

# WORKSHEETS

Key:

Writing Task



Art / drawing Task



Group Task



Experiment



Reflection



Outing/Visit





## ACTIVITY: 1

# HOW WETLANDS ARE MADE

Water flows from higher ground into flattish, wetland area and takes a long time to move away. This causes the water to gradually sink into the ground to produce a very high-water table unlike a river system where the water moves rapidly downstream because of the natural slope of the land.

You will need:

- newspapers
- Spray bottle for water or an outside hose with a nozzle with a “shower” setting
- Water
- An outside concrete space to conduct this experiment
- Stop watch or timer

### **Step 1 – making the pond**

Lie several layers of newspaper flat on the concrete. (*You could get different groups to do different thicknesses of layers*)

Roll up the edges of the newspaper to make a border – this makes a pond

Inside the pond place rolled up balls of newspaper to make small islands – these small islands don’t need to be below the height of the pond edge.

### **Step 2**

Gently spray water onto the pond until the water level is nearly level with the border.

Now make a small gap in the border and observe how long it takes for the water to drain away.

Before it completely drains away, place the gaps with some newspaper and refill the pond.

This time make two small gaps and observe how long it takes for the water to completely drain away.

Repeat this process several times to see if the process of draining away gets slower, quicker or stays the same.

If the time for draining either increases or decreases try to work out why this is so?



# HOW WETLANDS ARE MADE

GROUP NAME: \_\_\_\_\_

Number of gaps in the pond edge	Time it took to drain away
1	
2	
3	
4	
5	

As more water was put in our pond the water drained:

SLOWER

QUICKER

STAYED THE SAME

Why did your group think the pond drained slower, quicker or stayed the same?

What did the islands do in the pond?

What is the base of the pond like now?





## ACTIVITY 2

# HOW WETLANDS WORK

This experiment shows how the wetland area uses water, retains sediment and acts as a filter. The food colouring will show the effect of pollution within the waterway.

You will need:

- two plastic tubes
- Sponges – 2 or 3 different thicknesses, preferably light in colour
- Water
- A jug or suitable container for pour water into the plastic tube
- A measuring cup
- A large container (fish crate or similar)
- Fine soil
- Food colouring – a different colour to the sponge

1. Take one of your plastic tubes and place standing upright in your large container – this tube represents “downstream”.
2. Take one of your sponges and place that one top of your tube – this represents the wetland area
3. Take your second plastic tube and hold on top of the sponge – this represents “upstream”
4. Now gently pour 1 cup of water into the upstream tube
5. Notice how much water the sponge holds and how much comes out of the downstream tube
6. You can squeeze out the sponge into a measuring cup to see how much the sponge has absorbed
7. Try this again with the various size thicknesses of sponge you have and note the amount of water the sponge collects.
8. Now mix some of the fine soil in the water and pour that through your upstream tube – watch what happens to the sponge.
9. This time add some food colouring to the water.



## ACTIVITY 2 – HOW WETLANDS WORK

GROUP NAME: \_\_\_\_\_

*Write down the amount of water you collected from your sponge after you put one cup of water through your upstream tube, completed for each thickness of sponge you use*

Sponge thickness (cm)	Water collected

Describe what happened when you placed soil into the water:

Thinking about what the sponge looks like after you put soil through the tester, what do you think this represents in the environment?

Describe what your sponge looks like when you added food colouring to your water:

If the food colouring represented pollution, for example oil, what do you think this would do to the wetland area?





### ACTIVITY 3

## TYPES OF WETLANDS

Choose the best word to complete the sentence

Swamp	Wildlife	Bog	Spagnum	Lagoon	Fish
Estuary	Whitebait	Lakes	Pond	Ephemeral	

An Estuary provides an important breeding ground for \_\_\_\_\_  
on the West Coast.

A swamp has lots of plants that provide great hiding places for \_\_\_\_\_.

A bog is a good environment for \_\_\_\_\_ moss to grow.

