

NAME:	SCIENCE TEACHER:	10B
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SCIENCE

Year 10 Examination 2006

10B – 80 marks

Make sure that you have answered all the questions in this paper before you start paper 10A or 10C

Time allowed for both examinations: 2 hours

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

Give units for all answers (eg kg or m) unless they are already provided.

For Teacher Use

<i>Question</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	<i>Total</i>
<i>Marks gained</i>														
<i>Marks available</i>	4	8	9	2	9	8	4	7	4	4	9	7	5	80

Question One: (4 marks)

Aim: to find out how much of a candle needs to be burnt to boil water to make a cup of tea.

Joan wanted to design a "fair test" to investigate this aim. She set up an experiment three times with three identical candles and three containers of water.

- a. Explain why Joan did the same experiment three times?

- b. To make this a "fair test", describe the four things which are the most important to keep the same. (Do not include the size of the candles).

- c. What data would need to record to find an answer to her **aim**?

Question Two: (8 marks)

- a. State the **final** colour of the litmus paper when it is placed in the following solutions.

- (i) Blue litmus paper placed in hydrochloric acid. _____
- (ii) Red litmus placed in vinegar solution. _____
- (iii) Blue litmus placed in sodium hydroxide solution. _____
- (iv) Red litmus placed in ammonia solution. _____

- b. Some organic acids are found in fruits. For example...

Apples contain malic acid

Lemons contain citric acid

Grapes contain tartaric acid



Describe the flavour that would indicate the presence of these acids in the fruits listed.

- c. A commonly used indicator is called Universal Indicator. Explain why it is more helpful to use this indicator than litmus when you are trying to measure the level of acidity of a fruit juice.

- d. Use the descriptive terms below to complete the table correctly.

Strongly alkaline

Weakly alkaline

Strongly acidic

Neutral

Weakly acidic

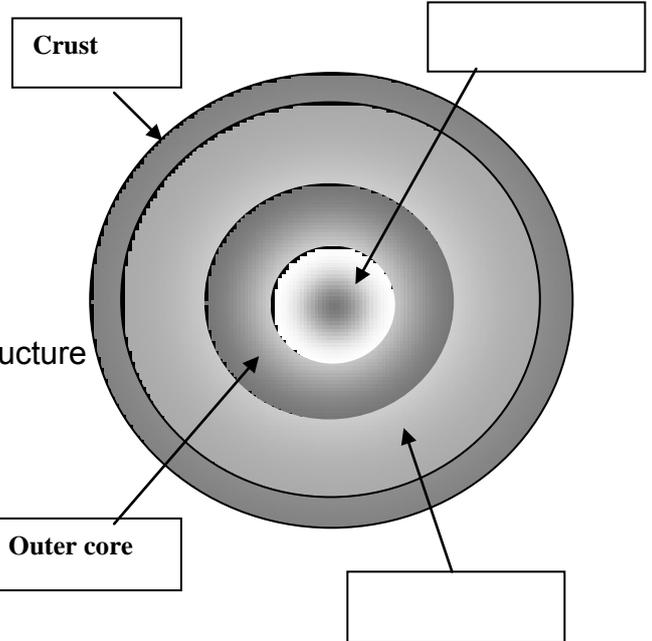
pH	Descriptive term
9	
7	
14	
1	
4	

- e. Name two strong acids commonly used in the school science lab.

Question Three: (9 marks)

a. The inner structure of the earth is shown in the diagram below.

(i) Complete the two missing labels in the diagram.



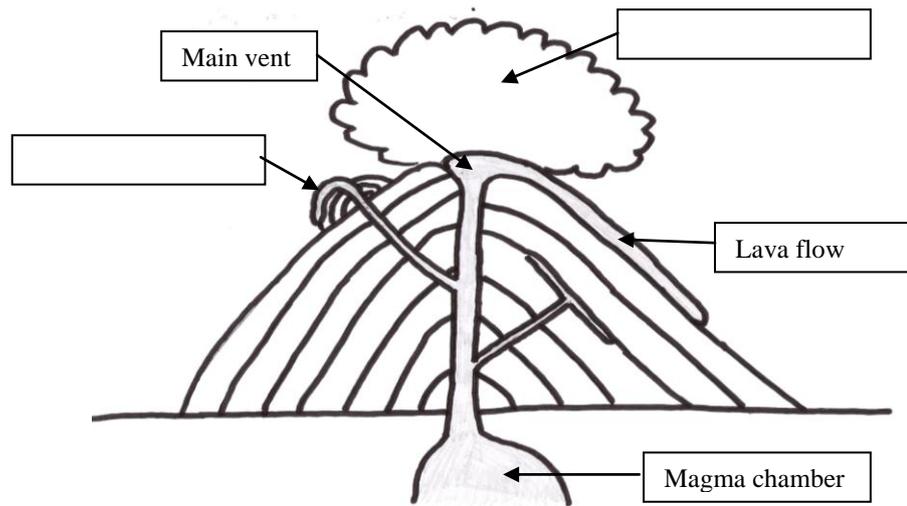
(ii) Name the part of the earth's structure that is thought to be a liquid.

