boar with Apples in his Tusks
Jennifer Foster
LIVING LEVELS LANDSCAPE PARTNERSHIP

It is a story about life on the Gwent Levels 7,500 years ago when people were starting to live there. To download a copy visit the webpage for this resource.

Goram & Ghyston: The Bristol Giants
Oliver Rigby
SELF-PUBLISHED

This is a story about the first Bristol Giants and how the landscape of the beautiful city of Bristol came to be formed.

Once upon a time there were two brothers called Goram and Ghyston. They were no ordinary brothers – they were GIANTS. One day, the brothers met and fell in love with a beautiful Princess called Avona who set them a task to decide who would win her hand in marriage. It was a task that only one of them could win!

Available on the Bristol Giants website: bristolgiants.co.uk/product/goram-ghyston-the-bristol-giants/

ACTIVITY

Stories told by footprints (cont.)

As a follow-on to the 'stories told by footprints' activity (p. 47), students could add objects from the clues list (left) to give more ideas of what the landscape they have created would have been like. Alternatively, they could think about which objects people in the future would find from our lives.

WORKING CREATIVELY

Clues that help tell the timeline story

- Where the forests once grew, seeds, pollen and wooden objects have been found in the mud.
- Burnt hazelnuts and wild boar tusks are evidence of people stopping for short periods and moving on.
- Carved stones called microliths and scrapers used for butchering red deer, wild boar and occasionally roe deer.
- Bones of fish, including eels, mullet, salmon, sticklebacks, bib, goby and bass.
- Clues from the Gwent Levels tell us about life even further back, from Palaeolithic flints from 30,000 years ago, to the bones of extinct animals including wolves and bison.

Places to visit


OTTER (WIKI COMMONS)

National Roman Legion Museum, Caerleon

Contact for information on current learning opportunities.

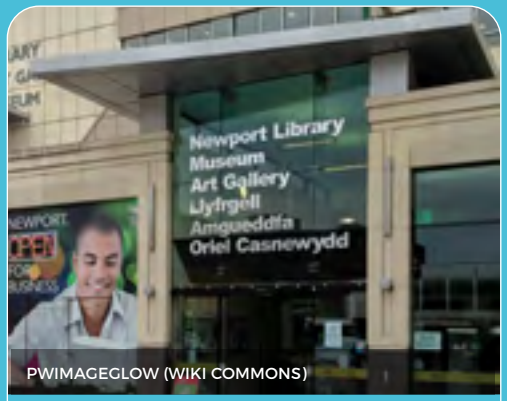
museum.wales/roman/learning


ELIZABETH HUDY

St Fagans – open-air museum

Discover how people lived and worked in Wales in the past by visiting original re-erected historical buildings. New galleries with contemporary learning ideas in mind have recently opened.

museum.wales/stfagans/learning



PWIMAGEGLOW (WIKI COMMONS)

Newport Museum

A range of galleries and learning opportunities focusing on maritime and urban heritage (and some agriculture).

newport.gov.uk/heritage

SECTION TWO

What is treasure?

Dracoraptor
BOB NICHOLLS

ACTIVITY

Dinosaur reporter

Write a magazine feature or produce a presentation about Dracoraptor for other children to learn about Wales' most recently discovered dinosaur.

- Include ideas on how the dinosaur may have hunted and lived, and what Wales would have looked like back then.
- Research how the dinosaur remains were found, what other fossils it was found with and what they tell us about how it probably died and became fossilised.
- Write about why the dinosaur has been called *Dracoraptor hanigani*, its scientific Latin name. Find out what each word means?
- Mention that dinosaur poo has been found on the beach at Goldcliff. Even today, dinosaur and marine reptile poo, known as coprolites, can be found on local beaches by the Gwent Levels. What do you need to be looking for?

nhm.ac.uk/discover/what-is-a-coprolite

APPLICATION OF KNOWLEDGE

People are often finding things from our past around the Gwent Levels and Severn Estuary. These finds all have their own story to tell and may be thousands of years old. People who find them may regard them as treasure.

What is real treasure?

Finding old items from the past is very exciting; local museums tell stories of our past using items that people have found. However, not all findings are treasure.

A treasure needs to be made of at least 10% precious metal such as gold or silver, unless it is a coin, and to be more than 300 years old. A single coin isn't enough to be treasure; there have to be at least two coins (or ten if they have less than 10% precious metals). Prehistoric items are also considered treasure if they have some precious metals, or if two or more are found made of any metal.

If someone finds what they believe is treasure they can report it to a local museum, regional archaeological trust or finds coordinator. It will then be checked by different independent experts, and if deemed to be treasure there may be a reward split between the finder and the landowner; it may also be bought by a museum.

Interesting finds – though non-treasure – discovered during lave fishing activities.
CHRIS HARRIS

Finding treasure beneath the Severn Estuary

Treasure and interesting items are often found by people working in the Severn Estuary. Fishing with nets and dredging material, such as sand, are the most common ways in which people find ancient objects beneath the sea. They are then reported and checked. Objects may include items from ship and plane wrecks, tools, bones, bottles, wood and ancient fish baskets.

Explore this map and see what treasure has been found near you in Wales, museum.wales/portable-antiquities-scheme-in-wales/map

More information on reporting objects and the types of things found: wessexarch.co.uk/sites/default/files/field_file/Protocol_handouts_english.pdf

For examples of treasure found in recent times see pages 68 (Rogiet treasure) and 60 (aurochs horn).

Myths and legends – Steepholm and Flatholm

Out in the Severn Estuary there are two islands. Legend says that there were two giant brothers, Goram and Vincent (or Ghyston), who constructed the Avon Gorge in Bristol.

One day, Goram threw himself into the Bristol Channel, turning to stone and leaving his head and shoulders above the water to make the islands of Steepholm and Flatholm.

SECTION THREE

Prehistoric life – dinosaurs

210–200 million years ago the Gwent Levels and the Vale of Glamorgan were part of a shallow, tropical sea – similar to today's Caribbean or Mediterranean. In the sea lived reptiles, large ichthyosaurs and plesiosaurs, feeding on fish, and ammonites with their spiral-shaped shells.

Islands dotted the landscape and on these lived an early, dog-size dinosaur that evolved into some the largest plant-eating dinosaurs in Europe. It was called Thecodontosaurus, the socket-toothed reptile, named due to the shape of its teeth. It has been found either side of the Severn Estuary, in South Wales and South Gloucestershire. It was first discovered in 1834 near Bristol Zoo and was only the fourth dinosaur to be discovered in the world.

New Welsh dinosaur

Another small dinosaur, Dracoraptor (dragon thief), was discovered in South Wales in 2014. This predatory dinosaur also lived 200 million years ago and was related to Tyrannosaurus which lived 130 million years later! Dracoraptor had many sharp, serrated teeth helping it to catch and feed on lizards, insects and other small animals.

Can we see the bones of these dinosaurs?

Yes. Fossilised bones of Dracoraptor are part of a special display in the Main Hall of the National Museum of Wales, Cardiff. The Evolution of Wales gallery has a spectacular display of dinosaur fossils, including dinosaur footprints, and a jaw bone from a larger carnivorous dinosaur, alongside fossils of other Jurassic and Triassic animals.

SECTION THREE

Lave fishing: discovering objects under the sea

For more information on lave fishing visit livinglevels.org.uk/lave-net-fishing

Here is a profile about one of the lave fisherman, Martin Morgan https://www.livinglevels.org.uk/life-on-the-levels-posts/2019/8/8/martin-morgan

A traditional way of fishing in the Severn Estuary, known as lave fishing, is where people take a large net fixed to a frame to catch fish, such as salmon, on a rising tide. While doing this a whole variety of things have been found including ancient fish baskets.

