PINE MARTENS BOUNCE BACK

PINE MARTEN SCHOOLS

KS3 RESOURCE PACK

Pine Martens Bounce Back: The Two Moors Pine Marten Project is made possible with The National Lottery Heritage Fund. Thanks to National Lottery players, this project aims to restore healthy populations of pine martens to the South West of England.

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Click on the links below to open each activity. The activities start with teacher guidance which include National Curriculum links, SEND considerations, a suggested lesson plan and links to further activities.

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PINE MARTENS BOUNCE BACK

This activity booklet aims to teach students about the European pine marten and the ecosystem it is part of. It covers the importance of a biodiverse environment and how species are interconnected. There are opportunities for debate and activism, as well as opportunities to share students learning with the wider community. This booklet has been designed to be displayed on an interactive whiteboard.

Key themes:

To understand the life cycle of the pine marten.

To understand the distribution of the pine marten.

To understand the contributing factors to their decline.

To identify the features of a woodland habitat and the effects of human impact.

To understand the importance of biodiversity.

To understand why reintroducing species is important.

An introduction to pine martens:

See below for links to resources that can be used to teach student about pine martens.

https://www.wildlifetrusts.org/wildlife-explorer/mammals/pine-marten

https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/animals/mammals/pine-marten/

https://www.forestryengland.uk/article/pine-martens

https://www.vwt.org.uk/species/pine-marten/

https://www.vwt.org.uk/projects-all/pine-marten-recovery-project/

https://www.vwt.org.uk/projects-all/back-from-the-brink/

The UKS2 pack can also be used for additional resources.

Suggested reading materials:

A Richness of Martens: Wildlife Tales from Ardnamurchan: Wildlife Tales from the Highlands by Polly Pullar

Pine Martens: (The British Natural History Collection 8) By Johnny Birks (Author)

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Types of activity:

Within this booklet are a range of activities to complete. There are six different types of activities, which are explained below.

Discuss:

Discussion questions are an opportunity to share thoughts and opinions based on the research completed at the beginning of the session or module. It is also important for students to ask questions to further their understanding.

Debate:

These activities allow students to open their minds to different view points and in the process deepen their understanding of a topic. Debate also provides an opportunity to develop important speaking and listening skills. Having a secure understanding of the topic (pine martens and their ecosystems) will enable them to confidently persuade others of their point of view and will enable them to respond to others' arguments.

Explain:

Activities where students will need to explain their answers allow them to use their knowledge and understanding of pine martens to write a clear and well thought out answer to the question.

Persuade:

Within this booklet students will need to persuade others of the importance of biodiversity, species reintroduction and habitat protection. They will be writing to persuade important and key influential people using the knowledge they will have learnt from the research prior to or within the session.

Draw:

For the activities students will need to draw a diagram or illustration to complete the activity.

Design:

The final activity of the booklet is a DT activity. This activity follows the 'Design, make and evaluate' process.

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Vocabulary: New vocabulary word bank

Whilst learning about pine martens and the ecosystem they live in, you will come across new technical vocabulary. We recommend creating a vocabulary list to help you to remember the meaning of these unfamiliar words. This new vocabulary will also be useful whilst completing the activities in the booklet.

Here is are some examples of technical vocabulary you may come across.
Do you know what these words mean?

Producers
Photosynthesis
Prey
Predators
Carnivore
Herbivore
Omnivore

Endangered
Extinct
Mustelid
Ecosystem
Conservation
Adaptation
Environment
Reintroduction

As you come across new words, record them and their meaning in a back of a book or a jotter so you can refer back to them. Throughout the activities, key vocabulary is in bold. These may be words you are familiar with, but if you are unsure of what they mean, add them to your vocab list.

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Activity 1 a: Food chains

Draw

Food chains show the feeding relationships between organisms. They show the transfer or flow of energy within **ecosystems**.

Food chains almost always start with a producer. The producer is then eaten by the **consumer**. A consumer which only eats plants (**herbivore**) is also called a **primary consumer**. A consumer that would eat a primary consumer is called a **secondary consumer**. The next level up from a secondary consumer is a **tertiary consumer**. A tertiary consumer eats secondary consumers and in some cases these animals are classed as **apex predators**. An animal that eats a tertiary consumer is called a **quaternary consumer**. If there is a quaternary consumer in a food chain, they are the apex predator!

Quaternary consumer
Apex predator
Lynx
(carnivore)

Here is an example of a food chain:

nettle ⟶ snail ⟶ frog ⟶ fox ⟶ lynx

Tertiary consumer
Fox
(omnivore)

These different types of consumer are called **trophic levels.**

Secondary consumer
Frog
(carnivore)

Primary consumer
Snail
(herbivore /**detritivore**)

Producer
Nettle

Task: Using your knowledge of what pine martens eat and which animals prey on pine martens, create a food chain labeling the different trophic levels.

Challenge: What do the arrows represent in a food chain?

Activity 1 b: Food webs

Draw

Most species of animal have multiple different food sources. Consumers will usually consume more than one type of species from the trophic level below. This means that within an ecosystem there are many different food chains and they are all interconnected. All of the linked food chains in an ecosystem combined are called a **food web**.

For this activity, you will need to use the vocabulary you have learnt form activity 1 a.
Below are a variety of woodland species that live in the same ecosystem.

Task: Draw a food web using these animals and plants and link the species using lines.

Think about these questions as you link up the species:
Which are producers? Which are primary, secondary, tertiary and quaternary consumers?
Which are prey and which are predators?

Common frog

Tawny owl

Earthworm

Lemon slug

Wood mouse

Hazel nut

Badger

Fox

Field vole

What would be the effect on the food web if the pine marten became extinct?

