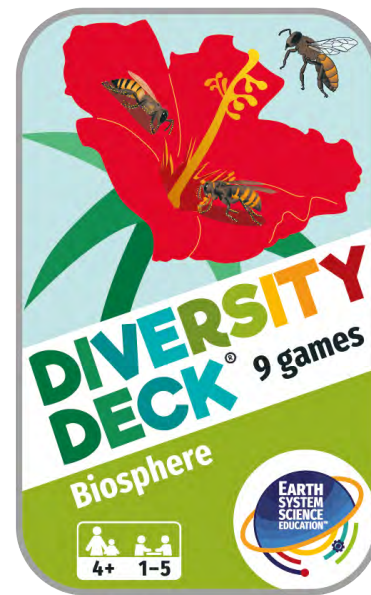


# DIVERSITY DECK®

## Funbook



# Biosphere



MAINTENANT  
Sustaining Now  
[maintenant.org.uk](http://maintenant.org.uk)

# PLAY ● LEARN ● CHANGE THE WORLD



## Earth System Science Education™

To understand how our planet works and our impact on it, we teach Earth System Science.

We divide the Earth into 7 different components called spheres.

Today, we will tell you the story of the Biosphere.

E12  
∞

This symbol means there is further information available on our Educational Hub [MAINTENANT.org.uk](https://www.maintenant.org.uk). You can click on the weblink or type the reference, e.g. **E12**, into the search box.





# PLAY ● LEARN ● CHANGE THE WORLD

Use code **MSNOFF20** for 20% off  
DIVERSITY DECK® card games

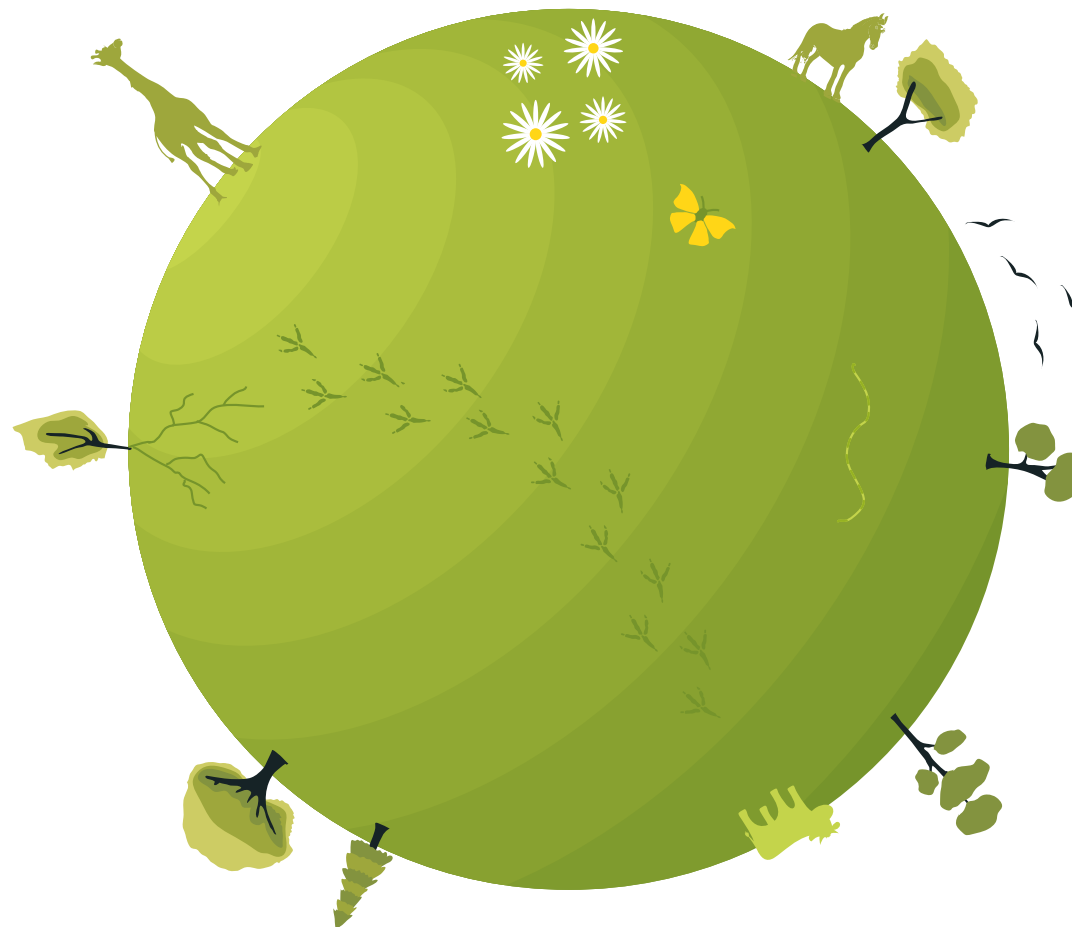




# The Biosphere

The biosphere contains all the living things on planet Earth.

As far as we know, we are the only planet to have a biosphere, making us extremely special.

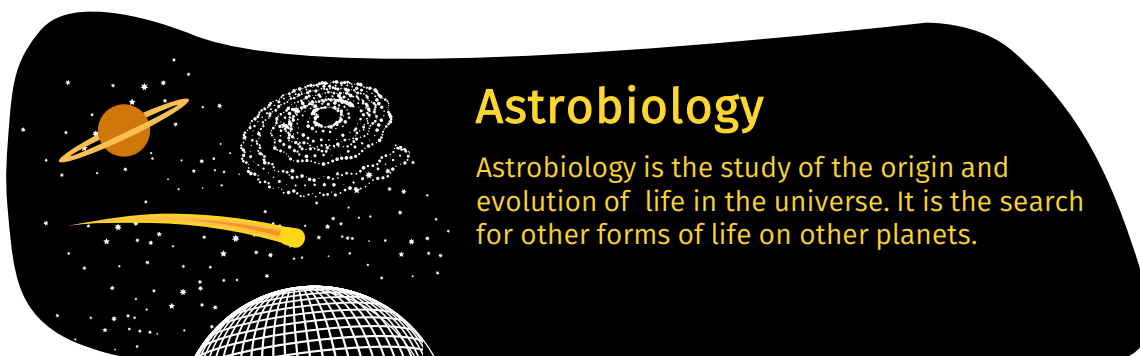


## DID YOU KNOW?

Viruses are not living organisms but are parasitic and replicate themselves inside cells of other organisms.

## FABULOUS FACT

The Biosphere extends **12 500 metres** below the surface of the Earth (lithosphere) and into the atmosphere to include birds, insects and bacteria.



## Astrobiology

Astrobiology is the study of the origin and evolution of life in the universe. It is the search for other forms of life on other planets.





Class

Name

Surname

Date



# Biosphere Wordsearch

Complete this wordsearch to familiarise yourself with some words about the biosphere. There is a glossary at the end of this book for you to use if you are not sure of their meaning. Some words are also linked to pages on our educational hub.

- ☐ BIOSPHERE
- ☐ UNIQUE
- ☐ ADAPTATION
- ☐ NUTRIENT
- ☐ EVOLVED
- ☐ ENVIRONMENT
- ☐ MUTATION
- ☐ INSECTS
- ☐ EXTINCTION
- ☐ WILDLIFE

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





Class .....

Name .....

Surname .....

Date .....



Page 6



# Our planet is unique

Our planet is unique and is the only one we know of that supports life.



1) Can you find the one planet Earth in the picture?

.....



2) How many planet Mars' are there?

.....



3) How many Suns are there?

.....



4) How many Europa moons are there?

.....

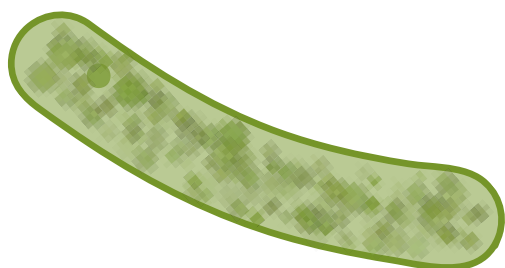




# First life

Life began in the deep oceans  
**3.5 billion years ago** from  
single celled organisms.

The biosphere was created at  
this point.

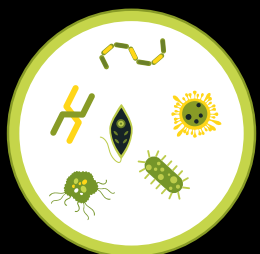


## DID YOU KNOW?

Blue-green algae,  
or *Cyanobacteria*, are  
thought to be the first life  
forms on Earth. Fossils  
have been found in  
Western Australia dating  
back  
**3.5 billion**  
years.

## FABULOUS FACT

Although  
not proven, some  
scientists claim to have  
discovered possible life  
as early as  
**4.2 billion**  
years ago in Quebec,  
Canada.



## Microbiology

Microbiology is the study of microscopic  
organisms, invisible to the naked eye (bacteria,  
fungi and viruses). Microbiologists study their  
structure and interaction with their environment.





Class .....

Name .....

Surname .....

Date .....

Page 8



# Our Time and Place in the Universe

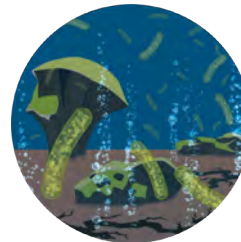
Draw a line from these events to the red arrows on the timeline to place them in the right order.



