AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 2F

Friday 7 June 2019 Afternoon Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:
- a ruler
- a scientific calculator.

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	

Information
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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0 1 Conditions inside the human body are controlled.

0 1 . 1 What is the control of conditions inside the body called?

[1 mark]

Tick (✓) **one** box.

- Excretion ☐
- Fertilisation ☐
- Homeostasis ☐
- Osmosis ☐

0 1 . 2 What are the **two** ways information is sent to control body conditions?

[2 marks]

Tick (✓) **two** boxes.

- By antigens ☐
- By hormones ☐
- By muscles ☐
- By nerve impulses ☐
- By red blood cells ☐

0 1 . 3 One condition in the body that needs to be controlled is the level of water.

Give **one** other condition in the human body that needs to be controlled.

[1 mark]

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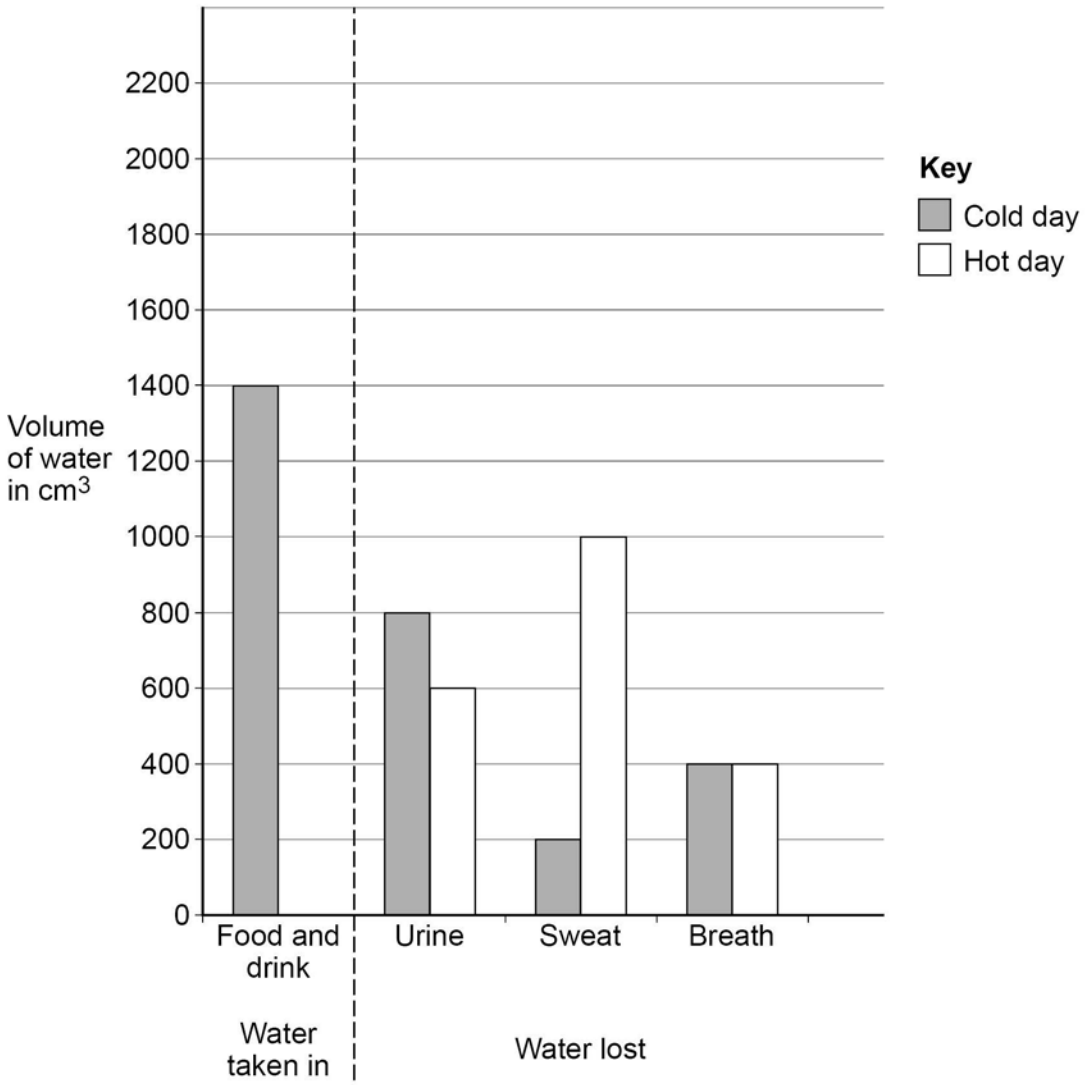
Figure 1 shows the volumes of water taken in and lost by one person.

