

# RIVER DETECTIVES

## CONTENTS



### INTRODUCTION

Surveying fun [Teacher's page](#)

### RIVER SURVEY SHEETS

GREAT OUSE WILDLIFE [Teacher's pages](#)

### WATER CYCLE WORKSHEET

### OUR RIVER

### A RIVER SYSTEM

### RIVERS AND FLOODS

ANSWERS [Teacher's page](#)

# INTRODUCTION

## Surveying fun

Careful surveys are an important part of investigating an area. We have provided a River Survey Sheet template with four sections over three pages for photocopying and use at three locations near or on the Island. But first, encourage the children to find out more about their river.

### Our river

Holt Island is located in the River Great Ouse. The river represents a wonderful natural resource that the children will find fascinating to research. Our river Great Ouse is approximately 140 miles/230 km long from source to sea. It is the fifth longest river in the UK. From this table can the children discover which rivers are longer and where they flow from and to?

	name	miles	km
1	River Severn	220	354
2	River Thames	215	346
3	River Trent	185	297
4	River Aire	161	259
5	River Great Ouse	143	230
6	River Wye	135	215
7	River Tay	117	188
8	River Spey	107	172
9	River Nene	100	161
10	River Clyde	98	158

### On flows the river

The source of the Great Ouse is near Syresham in Northamptonshire and it flows through Buckingham and Milton Keynes to Kempston in Bedfordshire. This 70 miles/114 km section is not navigable. From Kempston it continues through Bedford, and into Cambridgeshire via St Neots, Godmanchester, Huntingdon, Hemingford Grey to St Ives. From our town it continues through Earith, Ely and Littleport, to reach the Denver sluice in Norfolk. Below the sluice the 16 miles/26 km of river is tidal and passes Downham Market to enter The Wash at King's Lynn.

The Ouse Washes in Cambridgeshire where floodwater is diverted in winter are famous for the wildlife supported by the wet meadows there. A great day trip could be organised to either the RSPB or Wildfowl and Wetland Reserves to investigate the importance of this area.

To focus on the river in its entirety ask the children to discover as much about the Great Ouse as possible from its source to the sea. In addition ask them to investigate how the river is used in the towns and villages through which it passes, how many bridges it flows under, and how many locks are required to make the river navigable.

### RESOURCES

[www.waterscape.com/canals-and-rivers/river-great-ouse](http://www.waterscape.com/canals-and-rivers/river-great-ouse) Information regarding length, history etc of the River Great Ouse.

[www.rspb.org.uk](http://www.rspb.org.uk) Basic information about birdlife found at the Ouse Washes.

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk) Check to see if there are any fast stream or flood warnings in place at the moment.

[www.washbarrier.org](http://www.washbarrier.org) Considers flooding and actions that can be taken in The Wash.

[www.captainsplosh.co.uk](http://www.captainsplosh.co.uk) Anglian Water's educational pages look at nature, clean water provision and water uses.

# INTRODUCTION continued

## Using the River Survey Sheets

The purpose of this section is to investigate the river as it is found in St Ives in three locations on the Island. By completing a survey sheet for each, the children will gain a good understanding of the many different elements that make their local river landscape what it is today, and the differences between the backwater and the main river channel. The locations are as follows:

1. From the bridge onto the island, looking right along the backwater upstream (away from the town centre).
2. From The Waits, opposite the Island.
3. From the boardwalk on the Island overlooking Hemingford Meadow (at the widening of the path by the bench for Mr and Mrs Mann), looking both ways. The group adult rather than the children may need to collect the water sample from this location.

Choose the location you want, copy the sheets and tick the relevant box.



## Water safety

**Before they visit the site, ask the children to come up with how they can stay safe near deep water. Then ask them to make their own list of rules they must follow – they are more likely to remember these if they have created them themselves. There is a hazards table included in this pack for your information.**

## Parts of the River Survey Sheet

### Section 1. RIVER FACTS

Each side of the river may have different attributes – record both sides (maybe use a black and a blue pen, but remember to make a note of which bank is which colour). The depth of the river will have to be guessed or recorded as ‘unknown’.