On the Gwent Levels, a small group of people, the Lave Net Fishermen, still keep the tradition of lave fishing going. They are based near Black Rock and come from the neighbouring villages of Sudbrook, Portskewett and Caldicot. They are the last lave net fishermen in Wales.

ACTIVITY

Lave fishing in action

It is easier to understand what lave fishing is by seeing it in action. On their website there are a number of videos and blogs revealing more about how lave fishing works blackrocklavenets.co.uk

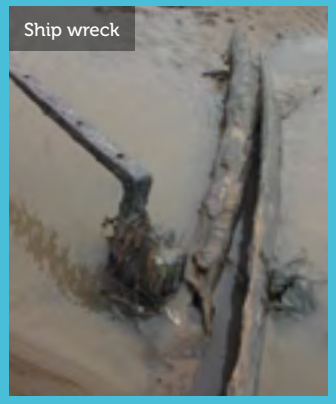
To visit, contact the team at lavenets4wales@msn.com

Perhaps ask them where the local names for fishing areas such as Monkey Tump, Lighthouse Vear and The Grandstand come from.

EXPLORING THE ENVIRONMENT

Lave fishing close to the Prince of Wales Bridge

BLACK ROCK LAVE NET FISHERMEN'S ASSOCIATION



How lave fishing works

The lave net is still made in the traditional way and knitted by some of the fishermen using a strip of wood and a needle. The net has a Y-shaped structure consisting of two arms called rimes which are made from locally cut willow (withy), and this acts as a frame for the loosely hung net. The handle is called the rock staff and is made from ash; the rimes are hinged at the rock staff and are kept in position while fishing with a wooden spreader called the headboard.

The fishermen fish in two ways, either standing in a low water channel waiting for a fish to hit the net or by watching the water for the movement of a fish, then moving to intercept the fish before it reaches deep water.

The Severn Estuary is a great place for finding out about the Gwent Levels' past. In the soft, sinking estuarine mud there are lots of different clues that reveal how people in the past used the area. And the building of the two Severn bridges has helped us find out even more, as changing water patterns (currents) allow more to be found. When the Lave Net Fishermen go fishing for salmon, they sometimes find some fascinating objects in the mud which often have prehistoric stories to tell.

The three most amazing objects they have found are:

1. Ancient fishing baskets.
2. A wooden boat in the sands west of the lave net fishing grounds.
3. A Roman vase west of the fishing grounds.

SECTION FOUR

Salmon Putchers

A salmon putcher is a woven basket that tapers to a small hole at its base. Stacked in columns of four or five on top of each other along a framework of wooden struts, the putchers were used to catch salmon. As the salmon swam with the incoming tide, some would swim into the baskets head first and, unable to turn around and swim out, they would be trapped. When the tide had lowered they were then collected, killed and sold for food.

Salmon putching was a common way of catching salmon along the Severn Estuary over thousands of years, including along the Gwent Levels. Today, the framework used for putchers still stands in the mud at low tide at Goldcliff.

The baskets were originally made from willow branches grown on the Gwent Levels. In the 1940s metal wire was used instead, although the willow baskets still continued to be used by some people.

Salmon putcher
BLACK ROCK LAVE NET FISHERMEN'S ASSOCIATION

ACTIVITY

Fishing in the Severn

- How was the willow grown to produce the branches and 'withy' for the putchers? (pollarding)
- Willow had many uses – find out what they were. (fencing, stabilising banks...)
- Why did catching salmon in this way stop?
- Where do salmon from the supermarkets come from today?
- Why is salmon good for you to eat?

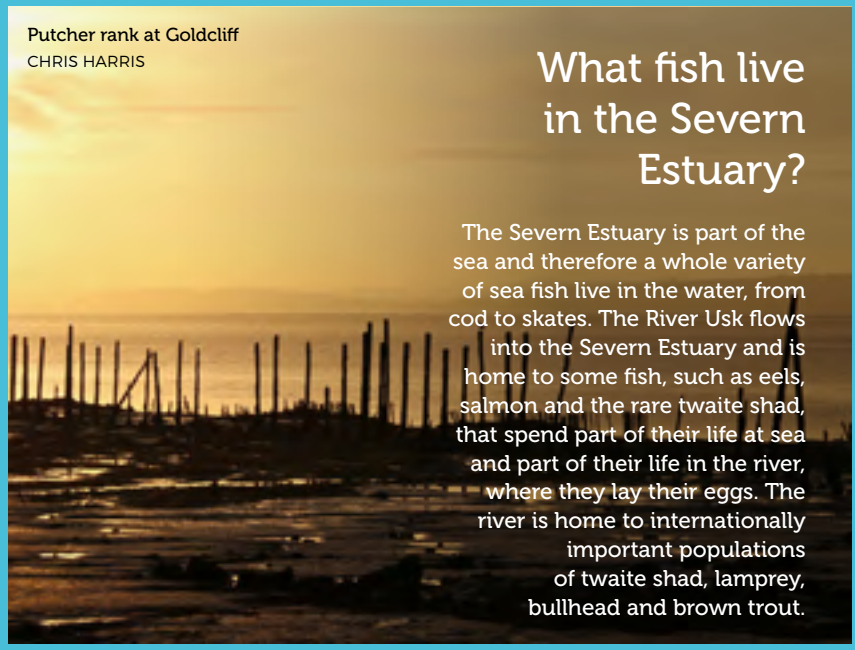
CURIOUS QUESTIONS TO EXPLORE

ACTIVITY

Life cycle of a fish

Find out more about the life cycles of the eel, salmon and twaite shad, and where they spend their lives at sea when they migrate away from the River Usk. Write a profile about each species. Discover why these fish are declining and what people are doing to help them in the Severn Estuary and Welsh rivers.

INTERPRETING DATA



Putcher rank at Goldcliff
CHRIS HARRIS

What fish live in the Severn Estuary?

The Severn Estuary is part of the sea and therefore a whole variety of sea fish live in the water, from cod to skates. The River Usk flows into the Severn Estuary and is home to some fish, such as eels, salmon and the rare twaite shad, that spend part of their life at sea and part of their life in the river, where they lay their eggs. The river is home to internationally important populations of twaite shad, lamprey, bullhead and brown trout.

THE BIG PICTURE

Mesolithic life on the Gwent Levels

This illustration is an artist's impression of life at Goldcliff 7,500 years ago. This is the period when footprints were made in the mud; today they are found by research archaeologists, preserved after all this time.

Use the image to discuss what life might have been like back then, how children may have played and what is happening in the picture.

ALEXANDER MALEEV/NATIONAL GEOGRAPHIC CREATIVE

PART FIVE

How were the Gwent Levels used to produce food?