The volume for water taken in on a hot day has **not** been plotted on the bar graph.

Figure 1



0 1 . 4 The person lost 1400 cm^3 of water on the cold day.

How much extra water did they lose on the hot day?

[2 marks]

Extra volume of water lost = _____ cm^3

Turn over ►

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0 1 . 5 Explain why the volume of water lost on a hot day is higher than on a cold day.

[2 marks]

0 1 . 6 A boy drank 750 cm^3 of water.

His total intake of water for that day was 3000 cm^3

Calculate the percentage of the boy's total intake that the 750 cm^3 represents.

[2 marks]

Percentage = _____ %

10

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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0 2 Some students estimated the population of daisy plants in a field.

This is the method used.

1. Place a quadrat randomly on the field.
2. Count and record the number of daisy plants in the quadrat.
3. Repeat steps 1 and 2 another four times.

0 2 . 1 How could the students have made sure the quadrats were placed randomly?

[1 mark]

0 2 . 2 Describe the piece of equipment called a quadrat.

[1 mark]

Table 1 shows the results.

Table 1

Quadrat number	Number of daisy plants
1	8
2	11
3	4
4	6
5	16
Mean	**X**

0 2 . 3 Calculate mean value **X**.

[1 mark]

X = _____ daisy plants

Do not write outside the box

0 2 . 4 The field is a rectangle 100 m wide and 150 m long.

Calculate the area of the field.

[1 mark]

Area = _____ m^2

0 2 . 5 The quadrat used by the students had an area of 1.0 m^2

Estimate the population of daisy plants in the field.

Use your answers to Question **02.3** and Question **02.4**

[2 marks]

Estimated population = _____ daisy plants

0 2 . 6 More daisy plants grew in some parts of the field compared to other areas of the field.

Give **two** biotic factors that may affect where daisy plants grow in the field.

[2 marks]

1 _____

2 _____

0 2 . 7 The students noticed that the daisy plants growing near a building were smaller.

Explain why smaller daisy plants grew near the building.

[2 marks]

10

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0 3 Animals have adaptations to survive in their environment.

These adaptations may be structural, behavioural or functional.

0 3 . 1 Draw **one** line from each animal adaptation to the type of adaptation it is.

[2 marks]

Animal adaptation	**Type of adaptation**
 Male palm cockatoos use sticks to beat on hollow branches to attract females.	Structural
 The harmless hornet moth has black and yellow stripes to look like a bee or wasp.	Behavioural
 Sea spiders have automatic muscle contractions that move oxygen around their bodies.	Functional

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Plants also have adaptations.

Orchid plants have adaptations which make them one of the most successful plant groups.

Orchids rely on insects for pollination.

Figure 2 shows an orchid.

Figure 2

0 3 . 2 Which **two** features help orchids survive?

[2 marks]

Tick (✓) **two** boxes.

- Brightly coloured flowers ☐
- Large quantities of pollen ☐
- No scent ☐
- Oval shaped leaves ☐
- Small leaves ☐

Turn over ►

Do not write outside the box

Many orchid species grow in tropical rainforest ecosystems.

0 3 . 3 What name describes the variety of all the different species found in an ecosystem?

[1 mark]

Tick (✓) **one** box.

- Biodiversity ☐
- Evolution ☐
- Feeding relationship ☐
- Habitat ☐

0 3 . 4 Some species of orchid may become extinct because of deforestation.

Give **one** reason why tropical rainforests are being cut down.

[1 mark]

_____

0 3 . 5 Give **one** factor that might cause a species of orchid to become extinct.

Do **not** refer to deforestation in your answer.

[1 mark]

_____

Scientists have analysed the entire genetic material of one species of orchid.

0 3 . 6 What chemical is the genetic material made from?

[1 mark]

_____

0 3 . 7 What is the name for the entire genetic material of an organism?

[1 mark]

_____

9

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0 4 A cat breeder noticed that four kittens from one Siamese cat mother had a new blue colour at the tip of their tails.

0 4 . 1 What has caused the new colour to appear?

[1 mark]

Tick (✓) **one** box.

Fertilisation ☐

Mitosis ☐

Mutation ☐

0 4 . 2 The cat breeder wants to use selective breeding so that all new kittens have blue tail tips.

Describe the process of selective breeding the cat breeder could use.

[3 marks]

0 4 . 3 Suggest **one** reason why the cat breeder wants to have all new kittens with the blue tail tips.

[1 mark]

Do not write outside the box

0 4 . 4 Siamese cats can suffer from heart defects.

