Kirkcaldy High School

BGE Science

Topic: Science and the environment

Biodiversity

Name:_____

Class:_____

Teacher:_____

Expectations and Outcomes Learner Evaluation

Topic: Biodiversity

Experience and Outcomes	Date Completed (dd/mm/yy)	Evaluation How happy are you with it? (☺ ? ☹)
I can describe an ecosystem		
I can identify a habitat and the community within it		
I can use the terms predator and prey		
I can name examples of carnivores, herbivores and omnivores		
I understand the meaning of the term biodiversity		
I can state the importance of biodiversity to the environment		
I can describe how energy flows between organisms		
I can make a simple food chain		
I can label a food chain		
I can select a food chain from a food web		
I can predict what might happen if an organism is added or removed from a food chain		
I can sample living things using a quadrat		
I can measure factors that affect ecosystems		
I can sample living things using a pit fall trap		
I can identify living things using a biological key		

Lesson 1: Introduction to the environment

Starter

In the box below, write down living things that might live in this woodland ecosystem

Learning Intentions

1. To understand and explain what an ecosystem is
2. To define key biological words

Tick me at the end if *you can* …

Success Criteria

❑ I can describe an ecosystem
❑ I can use the biological words in the word bank

Word bank			
predator	*prey*	*carnivore*	*herbivore*
producer	*consumer*	*habitat*	*population*
ecosystem	*omnivore*	*community*	

- - - - - - - - - - - - - - - - - -
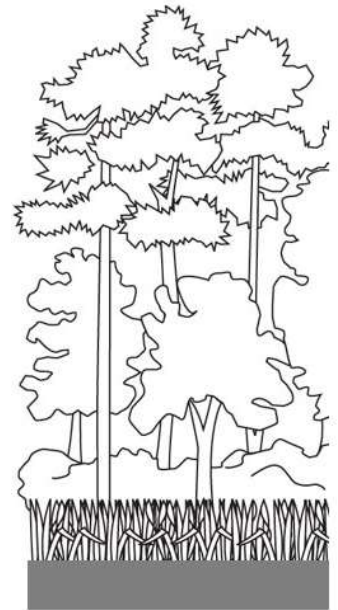
Ecosystems

An **ecosystem** is made up of both _____ and _____ parts.

It is made up of a number of _____ and _____ .

A **habitat** is the _____

A **community** is _____ the living organisms that live in a specific _____

A community contains lots of different species.

Layer of Ecosystem	Example of plant	Example of animal
Canopy		
Sub-canopy		
Overground		
Herb layer		
Ground layer		
Underground		

Ecosystems are stable if they have large biodiversity

This means that there are _____ living in the ecosystem.

Key term	Definition
Predator	
	An organism that is hunted and killed
Carnivore	
	An organism that only feeds on plants
Omnivore	
	An organism that produces its own food.
Consumer	
	The place where and organism lives
Population	
	All the living organisms in a habitat
Ecosystem	

Lesson 2: Food Chains

Starter

Correct the following statements
1. An omnivore is an organism that eats only plants.

2. A producer gets its energy from consuming other organisms.

3. A population is all the living organisms in a habitat.

Learning Intentions

1. To describe how energy flows between organisms in ecosystems
2. To construct and analyse food chains
3. To label our food chains with the key terms producer, consumer, herbivore, omnivore, carnivore

Success Criteria
- ❑ I can describe how energy flows between organisms
- ❑ I can make a simple food chain
- ❑ I can label a food chain
  (with the terms producer, consumer, herbivore, omnivore, carnivore)

Tick me at the end if *you can* …

Interactions in an Ecosystem

Ecosystems survive through the interactions between plants and animals. Without these interactions, ecosystems risk being broken down.

The interactions between plants and animals in an ecosystem can be displayed using _____ and _____.

Food Chains Example

The arrows in a food chain show the _____.

For example, energy flows <u>from</u> the grasshopper <u>to</u> the frog.

Producers and Consumers

Plants are known as _____. This is because they create their own food using a process called *photosynthesis*. Producers are at the bottom of the food chain and serve as the foundation for all food chains. We always draw the producer at the **start** of our chain.

All other organisms in a food chain must eat other organisms to get their energy. They are _____.

EXTRA
Predator:
Prey:

PRODUCERS	CONSUMERS

A food chain shows which _____ eat each other within an ecosystem. It starts at the beginning with _____ which are referred to as a _____ because they make their own food.

The first animal in the food chain only eats plants and so it is referred to as a _____. The other animals in the food chain that only eat other animals are known as a _____. The animals, including humans, that eat plants and other animals are known as an _____.

The animals in the food chain which prey on other animals are called _____.

The animals that get hunted by the other animals are called _____.