IMAGES FROM LEFT TO RIGHT: PROFESSOR MARTIN BELL; LIVING LEVELS LANDSCAPE PARTNERSHIP; GWENT ARCHIVES; PUBLIC DOMAIN; CHRIS HARRIS; KATE NICOL; ALEXANDER MALEEV/NATIONAL GEOGRAPHIC CREATIVE

SECTION ONE

Time capsule

What farming-related objects would you put into the time capsule? ***pp. 56 – 57***

SECTION TWO

Land use

Investigate, using maps, how the land use of the Gwent Levels, south of the M4, has changed over time. ***p. 58***

SECTION THREE

Growing food from the land

Why and how have people used the land? What food was produced? How has this changed over time? ***p. 59***

SECTION FOUR

The extinct aurochs

Why and how have people used the land? What food was produced? How has this changed over time? ***p. 60***

SECTION FIVE

Language of the levels

Using the Levels' lingo. ***p. 61***

SECTION SIX

Coping with sudden change

Rebuild your farm after a flood. ***p. 62***

THE BIG PICTURE

Farming in the past

What is this person doing? ***p. 63***

THESE ARE THE WELLY PRINTS OF A LOCAL FARMER STROLLING THROUGH THE MUD IN ONE OF HER FIELDS

Farming on the Gwent Levels over the centuries

Farming on the Gwent Levels

Around 7,500 years ago the sea level was lower than it is today; in the Severn Estuary people were able to walk and hunt across places which today are covered by sea. The Gwent Levels were visited by people during the summer and autumn months when the land became dry enough to walk over and hunt. People did not stay long, perhaps days or weeks, living a nomadic life in order to find food and shelter. In more recent times, during the past few thousand years, the sea was only a little lower than it is today. The Romans would have been looking at a Severn Estuary that started to look similar to that of today, with a series of major settlements and ports around its edges showing how it had become an important trade route.

Throughout different ages the wide, open land on the Gwent Levels changed its appearance considerably. During the Bronze Age, 3,400 years ago, rectangular buildings were used for raising animals on the saltmarsh during the spring and summer. In the Roman period a fortress was built at Caerleon and the army needed more land on which to graze their cattle and horses, and so earthen banks were constructed around areas of drier, higher ground to protect their pastures from the incoming tide. Following the Roman period sea levels rose, and the Gwent Levels were once again flooded by the tides, but around the time of the Norman Conquest individual areas of marsh started to be embanked again. Over time these separate earthen embankments merged into sea walls that protected both the Caldicot and the Wentlooge areas of the Gwent Levels. Monastic communities were involved in this work. These medieval sea walls have now been lost to later coastal erosion, and the ones that protect the coast today are only around 500 years old.

Grazing Sheep and cows on the Gwent Levels
CHRIS HARRIS

The Gwent Levels provide rich, fertile soils that give rise to high quality pasture. Some farmland, particularly on higher ground towards the coast, was arable and used for growing crops, such as wheat, used in bread-making. Many other areas of farmland in Britain have been developed intensively with fertilisers, pesticides, highly efficient machinery and ever increasing densities of grazing animals. This produces lots of food quickly, but this way of farming is not so good for wildlife – it means wild flowers, insects, birds and other animals are unable to survive in the numbers they used to.

While some farmers on the Gwent Levels use a range of modern products, from animal medicines to modern machinery, and traditional techniques such as spreading of manure onto the land to produce more grass – although much more than would have been spread in the past – these are less harmful to the environment than many practices elsewhere. Therefore, more wildlife lives on the Gwent Levels, from bumblebees to rare water plants and birds such as lapwings and skylarks.

ACTIVITY

Modern farming

How did the Gwent Levels change during the Second World War when more food was needed and produced in Britain, so it was self-sufficient?

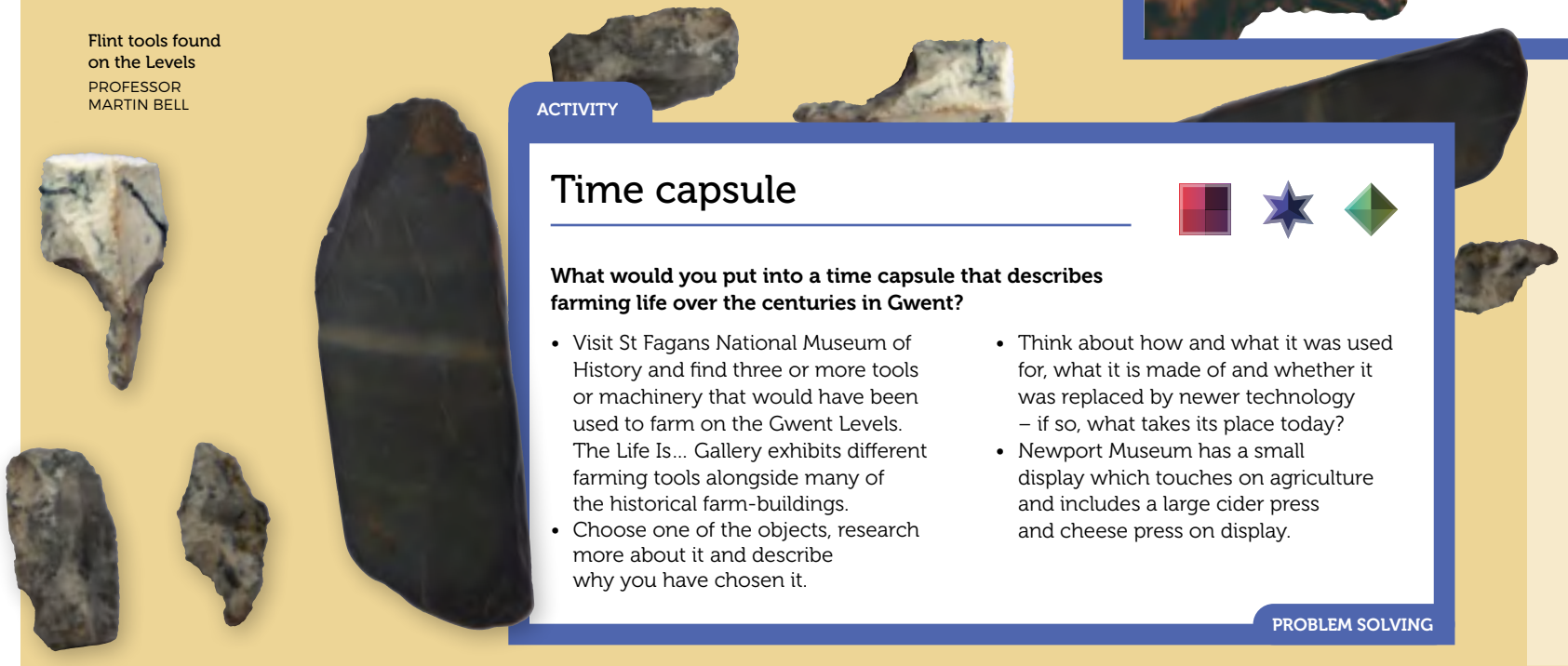
Find out more through the Gwent Archives, gwentarchives.gov.uk and the Museum of Wales collections' web pages, museum.wales/collections

Where does the food produced on the Gwent Levels travel to today? Where does the meat from cows and sheep go to be sold? What happens to cows milk? Discuss whether buying foods that haven't travelled far to be sold in a supermarket or local shop is better for the environment, the animals and for local people.

Invite a local farmer to come in to school or visit a farm, speak with a local farm vet and/or find out from a supermarket whether they sell local meat and milk.

CURIOUS QUESTIONS TO EXPLORE

Flint tools found on the Levels
PROFESSOR MARTIN BELL



ACTIVITY

Time capsule

What would you put into a time capsule that describes farming life over the centuries in Gwent?

- Visit St Fagans National Museum of History and find three or more tools or machinery that would have been used to farm on the Gwent Levels. The Life Is... Gallery exhibits different farming tools alongside many of the historical farm-buildings.
- Choose one of the objects, research more about it and describe why you have chosen it.
- Think about how and what it was used for, what it is made of and whether it was replaced by newer technology – if so, what takes its place today?
- Newport Museum has a small display which touches on agriculture and includes a large cider press and cheese press on display.

PROBLEM SOLVING

How do we know how people farmed the land thousands of years ago?

