

FORM TP 2011003



TEST CODE **01207032**

JANUARY 2011

CARIBBEAN EXAMINATIONS COUNCIL

**SECONDARY EDUCATION CERTIFICATE
EXAMINATION**

BIOLOGY

Paper 03/2 – Alternative to SBA

General Proficiency

2 hours

In addition to the 2 hours, candidates are allowed 10 minutes in order to read through the entire paper. Writing may begin during the 10-minute period.

READ THE FOLLOWING DIRECTIONS CAREFULLY.

- 1. Answer ALL questions.**
- 2. Use this answer booklet when responding to the questions. For EACH question, write your answer in the space provided and return the answer booklet at the end of the examination.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. In a study of their environment undertaken by the school's ecology club, *Ecominds*, members conducted a survey of the flora and fauna in a grassy field. They recorded the numbers of organisms that they found, as shown in Table 1.

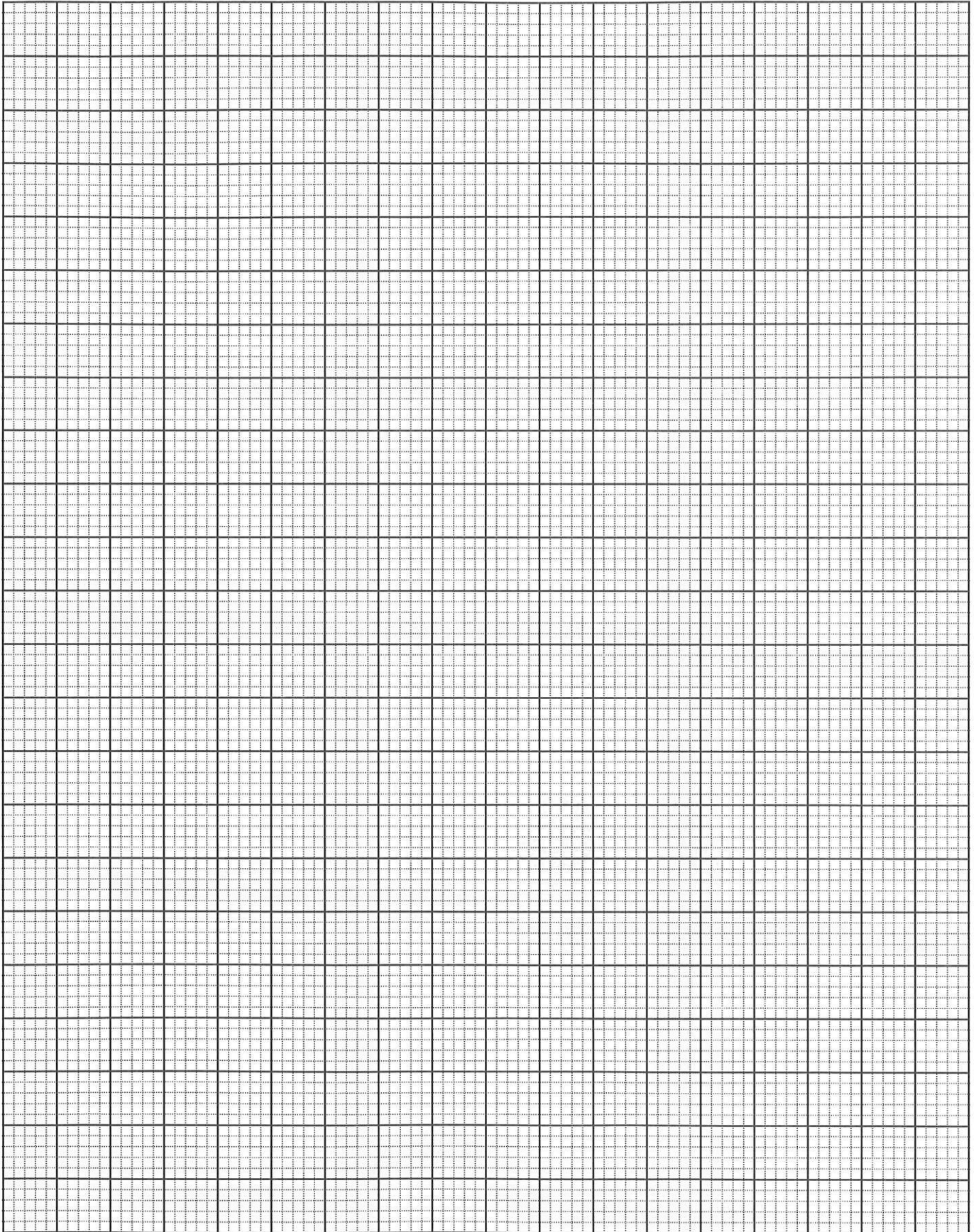
TABLE 1: ESTIMATE OF NUMBERS OF ORGANISMS IN A GRASSY FIELD

