SCIENCE | BTEC LEVEL 2 | EDEXCEL

Teaching Pack

For BTEC First Award in Applied Science

Unit 4: Biology and Our Environment

2nd Edition, 2nd March 2015

science@zigzageducation.co.uk
zigzageducation.co.uk

POD 4717

Contents

Thank You for Choosing ZigZag Education ii
Teacher Feedback Opportunity iii
Terms and Conditions of Use iv
Teacher's Introduction 1
Suggested Scheme of Work 3
Lesson Plan 1: Variation Within and Across Species 4
Variation and Evolution Questions 7
Lesson Plan 2: Classification of Organisms 10
Lesson Plan 3: Interdependence of Organisms 16
Interdependence of Organisms Questions 20
Assignment A: Relationships between Different Organisms and their Environment 23
Lesson Plan 4: Human Activities that Alter Ecosystems 26
Human Activities that Alter Ecosystems Questions 29
Lesson Plan 5: How Pollutants Affect Ecosystems 30
How Pollutants Affect Ecosystems Questions 33
Lesson Plan 6: Living and Non-Living Indicators of Pollution 36
Indicators of Pollution Questions 38
Lesson Plan 7: Measures to Counteract or Reduce the Impact of Pollutants on Ecosystems 40
Measures to Reduce Our Impact on the Environment Questions 46
Assignment B: Effects of Human Activity on the Environment and How to Measure Them 49
Lesson Plan 8: Infectious Diseases 52
Infectious Diseases Questions 58
Lesson Plan 9: Non-Infectious Diseases 60
Non-Infectious Diseases Questions 63
Lesson Plan 10: Inheritance of Disease 65
Inheritance of Disease Questions 69
Assignment C: Factors that Affect Human Health 71
Answers 74

Teacher's Introduction

This unit is taught over 30 guided learning hours (GLH). Teachers will have different approaches to the balance between teaching and working on assignments, as well as when they carry out assignment work. This scheme of work suggests splitting the time into ten teacher-taught hours, eight assignment lessons and 12 spare lessons for additional assignment time to obtain missed assessment criteria and also catch-up time for students who have missed lessons or need extra support. For differentiation purposes, information that only distinction-level students need is marked in a boxes with a D symbol. 'Did you know' boxes are included to give students some fun or useful extra information about the topic – they do not need to know this information to complete their assignments.

This pack contains the following materials:

1. A single-page overview scheme of work
2. Ten lesson plans
3. Notes for each lesson covering all the learning aims between them
4. Questions in non-write-on and write-on format to reinforce learning, with answers
5. Assignments covering all the assessment criteria between them

This resource is designed to be flexible in the following ways:

- Proposed assignment tasks have been put into suggested slots after the relevant material has been covered.
- The assignments provided in this pack are designed to be independent of each other so that any one can be substituted if you have a preferred assignment from elsewhere.
- For each lesson, there is a lesson plan followed by student notes and questions. Questions are then repeated provided in write-on format. You could use the material in one of the following ways:
    1. Use the notes to support your classroom teaching and then hand out either the non-write-on questions or the write-on questions at the end of the lesson (possibly for homework).
    2. Use the notes to supplement your own notes or the textbook and hand them out at the end of the lesson as a summary with the questions, so students can complete the questions using the notes as support.
    3. Just use the questions (either write-on or non-write-on, as appropriate) at the end of the lesson and subsequently hand out the notes at revision time.

If using this resource for assessed work, then as with all BTEC assignments they must be **internally verified**. Also you must check suitability with the board* and follow the **important disclaimer notice below**.

* Note: Pearson BTEC / Edexcel currently offer a free Assignment Checking Service.

IMPORTANT DISCLAIMER REGARDING ASSESSMENT: if you choose to use the assignments in this resource for assessed work, it is your responsibility to internally verify them and to check with Edexcel that the material you use is suitable. This includes the requirement from September 2014 not to conduct 'interim assessment' within a Learning Aim. You should **not** use the material in this resource for actual assignments unless you have checked their suitability with Edexcel. The awarding body specifies the level of support that students can be given and you **must** check the level of support given in this pack is appropriate to meet these needs and as necessary **adjust and use the resource appropriately to meet these requirements**. Please check for the most up-to-date information from Edexcel at: *http://www.edexcel.com/btec/Pages/default.aspx*. Note that relevant paperwork for practical work, such as observation sheets, should also be obtained from Edexcel. Assignment details and requirements from the awarding bodies sometimes change after their initial published requirements and so you must check that the resource material here is in line with the latest requirements **before use**.

Update (July 2014)
A new 'Important Disclaimer Regarding Assessment' has been added in the introduction.

Update: 2nd edition (February 2015)
Following changes to BTEC assessment rules which affect learners registered from 1st September 2014, this resource has been amended to meet these rules:

- Boxes for resubmission dates have been removed from all assignment briefs (pages 23, 49, 71)

In addition, to meet current assessment rules, essential changes have been made, including:

- Assignment briefs each cover one Learning Aim in full. Therefore:
  - Assignments 1 and 2 have been merged and edited (page 23)
  - Assignments 3 and 4 have been merged and edited (page 49)
  - Assignments 5 and 6 have been merged and edited (page 71)
  - Teacher's Introduction and Suggested Scheme of Work have been amended accordingly (pages 1, 3)
- Text aimed at students does not refer to Level 1 tasks or criteria (pages 25, 51, 73)
- Each assignment task allows students to access the full range of grades (pages 23, 49, 71)

Other amendments: assignments have been renamed to be consistent with the Learning Aims:

- Merged assignments 1 and 2 have been renamed Assignment A (page 23)
- Merged assignments 3 and 4 have been renamed Assignment B (page 49)
- Merged assignments 5 and 6 have been renamed Assignment C (page 71)

Suggested Scheme of Work

GLH	LP	Title
1	1	Variation within and across species
2	2	Classification of organisms
3	3	Interdependence of organisms
4–6	**Assignment A: Relationships between Different Organisms and i*	
7	4	Human activities that alter ecosystems
8	5	How pollutants affect ecosystems
9	6	Living and non-living indicators of pollution
10	7	Measures to reduce impact or reduces the impact of pollut
11–13	**Assignment B: Effects of Human Activity on the Environment a*	
14	8	Infectious diseases
15	9	Non-infectious diseases
16	10	Inheritance of disease
17–18	**Assignment C: Factors that Affect Human Health*	
19–30	***Opportunity for catch-up and obtaining missing assignment cri*	

Learning Aims Note
'All students should' aims are levelled at Level 1 and Pass students, **'most students should'** aims are levelled at Merit students and **'some students should'** aims are levelled at Distinction students.

	G
	S
	S

Sugg	
*	= assig
**	= oppo obta

Lesson Plan 1: Variation Within and Acr

Learning Aims

All students should:	Distinguish between variation due to genes and environmental factors Describe the role of genes and the environment i
Most students should:	Explain the role of genes and the environment ir
Some students should:	Evaluate the impact of genes and the environme of organisms

Keywords: Genetic variation, env m tal variation, genetic mutation,

Starter

Ask stude ook at the person next to them. Ask them to write down s between the two of them, e.g. hair colour, eye colour, etc.

Main

1. Use starter to introduce the concept of individuals being different.
2. Introduce the concept of genetic variation – include a reminder to work in pairs to try to come up with examples of characterist
3. Introduce the concept of environmental variation. Again, ask st
4. Explain how variation leads to evolution through the process of
5. Students can investigate camouflage, a specific adaptation to th practical. Students should scatter 20 black and 20 white counter black and white card. Record how many counters of each colou can find against each card background in 20 seconds. Ask stude the adaptation that each counter had to its background.
6. *Alternative practical*: Adaptations to cold environments. Ask stu water to a beaker with a furry 'coat' created from fake fur or sin beaker without no covering. Students should then measure the beakers at the beginning of the experiment and again after 1, 2, Students can use the data they collect to pl line graph of thei ability of each beaker (the model or s to retain heat.
   Health and safety note: Ask s s to take extra care when meas
7. Explain the co es of natural selection in terms of drivin k o xample.
8. A tudents to answer Questions 1–6.
9. Go over the answers to Questions 1–6 as a class.
10. Ask students to attempt the 'Further Your Learning Activity' ar

Plenary

Ask students to write down two examples of genetic variation and two ex variation from today's lesson.

Variation

Everybody is different; we all have different characteristics. These differences ar
variation and environmental variation.

Genetic Variation

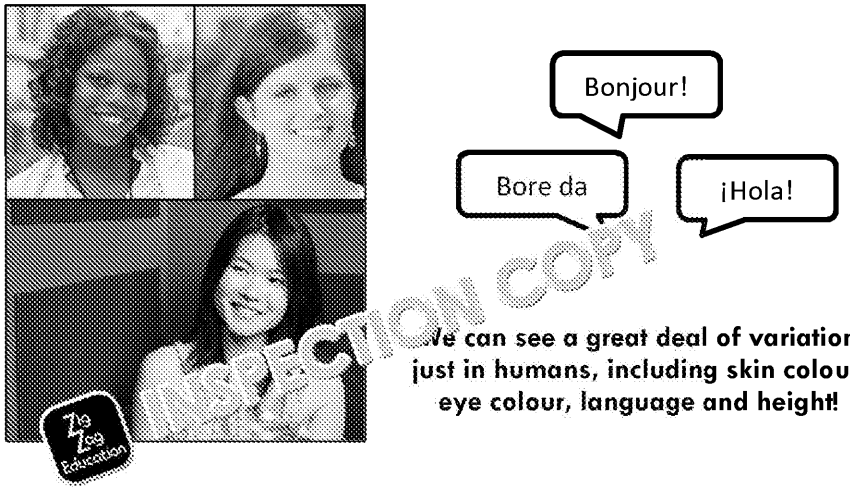
This type of variation is determined by the genes that you inherit from your pare
variation include eye colour, ear lobes that are attached/unattached, dimples in

Environmental Variation

This type of variation is determined by the world around us. For example, the am
our size.

Variation between and within species is mostly the result of a **combination** of genetic and environmental variation. For example, your skin colour is an example of genetic variation as you inherit your skin colour from your parents. However, if you live somewhere sunny, your skin will have a tendency to be darker and this is an effect of the environment and therefore also an example of environmental variation. Furthermore, a person might have a genetic tendency to be slim but if the environment provides access to abundant food, they may become overweight. This is another example of a combination of genetic and environmental variation.

Characteristic caused by genes	Characteristic caused by the environment	Chara gene
• Eye colour • Dimples in cheeks • Shape of the ear lobes	• Scars • Language we use	• We • Hei • Int



We can see a great deal of variation just in humans, including skin colour, eye colour, language and height!

Genetic mutations can be responsible for causing genetic variation. A genetic m
sequence of DNA that codes for a protein. Genetic mutations can be either bene

Variation can lead to a gradual process known as **evolution** by natural selection.

Evolution by Natural Selection

Evolution can be considered an interaction between genes and the environment

A population of the same organism will contain lots of genetic variants (organisms that are genetically different). Variations in genes mean that some of these organisms will be better adapted for their surroundings (environment) than others. This consequently means that they are more likely to survive than those organisms without the adaptation. The reduced survival rate of organisms without the adaptation can be caused by a number of factors including competition for resources, such as food, light, and predation.

In other words, the environment is 'selecting' the individuals with a specific adaptation which makes them suited to their current environment. This process is known as **evolution by natural selection**.

The organisms that are well adapted to their surroundings survive and go on to reproduce, passing their genes on to their offspring, including the genes that make them well adapted. This means that the number of well-adapted individuals increases in the population and can gradually lead to the **formation of an entirely new species**.

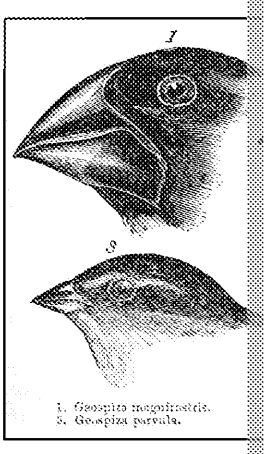
Those individuals without the adaptation may disappear completely. This is known as **extinction**.

Did you know?

*The theory of evolution by na selection was proposed by a **Charles Darwin** in 1859.*

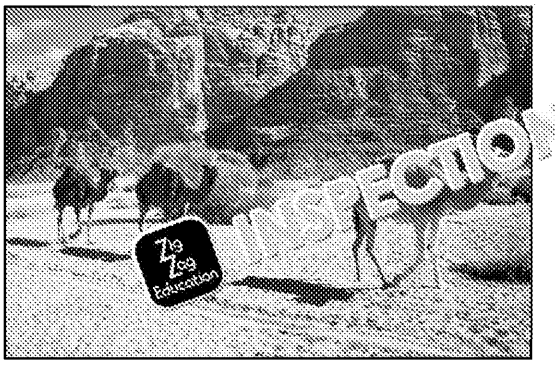
He published his theory in a famous book called **On the O Speci**

At the time, his theory was ve body of evidence now suppor molecular evidence and the f primary explanation for the e the extinction of existing one



Darwin travelled to the Gala and studied a large number differently sized and shaped seeds they fed on. The diffe ***selection*** *as they were the m different types of see*

Adaptation



Think about how the camel is ada in which it lives. It has large flat f fur on the top of its body for shad sand from getting in its eyes, and without water. All of these adapt generations and enable camels t

Another common adaptation is c camouflaged against its backgrou other animals, which is beneficia or if it is being preyed on by a pre

A Gradual Process

Evolution by natural selection is a very gradual (slow) process that occurs over m sudden changes in the environment can have dramatic impacts on species. Whe species cannot evolve adaptations quickly enough to survive and are therefore d

Case Study – The Kakapo

An example that illustrates how changes in the environment can drive a species to extinc
Zealand. The kakapo is a giant, nocturnal, ground-nesting, flightless parrot.

New Zealand used to be an island free from predators of this flightless bird but the arriva
of land mammals which predated it, such as dogs and rats, and animals that compete wi
also led to loss of habitat due to land clearance. These sudden changes meant that the po
reduced.

It was estimated in 2010 that there were only 123 birds remaining, and these have now a
moved off the mainland to islands that are free from predators.

It would take many thousands of generations for this bird t[illegible]ve the ability to fly in
order to adapt to its new environment, by which time it would be too late
as the bird will most likely be extinct.

Variation and Evolution Questions

1. Write a definition for the following terms:
   a) genetic variation
   b) environmental variation
   c) genetic mutation

2. Copy and complete the following passage using the words below:

combination	*genetic*	*variation*	*environmenta*

Variation between individuals is caused by _____ or _____

is caused by a _____of both factors. Different eye colours in a

genetic _____. Variation can also be caused by genetic _____.

3. Decide whether the following characteristics are a result of genetic or
combination of both:
   a) eye colour
   b) hair colour
   c) height
   d) weight
   e) dimples in cheeks

4. What characteris[illegible] environmental factors make the kakapo bird

5. How d[illegible]es determine the basis for many characteristics? Try to us
understanding of genetics in addition to what you have learnt in this

6. Describe the theory of evolution by natural selection.

Further Your Learning Activity: Discuss the following question in pairs: W
important factor in evolutionary change? Then write down all the differen
important you think each factor is, with reasons.

Variation and Evolution Questions

1. Write a definition for the following terms:
   a) genetic variation

   .....

   b) environmental variation

   .....

   c) genetic mutation

   .....

2. Complete the following passage using the words below:

combination	genetic	variation	environmental

Variation between individuals is caused by _____ or _____. Sometimes it is caused by a _____ of both factors. Differences in a population are an example of genetic _____. Variation can also be _____.

3. Decide whether the following characteristics are a result of genetic or environmental factors or a combination of both:
   a) eye colour .....
   b) hair colour .....
   c) height .....
   d) weight .....
   e) dimples in cheeks .....

4. What characteristics and environmental factors make the kakapo bird

   Characteristics .....

   .....

   Factors .....

   .....

5. How do genes determine the basis for many characteristics? Try to us
understanding of genetics in addition to what you have learnt in this

.....

.....

.....

.....

.....

.....

6. Describe the theory of evolution by natural selection.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Further Your Learning Activity: Discuss the following question in pairs: W
important factor in evolutionary change? Then write down all the differen
important you think each factor is, with reasons.

Lesson Plan 2: Classification of Org

Learning Aims

All students should:	Construct simple keys to classify organisms Describe how characteristics are used to classify
Most students should:	Discuss the factors that affect the relationship bet

Keywords: Classification, kingdoms, vertebrates, invertebrates, characteri

Starter

Ask students as a class to give examples of an animal, a plant, a bacterium

Main

1. Introduce the concept of classification of organisms using the or starter exercise.
2. Talk about the characteristics that define each kingdom.
3. Describe the difference between invertebrates and vertebrates. various students to name an example of a vertebrate and an inv
4. Go through the example of an identification key for imaginary
5. Ask students to attempt one of the 'Further Your Learning Activ

Plenary

Classify the following organisms into the correct kingdom.