Pine marten

Bilberries

Grass

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Activity 2: Pyramids of number

Draw & Explain

The size of the **population** at each trophic level can be represented in a pyramid of number.

nettle ⟶ snail ⟶ frog ⟶ fox

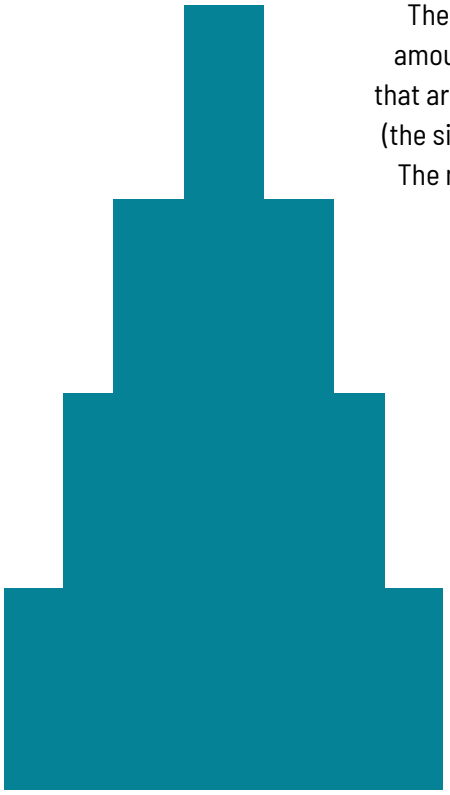
Here is a pyramid of number to represent this food chain.

Tertiary consumer
Fox
(omnivore)

Secondary consumer
Frog
(carnivore)

Primary consumer
Snail
(herbivore /**detritivore**)

Producer
Nettle



The bars represent the amount of that **organism** that are at each trophic level (the size of the population). The more individuals the bigger the bar.

The producer always goes at the bottom of the pyramid and the top predator or apex predator goes at the top.

In this pyramid of number the numbers decrease as you go up the food chain, but this is not always the case. If there is one large singular plant as the producer, for example an oak tree, then the bottom bar will be very small as the bar is only representing one organism. This means that the pyramid doesn't actually look like a pyramid!

Secondary consumer
Flea

Primary consumer
Grey squirrel

Producer
Oak tree

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Activity 2 (continued): Pyramids of biomass

Draw & Explain

A food chain can also be represented as a pyramid of **biomass**.
Biomass is all living (or recently deceased) tissue. All animals (including humans) and plants are included in this. Biomass pyramids show the amount of mass that is present in the food chain.

nettle ⟶ snail ⟶ frog ⟶ fox

Tertiary consumer
Fox
(omnivore)

Secondary consumer
Frog
(carnivore)

Primary consumer
Snail
(herbivore /**detritivore**)

Producer
Nettle

The bars represent the total mass in grams or kilograms for each species in the food chain.The higher the total weight of that population the bigger the bar.

Pyramid of biomass are always pyramid shaped.

Task: Pick a food chain (containing a pine marten) and draw a pyramid of number and a pyramid of biomass.
What do you notice about the two pyramids?

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Activity 3: Adaptations of a predator

Draw & Explain

Task: Label and explain how a pine marten has adapted to be a predator.

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Activity 4: How would you classify a pine marten?

Draw & Explain

What type of vertebrate is a pine marten?
Is it a bird, reptile, mammal, fish or amphibian?

Task: Label and explain how the features of the pine marten prove this.

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Activity 5: Adaptations: Delayed implantation

Explain

The life cycle of a pine marten

Did you know?

Pine Martens mate in the summer, but the fertilised egg is not implanted into the uterus until spring. This is called **delayed implantation**!

Once they have reached maturity, pine martens will leave their families to find their own territories. They will start to breed when they are two to three years old. This is quite a long time after they leave their families, which is one reason why their numbers have declined.

When pine martens reproduce, there needs to be a male and a female. When an egg is fertilised and implanted, it will develop into an embryo. The embryo stage lasts for a month, and then the female pine marten gives birth in spring. Pine martens produce one litter per year and will have up to five kits in a litter.

THE PINE MARTEN LIFE CYCLE

After six weeks they will begin to venture out of their dens. They develop their confidence in climbing trees and their mother will teach them how to hunt. By the age of three to four months they will have learnt to kill their own prey. At six months old they are fully grown and independent.

Like many other predatory mammals, at birth kits are deaf and blind. They weigh only 30 g. They open their eyes at 34-38 days and will feed on their mother's milk. The mother's bushy tail and furry body keep them warm in their den.

Task: Pine martens have evolved to delay the implantation of a fertilised egg.
Why do you think they have developed this adaptation?
Are there any disadvantages to this strategy?
Do any other animals have this adaptation?

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Activity 6: Mustelids: Similarities and differences

Explain

Compare the pine marten to other **mustelid** species: Polecat, weasel, stoat, badgers, otters, etc.

What are the similarities and differences?

Task: Present your findings in an innovative way. For example; in the style of Top Trumps cards, as a poster or as an infographic.

Suggested information you may want to include:

- habitat
- species name
- science
- diet
- distribution
- conservation status

Tip!

When researching the different species, use the scientific name to find the correct species.

Activity 7: Biodiversity

Discuss

Conservation charities have an important job of preserving habitats and the species that call those habitats their home. Woodland cover has reduced dramatically causing habitat loss across the UK and the woodlands that are left or that have been recently replanted have significantly decreased biodiversity.

Task: Discuss how human impacts have affected woodland habitats and think about the issues we face as biodiversity decreases.