Organisms	Estimated number
Plants	
• Sensitive plant	1 per m ²
• Rabbit bush	5 per m ²
• Savannah grass	75 per m ²
Animals	
• Lizards	10
• Bees and wasps	120
• Toads and frogs	85
• Woodlice	400
• Butterflies	150
• Ants	1100
• Grasshoppers	300

- (a) (i) **On the graph paper provided on Page 3**, construct a bar graph to show the relative size of the animal populations in the grassy field. **(8 marks)**
- (ii) Identify ONE organism that is likely to be preyed upon. Give a reason for your answer.

(2 marks)

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- (b) (i) Members of *Ecominds* used a quadrat to estimate the number of plants in the grassy field. Explain how they would have used the quadrat to arrive at the estimated number of plants.

(4 marks)

- (ii) Suggest TWO other methods that would have been used by members of *Ecominds* to collect their data. Explain your suggestions.

(4 marks)

- (c) In the leaf litter under a tree at the edge of the grassy field, the *Ecominds* team found organisms represented by Specimen A to Specimen D in Figure 1 below. The *Ecominds* team thought that they belonged to the same group, since they were all found in the leaf litter.

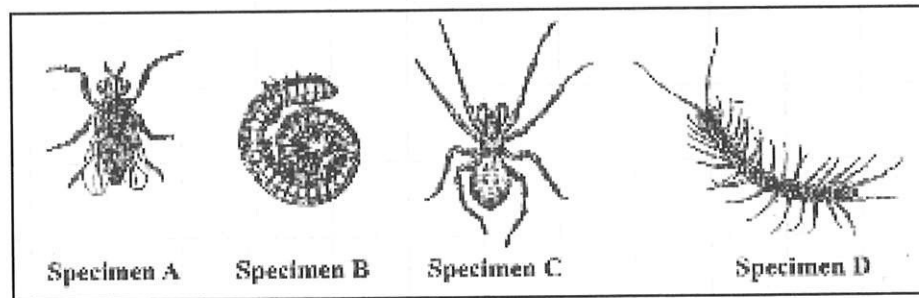


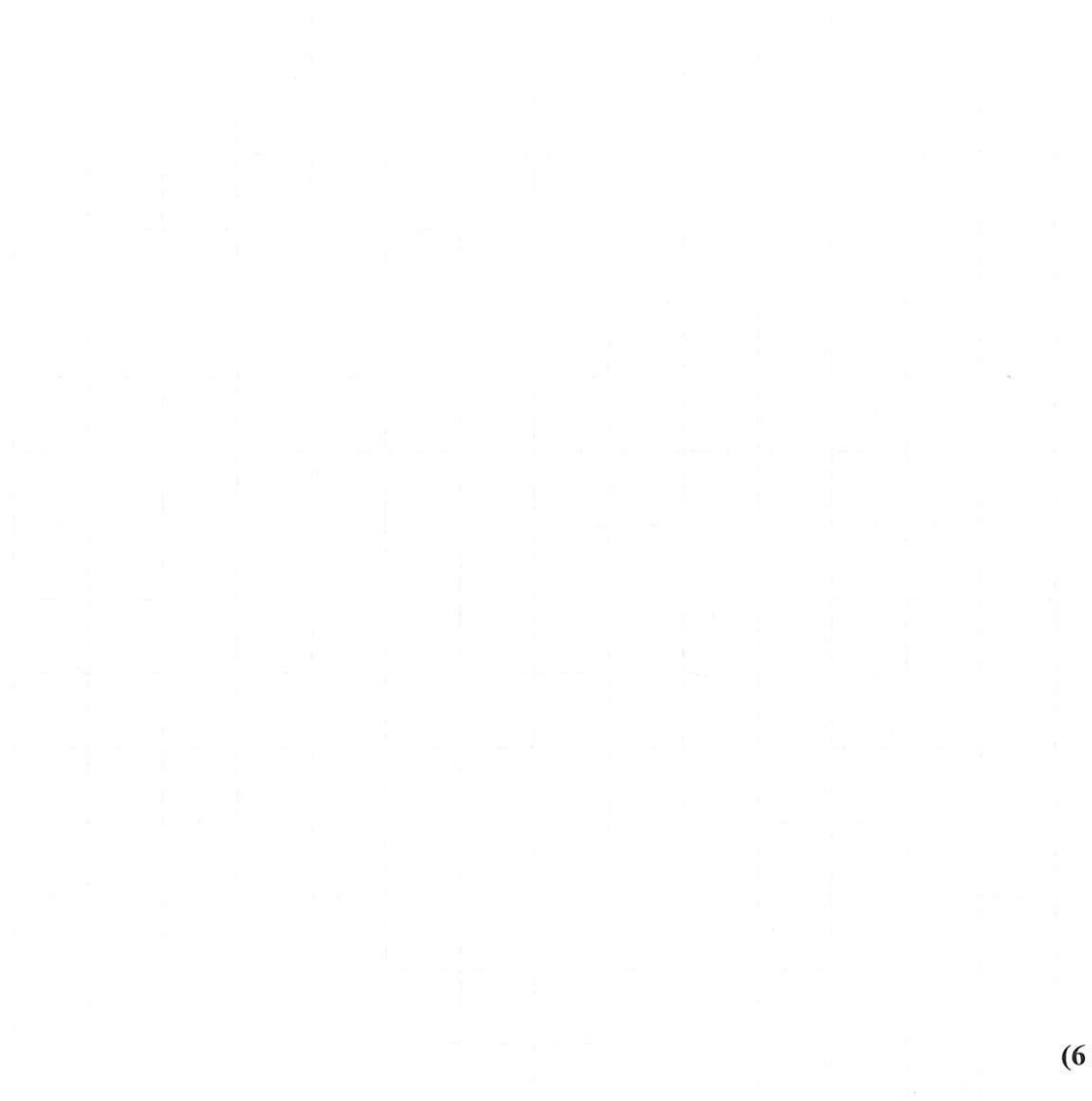
Figure 1. Drawings of specimens found in leaf litter

- (i) Identify TWO features shown in the drawings in Figure 1 that can be used to classify the organisms.

(2 marks)

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- (ii) In the space provided below, make a drawing of Specimen C twice the size shown in Figure 1. State your magnification.



(6 marks)