_____ **Outer core**

(iii) Which part of the earth's structure behaves like a "plastic". That is, it has the properties of a solid, but flows like a liquid when under pressure.

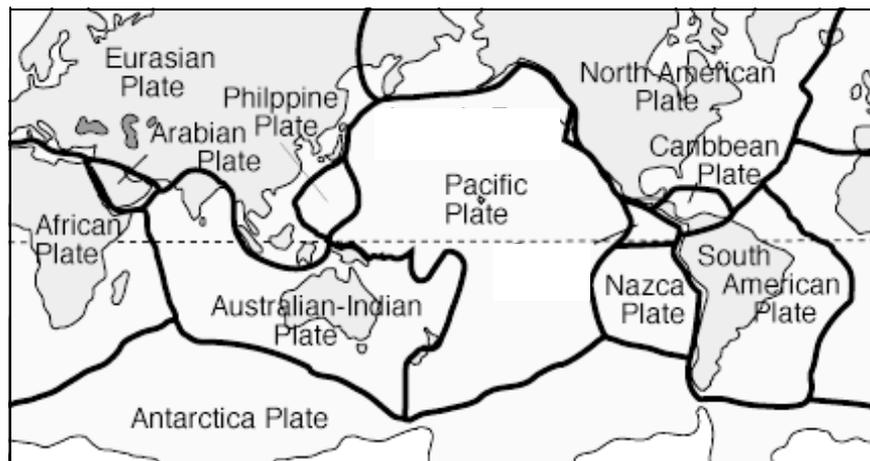
(iv) Name the metal that the core material is thought to be made of.

- c. Fred drew a picture of a volcano in cross-section and labelled some of it.
- (i) Complete Fred's labels.



- (ii) Describe the difference between a dormant and an active volcano.

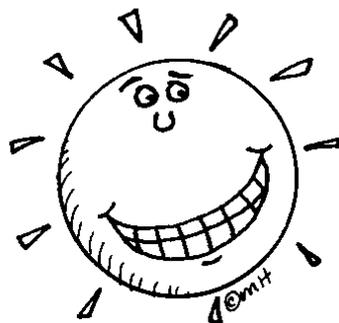
- (iii) What are the names of the two plates that New Zealand lies on the boundary of.



- b. If people had been living where Auckland city is now (about 200 km away from Taupo), at the time of the Taupo eruption, their lives would have been affected by the ash and gas. Describe a difficulty they would have experienced.

Question Five: (9 marks)

- a.. When Mary combs her long hair she finds that after a while the hair “sticks” to the plastic comb. Explain this from the point of view of static electricity.



b. Use some or all of these components to draw the following **circuits**.

 Battery	 Switch
 Bulbs	 Connecting wire

Henry sets up a test circuit to see which materials are conductors and which are insulators. He is given the following materials to test.

Cardboard, plastic spoon, copper wire, steel nail, glass rod, aluminium foil.

- (i) Draw a circuit diagram of a suitable test circuit using a battery, a light bulb and three connecting wires. Indicate where you would put the objects to be tested.

- (ii) From your knowledge of materials, suggest which objects **in the list above** would conduct electricity.

- (iii) Draw a series circuit containing a battery, two light bulbs, a switch and wires. The switch should be able to turn the bulb on and off.

(i) **Series circuit**



- (iv) Draw a parallel circuit containing a switch, two bulbs, a power pack and wires. Place the switch so that one bulb is always on but the other one can be turned on and off.