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Activity 8: Are pine martens a pest?

Discuss

Pine martens have been reintroduced in several areas in England and are now being released in Exmoor and Dartmoor. Many people feel that it is important to reintroduce endangered species back into the ecosystem but not everyone agrees.

Pine martens are omnivores and scavengers. They will eat what they can find.
This means that pine martens may try to predate on domestic fowl such as chickens and pheasants. Pine martens may also take fruit from fruit trees in gardens and can sometimes den inside people's roof spaces. For all of these reasons, pine martens can be seen as pests.

Read this pine marten fact sheet for information about the impact of pine martens and potential ways to reduce those risks.

https://www.vwt.org.uk/wp-content/uploads/2021/01/Living-with-Pine-Martens-Factsheet.pdf

Task: Using the information that you have learnt from the benefits of reintroducing pine martens and the issues that they can cause, discuss this statement:

Some people see this species as a pest which may have affected people's opinions of them.
Do you think this is fair?

Provide evidence for your answer.

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Activity 9: Reintroducing pine martens

Debate

<u>The pros and cons of reintroducing pine martens</u>

There is a piece of land earmarked to be developed for housing. The local wildlife charity are planning on releasing pine martens in the local area and this piece of land could be used as a release location.

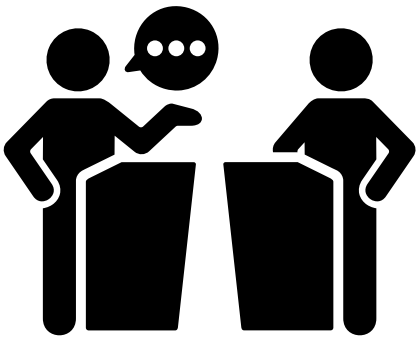
<u>Task:</u> In this activity you will be given roles as stakeholders. Once you have been given a role, you will read a statement of your role's view point about the potential of releasing pine martens on this piece of land. Discuss your statement with your group. Are there any other points you wish to make?

Once you feel confident with your role's view point, there will be a debate with the other roles.
After hearing the different points of view are there any compromises that can be made?
Is there a view point that the majority agree with?
Can a decision be made about the use of the land?

Roles:

- Landowner
- Conservation charity
- Representative of the local council
- Representative of the local community
- Debate chair person (This person will host and mediate the debate.)

The viewpoint cards for students to use when debating their argument are on the following pages.



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Activity 9: Reintroducing pine martens - Role cards

Landowner's Perspective

You are a landowner who owns a large tract of land that has been earmarked for business development, potentially providing economic growth and job opportunities in the region. The woodland would need to be completely cleared in order for the land to be developed. However, there is a proposal to reintroduce pine martens on this land, which could impact the development plans. You need to present your perspective in a debate on whether or not to proceed with the reintroduction.

I stand before you today as a landowner, deeply concerned about the proposal to reintroduce pine martens on land that has been earmarked for business development. While I understand and appreciate the importance of conservation efforts, I firmly believe that there are crucial economic and practical reasons to reconsider this proposal.

- First and foremost, the development of this land has the potential to bring significant economic growth to our region. It will create job opportunities, stimulate local businesses, and contribute to the overall well-being of our community. By introducing pine martens to this land, we risk hindering these economic benefits.
- Furthermore, pine martens and business development are not compatible land uses. Pine martens require a specific habitat with minimal human activity, while business development entails construction, infrastructure, and increased human presence. The reintroduction of pine martens could lead to conflicts between their habitat needs and the demands of businesses.
- If conservation is the goal, we should focus on enhancing and protecting existing natural habitats rather than introducing pine martens to an area earmarked for development. We can explore alternative ways to mitigate habitat loss, such as supporting conservation efforts in nearby forests or protected areas.
- While conservation is crucial, we must strike a balance between protecting wildlife and meeting the economic needs of our community. We can achieve this by identifying suitable areas for conservation and ensuring responsible development in other zones.

In conclusion, as a landowner with a vested interest in the economic growth and prosperity of our region, I urge you to reconsider the proposal to reintroduce pine martens on this development land. Let us explore alternative approaches that allow us to preserve nature while also meeting the vital economic needs of our community.

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Activity 9: Reintroducing pine martens - Role cards

Conservation Charity Perspective

You represent a conservation charity dedicated to protecting and preserving endangered species and their habitats. There is a proposal to reintroduce pine martens on land earmarked for business development. You need to present your perspective in a debate on the merits of proceeding with the reintroduction.

I stand before you today as a representative of a conservation charity, deeply committed to safeguarding our natural world and its precious inhabitants. The proposal to reintroduce pine martens on land designated for business development is an opportunity that we must seize to uphold our responsibility to nature and future generations.

- The reintroduction of pine martens is not just about saving a single species; it's about restoring balance to our ecosystems. Pine martens are a priority species, crucial to maintaining the health and diversity of our woodlands. By reintroducing them, we can help restore the intricate web of life in this region.
- As stewards of our planet, we have a moral and ethical obligation to protect and conserve our natural heritage. Pine martens were once a part of these woodlands, and their absence has disrupted the delicate balance of nature. Reintroducing them is an act of moral responsibility, not only to pine martens but to the entire ecosystem.
- Pine martens provide essential ecosystem services. They help control the populations of small mammals like voles and squirrels, preventing overpopulation and damage to forests. This, in turn, benefits the entire ecosystem and supports the services we rely on, such as clean air and water.
- In the face of habitat destruction and fragmentation due to development, it is our duty to mitigate these losses by reintroducing species like pine martens to suitable areas. This ensures that our woodlands remain healthy and resilient in the face of environmental challenges.
- Sustainable development doesn't mean sacrificing nature for economic gain. It means finding ways to coexist with the natural world while meeting our economic needs. Reintroducing pine martens can be a part of this balanced approach, as it teaches us the importance of harmonising conservation and development.

