



Adaptations



KS2 Workbook for Teachers

With curriculum links to Art and Design, Design Technology, English, Geography, Information Technology, Music, and Science

ACTIVITY 1- BEAK ADAPTATIONS

Curriculum focus- Science, Geography, Math, Art and Design.

Main Activity

Curriculum links-

Science-

- Sc1 Scientific enquiry
- Sc2 Life processes and living things
 - Adaptation 5b, 5c

Geography-

- Knowledge of env. Change and sust. development 5a

Maths-

- Ma4 Handling data
 - Using and applying handling data 1a, 1f
 - Processing, representing and interpreting number 2b, 2c, 2d, 2e, 2f
- Breadth of Study 1e, 1h

Aims:

- To introduce students to the concept that birds are physically adapted to their type of food supply.
- To decide for themselves what beaks are most efficient for a given food source by experimenting with imitation beaks and a given food source.
- To describe what would happen to a bird population if the environment could no longer provide that food source.

Background Teacher Information:

Animal adaptations can be thought of as any body shape, process or behaviour that allows an organism to survive in its environment. Animals change over time in response to changes in their environment so that they are better equipped. to survive.

Birds have different shaped beaks depending on what they eat and what their food source is. Birds may get their food from mud, water, seeds, wood, or they may catch it in the air. The different shapes of beaks allow access to various food supplies e.g. a parrot has a broad strong beak for cracking open nuts, a hummingbird has a long thin bill that allows it to reach the nectar inside flowers, and so on.

If an environment altered, organisms in the area would need to change in order to survive. Natural selection is the process by which organisms best suited to the change in the environment survive and reproduce, therefore passing their genes on to the next generation.

Materials:

- Beaks
 - 2 eye droppers
 - 1 pliers
 - 5 sets of chopsticks
 - 4 tweezers
 - 1 shoestring
 - 1 sponge strip
 - 1 drinking straw
 - 1 wrench
 - 2 slotted spoons
 - 1 strainer
 - 3 tongs
 - 1 envelope
 - 1 turkey skewer
- Food
 - Coloured water in a long narrow container
 - Gummy worms
 - Sunflower seeds
 - Styrofoam cubes
 - Popped popcorn
 - Rice
 - Marshmallows
 - Loose tea
- Other
 - Potting soil
 - Shallow pans
 - 8 boxes
 - Data tables for each student (data table follows for photocopying)
 - Vase or graduated cylinder
 - Pictures of various birds with corresponding environment/habitat and food source

Introductory discussion:

- Ask the students if they have ever had to adapt to a situation. Explain that adaptation means that an organism changes in order to better live in their environment.
- Ask the students to suggest animals or plants that have a characteristic that helps them to survive- make a list on the board as they are suggested.
- Ask the children what they think makes a bird a bird i.e. what do all birds have in common? What kinds of foods do they think that birds eat (*insects*,

seeds, berries, and meat should be among the suggestions)? Where do birds live? Do they know the names of any local birds?

- Use pictures of birds and their beaks on the handout provided (entitled 'Bird Beaks' to be found in the appendix) and ask the students to fill in their predictions of what they think each bird eats how they think the bird might use its beak to eat.

Activity 1:

1. In front of the class arrange:

- a) A tall, thin vase filled with coloured water
- b) A dish of potting soil containing buried gummy worms
- c) Sunflower seeds spread in a shallow pan
- d) Styrofoam cubes floating in shallow water
- e) Loose tea floating in shallow water
- f) Popped popcorn
- g) Rice grains tucked into the bark of a log
- h) Marshmallows hanging on strings

Tell the students that each of the items represents a type of food eaten by various birds. Ask students to guess how a bird might reach each food supply. Students can refer to their handouts for ideas. Ask the students if they think that the shape of a bird's beak limits the type of food that they can reach. The students should eventually conclude (though some guidance may be required) that:

- a) Nectar (coloured water) will need to be sucked out (*Hummingbird*)
- b) Worms (gummy worms) need to be dug and pulled out
- c) Seeds (sunflower seeds) need to be cracked open (*sparrows, finches*)
- d) Fish (Styrofoam pieces) will need to be scooped out of the water (*pelican*)
- e) Fine bits of vegetation (tea) will need to be carefully scooped out of the water (*ducks, geese, swans*)
- f) Flying insects (popcorn) will need to be caught in wide openings (*swallows*)
- g) Small insects (rice) will need to be picked and pried out of small crevices (*woodpeckers*)
- h) Meat (marshmallows) will need to be pulled off of bones (*Owls, hawks, eagles*)

Activity 2:

1. Divide the students so that they are in 8 groups.
2. Give each group a box of equipment and corresponding challenge card to each group (attached). Each box should contain the items listed on the challenge card- 1 food source and 3 sets of utensils (beaks).
3. After the students have read their card, ask them to write which 'beak' they predict will work best for 'eating' their specific 'food' in the space provided on their record card.
4. Each group will then time how long it takes to get a certain amount of 'food' with each utensil. They must remember to record each time on their record card.
5. Students should perform the task 3 times and work out the average time taken to get the amount of 'food' specified on their challenge card. Again, this should be filled in on their record card.
6. Ask the students to represent their average results in a bar chart. They must remember to label all axes on their chart and include a heading.