Total 26 marks

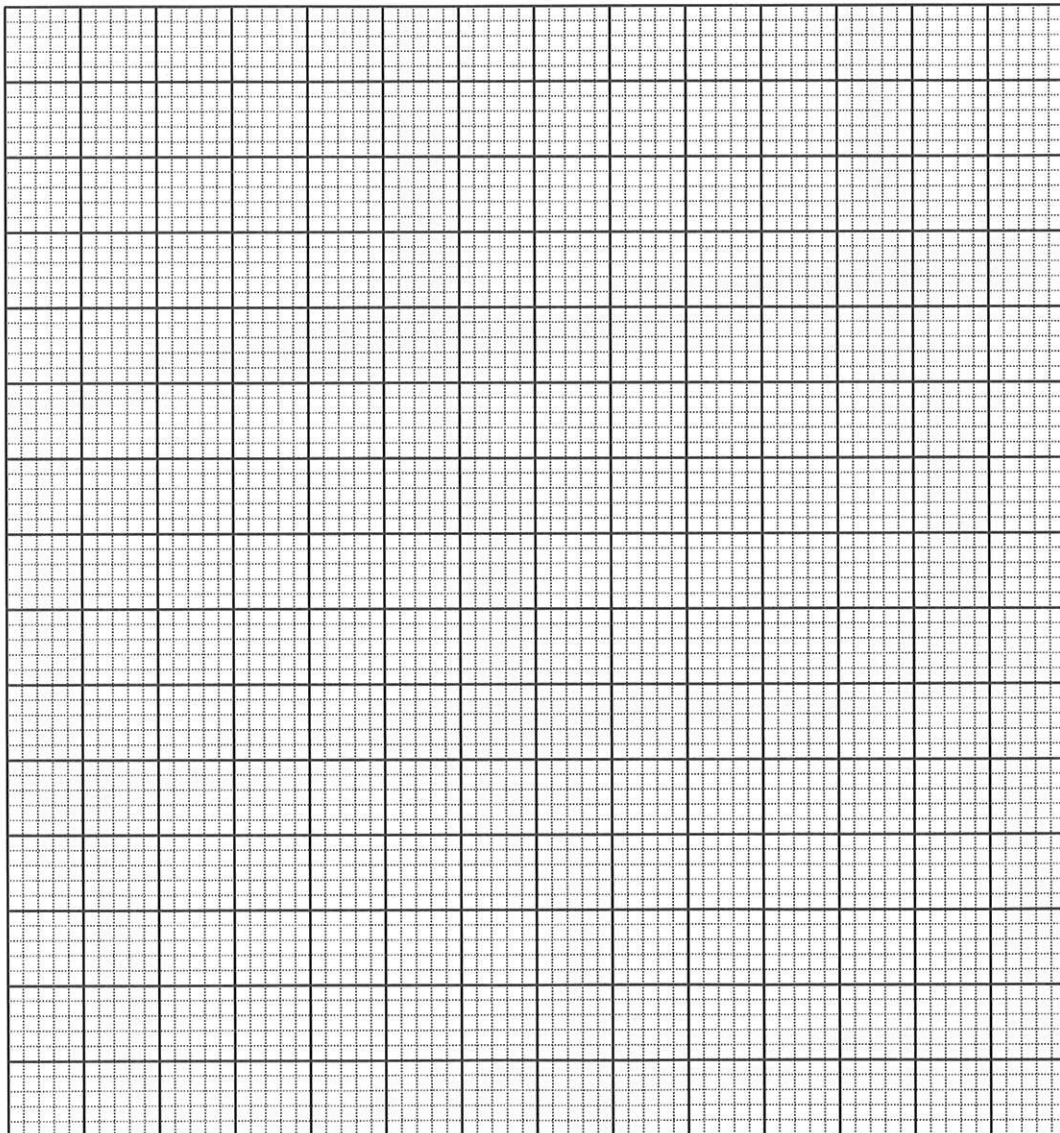
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2. Table 2 shows the height of a pigeon pea (*Gungo*) plant over a period of seven weeks.

TABLE 2: CHANGES IN HEIGHT OF A PLANT OVER A SEVEN-WEEK PERIOD

Time/days	0	7	14	21	28	35	42	49
Height/cm	0	10	90	215	245	255	260	260

(a) (i) On the grid provided below draw a histogram of the data shown in Table 2.



(6 marks)

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- (ii) Using information from the graph you constructed on Page 6, estimate the height of the pigeon pea (*Gungo*) plant on Day 18 and Day 31.

Day 18: _____

Day 31: _____

(2 marks)

- (b) The data shown in Table 2 and the graph in (a) (i) on Page 6 are used to illustrate the pattern of growth in the plant species. Another method of determining growth of a plant species is by using dry mass (weight).

- (i) Describe the method for obtaining dry mass, including the materials and apparatus.

Materials and apparatus:

Method:

(4 marks)

- (ii) State ONE precaution that should be taken to ensure accurate results when using the dry mass method.