(ii) **Parallel circuit**



- c. Describe what happens to the brightness of the bulbs in the two circuits you have drawn.

Question Six: (8 marks)

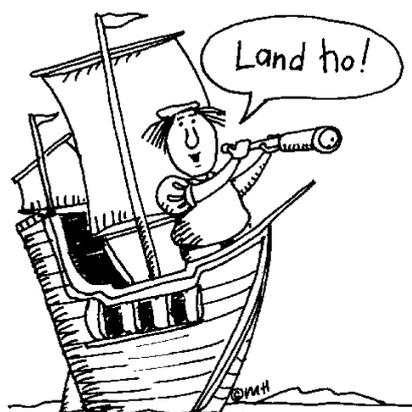
- a. If the definition of a physical change is one in which there are no new substances formed, identify which of the following are physical changes (P) and which are chemical changes (C).

Write the letter P or C in the box beside each change.

- | | | |
|-----|-------------------------------|--------------------------|
| (a) | A piece of paper is folded. | <input type="checkbox"/> |
| (b) | A piece of cardboard is torn. | <input type="checkbox"/> |
| (c) | A piece of paper is burnt. | <input type="checkbox"/> |
| (d) | A block of ice is melted. | <input type="checkbox"/> |
| (e) | A cake is cooked. | <input type="checkbox"/> |
| (f) | Toast is burned. | <input type="checkbox"/> |
| (g) | Milk and water are mixed. | <input type="checkbox"/> |
| (h) | Butter melts in the sun. | <input type="checkbox"/> |

- b. Your teacher tells you that when iron goes rusty, a **chemical** change has taken place.

Describe the differences in the properties of iron and rust.



- c. A chemical reaction that you have done in the lab is the burning of magnesium ribbon in air. A student who did this reaction described it as follows.

A strip of shiny magnesium ribbon was held with tongs in the Bunsen flame. It burned with a very bright white flame, making a white smoke and leaving behind a white solid.

- (i) Carefully explain **two** things in the student's description which show that this was a chemical change.

- (ii) The magnesium was reacts with oxygen in the air to make magnesium oxide. Write a simple **word equation** that describes this reaction.

In another reaction with magnesium the student put the magnesium into acid and noticed that it dissolved with lots of "fizzing" and the solution got hot.

- (iii) What is happening when the metal is "fizzing" that tells you this is a chemical reaction?

- (iii) The gas produced in part (ii) was hydrogen.

Draw a labelled diagram to show how you would **make** and **collect hydrogen**.

Question Seven: (4 marks)

a. In each of these eight objects, energy changes from one form to another.

 Lamp	 Iron	 Candle	 Blender
 Fan	 Car	 Gas stove	 Person walking

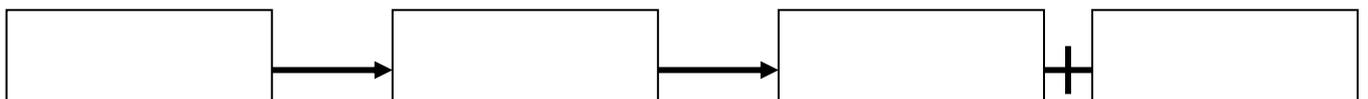
Write the names of the eight objects in the correct box in the table below. The lamp has been done as an example.

	Energy changed to		
Energy changed from	<i>Heat energy</i>	<i>Kinetic energy</i>	<i>Light energy</i>
<i>Electrical energy</i>			Lamp
<i>Chemical potential energy</i>			

b. What is the main energy change when a sewing machine is used?

_____ changes to _____

c. Complete the energy transformation to show the main energy changes when a torch is turned on.



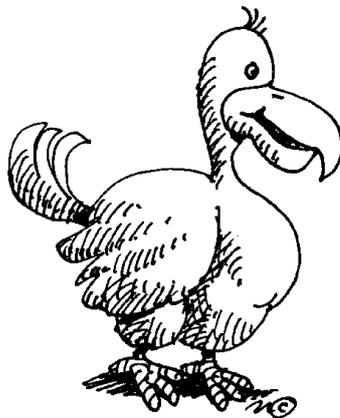
Question Eight: (7 marks)

- a. The following chart lists some animals and their diets. Classify each animal as **herbivore**, **omnivore** or **carnivore**.

animal	What it eats	Classification
Deer	green plants, seeds and nuts.	
Monkey	fruits, leaves, shoots and insects.	
Porcupine	Wood and bark, pine cones and vegetation.	
Lion	Eats buffalo, zebra, antelope and small giraffe.	

