



DARWIN
INSPIRED
LEARNING

Enquire
with Darwin

KS3

Module 3: Hedgerows

Darwin planted a hedge
as an experiment

What is so important about a hedge?



Change over time

- In 1846, Darwin planted a hedge which bordered a field used for grazing sheep and cattle and hay making
- On the other side of the path was a small copse



Change over time

In 1846 he planted...



Alder



Hazel



Lime



Hornbeam



Birch



Dogwood



Privet

The experiment

.....
For 20 years Darwin observed the hedge almost every day
.....

After 20 years he recorded the species that had come into this hedge

He observed and recorded:

- Incoming plant species
- The use animals made of the hedge
- Seasonal change

The Hedge in the 1850s



Change over time

In 1866 Darwin made a survey of the hedge:

Ash

Holly

Cherry

Maple

Privet

Sycamore

Honeysuckle

Hornbeam

Ivy

Elm

Spindle

Gooseberry

Wild Clematis

Rubus (Blackberry)

Rose

Beech

Oak

Change over time

In 2006, Jane McLauchlin made a survey of the hedge:

- There were 63 plant species
- Where did they come from?
- How did they get there?
- Some plants like the honeysuckle and elm have disappeared from the hedge. How has this happened?

The Hedge in 2009



What lives in the hedge?



.....
**Food in
a hedge**



.....
**Food in
a hedge**

**Hedge
flowers, berries
and seeds**



Food in a hedge

Hedge flowers, berries and seeds

Small Mammals

Food in a hedge

Hedge flowers, berries and seeds

Small Mammals

Eggs and Chicks

Food in a hedge

Hedge flowers, berries and seeds

Small Mammals

Eggs and Chicks

Food plants at the base of the hedge

Food in a hedge

Hedge flowers, berries and seeds

Small Mammals

Eggs and Chicks

Food plants at the base of the hedge

Insects in soil, under leaves and bark

Food in a hedge

Hedge flowers, berries and seeds

Small Mammals

Eggs and Chicks

Food plants at the base of the hedge

Insects in soil, under leaves and bark

Leaves for caterpillars

.....

Animals in a hedge

Different animals come here at night and vary through the seasons

Owls

.....

Animals in a hedge

Different animals come here at night and vary through the seasons



Owls



Squirrels

.....

Animals in a hedge

Different animals come here at night and vary through the seasons



Owls



Squirrels



Shrews, voles, and mice

.....