(1 mark)

- (iii) Give ONE disadvantage of using dry mass to determine growth.

(1 mark)

- (c) The pigeon pea (*Gungo*) is a leguminous plant and thus plays an important role in the recycling of nutrients.

- (i) Identify ONE nutrient element that the pigeon pea plant helps to recycle.

(1 mark)

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- (ii) Briefly outline the role that the pigeon pea plant plays as a leguminous plant in recycling nutrients.

(3 marks)

Total 18 marks

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3. Examine the pie chart in Figure 2, which shows the components in a balanced diet.

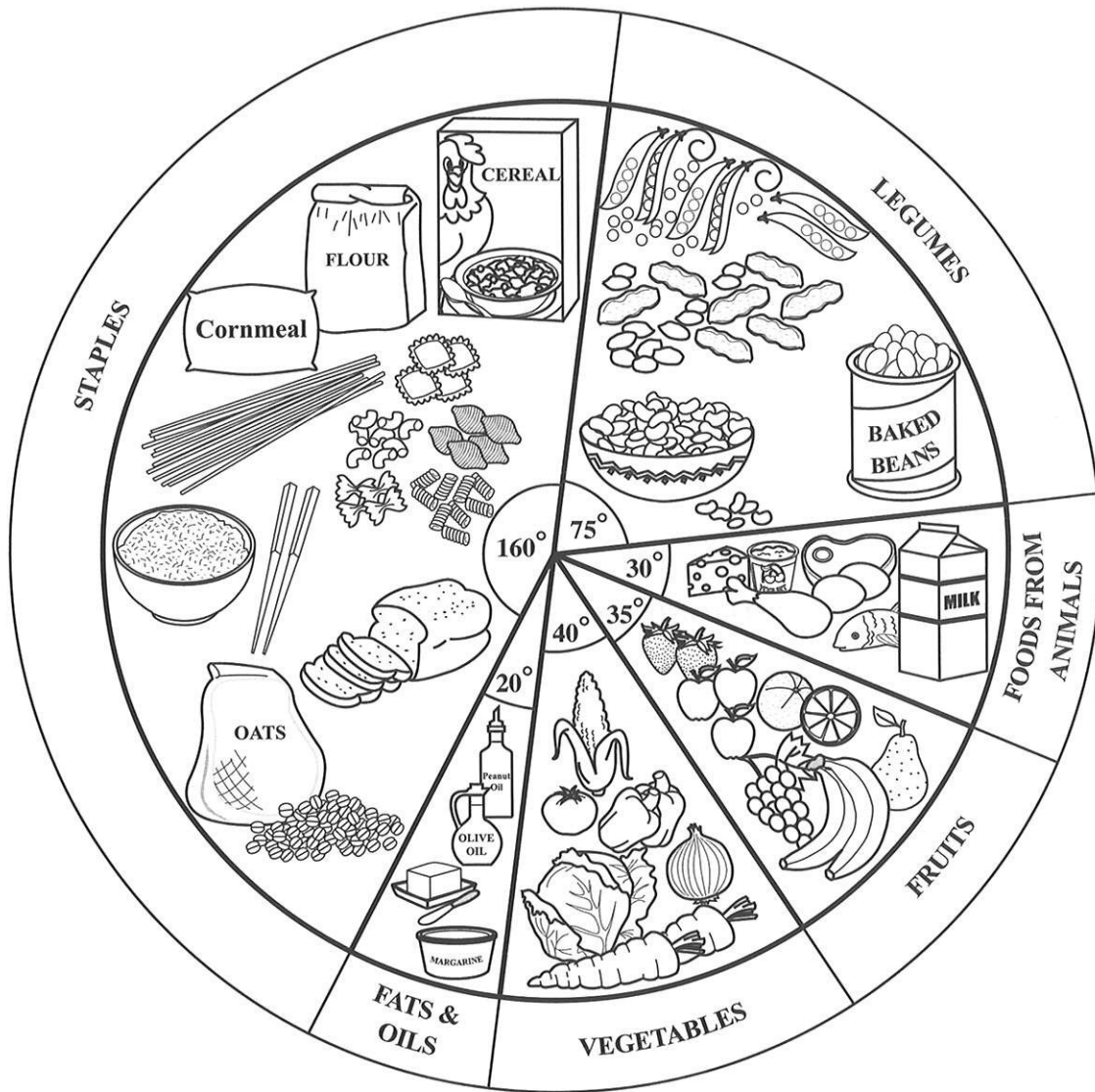


Figure 2. Components in a balanced diet

Prepared by the Caribbean Food and Nutrition Institute (CFNI)

