

The Crown Estate Sustainability Initiative Meadow Quest

To understand the importance of
soil and how to promote biodiversity
through meadow management



Reflecting on gameplay

2

1. Where is the activity based?
2. What has happened so far?
3. What did you find out about farm management?
4. Can you remember what an insect specialist is called?



Why is soil important?

3

- Soil provides the basis for almost all plant growth on land.
- It is vital for growing food for the 8 billion people on Earth.
- It is composed of many different organic and inorganic substances.
- It is a complex mixture, and the composition of soils varies widely depending on location.
- Soil health is declining so we need people to study soil and look after it.



Why is soil important?

4

- Each team has been given 4 cards with information about the importance of soil.
- Each of you must read out the information on a card to the team. This is your card.
- Discuss anything that you don't understand.
- If your team doesn't understand something, write it down.

Answers

5

Answer the section
on your card with
help from your team.

Using the Soil information cards, complete the questions
on the components of soil.

1. Minerals

What are the main minerals in soil?

Why are minerals important for reducing flooding?

2. Organic matter

What is the organic matter in soil made of?

Why is the organic matter important to tackle climate change?

3. Air

Why is air important in soils?

What is the air space like in sandy soils?

4. Living organisms

Which living organisms are in soil?

Why are the living organisms in soil so important?

Meadow Management

THE CROWN
ESTATE

Meadow management
Cards

Sort the statements in bold into good practice and poor practice

<p>Mowing: Farmers mow meadows to make hay as winter feed for their farm animals. Mowing also prevents the grass from becoming too tall and thick, which can limit growth and prevent access to sunlight. Mowing also helps to control weeds and encourage new growth. Mowing must be done at the right season to provide a crop of hay and benefit wildlife without damaging mowers and wildlife.</p>	<p>Failing to control weeds: If weeds are not properly controlled in a meadow, they can compete with the grass and beneficial flowers for nutrients, space, and sunlight. This can result in reduced grass growth and productivity, as well as increased risk of weed invasion and spread. Manual removal of weeds such as thistles is better than using chemicals that can get into the food chain.</p>	<p>Failing to manage soil erosion: Poor soil conservation practices, such as excessive ploughing, can lead to soil erosion, which can result in the loss of valuable topsoil and reduced productivity of the meadow. Ploughing across drainage lines can reduce soil erosion.</p>	<p>Soil Conservation: To conserve the soil in cropped fields, farmers may also take steps such as reducing ploughing and avoiding overgrazing. These practices help to prevent erosion and maintain soil health, which is important for the long-term productivity of the fields and meadows.</p>	<p>Hedge Planting: The addition of hedges can reduce the size of meadow fields but has huge advantages for encouraging biodiversity and slowing rainfall runoff which will in turn reduce soil erosion.</p>	<p>Addition of beneficial organisms: Some species, such as nematode worms, can help to improve soil structure by feeding on other soil organisms and breaking down soil clumps. This can help to create a more porous and well-aerated soil, which can improve water infiltration and reduce soil compaction.</p>
<p>Overgrazing: Allowing livestock to graze in a meadow for too long or too frequently can lead to overgrazing, where the grass is consumed faster than it can regrow. This can damage the root systems of the grass and prevent it from growing back, leading to soil compaction, erosion and degradation. Managed cattle rotation is important to prevent overgrazing.</p>	<p>Use of chemical fertilisers: This can lead to the loss of wildflowers and diversity, and cause nutrient imbalances and soil acidification, which can damage the root systems of the grass. It can also lead to water pollution and harmful effects on wildlife. Adding balanced amounts of well rotted farmyard manure can help to keep the meadow soil healthy and fertile.</p>	<p>Rotational Grazing: Farmers may use rotational grazing practices to ensure that the grass in meadows is not overgrazed. This involves dividing the meadow into smaller areas, and moving/rotating the livestock from one area to another to allow the grass to recover and regrow.</p>	<p>Use of heavy machinery: Tractors and harvesting equipment have become much bigger over the past couple of decades. These compact the soil leading to poor drainage and reduces the number of beneficial organisms such as worms. Overall soil fertility is reduced. Using lighter machinery can reduce compaction.</p>	<p>Irrigation: In areas where there is not enough rainfall, farmers can irrigate meadows to ensure that the grass has enough water to grow. This may involve using sprinklers or other irrigation systems to distribute water evenly over the meadow.</p>	<p>Overuse of chemical pesticides: Pesticides are used to kill unwanted insect or fungal pests on plants. However, these chemicals can also kill the beneficial living organisms in soils. Research shows that natural methods of pest control, such as increasing biodiversity to promote species, such as birds, can work very well.</p>

In your pairs, sort the **bold** statements into good and bad practice on how to maintain healthy soils.

Answers

7

Good practice:

Irrigation

Rotational grazing

Addition of beneficial organisms

Mowing

Soil conservation

Hedge planting

Bad practice:

Failing to manage soil erosion

Overgrazing

Overuse of chemical fertilisers

Use of heavy machinery

Overuse of chemical pesticides

Failing to control weeds

Scenario A

8

Assess the health of the meadow for Scenario A:
Cattle are kept in the field year-round.



Solution

9

What is the threat/problem for the soil and the solution?

Scenario	Problem	Solution
A	Overgrazing	Cattle rotation
B		
C		
D		
E		

Scenario B

10



Assess the health of the meadow for Scenario B:

Farmer cuts time mowing the meadow using some big machinery.

Solution

11

What is the threat/problem for the soil and the solution?

Scenario	Problem	Solution
A	Overgrazing	Cattle rotation
B	Heavy machinery / Mowing	Use smaller machinery
C		
D		
E		

Scenario C

12

Assess the health of the meadow for Scenario C:

Cows are allowed in the field on rotation and the field is left fallow (empty) regularly.



Solution

13

What is the threat/problem for the soil and the solution?

Scenario	Problem	Solution
A	Overgrazing	Cattle rotation
B	Heavy machinery / Mowing	Use smaller machinery
C	None	N/A
D		
E		

Scenario D

14



Assess the health of the meadow for Scenario D:

The field contains heavy clay soil that gets waterlogged.

Solution

15

What is the threat/problem for the soil and the solution?

Scenario	Problem	Solution
A	Overgrazing	Cattle rotation
B	Heavy machinery / Mowing	Use smaller machinery
C	None	N/A
D	Heavy clay soil, few organisms	Add organic matter and worms
E		

Scenario E

16

Assess the health of the
meadow for Scenario E:
**Ploughed meadow that has
soil erosion.**



Solution

17

What is the threat/problem for the soil and the solution?

Scenario	Problem	Solution
A	Overgrazing	Cattle rotation
B	Heavy machinery / Mowing	Use smaller machinery
C	None	N/A
D	Heavy clay soil, few organisms	Add organic matter and worms
E	Soil erosion, pollution of rivers	Plant hedges, don't plough ancient and flower-rich meadows, leave wide grassy strips (buffer strips) around fields if cultivating them. Don't cultivate so deeply, don't cultivate steep sloping fields.

Reflection

18

- What was the most interesting thing you learned today? Did anything you learned surprise you?
- What skills did you use in the last activity?
- What skills are most useful for meadow management?
- As well as farmers, which other jobs do you think are the most important for protecting soils and meadows?

