Nutrition and Digestion

What you eat and how your body breaks it down are essential KS3 biology topics — understanding nutrition and digestion also lays the groundwork for GCSE Science.

(c) Why do we need calcium in our diet?

13c
1 mark

(d) (i) Baby-milk powder is made from cows' milk.

What evidence is there in the table that iron is added when making baby-milk powder?

13di
1 mark

(ii) Why do we need iron in our diet?

13dii
1 mark

(e) A pupil said, 'There is more vitamin C than protein in human milk'.

How can you tell from the table that the pupil was wrong?

13e
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2008) - Q13(c)-(e)

(c) Cells in the lining of the intestine are adapted to absorb digested food.

How does the folded membrane of these cells enable them to absorb the maximum amount of digested food?

13c
1 mark

KS3 Science SATs, Tier 5-7, Paper 2 (2006) - Q13(c)

(c) **Not** all the types of nutrients needed for a balanced diet are shown in **table 1**.

Give the name of **one** of the missing types of nutrient.

_____

15c
1 mark

(d) **Table 2** shows the recommended daily amount of calcium for a person in four stages of the human life cycle.
We need calcium for healthy teeth and bones.

person	recommended daily amount of calcium (mg)
a baby aged 6 months	600
a woman before she is pregnant	500
a pregnant woman	1200
a breast-feeding woman	

table 2

(i) Use information in **table 2** to estimate how much calcium a breast-feeding woman should have each day.

_____ mg

15di
1 mark

(ii) Explain why she would need this amount of calcium.

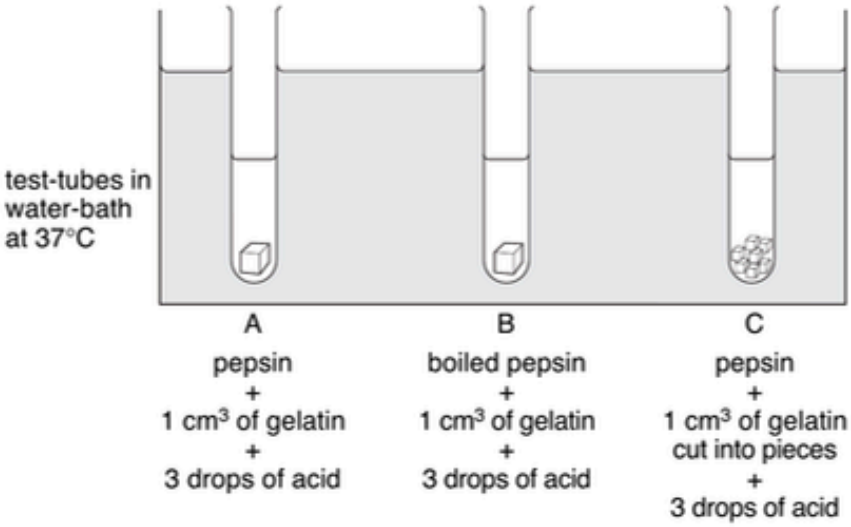
_____

_____

15dii
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2007) - Q15(c)-(d)

10. Andy investigated the digestion of a protein called gelatin.
He used an enzyme called pepsin from the human stomach, and three cubes of gelatin each 1 cm^3.
He set up the experiment shown below and put the test-tubes in a water-bath at 37°C.
He measured the time for the digestion of the gelatin.



(a) Why did Andy choose a temperature of 37°C for the water-bath?

10a
1 mark

(b) In test-tube C, the cube of gelatin that had been cut into pieces was digested more quickly than the whole cube in test-tube A.

Give the reason for this.

10b
1 mark

KS3 Science SATs, Tier 5-7, Paper 1 (2005) - Q10(a)-(b)

(c) The boiled pepsin in test-tube B did **not** digest the gelatin.

Why did boiling this enzyme stop it working?

_____

_____

10c
1 mark

(d) Protein is needed for growth and repair.
The digestion of protein begins in the stomach and is completed in the small intestine.

(i) What are the products of the digestion of protein?
Tick the correct box.

amino acids	☐	energy	☐
sugars	☐	vitamins	☐

10di
1 mark

(ii) Why is it necessary to digest protein before it can be used for growth and repair?

_____

_____

10dii
1 mark

KS3 Science SATs, Tier 5-7, Paper 1 (2005) - Q10(c)-(d)

15. **Table 1** gives information about 100 g of five different foods.

food	energy per 100 g of food (kJ)	nutrients per 100 g of each food			
		protein (g)	fat (g)	carbohydrate (g)	calcium (mg)
banana	403	1.2	0.3	23.2	6
wholemeal bread	914	9.2	2.5	41.6	54
butter	3031	0.5	81.7	0	15
cheese	1708	22.5	34.4	0.1	720
milk	275	3.2	3.9	4.8	115

table 1

(a) Look at **table 1**.

(i) Which of the four **nutrients**, protein, fat, carbohydrate or calcium, provides most of the energy in the cheese?

_____ 15ai

1 mark

(ii) Which of the four **nutrients** provides most of the energy in the wholemeal bread?