A \_\_\_\_\_ is mainly fresh water but may sometimes have  
saltwater as it washes in.

A \_\_\_\_\_ is a wetland that has water flowing through it.

The water that sits in a \_\_\_\_\_ will have few nutrients and be very acidic.

An \_\_\_\_\_ will have mudflats that will be covered in water at  
high tide.

\_\_\_\_\_ are permanent areas of open freshwater.

A lagoon is an important breeding ground for birds and \_\_\_\_\_.

An \_\_\_\_\_ wetland isn't there all the time, it can have water  
in it when it rains and can dry up when there are long periods without rain.

A \_\_\_\_\_ is a manmade wetland.



## ANSWERS to Activity 3

An Estuary provides an important breeding ground for whitebait on the West Coast.

A swamp has lots of plants that provide great hiding places for wildlife.

A bog is a good environment for spaghnum moss to grow.

A lagoon is mainly fresh water but may sometimes have saltwater as it washes in.

A swamp is a wetland that has water flowing through it.

The water that sits in a bog will have few nutrients and be very acidic.

An estuary will have mudflats that will be covered in water at high tide.

Lakes are permanent areas of open freshwater.

A lagoon is an important breeding ground for birds and fish.

An Ephemeral wetland isn't there all the time, it can have water in it when it rains and can dry up when there are long periods without rain.

A pond is a manmade wetland.





## ACTIVITY 4

# THE RIVER CATCHMENT WHERE I LIVE

On the following page is a general river catchment which can be copied and given to students.

Students need to think about:

- What structures are along the waterway – bridges, roadways, houses
- What farmlands or businesses are near the waterway
- If there is a town there, where does the wastewater and sewerage go
- When it rains where does the storm water go
- Are there any wetlands – ponds, lagoons
- What wildlife is there
- Are there any forests
- What colour is the water by the time it reaches the sea



### Group discussion

Bring the students together to share their River Catchment drawings.

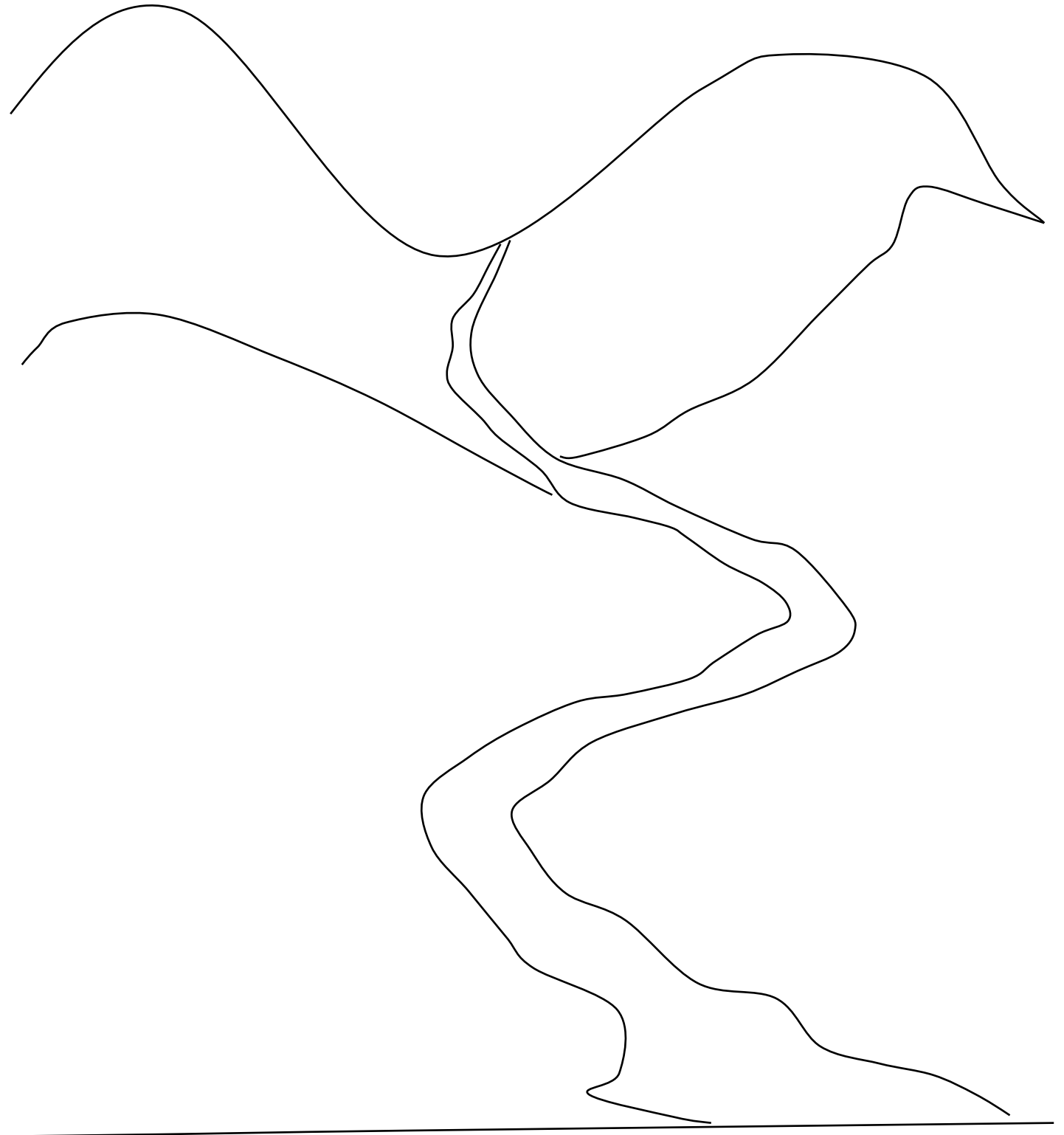
Ideas to discuss with them:

- Were you surprised at the levels of pollution that could enter the waterway
- Are there enough wetland areas in your catchment (think about the 3P's)
- What would a perfect catchment look like
- What could be done to make the catchment better
- Can you give examples of things you have done or have seen done, to help the river catchment be less polluted.

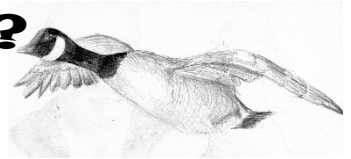




# THE RIVER CATCHMENT WHERE I LIVE



# WHO LIVES IN THE WETLAND?



bittern

shag

godwit

snail

eel

mudfish

rail

heron

stilt

swan

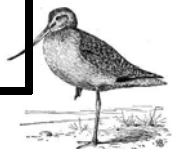
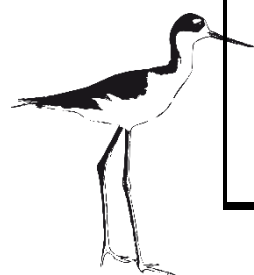
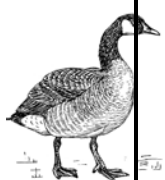
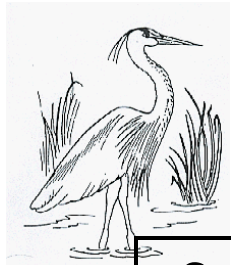
mallard

grey teal

mayfly

geese

worms



S	A	H	E	R	O	N	S	B
H	W	O	R	M	S	N	T	I
A	F	A	I	S	A	H	I	T
G	A	N	N	I	D	G	L	T
A	L	M	L	E	N	Z	T	E
M	A	L	L	A	R	D	F	R
U	E	G	E	E	S	E	Y	N
D	T	I	W	D	O	G	L	D
F	Y	I	S	H	A	L	F	N
I	E	G	A	M	L	I	Y	E
S	R	S	P	Y	E	A	A	Y
H	G	O	W	I	E	R	M	T



## QUACK QUACK QUIZ

Divide the class up into teams – each team is to have a duck call as their “buzzer” to answer the question.