Discussion and Conclusions

1. Ask each group if their original prediction of which utensil would work best was correct.
2. Ask each group to describe their 'food' and say which shape of beak from their original handout they think would best suit their food source. Ask the class if they can think of any other body characteristics that this bird has to help them survive in their habitat. Discuss how it is adaptations that make a pelican better suited to catching fish than a woodpecker, and so on.
3. Ask the students what they think would happen if a bird's food source suddenly disappeared. You can use examples such as the use of insecticides by farmers will kill all the flying insects and so the swallows and other bug eating birds will not have anything to eat. If they cannot adapt to another food source fast enough then they too will die out.

Extension activity 1:

Key Curriculum Focus:

Science-

- Sc2 Life processes and living things
 - Adaptation 5b, 5c

Geography-

- Geographical enquiry and skills 1a, 1d, 2a, 2d
- Knowledge of places 3a, 3d

Art and Design-

- Exploring and developing ideas 1a, 1b, 1c
- Investigating and making art, craft and design 2a, 2b, 2c

Method:

1. Ask students to create a bird that feeds on a particular food source of their choice.
2. Students should think about what kind of habitat their bird would find its food source - that is, where in the world would the bird live. They may need to research the habitat to improve their understanding. Remind them to include all adaptations needed for survival e.g. long legs for wading birds, sharp talons for meat eaters etc.
3. The students must then decorate their bird using materials that represent the habitat that they are found in. They should think about colour and camouflage in the habitat they have chosen. For example, it would be unwise for a brightly coloured bird to be found in the snow of arctic tundra.
4. They should also draw and decorate the food their bird would eat and put both on a display board.

ACTIVITY 2: FEET ADAPTATIONS

Main Activity- Wading feet

Curriculum focus- Science, Geography, Design Technology, Maths, English and Art

Key Curriculum links-

Science-

- Sc1 Scientific enquiry
 - Ideas and evidence in science 1a, 1b
 - Obtaining and presenting evidence 2e, 2f, 2g, 2h
 - Considering evidence and evaluating 2i, 2j, 2l
- Sc2 Life processes and living things
 - Adaptation 5b, 5c

Geography-

- Geographical enquiry and skills 1a, 2a
- Knowledge of places 3a, 3d

Design Technology-

- Working with tools and equipment 2a, 2b, 2d

Maths-

- Ma3 Shape, space and measure
 - Understanding measures 4e
- Ma4 Handling data
 - Using and applying handling data 1a, 1b, 1c, 1d, 1e, 1f, 1g
 - Processing, representing and interpreting data 2b, 2c,

English-

- En1 speaking and listening
 - Listening 2a, 2b, 2c, 2d, 2e
 - Group discussion and interaction 3a, 3b, 3c

Aims:

- Students should learn about different bird's adaptations to their habitats by thinking about feet shape and size.
- Particular focus will be on wading birds and the importance of a large foot surface area to prevent sinking.
- For students to understand how an adaptation to one habitat makes it impossible for a bird to live in other habitats.

Background information:

The shape of a bird's feet will depend on where they live and what they eat. Birds that live in trees or bushes may hop from branch to branch (e.g. robin) whereas birds spending a lot of time on the ground will walk or run (e.g. pheasant). Most birds have four toes with one pointing backwards and three forwards although this may not always be the case. For example, parrots and woodpeckers have two toes pointing forwards and two backwards to make it easier to climb and grip onto branches whereas an ostrich only has two toes altogether- both pointing forwards to make it possible for high speed running. Some birds will have webbed feet so that they can swim (ducks and geese) whereas others have very thin toes so that they may walk in the water without causing too many ripples (herons). Other birds, such as the barn owl, may have highly specialised claws so that they may catch their food.

The size and shape of a bird's legs will also depend on its habitat. For example, wading birds such as herons have long legs for wading into shallow water whereas parrots have short legs so that they may hang from tree branches in order to reach hanging fruit.

Introductory discussion and worksheet:

Start a discussion about bird's feet with the students by asking them to suggest different functions that bird feet may have. These should include:

- Movement
 - Climbing
 - Running
 - Walking
 - Hopping
 - Perching
 - Swimming
 - Wading
- Catching food
- Grasping food
- Displays
- Defence

Write these on the board as they are suggested. Then take each on in turn and ask if the students can suggest what habitat the bird may live in that requires each foot adaptation. Link their habitat suggestions with each foot function on the board. You may also wish to write up any suggestions the students make of specific birds with feet adapted for each purpose.

Ask students to complete the worksheet entitled "Who's foot is this?" Once they have completed the worksheet, go through the answers so they can see if they were correct and ask the students why they paired up each foot with a bird picture.

Once you feel that they understand why birds have specialised feet and legs, turn their attention to wading birds. Ask if the students can name any wading birds (heron, spoonbill, flamingo etc). Ask them to describe the habitat that a wading bird feeds in and discuss any adaptations that they think that that bird may have. During this class discussion, students should realise that wading birds get their food from the shallow water. They have long legs and long spread-out toes. They often walk onto the soft mud and sand at the edge of rivers and lakes where there is a risk of sinking.

