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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE**

B493/04

**ENVIRONMENTAL AND
LAND-BASED SCIENCE**

**Management of the Natural Environment
(Higher Tier)**

TUESDAY 31 JANUARY 2012: Morning

DURATION: 45 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper.

A calculator may be used for this paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this paper is 36.**

Answer ALL the questions.

1 Soil is made up of different components that include:

CLAY

GRAVEL

HUMUS

SAND

SILT

From the list give the name of the:

(a) component with the smallest particles

_____ [1]

(b) organic component

_____ [1]

2 The photographs show different landscapes.

limestone valley



sand dune



mud flat



Landscapes are formed over time. There are several factors that affect how a landscape looks.

From the list, put rings around TWO physical factors that affect the **FORMATION of a landscape.**

ADAPTATION

BIODEGRADATION

COMPETITION

DEPOSITION

EROSION

FLOCCULATION

REGENERATION

TRANSPIRATION

[2]

3 The photographs show rights of way signs.



Legislation gives the public open-access to large areas of the countryside.

This allows activities such as rock climbing and sight-seeing.

Which TWO of the following activities are also allowed by open-access legislation?

A bird watching

B shooting

C walking

D off-road driving

E lighting fires

Answer A, B, C, D or E _____ and _____ [2]

- 4 The photograph shows a data logger being used to gather information.



Choose the **BEST** words from this list to complete the passage.

Words can only be used once or not at all.

analyse

concentration

density

diversify

monitor

produce

There are many advantages of using dataloggers to _____ environmental conditions.

Data loggers can measure oxygen _____, temperature, light and sound.

This information can be transferred to a computer.

The computer can then be used to _____ and display the data.

[2]

5 Acid soils can be improved by the addition of lime.

Choose the TWO BENEFICIAL effects of adding lime to acid soil.

A acid weathering of minerals is increased

B acidity is increased

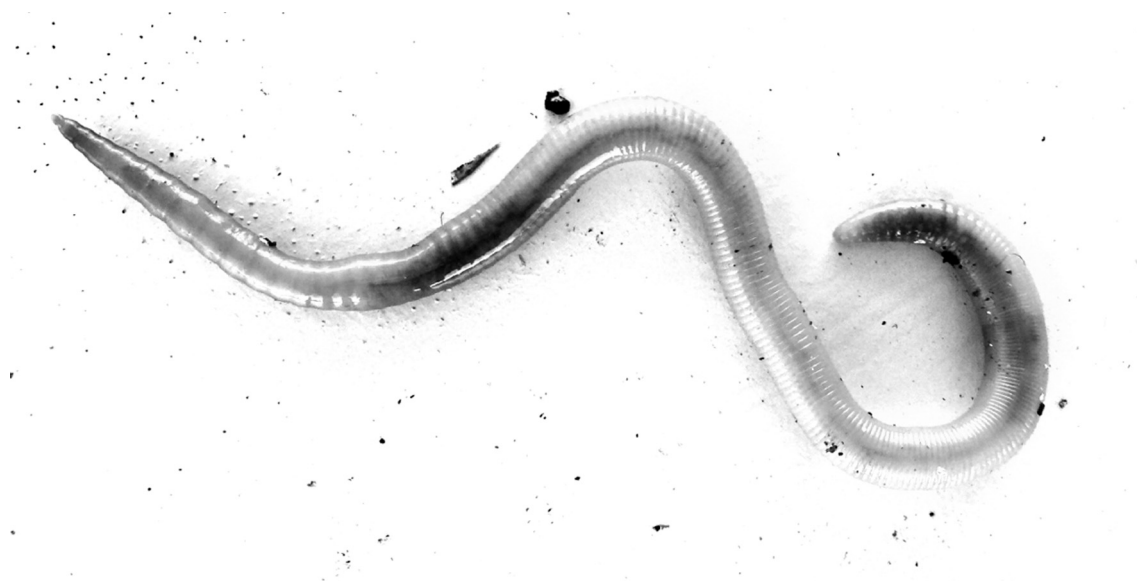
C nutrients are more available

D nitrogen fixation is decreased

E soil microorganisms are encouraged

Answer A, B, C, D or E _____ and _____ [2]

6 The photograph shows an earthworm.



Earthworms help improve soil.