1. Which duck lives in fast flowing water?
2. Which duck only had 1000 birds left by the 1990's?
3. What is the most common duck in New Zealand?
4. Which duck has a spoon shaped bill?
5. Which female duck has a white head?
6. Name two duck species that are protected ie. Not allowed to be hunted?
7. Which is New Zealand's only diving duck?
8. Which duck will nest in tree holes or rabbit burrows?
9. Which duck is listed as Endangered on the IUCN?
10. Which duck has been protected since the 1930s?
11. In the 1930s and 40s, eggs from San Francisco came in wicker baskets onboard flying boats – what species of duck were these eggs from?
12. Which duck has a white underwing and an iridescent turquoise green speculum on their wing?



# Ducks

There are four key species of duck in New Zealand:

## Mallard Duck:



The mallard is the most common duck in New Zealand and the Northern Hemisphere. From 1867 repeated attempts were made to acclimatise English game farm stock, but these failed. Then, in the 1930s and 40s, eggs from San Francisco came in wicker baskets onboard flying boats. After that, mallards rapidly spread throughout the country.

Today there are about 4.5 million mallards, so many that they are sometimes a nuisance. The mallard is the mainstay of the duck hunter's bag.

Mallards are most likely to be found on shallow bodies of fresh water such as wetlands and ponds, on lakes and even flooded fields. They are a medium-to-large dabbling duck that is most recognisable by the male's glossy green head and white collar around the neck. The female is a mottled brown with a brown bill. Both sexes have orange feet and a purple-blue speculum with both sides outlined in white.

## Grey Duck:



The native grey duck was once hunters' main quarry. However, draining wetlands caused loss of habitat, resulting in closed hunting seasons for grey duck.

The newly established and much more adaptable mallard kept the game seasons open, thus maintaining the flow of hunter licence money that helped turn the tide against wetland destruction. Introduced mallards have now taken over from grey duck, comprising 80 percent of New Zealand's dabbling duck population.

In areas where there are still large natural wetlands the grey duck continues to hold its own. Although now thinly scattered throughout the mainland, more prominent populations are found in the Northland, Waikato, Gisborne and Westland regions.

A distinguishing feature of the grey duck is a pattern of stripes extending from the bill back onto the head, with a thick dark patch over the top of the head, a thinner brown stripe through the eye, and another fainter line below from the beak opening. Males and females are alike in appearance, and similar to plumage of the female mallard. The grey duck's colouring is darker overall, and the head stripes more pronounced than the female mallard. Grey ducks have a white underwing and an iridescent turquoise green



speculum on their wing (lower right), whereas the mallard speculum is blue or purple. The blue speculum tends to predominate on hybrids.

## Shoveler Duck:



The “spoonie” has comb-like openings in the side of its spoon shaped bill that let it sift fine insect life from the surface of biologically rich wetlands.

The shoveler was uncommon last century but there are now around 150,000 in New Zealand. Because of its specialised habits, it is unlikely to ever be very common, but birds have moved into wetlands designed for them by Fish & Game NZ.

The male shoveler is New Zealand's most handsome duck, with variegated plumage, blue-grey head with a white vertical stripe between the eye and bill, a striking reddish-brown breast, and blue wings. The female is more plainly embellished with cryptic brown similar to female mallards and grey ducks. This may be nature's way of providing camouflage when she is nesting.

## Paradise Duck:



The paradise duck is New Zealand's only shelduck, which means it is a rather gooselike duck.

Paradise ducks or “parries” are another conservation success story. When the country was first settled, paradise ducks were rare. The conversion of bush to pasture, and the creation of many stock ponds, (thousands of which were subsidised by hunters' licence fees), has caused numbers to explode. In fact, special paradise duck hunting seasons are necessary to stop large mobs damaging farm paddocks with their grazing.