Once this discussion is complete, tell the class that they are going to do an activity to show why wading birds have long spread-out toes and how this makes them better adapted to their lifestyle.

Materials required:

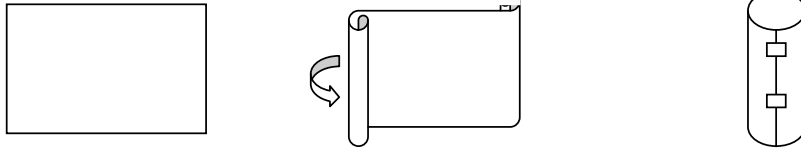
- 1 x A4 card
- Cling film
- Elastic bands
- Ruler
- Marker pen
- Scelotape
- Shallow tub
- Mud/ water/ plaster of paris

Method: the method is printed on the following pages to allow for photocopying if required.

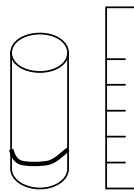
Method:

Students should be asked to:

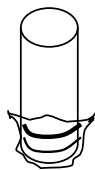
1. Roll the card into a tube and secure with tape.



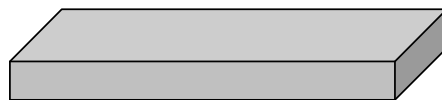
2. Use a ruler to measure 1 cm from the bottom of the cylinder and mark with a pen



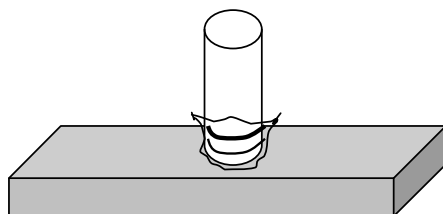
3. Pull cling film taught over the bottom of the cylinder and secure with an elastic band.



4. Fill a plastic tray or bowl at least 2 cm deep with mud/ water/ plaster of paris (hint- the thicker the substrate, the easier the experiment)



5. Place the tube with the cling film at the bottom into the tray of mud and make sure it balances in an upright position.



6. Drop in paper clips/ pennies (counting as you do) one by one until the tube sinks down to the 1cm line.
7. Measure the diameter of the tube with a ruler.
8. Repeat using tubes of different diameters e.g. 5, 10, 15, 20 cm diameters.

9. Plot a line graph to show the diameter of the base against the weight the tube can hold before sinking. Ensure that the graph is given a title and that the axes are clearly labelled.

Questions:

Ask the students to answer some maths questions using their graph and to draw conclusions from their findings. Some examples may include:

- 1) What is the smallest base that is able to support 12 paperclips/pennies without sinking 1cm?
- 2) Wading birds find their food in the shallow waters at the edge of lakes and rivers. To reach this area, they may often walk in soft mud or sand without sinking.
 - a) Do you think that it is better to have long spread out toes or small toes if you are a wading bird?
 - b) Using your graph, explain why you think that this foot design is best
 - c) What will happen to the area of the foot if the bird is heavier?

Discussion:

1) Why don't all wading birds have large webbed feet to support their weight?

Wading birds get their food from shallow waters and cannot chase fish into the deeper areas. Therefore it is very important that they creep up on the fish. Webbed feet would cause the water to splash, so scaring away all the fish before the bird could get near.

2) Why don't all wading birds have really long toes regardless of how heavy they are?

Really long toes would be impractical for perching on branches; they would waste energy due to movement and heat loss. Finally, they would add too much weight, making flight impossible, which means that the bird is more at risk from predators and cannot migrate in search of food and warmth.

Extension Activity 1:

Key Curriculum Links:

Geography-

- Geographical enquiry and skills 1a, 1d, 2a, 2d
- Knowledge of places 3a, 3d

Art-

- Exploring and developing ideas 1a, 1b, 1c
- Investigating and making art, craft and design 2a, 2b, 2c
- Knowledge and understanding 4a, 4b
- Breadth of study 5a, 5b, 5c

Method:

1. Ask students to create a bird found in a particular habitat.
2. Remind them to include all adaptations needed for survival e.g. long legs for wading birds, sharp talons and hooked beaks for meat eaters' etc.
3. The students must then decorate their bird using materials that represent the habitat that they are found in. They should think about colour and camouflage in the habitat they have chosen. For example, it would be unwise for a brightly coloured bird to be found in the snow of arctic tundra.
4. Students can then draw the food source of their made-up bird to create a wall display.