Earth was  
formed 4.5  
billion years ago



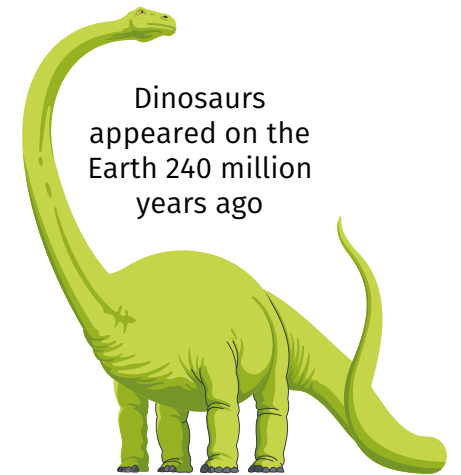
Humans  
appeared on  
Earth 6 million  
years ago



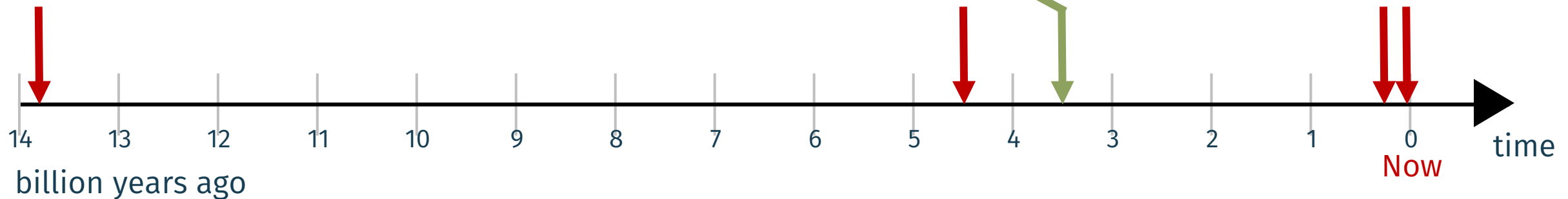
Life began  
3.5 billion  
years ago



Big Bang 13.8  
billion years ago



Dinosaurs  
appeared on the  
Earth 240 million  
years ago







# Life is everywhere

The biosphere is a closed, self-regulating system containing all the ecosystems on the planet.

Every part of the planet holds some form of life; from the deepest depths of the ocean floor to the highest mountain peaks.

The biosphere is supported by the atmosphere, the hydrosphere and the lithosphere in important ways which keep the planet in balance.



## Our STEAM ambassador



**Marine Biologist**

Marie-Anne  
Cambon Bonavita

Marie-Anne is using deep sea submersibles to study the ocean bed and observe what living organisms she and her team can find in the deep ocean cracks of the Pacific Ocean's floor.

They aim to document organisms such as bacteria, to gene sequence their DNA, and compare them to other fauna in the vents of different oceanic locations.

This information will lead to a better understanding of the deep sea's ecosystems. Marie-Anne's research helps to decide if those ecosystems can be sustainably exploited for the rare minerals deposited there.





# A balance of gases in the atmosphere allows life to flourish

Over billions of years, the **atmosphere** has developed the right balance of gases to sustain life.

This balance was created in several different ways including the following biological processes:

- Plants carry out photosynthesis and produce **oxygen**.
- Animals and plants respire and produce **carbon dioxide**.

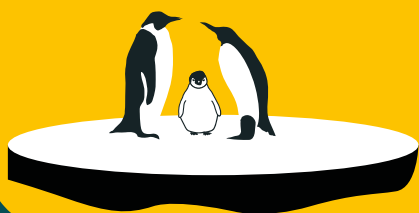


## DID YOU KNOW?

Changes to the amount of oxygen in the atmosphere over time have guided the evolution of animal lungs and affected the size of land animals.

## FABULOUS FACT

Photosynthetic bacteria produce oxygen through photosynthesis. *Prochlorococcus* is a tiny ocean living bacteria which produces around a fifth of the Earth's oxygen!



## Bioclimatology

Bioclimatology is the analysis between climatic zones and ecosystems. Bioclimatologists study the global climate's impact on the development and evolution of all organisms.



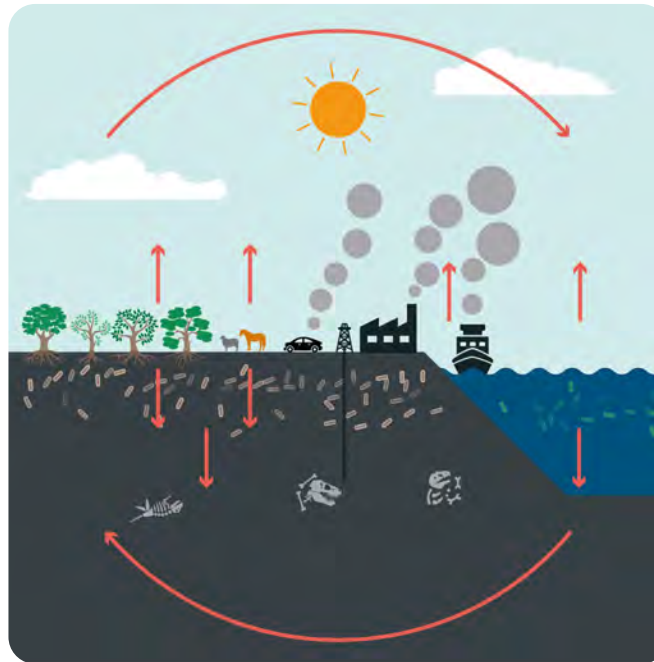


# The lithosphere contains all the nutrients needed for life

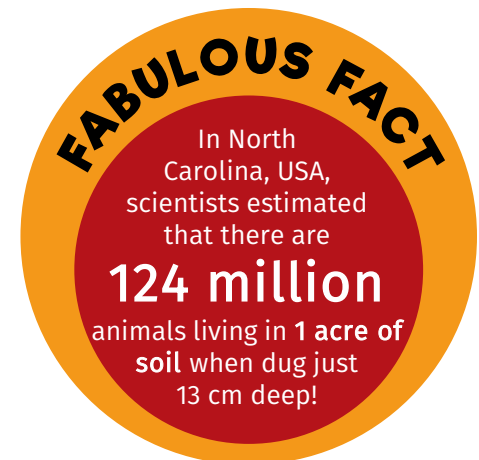
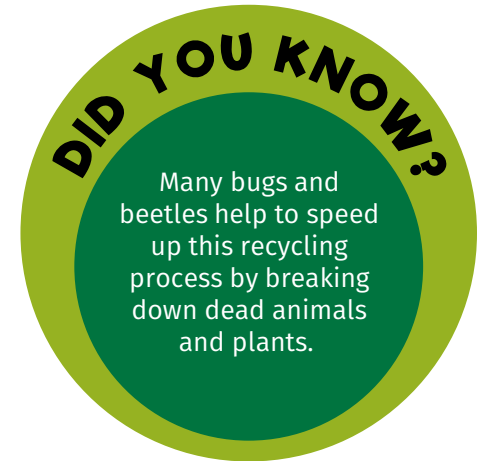
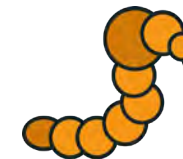
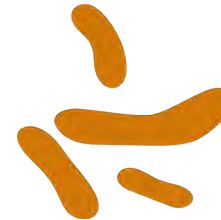
The **biosphere** interacts with the **lithosphere** where nutrients such as **carbon** and **nitrogen** are recycled in the soil.



Nitrogen cycle



Carbon Cycle







# The hydrosphere's water cycle makes life possible

The **hydrosphere** supports the **biosphere** by providing water for all living things.

Living things have a lot more water in them than you might expect!

A jellyfish



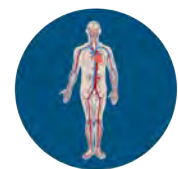
98%

An apple



84%

A human



70%

There may be less rain without an amazing bacteria called *Pseudomonas syringae*

We make it rain



**DID YOU KNOW?**

Rainforests such as the Amazon create rain by releasing water vapour through transpiration on the undersides of their leaves.



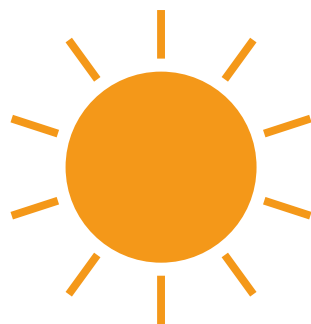


# A Terrarium

A terrarium creates its own environment and atmosphere by recycling nutrients and gases around its closed system.

It can clearly show the interactions between the different spheres in miniature!

They can be tricky to look after successfully, just like our planet, but if cared for properly, they can last for a long time.



Small plants

Soil

Gravel

## DID YOU KNOW?

A terrarium is a sealed transparent globe in which plants are grown. The heat and light which enter through the glass, start its very own water cycle!

## FABULOUS FACT

The world's largest terrarium can be found in a shopping mall in Warsaw, Poland. This mini enclosed forest weighs more than a ton:

**1018kg**





Class.....  
Name.....  
Surname.....  
Date.....



# Let's make a terrarium!

Creating a terrarium gives a sense of how our world works and how it can self-regulate as long as it is not polluted and spoilt.