Buried cows have been found that date back to the Romans. Bronze Age and Iron Age footprints from cattle have been found in the mud. By doing experiments on ancient cattle bones (isotope analysis), researchers have found that 20% of grazing animals destined for Caerleon may have been reared outside of south-east Wales and delivered by ships that sailed up the River Usk and docked at Caerleon. Some of the wooden jetties, where the cattle walked off the boats, have been preserved in the mud.

Land use

ACTIVITY

Land area

Over the past few hundred years, the Gwent Levels has changed in places. Newport has grown, a motorway runs along the top part of the Levels and industrial estates have appeared. Small villages and towns have increased in size, characterised by more densely packed houses and roads compared to adjacent farmland. Farmland can be viewed as open and unbuilt areas of fields, reens and countryside (while including individual farm houses or small groups of private houses).

(i) Compare maps of the Gwent Levels from the 1830s and today

Access digital 1830s maps of the Gwent Levels through **livinglevelsgis.org.uk**

Compare with modern maps today, for example on:

- Your own digital map service at school.
- Digimap for Schools.
- Ordnance Survey map (152, 154 and OL14) for the area (**ordnancesurvey.co.uk**).
- Google Maps.
- Google Earth.

(ii) Using a programme such as Digimap for Schools, measure the area of farmland south of the M4 between the Prince of Wales Bridge and the east side of the River Usk. Then measure the farmland shown in the 1830s maps covering the same area. How do they compare?

Digimap for Schools, **digimapforschools.edina.ac.uk/subscribe**, is an online map resource for schools that helps compare between old and new maps. There is a relatively small subscription fee (£69 excl. VAT for primary schools) alongside free resources and ideas/tips for teachers, **dfsresources.edina.ac.uk**

Students should realise that farmland has reduced in area. Discuss why and the pros and cons associated with it.

(iii) Measure how long the coastline is between the mouth of the River Usk, Newport and Sudbrook

This is the distance of coastline that borders the Gwent Levels; much of this is a man-made sea wall, keeping the seawater out at high tides.

PROBLEM SOLVING

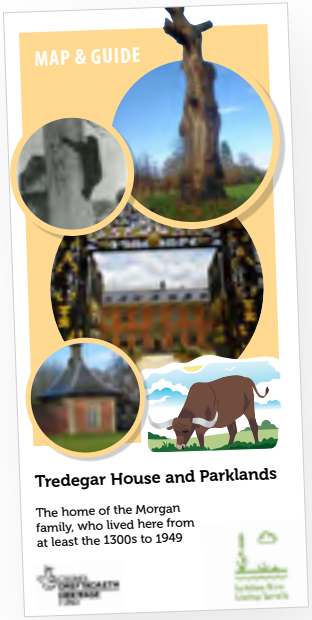
Monkscroft reen
LIVING LANDSCAPES PARTNERSHIP

Farm women on Llanover estate, perhaps near Abergavenny (1850s)
GWENT ARCHIVES

SECTION THREE

Growing food from the marshland

For more information on Tredegar House and to download a Memory Treasure Map to accompany a trip there visit livinglevels.org.uk/tredegar-house



Hayrick on Tredegar Estate (c.1900)
GWENT ARCHIVES

Tredegar House

nationaltrust.org.uk/tredegar-house

There has been a house on this site since medieval times and records of the house during the Tudor period, albeit a very different mansion to the one you see today.

Today, Tredegar House and its estate has three formal gardens, the Orchard Garden, Cedar Garden and Orangery Garden, each with their own distinctive characters.

- The estate's own farm, Home Farm, was where produce for the family and community came from; it enabled the family to be self-sufficient.
- Many of the farm buildings still exist, for example, barns which once formed one long continuous barn, are over 300 years old. The laundry and dairy date back to the early 1800s.
- The corner window of the main house is the Master's Dressing Room, and so the Master of the house, would have been able to keep an eye on the farm.
- The modern building estate was built on the old Kitchen Garden – an old orchard and vegetable garden.
- In 1911 a woman was employed to come in every day to bake bread. She made not only bread but also enormous slabs of fruit cake which supplied something sweet for teas at cricket and lunches for when family members went out shooting and hunting.

Modern-day Tredegar House
CHRIS HARRIS

Things to consider:

- How did Tredegar House provide food for itself and its community in the 1800s? What different foods would they have grown? What animals would they have farmed?
- On a visit to Tredegar House look carefully at the walled garden. Make a plan/drawing of the garden. What were walled gardens used for? How would this have kept people in the house fit and healthy?
- Orchards are important places for wildlife although we have lost many old orchards – explore why they provide good homes for insects, birds and mammals. Why have so many orchards been lost in South Wales? Why are some being replanted and making a comeback?
- Find out more about the lives of women who lived and worked at Tredegar House, nationaltrust.org.uk/tredegar-house/features/tredegar-house-a-herstory

ACTIVITY

Tree of life and stories

The large cedar of Lebanon tree at Tredegar House is 250 years old.

- If this tree could speak what stories about the house and its gardens would it tell?
- What changes in farming and land use have happened in that time in the countryside surrounding Tredegar House?
- What type of tree is a cedar? What does it look like and where would it have come from originally?

CURIOUS QUESTIONS TO EXPLORE

The Extinct Aurochs

In May 2020, local lave fishermen Richard and Martin Morgan found the horn of an extinct aurochs which would have been grazing on the Gwent Levels 5,000 to 6,000 years ago. Weighing in at 3kg, this 70cm horn has been well preserved in the Severn Estuary, protected from rotting away by the thick mud. It was found close to the M4 Prince of Wales Bridge. For more information on lave fishing, see section 3 of part 4 of this resource.

BLACK ROCK LAVE NET FISHERMEN

ACTIVITY

The extinct aurochs

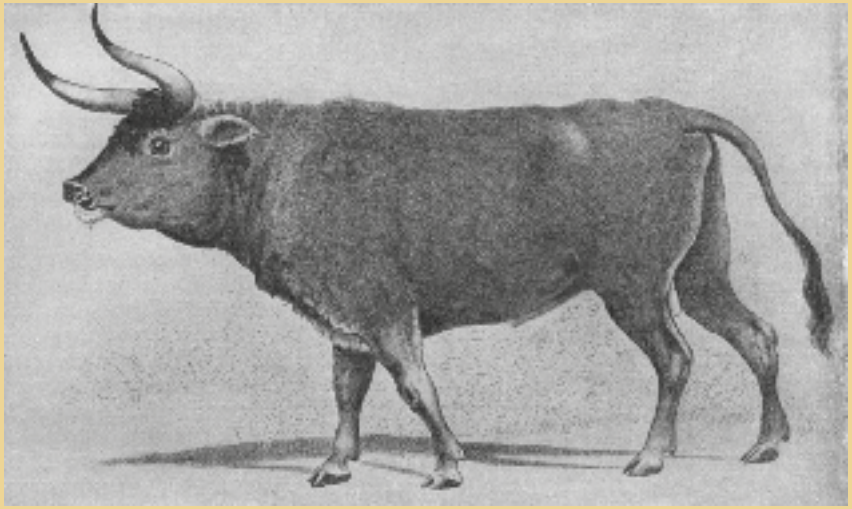
The aurochs was a large wild cow with huge curved horns that is now extinct. They once grazed on the saltmarsh, grassland and woodland of the Gwent Levels. They died out in the UK just over 3,500 years ago as hunting, farming and an increasing human population pushed them out.

- If you could bring back the extinct aurochs, what sort of world would it see today?
- Would it be able to survive on the Gwent Levels?
- Would it ever be possible to bring back a live aurochs from bones in a museum? If so, how?
- Is this something we as a society should do? Why might it be better to focus on conserving living animals?
- Find out about places in Europe where aurochs-like cows are being used to help turn farmland back into wild spaces for nature.