Food Chain Examples

Producers	1st Consumer	2nd Consumer	3rd Consumer

More Food Chain Examples

Draw food chains for the examples on the powerpoint:

1.

2.

3.

4.

- - - - - - - - - - - - - - - - - - - -

Plenary
Unscramble to reveal some of today's terms!

cup order	green wolfy	mon curse	teardrop	pyre

Lesson 3: Food Webs

Starter

1. Does a grasshopper only eat carrots? Does a snake only eat frogs?

   What other things might these organisms eat?

2. How could we display this information?

Learning Intentions

1. To be able to select food chains from a food web
2. To explain what happens when an organism is added or removed from a food web

Success Criteria

❑ I can select a food chain from a food web
❑ I can predict what might happen if an organism is added or removed from a food chain

Tick me at the end if *you can* …
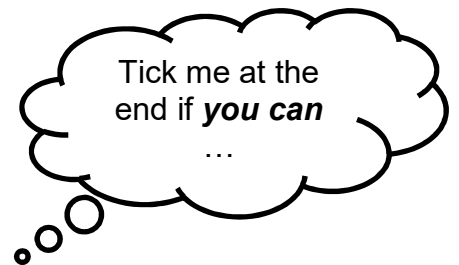
Consumers can't rely on just one food source. For this reason, food chains tend to overlap.

This can be shown using a _____.
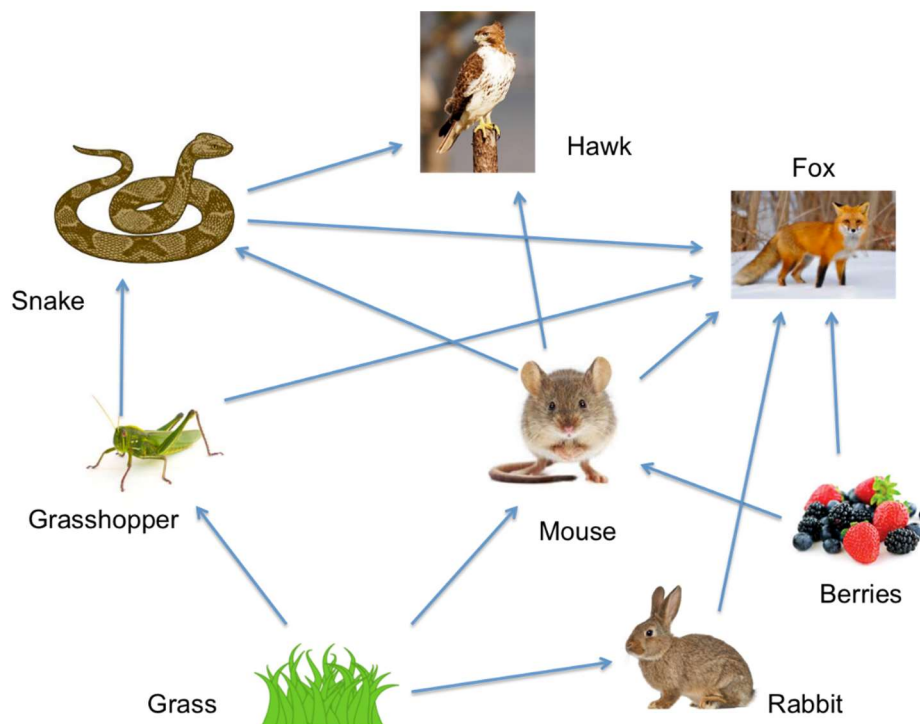
The _____ gets its energy by eating BOTH grass and berries.

The _____ gets its energy by eating snakes, grasshoppers, mice, rabbits AND berries.

The _____ gets its energy by consuming mice and snakes.

The _____ gets its energy by consuming grasshoppers and mice.

The _____ and the _____ only eat grass.

Aquatic Food Web
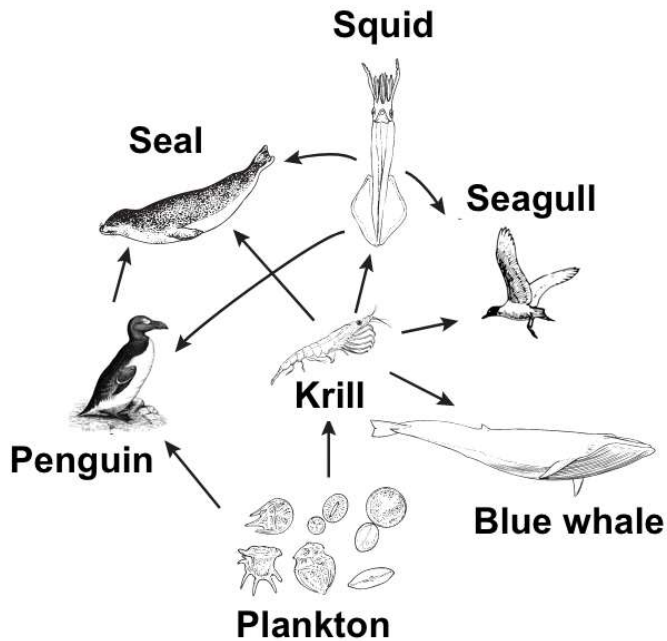
This is an example of an aquatic food web.