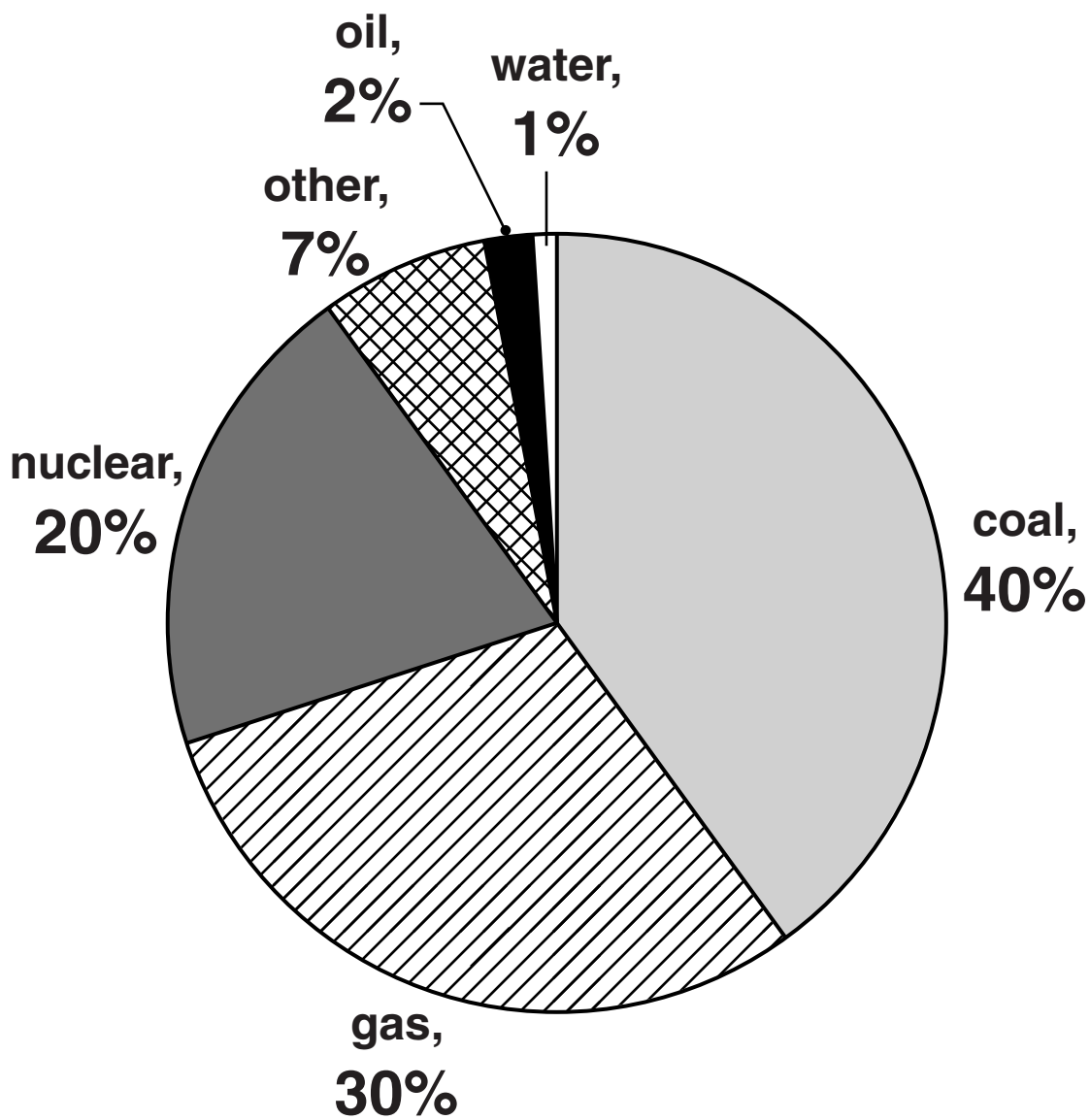
They drag leaves into the soil, which improves its humus content.