CURIOUS QUESTIONS TO EXPLORE

First-generation cross bull from Tauros Programme (Maremmana x Pajuna) in the Netherlands, 2013.
HENRI KERKDIJK-OTTEN

Charles Hamilton Smith's copy of a painting possibly dating to the 16th century.



SECTION FIVE

Language of the Levels

For more definitions visit livinglevels.org.uk/unique-levels-lingo

Over hundreds of years, a language that describes the different parts of the field and water systems on the Gwent Levels has developed.

Many of these names are still used today and can be seen in old documents referring to the Levels and their development; many of the drainage systems such as ditches date back to the Roman and medieval periods.

The drainage systems help to keep the water off the land. Sea walls along the coastline stop seawater getting onto the land, allowing it to be used for grazing and growing crops. The sea walls were often used for travelling along and today many are public footpaths.

Reen

One of the more common words used still today is reen – this refers to water ditches that people have dug and that run along the edges of fields; you most often see them running between a road and a field. There are different spellings for this depending on where you are in the country. You may see it spelt rhyne in Somerset. A reen has many different uses – it is used for draining water off fields, holding water in the summer for plants and animals to live, keeping animals such as cows and sheep in the fields and acting as a field boundary, like a fence or hedgerow would also do.

Sewers

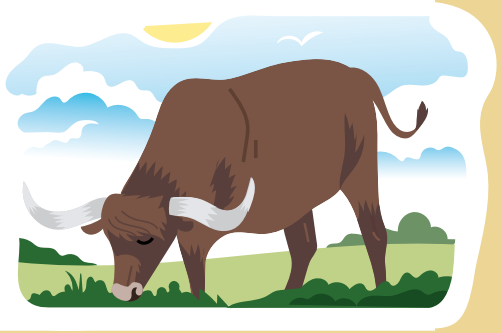
This doesn't relate to sewage or toilet waste. Instead it is the name for the various water courses – streams, ditches, rivers – on low-lying land such as the Gwent Levels.

Pill

A pill is a tidal creek, an area of mud or a wide ditch that has water flowing down through it from a stream or river, and is filled by seawater at high tide. In the past pills have been wide enough for boats to sail up. To stop water moving upstream through a pill and onto farmland, structures called a gout or goat, an outfall, pillhead or clyce, have been built that act as a barrier. The part that opens or shuts this is called a door, gate, flap or sluice.

Nogger

In the past, fields were watered in the summer to keep them lush and growing well for sheep and cows to graze. Water came from the adjacent reens. Planks pitted with holes, known as noggholes, were put at the bottom of reens. The holes were plugged with a wooden peg called a nogger. When people wanted to water or irrigate their fields, they would remove the noggers and allow the water to flow through the noggholes.



Chapel reen
CHRIS HARRIS

ACTIVITY

Using the Levels' lingo

Ask the students to imagine that they are a landowner in the past on the Gwent Levels. They need to write some instructions to the person they employ to maintain the drainage system. They need to use the language above to describe where and how the drainage system needs to be dug out and restructured to ensure it drains the water, keeps the animals safe and allow the land to be watered, but not flooded. They could also use the information from 'Part 2: How does the water on the Gwent Levels affect our lives?'

WORKING CREATIVELY

Coping with sudden change

ACTIVITY

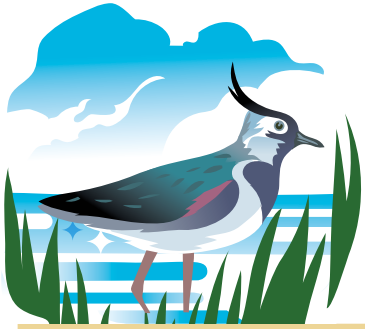
Rebuilding your farm after a flood

In the 1607 Great Flood lots of farms were destroyed through flooding. A huge storm surge saw the sea come all the way in across the Gwent Levels.

Ask students to imagine that they need to rebuild their farm following the flood. Research what a farm was like and draw a labelled plan of your farm and its farmland. It should include:

- A place for the owner to live;
- Possible places for farm workers to live;
- Places for animals to graze and shelter at night;
- Provision for food for yourself;
- Provision for food for your animals.

CURIOUS QUESTIONS TO EXPLORE



Old farm building for keeping animals and storing equipment and provision.
KATE NICOL

'The Old Farmhouse'
DAVID ANSTISS

Farming in the past

This is Mr Rees of Tŷ Gwyn, Peterstone Wentlooge in the late 1940s or early 1950s.

What is he doing in this photo? How would this work be done today?

Find out more about the tool (a scythe) he was using – St Fagans National Museum of History has more information on these.

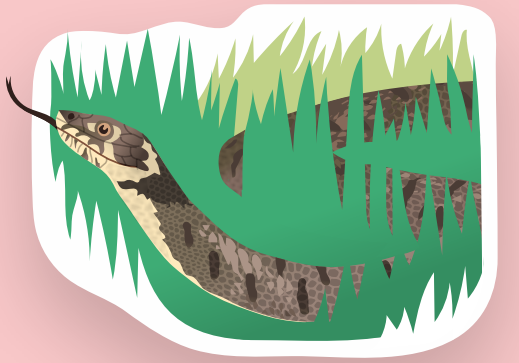
The road Mr Rees is on is now called Broadstreet Common; previously it was always referred to as either the B.4239 or more commonly, the Coast Road.

CAROLE NEWTON

PART SIX

How have people, past and present, moved around the Gwent Levels?

IMAGES BOTTOM-LEFT TO TOP-RIGHT: ED DREWITT (1 & 3); PETER POWER/NEWPORT MUSEUMS AND HERITAGE SERVICE; CHRIS HARRIS; TIIA MONTO; ANNE LEAVER



THE BIG PICTURE

Newport 500 years ago

How has Newport changed from a town to a city? ***p. 74***

SECTION FIVE

Moving goods around Newport

Why might Newport's transporter bridge become a World Heritage Site? ***p. 73***

SECTION FOUR

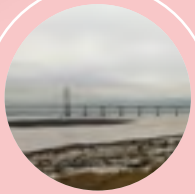
Newport's expansion

How has its growth affected the Gwent Levels? ***p. 72***

SECTION THREE

Shifting muds – what's beneath our feet?

Investigate how local channels and rivers have changed over time. ***p. 70 – 71***



SECTION TWO

Black Rock and Rogiet

How have these two places been important transport links? ***pp. 68 – 69***

SECTION ONE

The Newport Ship

Write a ship's log of the journey arriving at Newport. ***pp. 66 – 67***

THESE ARE THE FOOTPRINTS MADE BY A 15TH CENTURY PORTUGUESE SAILOR WEARING A POINTED SHOE CALLED A POULAINE

The Newport Ship

Newport has a thriving port bringing and sending goods around the world. Even 500 years ago Newport was busy with ships. The Newport Ship, a Spanish-made ship visiting from Portugal, was undergoing repairs in 1468. The ship toppled over and with no modern machinery to lift it back up, it was left where it fell. The space needed to be used by other ships, so half the ship's timbers were cut down and reused. Slowly, over time, the remains of the ship were covered and preserved in mud, only recently discovered in 2002 when the Riverfront Theatre was being built. The Newport Ship is the world's only remaining 15th century ship.

There are many clues to the life of the ship before it visited Newport; they give insights into the life of the sailors who came from Portugal. From over 1,000 remains including food, remains of animals such as insects, fleas and rats, clothing, pieces of ceramic pottery and wine barrels, we know the ship had spent time in southern Portugal.