Why might there be more Siamese cats with heart defects amongst the kittens with blue tail tips?

[1 mark]

Tick (✓) **one** box.

They are clones ☐

They are formed by mitosis ☐

They are formed by sexual reproduction ☐

They are produced by inbreeding ☐

With each pregnancy, the cat breeder expected that:

- 50% of the kittens would be male
- 50% of the kittens would be female.

The sex chromosomes in cats are inherited in the same way as in humans.

The sex chromosomes are X and Y.

0 4 . 5 Give the combination of sex chromosomes present in a male cat and in a female cat.

[1 mark]

Male cat _____

Female cat _____

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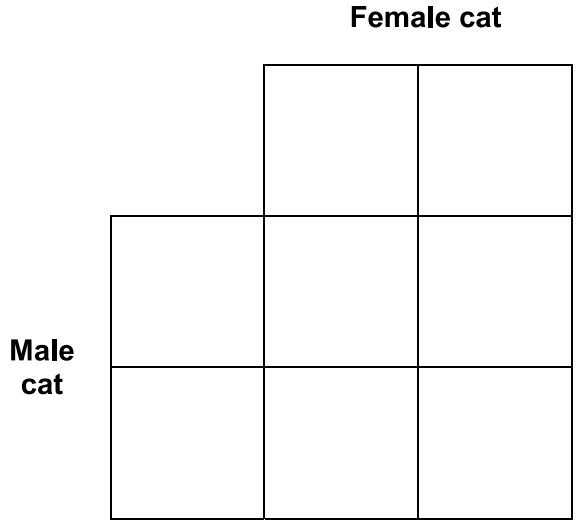
0 4 . 6 The cat breeder expected 50% male kittens and 50% female kittens.

Complete the Punnett square in **Figure 3** to show why.

[2 marks]

Figure 3



0 4 . 7 In the first pregnancy there was one male kitten and three female kittens.

Give the reason why there were **not** two kittens of each sex.

[1 mark]

10

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0 5 **Figure 4** shows a food chain in a garden.

Figure 4

bean plant → blackfly → spider → blackbird

0 5 . 1 Which term describes the spider in this food chain?

[1 mark]

Tick (✓) **one** box.

- Primary consumer ☐
- Producer ☐
- Secondary consumer ☐
- Tertiary consumer ☐

0 5 . 2 Many of the spiders in the garden died.

What is likely to happen to the number of blackflies in the garden?

[1 mark]

Tick (✓) **one** box.

- Decrease ☐
- Increase ☐
- Stay the same ☐

0 5 . 3 Give a reason for your answer to Question **05.2**

[1 mark]

_____

_____

Table 2 shows the estimated biomass of organisms in the garden.

Table 2

Organism	Biomass in g
Bean plants	225
Blackflies	115
Spiders	65
Blackbirds	10

0 5 . 4 What conclusion can be made about biomass in food chains?

[1 mark]

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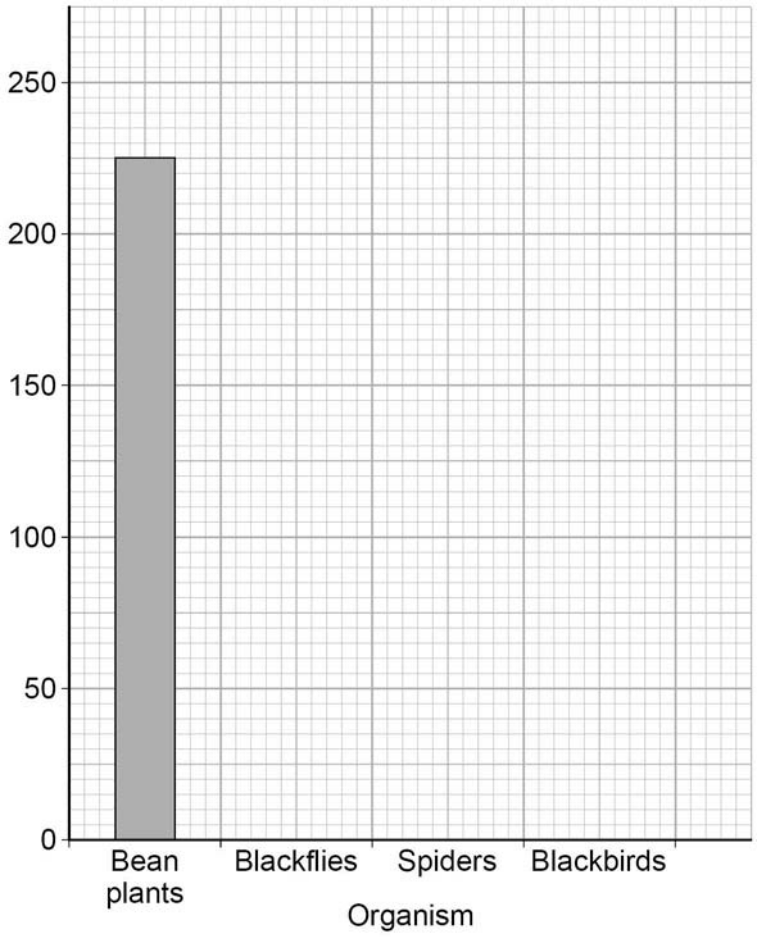
0 5 . 5 Complete **Figure 5.**