In conclusion, reintroducing pine martens on this development land is an opportunity to honor our commitment to nature, restore ecosystems, and fulfill our ethical obligations. Let us make the responsible choice and embrace this chance to create a future where both business and biodiversity can thrive.

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Activity 9: Reintroducing pine martens - Role cards

Council's Perspective

You are representing the local council responsible for making decisions on land use and development in the region. There is a proposal to reintroduce pine martens on land earmarked for business development. You need to present the council's perspective in a debate on whether or not to proceed with the reintroduction.

I stand before you today as a representative of the local council, tasked with making decisions that balance the interests of conservation and economic development within our community. The proposal to reintroduce pine martens on land designated for business development is a complex issue that requires careful consideration from multiple angles.

- First and foremost, we recognise the potential economic growth and job opportunities that business development can bring to our region. This development would contribute to the financial well-being of our community, creating employment and boosting local businesses, which is a priority for our council.
- At the same time, we acknowledge our responsibility to the environment and the need to protect and conserve our natural heritage. The reintroduction of pine martens is an opportunity to restore a part of our ecosystem that has been missing for too long.
- Our council's perspective is one of balance and compromise. We believe it is possible to find a solution that respects both economic growth and conservation goals. We can explore options such as habitat preservation in other areas or designating specific zones within the development for wildlife conservation.
- We value the input and concerns of our community members. Throughout this decision-making process, we have engaged with local stakeholders, residents, and environmental organisations to ensure that their voices are heard and considered in our deliberations.

In conclusion, the local council recognises the importance of both economic development and conservation. We are committed to finding a balanced solution that respects the interests of our community and our duty to protect our natural world. The decision we make must reflect our commitment to responsible and sustainable development.

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Activity 9: Reintroducing pine martens - Role cards

Local Community's Perspective

You represent the local community in a debate concerning the proposed reintroduction of pine martens on land earmarked for business development. The decision will directly impact your community. You need to present the local community's perspective in this debate.

I stand before you today as a representative of our local community, deeply invested in the decisions that will shape our future. The proposal to reintroduce pine martens on land earmarked for business development has sparked intense debate within our community, and it's crucial to consider our perspective.

- Our community recognises the value of economic growth and the potential for job creation through business development. We seek to improve the lives of our residents by providing employment opportunities and supporting local businesses.
- We are not indifferent to the environment; in fact, we cherish it. Many of us are nature enthusiasts who appreciate the importance of preserving our natural heritage. However, we believe that there are alternative ways to support conservation efforts without impeding the economic progress our community desperately needs.
- We propose finding a middle ground that balances conservation with economic development. This might include setting aside specific areas for wildlife preservation, creating green spaces within the development, or supporting conservation initiatives in nearby, less-developed regions.
- Our local community should have a significant say in decisions that directly affect our lives. We have actively engaged in discussions, expressed our concerns, and sought to find collaborative solutions. We believe that the decision should respect and reflect the will of our community members.

In conclusion, our perspective is one of finding common ground—a solution that allows for economic growth, job opportunities, and the preservation of our natural world. We stand united in our desire to protect our community's interests while acting responsibly toward the environment.

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Activity 10: Protecting our woodlands and the species that call woodlands their home: A persuasive letter

Persuade

Task: Write a persuasive letter to persuade an influential figure to protect our woodlands and support the reintroduction of pine martens.

First you will need to decide who you want to write to. Your letter may be addressed to your local MP, a member of parliament or a local land owner.

In your letter, you need to inform the recipient who you are and why you are writing to them. You will need to use formal language and persuasive writing strategies to persuade the individual to take action or to change their view point.

Plan the points you want to get across using the information you have gained from the other activities in this pack.

Things to include in your letter:

- Why woodlands and pine martens are important
- Why they need protection
- Provide evidence for your points
- Remember to summarise your view on the subject at the end of the letter and thank the reader for their attention

Don't forget to add your school as the return address, so that the individual can respond to your letter.

See the next page for an example letter.

Something to think about:
The government have changed their priorities about species reintroduction and it is no longer an environmental priority for them.
Do you agree with them and why?

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Emma Smith
123 Wildlife Drive
Exeter
EX12 3NS

Simon Jupp
House of Commons
London
SW1A 0AA

Thursday 30th November 2023

Dear Mr Simon Jupp,

I hope this letter finds you well. I am writing to you today to express my strong support for the reintroduction of pine martens to our region. I am hopeful that you will consider the vital role these magnificent creatures can play in restoring ecological balance and preserving our native woodlands.

Pine martens, once an integral part of our ecosystem, have faced a steady decline in recent years due to habitat loss, hunting, and other human-related activities. Their absence has had a profound impact on our local environment, contributing to an overpopulation of certain species and disrupting the delicate balance of our ecosystems. Are you happy to let that continue?

Numerous scientific studies have demonstrated the positive effects of reintroducing pine martens in various regions. These studies highlight the martens' role in controlling rodent populations, thereby reducing the instances of crop damage. Did you know that only 7% of our woodlands are in good condition? Pine martens have proven to be effective in improving the condition of our woodlands by preying on invasive species and allowing native woodlands to thrive.

Beyond the ecological benefits, the presence of pine martens can also have positive economic implications. Wildlife tourism is a growing industry, and the reintroduction of these charismatic creatures could attract nature enthusiasts, researchers, and tourists eager to witness the natural beauty of our region.