Can you identify and write down a food chain with **3 organisms only?**

Can you identify and write down a food chain with **4 organisms only?**

What is the **maximum number** of **different** food chains in this food web?

Food Webs

A _____ shows the feeding relationships among different species within a habitat. The _____ in a food chain and food web show the direction that the energy is flowing.
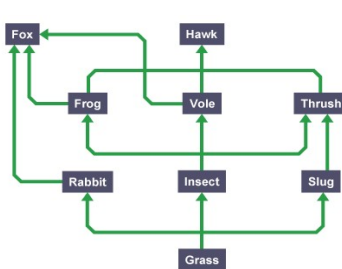
Can you complete the food chains in this food web?

grass → insect → _____   → _____

grass → insect → _____   → _____

grass →   slug   → _____   → _____

Look at the food web above (or on the screen)

1. What would happen if the grass died?

   _____

2. If the population of slugs decreased, what would happen to the population of

   a) grass? _____   b) thrush? _____

3. Challenge: a large population of bears were introduced to the ecosystem. Bears prey on foxes.
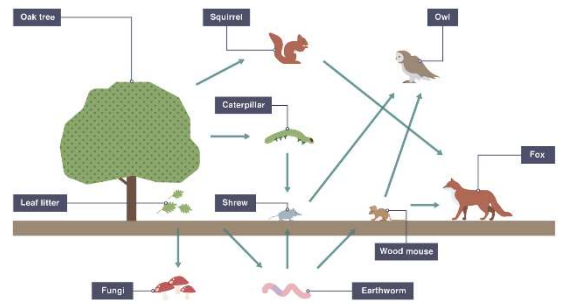
   Predict what would happen to

   a) the fox population? _____ b) the rabbit population? _____

Date: _____

Lesson 4/5: Sampling

Starter

What would happen if the wood mouse was removed from the food web?

a. To the fox population?

b. To the shrew population?
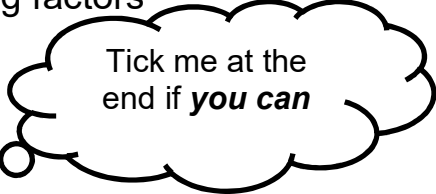
c. To the red squirrel population?

Learning Intentions

1. To explain why we need to take samples
2. To describe how to measure living and non-living factors

Success Criteria

❑ I can sample living things

❑ I can measure factors that affect ecosystems

*Tick me at the end if **you can***

Why do we need to sample?

It is **impossible** for us to count each and every kind of plant and animal in a habitat. It would be like trying to count different grains of sand on the beach!

The _____ (how many different species) and _____ (how many individuals in a population) tells us about the level of biodiversity. The level of biodiversity tells us how healthy an ecosystem is.

*lots of species + lots of individuals = **high biodiversity***

*few species + few individuals = **low biodiversity***

*few species + lots of individuals = **unstable biodiversity***

Ecosystem	Variety	Abundance	Biodiversity level
	How many different species	*How many of each species*	*Low / high / unstable*

Sampling Ecosystems: Quadrats   Date: _____

We can investigate an ecosystem by using _____ _____ .
We can sample variety and abundance of plants and animals:
_____ _____ .
We can also measure _____ - _____ _____ such as
temperature, soil pH and light intensity.

How to use a quadrat:

1. **Identify** a plant (daisies/clover/etc.)
2. **Record** the name of your plant in the table
3. Throw the quadrat randomly
4. **Count the number of squares** that have **your plant**
5. Record the abundance score in the table
6. **Repeat** another 9 times
7. Take an average of the ten throws

Quadrat	Number of _____
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Average _____ per quadrat	

Numeracy extension:

1. Our quadrat measures 0.5 metres by 0.5 metres.
   What is the area of ONE quadrat?
   space for working
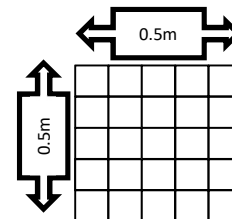
   Answer = _____ m^2

2. What was the **average** abundance score *(from table)*?

   Answer = _____ plants

3. The area we sampled was 20 metres by 60 metres
   Work out the area of our sample?
   space for working

   Answer = _____ m^2

4. What is our estimate of the total number of plants in our sample area?
   space for working

   Answer = _____ estimated plants in area.