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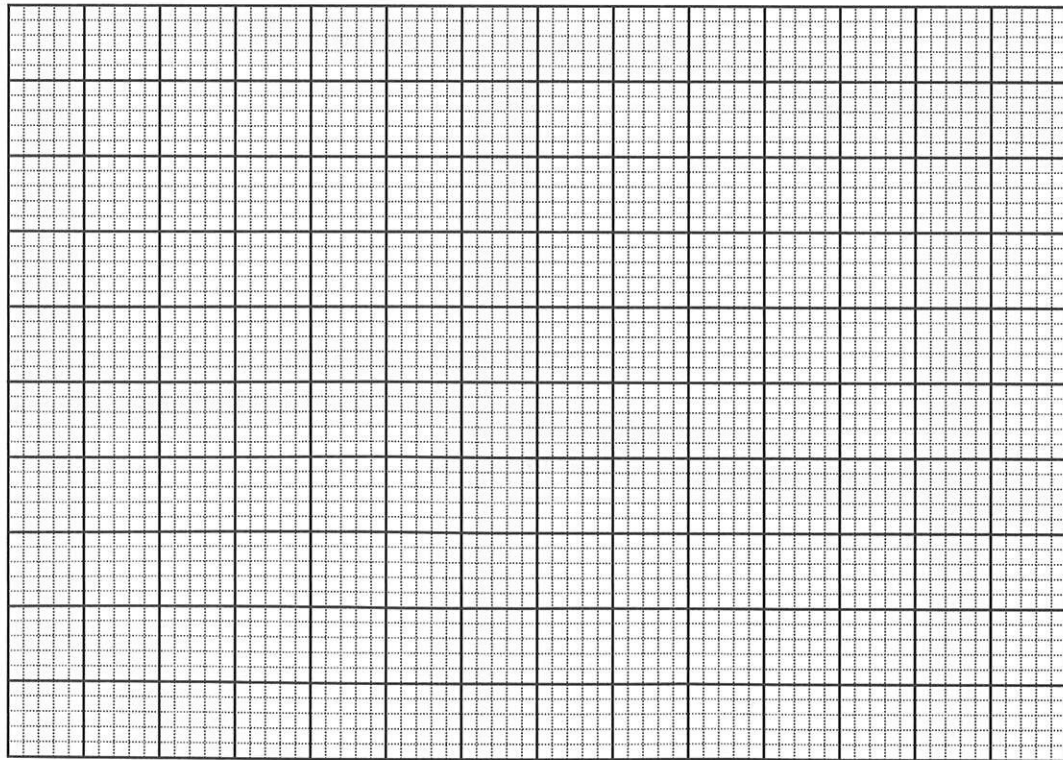
- (a) Convert the information in the pie chart in Figure 2 into percentages, for the construction of a bar graph. Show your working in Table 3.

TABLE 3: CONVERSION OF PIE CHART INFORMATION TO PERCENTAGES

	Staples	Legumes	Foods from animals	Fruits	Vegetables	Fats and oils
Calculations						
Percentages						

(6 marks)

- (b) Construct a bar graph in the space provided below using data from Table 3.



(6 marks)

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- (c) Which of the two methods of displaying the components of a balanced diet, pie chart or bar graph, may be considered MORE appropriate? Explain your answer.

(2 marks)

- (d) Suggest why staples form the LARGEST part of a balanced human diet.

(2 marks)

Total 16 marks

END OF TEST