I urge you to consider supporting the reintroduction of pine martens in our region. Thank you for your attention to this matter, and I look forward to hearing about your stance on this critical issue. Together, we can contribute to the preservation and restoration of our woodlands and the wildlife that call this habitat their home.

Yours faithfully,
Emma Smith

Made possible with Heritage Fund

Dartmoor National Park · Devon Wildlife Trust · Exmoor National Park · Forestry England · National Trust · Somerset Wildlife Trust · Woodland Trust

PINE MARTENS BOUNCE BACK

Activity 11: An introduction to pine martens: For local residents

Persuade

Task: Design an informative educational booklet about the pine marten and its reintroduction to inform and persuade local residents of the importance of reintroducing an endangered species back into the ecosystem.

You can use the information you have gained from the other activities within this activity pack to help you to create this booklet and you can structure it any way you wish.

Things to include:

- a relevant snappy title to hook the reader in
- an introduction paragraph that clearly sets out the purpose of this text
- relevant subheadings
- factual and informative language (don't forget to use your vocabulary list)
- persuasive language and strategies
- images of pine martens and their habitat

Useful website links:

https://www.vwt.org.uk/projects-all/pine-marten-recovery-project/

https://www.gloucestershirewildlifetrust.co.uk/project-pine-marten

Pine marten reintroduction feasibility study - Vlog 1. - YouTube
https://www.youtube.com/watch?v=LwUvBbifb3s&list=PLMny9kx2Xo_nWe6Um4JLISk1CwQ87MxMi

https://www.devonwildlifetrust.org/bringing-back-pine-martens

Meet the Pine Martens - Family-friendly online talk - YouTube
https://www.youtube.com/watch?v=zI_DQHvN3ZI&t=1875s

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Activity 12: Pine marten proof bird box

Design

Pine martens are an important native species that are being reintroduced, however they are predators and will eat birds and their eggs. Pine martens are scavengers who will take what they can find from nest boxes, so it is important that we find ways to stop them from getting in. As you can see from the picture above, predators can make the nest box holes bigger to gain entry into the box. There are a few different ways that we can adapt nest boxes to stop pine martens from getting in. Your job is to design a wildlife friendly, pine marten proof nest box!

DESIGN

1. Research existing bird boxes and bird box adaptions to stop predators from getting in. Collect images of examples for inspiration from the existing products.
2. Develop specifications to inform your design to make sure it is innovative, functional and appealing. Who is the product going to be made for? Where will the product be used?
3. Think about the properties of the materials you could use and the performance of structural elements in your product. Consider the use of computing and electronics to embed intelligence in products that respond to inputs (for example, sensors), and control outputs.
4. Develop and communicate your design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools.

MAKE

1. Using your final design, collect the materials and tools that you will need for your product. Are you using the the best and most efficient tool?
2. If you come across any issues whilst building your project, see if you can find a solution through problem solving, finding alternative tools or methods to help you finish your product.

EVALUATE

1. Test, evaluate and refine your product against the specification taking into account the views of the intended audience.
2. If you were going to make the product again, what would you do differently? If you have the time make a second model of your product incorporating what you have learnt from making the first model. Then you can repeat the process of testing and evaluating your product.

Pine Martens Bounce Back: The Two Moors Pine Marten Project is made possible with The National Lottery Heritage Fund. Thanks to National Lottery players, this project aims to restore healthy populations of pine martens to the South West of England.

PINE MARTENS BOUNCE BACK

Activity 13: The pine marten quiz!

1. What do pine martens predate and what animals prey on pine martens?
2. Name the different trophic levels and give examples of them from the pine marten food chain.
3. What does the word biomass mean? Draw a pyramid of biomass containing a tree, insects and pine martens.
4. Describe one adaptation a pine marten has, to be an effective predator.
5. Pine martens reach sexual maturity at age two to three years old. Why might this be an issue for the species?
6. Describe the importance of the adaptation 'delayed implantation'.
7. How can species be prevented from becoming extinct?
8. How will the reintroduction of pine martens effect the ecosystem?
9. Why is it important to protect woodlands?
10. Do you agree that pine martens should be reintroduced? Explain your answer using information you have learnt through these sessions.

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PINE MARTENS BOUNCE BACK

Activity 13: The pine marten quiz! ANSWERS

1.What do pine martens predate and what animals prey on pine martens?

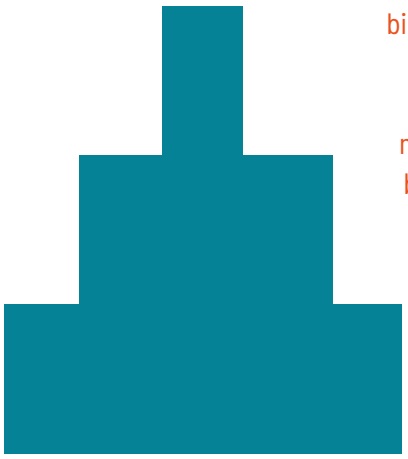
Pine martens predate small mammals (field voles, rabbits, grey squirrels), insects, birds and their eggs.
Foxes and eagles prey on pine martens, although eagles are less widely spread throughout the UK.

2. Name the different trophic levels and give examples of them from the pine marten food chain.

Producer: grass/ oak tree
Primary consumer: field vole/caterpillar
Secondary consumer: pine marten/ blue tit
Tertiary consumer: red fox/ pine marten
Quaternary consumer: golden eagle/ red fox

3. What does the word biomass mean? Draw a pyramid of biomass containing a tree, insects and pine martens.

Biomass is all living (or recently deceased) tissue. All animals including humans and plants are included in this.
Biomass pyramids show the amount of mass is represented in the food chain.