   Hint: Divide the total area (qn 3) by the area of one quadrat (qn 1)
               Then, multiply this by our average abundance score (qn 2)

Sampling Ecosystems: Pitfall traps

Date: _____

Starter

1. State the piece of equipment that can be used to sample plants

2. Three quadrats were thrown. The results were as follows:

| Quadrat Number	Abundance of daisies
1	12
2	10
3	5

Calculate the average number of daisies per quadrat.

3. The area of the quadrat is **1 m^2** and the area of the whole field is **100 m^2**. Calculate the estimated number of daisies in the **whole field**.

Learning Intentions

1. To sample invertebrates using a pit fall trap
2. To identify some invertebrates using a biological key

Success Criteria

☐ I can sample living things using a pit fall trap
☐ I can identify some invertebrates using a key

Tick me at the end if *you can*
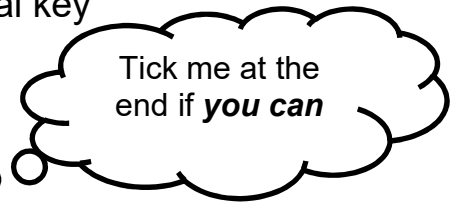
Pitfall traps are used to sample the _____ that live in the _____.

How to set up a pitfall trap:
1. Dig a hole in the soil
2. Pierce drainage holes in the bottom of the pitfall trap
3. Place the pitfall trap into the soil, level with the ground
4. Cover the trap with a leaf

twinkl.com

The pitfall trap was checked after 4 days and the following organisms counted:

Activity: Construct a graph using this information

Organism	Number of individuals
Ladybird	6
Ant	10
Butterfly	0
Woodlouse	4
Centipede	3
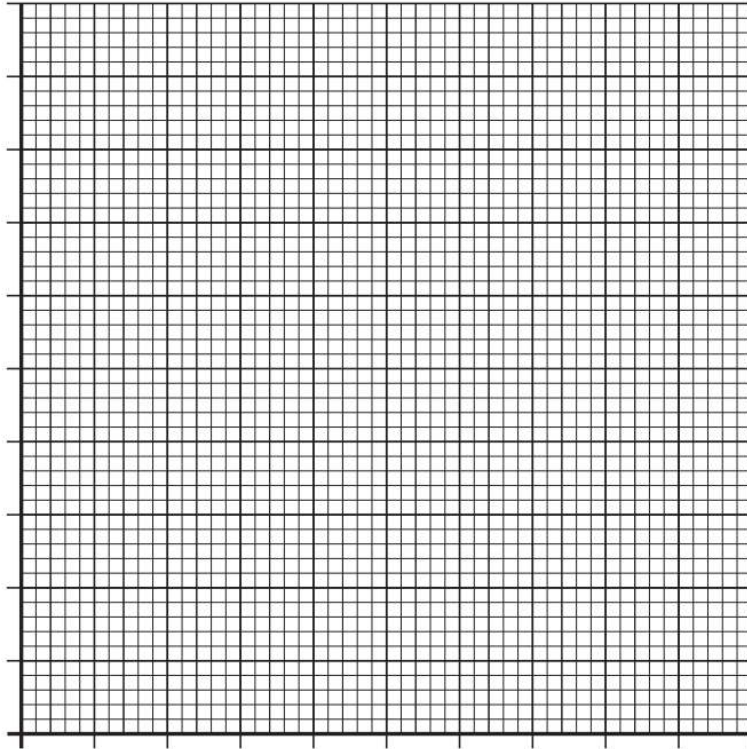
Identifying invertebrates:

A biological key can be used to identify organisms by their features.

1. **More than 20 legs** _____.
   Less than 20 legs Go to 2.
2. **7 body segments** _____.
   3 body segments Go to 3.
3. **No wings** _____.
   Wings Go to 4.
4. **Soft body** _____.
   Tough body _____.