Animals in a hedge

Different animals come here at night and vary through the seasons



Owls

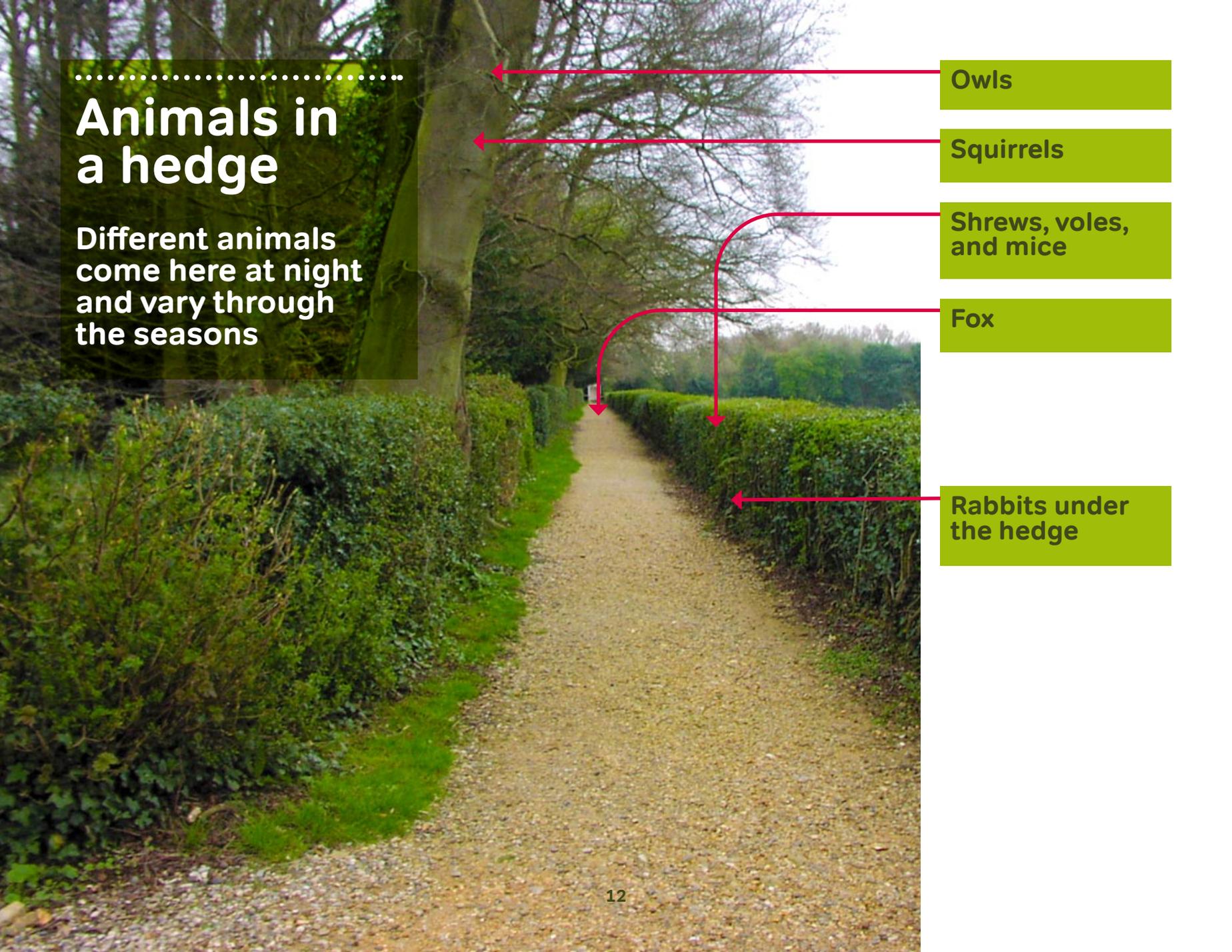
Squirrels

Shrews, voles, and mice

Fox

Animals in a hedge

Different animals come here at night and vary through the seasons



Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Animals in a hedge

Different animals come here at night and vary through the seasons

Possibly dormice (summer)

Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Animals in a hedge

Different animals come here at night and vary through the seasons

Possibly dormice (summer)

Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Leaf litter insects

Animals in a hedge

Different animals come here at night and vary through the seasons

Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Leaf litter insects

Possibly dormice (summer)

Butterflies by day, moths by night

Animals in a hedge

Different animals come here at night and vary through the seasons

Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Leaf litter insects

Worms and insects in the soil

Possibly dormice (summer)

Butterflies by day, moths by night

Animals in a hedge

Different animals come here at night and vary through the seasons

Owls

Squirrels

Shrews, voles, and mice

Fox

Rabbits under the hedge

Leaf litter insects

Worms and insects in the soil

Possibly dormice (summer)

Butterflies by day, moths by night

Hedgehogs

Darwin's ways of working

Darwin's son wrote:

'He used to walk very stealthily & quietly amongst the woods or where there was any animal life to watch'

'One day in the [Sandwalk] wood he surprised a fox asleep, it got up & looked at him much astonished & then trotted off'

'Another day [near the hedge] a whole family of young squirrels took him for a tree & ran up & down him'

'He had a sharp eye for birds nests & often used to find them without looking for them'

'Saw bees in holes at the end [of the hedge]'