Highlights include:

- Insights into how the ship was built.
- The ship carried domestic animals and their bedding such as hay.
- It specialised in carrying barrels, known as casks, of wine.
- The sailors on board ate a range of foods grown in southern Europe such as grapes, figs, walnuts and seeds.
- Clothing found includes a decorated helmet and a long, pointed leather shoe – the more pointed the shoe, the more important the person.
- A silver coin was found hidden in a small hole in the wood; it was used as a good luck charm when the ship was built.

Final resting place of The Newport Ship
DAVID JORDAN

The remains of the Newport Ship are now in storage. With 100,000 hours of hard work, 70% of the wood has been treated using a waxy chemical and then dried using special freeze-drying machines – the water is removed by freezing it under a vacuum. With the water extracted the wood is unable to rot. The timbers have been fixed together using plastic nails; they mimic the iron ones originally used and which rust away.

A well-preserved skeleton, minus the skull, was found beneath the ship. It had nothing to do with the ship and instead dates back to the Iron Age when it was a ritual to bury a body in a river.

It is possible there are other parts of ships and walkways still buried in mud. Many channels were much wider than they are today; back then ships were able to get much further inland.

Four things to explore with the Newport Ship

- The website of the Newport Ship gives more information and details on visiting.
- Consider where ships and goods come from and go to from Newport today – visit the Newport Port Company for more details.
- How are ships built today? How would sailors dress today and what foods would they eat? How would sailors have navigated back then, and how would they navigate from Portugal to Newport today?
- Shipbuilding, including wooden ships, was an important industry in Chepstow – find out more online and through the Gwent Archives and local museum.

Watch an animation about the Newport ship at **livinglevels.org.uk/newport-ship**. Here there is also more information about the ship, a guidebook and visiting with your school.

ACTIVITY

Newport Ship's log

Use the information above and the Newport Ship website to write a ship's log of the journey the Newport Ship took from Portugal to arriving in Newport.

Consider:

- What life would have been like as a 15th century sailor.
- The smells on the ship.
- What the food was like.
- How the Gwent Levels looked as the ship sailed up the Severn Estuary.
- The first view of the Newport docks.
- What might have happened to the sailors after their ship collapsed.

Further activity

Research what new foods the Romans brought to the Gwent Levels 1,500 years earlier.

INTERPRETING DATA

The French silver coin (22mm diameter) found hidden in a small hole; it was used as a good luck charm when the ship was built.
NEWPORT MUSEUMS AND HERITAGE SERVICE

A pointed leather shoe of a sailor from the Newport Ship.
REX MORETON/NEWPORT MUSEUMS AND HERITAGE SERVICE

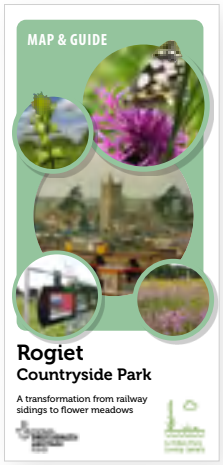
Remains found on the Newport ship, including (top-down) juniper, almond shells and pomegranate seeds
NATIONAL MUSEUM OF WALES

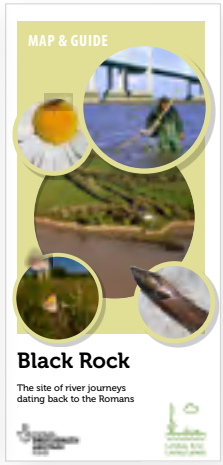
SECTION TWO

Black Rock & Rogiet

Black Rock and Rogiet Countryside Park have been important transport hubs for the Gwent Levels and surrounding areas since Roman times. Visiting these places with your classes gives a great idea of how these places functioned and why they were important. Below is more information on each site and links to further information.

livinglevels.org.uk/learning-resources





Black Rock

The rock here is over 300 million years old; it is known as carboniferous limestone and, as its name suggests, it is dark grey to black. It is made up of ancient sea creatures, particularly crinoids or sea lilies (related to starfish), and muds that built up at the bottom of the sea, eventually turning into rock and fossils.

Before the two Severn bridges had been built, the only way to get across the estuary was by boat. Black Rock, just on the edge of the Gwent Levels near Sudbrook, Chepstow and the Prince of Wales Bridge, was one of the places where people could cross. In 1863 a railway line stopped on Portskewett Pier at Black Rock where people took a boat to a connecting train and pier at New Passage near Severn Beach on the English side.

While the railways and pier have now gone, you can still visit the site of the ferry jetty at Black Rock to look out across the Severn Estuary and get a sense of the coastline. The site forms part of the Wales Coast Path.

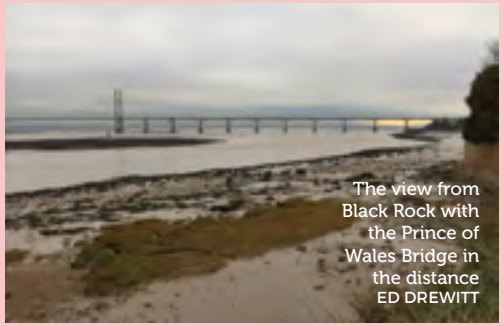
Black Rock and Beachley have been used as landing places for boats bringing goods and people by the Romans and Normans, and a ferry served Beachley as early as 1138 bringing monks, servants and cattle from Aust, on the other side of the Severn Estuary.

Further information and stories to use with your classes can be found on the webpage for this resource:

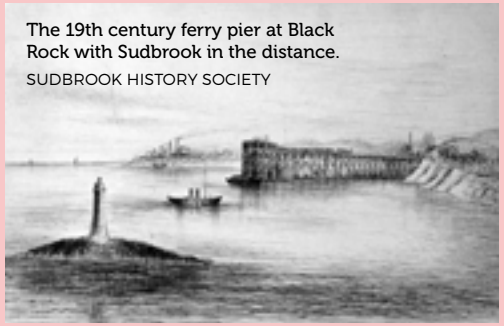
- PDF of the information panels revealing the history of the site and images of its past;
- Map of the coastal path;
- Black Rock/Sudbrook trail, providing many stories and images of the history of the area.

For more information on Black Rock and to download a Memory Treasure Map to accompany a trip there, visit **livinglevels.org.uk/black-rock**

At Black Rock there are now sculptures related to lave net fishing and engineering on the Gwent Levels. **livinglevels.org.uk/sculpture-trail**



The view from Black Rock with the Prince of Wales Bridge in the distance
ED DREWITT



The 19th century ferry pier at Black Rock with Sudbrook in the distance.
SUDBROOK HISTORY SOCIETY

Wild flowers at Rogiet Countryside Park
ANDY KARRAN, GWENT WILDLIFE TRUST

Rogiet Countryside Park

Snuggled in between housing, countryside and Severn Tunnel Junction, Rogiet Countryside Park is a space to explore and enjoy nature. It hasn't always been a quiet wild place though. Just over 30 years ago it was still a busy railway yard, known as a marshalling yard, full of sidings and trucks waiting to take goods such as coal, cows and steel to markets, often across the UK and other parts of the world. It closed in 1987. Getting supplies of goods from Wales to other parts of Britain and the world required careful planning and a network of trains and trucks. Rogiet was a key place for this.

Three information panels have been produced about the site, including photos and more facts about the site when it was a marshalling yard. They can be viewed at the countryside park as interpretation panels. They are available as a PDF on the webpage for this learning resource too **livinglevels.org.uk/learning-resources**.

On the webpage for this resource there are recordings with Ray Evans and Eric Broom talking to children about their time working on the steam trains. Hazel Bennett explains how local people then decided on turning the space into a countryside park.