### Section 2. RIVER CHEMISTRY

The children can work out a safe way to retrieve a water sample – the easiest is to use an empty plastic bottle (glue some clean stones to the underside so it sinks) on a long piece of string so you can throw it in and retrieve it again.

### Section 3. RIVER WILDLIFE

The Spotter Guide will help with wildlife identification.

### Section 4. ILLUSTRATIONS

If the surveys are to be used together for comparisons they need to be completed at a similar time. Sketches can be completed on a separate visit.

All of the sketches and photos created by the children can be used together in a big class display – draw out a large scale plan of the river and use the material to annotate it.

**NOTE** The sea is in the direction of the medieval stone town bridge (the one with the chapel). For the purpose of completing the survey sheets and annotating the maps, always stand facing downstream, towards the sea, with the bank on your left as the left bank and the bank on your right as the right bank.



# RIVER SURVEY SHEET

Name/name of group ..... Date .....

Tick which location you are surveying:

Location 1 From bridge on the backwater

Location 2 From The Waits

Location 3 From the boardwalk opposite Hemingford Meadow

Current weather conditions Rainy  Cloudy  Windy (strong)

Windy (light)  No wind  Sunny  Other .....

Recent weather conditions Lots of rain  Little rain  No rain

## Section 1 RIVER FACTS

River width <1m  1-5m  >5m

River depth .....

What is the river bed made of? Can't see  Mud and silt  Clay

Sand  Pebbles  Boulders  Concrete/bricks

Flow speed How long does it take for a stick to travel 10 m? .....

What is the river bank made of?

Earth  Boulders  Bedrock  Brick/stone  Covered in vegetation

What is the river bank shape? Steep  Gentle  Reinforced  Not visible

What is the height of the river bank above the water?

<1m  1-2m  2-3m  >3m

What signs of erosion can you see? .....

River litter Number of items you can see .....

Type of litter (bottles, oil, bicycles etc.) .....

What is the surrounding land use? Farmland (arable)  Farmland (grazing)

Scrub/rough grass  Woodland  Wetland  Public park

Urban/residential  Flood banks  Other .....

Is there any evidence of people using the waterway?

Moored boats  Moving boats  No evidence of boats

Other.....

# RIVER SURVEY SHEET continued 1

Name/name of group ..... Date .....

Survey location **1** The bridge  **2** The Waits  **3** The boardwalk

## Section 2 RIVER CHEMISTRY

You will need to use proper testing kits.

Water pH .....

Nitrate level .....

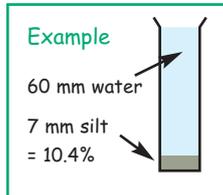
Collect a water sample and place it in a straight-sided, see-through container.

Is the water clear?  
.....

Leave it for a while until the silt settles and then measure the height of the sediment compared to the height of the water.

What percentage is this?  
.....

Draw in the level of water and silt in the blank container below



Your sample

## Section 3 RIVER WILDLIFE

Look carefully around the location and tick off the species of plants, trees, shrubs, birds, insects and mammals that you can see. Use the Spotter Guide to help your identifications.

### Plants (river)

- Water Plantain
- Bogbean
- Bulrush
- Common Reed
- Pondweed
- Duckweed
- Yellow Iris
- Water Mint
- Floating Sweetgrass
- Water Lily

Others .....

### Plants (bank)

- Purple Loosestrife
- Marsh Marigold
- Common Sedge
- Ragged Robin
- Himalayan Balsam

Others .....

### Trees and shrubs

- Ash
- Alder
- Willow
- Hawthorn
- Elder
- Bramble
- Oak

Others .....

### Birds (water)

- Heron
- Kingfisher
- Mallard
- Mute Swan

- Greylag Goose
- Canada Goose
- Coot
- Moorhen
- Great Crested Grebe

Others .....

### Birds (surrounding area)

- Sparrow
- Blackbird
- Blue tit
- Great Tit
- Chaffinch
- Wren
- Thrush
- Wood Pigeon

Others .....

### Insects

- Dragonflies
- Butterflies
- Beetles
- Bees
- Flies

Others .....

### Mammals (signs and actual sightings) on the river banks

- Rabbit
- Otter
- Water Vole

- Rat
- Muntjac
- Mink

Others .....