- b. Seagulls are often seen in school playgrounds is the seagull. They eat any left over scraps of student's lunches. Are seagulls acting as a **scavenger** or decomposers?

- c. Explain why **decomposers** are a necessary part of every biological community.

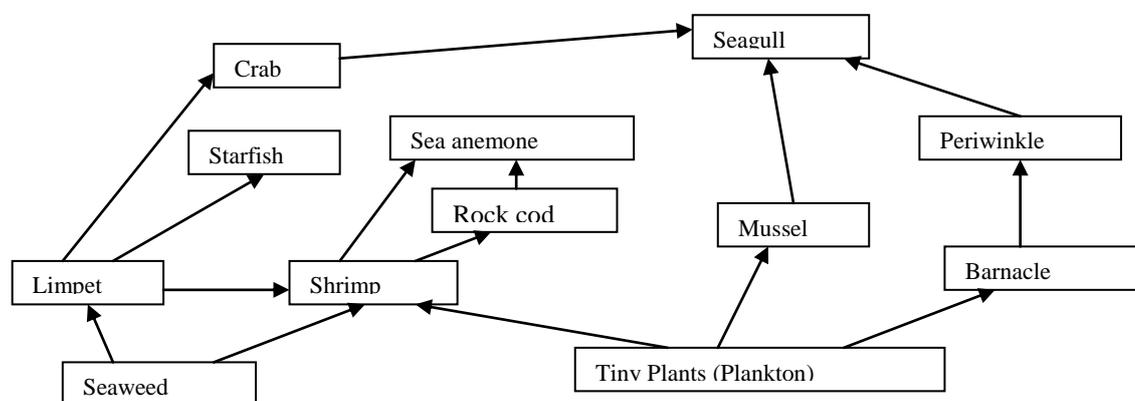


- d. Read the information given in the following chart about some common marine animals and use it to draw a marine **food web**.

Marine animal	Feeding behaviour
Killer whales	Eats other whales, seals, salmon and sea birds
Herrings	Plankton (tiny plants)
Salmon	Eats herrings
Seals	Eats salmon and herrings



- e.

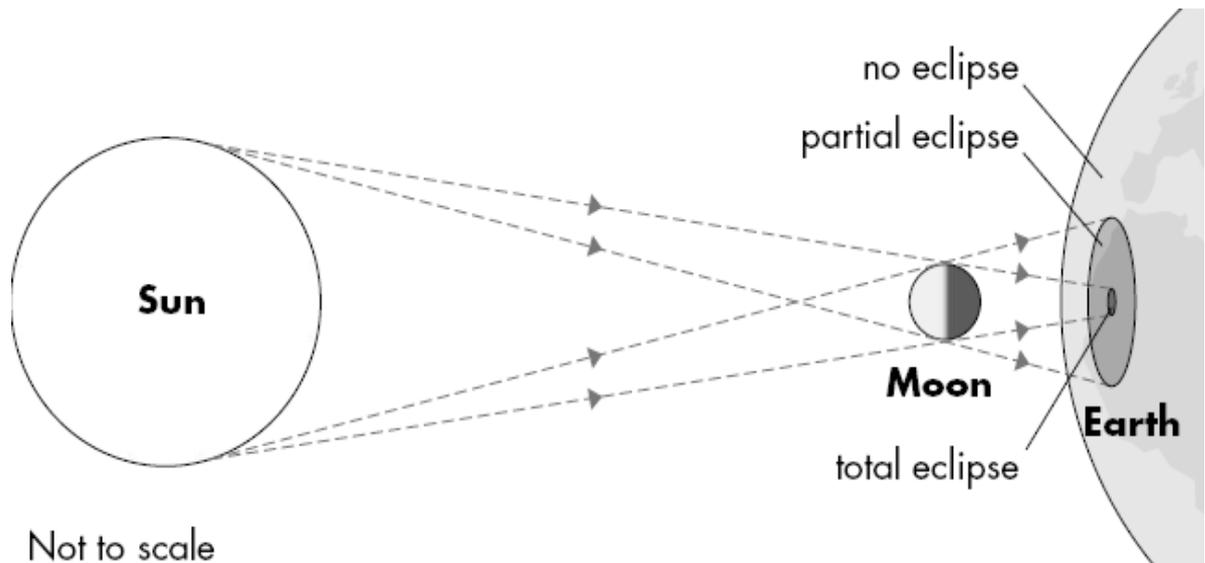


The food web shown above is found in a coastal rock pool by the beach.