## You will need

- ☐ 1) A large empty jar
- ☐ 2) Gravel for the base
- ☐ 3) Soil/compost
- ☐ 4) Small plants and moss
- ☐ 5) Water

## How to do it

- ☐ 1) Place a small layer of gravel at the bottom of the jar, followed by a layer of soil.
- ☐ 2) Place in small plants and moss.
- ☐ 3) Spray with water.
- ☐ 4) Once sealed, place in a cool place out of direct sunlight.
- ☐ 5) You may need to adjust the balance of water at first by opening the lid; too little water and it will dry out, too much water and it will rot.



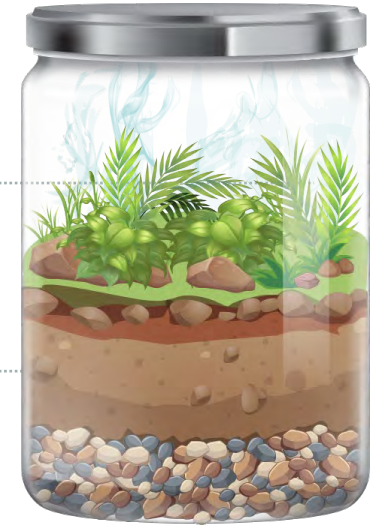
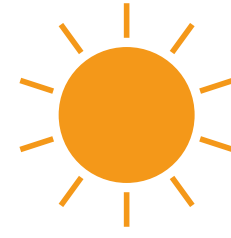




Class.....  
 Name.....  
 Surname.....  
 Date.....



# Terrarium discussion



1) What will the plants need to survive?

.....

2) What gases are circulating around the terrarium which are essential for life?

.....

3) Do you know the names of the processes which create these gases?

.....

4) What will you need to support animal life in the biosphere terrarium?

.....

5) Add toy figures to represent humans - what impact would this have on the biosphere - how will it change?

.....

.....



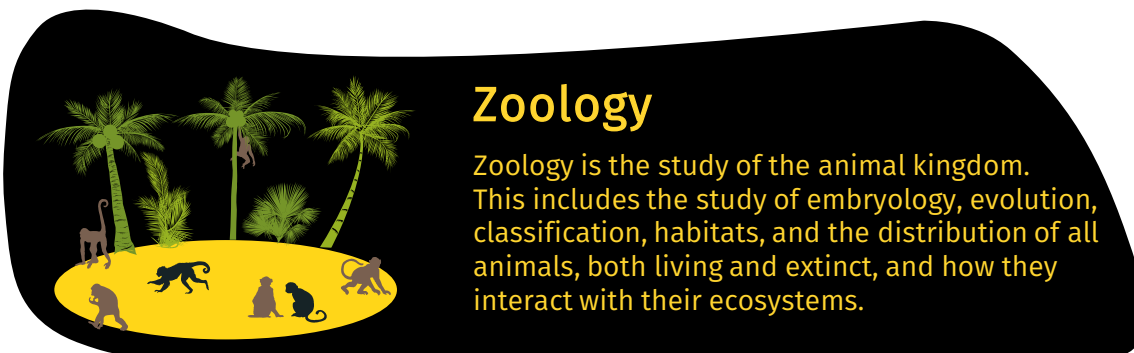
# Ecosystems

From the smallest bacteria to entire forests, everything in the biosphere is working to provide food, shelter, water and unique environments for animals and plants to live in.

It is really important that we value every species for the place that it holds in nature. There are big consequences when even small organisms disappear from ecosystems. When individual species go extinct, it will mean that important processes may not be carried out anymore.

Some examples of these would be:

- When an organism disappears from a food chain, it changes the energy flow through an ecosystem. Some animals have less to eat and decrease in numbers and if predators disappear, then some animals may increase in numbers.
- Seed dispersal of certain plants might not occur.
- Pollination of plants might stop and the plant may not be able to reproduce.
- The breakdown of dead material may be slowed leaving plants without the nutrients that they need to grow.



## Zoology

Zoology is the study of the animal kingdom. This includes the study of embryology, evolution, classification, habitats, and the distribution of all animals, both living and extinct, and how they interact with their ecosystems.





Class .....

Name .....

Surname .....

Date .....

B14



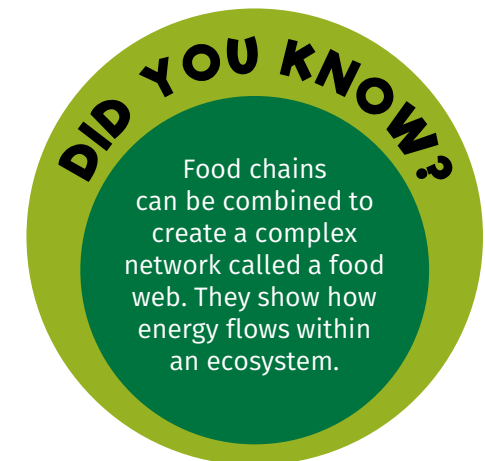
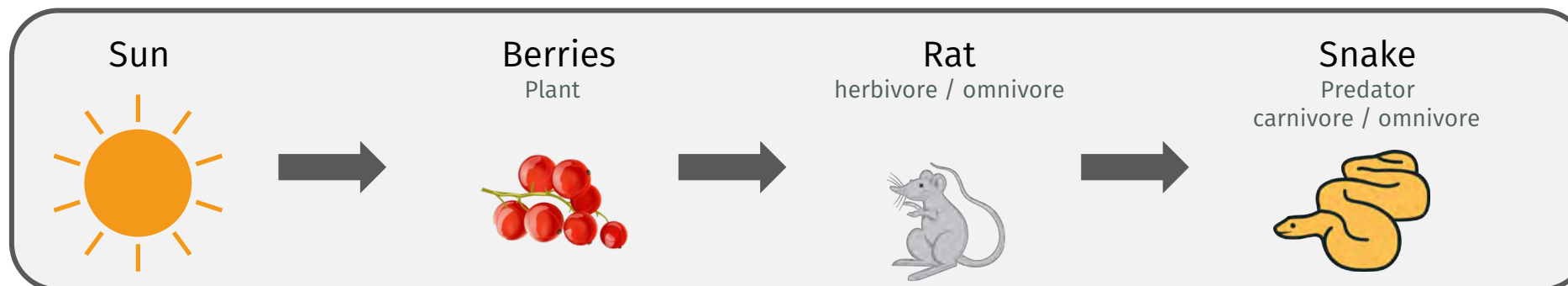
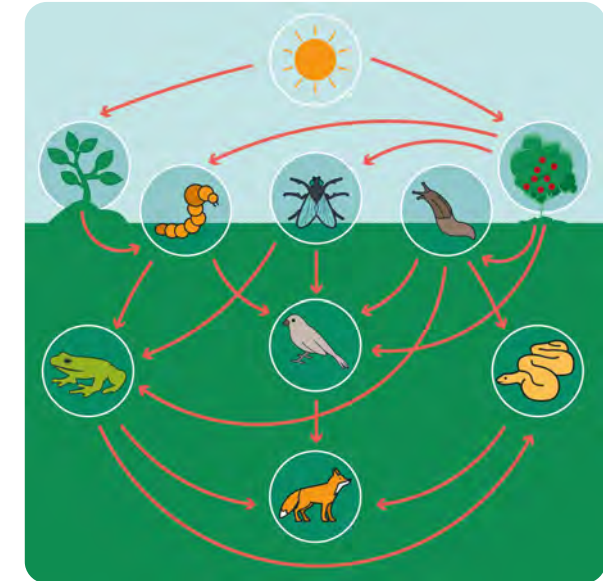
Page 17



# Cut and stick to complete the food chains 1/2

Help! Some of these organisms in the food chains have disappeared from their ecosystem and other animals are now in danger of starving!

- 1) Can you replace the missing organisms in the correct places to save them!
- 2) Have you noticed that the Sun is always at the beginning of a food chain? Why do you think that is?
- 3) There are always producers, herbivores and carnivores in food chains. Can you label these in the food chains below?
- 4) Can you create your own food chain?