# RIVER SURVEY SHEET continued 2

Name/name of group ..... Date .....

Survey Location **1** The bridge  **2** The Waits  **3** The boardwalk

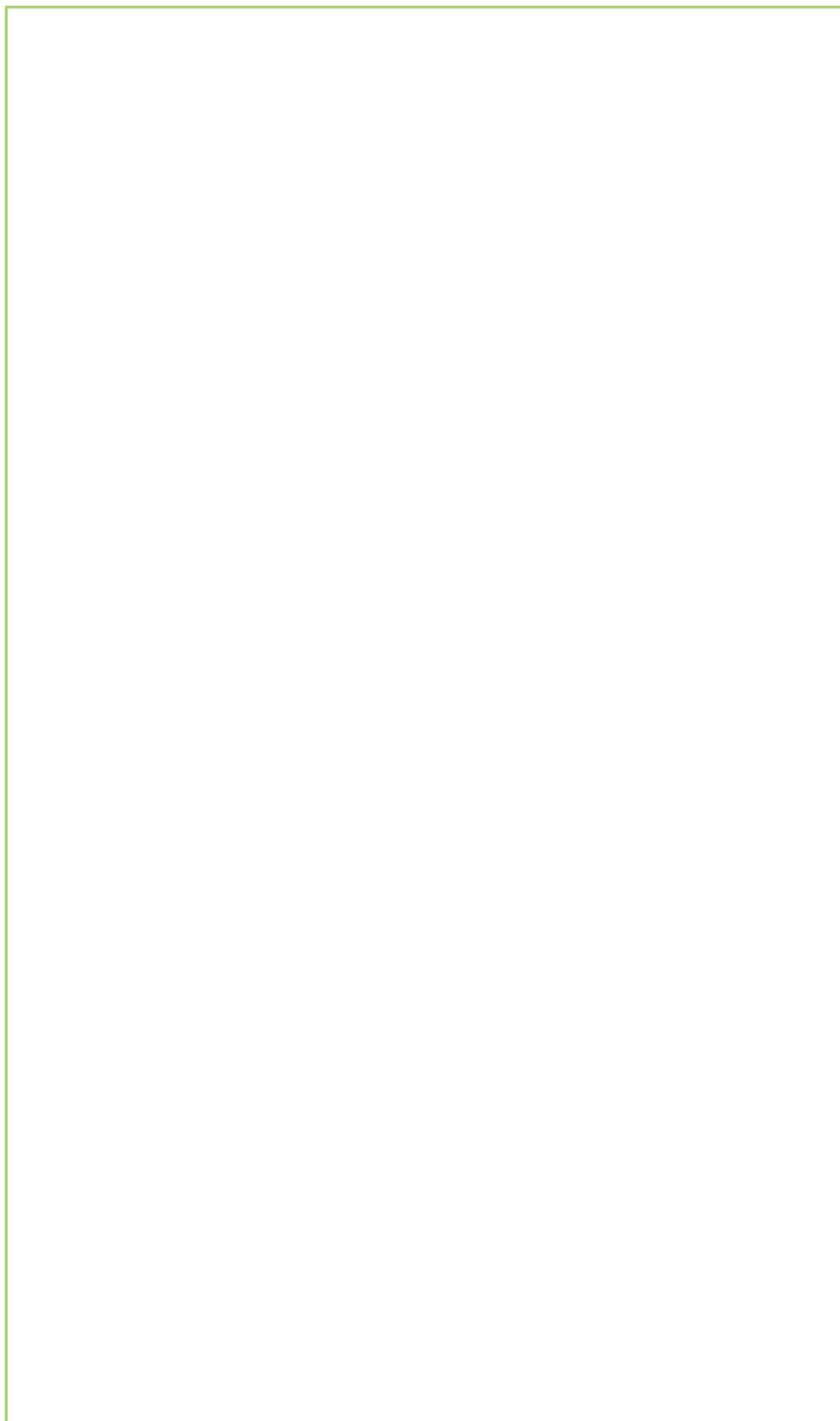
## Section 4 ILLUSTRATIONS

In this box  or on another piece of paper, sketch the area you have been surveying. Be sure to record information such as:

- direction of flow
- left bank and right bank
- bank composition
- man-made features
- types of plants in the water (on the surface, underwater or emerging from the water)
- overhanging trees
- what the riverside is used for
- where you saw animals
- .... and anything else of interest

This can be done as an aerial view/plan, or as a perspective view from where you are standing.