Extension Activity 2:

Key curriculum links-

Geography-

- Geographical enquiry and skills 1a, 1d, 2a, 2d
- Knowledge of places 3a, 3d

Art-

- Exploring and developing ideas 1a, 1b, 1c
- Investigating and making art, craft and design 2a, 2b, 2c
- Knowledge and understanding 4a, 4b
- Breadth of study 5a, 5b, 5c

English-

- En3 Writing
 - Composition 1a, 1b, 1c, 1e
 - Punctuation 3
 - Handwriting and presentation 5b
 - Standard English 6a

Method:

1. Ask students to draw a made-up bird and describe the habitat in which it is found and how it feeds. For example, they may draw a bird with webbed feet for swimming in lakes and a strong beak for cracking open nuts.
2. Students should think about what kind of habitat their bird would find its food source - that is, where in the world would the bird live. Remind them to include all adaptations needed for survival e.g. long legs for wading birds, sharp talons for meat eaters etc.
3. Students should research other real birds with similar lifestyles to assist them.
4. The students must then decorate their bird using materials that represent the habitat that they are found in. They should think about colour and camouflage in the habitat they have chosen. For example, it would be unwise for a brightly coloured bird to be found in the snow of arctic tundra.
5. Ask students to look at their made-up birds and decide if they could survive in a natural habitat. In this example, it would not survive as its feet are webbed so it can only move through water or on land and cannot climb trees; therefore it would not be able to reach the nuts and fruits growing in the trees.
6. Students can then write a short story about their made-up birds and the difficulties that they face in a natural habitat.
7. The best stories and birds can then be displayed.

Extension Activity 3:

Key curriculum focus-

English-

- En1 Speaking and listening
 - Group discussion and interaction 3a, 3b, 3c
- En2 Reading
 - Reading for information 3c
- En3 Writing
 - Composition 1e
 - Breadth of study 10

Science-

- Sc1 Scientific enquiry
 - Investigative skills 2b
- Sc2 Life processes and living things
 - Humans and other animals 2e

Introductory discussion:

Ask students to refer back to the worksheet "Whose foot is this?" Draw their attention to the parrot foot. Why do they think that parrots have toes pointing in two different directions? What type of habitat are parrots found in? Is there room to fly in areas where there are so many trees? How do they think that parrots are adapted to getting around?

Parrots have opposable digits i.e. some fingers or toes point in one direction and some point in the opposite direction. Tell the students that humans also have an opposable digit on their hands. Ask students to hold up their opposable digit (they should all give you the 'thumbs up' sign at this point). Ask them what they think they use their thumb for (gripping, eating, writing, climbing etc.)

Method:

1. Each student should tape their thumbs to the palms of their hands with masking tape (you may need to help them with this part). Try to avoid using scotch tape as this can be too sticky so may be uncomfortable or difficult to tear off.
2. Ask each student to write their name at the top of a piece of a piece of paper without using their thumbs. Then ask them to copy out the paragraph to be found in the appendix about where parrots live, what they eat and so on, without using their thumbs!
3. Students may also try to complete an every day activity such as eating lunch without the use of their thumbs

Discussion:

Ask the students if they found writing without their thumb easier or more difficult. Was their writing neater or messier? Do they think they could live without their thumbs?

Explain that even though it is possible to do every day chores without their thumb, it is more difficult to do, and takes longer to complete.

What would happen if a parrot only had 2 toes pointing forward and none backwards? How would it get about? How and what would it eat? Would it survive if it did not change the way it moved or ate? No, because without adapted feet, it could not climb to find food or escape from predators and even if it did find food, it would not be able to hold the food properly so would go hungry.

Extension Activity 4:**Key Curriculum Links-
PE-**

- Swimming activities and water safety 9a, 9b, 9c, 9d

Method:

Ask students to bring in (or provide) some fins for their feet. Time how long it takes to swim 25m with and without the fins on. Compare the times when back at school and encourage the students to see the link between the fins they wore and a ducks webbed feet. How does having webbed feet adapt the duck for life in the water?

ACTIVITY 3: CAMOUFLAGE

Curriculum focus: Art, Science, Information Technology, and PE

Main Activity

Art-

- Exploring and developing ideas 1a, 1b, 1c
- Investigating and making art, craft and design 2a, 2b, 2c
- Evaluating and developing work 3a, 3b
- Knowledge and understanding 4a
- Breadth of study 5a, 5b, 5c

Science-

- Sc1 Scientific enquiry
 - Investigative skills 2b, 2c, 2e
- Sc2 Life processes and living things
 - Living things in their environment 5b, 5c
- Breadth of study 1d, 2a, 2b

Aims:

- To understand the importance of camouflage
- To discuss how behaviour is important for colour to be an effective camouflage tool

Materials required:

- 1 x cardboard box per group (half an A4 printer paper box is ideal)
- Plastic cups
- Marbles
- Paint in a variety of colours
- A4 paper
- Scissors
- Blue-tac

Method:

1. Put the children into groups of 2 or 3. Each group should:
2. Secure an A4 piece of paper into the box using blue-tac
3. Put 4-5 marbles into a cup with enough paint to just coat the marbles (you may have to help with this part as too much paint can cause the end result to take a long time to dry!)
4. Shake the cup to give all the marbles a thin coat of paint
5. Tip the marbles onto the paper in the box and move the box around to create a random pattern
6. Tip the marbles back into the cup

7. Repeat using different coloured paints
8. Take out paper to and leave to dry. This will be the background.
9. Cut a piece of paper into the shape of the animal you are discussing e.g. bird, lizard etc.
10. Secure the cut out into the box using blue-tac.
11. Roll paint-covered marbles over the cut out (hint- use the paints in the same order as used for the background sheet)
12. Remove paper and leave to dry.