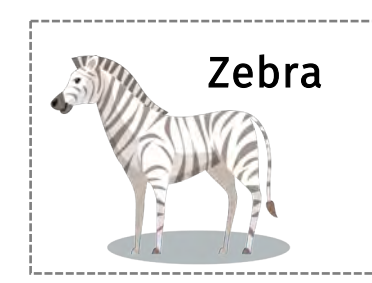
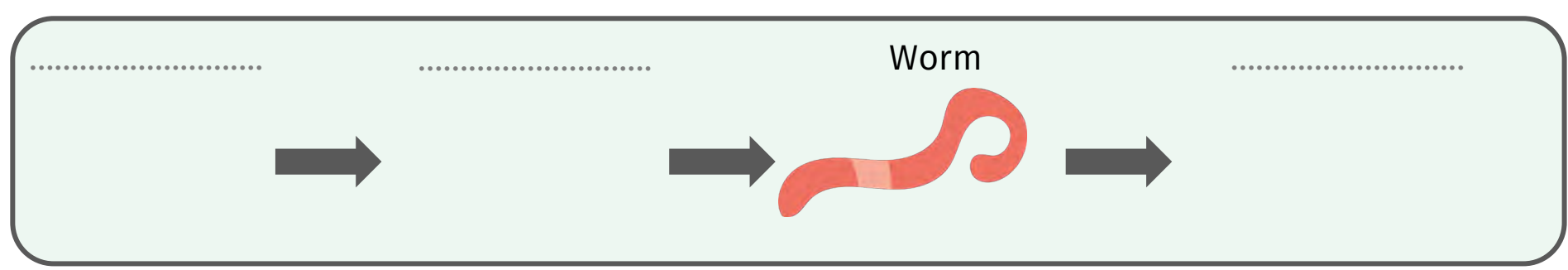
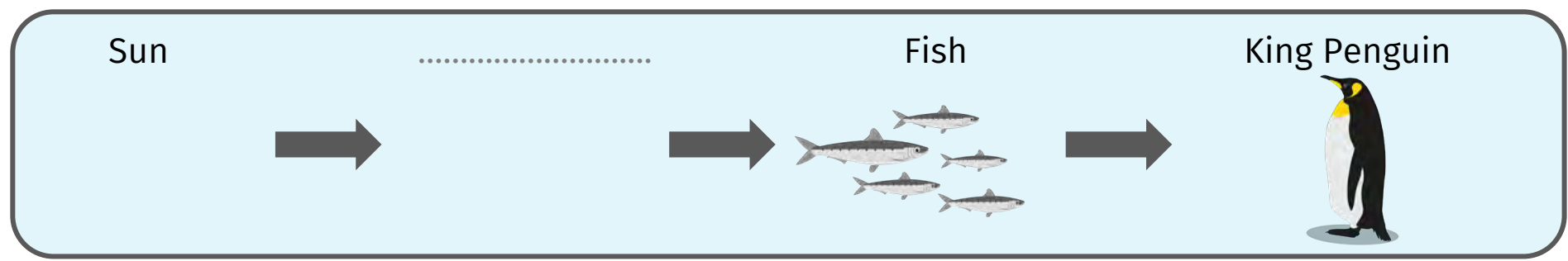
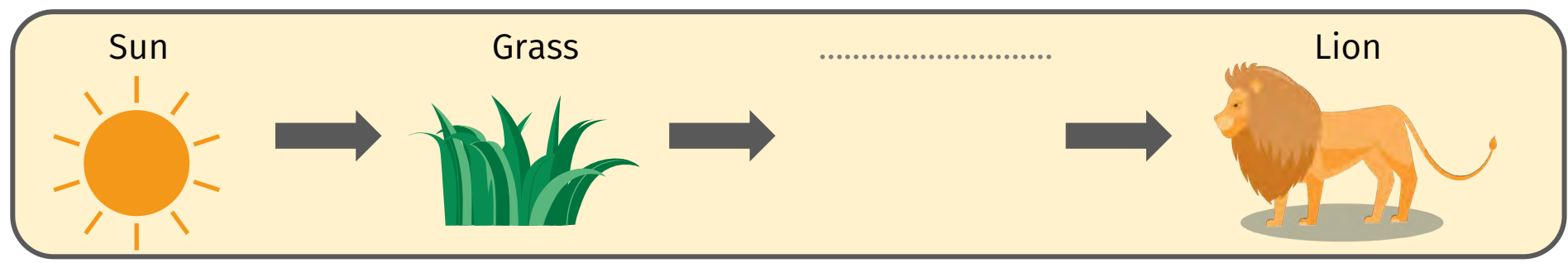




Class \_\_\_\_\_  
Name \_\_\_\_\_  
Surname \_\_\_\_\_  
Date \_\_\_\_\_



# Cut and stick to complete the food chains 2/2



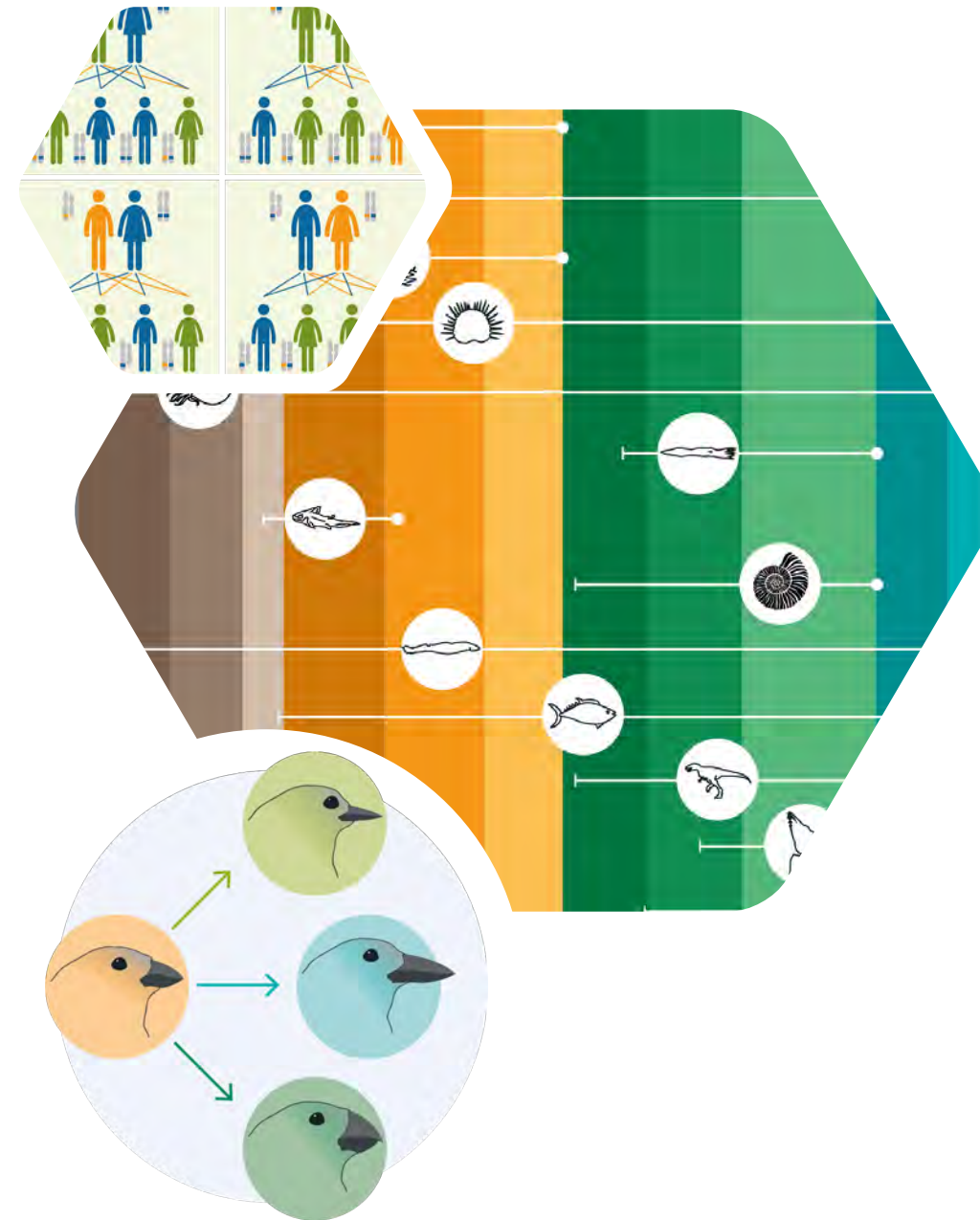


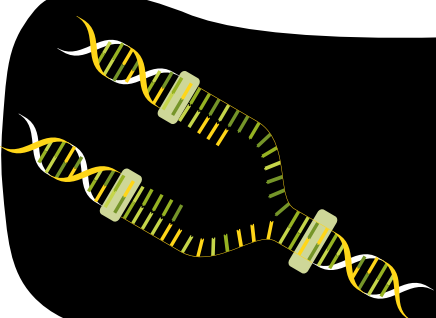
# Adaptation and evolution

Biodiversity means all the living organisms in a given area. That could be the entire planet or a particular forest or lake. Biodiversity has taken hundreds of millions of years to evolve through:

- Genetic mutations
- Adaptation to environment
- Mass extinctions

If biodiversity disappears because of human actions which are causing climate disruption, then it is irreversible and will take millions of years to recover.





## Genetics

Genetics is the study of the genes and heredity of living organisms (plants, bacteria, animals, humans).  
Heredity is the transmission of a gene, for example eye colour, to the descendants.



Class \_\_\_\_\_  
Name \_\_\_\_\_  
Surname \_\_\_\_\_  
Date \_\_\_\_\_



F2  
∞

Page 20

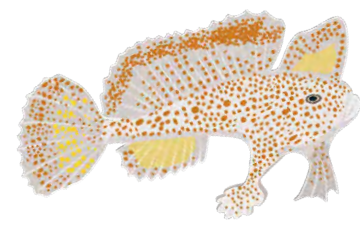


# Animal adaptations

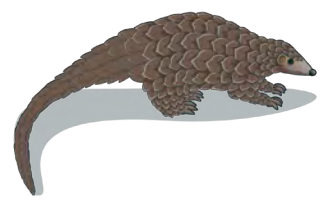
Match the adaptation with the animal



Musk Ox



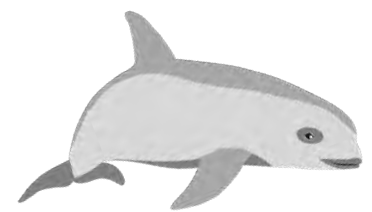
Spotted Handfish



Pangolin



Northern Bald Ibis



Vaquita

- 1 Long beak for finding worms and beetles in sand and soil.
- 2 Thick warm fur for surviving freezing temperatures.
- 3 Hand-like fins for walking over the seabed.
- 4 Streamline body for swimming fast.
- 5 Big strong front claws for digging and tearing up rotten wood.