Unusually for ducks, the female paradise shelduck is more eye-catching than the male; females have a pure white head and chestnut-coloured body, while males have a dark grey body and black head.

Paradise shelducks are commonly observed flying in pairs or grazing on pasture. They are very vocal birds, with males giving a characteristic 'zonk zonk', while females make a more shrill 'zeek zeek' while flying or as a warning to intruders.



# Protected Species (not hunted)

## Grey Teal



This Australian duck was thought to have come to New Zealand last century. However, its bones have since turned up in centuries-old midden sites, suggesting a much earlier arrival.

The Grey Teal nests near its favoured freshwater lakes and marshes, usually on the ground, but also in tree holes or rabbit burrows. Their fondness for nesting in hollow trees has led sportsmen and women to put up thousands of nesting boxes to encourage an increase in numbers. However, grey teal numbers will have to be raised still further to justify a limited hunting season.

Grey Teal are a mottled brown duck with white and green flashes on their wings. They are a vocal duck, especially at night. The male gives a soft preep, and the female has a loud quack.

## Scaup (Black Teal)



New Zealand's only diving species, the native scaup (also known as the black teal) is a dumpy little duck common on clear water. In the Maori language, scaup are commonly known as papango, also matapouri, titiporangi, raipo.

Although scaup are found throughout both North and South islands of New Zealand in deep freshwater lakes and ponds, farm sediment has clouded many lakes, causing scaup to abandon them. They have been protected since the 1930s.

Overall scaup are dark brown/black coloured. The male has a striking yellow eye and a dark coloured (greenish) head. The female is similar to the male, but without the yellow eye and has a white face patch during breeding season. A white wing bar can be seen in both sexes when in flight.



## Blue Duck (Whio)

The Blue Duck (Maori name: "Whio Whio") is a river specialist which inhabits clean, fast flowing streams in the forested upper catchments of New Zealand rivers. They occur nowhere else in the world.



This native New Zealand duck is a “torrent” species, at home on forest streams and rivers where it feeds among rocks on aquatic insects. Because of this specialised niche, blue duck have unique features such as streamlined head and large webbed feet to enable them to feed in fast moving water. They also have a flexible bill unique among the world’s many waterfowl.

Blue duck establish exclusive territories. Strong pair bonding results in individual pairs occupying the same stretch of river year after year which they aggressively defend against other blue duck, as well as grey duck, paradise duck and even shags or gulls.

Blue duck are recorded by the International Union of Conservation for Nature (IUCN) as "Endangered" because it has a very small and severely fragmented population which is undergoing a rapid decline owing to a variety of factors, most notably the affects of introduced predators.

They are a diving duck and may stay down for twenty to thirty seconds and go down three metres to look for aquatic plants, small fish, water snails, mussels and insects.

## Brown Teal (Pateke)



Pāteke/brown teal are a small dabbling duck endemic to New Zealand. They are mottled brown in colour, with a white ring around the eye. Males are easily distinguishable from females in their breeding plumage (during the autumn and winter months) with their iridescent green heads and chestnut-coloured breasts.

Pāteke flock during the non-breeding (summer) months and breed during winter. They do most of their feeding at night in seeps, swamps, damp pasture and the shallows of drains, streams, ponds and estuaries. They eat a variety of grasses, seeds, insects, molluscs, worms and many other invertebrates.

Pāteke were once found throughout the forests and wetlands of New Zealand, but underwent a dramatic decline during from the 19th century due to habitat loss, predation and probably excessive hunting in some areas. By the 1990s, the remnant range of pateke was restricted to less than 1000 birds on Northland east coast and Great Barrier Island. Intensive predator control and a strong captive breeding and release programme has allowed pateke to recover to around 2500 birds distributed across a number of sites around New Zealand.

Pāteke now occur mainly on lowland floodplains, typically where there are combinations of pastoral land, forest remnants, wetlands, and estuaries. Pateke are smaller, and fly lower and faster over the water (faster wing beat) than Grey or Mallard ducks. They have more white on their wings but could easily be mistaken for a Mallard duck (similar colour) or NZ Shoveler (similar size and wing beat).