Alternatively, take lots of photos to work with when you are back in school as part of an IT project!



# GREAT OUSE WILDLIFE

The best time to visit the Island with children to watch for river wildlife is in the spring and summer. Try to get on the Island as early in the day as you can. A key is always available from the Norris Museum or One Leisure St Ives or from the Friends group – see ABOUT THE FRIENDS GROUP at the back of the Education Pack.

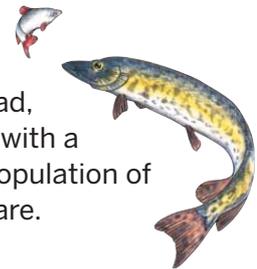
## Birds and fish

On a fine still morning in April, all the resident birds – there is a list displayed near the hut – are in full song as the males claim nesting territory and attract females. Listen out for the lovely fluted Blackbird, the Song Thrush repeating his phrases, the excited chatter of Blue Tits, the 'teacher, teacher' call of Great Tits and the Wrens singing loud, explosive phrases.



Later in the month the summer warblers arrive and you will hear the Chiffchaff singing its own name, the beautiful song of the Black Cap and Sedge and Reed Warblers chattering away constantly in the reed beds. Sit quietly by the river bank and you should see Great Crested Grebes, maybe a Cormorant diving for fish, a Heron standing stock still watching the water. If you are lucky, a Kingfisher will flash by fast and low. We hope one may start to fish in our pond. Coots and Moorhens will be sitting on floating nests, and we may have a Mute Swan nest somewhere on the Island bank.

Swallows, Sand Martins and House Martins will snatch insects from just above the river surface and later in the season, Swifts will scream overhead, and the lazy-winged Common Tern will suddenly plunge dive, often rising with a fish. Although slow and weedy, the river is healthy and supports a good population of coarse fish, which is why we can easily see the fish-eaters taking their share.



## Damsels and dragons

High summer – July, August and September – is the time to see the damsel and dragonflies. Make your way to the central meadow area where you will find some picnic benches to sit and wait quietly. Here the delicate damsels will flit and flutter gracefully. Watch out for the speciality of this area, the striking Banded Demoiselle with a dark 'thumbprint' on each wing. This is the male with a blue-green body. The female is a dazzling green with no wing mark.

When at rest damselflies sit with their wings folded along their body. Larger dragonflies sit with their wings outstretched – an easy way to tell the two groups apart. Dragonflies are spectacular and fly fast chasing insect prey. Listen out for the clattering sound of their dry wings. They will often bask on sunny days on the picnic tables. Sit very still! Both damsels and dragons have a larval stage that lives for several years underwater, before emerging and hatching into the adult form we see flying around. Neither will sting nor bite. There is more information about the life cycle of a dragonfly on the CD-ROM. **(See over page.)**



# GREAT OUSE WILDLIFE continued

## Mammals

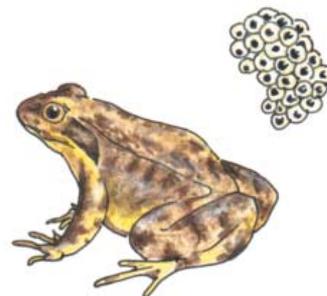
You'll have to visit early in the morning or late in the afternoon to catch fleeting glimpses of our Fox and Muntjac deer. At other times look for their evidence on the boardwalk! Fox droppings are obvious, and those of Muntjac are small, dark and round. Muntjac are about the size of a small dog and love to nibble the shoots of young willow. This is why the willow osiers in the plantations (see CHANGING LANDCAPES) are no longer coppiced to the ground, but pollarded to form a stump to deter the deer from reaching up. We also have Grey Squirrels and sometimes a melanistic (black) one. Mink are occasionally seen, rarely otters, and on occasions a Common Seal from King's Lynn appears to spend time in St Ives, or more likely Earith.



