



Feed *the* *Birds*

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ASAB

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Introduction

The beauty of using birds as a vehicle for teaching in Biology/Science is that:

- **They** come to you; you do not have to go out and find them.
- **Whatever** environment your school is in there will be some birds around.
- The number of species that need to be recognised is small enough to encourage 11 to 14 year olds to participate.
- The variety, though, is wide enough to make the projects interesting.
- Each species possesses a number of distinctive physical characteristics, which makes it easily identifiable.
- **Last, but not least**, the activities suggested here will hopefully provide students with an interest in their natural world that will continue for life and spill over into a desire to care for the (their) world around them.

This pack contains material to allow students to recognise common birds and to carry out two investigations, which involve the feeding behaviour of birds.

1. Observing garden birds to study the effect of the colour of food items on consumption.
2. Observing scavenger birds in the school playground to study inter- and intra-specific competition between birds.

So, using the foraging behaviour of birds teachers can deliver part of the National Curriculum at Key Stage Three.

The aim of the pack is to provide opportunities for students to:

- identify some of the common British birds;
- carry out investigations and explore `how science works`;
- analyse video sequences.

The analyses can either be used to acquire knowledge about bird ecology and behaviour in general, or as a vehicle to cover other skills, such as the drawing of graphs and interpreting data. Through the investigations suggested here, students can be taught to think about the different variables in any habitat and how they affect the behaviour of organisms, in this case the foraging behaviour of birds. This is particularly relevant to the teaching of `how science works`.



Links between the activities on bird behaviour and the Science National Curriculum

Although the materials in this resource pack are aimed at Key Stage 3 students, they may be relevant to all four key stages.

At the time of writing, a new National curriculum was being launched for KS3 to be taught to new Yr 7s in September 2008; the existing curriculum will still be taught to Yrs 8 and 9 in September 2008 until 2011. The KS4 curriculum was changed in 2006 and still stands.

New Key Stage 3

The suggestions in this resource pack may be useful to help students to:

- 1.1b critically analyse and evaluate evidence from observations and experiments;
- 2.1a use a range of scientific methods and techniques to develop and test ideas and explanations;
- 2.1b assess risk and work safely in the school grounds;
- 2.1c plan and carry out practical and investigative activities, both individually and in groups;
- 2.2a obtain, record and analyse data from a wide range of primary or secondary sources;
- 2.2b evaluate scientific evidence and working methods;
- 3.3d know that all living things show variation, can be classified, are interdependent and interact with each other and their environment;
- 3.3e behaviour is influenced by internal and external factors and can be investigated and measured.

Planning across the curriculum

Studies of birds and their behaviour, like those suggested in this resource, may also offer the possibility of collaborative working between science, design and technology and mathematics and so address the STEM agenda.

Background for teachers

For pupils to fully benefit from this resource they need to be able to recognise the different species of birds that they are most likely to encounter during the activities.

The key included in this pack, on sheet B, and the flow chart, sheet G, have been written to cover those birds which are most likely to be seen feeding on the marzipan or any nut and seed feeders in the school grounds; these birds are illustrated on sheet C. A line drawing of a typical bird is given on sheet D, with labels to show the names of the parts of a bird. Sheet E summarises the key features of each species. If students work through the key, using sheets B, C, D and E they should become familiar with these birds.

Sheet F is provided for the students to record their answers so that the colour pictures of the birds can be saved for re-use. If the students need a permanent record of their answers alongside the birds then copies of the coloured pictures will be needed.

[The correct answers are included below.]

The flow chart, sheet G, could be used either instead of the written key or in addition to it.

On the DVD (see DVD notes page 29) you will find a sequence of common garden birds feeding from a traditional nut and seed feeder or on the ground. The sequence is run twice, once without any aid to identification and then once with captions. This can be used to help students develop their identification skills.

During the running of any of the investigations other birds may well be encountered e.g. house sparrow and greater spotted woodpecker. If this should happen then identification will have to be done using a bird guide, for example, Hayman and Hume, Holden and Clevees, and Jackson and Simms.

The use of a dichotomous key (sheet B) is an essential tool in Biology and it addresses the National Curriculum's directive to use keys, to identify animals and plants and assign them to groups to classify living organisms. Therefore the exercise of using this key is of itself valuable; in addition it will allow the students to familiarise themselves with some common garden birds.

Answers to sheet F

- 1 Male Greenfinch
- 2 Female Greenfinch
- 3 Male Blackbird
- 4 Female Blackbird
- 5 Nuthatch
- 6 Great tit
- 7 Blue tit
- 8 Coal tit
- 9 Male Chaffinch
- 10 Female Chaffinch
- 11 Robin

Welfare issues involved in feeding birds

Ideally, food we provide for birds should be put out regularly, to avoid birds expending too much energy flying to a site where food is no longer available. Try also to put out the food at the same time each day as birds soon become used to it and time their visits accordingly. For slightly more detailed guidance look at the two page sheet `Advice: when to feed birds` available from the RSPB website – the address is:

www.rspb.org.uk/advice/helpingbirds/feeding/whentofeed.asp

There is also a risk of Salmonella transmission to birds via feeders – strains of one bacterium typically cause disease known as salmonellosis in British garden birds. The general advice is to follow sensible hygiene precautions. The best advice is probably provided in the Garden Bird Health initiative – Salmonellosis which is on the UFAW website (Universities Federation for Animal Welfare) - the website address is:

www.ufaw.org.uk/documents/Salmonellosisadvisesheet_June09.PDF

There are at least eight common birds which may come to feed in a garden or school grounds, and by using a key you can learn to name these birds; sheet C shows pictures of them. Three of those included here have males and females which look very different.