Darwin's ways of working: observation



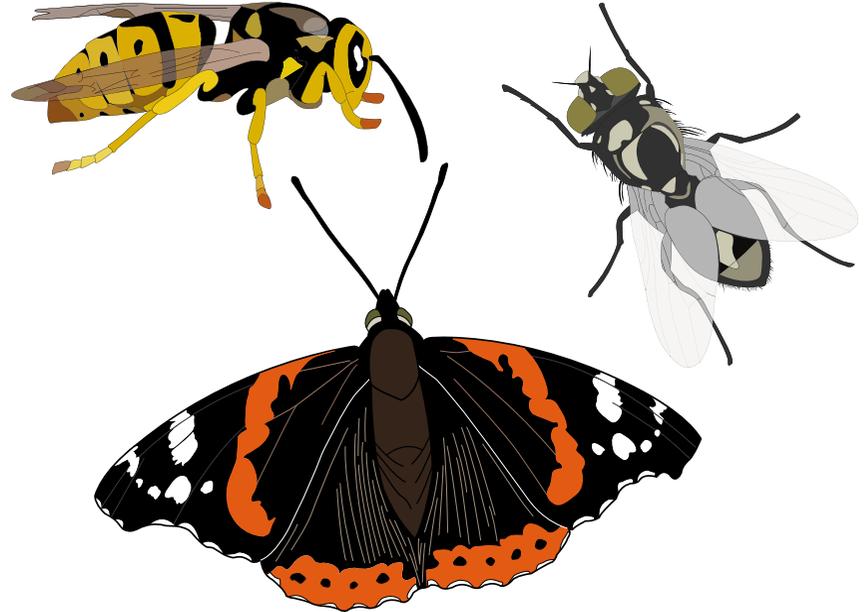
An evidence image

Darwin himself noted *'pulpy fruits serve quadrupeds and birds as food, while their seeds, often hard and indigestible, pass uninjured through the intestines, and are deposited far from their original place of growth in a condition peculiarly fit for [germination]'*

Darwin's ways of working: observation

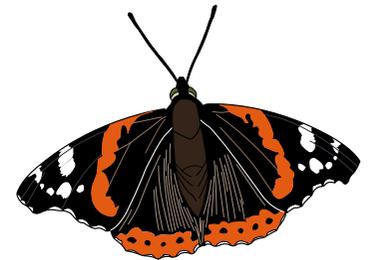


Blackberries have
tough skins



How do these insects
feed from the blackberry
in a way that shows
interdependence?

Darwin's ways of working: observation



Blackberries
have tough skins

A wasp has strong jaws (mandibles) to tear the skin open to reach the sugary flesh

A fly dribbles saliva on the fruit to make it mushy so it can suck up the juice.

A Red Admiral butterfly has a long tongue (proboscis). It sucks up the juice from the mushy blackberry.