The bat boxes in the trees near the main map – count groups of three on four trees – attract roosting Soprano Pipistrelles, which are about the size of a 50p coin. These are a protected species and must not be disturbed. Visit on a warm evening with a bat detector and you will hear their high frequency squeaks however.

## Amphibians and reptiles

The pond will attract frogs and toads, and perhaps newts, to breed – let us know of your sightings, especially of frog spawn. Watch out too for basking Grass Snakes – quite harmless – and sometimes to be seen swimming in the river hunting small fish and insects.



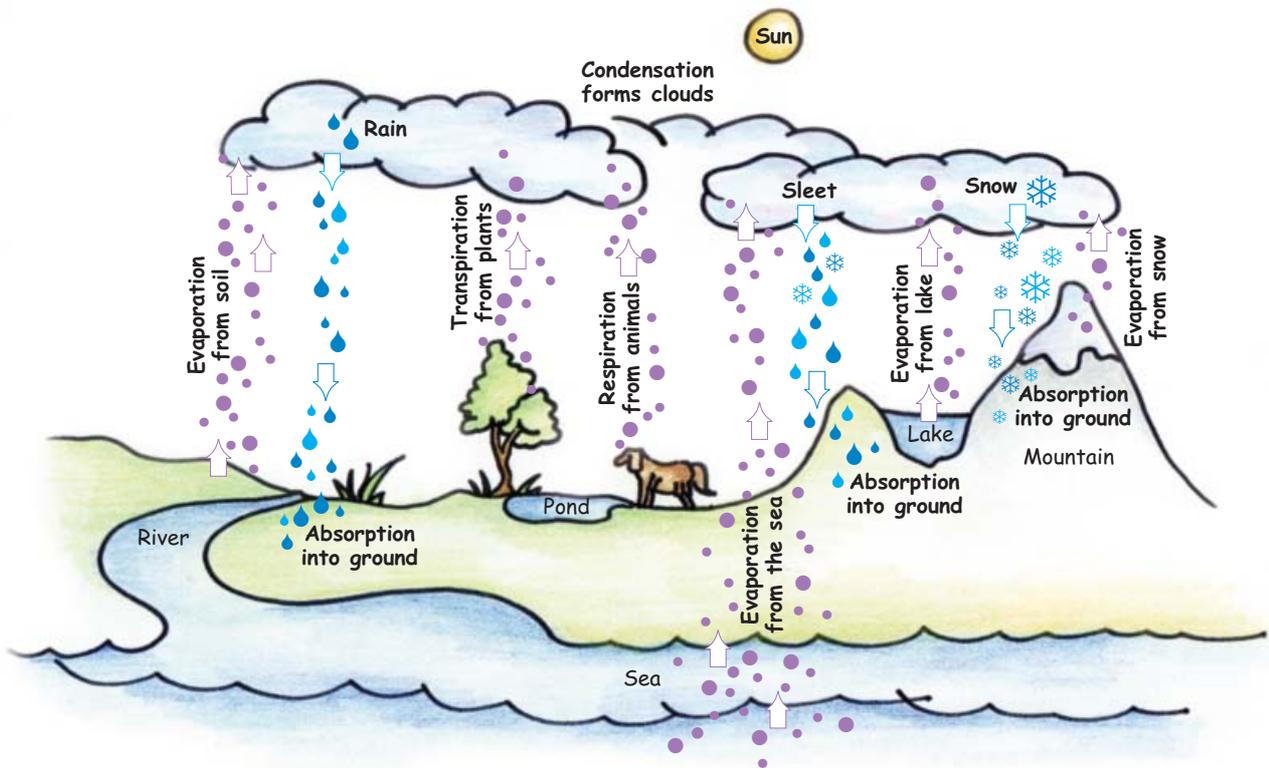
## Flora

Our rare wet woodland habitat supports a wide range of trees, shrubs and plants. Many species of willow delight in the damp conditions and we have mature Horse Chestnut and Common Ash with Alder, Hawthorn, Sycamore and Elder plus wild plum and apple trees. The reed bed comprises Phragmites common Reed, Reed Canary Grass, Bulrush and Branched Bur-reed and among marsh plants we have good displays of Water Mint, Common Comfrey, Hemp Agrimony plus Stinging Nettles with the unusual parasitic Dodder plant.