Discover more about the Rogiet Hoard found in 1998 on the timeline, **livinglevels.org.uk/timeline**

For more information on Rogiet and to download a Memory Treasure Map to accompany a trip there, visit **livinglevels.org.uk/memory-maps**

ACTIVITY

Walking at Black Rock

Black Rock has some superb views of the Severn Estuary. Walk some of the coastal path where you'll see grazing fields showing the original drainage patterns. Black Rock is an ideal location to picnic too.

Three things to do at Black Rock

- A bioblitz – open an hour looking for as many plants and animals as you can; record and upload them to your local environment records centre app, lercwales.org.uk/app.php
- Imagine how this place may have looked, felt and worked as a railway and ferry jetty. Walk along the coastal path and explore the landscape – some of the grazing fields have changed very little over hundreds of years.
- Stop and listen – how many different sounds can you hear? Consider how the two bridges affect the landscape, physically, visually and audibly. Birds to listen for include the curlew, redshank and wigeon (visit bird sounds at rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/

How to get to Black Rock

On reaching the outskirts of Portskewett turn down Black Rock Road (signed 'Black Rock Picnic and Lave Net Fishery Site'). Black Rock picnic site car park is at the end of single lane on your right (ST 512 881). Postcode NP26 5TP. There is a barrier/flow plate system into the car park which would not be suitable for a large coach.

EXPLORING THE ENVIRONMENT

ACTIVITY

Walking at Rogiet

Three things to do here

- A bioblitz – spend an hour looking for as many plants and animals as you can; record and report them to South East Wales Biodiversity Records Centre, sewbrec.org.uk
- Print photos of how the countryside park used to look and compare with how it looks now. Work out where the photos were taken.
- Look for clues to its past life as a railway. How has nature taken over?

How to get to the country park

Near the entrance to Severn Tunnel Junction railway station take the road bridge over the railway line. Take the next turning on the right down into the car park for Rogiet Countryside Park. **(ST 462 874; postcode NP26 3TZ)**

EXPLORING THE ENVIRONMENT

Severn bridges

From Black Rock you have brilliant views of the two Severn bridges. The old M48 Severn Bridge was opened in 1966; the Second Severn Crossing, now known as the Prince of Wales Bridge, was opened in 1996.

Severn Tunnel

The Severn Tunnel was constructed by the Great Western Railway between 1873 and 1886. In 1879, the works were flooded by what is now known as 'The Great Spring'. Through innovative efforts, the flooding was contained, and work continued, albeit with a greater emphasis on drainage.

Fifty million litres of water per day infiltrate the tunnel. It is removed using several large pumping engines. The tunnel is around 4 miles (7km) long, of which just over 2 miles is under the river. The tunnel was the longest underwater tunnel in the world for more than 100 years until 1987.

The Severn Tunnel has recently undergone works to electrify the railway line that runs through it. Find out more about the challenges and engineering that was involved to do this.

For more information on how crossing the Severn Estuary was accomplished throughout the ages visit **severnbridges.org**

Shifting muds – what's beneath our feet?

The Gwent Levels is changing all the time. Muds move around, the saltmarsh comes and goes. Reedbeds grow and turn into bogs.

Over the past 2,000 years there have been many parts of the Levels that boats could sail along to jetties. Many of these are now silted up, hidden away. Deep down in the mud, many of these old creeks still contain the old wooden beams of jetties and even sunk boats.

Find out more about the seascape and compare images of Goldcliff at low tide and at high tide, **livinglevels.org.uk/the-seascape**

Foreshore excusion with Professor Bell
JEREMY WHITE

Bog oak at Goldcliffe
CHRIS HARRIS

ACTIVITY

The Gwent Levels' changing landscape: comparing maps

Investigate, using maps, how channels and rivers have changed over time. Compare maps from the 1830s and maps of today to see differences. Look at the presence/absence and positions of rivers, streams, roads and fields then and now.

See Part 1 (How has the Gwent Levels landscape changed over time?) and Part 5 (How was the Gwent Levels used to produce food?) of this learning resource for more information on maps and websites to visit.

Older maps tell engineers what might be beneath our feet. There are some channels, now silted up, that may have boats and jetties from hundreds of years ago. If new structures, such as buildings and bridges, are planned on the Levels, archaeologists and engineers have to look for these potential old creeks and objects so they know where and how they can build without any problems.

CURIOUS QUESTIONS TO EXPLORE

Tredegar House and its family's involvement with Newport's expansion

The Morgan family, who lived at Tredegar house, were involved with many big changes that Newport went through during the 1800s. Here's a summary:

- 1805: A tramroad was constructed that linked ironworks in Newport to the River Usk. Sir Charles Morgan was involved in the ironworks and owned most of the land the tram road passed through. Tolls were imposed and it became known as 'Park Mile' or the 'Golden Mile'.
- 1807: Sir Charles Morgan and relative Samuel Homfray created the Tredegar Wharf Company to build new warehouses and docks at Newport and Pillgwenlly.
- 1830: Sir Charles Morgan's annual income was £40,000 (800 times the salary of a well-off working man!). This was largely due to the tolls from the Golden Mile; fees were for every ton of coal or iron crossing Tredegar Park.
- 1835: The Newport Dock Act was passed by Parliament allowing Sir Charles to build the new town dock. Work started immediately.
- 1842: New Town Dock opens.
- There was previous and continued involvement in the docks with the Morgan family, including connections to the Transporter Bridge.

An artist's' reconstruction of the Barland's Farm boat
DEXTRA VISUAL/LIVING LEVELS 2019

Barlands Farm Boat

In 1993, archaeologists working on the development of a supermarket storage depot on the site of Barland's Farm, near Magor, made an extraordinary discovery. A bank of an ancient tidal creek once stretched all the way across the Levels, from the inland edge to the sea; a distance of about 2 miles (3km). Under several metres of clay, they uncovered the remains of a stone structure, possibly a jetty or bridge. As they investigated further, the archaeologists uncovered the well-preserved remains of a small boat next to the jetty. The boat survived to a length of 9.7m, but its original dimensions were probably 11.4m long, 3m across and 0.9m deep. A Roman coin along with pottery, coins and leather shoes, were all dated to the late third or early fourth century AD, during the period when Britain was part of the Roman Empire, Cardiff was a Legionary fortress and nearby Caerwent a Roman town. Further investigation of the ship's timbers using dendrochronology (tree-ring dating) showed that the oak trees used in the boat's construction had been cut down between AD 283 and 326, giving a likely date for the boat of around AD 300.

Ship finds from the Roman period are very rare; timber structures, and other organic materials, usually rot away after a relatively short time. The Gwent Levels are made up of layers of clay laid down by tides and floods that washed across the land before the creation of the sea wall. Organic objects, such as timbers, buried in these clays do not decay normally because the ground is saturated with water and no oxygen is present to allow fungi and bacteria to begin the process of decay.

The Barland's Farm Boat is currently in storage at Newport Medieval Ship Centre. For more information visit **livinglevels.org.uk/barlands-farm-boat**

Archaeologists working on the recovery of the Magor Pill boat
AMGUEDDFA CYMRU - NATIONAL MUSEUM OF WALES

Heavy machinery was required to recover the Magor Pill boat
AMGUEDDFA CYMRU - NATIONAL MUSEUM OF WALES

Magor Pill Boat

In 1994, local archaeologist Derek Upton found the remains of a ship buried in the mud 500m from the sea wall at Magor Pill, an ancient tidal creek that once crossed the levels.