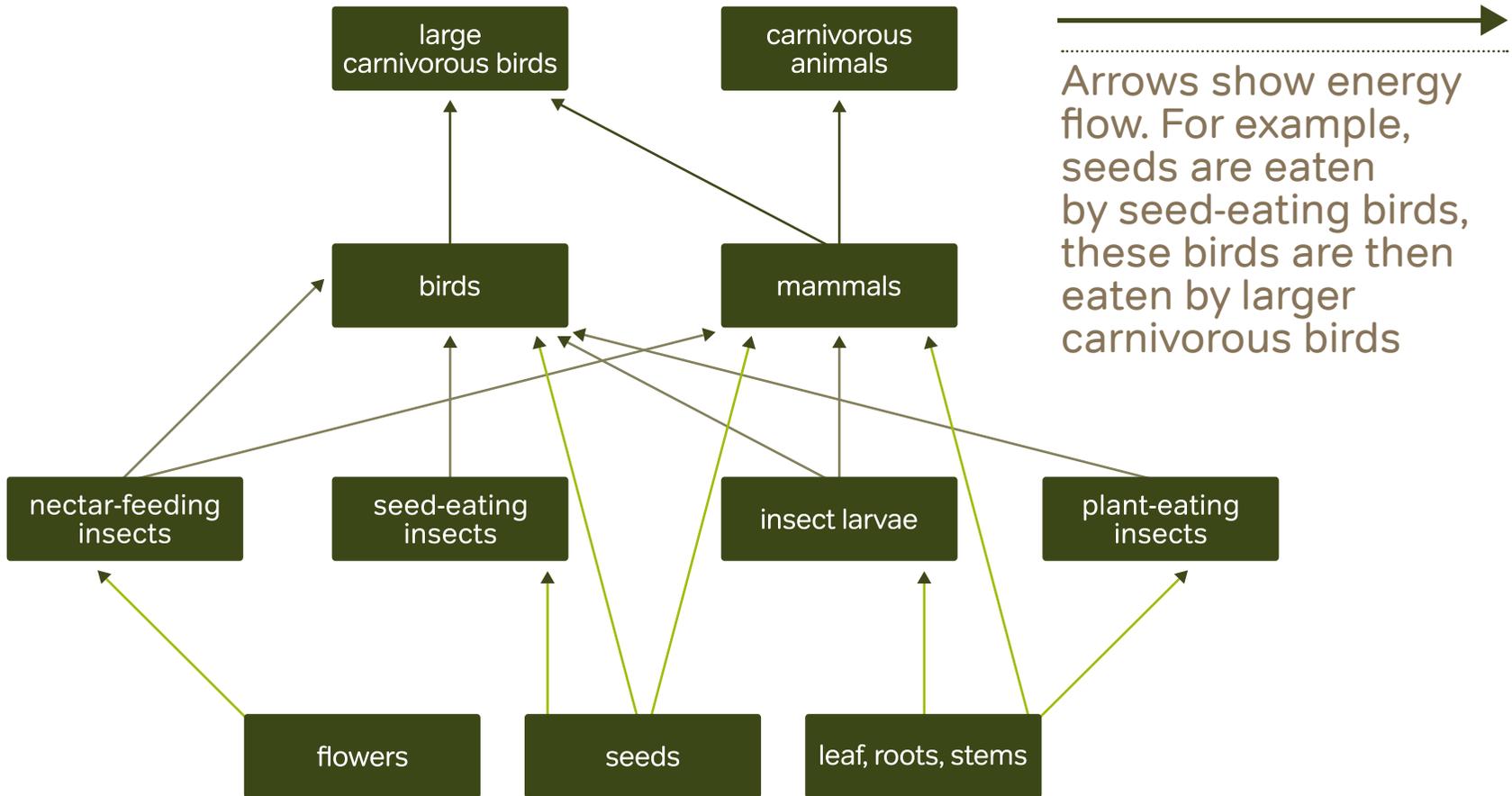
Videos of hedgerow life

www.bbc.co.uk/nature/habitats/hedge
(Living Britain, Autumn watch and Hedge lore)

www.youtube.com/watch?v=HHaNvgysJcQ&feature=related (bugs)

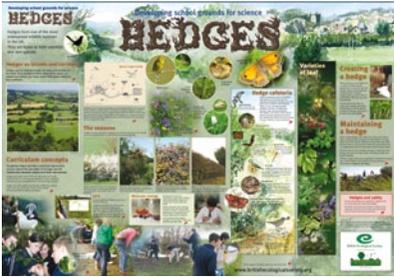
www.youtube.com/watch?v=Tx8rJJfZ5Ak
(birds nesting in a hedge)

Hedgerow food web



Hedge habitat

Using the Hedge poster, record the species of plants and animals found in many hedges