Use the key on sheet B, or alternatively the flow chart on Sheet H, to identify and become familiar with these birds. Sheet E shows you the parts of a bird named in the key.

Look at each picture of a bird on sheet C and name it by working your way through each question in the key or flow chart. For each question in the key look at the picture and answer **YES** or **NO**. Look at the end of the line for your answer and it will **EITHER** give you the bird's name **OR** tell you to go on to another question.

Once you think you know what it is check its key features on sheet E. Ask yourself if they match the bird you have named.

When you think you know which bird is which, fill in your answers on sheet F and check them with your teacher.

There are 8 different species of birds on the sheets BUT the males and females of three of them have distinctly different features, so both sexes are included. Do you know which three these are yet?

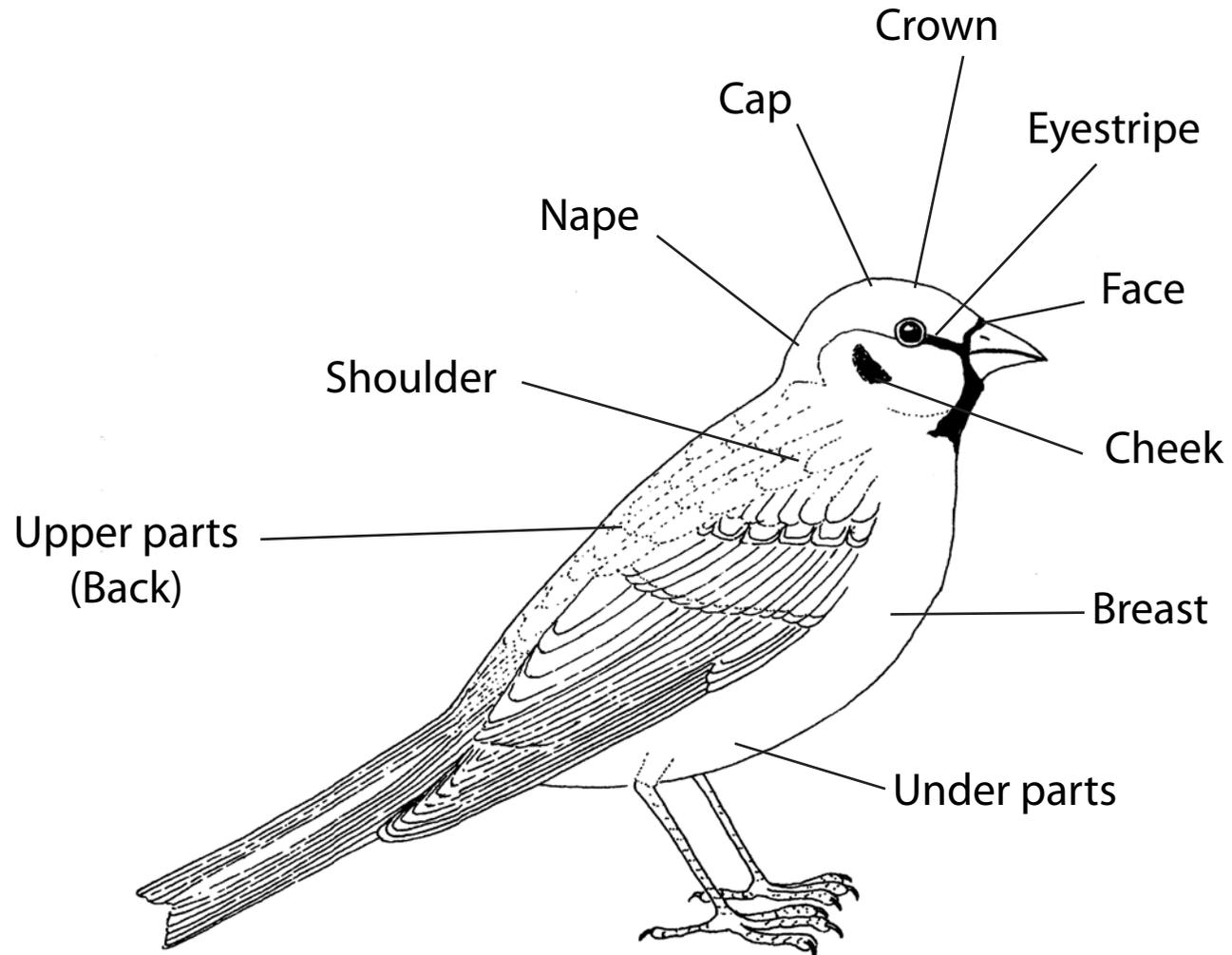
- | | | |
|--|-----|----------------------------|
| 1) Does it have a red breast and face, with no white on its wings? | Yes | Robin |
| | No | Go to 2 |
| 2) Does it have all black or all brown feathers? | Yes | Go to 10 |
| | No | Go to 3 |
| 3) Does it have white cheeks? | Yes | Go to 4 |
| | No | Go to 7 |
| 4) Does it have yellow underparts? | Yes | Go to 6 |
| | No | Go to 5 |
| 5) Does it have a white nape on the neck? | Yes | Coal tit |
| | No | Nuthatch |
| 6) Does it have a black stripe running down from its beak to its underparts? | Yes | Great tit |
| | No | Blue tit |
| 7) Does it have white shoulders? | Yes | Go to 8 |
| | No | Go to 9 |
| 8) Does it have a pinkish breast and face with a blue-grey crown? | Yes | Chaffinch (Male) |
| | No | Chaffinch (Female) |
| 9) Are its feathers mostly olive-green? | Yes | Greenfinch (Male) |
| | No | Greenfinch (Female) |
| 10) Are its feathers all brown? | Yes | Blackbird (Female) |
| | No | Blackbird (Male) |



On sheet C are drawings of garden birds. Identify each bird and record your answers on sheet F.