Experiment x

Aim:_____

_____

Results:_____

_____

_____

Title	Category 1	Category 2	Category 3
Name 1			
Name 2			
Name 3			

Conclusion:_____

_____

_____

Evaluation_____

_____

_____

Draw a graph of your data …
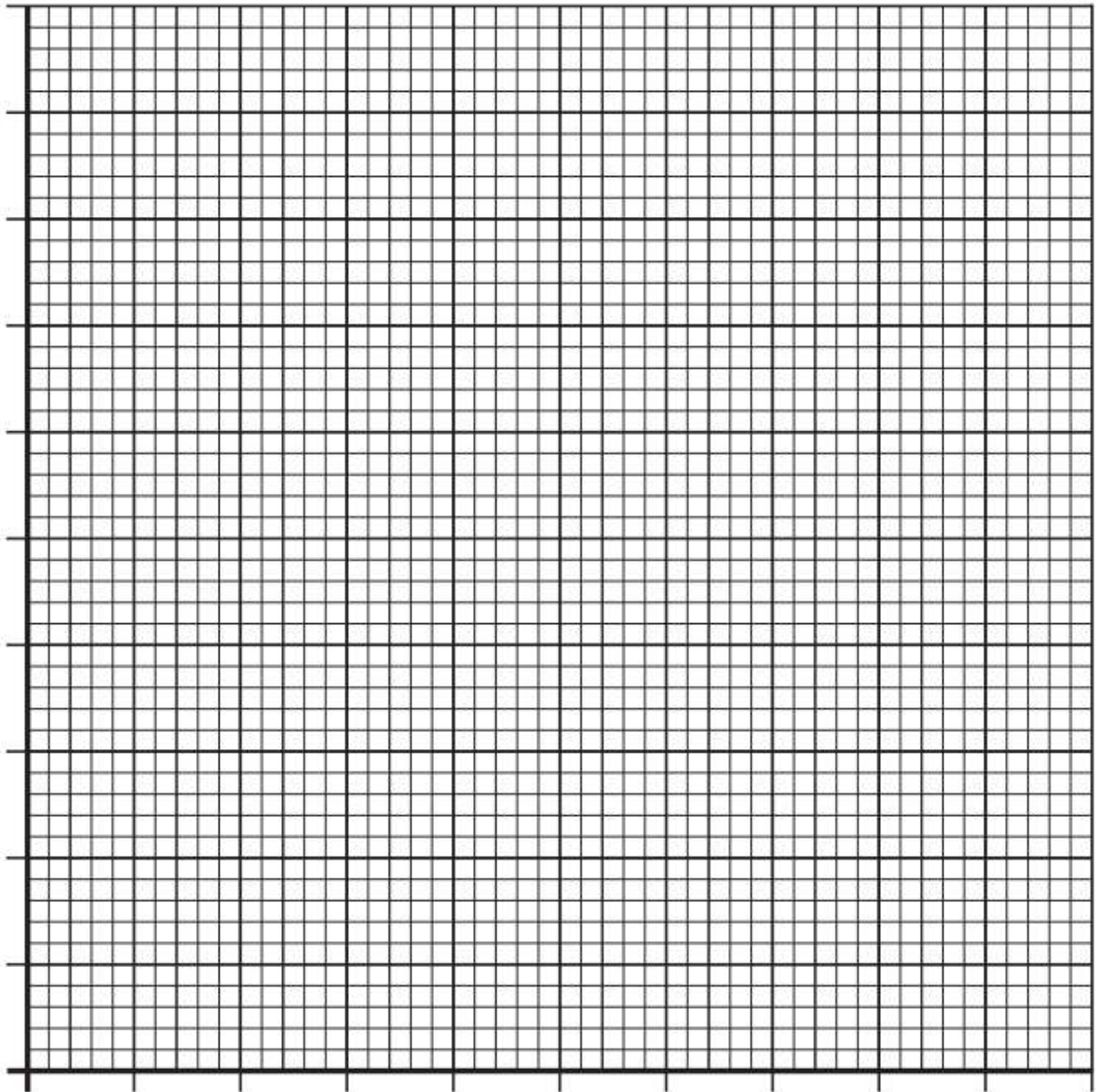
Copy paste the previous pages for how many lessons you have …