Typical hedge habitat

Hedge cafeteria

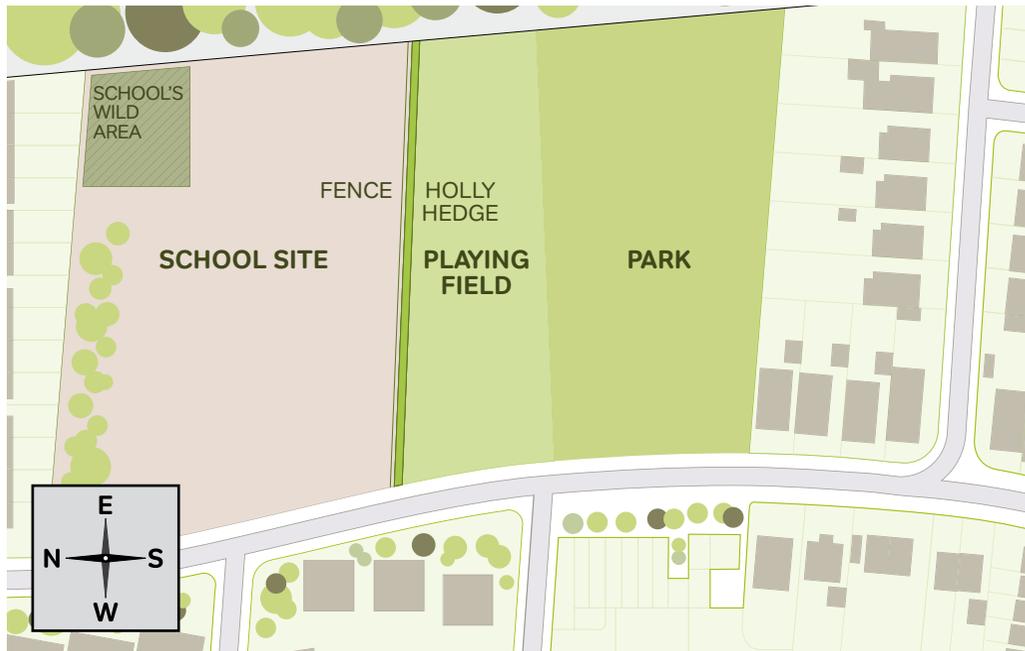
The seasons

The photographs of plants and animals under the main heading

Resource materials

Role play

A map of the old school development site:



Jonas Homes has submitted the following list of trees and shrubs to a Borough Council on the edge of a city. The planned hedge will be planted next to the footpath on the western edge of the development site.

- Birch (*Betula pendula*)
- Hornbeam (*Carpinus betulus*)
- Field maple (*Acer campestre*)
- Privet (*Ligustrum vulgare*)
- Guelder rose (*Viburnum opulus*)
- Dogwood (*Cornus anguinea*)

Resource materials

Role play

Students take roles and present the following arguments at a planning consultation.

Those people living opposite this site

The houses opposite the site are hardly visible from the road because the council prohibited grubbing up of trees and hedgerows during the building work. The planting should be of oak, field maple, hawthorn, blackthorn, crab apple, elder and hazel like the hedge opposite. It should grow to more than 3 metres high. It is an attractive feature that reduces pollution around their homes and the Borough maintains it well.

The local Wildlife Trust

Elm trees in the hedge around the site died in the 1980s. What remained of the hedge was not a safe wildlife corridor to the park, the hedge opposite or the railway embankment. The Trust is concerned about habitat fragmentation and would like to see a double row of closely planted saplings on the west and north sides of the site and the old school's wild area left intact. They need access to the hedge to monitor wildlife. The community can visit the site on open days.

Those who don't want the Borough to waste money

A hedge needs to be maintained so branches don't overhang the footpath to the shops or park. Even with bark mulch under the hedge, it will become full of weeds. The developer, not local people, should pay for maintenance. They want a low fence or a grass edge that householders can mow so that the Borough will not have to pay for maintenance.

Resource materials

Role play

Local biodiversity group

With no greenfield sites in the Borough, most brownfield sites have been built on. Its surveys show that local wild flowers are disappearing and this affects bees, butterfly, bird and small mammal numbers. Hedgerows are very important for conservation of threatened lichens, invertebrates, reptiles and amphibians, 20 species of bird and 11 endangered mammals in the UK. They work with schools and want to retain the wild area to show change over time. Its volunteers will maintain the hedge and schools will be encouraged to visit.

Green gym group

The purpose of the planting isn't just to comply with the planning permission nor to plant the cheapest option available. The green gym can source and plant a mixed hedge if the developer pays them instead of a contractor. This non-profit making group works with the Borough to encourage older or unemployed people to keep healthy, active, give something back to their community and gain skills. The hedge can become a focus for community events.

Potential house buyers who would have the hedge near their homes.

They don't want anything close to the houses that will grow over 2 metres and block out light, or risk their safety. They don't want prickly plants in the hedge collecting blowing litter. They don't want anything like willow that has a huge root system and can undermine house foundations. Whoever pays for the plants must also pay for the maintenance; why should they pay for it? There's plenty of wildlife on the railway embankment, why do we need more here?

Discuss the choices made and factors other than wildlife that affect decision making. What sort of hedge might be most wildlife friendly?

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