Discussion:

Ask the students if they have ever played hide and seek. What do they need to do to successfully hide from their friends? (to find a well-hidden place and to stay quiet and still).

At this point, you may wish to play a game of hide and seek (see further activities).

If the cut out is held over the background sheet then the animal is very hard to see. It is *CAMOUFLAGED* against its background.

If the cut out is moved slightly from side to side over the sheet then it is no longer camouflaged and can be seen quite easily.

If one students cut out is held over another students background sheet then it is no longer camouflaged and can be seen quite easily.

So, for an animal to be well hidden within its background environment it must:

- Be coloured to blend in with its background
- Remain still to successfully hide from predators

Further activities:

1. Repeat the experiment using the same coloured paints for the animal as used in the background, but in a different order.
 - Children should see that for an animal to be well camouflaged the colour of the animal must match the background and the pattern of those colours is also very important.
2. Repeat using different shapes to represent other animals that use camouflage.

Extension Activity 1:

Key Curriculum Links -

Information Technology-

- Developing ideas and making things happen 2a
- Exchanging and sharing information 3a

Students should set up a series of 'egg and nest' pictures. That is, for the 'nests' set up a series of different size and coloured rectangles. Leave a blank hole for the egg. Beneath each 'nest' place a series of eggs that are wrong for the nest (i.e. the wrong size, the wrong colour, the wrong shape or all) and one egg that is correct.

The students should produce a poster explaining how camouflage works, using their 'egg and nest' diagrams as a basis. They may want to add other materials to their eggs and nests, like sticks, leaves and mud.

As an extra challenge, students could research how various birds camouflage their eggs, and try to replicate these in their designs. Birdworld has quite an extensive egg display, so students may want to begin their research on your trip to the park.

Extension Activity 2:

Key Curriculum Links-

PE-

- Selecting and applying skills 2a, 2b, 2c
- Games activities 7c

Method:

1. Give each student a piece of paper saying either: 'still and quiet'; 'still and noisy'; 'quiet and moving'; or 'moving and noisy' (there should be an equal number of students put into each group).
2. Then choose one student to be the seeker and start a game of hide-and-seek. Students must keep doing what it says on their piece of paper. If it says they should move then they must keep moving an arm or a leg in their hiding spot. If it says they should be noisy then they should keep making some animal noise. As each student is found they must line up in the order that they were discovered in.
3. At the end each student should tell everyone what it said on their paper and why they think they were found so early or late in the game. You can then ask the students how they would expect animals that are low down in the food chain to behave when a predator is close by.

Note: you may wish to have more than one 'seeker' at a time to speed up the game.

ACTIVITY 4- SENSES

Curriculum focus- Science, English, Music, and PE

Main Activity: Adapted hearing

Science-

- Sc1 Scientific enquiry
 - Investigative skills 2b, 2j,
- Sc2 Life processes and living things
 - Life processes 1a, 1c
 - Living things in their environment 5c

English-

- En1 Speaking and listening
 - Group discussion and interaction 3a, 3b, 3c, 3e

PE-

- Selecting and applying skills 2a, 2b, 2c
- Evaluating and improving performance 3a, 3b
- Games activities 7c

Aims:

To learn more about owl's biology, especially their highly adapted hearing through an interactive game ('Owl and Mouse').

Materials:

- A blindfold
- An open area to play in

Background information:

Owls have highly developed hearing. Owl's ears are placed asymmetrically on their heads, one slightly higher than the other. This increases their ability to distinguish sounds, which direction they are coming from and the distance they are from the owl. This is particularly helpful for nocturnal owls such as the barn owl, which is said to have better hearing than any other animal and can even hear a human heartbeat!

Method to play 'Owl and Mouse' game:

Background information:

Owls have highly developed hearing. Owl's ears are placed asymmetrically on their heads, one slightly higher than the other. This increases their ability to distinguish sounds, which direction they are coming from and the distance they are from the

owl. This is particularly helpful for nocturnal owls such as the barn owl, which is said to have better hearing than any other animal and can even hear a human heartbeat!

Owls also fly silently, so that their prey cannot hear them approach. If you attend a Heron Theatre Show on your school trip to Birdworld, you will be able to witness a barn owl in flight.

Method to play 'Owl and Mouse' game:

1. Ask the students to stand in a circle. The students represent the forest so they should plant their feet like trees in the ground and not move or make a sound.
2. Choose one student to be the owl. This student is blindfolded and must stand in the middle of the circle.
3. Choose one or two students to be mice. They are not blindfolded but are also in the middle of the circle.
4. Explain that the goal is for the owl to catch a mouse using only sound. The owl says "owl". Every time the owl says this, the mouse must respond with "mouse". The owl must find the mouse by listening to where its voice is coming from.
5. Once the owl catches the mouse, pick a new owl and mouse and play the game again. Ensure to tell the children that this is strictly a walking game! (The 'trees' are there as a buffer to keep the owl contained and from bumping into anything that could cause injury).