Additional graph paper for numeracy tasks:
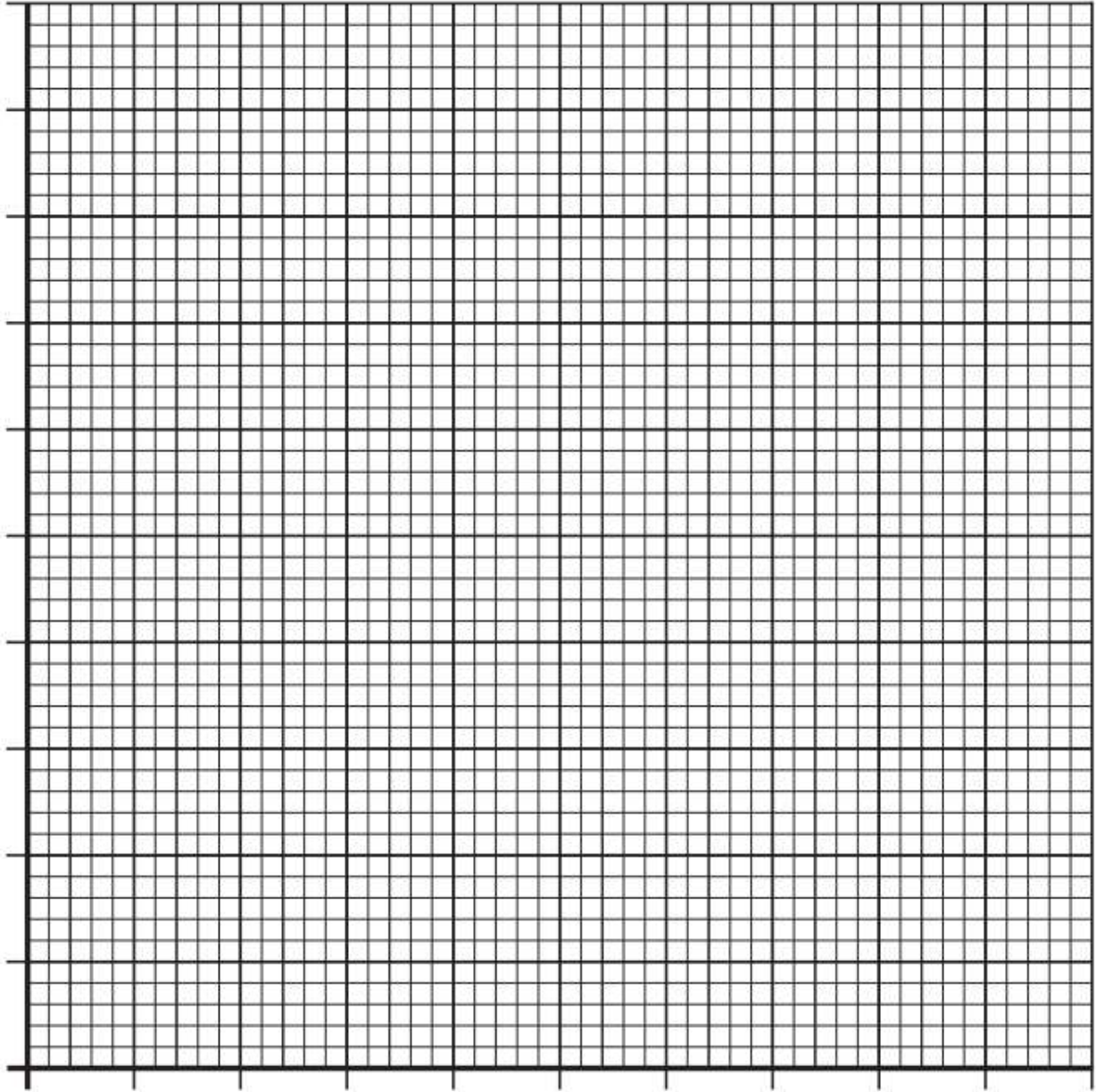
Additional graph paper for numeracy tasks:
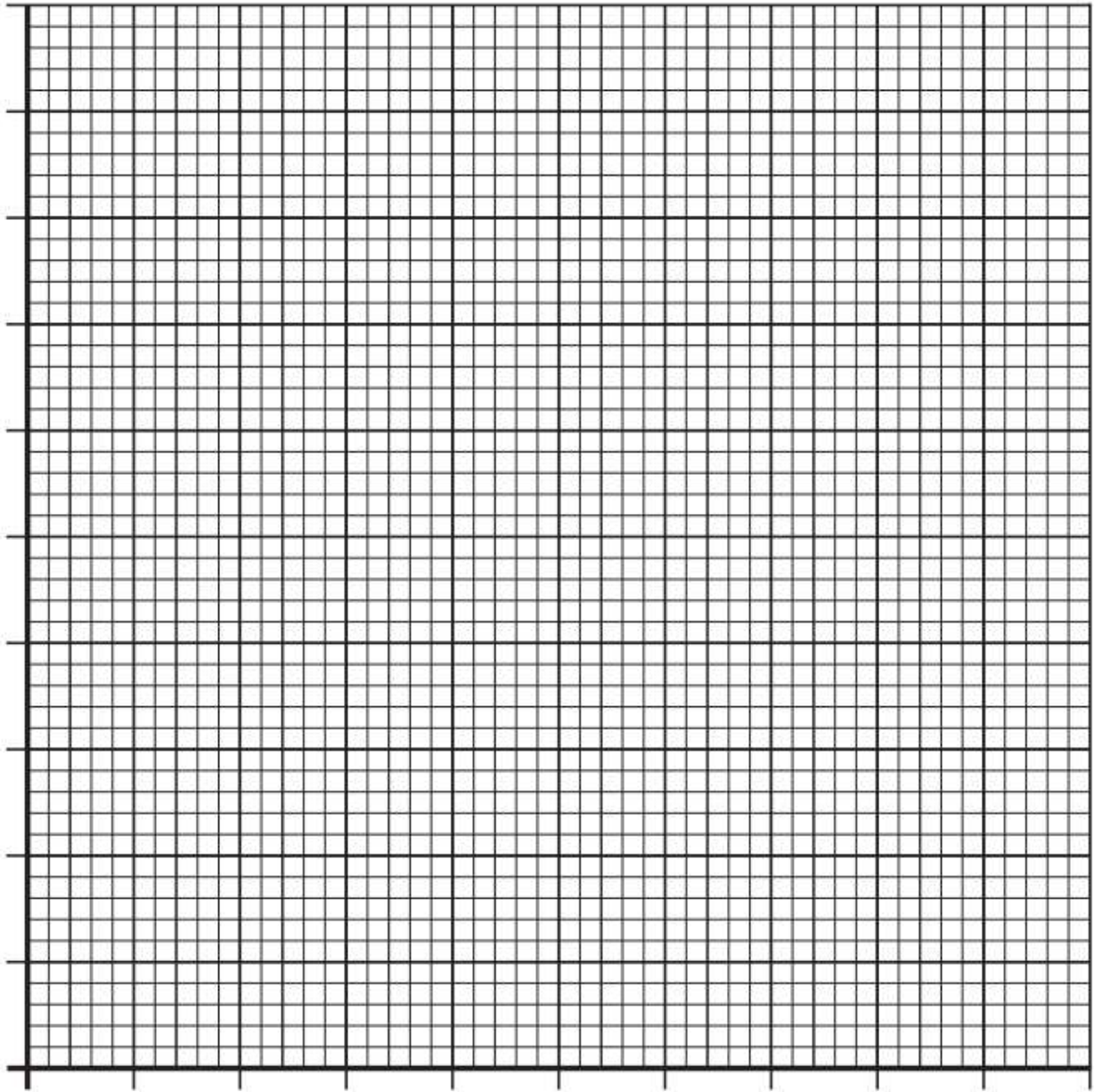
Extension Tasks

```
L  P  H  C  V  H  E  F  R  A  Y  W  R  W  B
F  S  F  F  L  F  A  O  J  S  D  I  M  U  H
F  A  E  C  F  F  T  B  B  M  P  W  E  T  E
O  R  W  C  A  A  N  K  I  P  L  C  Q  S  R
T  L  X  O  D  R  C  K  H  T  T  B  H  N  B
A  U  P  E  B  P  N  R  K  W  A  Q  K  E  I
R  G  R  M  R  Y  I  I  B  U  O  T  K  C  V
C  P  E  E  K  D  V  F  V  K  U  R  V  O  O
A  F  Y  G  L  Y  R  D  N  O  C  K  I  S  R
F  O  O  D  C  H  A  I  N  A  R  Q  Q  Y  E
D  Z  D  O  S  X  E  V  Q  R  X  E  T  S  X
K  D  E  J  D  E  W  Y  C  T  W  L  Y  T  T
E  P  Z  B  Y  W  H  J  S  M  J  W  B  E  A
E  M  F  Y  Z  I  E  H  P  Y  K  G  O  M  Z
S  O  X  L  A  D  K  B  G  E  Z  H  O  U  V
```