Describe and explain ONE other way that earthworms improve soil.

[2]

7 Electricity is generated from a number of different sources.

The pie chart shows the percentage of each source used to generate electricity in the UK.



(a) Suggest why the amount of energy generated from coal will change in the next twenty years.

_____ [1]

(b) 7% of the electricity generated in the UK is from 'other' energy sources.

Name TWO of these sources.

[1]

8 The photograph shows a tractor fitted with caterpillar tracks.



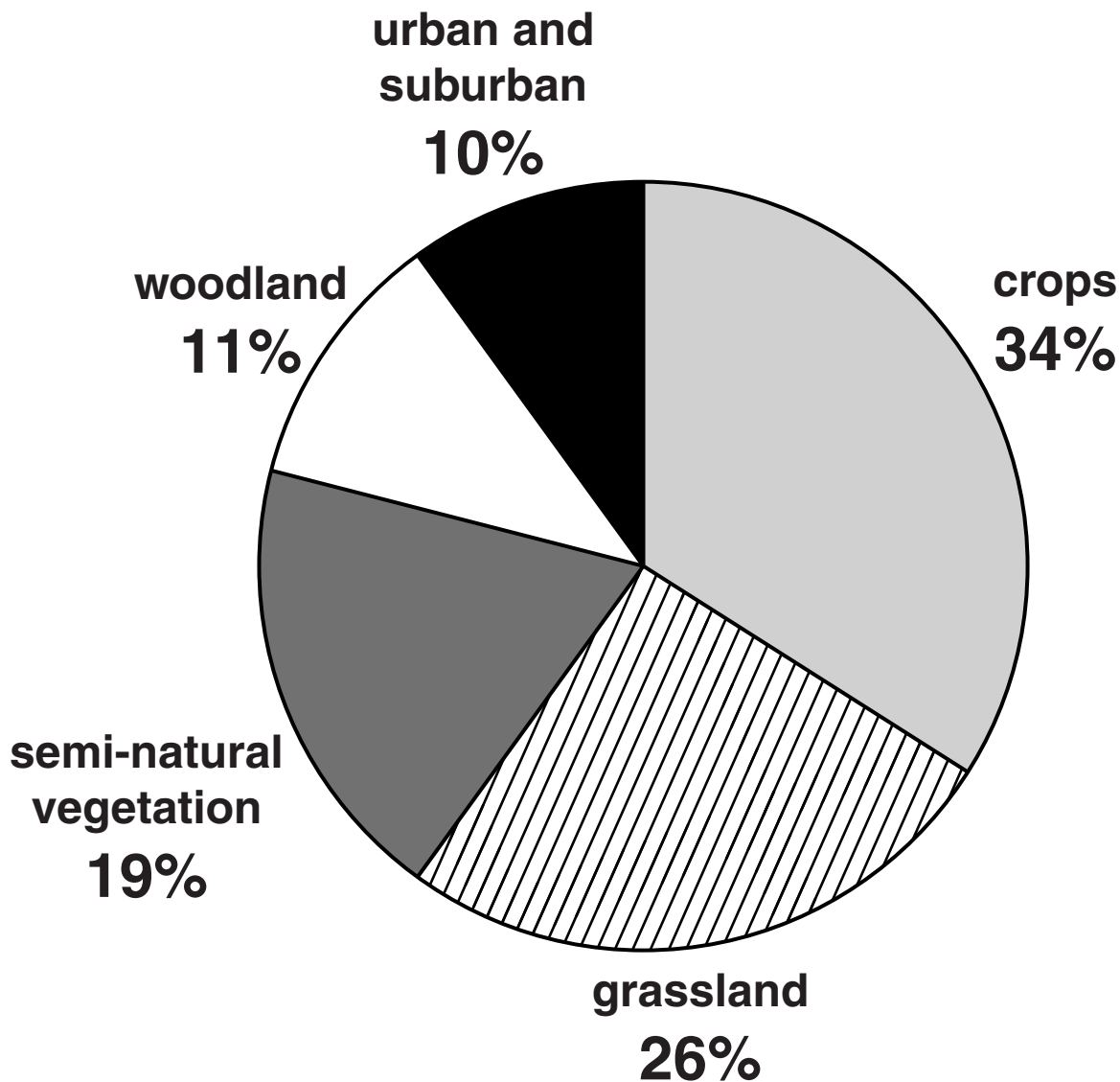
(a) Explain how caterpillar tracks reduce the harmful effect of the tractor on the soil.