1.	Lion	*Animals*
2.	*Salmonella*	*Prokaryotes*
3.	*Amoeba*	*Protists*
4.	Yeast	*Fungi*
5.	Conifer	*Plants*
6.	Mushroom	*Fungi*
7.	Jellyfish	*Animals*
8.	Fern	*Plants*

Classification of Organisms

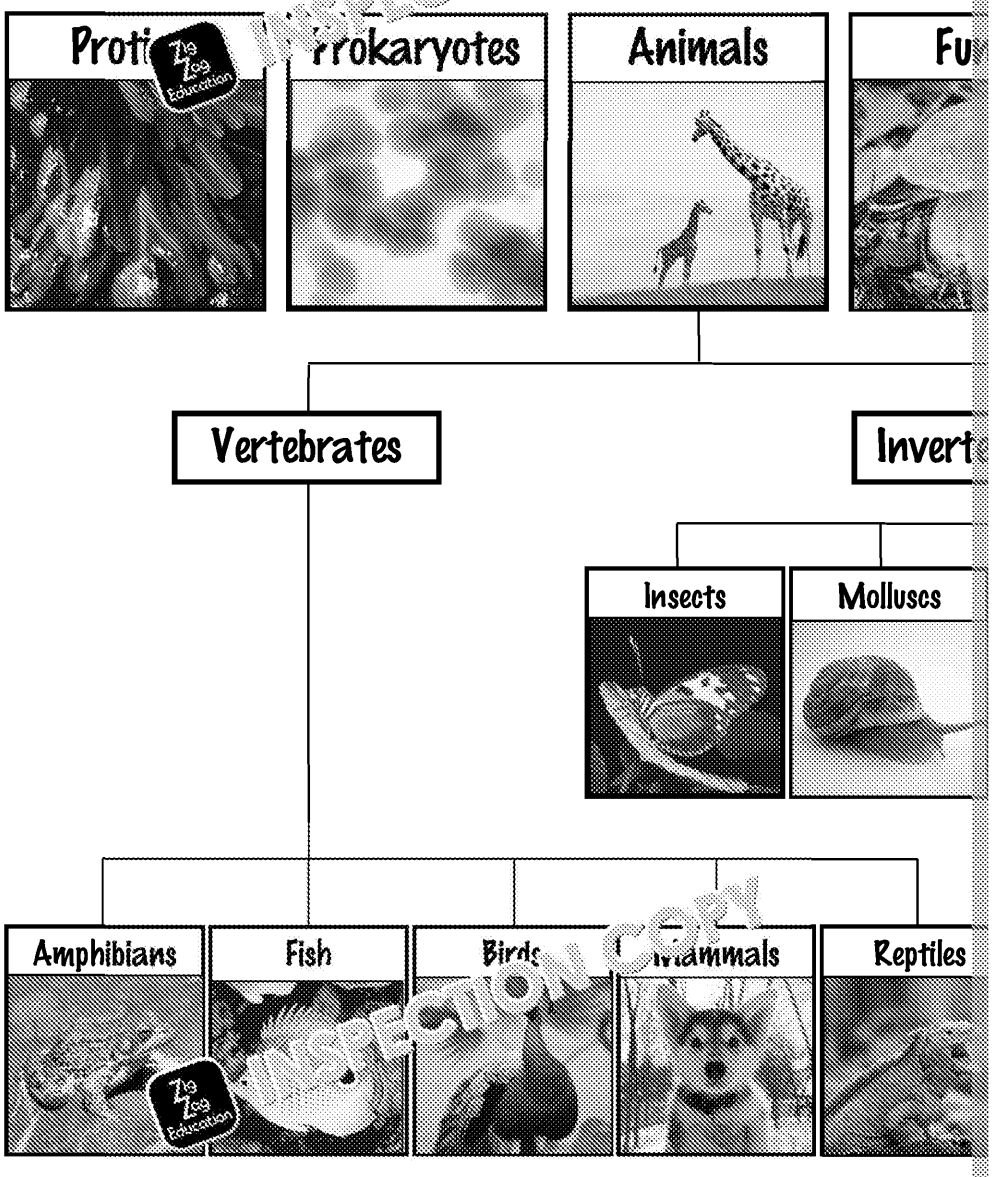
What is Classification?

Classification is the name of the system used to divide living things into groups a characteristics.

Organisms can be classified into five 'kingdoms': **protists**, **prokaryotes**, **animals**, shown in the diagram below.

Animals are further divided into two subgroups – **vertebrates** and **invertebrates** and these subgroups are further divided into insects, bir tiles, etc.

The five kingdoms and the sub oup the animals:



The Main Characteristics of the Kingdoms

Kingdom	Description
Protists	The microorganisms (very small organisms) that don't belong in the other kingdoms, i.e. they are not animals, plants, fungi or prokaryotes
Prokaryo	Organisms that lack a cell nucleus and do not have chloroplasts or other cellular organelles
Animals	Multicellular organisms with cellular nuclei. Require food for survival and have a nervous system
Fungi	Simple organisms with cellular nuclei. Acquire nutrients by releasing enzymes on to the nutrient source and then absorbing the products
Plant	Contain a pigment called chlorophyll which they require to make energy. Their cell walls are made up of a substance called cellulose

Vertebrates and Invertebrates

The animal kingdom can be further divided into two subgroups: vertebrates and

Vertebrates are organisms that have a backbone.

Invertebrates are organisms that do not have a backbone.

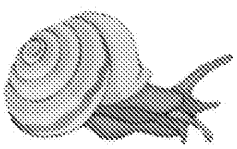
General Characteristics of Vertebrates

- They are symmetrical on both sides with two pairs of limbs, fins, wings, etc.
- They have an internal skeleton.
- They have more developed organ systems than invertebrates.
- They have closed circulatory systems – blood circulates the body in blood vessels.
- Their heart consists of 2–4 parts.
- The body is covered with skin.

Amphibians	Fish	Birds	Mam
• No scales, hair or feathers • Lay eggs in water • Cold-blooded • Live both in and out of water	• Skin covered with scales • Lay eggs in water • Cold-blooded • Breathe through gills	• Skin covered with feathers • Lay eggs • Warm-blooded • Have wings	• Skin cove hair • Give birt offspring • Warm-bl • Have ma (milk-pro glands

General Characteristics of Invertebrates

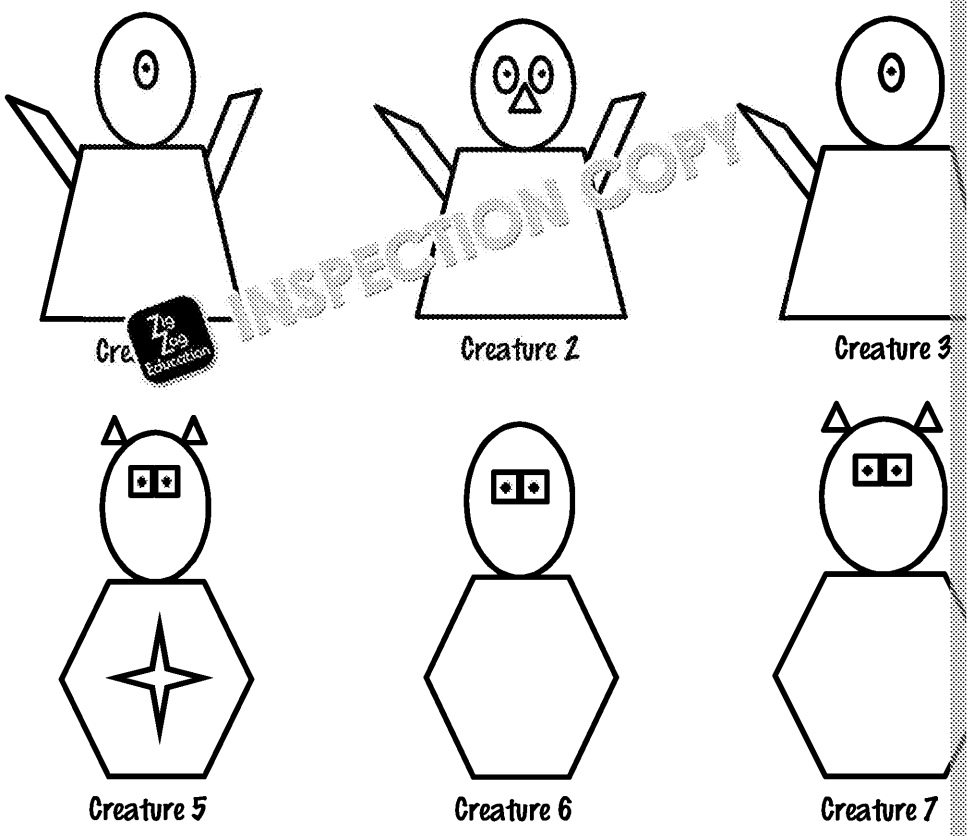
- They lack a backbone.
- They have a simple nervous system.
- They are either radially symmetrical or bilaterally symmetrical.
- Some have an exoskeleton – a hard outer covering that protects them from predators and prevents water loss.



Identification Keys

Biologists use special diagrams or sets of questions called 'keys' to help them ide
recognise. The organisms can then be classified according to their characteristics

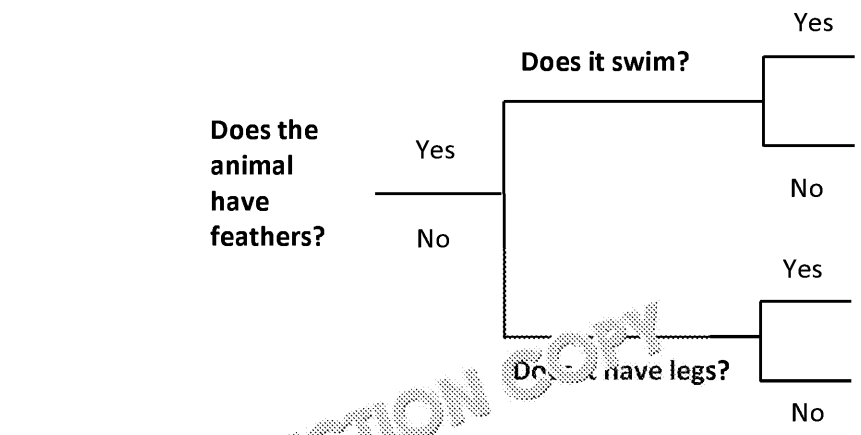
Look at the creatures below.

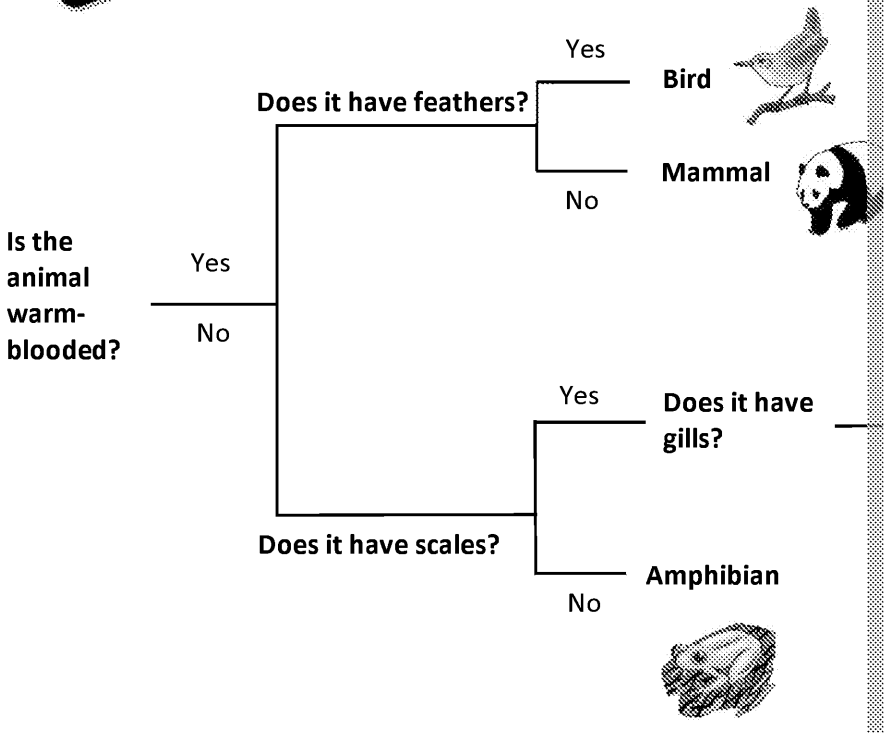


Here is an example of a key that can be used to identify the creatures above.

Part 1	a)	The creature has a trapezoid-shaped body .....
	b)	The creature has a hexagonal-shaped body .....
Part 2	a)	The creature has one eye .....
	b)	The creature has two eyes .....
Part 3	a)	The creature ha[illegible] .....
	b)	The [illegible] two arms .....
Part 4	a)	The creature has a nose .....
	b)	The creature has no nose .....
Part 5	a)	The creature has two ears .....
	b)	The creature has no ears .....
Part 6	a)	The creature has a star on its body .....
	b)	The creature does not have a star on its body .....
Part 7	a)	The creature has a mouth .....
	b)	The creature has no mouth .....

Keys can also be represented as **branch diagrams**. Take a look at the examples b





Keys can also be used to help identify food chains and fo[illegible]ebs. These will be

Further Your Learning Acti[illegible]es

1. Try drawing yo[illegible]aginary creatures, give them names and ma[illegible] your f[illegible]ca[illegible]se it to identify the creatures you have created.
2. Consti[illegible]key to identify some animals of your choice and explain w[illegible] characteristics to classify them.

Lesson Plan 3: Interdependence of Or

Learning Aims

All students should:	Construct food chains and food webs Describe the different ways in which organisms
Most students should:	Discuss the factors that affect the relationship be
Some students should:	Evaluate the impact of genes and the environme of organisms

Keywords: Food webs, food chains, predators, prey, producers, consumer

Starter

Recap of p s lesson – class mind map – five keywords from last lesso

Main

1. Go over the starter exercise.
2. Introduce the concept of interdependence between species.
3. Talk through food chains and food webs.
4. Assess students' understanding by asking questions like: What would rabbits if the bird of prey was removed from the top of the chain? Wh on the grass? and so on.
5. Discuss other relationships between species aside from predato
6. Show YouTube video clip of fish symbiosis – wrasse cleaning the teet **http://www.youtube.com/watch?v=TOC2Qc2Qedw&feature=related**
7. Show BBC video clip of flowering *Rafflesia arnoldii*: **http://www.bbc.co.uk/nature/adaptations/Parasitism#p00hm598**
8. Ask students to answer Questions 1–6.
9. Go over the answers to Questions 1–6 as a class.
10. Ask students to complete the 'Further Your Learning Activity'.

Plenary

Nominate one student to answer the following question: 'What is a predat

Then ask them to ask another person in the class a question of their choice

Interdependence of Organism

Many organisms in an ecosystem rely on each other for survival, i.e. the survival o existence of the other. This is known as **interdependence**.

The environment that organisms inhabit has an effect on whether they survive or are driven to extinction. For example, extinction of species *X* could lead to the extinction of a species that relied on it for food. Equally, the extinction of species *X* could lead to the improved survival of another species due to less competition for resources or fewer predators.

Did you know?

A predator *is an an*

Prey *are animals th*

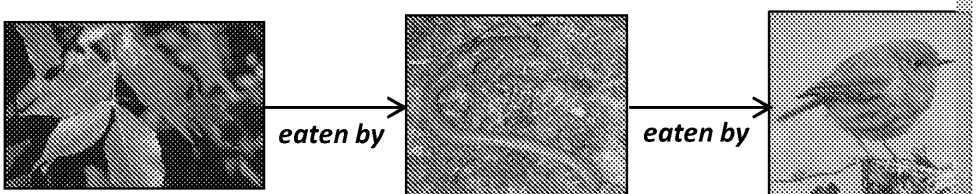
nimals

This can be seen most clearly when investigate predator–prey relationships a food chains and webs.

Food Cha

Food chains show how energy is transferred between organisms. The **arrow indi transfer**.

An example of a woodland food chain:



Leaves **Worm** **Robin**

We can classify organisms according to whether they get their energy from the s and animals. In other words, **the characteristics of organisms can be used to det chains or webs**.

Organisms that convert light energy from the sun into food energy are known as bottom of food chains. The producer in the food chain above is the grass. Produc food and ultimately provide the energy for everything else in the food chain. Pla carbon dioxide, water and light energy in a process known as photosynthesis.

Animals, however, are all considered to be **consumers**. They can't make their ow therefore must consume food for energy. This means the y found at higher le consumers in the food chain above are the worm the robin and the hawk. Consu three groups: primary, secondary and tertiary consumers.

Primary consumers are herbivores – they eat the producers.

Secondary consumers are carnivores and they eat the primary consumers.

Tertiary consumers are also carnivores; they eat the secondary consumers and a sometimes referred to as the **top carnivore** because they are at the top of the fo chain. The top carnivore in the example above is the hawk.

Predator–prey relationships are much more complicated than shown above, as n predators eat more than one type of prey and they may have to share those prey sources with other predators.