Parts of a bird



Key Features

NUTHATCH

Blue-grey upperparts
Buff underparts
Strong pointed beak
Black eye-stripe

BLUE TIT

Blue crown
White face
Bluish upperparts
Yellow underparts

GREAT TIT

Black cap
White face
Yellow underparts
Black stripe on underparts
Green, bluish-grey upperparts

ROBIN

Red face and breast
Brown upperparts and tail
White underparts

GREENFINCH

Male

Bright yellow wing patch
Yellow edge to the tail
Pale, heavy bill
Olive-green plumage

Female

Yellow wing patch
Less yellow edge to the tail
Upperparts brown, faintly streaked
Underparts greyish, faintly tinged green

BLACKBIRD

Male

All black plumage
Yellow or orange bill (black in young bird)
Narrow yellow eye-ring

Female

Sooty-brown plumage
Lighter brownish-white throat
Mottling on breast

COAL TIT

Black crown/cap
White nape patch
White face
Buff underparts
Greyish upperparts

CHAFFINCH

Male

Slate-blue crown
Slate-blue neck
Chestnut back
Pinkish-brown underparts
White wing bar
White shoulder

Female

White wing bar
White shoulder
Grey-green upperparts
Greyish-white beneath

Below are my answers to "Who's who?" – 1

My name _____

The species of birds are:

[Add the word `male` or `female` where appropriate]

1

2

3

4

5

6

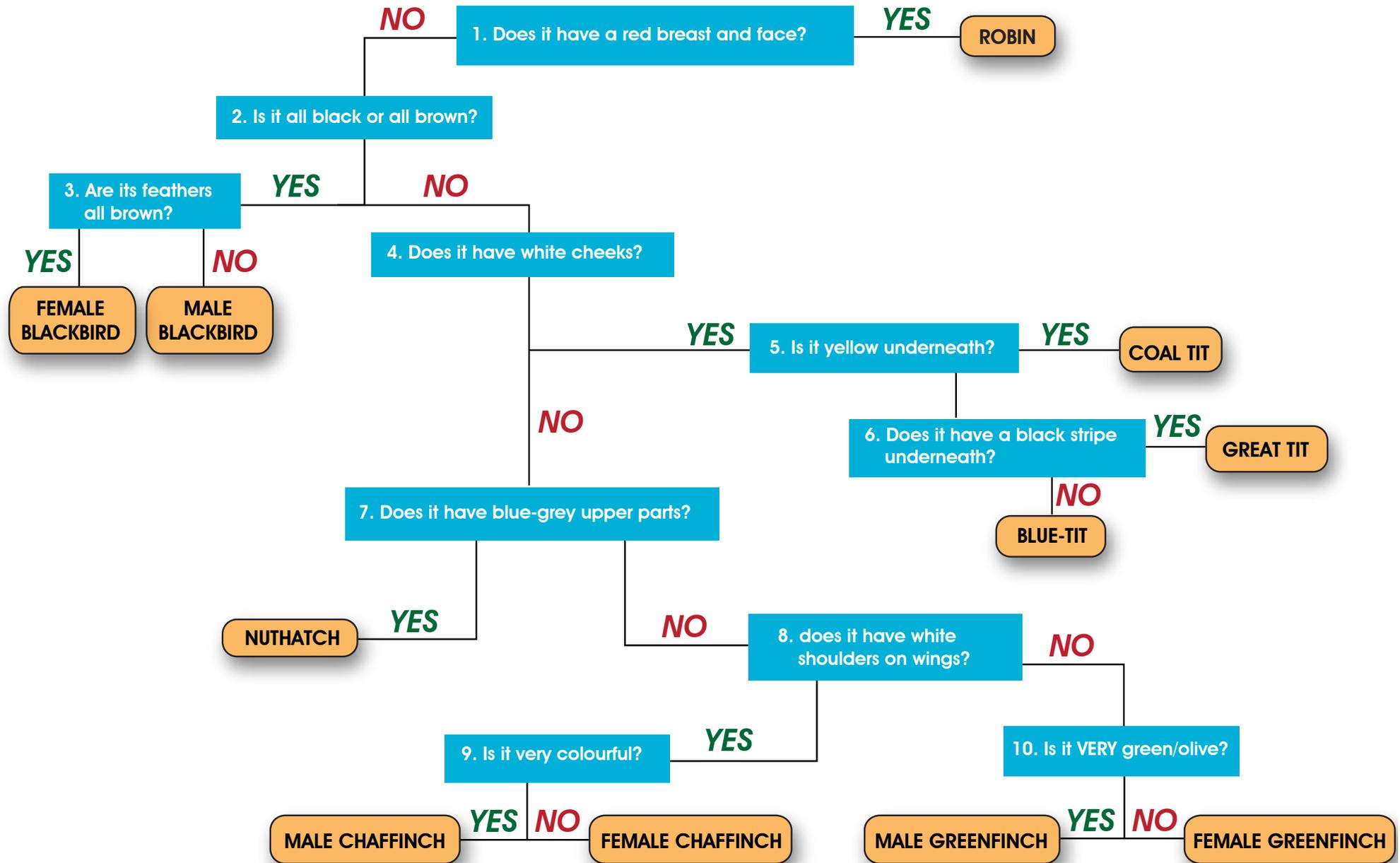
7

8

9

10

11



Activity 2: Foraging behaviour using Marzipan and food colouring

Background for teachers

1. General information

It is well known that birds possess colour vision (Sibley 2001). The principle being used in this activity is to see if birds have a food colour preference when given a choice of two colours, red and green.