Discussion:

- Ask the students if they think they would survive if they had to catch real mice for food in the dark. Do they think that the owl is better adapted for this food source?
- Ask the students to list any other adaptations that the owl has for catching mice
 - Silent flight
 - Night vision
 - Good hearing
 - Sharp talons (claws)
 - Sharp, hooked beaks

Extension Activity 1: Hearing prey and predators

Key Curriculum Links-

Music -

- Creating and developing musical ideas - composing skills 2b
- Responding and reviewing 3a, 3b, 3c
- Breadth of study 5a, 5c

PE-

- Selecting and applying skills 2c
- Dance activities 6b
- Games activities 7c

Background information:

Many birds, including owls, use their highly developed hearing to identify what is going on around them. This may range from listening for predators or prey, to identifying the call of a mate.

Method:

As a class, discuss the types of sounds different birds listen out for. For example, an owl might listen for a mouse, a small bird like a robin might listen out for cats, and all birds listen out for a mate's bird song or a rival birds warning call.

Once you have selected about 5 different sounds, as a class select-

1. A musical instrument/sound to represent each noise. For example light taps on a triangle could represent the sound of a mouse scurrying around, a shrill blow on the recorder the sound of a cat pouncing, a short recorder tune the sound of a mate calling, and bangs on a drum the sound of a rival bird. Explore a range of different sounds and, as a class, select the most representative sounds.
2. A physical movement to represent each bird as it responds to the noise it has heard. Using the examples above, at the sound of the mouse, the students could beat their wings as if flying and then sweep their hands down to the floor. At the sound of the cat, the students could leap into the air with arms flapping. At the sound of a mate, they could grab a partner and walk around holding hands. At the sound of a rival, they could leap from spot to spot, trying to get distance between themselves and others. It is really up to the students' imaginations, but the class should all agree on a single movement.

After the class has settled on representative music and movement, try out each sound out a few times slowly - calling out what the sound represents, playing the music and reminding the students of the movement they should be doing.

As the students get the idea, stop calling anything out - just play the representative sounds. The students should change their movements as the music changes. In between sounds, the students should continue to move around the room.

Eventually, turn it into a game, where anybody doing the wrong movement is out. The winner of the game can be made the 'music master for the next game.

Extension Activity 2: Touching food

Key Curriculum Links-

English

- En1 speaking and listening
 - Group discussion and interaction 3a, 3b, 3c

Science

- Sc1 Scientific enquiry
 - Investigative skills 2b, 2j,
- Sc2 Life processes and living things
 - Life processes 1a, 1c
 - Living things in their environment 5c

Introductory discussion:

Start by telling the students that not all birds use their eyes to find their food. Ask them to list what other senses may be used for this purpose. These should include:

- Sight
- Hearing
- Taste
- Touch
- Smell

Write these suggestions on the board as they are suggested. Ask them if they can name any birds (or other animals) that use each sense to find food e.g. smell- vulture, hearing- owl, sight- eagle, taste- parrot. Explain that some wading birds e.g.

spoonbills, catch their fish in cloudy water at the edge of rivers and lakes. Do the students think that they could find food based only on touch?

Method:

1. Put different food sources that a bird may like to eat into an enclosed box (a shoebox with a hole cut in the lid would be ideal). Food types may include:
 - a. Seeds
 - b. Nuts (beware of students with nut allergies- **do not use nuts if you are in any doubt**)
 - c. Small furry toy (to represent meat eaters)
 - d. Gummy worms
 - e. Grapes
2. Explain that each box contains a type of 'food' that a bird might eat. Be sure to say that there is nothing dead or disgusting in the box.
3. Ask each student to put his or her hand into each box in turn without looking inside. Let them feel each item but tell them not to say what they think it is out loud.
4. Once everyone has felt what is in each box ask the students to put up their hands to tell you what was in each one. With each food type ask which birds they think will eat the food.
Can they guess what shape its beak may have to be to get to the food source?
Do they think that they could find their food just by touch alone?

Extension Activity 3: Colour vision and taste

Key Curriculum Links-

Science

- Sc1 Scientific enquiry
 - Investigative skills 2b, 2j,
- Sc2 Life processes and living things
 - Life processes 1a, 1c
 - Humans and other animals 2b
 - Living things in their environment 5c

Background information:

Some birds see in colour whereas others such as owls only see in black and white. Parrots are able to see in colour. Colour vision is very important for those birds that eat fruit because it helps them to tell if the food is ripe. During their lives, parrots quickly learn that a fruit in one colour e.g. a yellow banana tastes better than the same fruit of a different colour e.g. a green banana which is not ripe yet. This is particularly important, as it is not unusual to see 2 different fruits with the

same shape but different colours e.g. some berries, where one berry is fine to eat but the other may cause illness.

Introductory discussion:

Ask the students if they think that they use colour when selecting their food? How do they tell if a fruit is ripe? (texture, firmness, colour) What happens if they eat bad or mouldy fruit? (they may feel ill) Explain that some birds use colour to decide if they can eat a certain food. Give the example of parrots that use colour to remember fruit that tastes nice (ripe fruit) and fruit that tastes bad (mouldy or poisonous fruit).