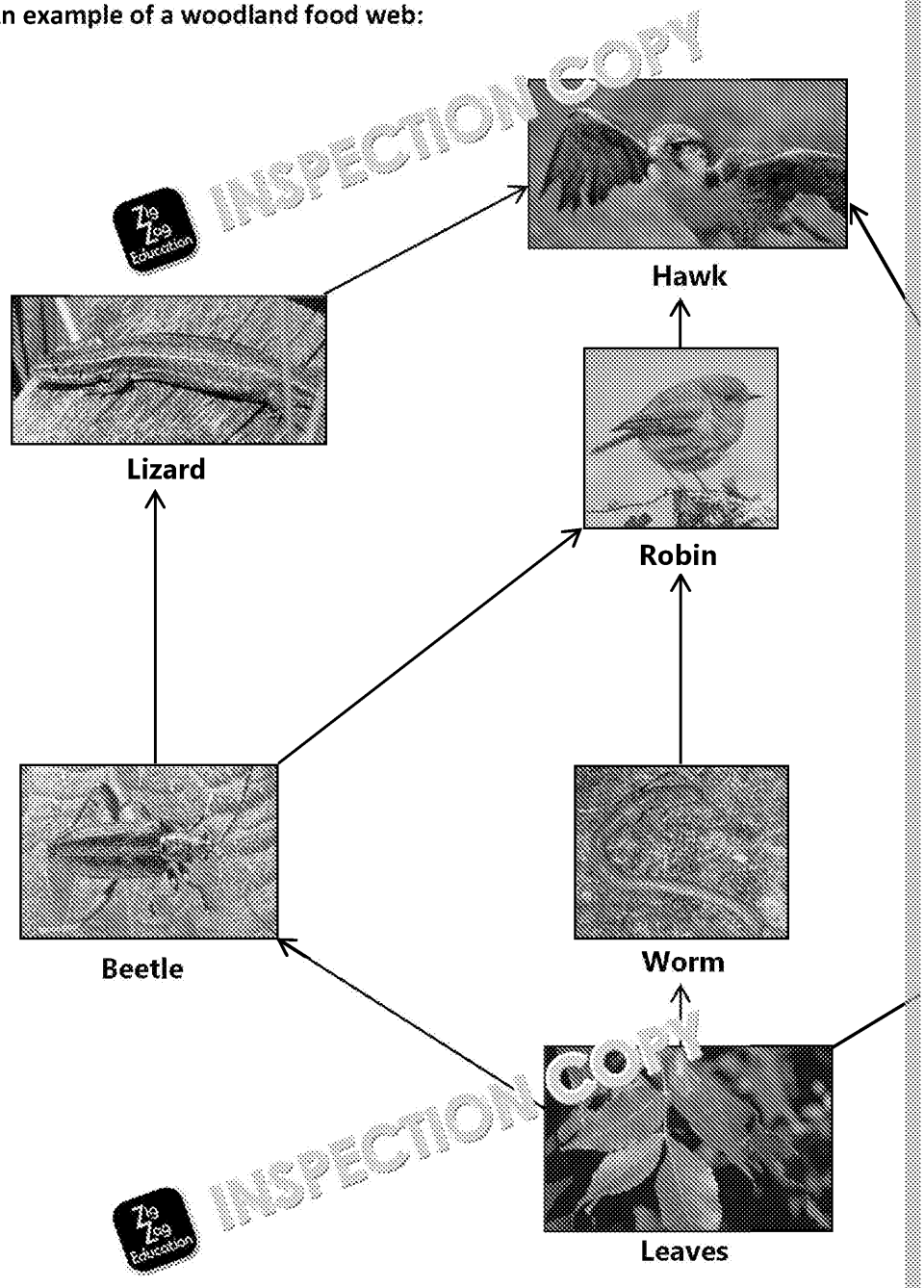
These more complex, interlinked relationships can be illustrated using a **food we**

Food Webs

Again, as in food chains, the **arrow indicates the direction of energy flow**. Here w
and vole are all competing for the same food resource, leaves. The vole only has
two. The hawk has a choice of three items of prey and no competition from anot

The balance of these interlinked relationships can easily be disturbed. The remov
below can impact all the other organisms in the food web.

An example of a woodland food web:

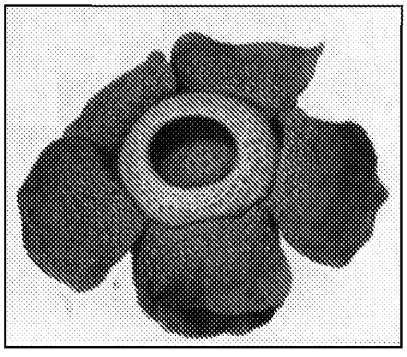


Other Relationships Between Species

Predator–prey relationships aren't the only relationships that exist between spec

For example, there are **mutual relationships**. These are relationships in which tw existence of one another. An example of this is the cleaner fish and its 'client'. Cl parasites off the surface of other fish, the so-called 'client'. This maintains the he cleaner fish avoids predation and obtains a free meal!

Another example of a mutual relationship is that of pollination in flowers. The nectar or pollen of the flower provides the pollinator with a food source and the pollinator disperses the plants pollen, aiding the plants reproduction. The mutual relationship between pollinating insects and flowers is one of the most important in biology. We rely on pollinating insects to pollinate flowers and provide the food we eat, so if pollinating insects become extinct or are greatly reduced in numbers, the plants will not be pollinated and we will be in big trouble.



Parasitic relationships are relationships in w benefits at the expense of another (the host Disease outbreaks in a population can have sizes and knock-on effects for the rest of the indeed ecosystem. An example of a parasitic ***Rafflesia arnoldii*** flower and its host vine. T parasite. It obtains its nourishment through nutrients; it also uses the vine for physical s Earth with a diameter of approximately 1 m the 'corpse flower' because it smells of rotti

Another example of a parasitic relationship in biology is that of the tapeworm an internal parasites that usually live in the intestine of their host. They feed on the tapeworm infection can cause symptoms such as nausea, weight loss and malnu the tapeworm cannot survive.

D

Assignment tips: If you are working towards a Distinction in your assignmen give evidence relating to how an organism's genes and environment influence able to evaluate this evidence by considering how important genes and the env extinction of a species and the formation of new ones.

To help you do this, you should think about the role that genes and the environ could consider genetic mutations, selection pressures and how the different rel organisms affect the environment. You can gather this information from your no but it is important to think really carefully about the concepts involved and c interpret it – this will really impress your teacher!

Interdependence of Organisms Questions

1. Arrange the following list of organisms into a food chain:

   frog *hawk* *snake* *small fish*

2. Arrange the following list of organisms into a food web:

   grasshopper *owl* *ladybird*
   aphid *caterpillar* *small bird*

3. Consider the food web you have just drawn. Label the producer and t

4. Copy and complete the following passage using the words below:

benefits	*two*	*mutual*

_____ relationships are relationships in which _____ sp

of one _____. Parasitic relationships are relationships in which one o

the _____ of the other.

5. Use your knowledge of keys and classification from last lesson to des
   organisms determine their place in a food chain / food web.

6. Create a diagram to show details of mutual or parasitic relationships.

Further Your Learning Activity: Work in pairs to create a magazine article
affect relationships between organisms. Make sure that you split the work

Interdependence of Organisms Questions

1. Arrange the following list of organisms into a food chain:

frog *hawk* *snake* *small fish*

2. Arrange the following list of organisms into a food web:

grasshopper *ladybird*
aphid *caterpillar* *small bird*

3. Consider the food web you have just drawn. Label the producer and t

4. Complete the following passage using the words below:

benefits	*two*	*mutual*

_____ relationships are relationships in which _____ sp
of one another. Parasitic relationships are rel[illegible]ps in which one
the _____ of the oth[illegible].

5. Use your knowledge of keys and classification from last lesson to des
organisms determine their place in a food chain / food web.

.....

.....

.....

.....

.....

.....

6. Create a diagram to show details of mutualistic or parasitic relationships.

Further Your Learning Activity: Work in pairs to create a magazine article
affect relationships between organisms. Make sure that you split the work

Assignment A: Relationships between Different Organisms a

Learner's name:		
Start date:	Deadline:	Da

Scenario

You have always been passionate about wildlife and nature. After graduating science degree, you started work as a runner for a wildlife programme at the line manager has been very impressed with your work and you are thrilled wh You start work as a natural history presenter and your first task is to share you biology with the BTEC students at your local school. In the, your next task is nature documentaries to be broadcast to a national audience. You travel to Br titled 'Biodiversity in the Amazon R e

Task 1

Firstly pre presentation to share your knowledge of evolutionary biolo your local s . After that, present and film the first episode of a series broadcast to a national audience.

For the presentation to BTEC students:

Write the script that you will read to the students during your presentation. Begin by discussing some examples of variation that exists between the orga discuss the variety that exists between plants, animals and microorganisms, in different habitats. Explain to the students why this variation exists and giv between organisms. Then explain whether the organism's genes or environm examples you have given.

Remember to think about the different characteristics of organisms you have st characteristics.

Then go on to describe and explain to the students how both an organism's g determine which characteristics it will display. Give some examples of charac are caused by genes and explain how they can also be influenced by the facto to in its environment.

Remember to explain how an organism's genes can determine the characteristi by drawing a genetic diagram for a particular characteristic you have studied diagram shows that genes are important.

You then decide to explain the basis behind your greatest passion to the stud by natural selection. Start by introducing the role of genes in evolution and e so important for evolutionary change. Then describe the importance of the en how it affects species survival. Finish this part of the script by explaining how selection has been for life on Earth.

Conclude by assessing ho nt genes and the environment are for the species extinc discussing the contribution of each factor in evol up with ev which you could gather from your notes or from additiona evidence an e a judgement about which factor has been more importan species and the extinction of other species. Why have you come to this conclu

Remember to relate your answer to the influence that genes and the environme Think about the contribution each factor has on evolutionary change and reme contributing factors you have studied, including genetic mutations and variatio

For the first episode of 'Biodiversity in the Amazon Rainforest':
Present and film the episode 'Biodiversity in the Amazon Rainforest'. If you d
recording equipment, you should present the episode to your teacher. You sh
identifying some common rainforest species and the relationships between t

Part 1: The Characteristics of Rainforest Organisms
Begin the episode by introducing some examples of rainforest organism
kingdoms, including both vertebrates and invertebrates. Then explain to
which category each organism belongs to, based on its characteristics. U
you construct keys to identify and categorise the rainforest organisms. T
organism and explain to the audience how you can use your key to find o

Describe to the audience how you used the characteristics of the rainfore
into the correct groups. Remember to describe how you did this for each
vertebrate and invertebrate organisms.

Part 2: Relationships between Rainforest Organisms
After introducing the rainforest organisms to the audience, you go on to
characteristics determine the relationships that exist between them. Sta
knowledge to construct a simple rainforest food chain and a rainforest fo
pictures of the organisms to help make your food chain and food web m

Then go on to explain to the audience how the characteristics of each of
allowed you to identify their place in the food chain and food web. You s
other relationships that exist between organisms in the rainforest and h
each other for survival.

Conclude the episode by discussing why these interdependent relationsh
important these relationships are, and discuss why organisms rely on ea
*Think about all of the relationships you have studied and why these may b
in the rainforest. Remember to discuss non-feeding relationships as well th
a food chain / food web.*

Learner's name:	Start Date:

Learner's declaration:
I certify that the work submitted for this assignment is my own. I have clearly refer
work. I understand that false declaration is a form of malpractice.

Learner's Signature: Date:

Learner's comments for the assessor:

Teacher's/assessor's name:

Marking Criteria		
Task:	**Criteria:**	**Learner must:**
Task 1	**2A.P1**	Describe the role of genes and the environment in variation
	2A.M1	Explain the role of genes and the environment in evolu
	2A.D1	Evaluate the impact of genes and the environment on survival or extinction of organisms
	2A.P2	Describe how characteristics are used to classify organ
	2A.P3	Describe the different ways in which organisms show interdependence
	2A.M2	Discuss the factors that affect the relationship betwee different organisms

Deadline:

Summative feedback:

Date assessed:

Internal verifier's name:

Internal verifier's feedback:

Date:

If a learner [illegible] the Level 2 criteria, they can be assessed on the Level	
1A.1	Distinguish between variation due to genes and variation due to environm
1A.2	Construct simple keys to classify organisms
1A.3	Construct food chains and food webs

Lesson Plan 4: Human Activities that Alte

Learning Aims

All students should:	Identify human activities that affect an ecosyste Describe the impact that different human activit
Most students should:	Analyse the effects of pollutants on ecosystems
Some students should:	Explain the long-term effects of pollutants on liv

Keywords: Human impact, ecosyste[illegible]orestation, agriculture, transpo

Starter

Recap of p[illegible]s lesson. Ask students to give an example of a relationshi

Main

1. Explain what an ecosystem is in terms of communities of specie
2. Introduce the concept of deforestation – stress the significance o
3. Talk about the effects of agriculture in terms of methane emissio
4. Remind students what the greenhouse effect is.
5. Teach about the effects of transport on ecosystems.
6. Ask students to answer Questions 1–5.
7. Go over the answers to Questions 1–5 as a class.

Plenary

Decide if the following statements are true or false.

1. Ecosystems can be different sizes. *Tru*
2. Human activities aren't having an effect on e[illegible]ns. *Fals*
3. Deforestation makes carbon dioxide l[illegible]ecrease. *Fals*
4. Cows contribute to glob[illegible]. *Tru*

Ecosystems

What is an ecosystem?
An ecosystem can be defined as a community of plants, animals and microorgan
environment (habitat) that they live in. Ecosystems exist on different scales – for
of a micro ecosystem. Larger ecosystems are known as biomes. Examples of thes
grassland and mountains.

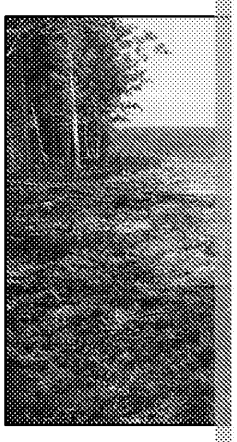
Whatever their size, all ecosystems exist in a very delicate balance and human ac
consequences.

Human Impact on Ecosystems

Humans are altering ecosys[illegible] number of ways. An exploding global popul
agricultural space to [illegible]od and demands for energy are increasing rapidly. T
the world a[illegible]us. Our activities are affecting organisms in a number of ways.
environmen[illegible]having an impact on species survival, the pollutants we are pro
chains and food webs, and eventually our actions will begin to affect the human
points will be covered over the next few lessons when we will discuss different p

Deforestation

Deforestation is the removal or destruction of areas of forest or woodland. Deforestation is believed to be necessary in order to provide building materials such as timber, enough land to build on and space for agriculture to provide food to support the growing global population.



Defor

Deforestation has a number of worrying consequences:

1. **Loss of biodiversity** (variety of life) – destruction of forests destroys the habitats of living organisms, causing the loss of many species. For example, destruction of tropical forests in Borneo is driving the orang-utan towards extinction.
2. **Adds to atmospheric carbon dioxide levels** – when trees grow, they act as stores for carbon dioxide. However, when they are burned or decay as a result of deforestation, they release the carbon dioxide that was stored in them into the atmosphere.

   Furthermore, if there are fewer trees growing [illegible]er are fewer trees to absorb and store carbon dioxide. Not only does the loss of the trees themselves contribute to increasing carbon dioxide levels, but the machines used to cut them down and transport them release the use of fossil fuels. Therefore, deforestation is one factor that is driving climate change.

Did you know
Rainforest onc
Earth. Now on

Scientists estim
approximately
rainforest defo

Deforestation also affects water cycles and reduces soil quality.

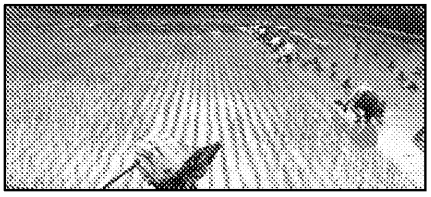
Reminder:
In Unit 2, you will have studied the **greenhouse effect**. Remember that greenhou
in the atmosphere, causing the planet to heat up, an effect known as **global war**
gases include **carbon dioxide** (CO_2) and **methane** (CH_4).

Possible effects of global warming include a rise in sea levels due to the polar ice
disruption of weather and climate patterns. All of these consequences of global w
impact on ecosystems.

Agriculture

Not only does farming require large amounts of la[illegible] crops on or graze li
deforestation; certain farming practices [illegible]ease the amount of harmful gase
contribute to global warming.

Farming ca[illegible] ov[illegible]duce large amounts of methane. Methane is a gas
that contrib[illegible] global warming.



Rice growing – paddy fields, the swamped fi
large amounts of methane into the atmosph

Machinery – agricultural machinery used to prepare land for crops or to transport livestock uses fossil fuels which pollute the atmosphere.

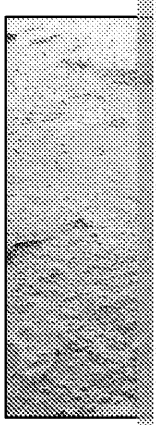
Did you know?
Agriculture is estimated to be responsible for 14
world's greenhouse gas emissions.

Cows contribute 25–30% of Britain's methane em

Transportation

Transport affects ecosystems in a number of ways:

- Emissions from **cars**, such as carbon monoxi[illegible]d[illegible]bon dioxide, pollute the atmosphere an[illegible]bute to global warming.
- Much of the food [illegible]comes from abroad and requires transp[illegible]ae[illegible]lanes. Aeroplanes are responsible for a large a[illegible]of emissions that contribute to global warming.
- Petrol comes from crude oil and sometimes the transport of oil across the sea ends in disaster. **Oil spills** can devastate marine ecosystems.
- Furthermore, the **roads** we build break up habitats which might result in biodiversity loss and provide routes for pests and disease to spread.



O
mar

Human Activities that Alter Ecosystems Questions

1. Give the definition of an ecosystem.
2. Give two examples of large types of ecosystem.
3. What are the two main effects of deforestation?
4. How does agriculture contribute to global warming?
5. Much of the fruit we like to eat all year round comes from abroad and
   How could we reduce the amount of environmental damage caused b

Human Activities that Alter Ecosystems Q

1. Give the definition of an ecosystem.

   .....

   .....

2. Give two examples of large types of ecosystem.

   1 ..... 2 .....

3. What are the two main effects of deforestation?

   1 .....

   2 .....

4. How does agriculture contribute to global warming?

   .....

   .....

5. Much of the fruit we like to eat all year round comes from abroad and
   How could we reduce the amount of environmental damage caused b

   .....

   .....

   .....