However, an important step in the procedure is to embark on a food training programme BEFORE the study is carried out.

It is crucial to train the birds to come to your feeding platform. Initially a food such as bread needs to be left out for a few days until a clientele of birds regularly use the feeding station. Bread is cheaper than using marzipan and gets birds used to feeding where you want to carry out the investigation. It depends on the history of bird activity at the feeding site as to how long it takes birds to become regular visitors to a feeding station. Also, the availability of birds will vary from site to site so it is worth exploring several positions to get the best possible bird population and viewing point and avoid any sites that are distant from cover in case danger threatens, such as a predator flying by.

2. Food material

Marzipan is the suggested food for this investigation. This is because it can be bought ready made and is easy to mould and colour using food dye. It is an activity that students enjoy doing if time and care about dyeing hands can be allowed for. (NB Take care to use plastic bags, or gloves if you can afford them, over the hands to prevent dyed fingers!!)

The marzipan needs to be dyed in a bowl with the chosen food colouring, either by doing this yourself or getting the students to do it. Once dyed, the marzipan can be kept until needed, for example, in a plastic food bag in a refrigerator. When ready, the marzipan is rolled into spheres with the fingers (again remember the plastic bags or gloves). It would also be wise to tell the students to wash their hands after the colouring is completed.

The colours used in this study are red and green, but others could be explored. The marzipan can be rolled into a range of shapes but in this study, spheres of about 1 cm diameter are recommended. The suggestion here is that 24 spheres of each colour are placed inside a tray. The spheres need to be placed into a tray of a plain, neutral colour. This could be a plastic, hardboard or a wooden tray, though obviously it should not be red or green. A tray that is roughly 300 mm x 200 mm x 50 mm is an appropriate size, about the size of a plant seedling tray. The tray serves to contain the spheres and prevent them rolling away. The tray can be placed on a feeding platform but if a feeding table is not available then an old table, desk or picnic table will do equally well. Mix the colours up so the spheres are distributed around the tray without conscious bias.

The original study, on which this method is based (Allen, Anderson and Tucker 1987), used pastry, and a recipe for this is available in their article. This is a cheaper option, but it is not as easy to dye, mould or keep ready for replenishing the trays. There is also the extra step involved in making it up. Marzipan was chosen due to its ease of use and because it proved to be palatable to birds and would do them no harm: this was confirmed by Dr Ian Hartley (Lancaster University).

If a video camera is available for use that would be very helpful so that the trays do not have to be watched continuously. There can be long periods of inactivity and then a flurry of activity so students could perhaps be distracted. However, live observations can be carried out and this can be useful in showing students how to plan observations and to record events as they happen.

Aim of Activity Two

This activity will determine which colour of marzipan, red or green, the birds prefer to eat. Therefore marzipan of both colours needs to be placed on the tray. The tray can then be left long enough to allow the birds to eat a substantial amount of the food. It has been found that an hour should be long enough, but it depends on the number of actively feeding birds that are present. It is important that there is still some of each colour left, otherwise the preference cannot be seen, and so the tray must not be left out for too long. It would be wise to check on the tray, say, every 15 minutes.

When the allocated time is over, or the number of marzipan spheres is low, students can bring the tray in, count how many of each colour are left and then complete the table on Sheet H2. The number and percentage of each colour eaten can be calculated (if appropriate). The process can then be repeated on subsequent days for replication and a suitable graph drawn.

Students can then try to explain why any colour preference in consumption has occurred; our research so far has shown this to be red.

[You can use the Who's who? - 1 activity with pupils to practise the identification of the common birds whilst this feeding station is being established. The Who's who? - 1 DVD can also be used to help the pupils develop their identification skills.]

Food Colour Preference

Aim: To determine if the colour of food influences its consumption by birds.

Introduction

The world is a colourful place and we use our eyes and brain to allow us to appreciate these colours. We often show colour preferences, for example, in the food that we choose to eat or in the clothes that we select to wear. However, there are certain colours that have special meaning for us. For example, red is a warning colour for humans and we use it to indicate danger; a red traffic light means STOP to a car driver.

The question we are asking here is "How do birds respond to the colour of food?"

Many berries that a bird may eat are red, whereas caterpillars and other insects that a bird may eat are often green. So, some birds might choose food that is red in colour and others might prefer green.

Using the following procedure you could explore this idea and find out what colour of food the birds in your area prefer to eat. The focus of the investigation is whether birds will eat more red marzipan or more green marzipan.

Procedure

- 1) Take a piece of marzipan, enough to make about 24 spheres, each with a diameter of 1 cm.
- 2) Put the marzipan into a bowl and add a few drops of food colouring (either red or green). Make sure that you wear some form of protection over your hands to prevent you having dyed skin - disposable gloves or plastic food bags will do.
- 3) Mix the colour in with a fork or with 'protected' hands until the marzipan has a uniform colour.
- 4) Roll the marzipan with your fingers, still protected, into 24 small balls.
- 5) Repeat the sequence but this time use a different food colouring to colour the marzipan. (Another group may have done this and you can share their marzipan.)
- 6) Place all the spheres (48 in all) on to the tray. Rotate the tray slightly so that the spheres move – this will mix up the colours so that both colours are spread around the tray.
- 7) Place the tray in a place where you know that birds can safely feed.