Find these words in the word search and then use those words to fill in the gaps in the sentences below:

**ecosystem   habitat   prey   carnivore   herbivore   food chain
food web   dry   wet   humid   predator**

An _____ is where animals and plants live along with the conditions there. A small part of an ecosystem where certain animals and plants live is called a _____. We can use words to describe ecosystems, for example: _____, _____ and _____.
Some animals eat other animals, they are the _____. Some animals are eaten by other animals, they are called the _____. We can show simply how animals eat other animals using a _____.
A _____ is lots of food chains joined together. A _____ eats only other animals. A _____ eats only other plants.

Riddles/Word searches

Predator/Prey

Task 1:

- Unscramble the words below
- Follow the instructions in brackets.
- All six are **PREY** species

1. REDE (Take the 3rd letter) ___

2. SAVEREB (Take the 4th letter) ___

3. HERSWS (Take the 5th letter) ___

4. OSINB (Take the 4th letter) ___

5. SOMEO (Take the 4th letter) ___

6. LETANPOE (Take the 5th letter) ___

Task 2:

* Use the letters you have got from Task 1 to unscramble and find a **PREDATOR** species.

— — — — — —

Hints:
All of the species can be found in American forests.
Only 1, 2 and 3 can be found in the wild in Scotland
2 became extinct in Scotland in the 16th Century but was successfully reintroduced in 2009
The predator has been extinct in Scotland since 1680!
5 was successfully reintroduced to the Scottish Highlands in 2008
4 can be found in captivity in the Highland Wildlife Park
6 can be found in captivity at Blair Drummond Safari Park

Native biodiversity!