Lesson Plan 5: How Pollutants Affect E

Learning Aims

All students should:	Identify human activities that affect an ecosyster Describe the impact that different human activit
Most students should:	Analyse the effects of pollutants on ecosystems
Some students should:	Explain the long-term effects of pollutants on liv

Keywords: Fertilisers, eutrophication, herbicides, pesticides, bioaccumula

Starter

List 10 sci words we talked about last lesson.

Main

1. Brief recap of previous lesson using students' starter lists.
2. Go over the eutrophication process – use diagrams on the board
3. Choose one of the following two-week windowsill experiments

   Experiment 1: Ask students to half fill two beakers with pond wa ammonium nitrate (fertiliser) into one of the beakers. Students s water, label them appropriately, place the beakers on a sunny w reduce evaporation. Ask students to check the jars every lesson record what they see.

   Experiment 2: Ask students to half fill four beakers with water a Students should add different amounts of monoammonium pho 0, 5, 10, or 20 drops, stir the solution and record the amount of d beakers using a dissolved oxygen sensor. Ask students to place windowsill and cover them to reduce evaporation. Students sho lesson for the next two weeks, record what they see and record
4. Introduce the terms herbicide, pesticide and bioaccumulation.
5. Use the Minamata Bay case study as a general example of bioac
6. Use DDT case study as an example of bioaccuumulation of pest
7. Ask students to work in pairs to do their own research on the effects o
8. Ask students to answer Questions 1–8.
9. Go over the answers to Questions 1–8.
10. Ask students to attempt one of the two 'Further Your Learning

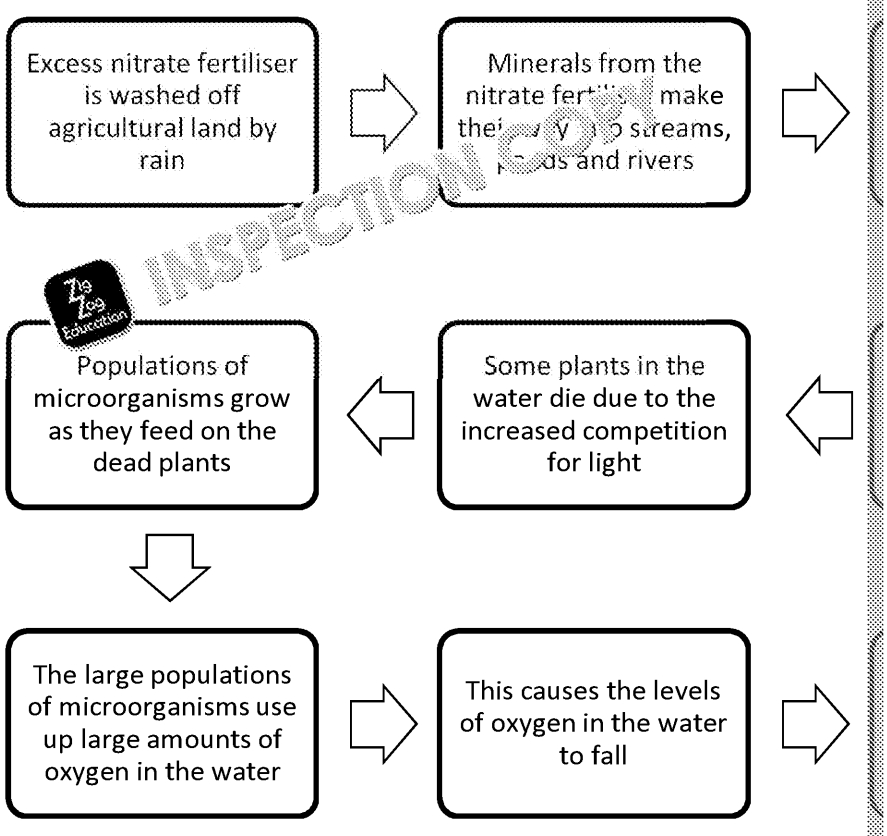
Plenary

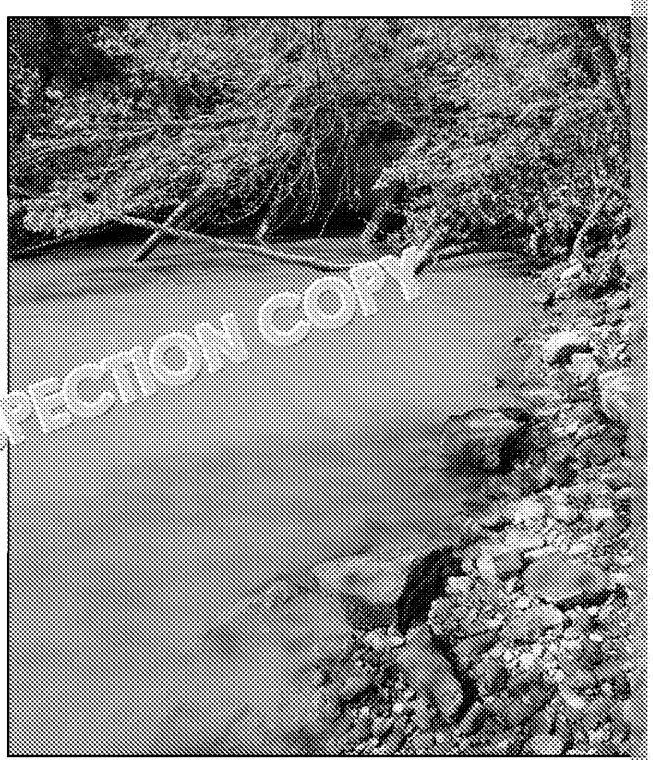
Nominate students to give the definition of the following words:
eutrophication, herbicide, pesticide, bioaccumulation

The Effect of Pollutants on Ecosys

Fertilisers and Eutrophication

Farmers use fertilisers to give their crops the extra nutrients they require to grow phosphates which might be missing from the soil. However, the overuse of fertili on aquatic ecosystems through a process known as **eutrophication**. The process below and begins when too much fertiliser is used on the land.





The water in this river is green, which shows th extent of algal growth due to eutrophication

Use of Herbicides and Pesticides

Farmers use chemicals called **herbicides** and **pesticides** to help them control weeds and pests that might destroy their crops. Unfortunately, many of these chemicals are toxic to living organisms and can build up in food chains. When chemicals build up in food chains, the term **bioaccumulation** is used. Bioaccumulation tends to affect the top predator in food chains.

Key Terms

Herbicide – A chemical that kills plants that are considered to be weeds

Pesticide – A chemical that kills organisms, usually in[illegible], which cause damage to crops

Bioaccumulation – The build-u[illegible] substances in an organism / food chain

Case Study – Bioaccumulation and the Poisoning of Minamata Bay

Minamata is a small fishing village in Japan. During the 1950s, the people who lived there unexplained symptoms such as damaged hearing and speech, insanity and, in extreme ca cats in the village had been reported to be 'dancing' in the streets, collapsing and falling in strange symptoms was later identified to be mercury poisoning, but the mystery was how and cats. The source of the mercury was later discovered to be industrial waste water fr from this water had bioaccumulated in fish and shellfish – the food source of the local po like mercury cannot be broken down by animal bodies and so it is stored in the tissues. T the food chain, the higher the concentration of the dangerous substance, so the organism the worst affected.

Case Study – The Effects of DDT

DDT is a particularly powerful pesticide that was widely used in agriculture from the 195

Its use in agriculture is now banned as it has been found to have many damaging effects primary target. For example, research has found that bioaccumulation of DDT in the food eggshells of birds of prey. Furthermore, it is toxic to many marine animals, including fish. S hormone disruption in humans.

Despite the ban, DDT is still used illegally in parts of India and North Korea. Many African use DDT to control mosquitoes, which are insects that carry the disease malaria. Malaria disease that causes flu-like symptoms. Without treatment, it can develop into a more seri and is estimated to kill one million people per year, mostly in su[illegible]aran Africa, where t cannot be afforded but DDT is an accessible substance t[illegible]ntrol the disease.

There are, however, alternatives to usi[illegible]s such as DDT for mosquito control. T using bed nets at night and de[illegible] mosquito breeding grounds.

D

Assignment tips: If you are working towards a Distinction in your assignmen knowledge together with additional research to explain how the continued rele ecosystems in the future. To do this, you could discuss how the continued rele both humans and entire ecosystems in the future. Remember that we rely on e survival, so most ecosystem damage affects us, even if it doesn't do so directly. your answer, including the effects on food chains and food webs and how this extinction of entire species.

How Pollutants Affect Ecosystems Questions

1. Copy and complete the following passage using the words below.

bioaccumulation	*herbicides*

_____ are chemicals that kill weeds. _____ are chemicals that kill

Some of these chemicals build up in the food chain. This is known as

2. Why do farmers use fertilisers?
3. How can the use of fertilisers lead to the death of fish in streams, pond
4. What is DDT?
5. Why was the use of DDT in agriculture banned?
6. Why do some countries still use DDT? Do you think this is a good idea opinion? What alternatives do you suggest?
7. Create a table to summarise the human activities that affect the ecosys and how they affect the ecosystem.
8. Do your own research and write a brief report that explains the long-t have on living organisms and ecosystems. Mention species survival a food chains/webs, and provide information that illustrates the effects.

Further Your Learning Activities: Choose one of the following activities t

- Carry out your own research at home into how the overuse of fertilise Find some data that shows the effect that fertilisers are having on the you can tell this from the data. Write up your findings in a short repo
- Carry out your own research at home into how increased levels of car global temperature. Find some data that supports this and write up y

How Pollutants Affect Ecosystems Que

1. Complete the following passage using the words below.

bioaccumulation	*herbicides*

_____ are chemicals that kill weeds. _____ a
organisms that destroy crops. Some of these chemicals build up in the
_____.

2. Why do farmers use fertilisers?

.....

.....

3. How can the use of fertilisers lead to the death of fish in streams, pon

.....

.....

.....

.....

.....

.....

4. What is DDT?

.....

.....

5. Why was the use of DDT in agriculture banned?

.....

.....

.....

.....

6. Why do some countries still use DDT? Do you think this is a good idea? Give reasons for your opinion. What alternatives do you suggest?

.....

.....

.....

.....

7. Fill in the table below to summarise the human activities that affect the environment, the pollutants produced and how they affect the ecosystem.

Human activity	Pollutants produced	How they affect the ecosystem

8. Do your own research and explain the long-term effects that pollutants have on individual organisms and ecosystems. Mention species survival and the effect of pollutants on food chains/webs, and provide information that illustrates the effects.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Further Your Learning Activities: Choose one of the following activities to do:

- Carry out your own research at home into how the overuse of fertilisers affects rivers. Find some data that shows the effect that fertilisers are having on the environment. Explain how you can tell this from the data. Write up your findings in a short report.
- Carry out your own research at home into how increased levels of carbon dioxide affect global temperature. Find some data that supports this and write up your findings.

Lesson Plan 6: Living and Non-Living Indica

Learning Aims

All students should:	Identify living and non-living indicators and the measure Describe how living and non-living indicators ca pollutants

Keywords: Lichens, sulphur dioxide, acid rain, limestone, water pollution dissolved oxygen levels, nitrate levels

Starter

Class brainstorm on bo[illegible] some pollutants.

Main

1. Introduce the concept of bioindicators.
2. Talk about lichens and how they are affected by pollutant levels students some real examples of lichens. Take the class outside t find in the school grounds.
3. Talk about water pollution and how it can be detected through freshwater shrimp populations.
4. Introduce the concept of non-living things also acting as indicat example of acid rain and limestone buildings.
5. Illustrate the effects of acid rain. Pipette 2 mol sulphuric acid (re a piece of limestone (representing the building), and ask studen
6. Investigate the effect of acid rain on plant growth. Ask students one of concentrated lemon juice, one of dilute lemon juice and o and label these A, B and C respectively. Students should label th and water each plant with four tablespoons of the correspondin labelled 'A' with solution marked 'A'. Place the beans on a wind their solution every lesson for two weeks. K[illegible] a diary of what they are watered. Goggles must be [illegible] oughout.
7. Ask students to ans[illegible]ions 1–8.
8. [illegible]er [illegible]ers to Questions 1–8 as a class.
9. Ask students to attempt the 'Further Your Learning Activity' in

Plenary

True or false?

- Lichens are not living things.
- Lichens are sensitive to sulphur dioxide levels.
- When acid rain falls on limestone buildings, a chemical reaction takes p

Indicators of Pollution

Both living and non-living things can act as indicators of pollution in an ecosyste
see changes in the environment are known as **bioindicators**.

Living Indicators

Lichens and Sulphur Dioxide

Lichens are unusual organisms that are made up of two components –
a fungus and an alga, that work together to survive. You may not have
noticed lichens before, but they grow almost everywhere a
can often be found on pavements, walls and gravesto
their nutrients from the atmosphere rather
change in the atmosphere causes
respond very quickly to ch

In areas wh
(SO$_2$) are hig
released into the atmosphere when we burn fossil fuels. It is also
emitted from car exhausts. Lichens that are present will be those that
are very resistant to pollution, known as crustose lichens.

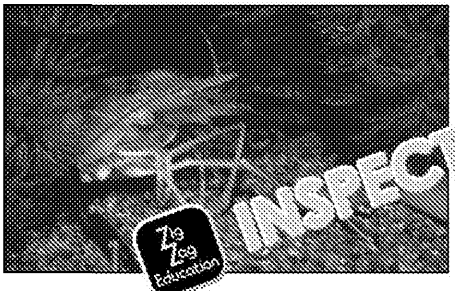
Where air is clean, shrubby, hairy and leafy (foliose) lichens will be
abundant.

Algae and Freshwater Shrimp and Water Pollution

If we take a sample of water from a stream, river or pond, the organisms contain
the condition of the water, i.e. how clean or how polluted it is.

Two organisms that can give us an indication of this are algae and freshwater shr

Algae can be used to detect water acidity, sewage and fertilisers, heavy metals a
in a water source can tell us about the level of pollution in that water source. If t
likely that there are high levels of toxic chemicals in the water which have killed
huge algal growth, it indicates that the water source has been polluted by a diffe
encouraged them to grow – fertiliser! A water source with normal conditions sho



Freshwater shrimp are sensitive to the levels of pollutants the in the watercourse they live in

The presence of **freshwater shrimp** in a s
water is clean. Th
levels of poll

Non-Living Indicators

Limestone Buildings and Acid Rain

Acid rain is formed when sulphur dioxide (SO_2) reacts with water and oxygen in the atmosphere to form sulphuric acid. Acid rain is rain with a pH of less than 5. When acid rain falls, it can damage buildings as well as living things.

You should know from your Chemistry studies that, when an acid meets a carbonate, they react.

Limestone is an example of a carbonate, so when acid rain falls on buildings made of limestone, it dissolves the stone, causing erosion and damage to the building. Large amounts of erosion indicate high levels of acid rain.

It is important to note that acid rain does not only damage buildings; it also damages trees and whole ecosystems.

Dissolved Oxygen and Nitrate Concentrations and Water Pollution

Oxygen dissolves in water through diffusion from surrounding air, aeration of wa photosynthesis. Fish and other aquatic organisms require dissolved oxygen for re oxygen dissolved in water through their gills or across their skin. Pollution causes oxygen concentrations, so the dissolved oxygen concentration of water samples pollution. Low dissolved oxygen levels indicate high levels of pollution.

Water samples can also be tested for concentration of nitrates. This is another e or pollution. As we learned in our previous lesson, high nitrate levels in water lea depletion of dissolved oxygen. Therefore high nitrate concentration in water ind pollution.

Indicators of Pollution Questions

1. What is a bioindicator?
2. Give an example of a bioindicator.
3. What pollutant are lichens particularly sensitive to?
4. What happens to lichen populations if levels of pollutant are high?
5. Name two bioindicators used to detect levels of water pollution.
6. Give an example of a non-living indicator of pollution.
7. Why does limestone corrode when acid rain falls on it?
8. Copy and complete the following table to summarise what you have l

Indicator	Living/Non-living	
Lichen		L
Freshwater shrimp	Living	
	Non-living	
Dissolved oxygen/nitrate level		

Further Your Learning Activity: Get into small groups and discuss how e indicator can be used to measure levels of pollutants in different ecosyster

Indicators of Pollution Questions

1. What is a bioindicator?

   .....

   .....

2. Give an example of a bioindicator.

   .....

3. What pollutant are lichens particularly sensitive to?

   .....

4. What happen to lichen populations if levels of pollutant are high?

   .....

5. Name two bioindicators used to detect levels of water pollution.

   1 .....

   2 .....

6. Give an example of a non-living indicator of pollution.

   .....

   .....

7. Why does limestone corrode when acid rain falls on it?

   .....

   .....

8. Complete the following table to summarise what you have learned in

Indicator	Living/Non-living	
Lichen		Le
Freshwater [illegible]	Living	
	Non-living	
Dissolved oxygen/nitrate level		

Further Your Learning Activity: Get into small groups and discuss how e
indicator can be used to measure levels of pollutants in different ecosyster

Lesson Plan 7: Measures to Counteract the Impact of Pollutants on Ecosys

Learning Aims

All students should:	Describe how recycling and reusing materials ca human activities have on an ecosystem Describe the different methods used to help redu activities on ecosystems
Most students should:	Discuss the advantages and di advantages of me impact of human activity on ecosystems
Some students should:	Evaluate th ss of methods to reduce the im ecosystem for a given scenario

Keywords: cycling, conservation, reforestation, breeding programmes, pest control, organic fertilisers

Starter

What is renewable energy? Can anyone name some renewable energy sou

Main

1. Discuss the importance of recycling in relation to natural resour sites filling up. Ask students to work in small groups to discuss we don't do anything.
2. Ask students what they recycle at home.
3. Introduce conservation techniques – reforestation, coppicing an
4. See if students can name some examples of endangered species.
5. Draw students' attention to the California condor case study – a captive breeding programme.
6. Talk through the advantages and disadvantages of various rene
7. Introduce students to alternati to chemical pesticides and fer
8. Ask student Questions 1–10.
9. r the answers to Questions 1–10 as a class.
10. Ask students to attempt one of the 'Further Your Learning Activ homework.