- 8) Record in the table below the time that you put out the tray and the number of balls of marzipan that you have used. This should be 48 (24 red and 24 green), but you might have made a different number of spheres.
- 9) Then leave the tray for birds to feed from and return later (after an hour or so). Count and record the number of marzipan spheres of each colour that are left when you return.

Colour of Marzipan	Number put out at start	Number left at end	Number taken	% Taken
Green				
Red				

- 10) Work out how much the birds have eaten of each colour of marzipan. Plot a bar chart showing the results. This can either be done for the actual numbers taken or as the percentage taken, if your teacher asks you to calculate this.

Questions

- 1) Did the birds appear to have a preference for one colour or the other?
- 2) Can you think of any food that is this colour in the bird's natural habitat?
- 3) Did the birds take any of the non-preferred food?
- 4) What does this tell you about the birds' foraging behaviour?

Background for teachers

Scavenger birds occur anywhere where there is readily available food to be had; a school playground is often a prime place for this, particularly after a break-time. These birds will often wait around the school grounds looking out for the opportunity to come in and feed. Therefore it can be an ideal way for students to see birds exhibiting spontaneous competitive behaviour.

Different species of birds have a 'pecking order', a hierarchy of competition, so some species will usually eat more food than others. As they move in on a source of discarded food, observers may see competition between birds. The competition may be inter-specific competition (i.e. competition between birds of two, or more, different species) or intra-specific competition (competition between individuals of the same species). The suggestion in this resource is to either carry out a naturalistic observation (watch the birds after a break-time as they fly down to feed on discarded food) or manipulate the situation by going out into the playground and scattering bread. Students can then retreat inside and watch as the birds fly in to feed. A videoed sequence (see DVD notes on page 29) is provided showing birds coming down to scavenge after a morning break in a comprehensive school in Hampshire.

The success of this exercise will depend on how many scavenger birds are in your immediate vicinity. Most towns have a good supply of these and they are often used to feeding in school grounds. However, this tends to depend on how much food litter there is in the grounds - some schools may ban the consumption of food at mid-morning and mid-afternoon breaks.

Recognition of the main species of scavenger birds that are likely to come into a playground is crucial. Fortunately the number of species most commonly found is small and so students should become familiar with these relatively easily.

The key included in this pack on sheet K, and the flow chart on P, have been written to cover those birds which are most likely to be seen feeding in a playground; these are illustrated on sheet L. If students work through the key using the pictures provided on sheet L and then look at the key features on sheet N, they should become familiar with these birds.

The correct answers are included below (see page 19).

On the DVD (see DVD notes on page 29) you will find a sequence of scavenger birds flying in to a playground. The sequence can be used to help students develop their identification skills and/or it can be used for analysis of the scavenger competition. It has a commentary which can be turned down if it is not wanted. Student worksheets Q1 and Q2 take students through a possible exercise using real time observations of the scavenger birds in your grounds. An alternative is to use the video footage.

During the running of this project, it is likely that birds other than those included in the keys may well be encountered. If this should happen then identification will have to be made using a bird guide. There is also the problem of juvenile birds which do not show the adult plumage. Some birds also show distinct changes in their plumage in and out of the breeding season. This is particularly the case for the black-headed gull and the DVD (see DVD notes on page 29) shows examples of this. The key tries to use general features, which do not change substantially, such as beak colour, in an attempt to overcome this problem.

[NB The feral pigeon may cause a particular problem due to the variety of its plumage. The wild type is blue-grey but the feral form can be anything from pure white to almost black or various shades of brown. The key uses the plumage of the wild form.]

The use of a dichotomous key is an essential tool in Biology and it addresses the National Curriculum directive to use keys, identify animals and plants and assign them to groups to classify living organisms. Therefore the exercise of using this key has value, in addition to allowing the students to familiarise themselves with some common scavenger birds.

The flow chart, sheet P, could be used either instead of the written key or in addition to it.

A simple line drawing of a bird, sheet M, is included to show the different parts of a bird which are used in the key.

Answers to sheet O "Who's who?" - 2

- 1 Herring Gull
- 2 Magpie
- 3 Jackdaw
- 4 Starling
- 5 Male House Sparrow
- 6 Female House Sparrow
- 7 Pied Wagtail
- 8 Black Headed Gull in winter plumage
- 9 Black Headed Gull in summer plumage
- 10 Crow
- 11 Feral Pigeon
- 12 Rook

There are at least ten common birds which may come to scavenge in your school grounds and by using a key you can learn to name some of these birds. Sheet L show pictures of these birds.

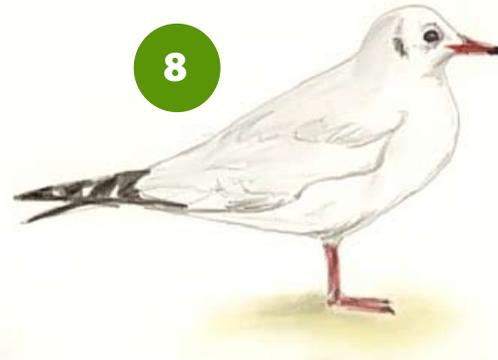
Use the key on sheet K, or alternatively the flow chart on Sheet P, to identify and become familiar with these birds. Sheet M shows you the parts of a bird named in the key.

Look at each picture of a bird on sheet L and name it by working your way through each question in the key or flow chart. For each question in the key, look at the pictures and answer YES or NO. Look at the end of the line for your answer and it will EITHER give you the bird's name OR tell you to go on to another question.