C O S T S / N E P I   _ _ _ _ _ / _ _ _ _
C U T P E T R U B   _ _ _ _ _ _ _ _ _
H I C N E L   _ _ _ _ _ _
A K B I G S G N / K A R S H   _ _ _ _ _ _ _ / _ _ _ _ _
H S E N I C R O O R / E L B E T E   _ _ _ _ _ _ _ _ _ / _ _ _ _ _ _
E R D / L E S R I U R Q   _ _ _ / _ _ _ _ _ _ _ _
H I T O S T S C / A C I W T L D   _ _ _ _ _ _ _ _ / _ _ _ _ _ _ _
N U P F I F   _ _ _ _ _ _
R E P N E R I E G / N O L C A F   _ _ _ _ _ _ _ _ _ / _ _ _ _ _ _
C A R I C T / R E N T   _ _ _ _ _ / _ _ _ _

Draw a comic strip on one of the topics. Ask your teacher for ideas.

Extra Questions

1. What are the main functions of the human skeleton?

_____

_____

Homework
/Extra Suggestions

Aim: To produce a poster on a chosen ecosystem:

> **DESERT or TUNDRA or MARINE or FOREST or GRASSLAND**

Success Criteria:

- **State WHERE on Earth your ecosystem can be found.**

- **Identify CLIMATE in your chosen ecosystem** *(temperature range, rainfall, wind speed, etc.)*

- **Identify EXAMPLES of both plants and animals**

- **Comment on the BIODIVERSITY of your chosen ecosystem**

- **Suggest how HUMANS may impact on the BIODIVERSITY of your ecosystem**

BINGO

Colouring Sheets

Vanessa Lewis©

British wildlife colouring page – How many plants, insects and animals can you find?

This UK nature colouring sheet is teeming with animals, birds, insects and flowers that can all be found living in Britain. Their common English names are hidden alongside them – how many of these species have you seen in the wild?

As well as a Barn Owl, see if you can find all of these animals, birds, insects and plants in the picture:

Red Squirrel	Oak tree	Foxglove
Badgers	Tawny owl	Ivy
Fox	Peacock butterfly	Bumble bee
Rabbit	Silver-washed fritillary butterfly	Dunbar caterpillar
Honeysuckle	Common Ink Cap toadstools	Banded Snail
Blue Tits	Cuckoo Pint	Primrose

If you see a wild Barn Owl anywhere in the UK please help our research by recording it on the **Barn Owl survey website.**

(Remember never to disturb nesting birds and follow the Countryside Code.)

wildlife watch

Minibeasts

Garden Tiger Moth

Common Blue Butterfly

Brimstone Butterfly
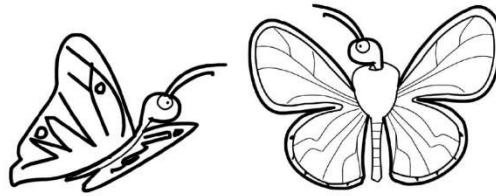
Bumblebee

Dragonfly

Ladybird
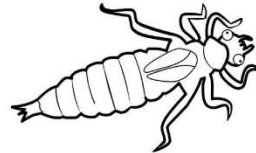
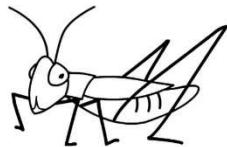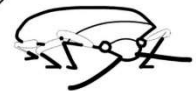Dragonfly Nymph
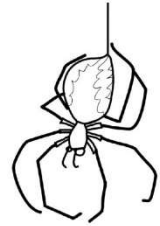
Garden Spider
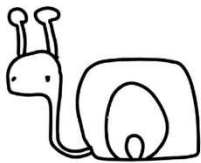
Snail

Privet Hawkmoth
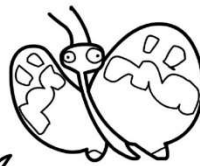
Red Admiral Butterfly
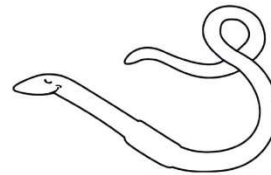
Earthworm
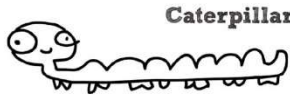
Shieldbug

Caterpillar

Grasshopper

www.wildlifewatch.org.uk

wildlife watch
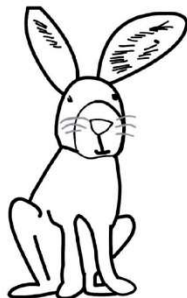
Mammals, reptiles and amphibians

Bat

Common Lizard

Water Vole

Red Squirrel

Stoat

Otter

Frog

Red deer

Hedgehog

Newt

Brown Hare

www.wildlifewatch.org.uk