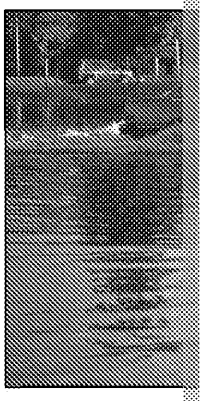
Plenary

Bring in a collection of household waste items. Ask students to identify if not, come up with creative ideas about how they might be reused.

Measures to Reduce Our Impact on the E

If we do nothing to reduce our impact on the environment, climate scientists pre
consequences, including:

- The frequency of natural disasters such as floods, droughts and hurricanes will increase.
- Sea level rises will lead to the flooding of coastal areas, and low-lying cities such as London and New York will be threatened.
- A change in weather patterns will mean reduced rainfall and consequently reduced yield of cr ps, as rice and other grains, leading to f
- Many species will be dri o ex ction.



Increased in level rise and one likely c

It is eviden he above predictions about pollution and its effects o stems that we must do something to reduce or counteract the impact we are having on the environment. There are a number of actions we can take and are taking.

Recycling to Reduce Waste and Energy Consumption

These days, as the human population grows, we are becoming increasingly awar resources like coal, oil and gas (fossil fuels) that we use for energy and to make n out and the landfill sites where we dispose of our rubbish are filling up. The wast hundreds or even thousands of years to break down in landfill sites and, as the w damaging to the environment (such as methane) are released into the atmosphe

One way we can reduce our recycle. Many household ite you might recycle plastics, a paper and glass bottles/jars. bin for your food waste. The initiatives such as 'Reduce, r hate waste', which aim to ra effects of being wasteful an reduce their waste.

Supermarkets now encourage us to reduce our pl sti h g use by selling 'bags fo a charge for their carrier bags to encou g e. Profits from the carrier bag ch environmental charity.

We are also e couraged to recycle technological items such as mobile pho printers, an are special recycling centres that have been set up for this pu

As well as recycling, we can also reuse glass jars and tin cans for other purposes.

How will Recycling and Reusing Materials Help to Conserve Natural Resc

First, recycling and reusing materials will help to reduce our energy consumption by reducing the energy required to produce materials – making products from recycled materials often uses far less energy than making them from raw materials. For example, in the manufacturing of recycled paper, 64% less energy is required than making the paper from raw materials. In turn, this reduces the amount of fossil fuels used to make the product and therefore reduces the amount of harmful pollutants released into the atmosphere. It is estimated that current UK recycling saves approximately 18 million tonnes of carbon dioxide being released into the atmosphere per year. Secondly, it reduces the amount of waste we produce and also reduces the energy needed for disposal of waste. Furthermore, it conserves natural resources such as coal, oil and natural gas for future generations and also conserves natural habitats.

Advantages and Disadvantages of Recycling

Advantages	Di
• Reduces consumption of natural resources • Cuts carbon dioxide emissions • It often takes less energy to produce something from recycled materials than it does to make the same product from new material. This is especially true for glass.	• Recycled materials s sorted and cleaned • Pollutants can be pr process itself • Expensive – cost of • Not as efficient as re

Conservation Techniques

A well as recycling and reusing, it is important to conserve what we still have left

Reforestation

Reforestation is the process of replanting trees, in an attempt to reverse the effects of deforestation. Planting new trees helps the environment by absorbing carbon dioxide from the atmosphere. It also creates new habitats for wildlife, which might in turn lead to the establishment of new ecosystems, and it stabilises soils.

Coppicing

Coppicing is a traditional woodland management method that involves cutting down young tree stems close to ground level and waiting for new stems to grow for a number of years before cutting them down again. Typically, coppicing is carried out in sections, so not all of the woodland is harvested at once. This means that coppicing is beneficial to biodiversity as it provides a variety of habitats to support many different organisms at any one

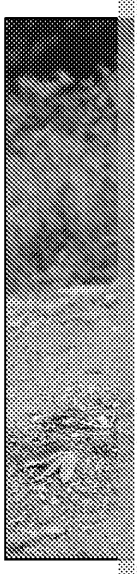
Replacement Planting

Replacement planting involves replacing plant species in areas from where they have been removed. The replacement species chosen is either the same as the species that was removed or, if this is not appropriate, a species that will perform a similar role in the ecosystem is planted.

Breeding Programmes

Many zoos take part in **captive breeding programmes** (breeding of endangered species outside their natural habitat) in order to sustain levels of critically endangered species. A critically endangered species is a species that is likely to go extinct unless immediate action is taken to help stabilise populations.

It is hoped that many of the animals that are bred in captivity will be released back into the wild. However, for some species, this will not be possible as reintroducing them back into their natural habitat would be too dangerous. Furthermore we may reach a time when their natural habitat no longer exists.



Right: A giant panda is bred in captivity because its natural habitat is being destroyed

Did you know?

The tiger, polar bear and leatherback turtle are all animals that are considered to be critically endangered.

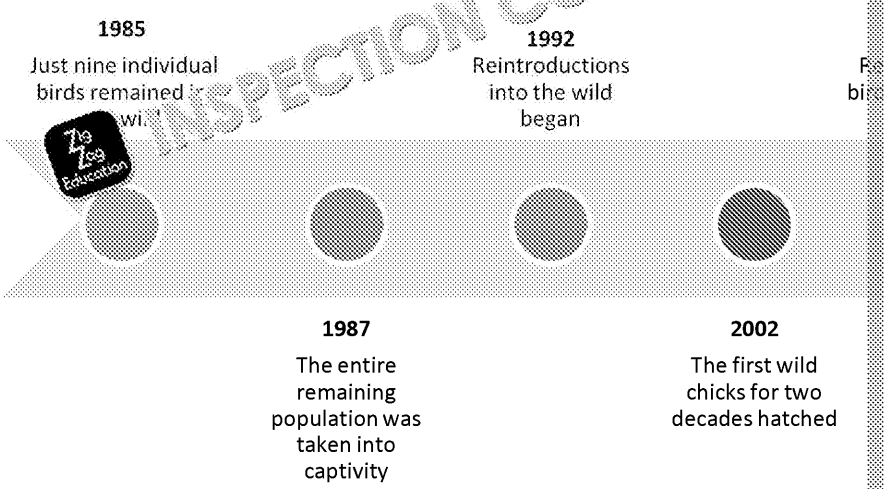
In 2010, studies suggested that only 3,200 tigers remained in the wild.

The Javan rhino, with only two populations existing in the wild, is believed to be the most endangered large mammal on the planet.

Case Study – The California Condor – An Example of a Successful Cap

The California condor is a large bird that is a member of the vulture family and, like all vultures, it feeds on the remains of dead animals. In the 1980s, it was on the verge of extinction due to habitat loss, lead poisoning, egg collecting and bioaccumulation of pesticides in the food chains. The remaining population was taken into captivity and, thanks to captive breeding efforts, it has now been successfully reintroduced into the wild

Right: A California Condor being fed by a puppet as pa the captive breeding progra

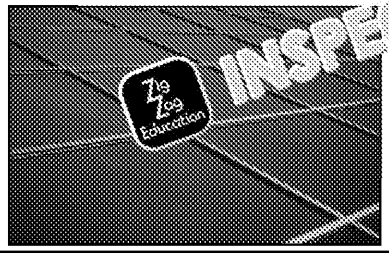
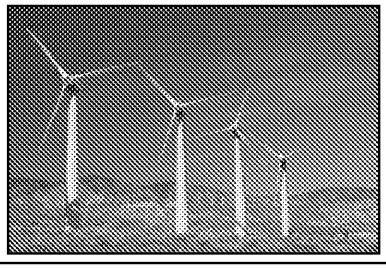


Use of Renewable Resources

The fossil fuels we currently use for energy – oil, coal and natural gas – will not la
non-renewable energy sources because they will eventually run out.

Renewable energy sources are energy sources that won't run out – for example,
energy and wave energy.

Ever-increasing and more sophisticated technologies are allowing us to harness t
our reliance on burning polluting fossil fuels for energy. However, each renewab
advantages and disadvantages.

Energy source	ar ges	
Solar power 	Solar energy is free and is an unlimited resource.	W d T
Wind power 	Wind is free. There are few safety risks.	W lo e d
Wave power 	Ideal for an island country. Waves are free.	T w s
Hydroelectric power 	Water is fr e. r ates water reserves as	R e a lo
mass 	Cheap. Good way to recycle organic material – we can find waste everywhere.	W g la cr b g

Alternatives to Chemical Fertilisers and Pesticides

Biological Pest Control

Biological pest control is the use of natural enemies to control pests and can be considered an exploitation of a naturally occurring process. It involves the use of predatory insects, wasps or pathogenic nematodes (a type of organism that infec its host with fatal bacterial diseases) to control numbers of pests. An advantage o biological pest control is that it is targeted; biological controls target a narrow ra of pests, sometimes a single species. This is far more beneficial for an ecosystem than using a chemical pesticide which kills many species, including those it is not designed to affect. However, the results of biological pest control are not instant the biological control species may require several weeks to become established a build up sufficient numbers to control the pest population. They can also produc unpredictable and undesirable results – for example, predating a beneficial organism. Species used for biological control include ladybirds to control levels o aphids and dragonflies to control mosquitoes.

Case Study: The Cane Toad – An Example of a Biological Pest Control

The cane toad (*Bufo marinus*) is an amphibian that is native to South America. It was introduced to Australia in 1935 as a biological control for beetles in the sugar-cane industry. However, since its introduction, it has had dramatic negative impacts on biodiversity. This is because it fed not only on the troublesome cane beetles but also on many other insect species too. It also brought foreign disease to native reptiles and is poisonous to many animals which feed upon it, including freshwater crocodiles and domestic pets.

Because this toad has no natural predators in Australia, it has become a pest in itself and scientists are now searching for a biological pest control to reduce numbers of the toad.

This case study illustrates the importance of considering possible effects on biodiversity a biological control into the environment.

Use of Organic Fertilisers

Compost is an organic fertiliser that is commonly used by amateu

Organic fertilisers are naturally occurring alternative derived from organic matter such as manure and co of microorganisms in the soil to break them down a is available for the crops to absorb. There are many fertilisers. The first is that they are a by-product of a not need to be manufactured like chemical fertiliser use of fossil fuels. Secondly, enriching the soil with o structure, prevents topsoil erosion and improves its nutrients. This helps the nutrients from being lea prevents eutrophication of aquatic ecosystems. An a fertilisers do not need to be consistently rea because they release nutrients at a slower and more have a complex composition and are more dilute th

D

Assignment tips: If you are working towards a Distinction in your assignmen knowledge and your own research to describe the various methods and scheme impact upon the ecosystem. You should also be able to evaluate the success of t evidence on whether they have been successful or not. You should also be able improve these methods or how to get more people involved. You could think ab part in the methods so far and how effective they have been at reducing our im

Measures to Reduce Our Impact on the Environment Qu

1. Why should we recycle?
2. What is reforestation?
3. Copy and complete the following passage using the words below:

wild	*extinct*	*critically endangered*	*captive*

Many zoos are taking part in _____ _____ programmes in t

_____ some species from becoming _____. Many breeding

_____ _____ species with the intention of releasing animals

4. What is a renewable energy resource?
5. Give the examples of renewable energy resources and list an advan each.
6. List four things that climate scientists predict will happen if we do no the environment.
7. What is biological pest control?
8. Give an example of a species that can be used to control numbers of a
9. Name two sources of organic fertiliser.
10. List three advantages of using organic fertiliser as opposed to chemic

Further Your Learning Activities:

1. Write a brief report evaluating the measures taken so far to reduce ou and whether they have been successful or not. Mention the methods c You might like to make suggestions on how to improve current meth methods, and explain the consequences for humans if our actions to r are not successful.
2. Use the Internet to research what green initiatives are active in your l about them for a local newspaper entitled: 'The benefits of local green

   Consider the following points:
   - Do you have a local recycling centre?
   - What items does your council collect and re[illegible]?
   - What does your local supermarket d[illegible]duce waste?

Measures to Reduce Our Impact on the Environ

1. Why should we recycle?

.....

.....

.....

.....

2. What is reforestation?

.....

.....

3. Comp e following passage using the words below:

wild	extinct	critically endangered	captive

Many zoos are taking part in _____ _____ programmes in t

_____ some species from becoming _____. Many breeding

_____ _____ species with the intention of releasing animals

4. What is a renewable energy resource?

.....

.....

5. Give three examples of renewable energy resources and list an advan each.

Example 1 .....

Advantage .....

Disadvantage .....

Example 2 .....

Advantage .....

Disadvantage .....

Exampl .....

Advantage .....

Disadvantage .....

6. List four things that climate scientists predict will happen if we do no
the environment.

   1 .....

   2 .....

   3 .....

   4 .....

7. What is biological pest control?

   .....

   .....

8. Give an example of a pest that can be used to control numbers of a

   .....

9. Name two sources of organic fertiliser.

   1 ..... 2 .....

10. List three advantages of using organic fertiliser as opposed to chemica

    1 .....

    2 .....

    3 .....

Further Your Learning Activities:

1. Write a brief report evaluating the measures taken so far to reduce ou
   and whether they have been successful or not. Mention the methods c
   You might like to make suggestions on how to improve current meth
   methods, and explain the consequences for humans if our actions to r
   are not successful.
2. Use the Internet to research what green initiatives are active in your l
   about them for a local newspaper entitled: 'The benefits of local green

   Consider the following points:
   - Do you have a local recycling centre.
   - What items does your local collect and recycle?
   - What does your local supermarket do to reduce waste?

Assignment B: Effects of Human Activity on the Environment ar

Learner's name:		
Start date:	Deadline:	Da

Scenario

While studying for your BTEC, you became really interested in environmental is
Environment Agency as a marine ecologist. Your local forest is a popular visitor
through it, but it is very vulnerable to pollution and damage, especially as it is
regularly releases waste into the rivers. The local freshwater boating lake has
people for decades, despite the large number of insects that fly over the lake
Recently, your local authority decided to encourage more people to visit the la
around the lake with pesticides to reduce the number of insects. This boosted th
unfortunately had an unexpected consequence – the lake has become heavily
additional boats. In addition, the pesticides sprayed by the local authority and
visitors are having a negative impact on the birds that feed on them. You need to engage vi
encourage them to do all they can to protect it. In addition, you have been con
study the extent of the pollution in the lake and explain to the directors how th

Tasks

Create a leaflet to distribute to visitors as they arrive at the visitor centre. Th
presentation to present to the directors.

Task 1: Leaflet for visitors

- Begin by introducing some of the human activities that are damaging
human activities that are damaging to the forest in particular, includ
pollutants produced by each activity and how the pollutants affect ec
into more detail by describing how each of the pollutants you identif
live in the forest.

  *Remember to discuss all of the pollutants you have studied in this unit i
  specifically affect forest ecosystems. Remember that the forest ecosyste
  addition to terrestrial habitats and contains a wide range of species inc*

- Then conduct research into a specific forest-damaging activity on the
graph which demonstrates how the activity is damaging to one of the
analyse it and describe what it shows in the leaflet.

  *Remember to consider all of the habitats in the forest and the possible p
  next to the forest.*

- Conclude by conducting further research to help you explain what im
the forest in the future. Consider the forest as a whole, including the
organisms that live there. Then explain what the future consequences
be for the forest, and why it is so important for the visitors to the centr
forest in the present day.

  *Remember to include the impacts of the pollutants on species survival a
  webs between organisms in the forest.*

Task 2: Flipchart presentation for the directors

Part 1: Measuring the Pollution

Begin by introducing the methods you used to study the pollution in the
non-living indicators you studied to determine the extent of the pollutio
directors the difference between a living and non-living indicator and st
measured with each indicator.

You are keen to impress the directors at the meeting so you decide to de
the living and non-living indicators measures and how you used them to

Part 2: How to Reduce the Pollution

You then go on to address how the local authority can act to reduce the a
Start by describing the benefits of providing recycling bins next to the la
everyday materials that visitors can recycle or take home to reuse. Then
instead of leaving it at or in the lake would benefit both the lake ecosystem
*To help you with this part of the assignment, you could think about the thi
what benefits recycling has on the environment.*

Inform directors of the methods they could introduce to reduce the l
how these methods would reduce the impact of pollutants both in the la
the area, now and in the future. Then introduce the general benefits of re
could introduce to encourage recycling in the area.
*Think about how the methods could be used to counteract the impact of hu
referring to the specific pollutants that affect it. When introducing metho
ecosystems, you might like to refer to similar methods you have seen in you
they have had.*

In order to give the directors a balanced view of the methods that can be
lake and the local area, you decide to discuss both the advantages and po
methods.
*Remember to discuss the methods used to encourage recycling in the local
that can be used to reduce the level of pollution in the lake.*

Conclude the presentation by evaluating the success of the methods at re
Assess the methods in terms of both the number of people who have tak
cooperated with them and the effects they have had on other ecosystems
information from your notes and from additional research. Then weigh u
and suggest improvements to the methods that the directors can use wh
in their authority.
*Remember to suggest improvements to methods we are currently using or
involved. Also comment on alternative methods to those already discussed.*

Learner's name:	Start Date:

Learner's declaration:
I certify that the work submitted for this assignment is my own. I have clearly refe
work. I understand that false declaration is a form of malpractice.