You should:

- label the y-axis
- plot the data from **Table 2.**

[3 marks]

Figure 5



0 5 . 6 Explain why a garden is **not** a stable community.

[2 marks]

9

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0 6 Some students investigated the effect of drinking caffeine on reaction time.

They used a drink containing 32.25 mg of caffeine per 100 cm^3

This is the method used.

1. Divide the students into four groups, **A**, **B**, **C** and **D**.
2. Measure and record the reaction time of each student using the ruler-drop test.
3. Students in:
   - group **A** drink 200 cm^3 of water
   - group **B** drink 200 cm^3 of the caffeine drink
   - group **C** drink 400 cm^3 of the caffeine drink
   - group **D** drink 600 cm^3 of the caffeine drink.
4. Repeat step 2 after 15 minutes.

0 6 . 1 Describe how to do the ruler-drop test.

[3 marks]

Question 6 continues on the next page

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0 6 . 2 **Table 3** shows the mass of caffeine taken in by each student.

Table 3

Group	Mass of caffeine in mg
A	0
B	64.5
C	129.0
D	**X**

Calculate value **X.**

[1 mark]

X = _____ mg

0 6 . 3 Why did group **A** drink water instead of the caffeine drink?

[1 mark]

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Table 4 was used to convert the results of the ruler-drop test into reaction times.

Table 4

Distance in cm	Reaction time in s
2	0.064
4	0.090
6	0.111
8	0.128
10	0.143
12	0.156
14	0.169
16	0.181
18	0.192
20	0.202
22	0.212
24	0.221
26	0.230

Distance in cm	Reaction time in s
28	0.239
30	0.247
32	0.256
34	0.263
36	0.271
38	0.278
40	0.286
42	0.293
44	0.300
46	0.306
48	0.313
50	0.319
52	0.326

0 6 . 4 Estimate the reaction time for a student who recorded a distance of 23 cm

[1 mark]