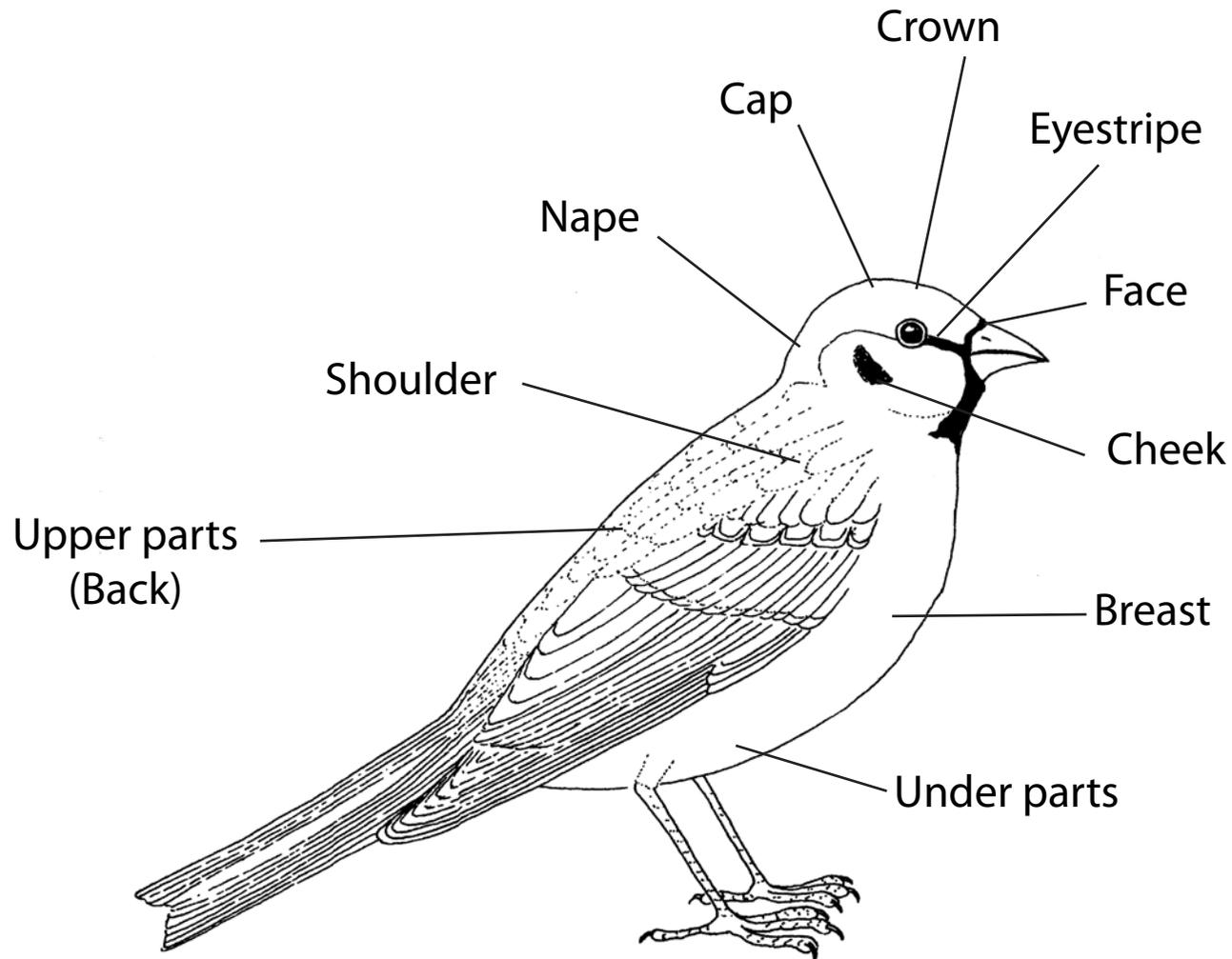
Once you think you know what the bird is then check its key features on sheet N. Ask yourself if they match the bird you have named. You will need to use sheet N to separate male and female sparrows and the summer and winter plumage forms of the black-headed gull.

When you think you know which bird is which, fill in your answers on sheet O and check them with your teacher.

- | | | |
|--|-----|---|
| 1) Does it have mostly white plumage? | Yes | Go to 2 |
| | No | Go to 3 |
| 2) Does it have a red bill? | Yes | Black-headed Gull |
| | No | Herring Gull |
| 3) Does it have mostly black, but not shiny or glossy plumage? | Yes | Go to 4 |
| | No | Go to 6 |
| 4) Does it have a grey hood? | Yes | Jackdaw |
| | No | Go to 5 |
| 5) Does it have a pale base to its beak? | Yes | Rook |
| | No | Crow |
| 6) Is its plumage white and black? | Yes | Go to 7 |
| | No | Go to 8 |
| 7) Is it a small bird (< 18 cm)? | Yes | Pied wagtail |
| Is it a large bird (> 45 cm)? | No | Magpie |
| 8) Is its plumage generally grey? | Yes | Feral Pigeon |
| | No | Go to 9 |
| 9) Does it have a long pointed bill? | Yes | Starling |
| | No | House sparrow
(male or female) |



Parts of a bird



Key Features

Rook

Purplish-black feathers
Long dark bill with a pale base
Large 44-46 cm

Jackdaw

Mainly black feathers (with a slight purple sheen)
Grey hood
Short bill
Smaller than crow and rook, 33-34 cm

Starling

Feathers blackish with a green-blue sheen
Speckled white in autumn but less so in spring
Pointed beak, dark in winter but yellow in spring and summer
21-22 cm