Learner's Signature: Date

Learner's comments for the assessor:

Teacher's/assessor's name:

Marking Criteria		
Task:	**it[illegible]earner must:**	
1 – Leaflet	**2B.P4**	Describe the impact that different human activities have ecosystems
	2B.M3	Analyse the effect of pollutants on ecosystems
	2B.D2	Explain the long-term effects of pollutants on living organisms and ecosystems
2 – Flipchart presentation	**2B.P5**	Describe how living and non-living indicators can be us to measure levels of pollutants
	2B.P6	Describe the different methods used to help reduce the impact of human activities on ecosystems
	2B.M4	Discuss the advantages and disadvantages of methods reduce the impact of human activity on ecosystems
	2B.D3	Evaluate the success of methods to reduce the impact o human activity on an ecosystem, for a given scenario

Deadline:

Summative feedback:

Date assessed:

Internal verifier's name:

Internal verifier's feedback:

Date

If a learner has not met the Level 2 criteria, they can be assessed on the Level	
1B.4	Identify human activities that affect an ecosystem
1B.5	Identify living and non-living indicators and the type of pollution they me
1B.6	Describe how recycling and reusing materials can reduce the impact that have on an ecosystem

Lesson Plan 8: Infectious Disea

Learning Aims

All students should:	List the different biological factors that affect hu Describe how pathogens affect human health Identify measures that can be taken to prevent a Describe two different treatment regimes: one us one used to treat a disease
Most students should:	Explain how bacteria can become resistant to an Discuss the advantages and disadvantages of va
Some students should:	Evaluate the use of anti[illegible]s and vaccination p and prevention of childhood illnesses

Keywords: Bacteria, viru[illegible]bacs, antibiotic resistance, vaccinations

Starter

Class mind[illegible]pping exercise on the board – what makes us ill?

Main

1. Go over the starter exercise.
2. Explain how microorganisms (bacteria and viruses) can affect h
   make us ill.
3. Ask students to name some diseases. Help them classify them accordi
   or viral.
4. Talk through examples of bacterial and viral diseases in detail –
5. Introduce the concept of antibiotics as a method for treating dis
   of treatment regimes and how misuse can lead to antibiotic resis
6. Testing for antibiotic sensitivity. Provide each student with a pr
   students to create a bacterial lawn by placing a sterile cotton sw
   carefully swabbing the entire area of the agar plate with the bac
   divide the dish into quarters using a permanent marker pen (thi
   not the lid) and apply three antibiotic discs of different concentr
   the sections. To the fourth section, students should add a sterile
   students to put on the lid of the dish and attach it to the base us
   Incubate the dish at 30 °C until the next lesson. Students can the
   in their next lesson (assuming that there are 2-3 days between le
7. Talk about methods used for prever[illegible]g[illegible]ease including: vacc
   food safety.
8. Draw students' at[illegible]tio[illegible]o the information box on historical he
9. Ask stu[illegible]answer Questions 1–9.
10. [illegible]r the answers to Questions 1–9 as a class.
11. Ask students to attempt the 'Further Your Learning Activity' an

Plenary

Quick quiz: Name the…

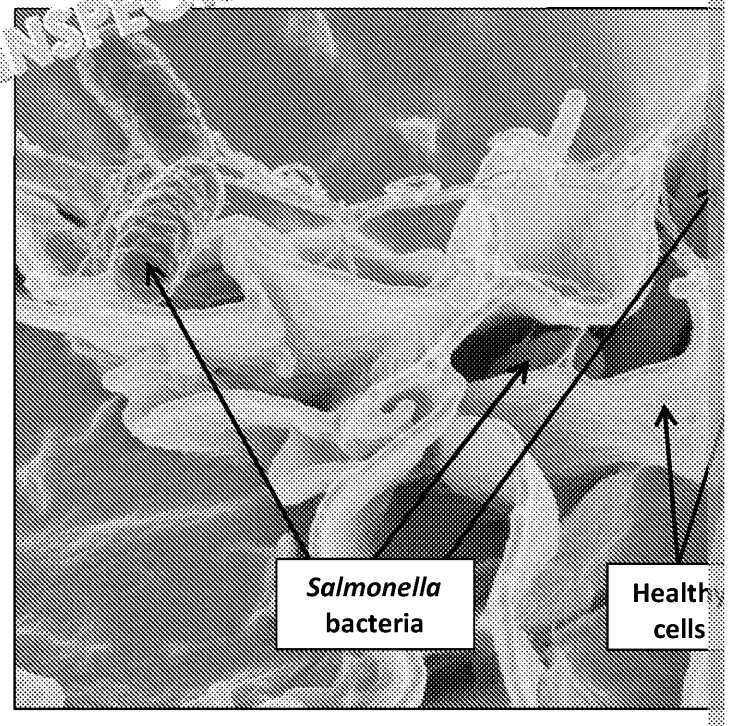
- type of microorganism that makes us ill by releasing toxins
- type of microorganism that makes us ill by killing our cells when it infe
- first antibiotic to be discovered

Microorganisms that Cause Dise

A **microorganism** is a very small organism that cannot be seen with the naked ey special piece of scientific equipment called a microscope. We will discuss two dif this lesson – bacteria and viruses. Microorganisms can affect our cells and make are referred to as **pathogens**.

Bacteria

Bacteria are microorganisms that can make us ill by producing toxins (poisons) in cells. We live in a world surrounded by bacteria. Some of them make us ill – for e poisoning – and some of them are good for us, such as the bacteria that live insid food.



***Salmonella* is a type of bacteria that causes food pois**
This image shows *Salmonella* bacteria invading healt

Tuberculosis (TB) – An Example of an Infectious Bacterial Disease

TB is a contagious bacterial disease that mainly affects the lungs. Symptoms of th cough (a cough that won't go awa with loss and night sweats. The bacteria a contaminated saliva droplets which are released from the body when someone v sneezes. If left untreated, disease can cause significant damage to the lungs a

Viruses

Viruses are microorganisms that make us ill because they infect the living cells of
(replicate) inside cells, causing them to burst and die. When cells burst, the virus
to travel around the body and infect other cells. The diagram on the following pa

Measles – An Example of an Infectious Viral Disease

Measles is a highly infectious viral disease that is spread through breathing conta
out of the nose and mouth of an infected person. The symptoms include a fever
spotty rash.

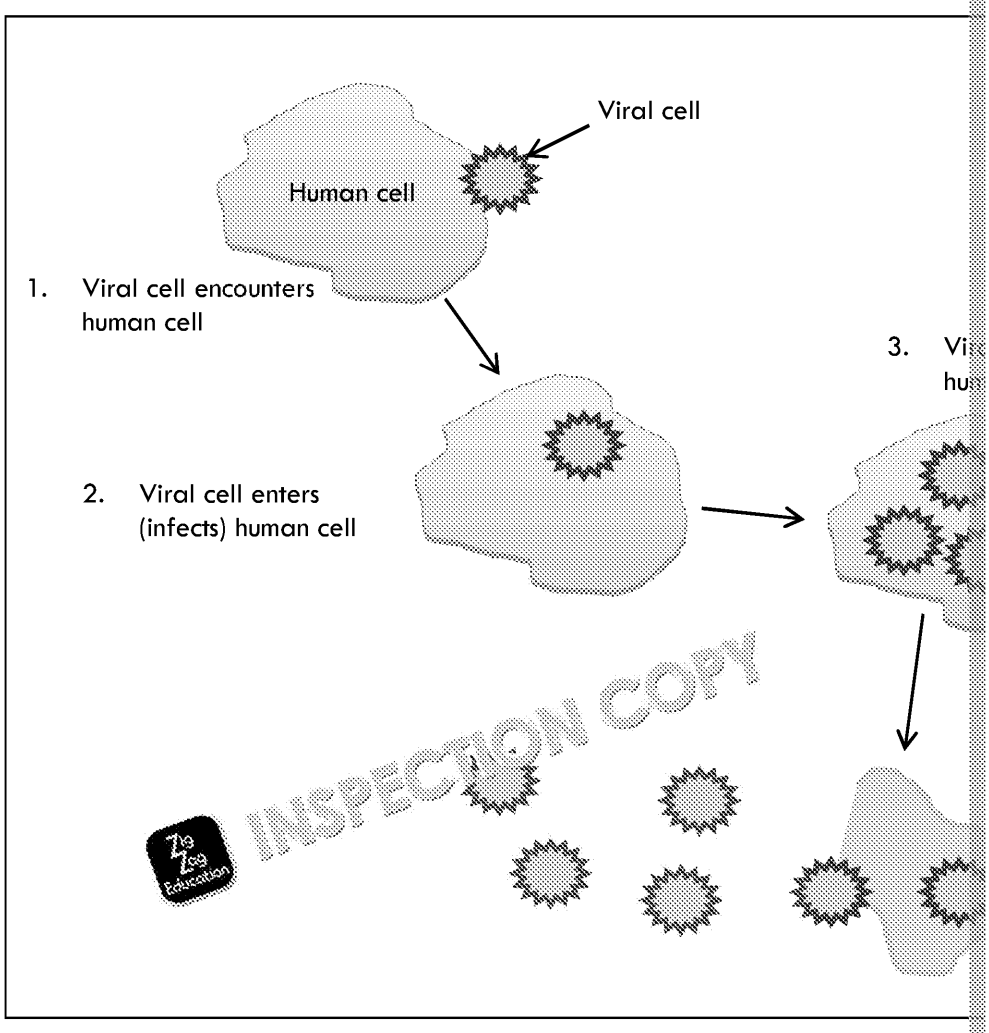
Generally, the disease is not treated because the immun[illegible]em should fight of
However, the disease can be prevented through t[illegible] the MMR (measles, n

Did you know?

Before wi[illegible]ation, measles is estimated to have caused approxima

According [illegible] World Health Organisation, the measles vaccine resulted in a
worldwide between 2000 and 2008.

Mechanism of action

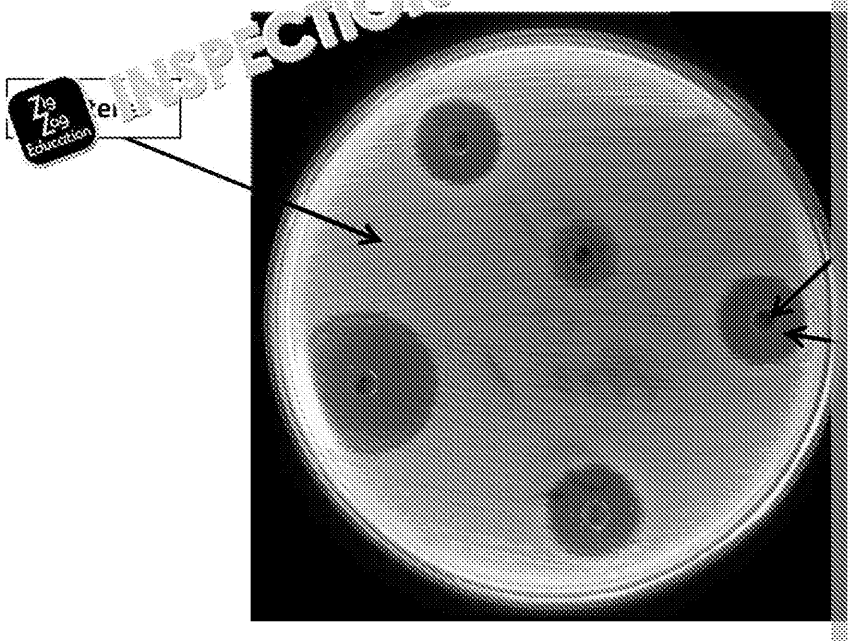


Treating and Preventing Disea

We are fortunate to live in a world where scientific advances have allowed us to
preventing diseases caused by microorganisms.

Antibiotics

Antibiotics are drugs used to **treat bacterial infections** (not viral infections). Ther
antibiotic, designed for treating infections caused by different types of bacteria.
medicine called penicillin. Penicillin is an example of an antibiotic that is used to
infections. It was the first antibiotic to be discovered and prescribed for use. Sinc
antibiotics have been developed and we can now treat a wide range of bacterial



Antibiotics work by killing bacteria or slowing down the
This image shows the action of antibiotics on the bacteria *Stap*

Antibiotic Resistance

Antibiotic resistance is a term used to describe a situation where an antibiotic is
bacteria it is designed to treat.

Antibiotic resistance arises for two main reasons: first, the misuse of antibiotics
antibiotics for diseases for which the cause is unidentified and therefore could be
which case antibiotics will be ineffective and second, through patients stopping t
completing their prescribed course of (in other words, ignoring their treatment r

Antibiotic resistance is responsible for the development of 'superbugs' such as M
Staphylococcus aureus) which are caused by resistant bacteria and very difficult
spread in hospitals where people are more vulnerable to infection and there is m
to be transmitted from person to person. For this reason, many superbugs are al
acquired infections'.

Scientists are concerned that, in the future, antibacterial resistance may lead to
infections for which we have no treatment. This would be like going back to the p
people died from common bacterial infections.

Vaccinations

A vaccination is an injection of a vaccine given to help prevent a disease. Vaccinations are used to boost the natural immune system (the body's system of defence designed to stop us from falling ill) and, in doing so, **prevent disease**. They have helped lower the number of cases of diseases such as measles and mumps and have eradicated the disease smallpox. Vaccinations contain very small amounts of pathogen in a dead, inactive or weakened form. When injected into the body, the **immune system** recognises the foreign pathogen and responds by destroying it. The immune system then creates a 'memory' of how to counteract that particular pathogen, ready for the next time it encounters it.

Advantages and Disadvantages of Vaccination Programmes

Advantages of vaccinations	Disadvantages o
ave millions of lives • Reduce the spread of pathogens in the population • Have eradicated some diseases such as smallpox	• Risk of adverse rea • Less effective again high mutation rates take a long time to time a vaccine is cr was created to act mutated into a form will no longer be ef

Treatment Regimes

Medications usually have labels on them that tell patients how and when to take them

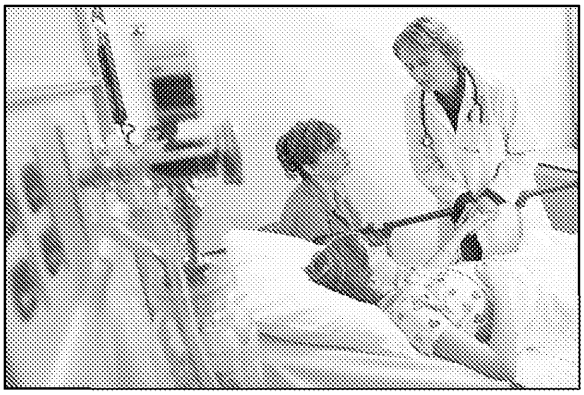
A treatment regime is a plan t should be taken in order to tr recently received a prescriptio on your medication that said, *twice daily.'* Equally, a treatm the prevention of a disease. It regimes strictly otherwise the measure may not work.

Examples of Treatments Regimes

A regime to treat tuberculosis: Take two types of antibiotic every day for six mo additional types of antibiotic every day for the first two months of treatment.

A regime to prevent measles: MMR vaccine. The first dose is to be given at 12 m given when the patient is aged 3–4 years.

Treating and Preventing Childhood Illnesses



A common use of antibiotics i
infections and sore throats (to
childhood illnesses are caused
antibiotic treatment will be in
deadly childhood illnesses suc
through vaccination. To preve
illnesses, the vaccination sche
the UK.

Age	Vaccines
months	• DTaP/IPV/Hib (5 in 1) – protects against diphthe pertussis (whooping cough), polio and haemoph • Pneumococcal infection
3 months	• DTaP/IPV/Hib 2nd dose • Meningitis C
4 months	• DTaP/IPV/Hib 3rd dose • Pneumococcal infection 2nd dose • Meningitis C 2nd dose
12/13 months	• Meningitis C 3rd dose • Hib 4th dose • MMR • Pneumococcal infection 3rd dose
3 years and 4 months	• MMR 2nd dose • DTaP/IPV (4 in 1 preschool booster)
12–13 years	• Cervical cancer (HPV) vaccine
13–18 years	• Td/IPV – diptheria, tetanus and polio booster

Did you know?

In 1998, there was a scare associated with the MMR vaccine when a scientist p that the vaccine was linked to autism (a disorder that affects social interaction, behaviour) in children. His findings were later found to be false, but media cove among parents and many did not have their children vac ted. This had a dra measles cases in subsequent years.

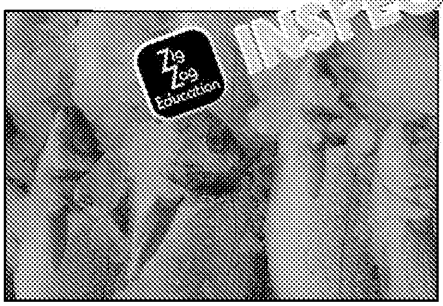
Personal Hygiene

Basic hygiene can also help prevent disease – for example, washing hands after using the toilet and washing hands before preparing or eating food.

Using antibacterial hand gel when visiting hospitals and medical centres helps to prevent the spread of infectious diseases.

Food Safety

Many bacterial infections can be contracted from food that has not been cooked thrive (multiply rapidly) between temperatures of 5 °C and 60 °C.



It is very important that food is stored and cooked correctly

Hot food needs to be cooked to the corre amount of time; this kills any bacteria tha Cooked food should be checked with a ter thermometer) to ensure that its core tem centre) stays at 70 °C for at least two min

Cold food must be stored at the correct t from growing on it. For example, chilled temperatures at or below 8 °C and froze °C.