[1]

(b) Give ONE OTHER way a farmer can reduce the harmful effect of large machines on the soil.

[1]

9 The pie chart shows land use in Great Britain.



(a) One grassland ecosystem is a hay meadow. Give ONE OTHER example of a grassland ecosystem.

_____ [1]

(b) Woodland can be deciduous (the trees losing their leaves in winter) or coniferous (the trees having leaves all year round). Give ONE difference between these two types of woodland habitat.

_____ [1]

10 The photograph shows a crop of oilseed rape that has finished flowering.

Growing in the crop are many red poppies.

Poppies are weeds.



Weeds can be controlled by using a herbicide.

Suggest why there are concerns about herbicides getting into water courses.

[2]

11 The photograph shows some organically grown food.



Organic farmers do not use synthetic pesticides. Pests are controlled by using a number of other methods. For example, one method is to grow varieties of plants with high natural pest resistance.

Suggest TWO other methods organic farmers could use to reduce pest damage.

[2]

12 In the UK, the red kite is a rare, protected bird.

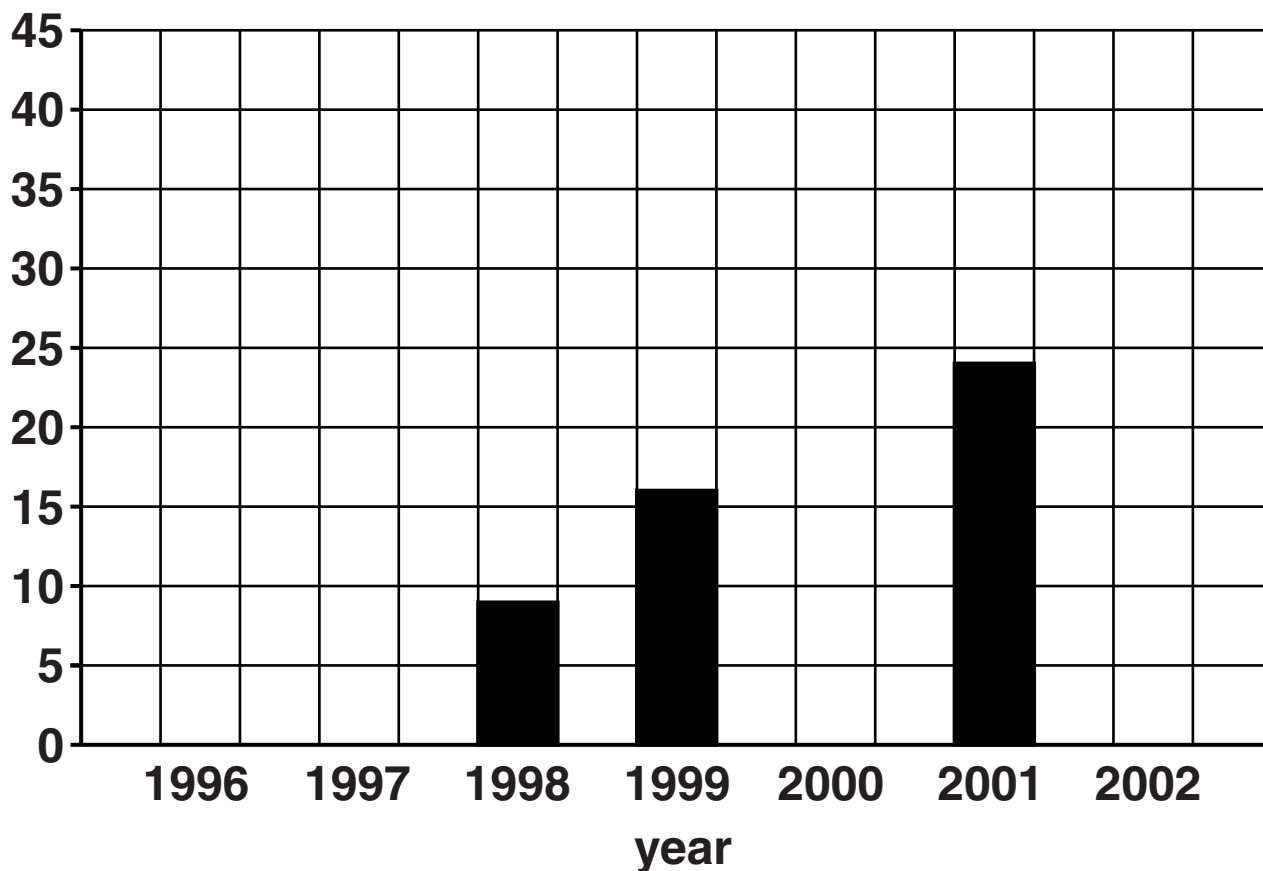
In 1996, one pair of these birds began breeding in Rockingham Forest. The population has continued to grow.