Answers to Quiz questions:

1. Which duck lives in fast flowing water? **Whio/blue duck**
2. which duck only had 1000 birds left by the 1990's? **Brown teal/ Pateke**
3. what is the most common duck in New Zealand? **The mallard**
4. which duck has a spoon shaped bill? **Shoveler**
5. which female duck has a white head? **Paradise**
6. name two duck species that are protected ie. Not allowed to be hunted?  
**Whio, Brown teal, Scaup, Grey teal**
7. which is New Zealands only diving duck? **Scaup**
8. which duck will nest in tree holes or rabbit burrows? **Grey teal**
9. which duck is listed as Endangered on the IUCN? **Whio/blue duck**
10. which duck has been protected since the 1930s? **Scaup**
11. in the 1930s and 40s, eggs from San Francisco came in wicker baskets onboard flying boats – what species of duck were these eggs from? **The mallard**
12. which duck has a white underwing and an iridescent turquoise green speculum on their wing? **The Grey Duck**





# MALLARD DUCK LIFECYCLE

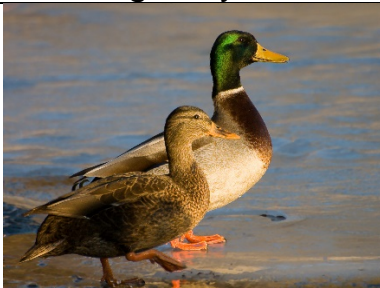
Cut out the below pictures and place in order



Learning to fly



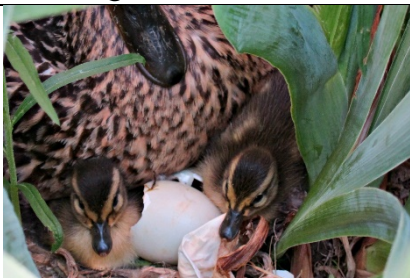
The hen incubates the eggs



Finding a mate



Out on the water for the first time



Ducklings are hatching



Eggs have been laid



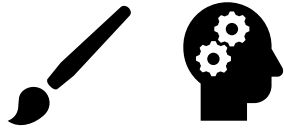
Moulting



Learning to feed

Need to credit the photos





## DESIGNING A WETLAND

A local farmer, Mr Mallard, built a pond on his property a few months ago. He has noticed that no wildlife are visiting the pond.

Mr Mallard doesn't know what he has done wrong and he'd heard that your class was studying wetlands and thought he'd ask for your help.

Mr Mallard has been able to tell you that he has a small freshwater stream flowing into the pond, and a small outlet on the other side. Half of the water is only 40cm deep with deeper places in the middle of the pond.



He would really like to be able to sit and watch the birds, especially his favourite bird, the mallard duck.

His brother is a keen gamebird hunter and would like to hunt for gamebirds on the pond one day.

Mr Mallard would like to see a plan of what the pond will look like when it is finished – this can be done as an artwork of your choice (e.g. a model, painting, drawing)

Things to think about in your plan:

- What sort of plants will you plant?
- Where will you plant them?
- What type of birds or insects will your plants attract?
- Will you put something there for Mr Mallard to sit and watch the birds?
- Will you need some fences to keep stock out?
- Will you need some predator control?

When completed, present this to your class and explain the above points.





# FIELD TRIP

You will need:    Binoculars  
                         Worksheet  
                         Pen/pencil

What birds can you see?

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How many ducks can you see? \_\_\_\_\_

Can you identify the different duck species? (name them if you can)

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What are the birds doing?

---

What time of year is it? (spring, summer, autumn, winter)

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Could there be ducks sitting on nests, or are there ducklings?

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How deep do you think the wetland area is?

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What plants can you identify?

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Can something be done to make this wetland better to attract more wildlife

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