Our SPOTTER GUIDE will help you to identify the animals and plants you see on the Island.



# WATER CYCLE WORKSHEET



Have you ever looked at a glass of water and wondered how old the water is? Well it is very old indeed because the earth has only a limited supply, and so it keeps going round and round in what is known as The Water Cycle.

You'll get the idea if you look closely at the diagram and then fill in the missing words in the statements below. If you are not sure about an answer, have another look at the diagram.

The water on our planet, \_\_\_\_\_, is constantly being \_\_\_\_\_. When the heat from the \_\_\_\_\_ warms water from the River Great Ouse, lakes, ponds and the \_\_\_\_\_, it is turned into \_\_\_\_\_ - \_\_\_\_\_. This process is known as \_\_\_\_\_.

\_\_\_\_\_ is when the vapour rises up and cools down to form small water \_\_\_\_\_ which join together to form \_\_\_\_\_. If these get too heavy, the water droplets fall from the sky as \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_. Water is essential for life.

The water that falls may go straight into reservoirs or seas, whilst some may soak into the \_\_\_\_\_ before finding its way back into the River Great Ouse and other river systems.

Some water is used by \_\_\_\_\_ which suck it from the ground using their \_\_\_\_\_.

The water cycle starts again as the water is transpired from their \_\_\_\_\_.

# OUR RIVER

Let's think about rivers. Rivers can appear very different from each other depending on what type of rock and landscape they flow through, or whereabouts on the river happen to be. Rivers change in appearance from the source to the sea. You might imagine a very wide river (think of the Amazon) with a large delta at the mouth (think of the Nile.) Alternatively, you may think of a narrow, pretty river you have seen on holiday - a mountain stream splashing along a stony bottom for example, or a river meandering gently through rolling hills, or a torrent flowing from a high point to form a waterfall crashing into a pool below.



To describe a river you need to understand the following terminology. Research these words and write a definition in the space provided then tick any that you know relate to the River Great Ouse in St Ives.

River word	Meaning	Tick
Source		
Waterfall		
Meander		
Delta		
Mouth		
Flood plain		
Estuary		
Ox bow lake		
Steep sided valley		
Erosion		
Pollution		
River bed		
River load		

Now write a few notes from your observations to describe our river (shown above):

The River Great Ouse is .....

It flows .....

In St Ives in summer it is .....

In St Ives in winter it is .....

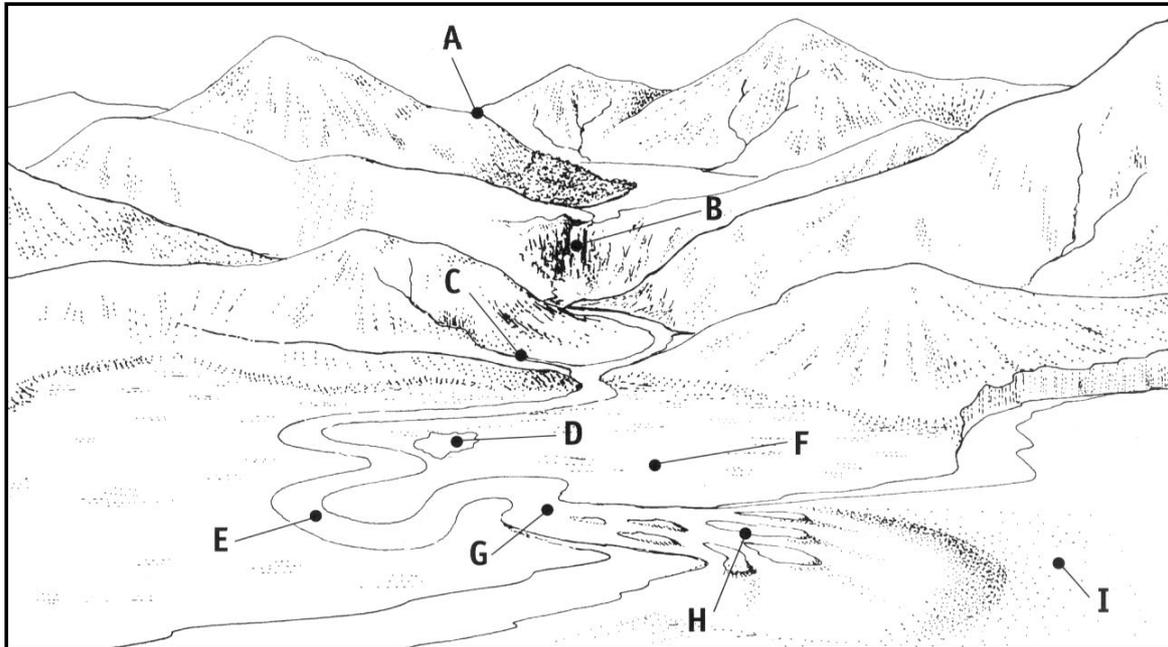
Throughout the year the river is used by .....