Did you know?

As knowledge of disease increased and antibiotics and vaccines we became available, a number of health campaigns were introduced awareness and help to prevent the spread of infectious disease. Fo

Nineteenth century – public health campaign targeting tuberculos

1920s – 'coughs and sneezes spread diseases'

1966 – smallpox eradication campaign

Infectious Diseases Questions

1. What is a microorganism?
2. How do bacteria make us ill?
3. How do viruses mak ill?
4. Give an exam bacterial infection.
5. Give a mple of a viral infection.
6. What can we use to treat bacterial infections?
7. How can we prevent infection?
8. Why is it important to follow an antibiotic treatment regime strictly?
9. What factors can lead to antibiotic resistance?

Further Your Learning Activity: Working in pairs, use the Internet to do y of the MMR vaccine and write a balanced article on MMR vaccine safety c measles. Include some secondary data to support your findings.

Infectious Diseases Questions

1. What is a microorganism?

.....

.....

2. How do bacteria make us ill?

.....

.....

3. How do viruses make us ill?

.....

.....

4. Give an example of a bacterial infection.

.....

5. Give an example of a viral infection.

.....

6. What can we use to treat bacterial infections?

.....

7. How can we prevent infection?

.....

.....

8. Why is it important to follow an antibiotic treatment regime strictly?

.....

.....

9. What factors can lead to antibiotic resistance?

.....

.....

Further Your Learning Activity: Working in pairs, use the Internet to do your own research of the MMR vaccine and write a balanced article on MMR vaccine safety and the risk of measles. Include some secondary data to support your findings.

Lesson Plan 9: Non-Infectious Dis

Learning Aims

All students should:	List the different social factors that affect human List some benefits of exercise on health Describe how lifestyle choices can affect human

Keywords: Smoking, respiratory disease, alcohol, liver disease, recreation
skin cancer, diet, deficiency disorders, the benefits of physical activity

Starter

Class discussion: Name some lifestyle choices that are bad for our health.

Main

1. Learn what a non-infectious disease is.
2. Discuss the negative health aspects associated with smoking.
3. Discuss the negative health aspects associated with recreational
   / police forces will bring in samples and give a talk if you book
4. Show students the NHS real stories video: cannabis:
   www.nhs.uk/Conditions/Psychosis/Pages/Causes.aspx
5. Discuss the negative health aspects associated with alcohol cons
6. Describe the negative health aspects associated with UV light ex
7. Discuss the negative health aspects associated with a poor diet.
8. Explain how physical activity helps to keep the body healthy.
9. Ask students to answer Questions 1–6.
10. Go over answers to Questions 1– 6.

Plenary

Name five factors that can lead to the development of a non-infectious dis

Non-Infectious Diseases

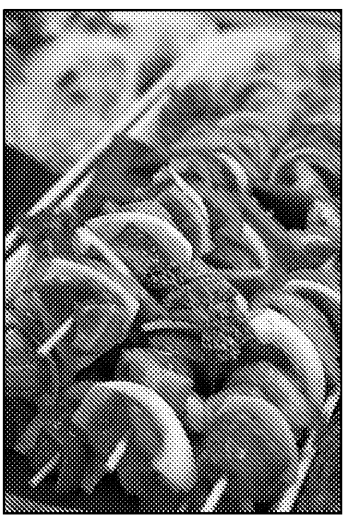
A number of non-infectious diseases (diseases that are not caused by a pathogen caused by the lifestyle choices we make such as smoking, diet, consuming alcoho exposing ourselves to too much ultraviolet (UV) light. They can also be caused by

Recreational Drugs and Mental Illness

There is an increasing amount of evidence that links recreational drug use to mental illness. Mood disorders, anxiety disorders and psychotic disorders can all be caused by using drugs such as cocaine, speed a D.

Long-term cannabis use can be linked to an elopment of psychosis. Psychosis is a condition where a refe can't distinguish between reality and their imagination. Studies claims that cannabis users are 40% more likely to suf m psychotic illness than non-users.

Inadequate Diet and Deficiency Diseases



Eating a poor diet can result in the body becoming and minerals that it needs to function correctly.

Deficiency in the mineral iron leads to a condition important component of red blood cells, the cells t the body. Without iron, our blood can't carry as m breathless and lethargic. A person diagnosed with to include more foods that are rich in iron, which i and leafy green vegetables (such as spinach).

Deficiency in vitamin C causes a disease called scu muscle and joint pain, tiredness and bleeding/swe vegetables are all sources of vitamin C, so the diet be modified to include lots of these. Supplementa

Smoking Cigarettes and Respiratory Disease

Smokers are more likely to suffer from a number of respiratory diseases (disease that affect breathing) including lung cancer, chronic obstructive pulmonary disease (COPD), bronchitis, emphysema, pneumonia and asthma.

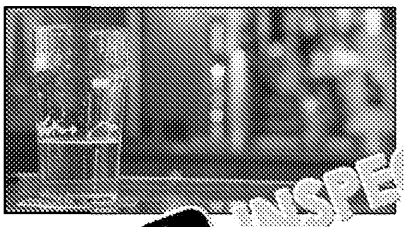
Smoking affects not only the respiratory system but also the circulatory system. Smoking cigarettes leads to the inhalation of carbon monoxide. Carbon monoxide prevents oxygen from being transported to organs of the body.

In the long term, smoking leads to high blood pressure, increased heart rate and damage to blood vessels. All of these factors result in an increased risk of stroke and heart attack, both of which can be fatal.

UV Light and Skin Cancer

Skin cancer is currently the most common form of cancer in the UK. It is caused by long-term exposure to the sun. The ultraviolet rays in sunlight damage the DNA in skin cells. Skin cancer usually presents itself as spots or sores on the skin that do not heal within four weeks. To reduce the risk of developing skin cancer, you should always wear sunscreen when you go out in the Sun and avoid using sun beds.

Alcohol and Liver Disease



Liver disease can be caus[ed] by excessive alcol[hol]. liver disease inclu[de] [vo]mi[t]ce, nausea, weight drowsine[ss]. A[d]vanced liver disease can result

Poor Air [Q]uality and Asthma

Some scientific studies show that there is a link between poor air quality and ast[hma]. is a respiratory condition which, when triggered, causes the muscles of the walls airways to tighten and become narrower, making breathing difficult and causing wheezing and shortness of breath. Over 80% of people with asthma find air pollu[tion] their symptoms worse.

Physical Activity Helps to Keep the Body Healthy

Physical activity has many benefits and it can help prevent a number of non-infe[ctious]

Improves Cardiovascular and Respiratory Functions

When we exercise regularly, our heart muscle size increases, making it more efficient at pumping blood around the body. Blood supply to the lungs al[so] exchange more efficient. This, in turn, boosts our energy for carrying out normal

Boosts Mood

Exercise stimulates the release of feel-good chemicals called endorphins from th[e] brain. This leads to an increase in self-esteem and a reduction in stress levels, an[d] it can also aid in the treatment of depression and anxiety-related disorders such as panic attacks.

Reduces the Risk of Certain Diseases

- Slows the process of bone dege[neration] which can lead to the disease osteop[orosis]
- Reduces high blood pre[ssure]
- Prevents so[me] t[ypes] [o]f [c]ancer
- Prevent[s] [t]ype 2 diabetes
- Decrease[s the risk] of heart attack and stroke

Controls Weight

Exercise prevents excess weight gain and maintains weight loss by burning off th[e] food.

Did you know?
The government recommends that adults do at least 30 minutes of moderate ac[tivity] recommends that children do 60 minutes of activity every day.

Non-Infectious Diseases Questions

1. Link the following non-infectious diseases with their cause:

Skin cancer	Smok
Liver disease	Poor air
Deficiency disease	Excess U
Mental illness	Alco
Respiratory disease	Die
Asthma	Recreationa

2. Name two deficiency diseases and explain their causes.

3. Describe how smoking cigarettes affects human health.

4. Why should we wear sun screen when we are outdoors on sunny days?

5. List four positive benefits of exercise on health.

6. Describe how exercise boosts mood.

Non-Infectious Diseases Question

1. Link the following non-infectious diseases with their cause:

Skin cancer	Smo
Liver disease	Poor ai
Deficiency disease	Excess
Mental illness	Alc
Respiratory disease	D
Asthma	Recreation

2. Name two deficiency diseases and explain their causes.

Disease 1 .....

Cause .....

Disease 2 .....

Cause .....

3. Describe how smoking cigarettes affects human health.

.....

.....

4. Why should we wear sunscreen when we are outdoors on sunny days

.....

5. List four positive benefits of exercise on health.

1 .....

2 .....

3 .....

4 .....

6. Describe how exercise boosts mood.

.....

.....

.....

Lesson Plan 10: Inheritance of Dis

Learning Aims

All students should:	List the different inherited factors that affect hum
Most students should:	Explain the use of pedigree analysis
Some students should:	Evaluate the use of pedigree analysis in the prev

Keywords: Genes, chromosomes, allele, heterozygosis, homozygosis, cyst disease, Punnet squares, pedigree analysis diagrams

Starter

Review of previous lesson. Name a non-infectious disease caused by each choices:

- recreational drug use
- excess UV light exposure
- poor diet
- alcohol consumption
- smoking cigarettes
- poor air quality

(**Answers**: mental illness; skin cancer; anaemia/scurvy; liver disease; lung emphysema, COPD, pneumonia; asthma)

Main

1. Review the starter exercise.
2. Explain inheritance in terms of dominant and recessive alleles.
3. Investigate some of the genetic traits that exist in the class, for e Unattached ear lobes – dominant. Tongue rolling – dominant (7 Cleft chin – dominant. Dimples – dominant. Right-handedness dominant.
4. Go over examples of Punnet square
5. Go over an example of a pedigree analysis diagram.
6. Ask students to answer Questions 1– 4.
7. Go over answers to Questions 1–4 as a class.
8. Ask students to attempt the 'Further Your Learning Activity'.

Plenary

Write down 10 keywords from today's lesson.

Influence of Genes on Human He

Genetic Diseases

Some diseases are not caused by a pathogen or the consequences of a lifestyle c
in the genes we receive from our parents.

Genes are sections of **DNA** (DNA is a special chemical that is involved in inheritan
information needed to make **proteins**. You can think of them like a set of instruc

Each protein of the human body requires a specific set of instructions to build it
requires a specific sequence of DNA.

Sometimes the DNA sequence is cha[illegible]hange called a **mutation**. Mutati
change the structure of a pro[illegible] whi[illegible]could prevent it from working or they m
from being made at [illegible]

The result o[illegible]tic mutations can be a **genetic disease**. Some examples of gen
and Huntington's disease. These will be discussed later.

You should remember from your unit 1 studies that DNA is split up into sections
chromosomes are split up into sections called **genes**, which give instructions for
person has two genes for each of their characteristics and if these are different t
example, you may possess on allele for brown eye colour and one allele for blue

So, why do we only express one eye colour, rather than two? This is explained by
either **dominant** or **recessive**, and dominant alleles mask the effect of recessive
for brown eyes is dominant, and the allele for blue eyes is recessive. So, if you ha
and one allele for brown eye colour, your eyes will be brown. Similarly, if both o
colour you will have brown eyes. You will only have blue eyes if you have both of
colour.

If both of the alleles of a gene are the same we say that the **genotype** (genetic m
homozygous; if both alleles of a gene are different we say that the genotype is **h**

If we know whether two organisms that mate are homozygous or heterozygous f
predict the alleles that the offspring will inherit and find out the characteristics t

Using Punnet Squares to Make Genetic Inheri[illegible]nce Prediction

Genetic predictions can be shown using one of tw[illegible]m[illegible]ods: Punnet squares or

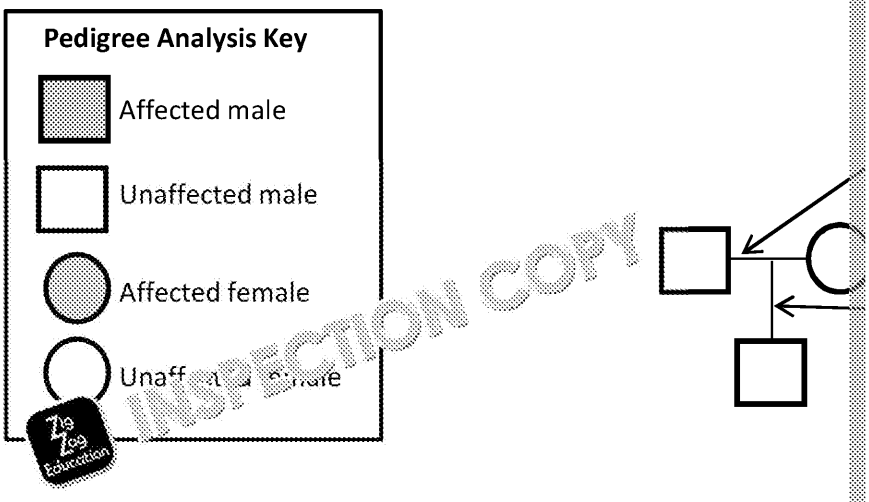
The Punnet square below rep[illegible]nts [illegible]ross between a heterozygous male with
homozygous recessiv[illegible]e [illegible]h blue eyes (bb). Here the dominant allele is re
recessive a[illegible]re[illegible]sented using 'b'.

Female \ Male	B	b
b	Bb	bb
b	Bb	bb

From the square we can see that there is a 50% chance that the offspring will ha
chance that the offspring will have blue eyes (bb).

Pedigree Analysis

Pedigree analysis is a pictorial version of a Punnet square in the form of a family
or male is affected or unaffected by a genetic disease and the chances of their of



Huntington's Disease – Dominant

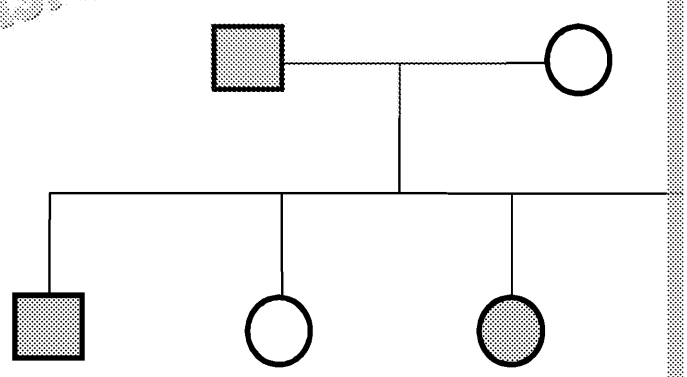
Huntington's disease is a genetic disease that affects the central nervous system
cells of the brain to degenerate. Eventually, sufferers lose the ability to walk, talk
be caused by a **dominant allele**.

In the Punnet square below, the **dominant allele is denoted as 'H'** the **recessive**

In this example, the father suffers from the disease and is heterozygous dominan
suffer from the disease and is homozygous recessive (hh).

		Father	
		H	**h**
Mother	**h**	Hh	hh
	h	Hh	hh

Here you can see that the offspring have a 50% chance of inheriting the disease f
father was affected by the disease and mother was not and they had two sons a
pedigree analysis for the family would look like this:



Cystic Fibrosis – Recessive

Cystic fibrosis is a genetic disease caused by a **recessive allele**. This means that, u
people can be **carriers** of the disease without actually suffering from it themselv

Cystic fibrosis is a condition diagnosed in childhood in which the sufferer produc
lines the airways and the digestive tract, resulting in breathing difficulties and m
absorption in the gut.

In this example, both parents are heterozygous (Ff) so they are carriers.

		Father	
		F	**f**
Mother	**F**	FF	Ff
	f	Ff	ff

Here we can see that the offspring have a 25% (one in four) chance of contractin

Preventing Childhood Illness Using Pedigree Analysis

Pedigree analysis can be used to determine the risk of having a child with a gene
risk of having a child with a genetic disorder may influence the choice of a couple
pedigree analysis leads to further medical testing as well as genetic counselling.
type of support that helps families to cope with the emotional, psychological, so
a genetic disease.

D

*Assignment tips: If you are working towards a Distinction in your assignmen
the main methods discussed in this part of the unit (vaccination, antibiotics ar
how effective they have been in treating and preventing childhood illnesses. Yo
the methods for their purpose. You could do this by researching historical heal
on how successful the methods have been for treating or preventing disease in
the costs and benefits of the methods too, and decide whether the methods shou
Remember to explain why you came to this judgement in your assignment.*

Inheritance of Disease Questions

1. What is DNA?
2. What do DNA sequences code for?
3. Write down a definition for each of the following words: **genetic mut**
   heterozygous.
4. Construct a pedigree analysis diagram to illustrate the cystic fibrosis I
   to you in the lesson, assuming that the parents have two sons and two
   was affected.

Further Your Learning Activity: Write an article on the genetic disease cy
analysis can be used to prevent the disease. Conduct your research on the
then write up the article, including the following points:

- What is cystic fibrosis and what are its symptoms?
- What is pedigree analysis and what is it used for?

Then evaluate the use of pedigree analysis in the prevention of cystic fibro

- Is it ethical and right that we can use our scientific knowledge to deci
  child into the world based upon the possibility that it may have a gen
- What are the negative aspects of living with cystic fibrosis?
- Do the benefits of pedigree analysis outweigh the costs?

Inheritance of Disease Questions

1. What is DNA?

   .....

2. What do DNA sequences code for?

   .....

3. Write down a definition for each of the following words: **genetic mut**
   heterozygous.

   Genetic mutation .....

   .....

   Allele .....

   .....

   Homozygous .....

   .....

   Heterozygous .....

   .....