- (i) Write a food chain of at least 3 links that involves the plankton.

- (ii) List the three herbivores in this food web.

Question Ten: (4 marks)



The diagram below shows an eclipse.

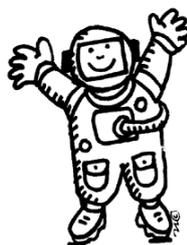
- a. Does the diagram represent a **solar eclipse** or a **lunar eclipse**?

- b. Name the phase of the moon at which this eclipse would occur.

- c. Join the parts of the sentences below by drawing a line to explain some facts about eclipses. The first one has been done as an example.

For an eclipse of the Sun to happen, the Moon has to -----
During an eclipse of the Sun, the Moon -----
Where the Moon casts its shadow on the Earth -----
When you watch an eclipse of the Sun, the Moon appears to be -----

----- moving over the surface of the Sun.
----- passes between the Sun and the Earth.
----- casts its shadow on part of the Earth.
----- we cannot see part or all of the Sun.



- d. In the chart below write the name of the heavenly body that best fits each description.

Use the list given when you fill in the spaces on the chart.

Asteroid, meteor, comet, satellite

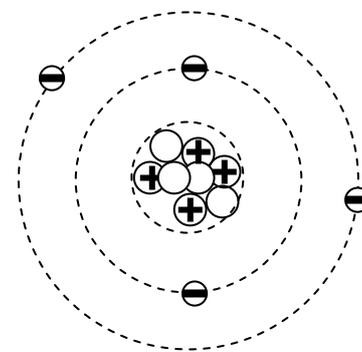
Description	Name
A lump of rock from space which burns up as it falls through the earth's atmosphere.	
A ball of frozen material that orbits the sun in a huge ellipse.	
Any object which orbits another object.	
A lump of rock which orbits the sun and is most likely to be found between Mars and Jupiter.	

Question Eleven: (9 marks)

An atom has the structure shown in the diagram.

- a. Name each of the three particles shown in this atom.

⊕	
⊖	



Use the Periodic Table provided (at back of booklet) to answer the following questions.

- b. Name the element this diagram represents. _____
- c. What is the Atomic Number of this element? _____
- d. What is the Mass Number of this element? _____

- e. Write the missing names and symbols in the chart below.

NAME OF ELEMENT	SYMBOL OF ELEMENT
phosphorus	
	Cl
oxygen	
sodium	
	K

- f. The electron arrangement of an atom is **2,8,8**.
- (i) Name the element with this electron arrangement. _____
- (ii) Describe a special characteristic of this element that relates to its electron arrangement.

- g. One of the following statements about an element is **wrong**. Write the letter of the **wrong** statement in the box provided.

- (A) An element contains all the same kind of atoms.
- (B) Elements can be broken down into simpler chemical substances.
- (C) Metals are elements.

- h. The following list gives the names of seven substances. **Circle** the elements.

sodium chloride *water* *carbon* *helium*

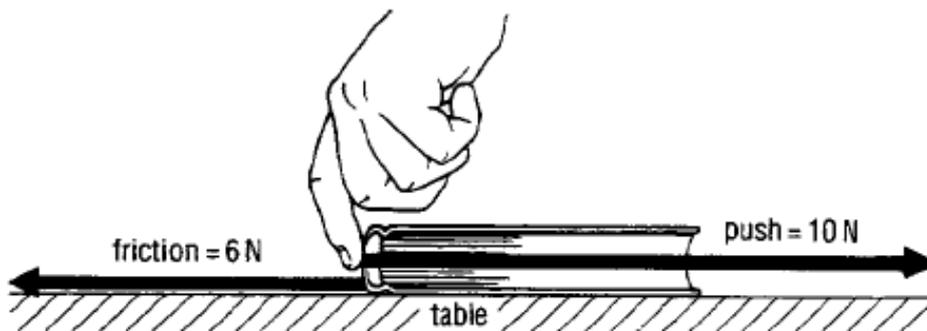
carbon dioxide *magnesium* *hydrochloric acid*

- i. The following list gives the formulae of seven substances. **Circle** the compounds.