In historical times the river was important because .....

I like the river best for .....

# A RIVER SYSTEM

As soon as rain falls on high ground it starts to flow downhill. The water finds the easiest way it can to the sea. The picture shows the course of a river from the hills to the sea.



What are the features marked at A, B, C, D, E, F, G, H and I? Choose the correct labels from those listed below and write the letter in the box.

- source
- sea
- flood plain
- meander
- tributary
- delta
- waterfall
- lake
- mouth

Use the picture to help you fill in the gaps in these sentences:

The place where a river starts is called its .....

A ..... is a smaller river or stream which flows into a larger one.

A large bend in a river is called a .....

A ..... is an area of land roughly triangular in shape which forms where a river enters a lake or the sea.

# RIVERS AND FLOODS

Rivers carry heavy loads of earth, stones, debris and silt when they have lots of energy. This is usually when they are moving fast during a flood. If the water flow slows down the material is deposited. On Holt Island the willow grows extremely well because the ground is wet, but also because the sediment that is dropped by the river in flood is rich in nutrients.



## Flood research

The River Great Ouse has flooded frequently in this area in recent years.

Can you find out the date of the last big flood?.....

Which areas locally were flooded? .....

Was there any damage to properties? If so, which? .....

.....

Once the water had gone down, was there any debris left? Yes  No

## Why does the river flood?

A lot of water falling in the catchment area can cause the river to flood, but there are many contributing factors. Consider yourself as a town planner and try to predict what might happen in the following scenarios:

**Scenario 1.** If the ground is **extremely** dry prior to a torrential rainstorm, what might be the result and why? .....

.....

**Scenario 2.** If an area was once a grassy field with cows grazing but has recently been developed with new concrete play areas and tarmac roads, what might the effect be if it rains heavily?.....

.....

**Scenario 3.** If the ground in the Ouse valley was already slightly damp, say in May, and there was a terrific thunderstorm five miles upriver with torrential rain in Huntingdon, can you predict what might happen in St Ives, and explain your answer?.....

.....