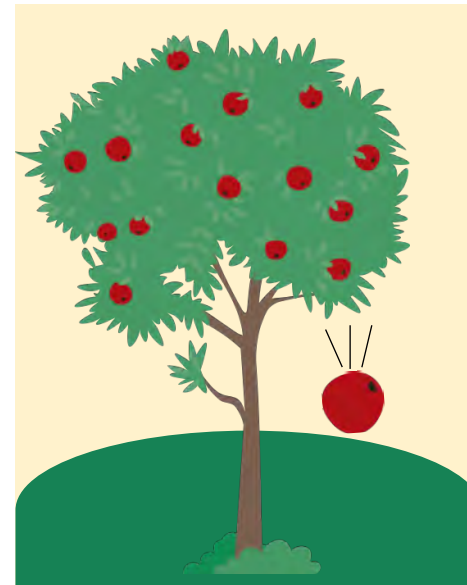
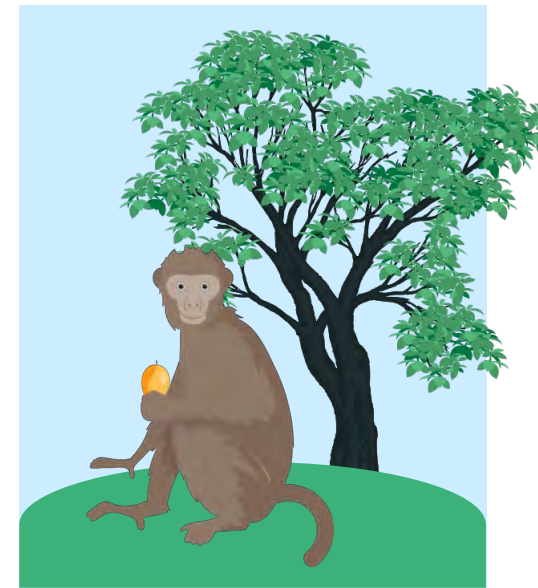
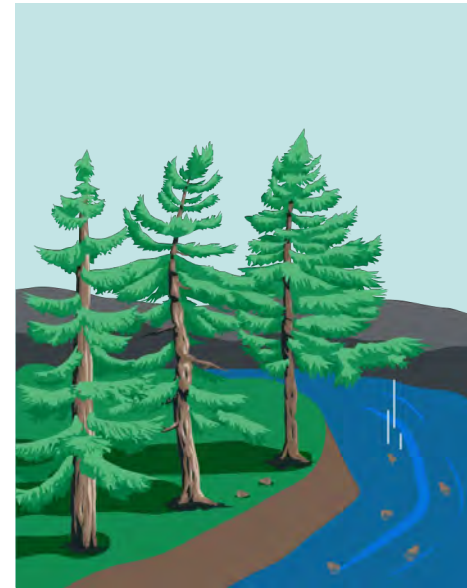
# Seed dispersal

Plants have evolved to use seed dispersal techniques to plant offspring far from the parent plant.

They do this by using gravity, wind, water or animals to disperse their seeds far and wide.

There are a many examples of how animals transport seeds. Some seeds have barbs or hooks which attach to an animal's fur or body and are moved to another place.

Some animals such as mammals and birds, eat seeds in fruits which are then deposited a few days later in their waste.




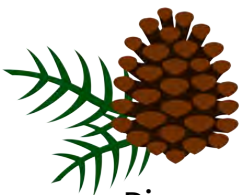








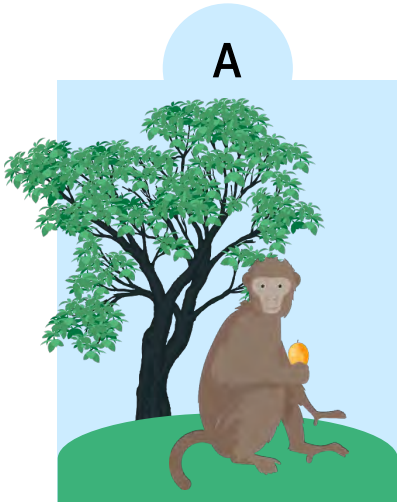

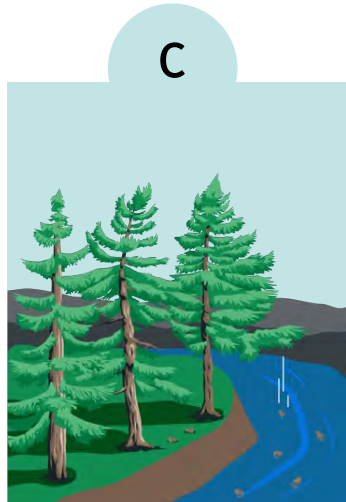

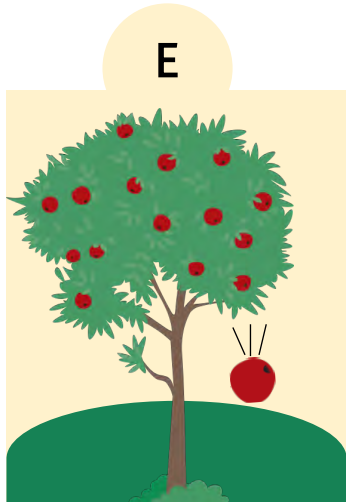
Class \_\_\_\_\_  
Name \_\_\_\_\_  
Surname \_\_\_\_\_  
Date \_\_\_\_\_



# Seed dispersal game

Seeds can be dispersed in various ways to help the seed to **germinate** into a plant. Tick to match the seeds to the correct type of seed dispersal. Be careful, a few seeds have more than one seed dispersal method!

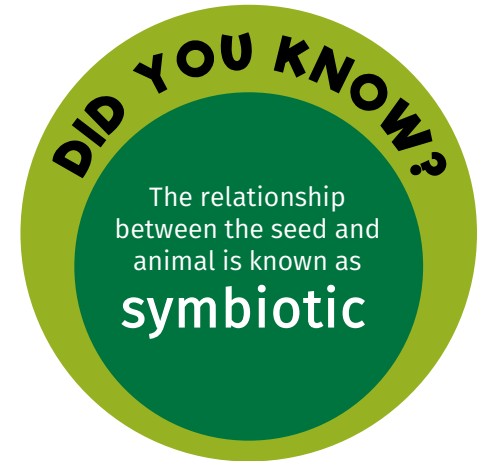
							
Berries	Pine	Sycamore	Yellow pond lily	Acorn	Poppy	Coconut	Dandelion
A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

				
A	B	C	D	E
Eaten or buried by animals	Stick to animals' fur or feathers	Float on water	Blown by the wind	Spread by gravity



# Bornean rainforest plants and orangutans

- Some seeds benefit and will germinate, or begin to grow better once they have been through an animal's digestive system.
- It has been shown that the Bornean forest and the orangutans which live there are intricately linked in this way so that if the orangutans were to go extinct, the regeneration of the forest would be badly affected, and certain trees and plants would also die out.







# The biosphere is dying

Human behaviour, habitat loss and climate change are leading to the 6<sup>th</sup> wave of mass extinction all too quickly.

Scientists believe that we are on track to lose 50% of all higher life forms on the planet by 2100.

This would lead to a collapse in many ecosystems and further extinctions over the coming decades.

Some scientists believe that we have a short window to reverse this trend, but we must work together and quickly. The United Nations Sustainable Development Goals provide a plan to achieve this globally.



## DID YOU KNOW?

There have been **5** previous mass extinctions on Earth which wiped out nearly **75%** of all life forms each time including the dinosaurs at the end of the Cretaceous period.