CO *Cu* *Ne* *CaCO₃* *MgO* *O₂* *H₂SO₄*

Question Twelve: (7 marks)

The diagram shows a book, with 2 forces acting on it:



- a. What unit does N stand for? _____

- b. Describe in words what the diagram tells you.

- c. What is the resultant force on the book?

- d. Is the book moving or not? _____

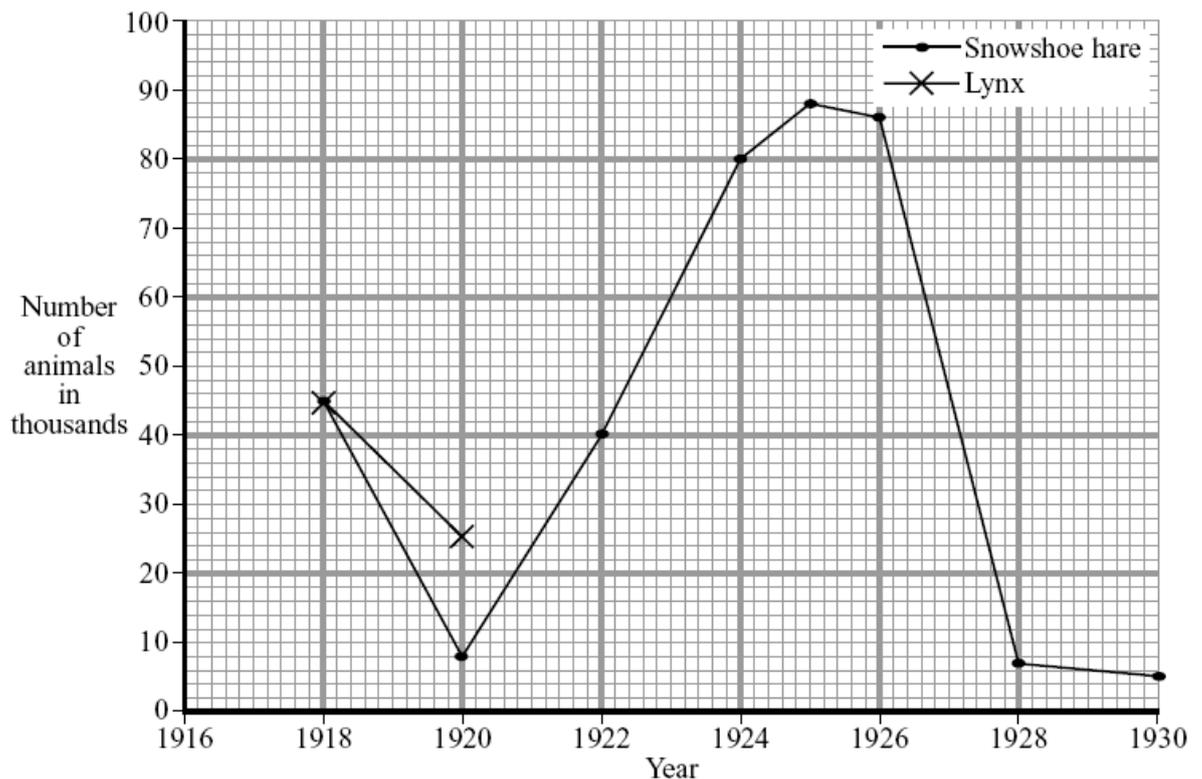
Question Thirteen: (5 marks)

The lynx is a wild cat which lives in Canada. The table shows the number of lynx trapped in a part of Canada in certain years.

Year	Number of lynx in thousands
1918	45
1920	25
1922	10
1924	20
1926	40
1928	50



The snowshoe hare is another wild animal found in Canada. The graph shows the number of snowshoe hares trapped in the same years. The lynx eats the snowshoe hare.



- Draw a graph of the data in the table. The first two points have been plotted for you.
- From your graph, predict how many lynx were trapped in 1925.

c. Use the information to explain what would you expect to happen to the number of lynx trapped in 1930?

d. Give a reason for your answer to part (c)

e. The lynx is a predator. What is a predator?



End of Paper B.

Well done.

Now do your other paper and then check your answers.