Ask the students if they think that some colours match certain flavours. At this point you may wish to call out a flavour such as lemon then call out colours and ask students to put up their hand when the colour matches the flavour. Repeat this with flavours such as strawberry, banana, apple, blackcurrant, orange etc. Students should see that they all tend to think of the same colour when they think of a flavour.

Materials:

- Jellies and blancmange of various flavours (or make plain jellies and add flavouring)
- Food colouring (black, red, yellow, green, orange)
- Jelly moulds

Method:

1. Prior to the lesson, make several different flavoured jellies/blancmanges. There should be two of each flavour. Use food colouring so that one of each flavour is the colour you would expect e.g. you would expect strawberry jelly to be red or pink, and the other is a completely different colour such as green or yellow.
2. Give each student a sample of each jelly (check for food allergies before this activity and tell students that they do not have to eat any of the jellies if they do not want to). Do not tell the students what the flavours are at this time but be sure to number the jellies so you know which is which. Try mix up the flavours for best results and do not allow the students to keep comparing jellies with each other.
3. Each student should guess what flavour the jelly is by looking and tasting the jelly and should write the number and their guess of flavour on a piece of paper.
4. You can then reveal the flavours to the class. You should find that most students would guess correctly the flavour when the colour is what they would expect.

When the colour is changed so that it does not 'match' the flavour, students may find it harder to guess the flavour and may even guess wrong.

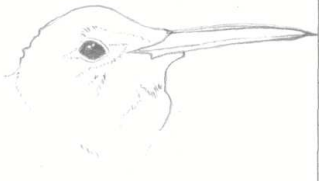

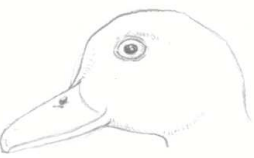
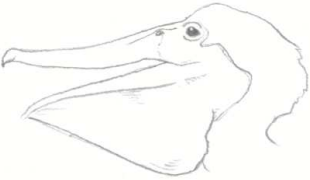
Discussion:


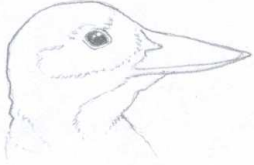

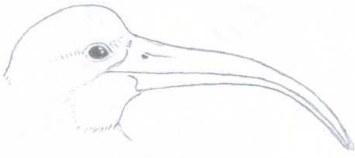
Explain that the reason some students got the non-matching jellies confused was because their brains had already guessed the flavour before they had tried the jelly. When the flavour was not what they expected, their brain was confused and so found it harder to guess the correct flavour.

Ask the students if they think they could have guessed all the flavours correctly with their eyes closed. They should be able to because their eyes will not have confused their brain before the tasting.

APPENDIX

Activity 1: 'Bird Beaks' worksheet

Bird	Favourite food	Method of feeding
 Hummingbird		
 Sparrow		
 Duck		
 Pelican		

Bird	Favourite food	Method of feeding
 Swallow		
 Woodpecker		
 Eagle		
 Curlew		

Activity 1: Beak Adaptations- Challenge cards and record sheet to be photocopied.

<p>Group 1) You have been given:</p> <p>'Food': a cylinder full of liquid</p> <p>'Beaks': a shoe-string a medicine dropper a sponge strip</p> <p>A cup</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to get 10ml of water from the graduated cylinder to the cup.</p> <p>Record the 3 times in the data table.</p> <p>Repeat each test 2 more times. Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>
<p>Group 2) You have been given:</p> <p>'Food': a dish of soil with buried gummy worms (10 worms)</p> <p>'Beaks': a straw chopsticks a wrench</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to dig out all 10 gummy worms.</p> <p>Record the three times in the data table.</p> <p>Re-bury the worms and repeat the test 2 more times.</p> <p>Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>

<p>Group 3) You have been given:</p> <p>'Food': sunflower seeds</p> <p>'Beaks': pliers chopsticks tweezers</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to crack 5 sunflower seeds and remove the seed inside. Record the 3 times in the data table.</p> <p>Repeat each test 2 more times. Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>
<p>Group 4) You have been given:</p> <p>'Food': a dish of water with Styrofoam squares floating in it.</p> <p>'Beaks': tweezers chopsticks a slotted spoon</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to remove all the Styrofoam squares from the water. Record the three times in the data table.</p> <p>Return the squares to the water and repeat the test 2 more times. Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>

<p>Group 5) You have been given:</p> <p>'Food': tea leaves floating in a pan of water.</p> <p>'Beaks': a slotted spoon a strainer tweezers</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to remove all the tea leaves from the water. Record the 3 times in the data table.</p> <p>Return the tea to the water and repeat each test 2 more times. Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>
<p>Group 6) You have been given:</p> <p>'Food': popped popcorn</p> <p>'Beaks': tongs chopsticks and envelope</p>	<p>Method:</p> <p>A group member must gently toss some popcorn into the air. Time how long it takes for each 'beak' to catch 20 kernels of popcorn (they must be caught while still in the air!)</p> <p>Record the three times in the data table.</p> <p>Repeat the test 2 more times. Work out the average of these times and write it in the data table.</p> <p>Construct a labelled bar chart of the averages for each 'beak'.</p>