# What can you do to help the Biosphere?

**Look around you.**

**Think and look after our planet.**

**Be stewards for the next generation.**

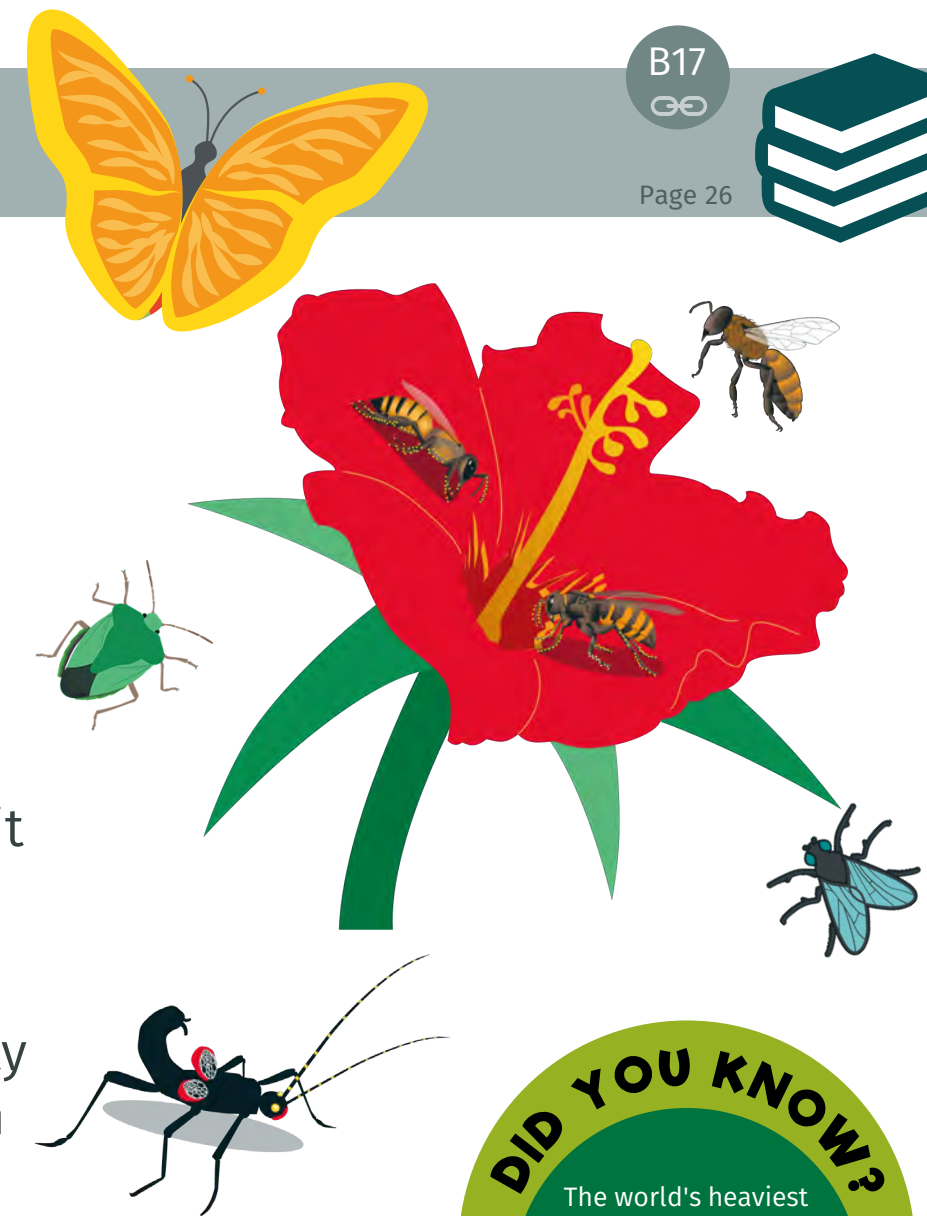
There are many ways that we can positively impact the biosphere.





# Encourage insects

- Insects are very important to the success of any ecosystem. They provide a major food source for birds and small mammals, pollinate many plants and are important decomposers.
- Farming and food production rely on insects. Without them we would not be able to feed ourselves. They pollinate many crops which leads to seed growth and fruit formation. Bees also produce honey and bees wax.
- Insects are under threat because of pesticide use in food production which kills insects. Habitat loss because of city expansion and climate change are also causing a crash in numbers.



## Look after our insects

You can encourage insects in your garden by leaving overgrown areas with wild flowers and bug hotels. Some ideas can be found at [CountryFile.com/Wildlife](http://CountryFile.com/Wildlife)



## Buy organic food

This is important as it uses less pesticides, and generally, farmers that grow organically provide areas for insects to thrive.

## DID YOU KNOW?

The world's heaviest insect is the Goliath Beetle which can weigh **more than 50g** and be over **10cm long**







Class \_\_\_\_\_  
Name \_\_\_\_\_  
Surname \_\_\_\_\_  
Date \_\_\_\_\_



# TRUE or FALSE



How much do you know about insects? Test yourself!

	TRUE	FALSE
1) Insects use parts of their bodies to make sounds		
2) Insects have 8 legs		
3) There are between six and ten million different types of insects		
4) Insects communicate with each other		
5) Ants pollinate crops		
6) Many insect species are found in oceans		
7) An insect's tail is called a thorax		
8) Insects make up one quarter of all animals on the planet		
9) Some insects feed on blood		
10) Only 1% of insects are harmful to humans		



**DID YOU KNOW?**

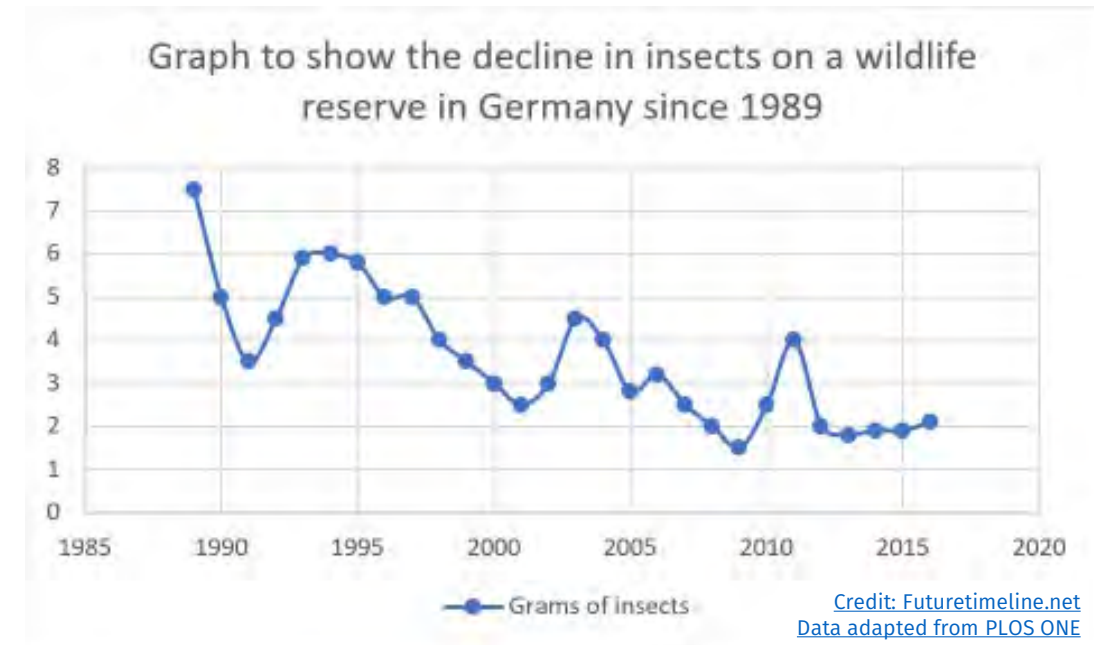
The Golden Eyed Stick Insect was only discovered in 2005 in a remote part of Peru on the edge of the Amazon Rainforest but is Critically Endangered.



# Insect population decline

This data comes from a German wildlife reserve. Scientists caught insects overnight in large nets and weighed the numbers that they caught from year to year.

Can you help them to analyse their findings?



- 1) How many grams of insects were caught in 1989?
- 2) When was the lowest amount of insects caught?
- 3) Between which years was the biggest fall in amount of insects caught?
- 4) What is the difference in grams of insects caught between 1989 and 2016?
- 5) Can you work this out as a percentage fall in insect numbers?
- 6) What could be done to increase the numbers of flying insects at the reserve?



# Plant Trees

Trees are the lungs of the planet.

- Trees and other plants produce oxygen through photosynthesis which enables animals to breathe the air in the atmosphere. Trees are also important because large, old forests provide huge stores of carbon by taking carbon dioxide out of the air and storing it in their large tree trunks.
- Unfortunately, through deforestation, much of this carbon is released into the atmosphere, therefore increasing the amount of greenhouse gases and warming the planet.
- Trees also provide wonderful shelter and homes to many animals. Birds nest in them, mammals create dens and burrows under them, and insects live inside them.



You can help by planting trees in your local area

- to help reduce air pollution
- to provide homes for wildlife



## Seed bombs

Seed bombs are used by people to reforest huge areas of land which have been deforested. The seed bombs are dropped by all sorts of methods such as helicopter, airplane, bicycles and sling shots.

Reforestation programs have been delivered in the USA, Australia and China and now there are big plans to reforest much of Kenya and West Africa.

It's sad that humans have destroyed these forests in the past but also a huge accomplishment by conservation groups and governments who are committed to restoring landscapes for generations to come.

A fantastic positive example of a seed bombing project is Seedballs Kenya who have managed to disperse nearly 10,000,000 seed bombs across Kenya since 2016!







Class .....

Name .....

Surname .....

Date .....

Page 30



# Origami chatterbox 1/2

Print this page, cut it out and fold it as instructed on the next page.



## How to play

- 1) Pick 1 of 4 words and spell out the letters out as you move the origami back and forth.
- 2) Pick a number and read out the fact. Then move the origami whilst counting the number of times chosen.
- 3) Pick another number and open up the origami to reveal the question. Discuss question!

 <p><b>Soil</b></p>	<p><b>2.</b> Soil helps plants grow and habitat for animals.</p>	<p><b>3.</b> Plants get most energy from sunlight</p>	<p><b>Plants</b></p> 
<p><b>1.</b> The 1 planet with life is Earth.</p>	<p>What are the 4 components of soil?</p>	<p>What ecosystem is often called the 'lungs of the planet?'</p>	<p><b>4.</b> Plants absorb carbon dioxide and release oxygen.</p>
<p><b>8.</b> Every year 8 million metric tons of plastic enters our oceans.</p>	<p>What changes can you make to help protect the environment and live more sustainably?</p>	<p>What can you do to help endangered animals?</p>	<p><b>5.</b> The Big Five: Lion, leopard, elephant, buffalo, rhino.</p>
<p><b>Humans</b></p> 	<p><b>7.</b> There are over 7 billion people in the world.</p>	<p>How many different animals can you spot out your window, in your garden or in your local park?</p>	<p><b>Animals</b></p> 



Class.....  
Name.....  
Surname.....  
Date.....