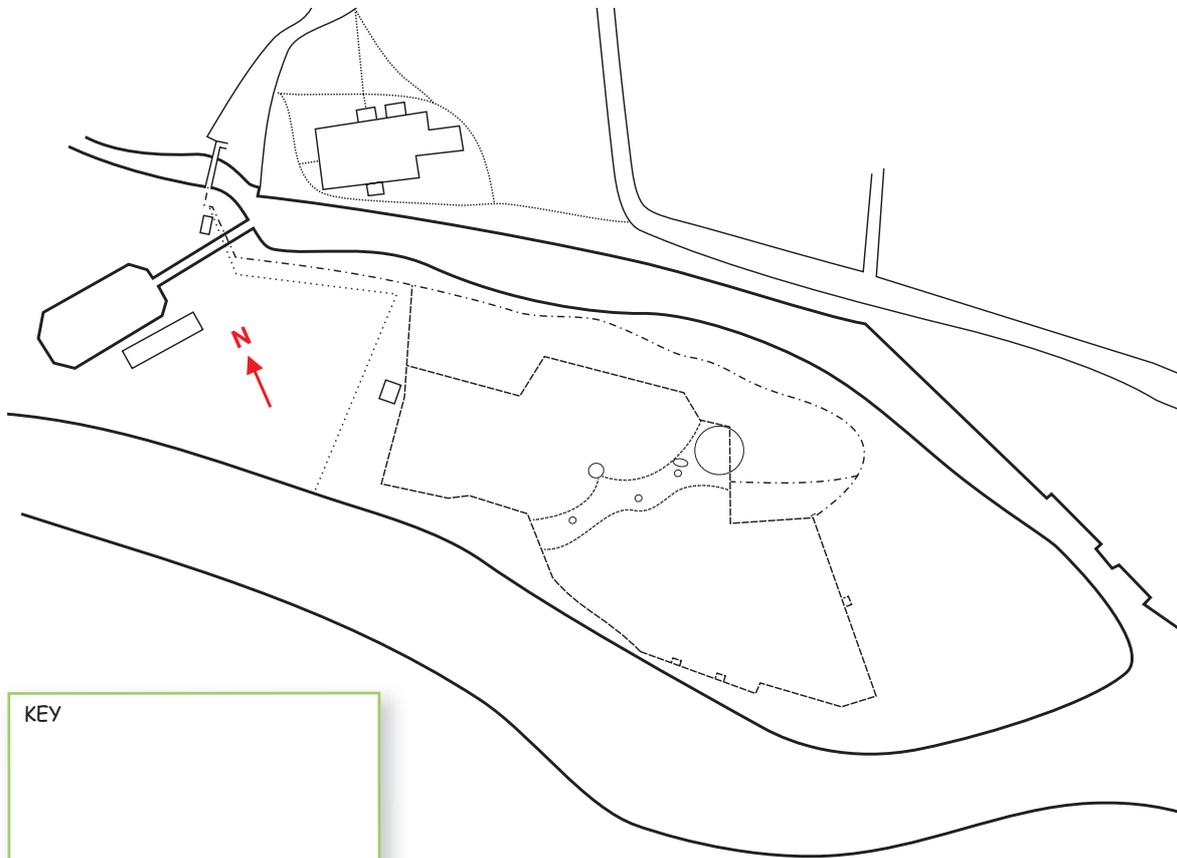
# RIVERS AND FLOODS continued

## Working with the flood

As the town planner, you have been told to create a nature reserve on an existing island in a river which is frequently flooded. The public will be allowed to visit and access is over a bridge. Using the island outline below add the features you might have to include to encourage people to visit. Create a key and use symbols for everything you want to include.

Remember! Consider the following important points:

- You have to balance the needs of the wildlife with those of the visitors.
- Different visitors will have different needs.
- What will happen when the island floods?



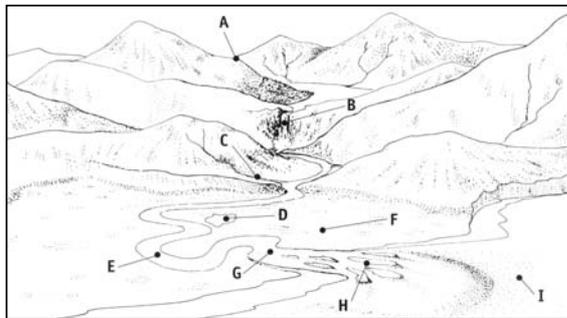
KEY

# ANSWERS

## WATER CYCLE WORKSHEET

The water on our planet, **earth**, is constantly being **recycled**. When the heat from the **sun** warms water from lakes, ponds and the **sea**, it is turned into **water vapour**. This process is known as **evaporation**. **Condensation** is when the vapour rises up and cools down to form small water **droplets** which join together to form **clouds**. If these get too heavy, the water droplets fall from the sky as **rain, sleet** or **snow**. Water is essential for life. The water that falls may go straight into reservoirs or seas, whilst some may soak into the **ground** before finding its way into river systems. Some water is used by **plants** which suck it from the ground using their **roots**. The water cycle starts again as the water is **transpired** from their leaves.

## A RIVER SYSTEM



- A** source
- I** sea
- F** flood plain
- E** meander
- C** tributary
- H** delta
- B** waterfall
- D** lake
- G** mouth

The place where a river starts is called its **source**. A **tributary** is a smaller river or stream which flows into a larger one. A large bend in a river is called a **meander**. A **delta** is an area of land roughly triangular in shape which forms where a river enters a lake or the sea.