4. Construct a pedigree analysis diagram to illustrate the cystic fibrosis I
   to you in the lesson, assuming that the parents have two sons and two
   was affected.

Further Your Learning Activi ... an article on the genetic disease cy
analysis can be used t... ... e disease. Conduct your research on the
then write ... including the following points:

- What ... c fibrosis and what are its symptoms?
- What is pedigree analysis and what is it used for?

Then evaluate the use of pedigree analysis in the prevention of cystic fibr

- Is it ethical and right that we can use our scientific knowledge to deci
  child into the world based upon the possibility that it may have a gen
- What are the negative aspects of living with cystic fibrosis?
- Do the benefits of pedigree analysis outweigh the costs?

Assignment C: Factors that Affect Human H

Learner's name:		
Start date:	Deadline:	Da

Scenario

You have recently graduated from university with a degree in nursing. While y very interested in childhood illnesses so you have decided to apply for a nursin children's hospital. The recruitment team were impressed by the enthusiasm you application so have called you in for an interview. Before your interview, you v the potential role of antibiotic resistance in global pa and to prepare r about childhood illnesses, which will be asked in thre parts.

Task 1

Write an article on the potential role of antibiotic resistance in global panden a set of questions about childhood illnesses, which will be asked in three parts

For the article on the potential role of antibiotic resistance in global pa

The title of the article is 'Antibiotic resistance – should we be worried?'.

Start the article with an introduction to the factors that affect human health. including at least two biological factors, social factors and inherited factors. F it has on the body.

Describe the biological factors you identified in more detail by explaining ho *Remember to explain this in terms of pathogens and how they act once they en*

Explain how antibiotic resistance arises and how it could potentially cause a your article by describing the actions we can take to reduce the likelihood of *Remember to refer to the specific pathogens involved and think about the actio and personal scale.*

For the questions about childhood illnesses:

Prepare the answers that you will give to the following questions when you a these down, you could give them in an interview situation, with your teacher interviewer.

Part 1: General Treatment Methods

'What are some of the different methods that are used in hospitals to pre in children?'

To help you answer this question, you should think about the factors you h health and the methods that can be used to prev t treat them. Remer pathogens and the hygiene measures that a e t k n when providing clothe a hospital stay.

'How do these me h w rk?'

To hel n. s question, you should describe how the methods pr includ mode of action and how this affects the body. Remember to i is inten d to prevent disease and one that is intended to treat disease.

Part 2: Lifestyle Choices

'Why is it important for a child to take regular exercise?'

To help you answer this question, think about the positive effects of exercis

'Why is it important for a child to be taught healthy lifestyle techniques t later life?'

To help you answer this question, think about the effect that unhealthy life
health of a child as he or she grows up. Also think about healthy lifestyle cl
encourage their child to take part in. Remember to discuss at least four of
studied.

Part 3: Medical Techniques

'The hospital has recently implemented a pedigree analysis programme
get the job. How does pedigree analysis work and how can it be used?'
To answer this question, explain what pedigree analysis is used for and giv
analysing the inheritance of genetic diseases. What can pedigree analysis

'If you get the job, you will be involved in vaccinating children against m
are some of the benefits, limitations and poten[illegible] involved in vacci
To answer this question, think about the effects that vaccinations have on
impress the interviewer by discussing a recent controversy to illustrate on

'How effective ha[illegible]tics, pedigree analysis and vaccination progra
preve[illegible]hi[illegible]od illnesses in the past?'
To ans[illegible]s question, you should evaluate the effectiveness of the metho
have made to children's medicine. Have the methods reduced death rates?
effects? Remember to give an example of the use of each method and consi
disadvantages too. Then weigh up the evidence you have gathered and use
antibiotics, pedigree analysis and vaccinations should continue to be used
children. You can find the information you need on the Internet or in your

Learner's name:	Start Date:

Learner's declaration:
I certify that the work submitted for this assignment is my own. I have clearly refe
work. I understand that false declaration is a form of malpractice.

Learner's Signature: Date

Learner's comments for the assessor:

Teacher's/assessor's name:

Marking Criteria		
Task:	**Criteria [illegible]er must:**	
1	[illegible]5	Describe how pathogens affect human health
		Explain how bacteria become resistant to antibiotics
	2C.P8	Describe two different treatment regimes: one used to pre a disease and one used to treat a disease
	2C.P9	Describe how lifestyle choice can affect human health
	2C.M6	Explain the use of pedigree analysis
	2C.M7	Discuss the advantages and disadvantages of vaccination programmes
	2C.D4	Evaluate the use of antibiotics, pedigree analysis and vaccination programmes in the treatment and prevention childhood illnesses

Deadline:

Summative feedback:

Date assessed:

Internal verifier's name:

Internal verifier's feedback:

Date

If a learner [illegible]t met the Level 2 criteria, they can be assessed on the Level	
1C.7	List the different biological, social and inherited factors that affect human
1C.8	Identify measures that can be taken to prevent and treat infectious diseas
1C.9	List some benefits of exercise on health

Answers

Lesson Plan 1: Variation and Evolution Questions

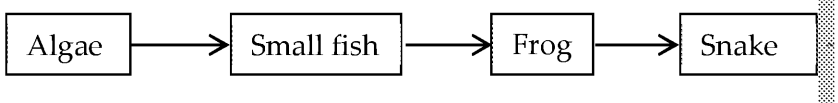
1. a. Genetic variation – variation determined by genes you inherit from you
   b. Environmental variation – variation determined by the environment.
   c. Genetic mutation – change in the base sequence of DNA.
2. Variation between individuals is caused by **genetic** or **environmental** variat **combination** of both factors. Different eye colours in a population are an exa Variation can also be caused by genetic **mutation**.
3. a. Eye colour – genetic
   b. Hair colour – combination
   c. Height – combination
   d. Weight – combination
   e. Dimples in cheeks – geneti
4. Characteristics – flight t on the ground. Factors – predation by rats a resources loss of habitat due to human development.
5. Genes in the basis for many characteristics, including visible charact shape c lobes. These characteristics are caused by genetic variation. Gen genes we inherit from our parents. Genes also influence factors such as heigl these factors are also affected by the environment. Genetic mutations, chang also influence genetic characteristics and increase genetic variation in a popu
6. Evolution by natural selection is an interaction between genes and the envir A population of the same organism will contain lots of genetic variants (orga different) . Variations in genes mean that some of these organisms will be be surroundings (environment) than others. This consequently means that they those organisms without the adaptation. The reduced survival rate of organi be caused by a number of factors including competition for resources, such a In other words, the environment is 'selecting' those with a specific adaptatio their current environment. The organisms that are well adapted to their surr reproduce, passing their genes on to their offspring, including the genes that means that the number of well-adapted individuals increases in the populati formation of an entirely new species. Those individuals without the adaptati this is known as extinction.

Further Your Learning Activity

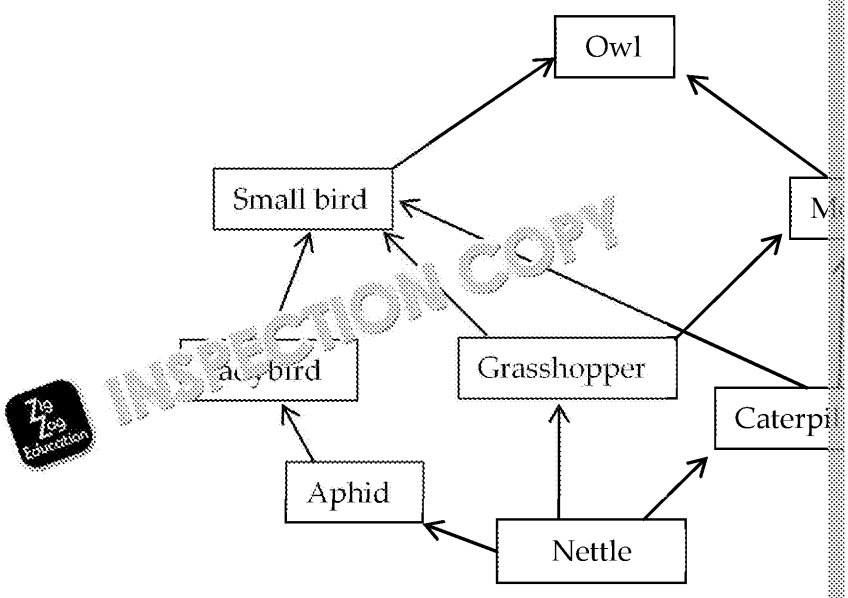
Report should mention variation caused by genes, variation caused by environme and how it links variation with environment and likelihood of survival/extinctio

Lesson Plan 3: Interdependence of Organisms Questions

1.



2.



3. Top carnivore – owl. Producer – nettle.
4. **Mutual** relationships are relationships in which **two** species benefit from the
   Parasitic relationships are relationships in which one organism **benefits** at th
5. Organisms can be classified into one of five kingdoms. These kingdoms influ
   a food chain. For example, plants belong in a separate kingdom from animal
   are always found at the bottom as they are the producers, producing the ene
   chain. Animals are found further up the chain as they are consumers, and ca
6. Diagrams should stress the following points:
   Mutual relationship – both organisms benefit from the relationship
   Parasitic relationship – parasitic organism benefits at the expense of the host

Further Your Learning Activity

Article should comment on predator–prey relationships, mutual relationships an
example of each and commenting on the factors that affect these relationships.

Lesson Plan 4: Human Activities that Alter Ecosystems Questions

1. An ecosystem is a community of organisms and the habitat they live in.
2. Choose from the following: rainforest, grassland, mo[illegible]ns, desert
3. Biodiversity loss and increased CO_2 levels
4. Methane emissions – cattle and rice g[illegible]g produce methane which is a gre
5. Only eat fruit that is in sea[illegible] in the UK, i.e. eat strawberries in summer, bla
   Supermarkets shou[illegible]y on fruit grown in the UK.

Lesson Plan 5: How Pollutants Affect Ecosystems Questions

1. **Herbicides** are chemicals that kill weeds. **Pesticides** are chemicals that kill o
   of these chemicals build up in the food chain. This is known as **bioaccumula**
2. To give their crops extra nutrients that they require to grow
3. By the process of eutrophication. Fertiliser gets into water systems and cause
   Water plants have too much competition for light, so some die.
   The number of microorganisms that feed off the dead plants increases. These
   oxygen that is dissolved in the water. This in turn leads to the death of fish a
   do not have access to enough oxygen to survive.
4. A pesticide that was used widely in agriculture between the 1950s and 1970s
5. Its use was banned because a number of concerning effects were recognised.
   bioaccumulation in food chains led to eggshell thinning in birds of prey and
   was also toxic to many marine mammals and fish
6. Used to control numbers of mosquitoes and reduce malaria. Not a good idea d
   bioaccumulation. Alternatives include treated nets and destroying mosquito bre
7.

Human activity	**Pollutants produced**	
Farming cattle	Methane	
Growing rice	Methane	
Fertilising soils	Nitrates and phosphates	
Burning fossil fuels	CO, CO_2, SO_2	G
Deforestation	CO_2	
Using herbicides and pesticides	Toxic chemicals	Bioa

8. Long-term effects that should be discussed include: use of fertilisers and eutr
   climate change, acid rain damage.

Further Your Learning Activities

1. Students should explain how the overuse of chemical fertilisers leads to eutr
   damage this causes to aquatic ecosystems. The report should also include sec
   effects of fertilisers on ecosystems and an analysis of this data.
2. Students should discuss eutrophication, global warming / climate change an
   include some data that supports the discussion of at least one of the above to

Lesson Plan 6: Indicators of Pollution Questions

1. A bioindicator is a living thing that can be used to help us measure the effect
   environment.
2. Lichen, algae or freshwater shrimp
3. Sulphur dioxide
4. Lichen populations will decrease
5. Algae and freshwater shrimp
6. Acid rain damage to limestone buildings **or** dissolved oxygen/nitrate levels c
7. A chemical reaction takes place when acid reacts with a carbonate. Acid rain
   carbonate (calcium carbonate).
8.

Indicator	Livi… living	
Lichen	**Living**	
…shrimp	Living	
Limestone buildings	Non-living	
Dissolved oxygen/nitrate levels	**Non-living**	

Further Your Learning Activity

Presentation should include slides on both living and non-living indicators of pol
freshwater shrimp / algae; non-living – dissolved oxygen/nitrate concentrations, l
information on the different pollutants they measure.

Lesson Plan 7: Measures to Reduce Our Impact on the Environment Questions

1. We should recycle because the population is growing, natural resources are filling up. Recycling reduces the energy consumption needed to produce ma natural resources; it also reduces the amount of waste that goes to landfill.
2. Reforestation is the process of planting trees in an attempt to reverse the effe
3. Many zoos are taking part in **captive breeding** programmes in the hope that from becoming **extinct**. Many breeding programmes focus on **critically enda** of releasing animals back into the **wild**.
4. A renewable energy resource is an energy source that won't run out.
5.

Energy source	Advantages	Disa
Solar power	Solar energy is free and is an unlimited resource.	We only receive solar e Technology is expensive.
Wind power	Wind is free. The e w safety risks.	Wind turbines are unsightl enough energy. Also, the w
Wave power	to an island country. Waves are free.	Technology is expensive. N from sea to land.
Hydroelectric power	Water is free. Creates water reserves as well.	Requires dam building wh large area of land can lead ecosystems.
Biomass	Cheap. Good way to recycle organic material – we can find waste everywhere.	We may not have enough l this land could be used for of biomass fuels releases gr

6. Rise in sea levels, reduction in crop yields/famine, more natural disasters. M extinction.
7. Biological pest control is the use of natural enemies to control numbers of pe
8. Ladybird
9. Manure and compost
10. Do not need to be manufactured, improve soil structure and do not need to b

Further Your Learning Activities

1. Report should cover the following points:
   - recycling and reusing materials
   - reforestation and coppicing
   - captive breeding
   - use of renewable energy sources
   - biological pest control
   - use of organic fertilisers
   - suggest ways of improving the above methods or suggest alternative met
   - explain consequences if nothing is done to reduce impact, e.g. rise in sea l leading to famine, mass extinction and an increase in frequency of natura
2. Report should cover the follo
   - an example of a lo g centre
   - a list of the council collects/recycles
   - the the local supermarket takes to reduce waste
   - the ts of any local green schemes such as reduction in CO_2 emissio

Lesson Plan 8: Infectious Diseases Questions

1. A microorganism is a very small living thing that can only be seen using a m
2. Bacteria make us ill by producing toxins that poison our cells.
3. Viruses make us ill by replicating inside our cells, causing them eventually t
4. Tuberculosis
5. Measles
6. Antibiotics.
7. Infection can be prevented through use of vaccinations, good personal hygie
   practices regarding food preparation and storage.
8. It is important to follow an antibiotic treatment regime strictly because not d
   resistance.
9. Through overprescription of antibiotics or through p[illegible]s not completing t

Further Your Learning Activity

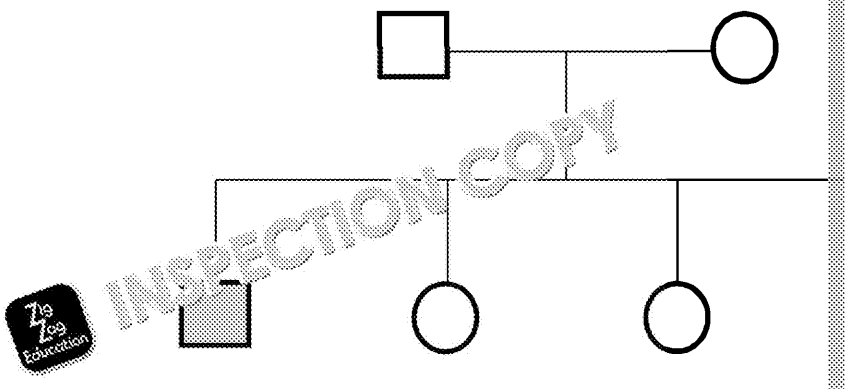
Article should include informatio[illegible] MMR vaccine scare and its link to a
The scare stopped many [illegible] having their children vaccinated and conse
Article shou[illegible] dangers of measles – a highly infectious viral disea
prevented u[illegible] MMR vaccine. Article should also include some secondary d

Lesson Plan 9: Non-Infectious Diseases Questions

1. **Skin cancer** → Excess UV light
   Liver disease → Alcohol
   Deficiency disease → Diet
   Mental illness → Recreational drug use
   Respiratory disease → Smoking
   Asthma → Poor air quality
2. Anaemia – caused by lack of iron. Scurvy – caused by vitamin C deficienc .
3. Smoking cigarettes causes respiratory problems including COPD, lung cance
   pneumonia and asthma.
4. To protect us from the harmful effects of UV light
5. Improves cardiovascular and respiratory functions, boosts mood, reduces ris
   weight.
6. Exercise boosts mood through stimulating the release of 'feel-good' chemica
   a reduction in stress and increase in self-esteem.

Lesson Plan 10: Inheritance of Disease Questions

1. A special chemical involved in inheritance
2. Proteins
3. **Genetic mutation** – a change in the base sequence of DNA
   Allele – different forms of a gene
   Homozygous – describes and organism carrying two of the same alleles of a
   Heterozygous – describes and organism carrying two different alleles of a pa
4. Pedigree analysis diagram for cystic fibrosis



Further Your Learning Activity

Article should explain what cystic fibrosis is, its causes and symptoms. Article sh
explanation of pedigree analysis and a description of how it can be used to predic
should consider the ethical issues associated with this technique – for example, is
knowledge to decide whether or not to bring a child into the world based upon th
genetic disorder? They should then balance this argument with the negative aspe
form the main part of their evaluation.