An oak tree has the largest biomass/mass so has the largest bar. The population of beetles will be considerably higher than the pine marten and will therefor have more biomass and the bar will be wider.

4. Describe one adaptation a pine marten has, to be an effective predator.

Potential answers:
Sensitive nose - Having a sensitive nose allows them to sniff out prey.
Whiskers - Whiskers help an animal sense if prey is nearby.
Strong legs - A pine martens strong legs help them to run and climb up trees effortlessly which will help when chasing and catching prey.
Pointy teeth - Pine martens have some sharp canines to help them to eat their prey.
Excellent eyesight - Pine martens have great eyesight to help them hunt at dusk and through the night until dawn.
Sensitive hearing - Pine martens have sensitive hearing to help them to track down prey.
Sharp claws - Their semi-retractable (claws that can go out further) help them in multiple ways. They help pine martens to climb trees and get to birds nests or squirrel dreys. They will also help grip onto their prey so it can't escape.

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PINE MARTENS BOUNCE BACK

Activity 13: The pine marten quiz! ANSWERS

5.Pine martens reach sexual maturity at age two to three years old. Why might this be an issue for the species?
Pine martens leave their mother at the age of six months to find their own territory. This means that a pine marten has around one and half to two and a half years to avoid predation and other potential dangers such as loss of habitat or human persecution, before it can reproduce. This makes increasing their population difficult.

6.Describe the importance of the adaptation 'delayed implantation'.
Delayed implantation allows the species to give birth to their young at the best time of the year for survival, spring. Delaying until the spring means that the mother can keep her level of activity low in the winter and when the pine marten kits are born the weather is warmer.

7.How can species be prevented from becoming extinct?

- Habitat protection and conservation (habitat restoration/improving habitats)
- Species monitoring to make sure we know population numbers
- Species reintroductions
- Legal protection
- Educating people about the species and what is causing the population to decline

8.How will the reintroduction of pine martens effect the ecosystem?

- Pine martens will balance the ecosystem by adding another predator into the food web. Controlling the small mammal populations.
- The reduction in small mammals will mean that more tree saplings will be able to develop into mature trees.
- Reduce the impact of grey squirrels damaging young trees (bark stripping) and the reduction in grey squirrels may make it easier for red squirrels to return to our woodlands.

9.Why is it important to protect woodlands?

- Woodlands are an important and diverse habitat for thousands of species of plant, fungi, animal and many different micro-organisms.
- If we continue to destroy woodlands, species of animal and plant will become extinct making the woodland ecosystem unbalanced.
- Trees take in carbon dioxide from our atmosphere which is a green house gas. If we remove woodlands then carbon dioxide will contribute to global warming and climate change, which affects all living things on our planet.
- Woodlands are part of our history and heritage. They make up the diverse landscape we have across the UK.

10.Do you agree that pine martens should be reintroduced?
Explain your answer using information you have learnt through these sessions.
Students need to write an informed answer using the knowledge they have learnt throughout the activities.

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TEACHER GUIDANCE

An introduction into pine martens:

Before students complete any of the activities in this booklet, they will need to have researched and learnt about pine martens and their habitats. Within this section are links to websites that you may find useful and other resources such as comprehension texts, the pine marten life cycle document and a pine marten PowerPoint are available separately on the PMBB school resource page.
This research activity could be a whole session or alternatively the you could choose to use the PowerPoint to introduce the topic as an intro to any of the activities.

Vocabulary: New vocabulary word bank

This activity is a student led activity that is designed to be ongoing throughout the sessions. Students could be given a journal to record new vocabulary or this could be completed in the back of an exercise book. The aim of this activity is to allow students to find out the meaning of unfamiliar words and to record this, so that they can refer back to them when completing activities. Allowing students to find out the meaning of a word embeds this information in a way that they understand.

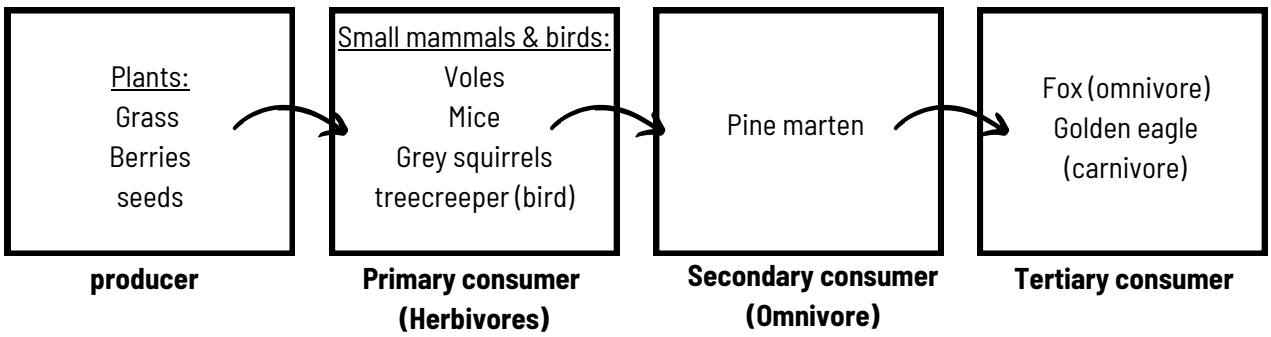
Activity 1 a: Food Chains

Prior to this activity, students should recap food chains using this website:

https://www.bbc.co.uk/bitesize/topics/zxhhvcw/articles/zjh4r2p#zjfdkty

This should remind them of key terminology and the concept of energy transferring through the food chain. Students will then need to create a food chain containing a pine marten, using the information they have gained from their introduction to pine martens. Students can also research what predates a pine marten and what pine martens eat to help them complete the activity. Their food chain can be recorded in their books by drawing the animal, using printed pictures or they can just write their names. It is important that the arrows are facing the right way to show the flow of energy.