Pied wagtail

Black wings with white bars
Underparts white
Male has black upperparts and chest
Female has grey back
Tail is long, black and white, and bobs constantly
17 - 18 cm

Magpie

Black body and head
Inner wings and tail black with blue-green sheen
Outer wings and belly white
44-46cm

Feral pigeon

Blue-grey plumage
Grey head
Dark bars on wings
Green or purple sheen to neck
31-34 cm

Herring gull

All white head and neck in summer streaked with grey in winter
Yellow bill with red spot near the tip
Legs and feet are flesh coloured
Wings grey
Large gull, 55-67 cm

Crow

All black feathers and beak
Strong thick bill
Flat head
Large 45-47 cm

Black-headed gull

Black/dark brown hood only in late spring and summer - dark spot behind eye in autumn and winter
Wax-red bill and legs in spring and summer - duller rest of the year
White body
Pale grey wings
Small gull, 34-37 cm

House sparrow

Male

Brown back with blackish marks
Brown head with a grey crown
Pale grey underparts
Grey cheeks
Black bib
14-15 cm

Female

Yellow-brown streak above the eye
Pale underparts
Pale cheeks
Pale brown crown
Straw-coloured line above and behind the eye
14-15 cm

Below are my answers to "Who's who?" – 2

My name _____

The species of birds are:

[Add the word `male` or `female` and `winter plumage` and `summer plumage` where appropriate]

1

2

3

4

5

6

7

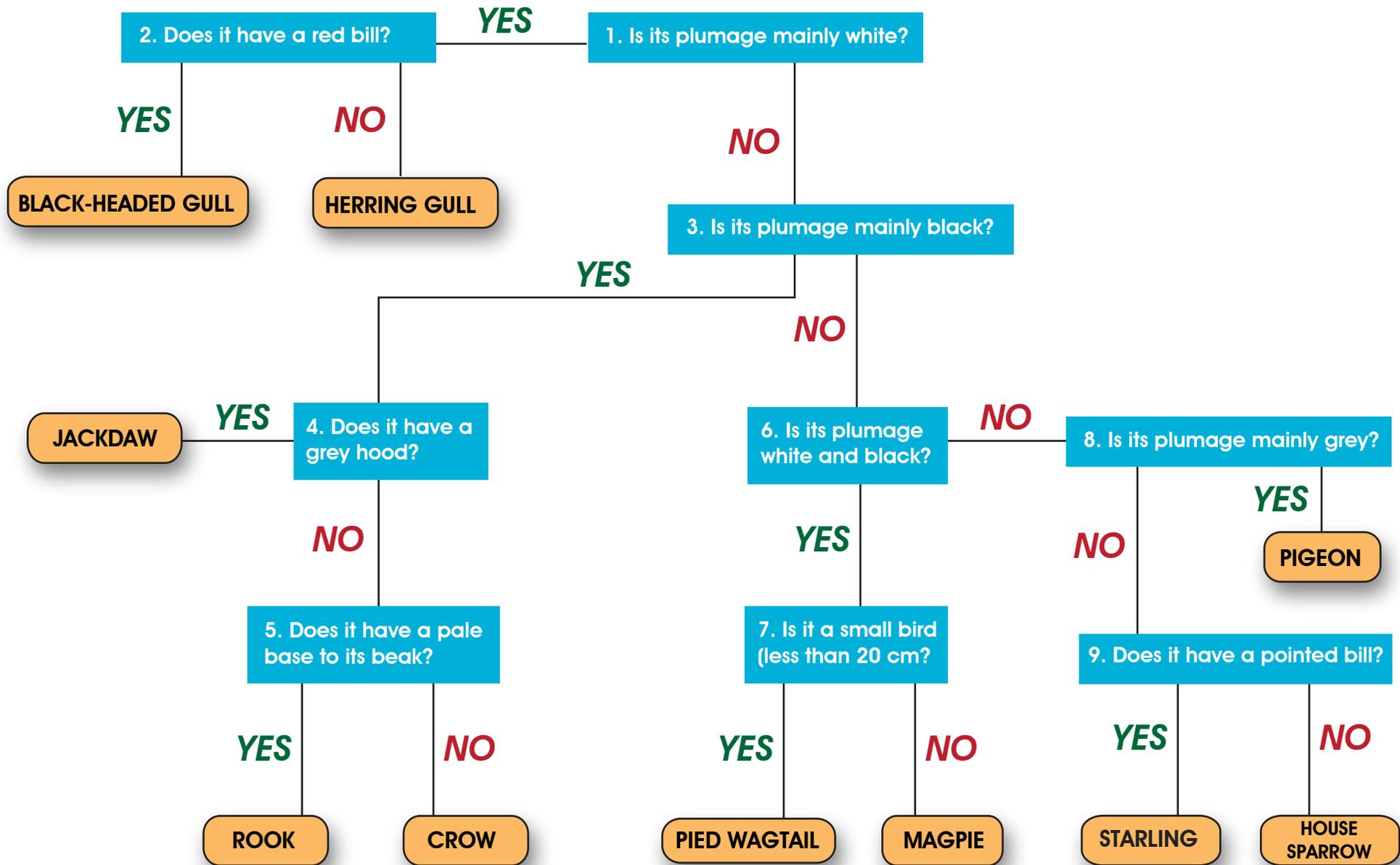
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9

10

11

12



Who competes with whom?

By observing birds as they scavenge for food you can work out how they compete with each other. Your `discarded food` may provide an important food source for some species of birds. If you have carried out Activity Three who's who? - 2 you should be familiar now with some common scavenger birds. If not you will have to try and recognise these birds as you observe them in your school grounds.