The table below shows the number of breeding pairs and the number of chicks from 1996 to 2002 in Rockingham Forest.

year	breeding pairs	number of chicks
1996	1	2
1997	4	8
1998	4	9
1999	?	16
2000	13	25
2001	12	24
2002	22	44

(a) Complete the bar chart using the data in the table above.

number of chicks



[1]

(b) Estimate the number of breeding pairs in 1999.

_____ [1]

(c) Calculate the average number of chicks per breeding pair from 1996 to 2002.

_____ [1]

13 The photograph shows photovoltaic cells on the roof of a house.



Scientists tested three domestic photovoltaic systems over 12 months.

system	cost of system	units of electricity produced over 12 months	value of electricity produced over 12 months at 8p per unit
1	£4000	2000	£160
2	£3744	1800	£144
3	£4536	2100	£168

(a) How many years would you have to operate system 2 before it paid for itself?

_____ [1]

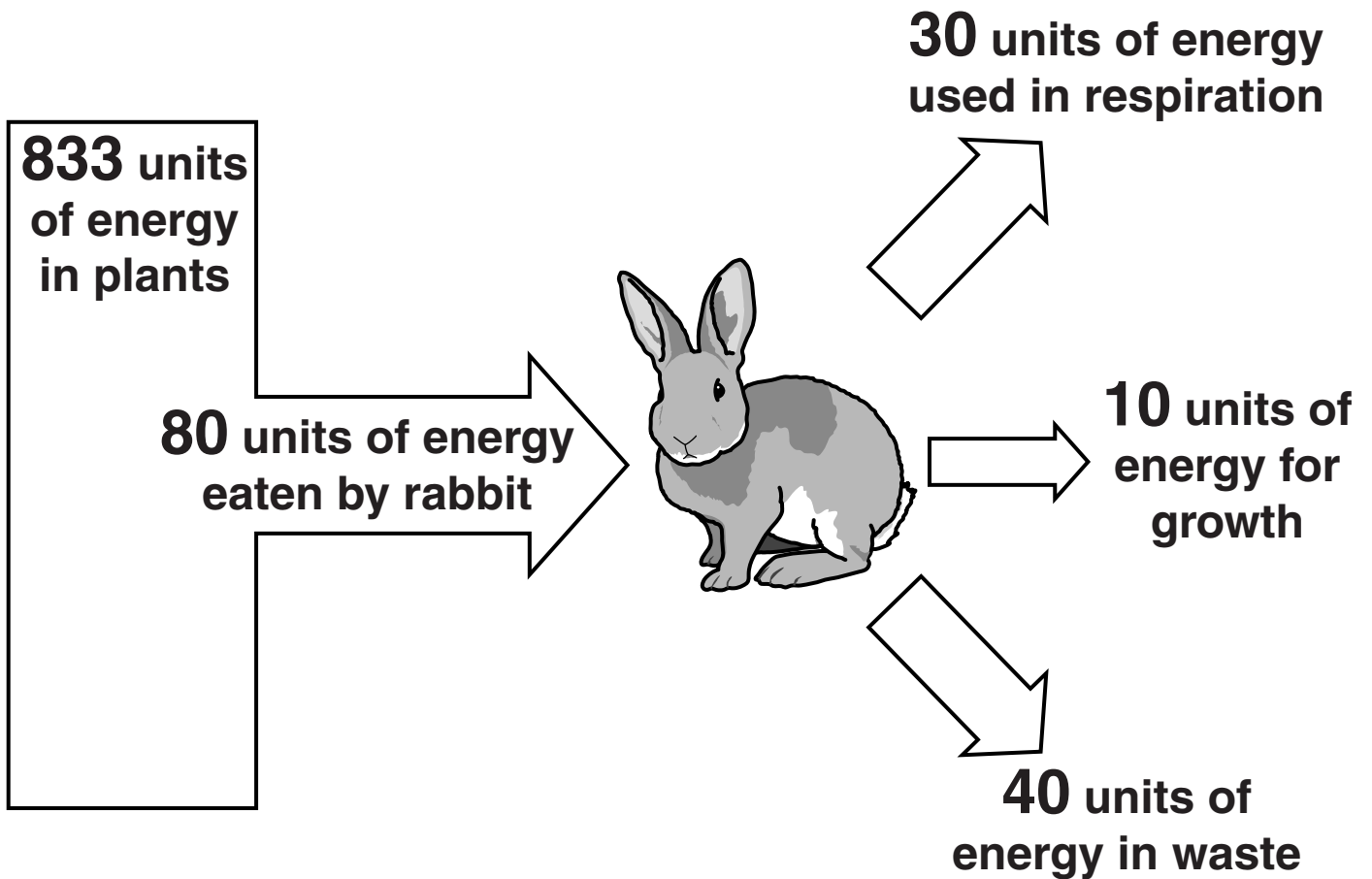
(b) System 3 is 20% efficient.

After 12 months its efficiency has dropped to 18% because of dust and dirt.

Calculate how many units of electricity it would produce in 12 months at 18% efficiency.