<p>Group 7) You have been given:</p> <p>'Food': rice tucked into tree bark</p> <p>'Beaks': tongs a medicine dropper tweezers</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to get 30 grains of rice out of the tree bark. Record the 3 times in the data table. Return the rice to the bark and repeat each test 2 more times. Work out the average of these times and write it in the data table. Construct a labelled bar chart of the averages for each 'beak'.</p>
<p>Group 8) You have been given:</p> <p>'Food': marshmallows hanging on string</p> <p>'Beaks': tongs chopsticks a turkey skewer</p>	<p>Method:</p> <p>Time how many seconds it takes each 'beak' to remove 5 marshmallows from the strings. Record the three times in the data table. Repeat the test 2 more times. Work out the average of these times and write it in the data table. Construct a labelled bar chart of the averages for each 'beak'.</p>

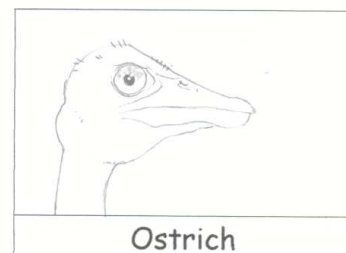
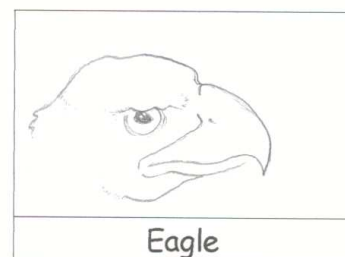
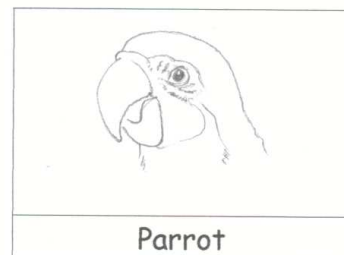
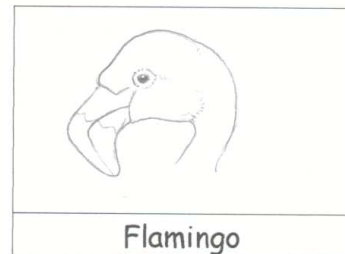
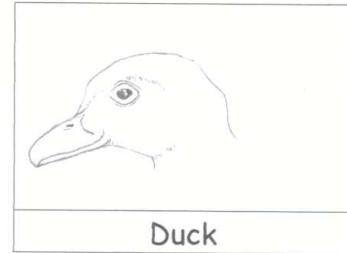
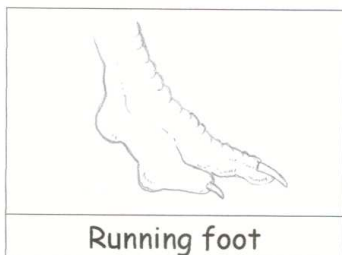
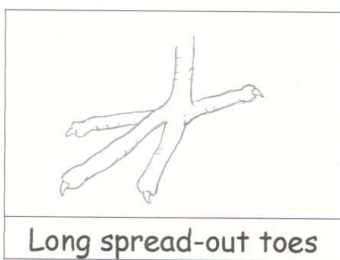
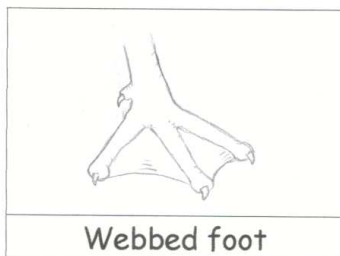
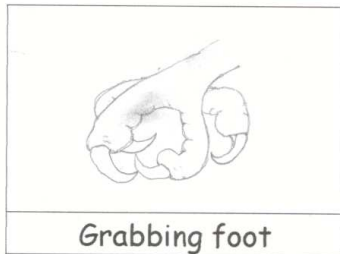
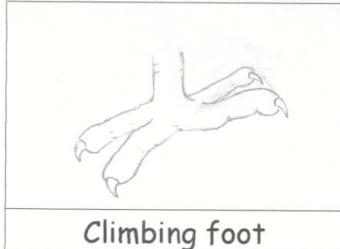
RECORD CARD

ACTIVITY NUMBER:		
Prediction of which sample 'beak' will work best:		
Sample 'beak'	Time taken to complete activity (seconds)	Average time to complete activity (seconds)

Activity 2: Who's Foot is this? Worksheet

WHO'S FOOT IS THIS?

Join each foot to the matching bird



Activity 2

Extension Activity 3: Parrot Comprehension

Can you copy out this passage without using your thumb?

Parrots

Most parrots live in the trees. They move about by climbing, although they may fly over the trees if they have further to travel. To help them to climb, they have two toes that point forwards and two toes that point back. This shape of foot helps them to grip tightly onto branches and vines.

Parrots have strong, broad beaks. Most parrots eat nuts, fruits and seeds. Most parrots are brightly coloured so they can hide in the brightly coloured leaves and flowers.