_____ 15aii

1 mark

(iii) Which of the four **nutrients** is needed for growth and repair?

_____ 15aiii

1 mark

(b) The recommended daily amount of protein for a woman is 45 g.
Look at **table 1**.
How many grams of cheese would provide 45 g of protein?
Tick the correct box.

50 g ☐ 100 g ☐ 150 g ☐ 200 g ☐ 15b

1 mark

Modern Tuition

10. (a) Pineapple juice contains a substance that speeds up the digestion of protein.

(i) What is the name for substances that speed up digestion?

10ai

1 mark

_____

(ii) What happens to a molecule of protein during digestion?

10aii

1 mark

_____

_____

(b) Asim did an experiment to investigate the digestion of gelatin.
Gelatin is the protein in jelly.
In test tubes A and B he used one cube of jelly in each.
In test tube C he used one cube of jelly that he had chopped up.



A
5 g jelly cube + 15 cm^3 cold water

B
5 g jelly cube + 15 cm^3 fresh pineapple juice

C
5 g jelly cube chopped into pieces + 15 cm^3 fresh pineapple juice

He recorded how long it took for the jelly to be digested in each test tube.
The table below shows his results.

test tube	result
A	**not** digested after 2 hours
B	jelly digested in 2 hours
C	jelly digested in 1 hour

KS3 Science SATs, Tier 5-7, Paper 1 (2009) - Q10(a)-(b)

(i) What was the purpose of test tube A?

_____

_____

10bi
1 mark

(ii) It is helpful to chew your food.
How do the results in test tube C show this?

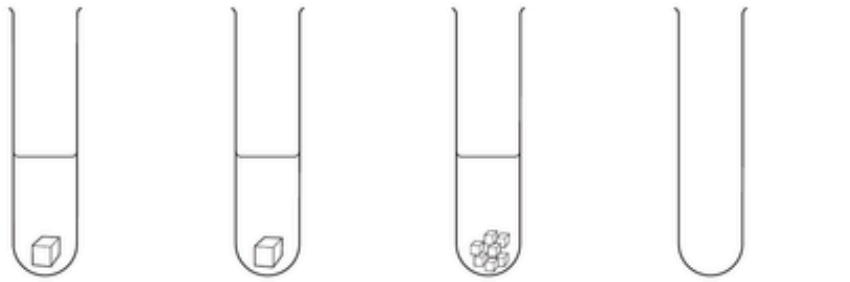
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10bii
1 mark

(c) The substances that speed up digestion stop working when they have been boiled.

(i) What does Asim need to put in a fourth test tube to test this in his experiment? Label test tube D.
Test tubes A, B and C contain the same as in the first experiment.



A	B	C	D
5 g jelly cube + 15 cm^3 cold water	5 g jelly cube + 15 cm^3 fresh pineapple juice	5 g jelly cube chopped into pieces + 15 cm^3 fresh pineapple juice	_____ _____ + _____ _____ _____

10ci
1 mark

10ci
1 mark

(ii) Predict what Asim would observe in test tube D after 2 hours.

_____

10cii
1 mark

maximum 7 marks

KS3 Science SATs, Tier 5-7, Paper 1 (2009) - Q10(b)-(c)

(c) Cheese is a source of calcium.

Why do we need calcium?

_____

5c
1 mark

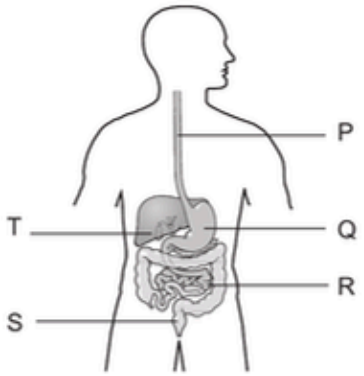
(d) Draw a line from each nutrient to a good source of that nutrient in our diet.

nutrient	source of nutrient
starch	lean chicken meat
fat	jam
protein	pasta
sugar	margarine

5d
1 mark

5d
1 mark

(e) The diagram shows part of the human digestive system.



(i) Write the letter which labels the small intestine.

_____

5ei
1 mark

(ii) Write the letter which labels the stomach.

_____

5eii
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2009) - Q5(c)-(e)

5. (a) Green beans contain vitamin C.

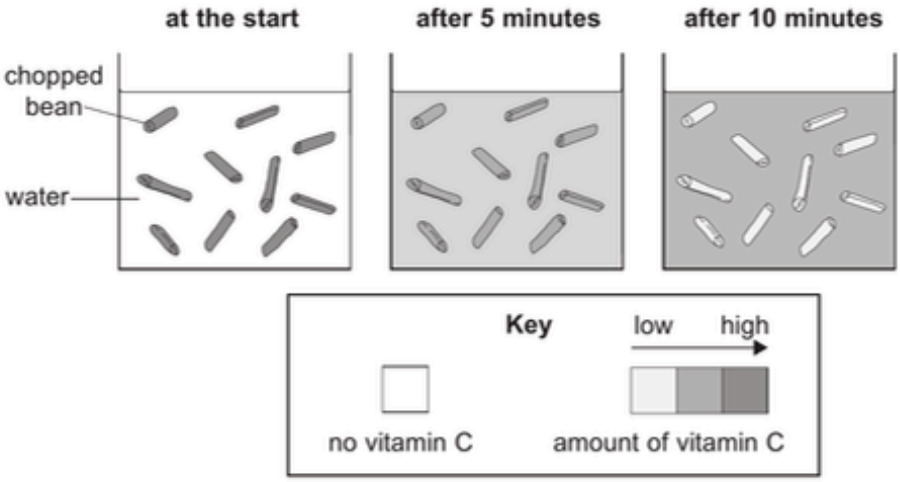


Which other food is a good source of vitamin C?
Tick the correct box.