A sample of timber was analysed and showed that the ship had been constructed sometime in the 13th century. Boat finds from this period are extremely rare, so the decision was taken to recover and conserve the remains. This proved a difficult task as the site was only exposed for a maximum of two hours each side of low tide.

The ships' timbers, which were well preserved by the estuary mud, were sent to the National Museum of Wales for conservation. Further analysis of the timbers, using tree-ring dating (dendrochronology), showed that the ship was built in AD 1239/40. The vessel was incomplete but would originally have been around 14m long, 3.7m wide and 1.2m deep.

During the medieval period such boats would have carried goods, animals and people to seaports at Newport, Caerleon, Chepstow and Monmouth, and as far inland as Hereford along the River Wye. The vessel was carrying iron ore, probably from Glamorgan.

At the time the ship sank, the entrance to Magor Pill was a small port or landing place on the edge of the Levels, called Abergwaitha (first recorded in 1245). The port probably served Tintern Abbey's Lower Grange, Magor, and the surrounding area. The remains of the port have long since vanished under the muddy estuary water.

Why did it sink? The boat may have sank during a storm, the keel may have split at a weak point, or its heavy cargo may have shifted on the wooden hurdle it was placed on, causing the boat to capsize.

For more information visit **livinglevels.org.uk/magor-pill-boat**

SECTION FOUR

Moving around the Gwent Levels

A few hundred years ago people living on the Gwent Levels didn't travel very far from where they lived or worked.

Farm equipment was very basic and much of the hard labour was done by hand. Over time, farming became mechanised as technology and tools became more sophisticated and quicker; there was a move from using horses and people to do work to tractors and machines. Many of the small lanes across the Gwent Levels were farm droves, corridors and back routes used by farmers to move farm animals and equipment between fields. While some remain muddy and stony today, others have been tarmacked and are used as roads by everyday traffic.

Partly developed small farm track
PETER CLAYTON

Tarmacked farm road with public right of way
MIKE FAHERTY

Pylons and motorway into Newport across the Levels; a sign of infrastructure to accommodate a large town or city.
ED DREWITT

ACTIVITY

Newport's expansion

Make an animation showing how Newport has grown over time. This can be done with stop motion animation tools or software, which are available as apps or downloads. Students could use Lego, junk modelling or Playmobil type toys to show how the village has changed from a few houses, with one or two narrow roads, to grow to a large city. Students could include some of the ideas below.

- The effects of building the steelworks and industrial estates;
- The building of more houses for people to live in;
- The growth of traffic and new and wider roads;
- Building of warehouses and factories on farmland;
- Air pollution and litter;
- Effects on wildlife.

As an extension, students could consider how future road projects, building of houses and growth of industrial estates affect the local environment.

INTERPRETING DATA

SECTION FIVE

Moving goods around Newport

For more information about going to the the bridge and its history visit livinglevels.org.uk/newport-transporter-bridge

Look through the timeline to see a photo of when the bridge was still being constructed livinglevels.org.uk/timeline

ACTIVITY

Port of Newport maths problems

Use the data about the Port of Newport to answer the maths problems below.

- Which quay is bigger?
- How much deeper is the north quay than the south quay? How much longer is the north quay than the south quay?
- Assuming a ship is rectangular, work out the area of the largest ship that can fit into each quay.
- Which quay can fit the greatest number of ships in end to end?

INTERPRETING DATA

The Port of Newport is classed as a major sea port and in 2014 handled in excess of 1.85 million tonnes of cargo.

Today it employs 3,000 people and contributes £186 million to the Welsh economy. It has been a port since the Roman times and when the Newport Ship collapsed into the river, the port, then a town dock, was in the middle of Newport. The current port, on the outskirts of the city, was built in 1865. During the 1800s, common land on the Gwent Levels, large open fields used by local people to grow crops and graze animals, became enclosed as part of the Inclosure Acts. With nowhere to farm, many local people moved to Newport to work and live, with many being employed in the growing port.

Today, goods come from and go to all around the world from Morocco to Malaysia and the United States to Ukraine. Ships carry a huge selection of different cargo including steel, wood, materials to be recycled, coal, grain, animal feeds, natural materials (biomasss) for fuel, sand, cement and fertilisers. More information can be found at abports.co.uk/Our_Locations/South_Wales/Newport

The Port of Newport has two quays where ships can dock. Although the quays are long, the size of the ships is restricted. Why might this be?

Quay	Length	Depth of water	Length of ship	Beam (width of ship)
North	5,569m	11.1m	244m	30.1m
South	2,450m	8.2m	122m	17.2m

ACTIVITY

Building a bridge

As Newport grows the port becomes busier and more people visit the city. More roads are likely to be built to take cars, lorries and buses to different places. To ease congestion, one idea is to build a new bridge over Newport Docks; it would need to be as long as the Second Severn Crossing (Prince of Wales Bridge). Design a bridge that would span this distance.

Things to discuss

- What would the bridge be made from?
- How much might it cost?
- How long would it take to build?
- What effect would a new bridge and road have on wildlife?
- How would the Gwent Levels be protected? How would the bridge avoid the Gwent Levels?
- How would it affect the look of the area?

INTERPRETING DATA

Newport's transporter bridge

In 1906, a transporter bridge opened in Newport to deal with the increasing number of people working in the port. Rather than walking the 4-mile distance from one side of the river to the other, the transporter bridge was able to take people (and cars) straight over the water and ships. Across the world 20 were constructed and this one in Newport is only one of six left that still work.

Research why Newport's transporter bridge might become a World Heritage Site.

Newport Transporter Bridge
IMAGE: TIIA MONTO

Span of bridge	Weight of steel in each tower	Weight of steel in the suspension cable	Diameter of suspension cable
197m	282 metric tonnes	199 metric tonnes	75mm

Newport 500 years ago

This is a scene of Newport in the 1400s when the Newport Ship was in the docks for repairs. Look carefully at the painting. Newport was a small town with a castle. What different things can you see in the painting? How has Newport changed over the past 500 years?

ANNE LEAVER

THE LEVELS THROUGH THE AGES, PAGE 16

Answers

Age	Describe how the water coverd the land	Describe how and where the people lived	Explain how the people used the land
End of last ice age, around 6000BC *	Glaciers melt flooding the land, small rivers and streams.	Wooden temporary buildings.	Hunting, gathering and fishing for wild foods.
Iron age, about 280BC *	Wet marsh lands with some higher drier areas.	Wetland settlement. Groups of wooden houses enclosed with a fence. Walkways through the marshes.	Settled on higher drier ground. Summer dwellings on the levels for grazing.
Roman occupation, around AD200AD *	Land was enclosed and partly drained to create drier grassland.	Wetland enclosure. Larger, more substantial dwellings.	Cattle and cavalry horses grazed.
Monastic life, around AD1250 *	Drained the higher land near the shoreline, then the lower-lying areas further away from the sea.	Substantial stone monastery buildings and larger wooden houses. First roads are made and developed.	Farming the drier areas.
The time of the act of sewers, around AD1500	Land drained further and a series of fields laid out. Ditches and drains created.	Progressively more permanent settlements.	Farming more areas as they are drained.
The flood, AD1607 *	Storm and a high tide caused a flood which swept 3 miles inland and rose 3m in some areas.	Stone and wooden buildings	Livestock was killed, houses destroyed, and people displaced.
Industrial revolution, AD1800s	Roads, fields, towns and villages develop.	Railway and factories arrive. Tunnel made under the Severn. Bridges made across local rivers.	Farming. Industry develops.
Modern day	Land is drained and mostly dry.	Populated with houses and industry.	Industry leisure activities road and rail.

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Living Levels

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