Potential answers:



Pine martens also eat berries when they are available, so they could also be the primary consumer in a food chain.

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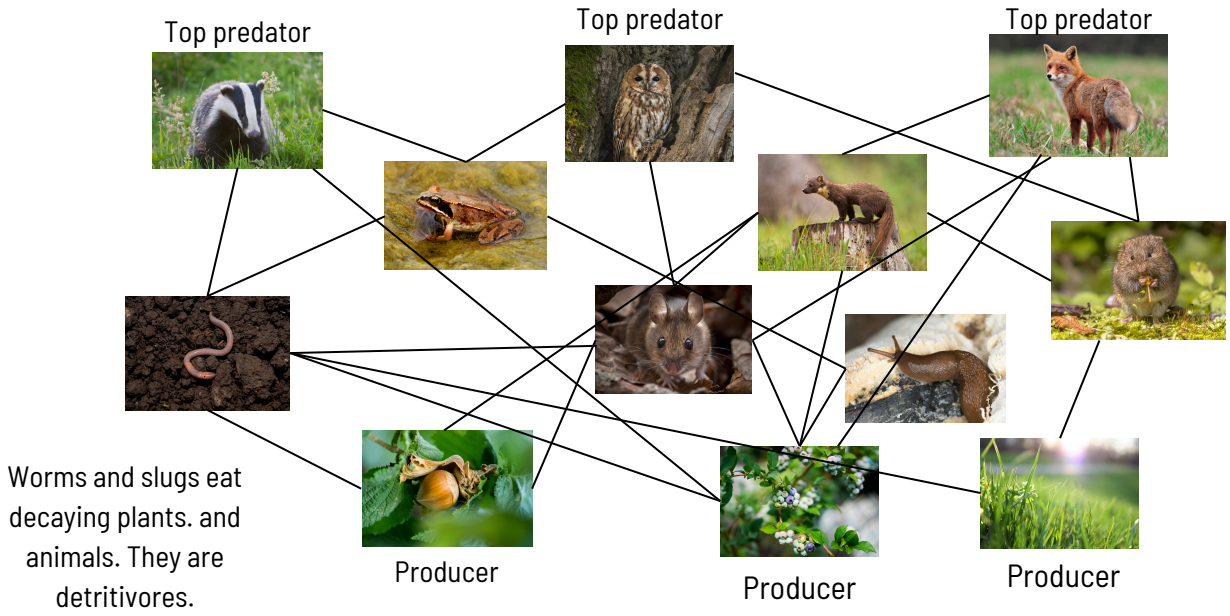
Activity 1 b: Food Webs

This activity leads on from activity 1a as food chains connect up to create food webs within an ecosystem. Share this video explaining where energy comes from and demonstrates how food chains are connected into webs (Watch from 4mins to see the section about food webs.)

https://www.bbc.co.uk/bitesize/topics/zxhhvcw/articles/zjh4r2p#zgjfn9q

To complete this activity students will need to draw a food web with these animals and plants. The activity page can be printed so that students can stick the images in their book and connect them with lines or they can just write down the names instead. It is important for students to label the species with the tropic levels, to consolidate their learning from the last session.

Answers:



Primary consumer: worm, wood mouse, slug & field vole (could also be fox, pine marten or badger as they also eat producers).
Secondary consumers: pine marten, fox, badger, owl, frog
Tertiary consumers: owl, fox, badger

Activity 2: Pyramids of number & pyramids of biomass

This activity leads on from the first two activities about food chains and food webs. Students can use the species from the food web to create the pyramids of number and biomass.
Watch this video and share this web page to explain the concept:

https://www.bbc.co.uk/bitesize/topics/zxhhvcw/articles/z64ddp3#zsrddp3

Students need to draw both types of pyramid using the same species for each, to see if there is any difference in the pyramid shape.

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Activity 3: Adaptations of a predator

For this activity, you can print off the page with the pine marten so students can label the image.
Share this video and look at the image of the predators skull and discuss adaptations.

https://www.bbc.co.uk/bitesize/topics/zxhhvcw/articles/zw46m39#zm33f82

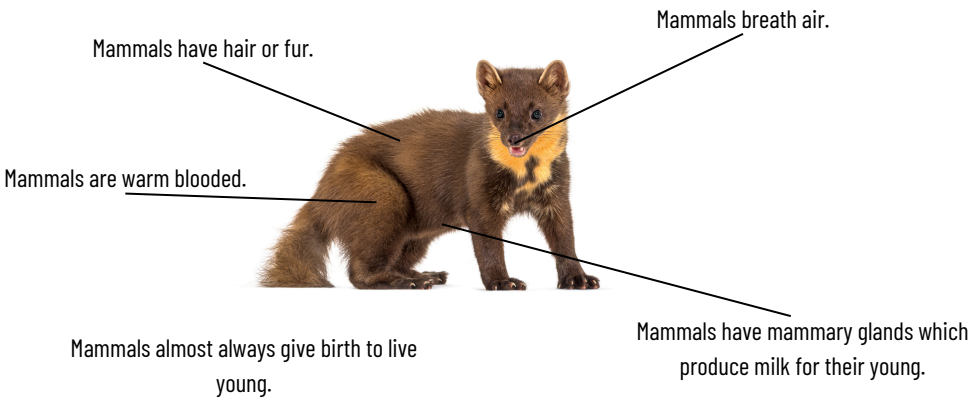
Potential answers:
Sensitive nose - Having a sensitive nose allows them to sniff out prey.
Whiskers - Whiskers help an animal sense if prey is nearby.
Strong legs - A pine martens strong legs help them to run and climb up trees effortlessly which will help when chasing and catching prey.
Pointy teeth - Pine martens have some sharp canines to help them to eat their prey.
Excellent eyesight - Pine martens have great eyesight to help them hunt at dusk and through the night until dawn.
Sensitive hearing - Pine martens have sensitive hearing to help them to track down prey.
Sharp claws - Their semi-retractable (claws that can go out further) help them in multiple ways. They help pine martens to climb trees and get to birds nests or squirrel dreys. They will also help grip onto their prey so it can't escape.