_____ [1]

14 The diagram shows the energy flow through a rabbit.

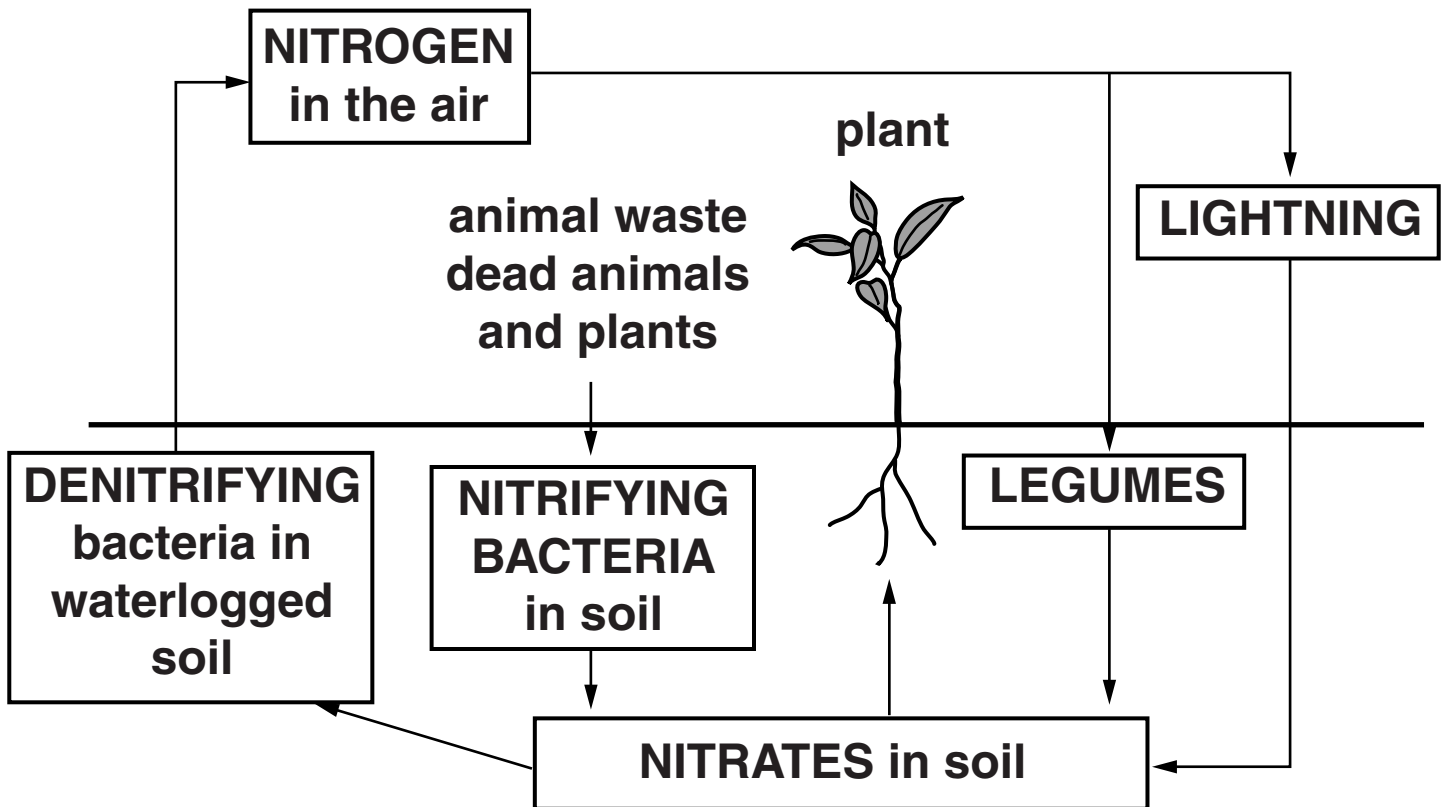


Calculate what percentage of the energy eaten by the rabbit is converted to growth.

[1]

15 Plants need nitrates to grow properly.

The diagram shows part of the nitrogen cycle.



Describe **THREE** ways in which nitrates become available to plants.

Use information from the diagram to help your answer.

[3]

16 A teacher is planning to take a LARGE group of GCSE students on a farm visit.

She accepts there are risks and carries out a risk assessment.

Describe how she could manage these risks.

[2]

- 17 Farming activity can impact on organisms by changing the balance of plants and animals in an ecosystem.**

Look at this extract from a magazine.

British birds news

Farmland bird population falls

The population of British farmland birds fell by 42% between 1970 and 2002. The ecologist Ashley Arundel explained that ‘the fall is due to farming activity changing the balance of plants and animals in the ecosystem.’

Explain THREE ways farming activity could have caused this decline in farmland bird numbers.

[3]

END OF QUESTION PAPER

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