cheese	chicken	eggs	oranges
☐	☐	☐	☐

☐ 5a
1 mark

(b) The amount of vitamin C changes in the beans and in the water as the beans are cooked. The shading shows how it changes.



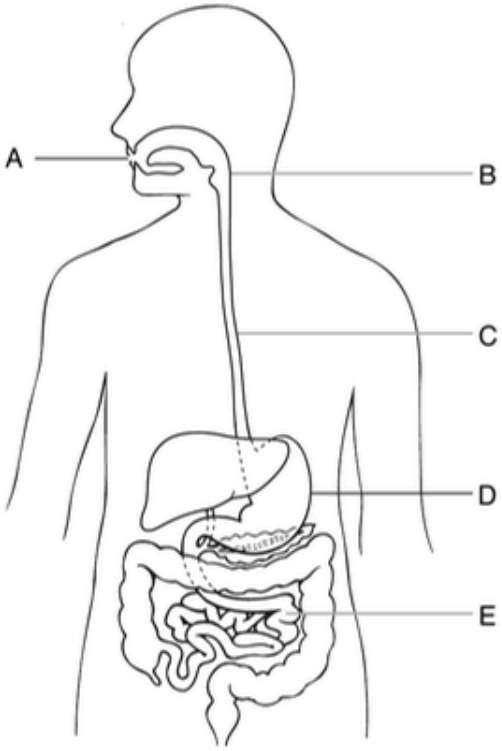
Use the diagram. How does the **amount of vitamin C** in the beans and in the water change as the beans are cooked? Tick one box in each row.

amount of vitamin C	increases	decreases	stays the same
in the beans			
in the water			

☐ 5b
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2009) - Q5(a)-(b)

6. The diagram below shows the digestive system.



(a) (i) Give the letter which labels the stomach.

6ai
1 mark

_____

(ii) Give the letter which labels the small intestine.

6aii
1 mark

_____

(iii) Glucose is absorbed in the small intestine.

What carries glucose from the intestine to other parts of the body?

6aiii
1 mark

_____

KS3 Science SATs, Tier 3-6, Paper 2 (2005) - Q6(a)

The table below shows the mass of six nutrients in 100 cm^3 of three types of milk.

nutrient	100 cm^3 of human milk	100 cm^3 of cows' milk	100 cm^3 of milk made from baby-milk powder
carbohydrate (g)	7.4	5.0	7.2
fat (g)	4.2	3.7	3.6
protein (g)	1.1	3.5	1.5
calcium (mg)	35.0	120.0	49.0
iron (mg)	0.075	0.05	0.9
vitamin C (mg)	3.8	1.5	6.9

(a) A scientist compared the three types of milk.

Why was it a fair comparison?

_____

_____

(b) Both human milk and milk made from baby-milk powder contain more sugar than cows' milk.

Which data in the table supports this?

_____

KS3 Science SATs, Tier 3-6, Paper 2 (2008) - Q13(a)-(b)

(b) (i) Starch is a carbohydrate.

Which two of the following foods are good sources of starch?
Tick the two correct boxes.

bread	☐	cheese	☐
chicken	☐	tomatoes	☐
fish	☐	pasta	☐

☐ 10bi
1 mark

☐ 10bi
1 mark

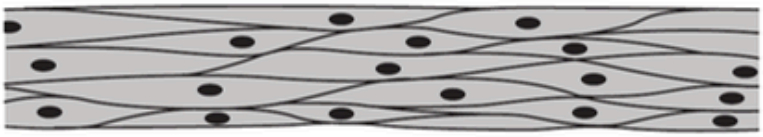
(ii) What other type of nutrient, needed as part of a balanced diet, keeps the intestine working well and prevents constipation?
Tick the correct box.

fat	fibre	minerals	protein	vitamins
☐	☐	☐	☐	☐

☐ 10bii
1 mark

KS3 Science SATs, Tier 3-6, Paper 1 (2006) - Q10(b)

(b) The diagram below shows muscle cells from the wall of the human intestine.



(i) Muscle cells can contract.

Give **one** reason why muscles are needed in the intestine.

_____

_____

14bi

1 mark

(ii) Other cells in the intestine produce enzymes.

What effect do enzymes in the intestine have on nutrients such as protein?

_____

_____

14bii

1 mark

(iii) Which of the following is required in the diet to keep food moving through the intestine?
Tick the correct box.

fat	☐	fibre	☐
protein	☐	starch	☐

14biii

1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2005) - Q14(b)