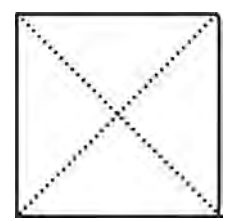
# Origami chatterbox 2/2

Follow these instructions below.

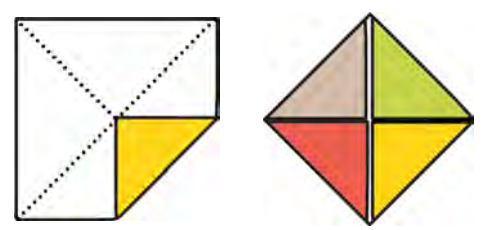
1) Print and cut out square. Fold diagonally in both directions to establish the centre.



2) Unfold and turn over, so the image is facing down.



3) Fold corners to centre point.



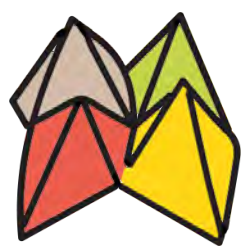
4) Turn over and fold corners to center point.



5) Fold in half vertically, crease & unfold. Fold in half horizontally.



6) Insert thumbs and index fingers under outside corners and pinch together.







Class .....

Name .....

Surname .....

Date .....

Page 32



# Animal diary competition

We would like you to create a story about being a wild animal and what your day would be like.

Here are some ideas to get you started:

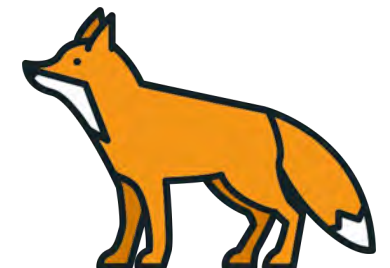
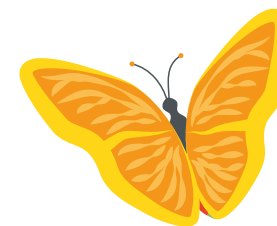
- You can choose to write about any animal you like! For example, you could be a butterfly, a bird or a fox.
- You could ask your parents to help you spend some time watching local wildlife. This could be anything from birds in the sky from your window, a video clip from the internet or ants in between paving stones, even in urban areas there is lots to see.
- Make quick notes on what you see happening.
- Can you imagine what life is like for a wild animal?
- You may want to do some additional research about the animal you choose to write about.
- Think about all the following questions and try to include them in your story:
  - What other animals would you see?
  - Where would you go?
  - What would your home be like?
  - What do you eat and why?
  - How do you feel? Safe, scared, warm, cold?
  - What kind of things make you happy and sad?

**WIN A CARD DECK!**

Send your completed diary entry to us at [games@maintenant.org.uk](mailto:games@maintenant.org.uk)

by the 31<sup>st</sup> July 2020

The best 3 entries will be published on our website and winner will also receive a copy of the amazing Biosphere DIVERSITY DECK® card game







Class .....

Name .....

Surname .....

Date .....



Page 33



## I pledge to ...

Start these 3 actions to live more sustainably and help bring about positive change to ensure a good future for me and generations to come.

1

2

3

## Sustaining Now to Protect our Future

Sign .....

Date .....



**PLAY ● LEARN ● CHANGE THE WORLD**

Use code **MSNOFF20** for 20% off  
DIVERSITY DECK® card games



## Earth's Spheres Collection



## Sustainability Collection



# PLAY ● LEARN ● CHANGE THE WORLD

The United Nations Sustainable Development Goals or SDGs are a worldwide plan for all to tackle poverty and environment challenges like climate breakdown.

## SUSTAINABLE DEVELOPMENT GOALS

We endorse the United Nations Sustainable Development Global Goals and use them as a teaching framework.








PLAY ● LEARN ● CHANGE THE WORLD

1	<b>Adaptation</b>	A feature of a living thing which helps it to survive
2	<b>Atmosphere</b>	The gases which surround our planet
3	<b>Biodiversity</b>	The variety of living things in a certain area
4	<b>Biosphere</b>	The areas of the Earth which contains all the living organisms on Earth
5	<b>Carnivores</b>	Animals which eat other animals for food
6	<b>Deforestation</b>	When a forest is cut down, burnt and destroyed by human activity
7	<b>Dispersal</b>	Spread out, as seeds do when they are scattered by the parent plant
8	<b>Ecosystem</b>	A community of organisms and their environment interacting together
9	<b>Environment</b>	The conditions of a habitat including light, temperature and other organisms
10	<b>Evolved</b>	The way an organism has changed genetically to fit into its environment
11	<b>Extinction</b>	When there are no more individuals in a species left
12	<b>Germinate</b>	When a seed starts to grow
13	<b>Gravity</b>	The force by which objects fall to the ground
14	<b>Herbivores</b>	Animals which eat plants for food
15	<b>Hydrosphere</b>	All the water on the planet
16	<b>Lithosphere</b>	The Earth’s crust and everything in it
17	<b>Mutation</b>	A random change in an organism’s genes which changes the way it looks or behaves
18	<b>Nutrient</b>	Substance that a plant needs to keep healthy
19	<b>Organism</b>	A living thing
20	<b>Pesticide</b>	Substances that are used to control pests
21	<b>Predator</b>	An animal which kills another animal for food
22	<b>Prey</b>	An animal which is killed and eaten by another animal for food
23	<b>Producer</b>	An organism which produces its own food, normally plants through photosynthesis
24	<b>Photosynthesis</b>	The process by which plants make food in their leaves. Oxygen is a waste product
25	<b>Pollination</b>	When pollen from one flower is taken to another
26	<b>Respire</b>	The way cells get energy by combining glucose and oxygen. Carbon dioxide is produced as a waste product
27	<b>Symbiotic</b>	A close physical association between 2 living organisms which mutually benefit from the interaction



# ETYMOLOGY

## The origin of a word

Biosphere			
βίος	bíos	life	Greek
σφαῖρα	sphaira	sphere	Greek

## Biosphere Wordsearch

Check your responses. How many right responses did you get: \_\_\_\_\_ / 10

- ☐ BIOSPHERE
- ☐ UNIQUE
- ☐ ADAPTATION
- ☐ NUTRIENT
- ☐ EVOLVED
- ☐ ENVIRONMENT
- ☐ MUTATION
- ☐ INSECTS
- ☐ EXTINCTION
- ☐ WILDLIFE

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

**PLAY ● LEARN ● CHANGE THE WORLD**

# Our planet is unique

Check your responses. How many right responses did you get: \_\_\_\_\_ / 4



1) Can you find the one planet Earth in the picture?

**YES**



2) How many planet Mars' are there?

**7**



3) How many Suns are there?

**5**



4) How many Europa moons are there?

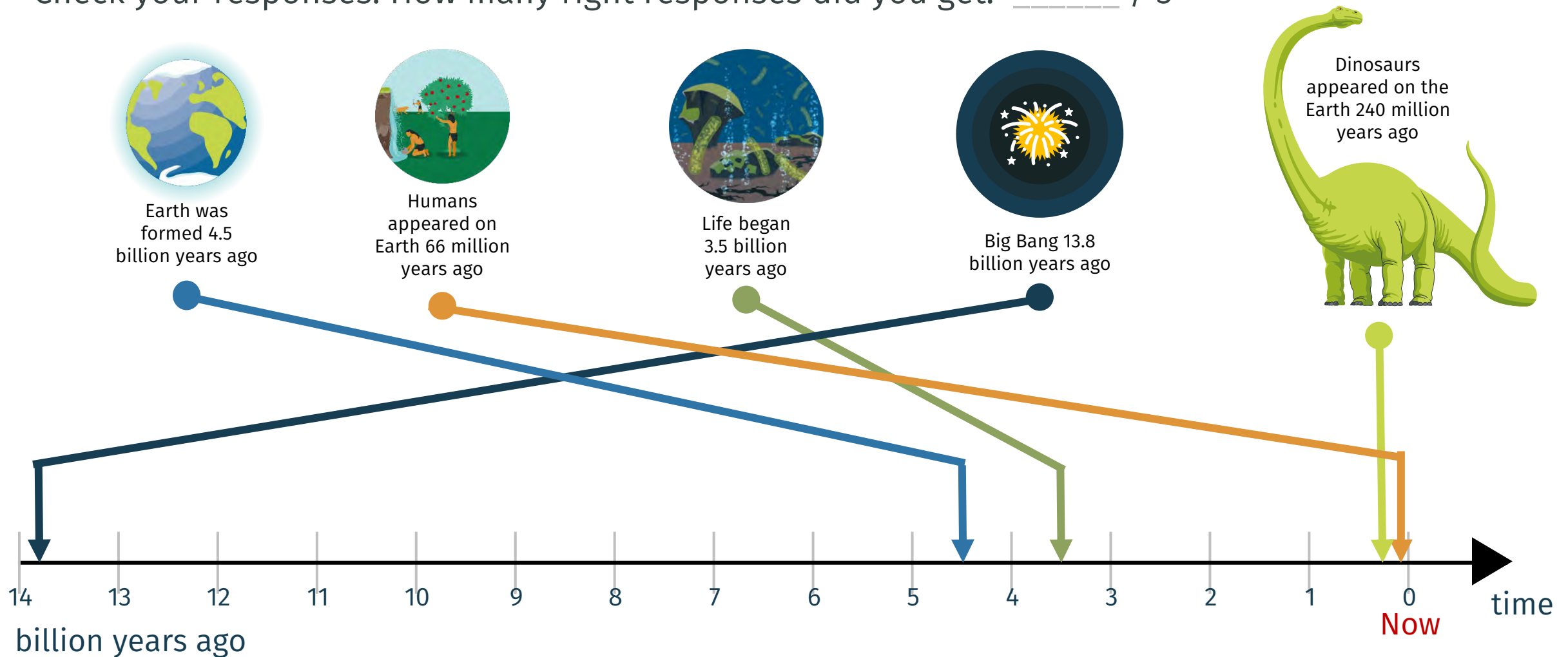
**6**





## Our Time in the Universe

Check your responses. How many right responses did you get: \_\_\_\_\_ / 5



## Animal adaptations

Check your responses. How many right responses did you get: \_\_\_\_\_ / 5



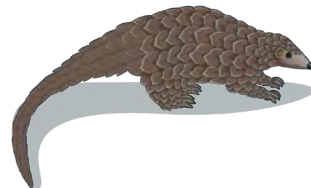
Musk  
Ox

2



Spotted  
Handfish

3



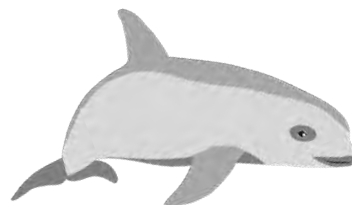
Pangolin

5



Northern  
Bald Ibis

1



Vaquita

4

1

Long beak for finding worms and beetles in sand and soil.