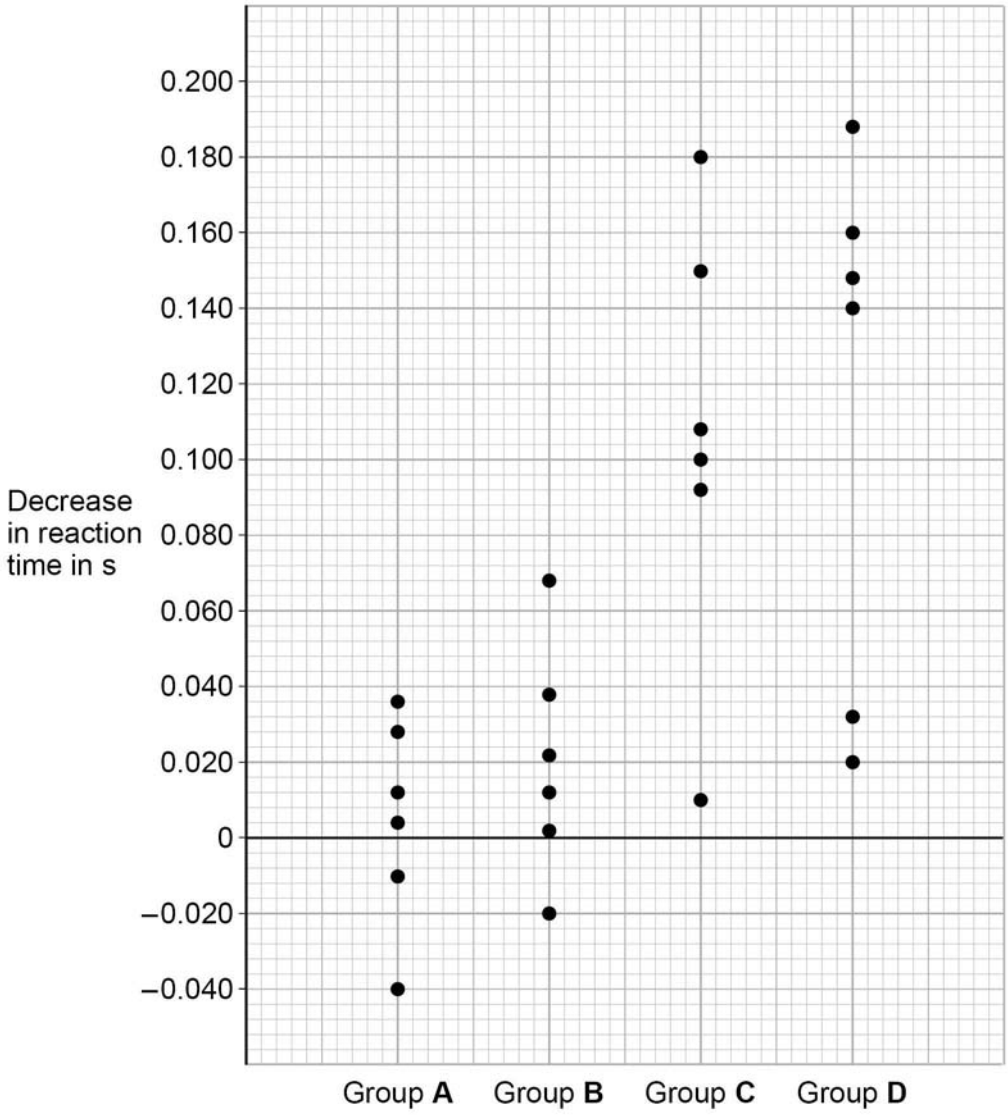
Reaction time = _____ s

Question 6 continues on the next page

Students calculated the decrease in their reaction time after the drink compared with before the drink.

Figure 6 shows the results for each student.

Figure 6



0 6 . 5 Describe the effect of the mass of caffeine taken in on the decrease in reaction time.

[1 mark]

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0 6 . 6 For three students the decrease in reaction time was negative.

Give the reason why the value was negative.

[1 mark]

0 6 . 7 What is the range of results for group **C**?

[1 mark]

0 6 . 8 Suggest **two** variables that should have been controlled in this investigation.

[2 marks]

1

2

0 6 . 9 Explain why the ruler-drop test does **not** involve a reflex action.

[2 marks]

13

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0 7 There has been a rapid increase in the percentage of carbon dioxide in the atmosphere since 1960.

0 7 . 1 Carbon dioxide is a greenhouse gas that contributes to global warming.

Name **one** other greenhouse gas.

[1 mark]

_____

0 7 . 2 Global warming causes climate change.

Give **two** effects of climate change.

[2 marks]

1 _____

_____

2 _____

_____

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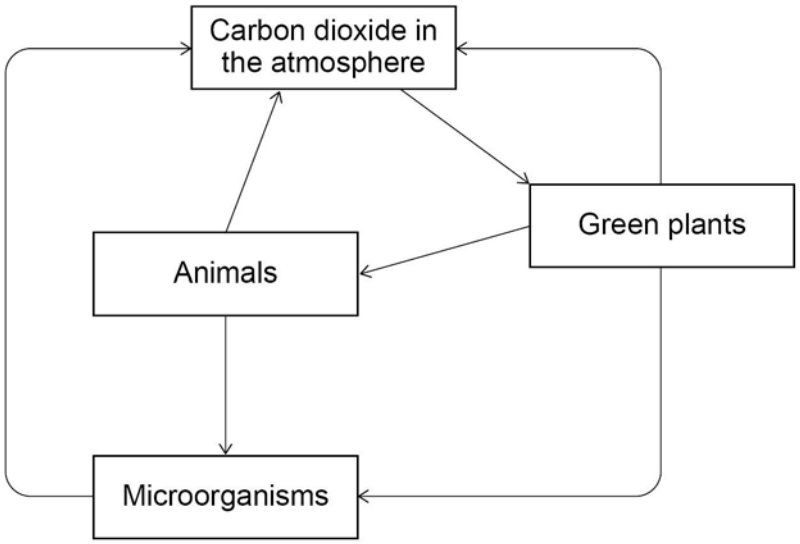
0 7 . 3 Plants take in carbon dioxide from the atmosphere.

Figure 7 shows part of the carbon cycle.

Figure 7



Describe how carbon from the atmosphere is cycled through living organisms.

[6 marks]

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END OF QUESTIONS

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