Aim

The aim of this activity is to work out how the scavenger birds in your school ground compete with each other. Each species of bird has a hierarchical relationship (or `pecking order`) with other species of birds. By watching birds as they fly in to gather `discarded food` you can work out this relationship.

Procedure

Go out into your school's playground and:

- Either, as break time finishes, watch the different species of birds as they fly in to gather up the food that has been dropped during break;
- Or, throw food (such as bread) down onto the floor and stand back to watch the different species of birds fly in to gather it up;
- Or, watch the videoed sequence of birds feeding in school grounds (in this case you will not be able to record the real time of arrival).

If you have a stopwatch you can also record how long it takes for each species of bird to arrive. You will need to start the clock when the first bird lands and record which species it is. You then need to write down each new species as it comes down to feed and record the time that it lands. If you can work in groups you can elect one person to write and others to watch as the birds interact with each other. Record any `fights`/interactions as they happen and record which species are involved.

Results

(If you have more than 7 different bird species you will need to add more rows to the table)

Order of arrival of species	Species of bird	Time of arrival
1st		0 mins/secs
2nd		
3rd		
4th		
5th		
6th		
7th		

Conclusion

- Which species arrived first to scavenge in your grounds?
- How long did it take for the second species to arrive?
- Did you notice any `fights` between any birds? If so which birds were they? Were they the same or different species?
- What advantage does a bird have if it can arrive first?
- Which species of bird was the last to land?
- What is the advantage of arriving last?
- Suggest some characteristics that birds might need to have if they are going to beat other birds to the food.
- Did the birds you observed arriving first show any of these characteristics? If so, list the characteristics.
- Did you see any birds chase off any other birds? If so, which were they?
- From the birds seen, try to write out a list of birds with the most aggressive species first to the least aggressive last. This list will be like a `pecking order` or `hierarchy` for the species you have seen.

Film footage - notes for teachers

The DVD that accompanies this pack is designed as an addition to the natural observations, if it is desired. It will help the pupils familiarise themselves with the birds in a controlled fashion. There are four separate sequences and the menu page has 4 icons to enable each to be accessed as follows:

Feed the birds: identification

1. Identification guide with captions

This is a sequence of garden birds feeding from a traditional nut/seed feeder and feeding on the ground. Accompanying the arrival of each bird is its song and a caption identifying the bird. This can be used with Activity - 1 to get the students familiar with the common birds that they might see at their feeding station. The footage was shot with a tripod-mounted camera.

2. Identification guide without captions

There is the same sequence of garden birds feeding from a traditional nut/seed feeder and feeding on the ground but this time without the captions. This can be used with Activity – 1 to allow the students to test their identification skills using the common birds that they might see at their feeding station.

Feed the birds: Marzipan investigation

Feed the birds - Scavenger Birds

Finally there is a sequence showing scavenger birds in a typical city school playground. [This footage is not for analysis but simply to show what you might see in your school situation.] This shows the order in which the different scavenger birds come in to feed as the pupils leave the playground to return to lessons. There is a commentary throughout but if you wanted to use it for data analysis, and/or to practise identification, then the sound needs to be turned down.

The footage starts with black-headed gulls out on the school fields along with jackdaws and rooks. Once break is over the gulls fly in to the playground as a flock, followed by the rooks and jackdaws then starlings and finally pied wagtails. The black-headed gulls are numerous and intra-specific competition (i.e. competition between black-headed gulls) is obvious. The other birds only occur in small numbers. The order of arrival of these birds can be used to devise a hierarchy for the different species

Further work

The set of activities in this resource have been designed mainly for students at KS3 but it could be used with KS4 or A level and, if simplified, for KS2 and KS1. It has addressed the National Curriculum directives concerned with classification and the use of keys, adaptation to habitats (with particular reference to predation, birds' abilities to see colour and the use of camouflage) and the interdependence of organisms as regards competition. It could also be useful in discussion of the scientific method, especially in tackling natural situations where variables are difficult to control.

The ideas used can be extended to investigate other variables, for example:

- Do different species of birds prefer different shapes of food? [Using marzipan]
The resource suggested spheres but lots of other shapes could be tried, such as cylinders or cubes.
- Do different species of birds have different colour preferences?
The resource has focused on red and green but other colours could be tried, if dyes are available.
- Is the pattern of consumption of red and green marzipan spheres affected if we put the red and green marzipan balls into a) a red tray, or b) a green tray?

Reference Section

Allen, J. A., Anderson, K. P. and Tucker, G. M. 1987. More than meets the eye - a simulation of natural selection. *Journal of Biological Education*, 21 (4) 301-305.

Hayman, P. & Hume, R. 2002. *The New Mitchell Beazley Birdwatcher's Pocket Guide to Britain and Europe*. London, Mitchell Beazley.

Holden, P. & Cleaves, T. 2008. *RSPB Handbook of British Birds*. London, Helm.

Jackson, E., Simms, A. & Hayman, P. 1999. *Guide to 'Top 50 garden birds*. Shrewsbury, Field Studies Council.

Sibley D.A. 2001. *The Sibley Guide to Bird Life and Behaviour*. London, Knopf.

Materials

Marzipan: Available in most supermarkets.

Pastry Alternative: Cookeen and flour is mixed thoroughly in the ratio of 1:3, either in a food mixer or by hand.

Food colourings: We recommend - Supercook Colouring Red and Green, produced by Supercook, Leeds, LS25 6JA

Seed Trays; 344 mm x 214 mm x 52 mm from any garden centre.

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