2

Thick warm fur for surviving freezing temperatures.

3

Hand-like fins for walking over the seabed.

4

Streamline body for swimming fast.

5

Big strong front claws for digging and tearing up rotten wood.

### TRUE or FALSE questions

Check your responses. How many right responses did you get: \_\_\_\_\_ / 10

	TRUE	FALSE
1) Insects use parts of their bodies to make sounds	●	
2) Insects have 8 legs		● They have 6 legs
3) There are between six and ten million different types of insects	●	
4) Insects communicate with eachother	●	
5) Ants pollinate crops		● Pollinators such as bees and butterflies do
6) Many insect species are found in oceans		● No insects are found in oceans
7) An insect's tail is called a thorax	●	
8) Insects make up one quarter of all animals on the planet		● No one is exactly sure as not all insects have been discovered yet, but estimates are between a half and three quarters of all animals are insects!!
9) Some insects feed on blood	●	
10) Only 1% of insects are harmful to humans	●	



PLAY ● LEARN ● CHANGE THE WORLD

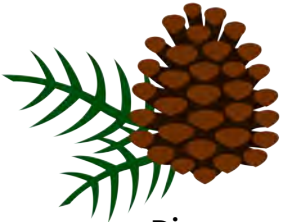
Seed dispersal game

Check your responses. How many right responses did you get: \_\_\_\_\_ / 16



Berries

A	B	C	D	E
✓				✓



Pine

A	B	C	D	E
			✓	✓



Sycamore

A	B	C	D	E
			✓	✓



Yellow  
pond lily

A	B	C	D	E
		✓		



Acorn

A	B	C	D	E
✓			✓	✓

squirrels bury them  
in the ground



Poppy

A	B	C	D	E
	✓		✓	



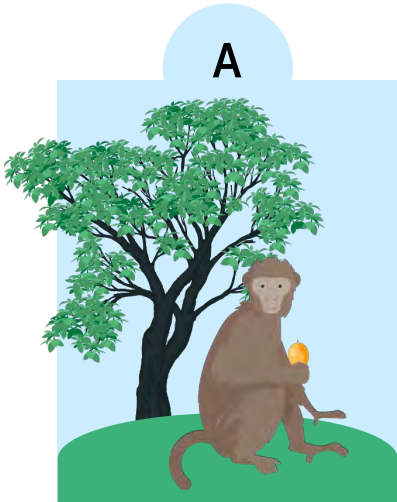
Coconut

A	B	C	D	E
		✓		✓

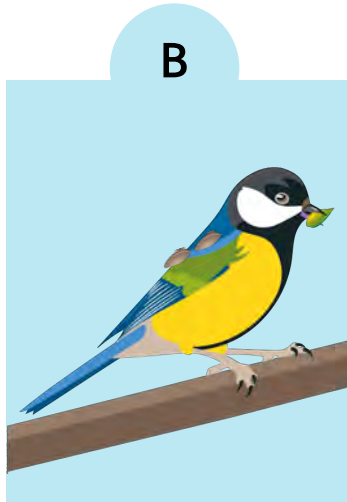


Dandelion

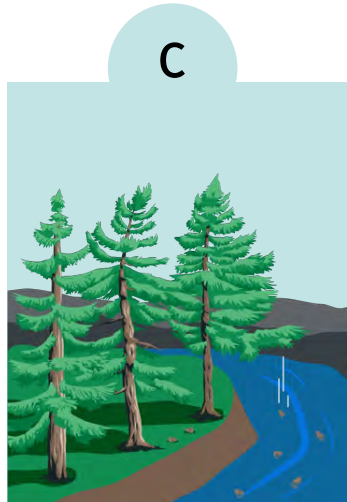
A	B	C	D	E
	✓		✓	



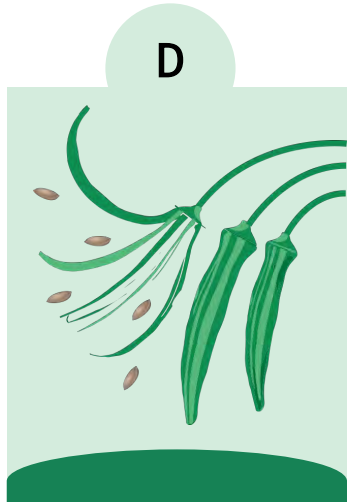
Eaten or buried  
by animals



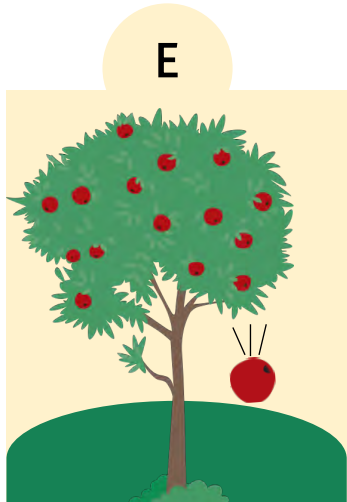
Stick to animals  
fur or feather



Float on water



Blown by the  
wind

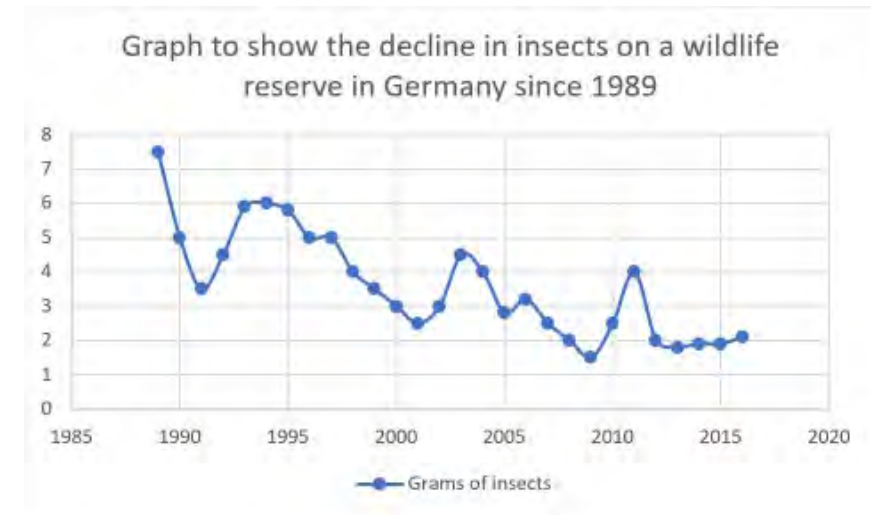


Spread by  
gravity

### Insect population decline

Check your responses. How many right responses did you get: \_\_\_\_\_ / 6

- 1) How many grams of insects were caught in 1989? 7.5g
- 2) When was the lowest amount of insects caught? 2009
- 3) Between which years was the biggest fall in amount of insects caught? 1989-1991
- 4) What is the difference in grams of insects caught between 1989 and 2016?  $7.5 - 2.1 = 5.4g$
- 5) Can you work this out as a percentage fall in insect numbers?  
 $5.4 \div 7.4 \times 100 = 72\%$  fall in insect numbers
- 6) What could be done to increase the numbers of flying insects at the reserve?  
They can increase areas of wildflowers and create bug hotels. If local farmers use pesticides, they could encourage them to stop.



Credit: Futuretimeline.net  
Data adapted from PLOS ONE

# PLAY ● LEARN ● CHANGE THE WORLD

## Earth System Science Education™ our innovative educational methodology

The Earth is a dynamic planet in constant evolution. The Earth System Science represents our planet as a set of strongly interconnected spheres. MAINTENANT Sustaining Now adapted this global and multidisciplinary approach to tell children about Sustainability Science such as Earth's climate, renewable energy, biodiversity conservation and well being.



**MAINTENANT**  
Sustaining Now  
[maintenant.org.uk](http://maintenant.org.uk)

**MAINTENANT Sustaining Now** is an award-winning social enterprise producing educational sustainability science resources, and running corporate and school workshops which empower children, adults and the whole community to adapt their lifestyles now.



**WINNER**  
**BEST GREEN BUSINESS**