Activity 4: How would you classify a pine marten?

For this activity the sheet can be printed, so that students can label the characteristics of a pine marten.
Start the session with this video to revise classifications and their characteristics:

https://www.bbc.co.uk/bitesize/topics/zxhhvcw/articles/zdj3vwx#zxtk96f

Allow students to label the pine marten and then get students to share their answers.
Answers:



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Activity 5: Adaptations: Delayed implantation

Have the activity sheet displayed on the board and go through the life cycle of a pine marten.
Allow students to discuss the question with their peers and then ask students to write down their answers, backing up their thought with their knowledge of pine martens, their predators and other impacts that are causing the pine marten population to decline.
Once students have written there answer, allow them time to research other animals that use delayed implantation. Get them to think about why that animal has it and if there are any disadvantages for that animal.

Potential answers:

Why do you think they have developed this adaptation?

Delayed implantation allows the species to give birth to their young at the best time of the year for survival, Spring. Delaying until the spring means that the mother can keep her level of activity low in the winter to conserve energy. When the pine marten kits are born the weather will have improved and temperatures will have increased.

Are there any disadvantage to this strategy?

This strategy slows down the rate of reproduction, so has the potential to cause the population to decrease as there is a longer time period between conception and birth.

Do any other animals have this adaptation?

- Armadillos
- Badgers
- Bears
- Mink
- Roe deer
- Sea lions
- Shrews

Activity 6: Mustelids: Similarities and differences

To complete this activity, students must have had completed some of the other sessions prior to this session. This prior knowledge will help them when comparing the other mustelid species.
Display the activity prompt on the board and allow students to think about how they will display their research. Remind them of the types of information that would be useful to include.
Once students have collected the information and presented in their own way, allow students to share and compare what they found with their peers.

Activity 7: Biodiversity

This activity is designed as a whole class activity, where students must think about how humans have negatively impacted the woodland habitat (directly and indirectly) and how that is effecting biodiversity in that ecosystem. You can make notes on a mind map as students share their ideas or pupils can write ideas on Post-it notes.

Potential human impacts:

Litter/rubbish
Tree stumps (deforestation)
Buildings being built
Farmland replacing woodlands
Roads going through the woodlands

Potential effects:

Loss of habitat reduces biodiversity
Noise disturbing animals
Light disturbance
Animals being hit by traffic
Animals being harmed or killed by rubbish

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Activity 8: Are pine martens a pest?

Ask the class the question 'Are pine martens pests?'. Get them to think about their answer but not share it. Then ask the children to try and define what a pest is and if they can think of anything they would class as pests.
Share the link on the page and talk about how pine martens can be considered as pests. Talk through the suggestions to avoid these situations in the leaflet.
Get the students to rethink their original answer and see if they have changed their initial answer.
Now get students to answer this question giving clear reasons for their answer:
'Some people see this species as a pest which may have affected people's opinions of them. Do you think this is fair? '

Activity 9: Reintroducing pine martens

This activity is a whole class debate activity. Explain what the word debate means and read out the scenario.
Separate the class into the different roles and then send the groups off to read their statements and arguments.
Encourage them to write down any addition points they want to use in the debate.
When starting the debate, set out the ground rules and remind everyone they have to listen to the chair person who is there to mediate and make sure each view point is heard.
The chair person decides who goes first. Each group get to share their view point with a pause in-between for groups to write counter arguments. Once every group has shared their view point, there will be an opportunity to use counter arguments or ask other roles questions.
Finish with these questions:
After hearing the different points of view are there any compromises that can be made? Is there a view point that the majority agree with?
Can a decision be made about the use of the land?

Activity 10: Protecting our woodlands: A persuasive letter

This activity is design to be a self led activity that should be completed near the end of a topic on pine martens. Students may need a reminder of persuasive strategies to use in their writing.
See this website for strategies: https://www.bbc.co.uk/bitesize/articles/zsgxqfr#zq2ms82

Activity 11: Pine martens - For local residents

This activity is an opportunity for student to draw upon everything they have learnt about pine martens and it is also an opportunity for students to write for a real life purpose. Students have the freedom of being creative with how they present their writing and should be allowed to share their work with local residents.

Activity 12: Pine marten proof bird box

This activity is a Design and Technology activity that should be completed over multiple sessions.
It can be a a self led project that could be spread over a half term or it could link to a specific material topic.
Sessions on how to use tools and techniques will have to be taught before this project.
The website below has design ideas for how to protect bird boxes from pine martens, but students can look at general designs that protect bird boxes from predators:

Pine martens and bird boxes - PineMarten.ie

Activity 13: The pine marten Quiz!

A fun quiz to test their understanding of pine martens and their habitats.
This quiz could be completed individually, in pairs or in team.

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