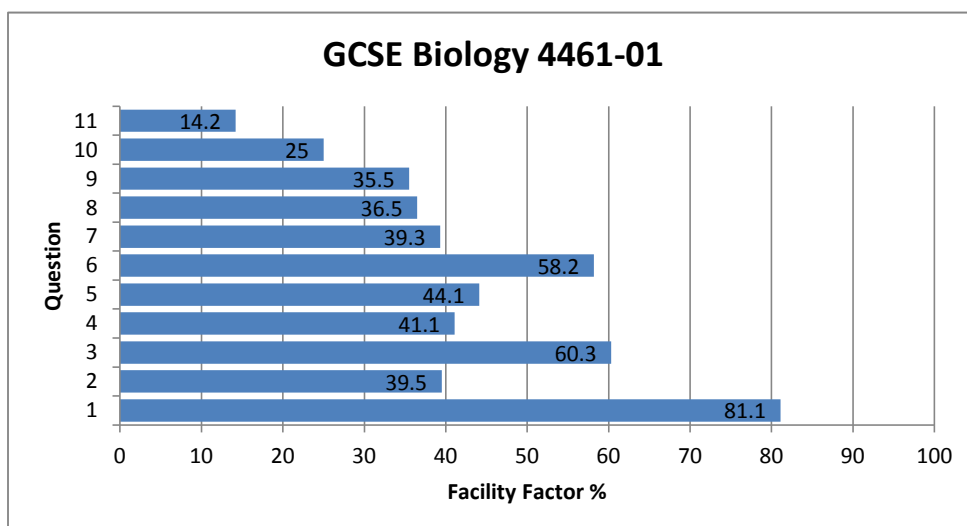


GCSE Biology 4461-01

All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	FF	Attempt %
1	7842	3.2	0.8	4	81.1	99.9
2	7790	2	1.4	5	39.5	99.3
3	7831	3.6	1.4	6	60.3	99.8
4	7827	1.6	1	4	41.1	99.8
5	7836	3.1	1.4	7	44.1	99.9
6	7831	2.9	1.5	5	58.2	99.8
7	7790	2	1	5	39.3	99.3
8	7824	2.2	1.4	6	36.5	99.7
9	7779	2.1	1.2	6	35.5	99.1
10	7679	1.5	1.2	6	25	97.9
11	6839	0.9	0.9	6	14.2	87.2



4. The photograph below shows maggots. Maggots are the larvae (young) of flies.



Read the following information.

- In the First World War, many soldiers died from infection of their wounds by bacteria.
- Sometimes, maggots would hatch in the wounds from eggs laid by flies.
- An army doctor called William Baer observed that soldiers whose wounds had maggots were more likely to survive than soldiers who did not have maggots.
- The maggots seemed to clean the wound.
- He reasoned that maggots ate bacteria and dead flesh around the wound.
- Baer published his ideas in 1931. Since then, using maggots to treat wounds has become common.

(a) From this information:

- (i) What was Baer's observation? [1]

.....

.....

- (ii) What was Baer's hypothesis? [1]

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- (iii) Suggest why it was important for Baer to publish his ideas. [1]

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- (b) Suggest **one** reason (apart from cost) why using maggots to treat wounds may be preferred instead of using antibiotics on patients. [1]

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(a) From this information:

- (i) What was Baer's observation? [1]

That maggots cleaned wounds as they eat bacteria and dead flesh.

- (ii) What was Baer's hypothesis? [1]

If a soldier had maggots in his wound he would survive longer than those who did not.

- (iii) Suggest why it was important for Baer to publish his ideas. [1]

It was important as it could help save lives and to treat wounds.

- (b) Suggest **one** reason (apart from cost) why using maggots to treat wounds may be preferred instead of using antibiotics on patients. [1]

Using maggots may have been preferred as they are easy to find and are common.

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Soldiers whose wounds had maggots were more likely to survive than soldiers who did not have maggots.

- (ii) What was Baer's hypothesis? [1]

Do maggots eat bacteria and dead flesh around the wound?

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To see if this could be useful in the future.

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a soldier with or without maggots in his wound.

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and dead flesh around the wound cleaning it.

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Baer published his ideas so other people
could do it to save lives (cleans the wound).

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Using maggots to treat wounds instead of antibiotics
on patients were preferred because the maggots were
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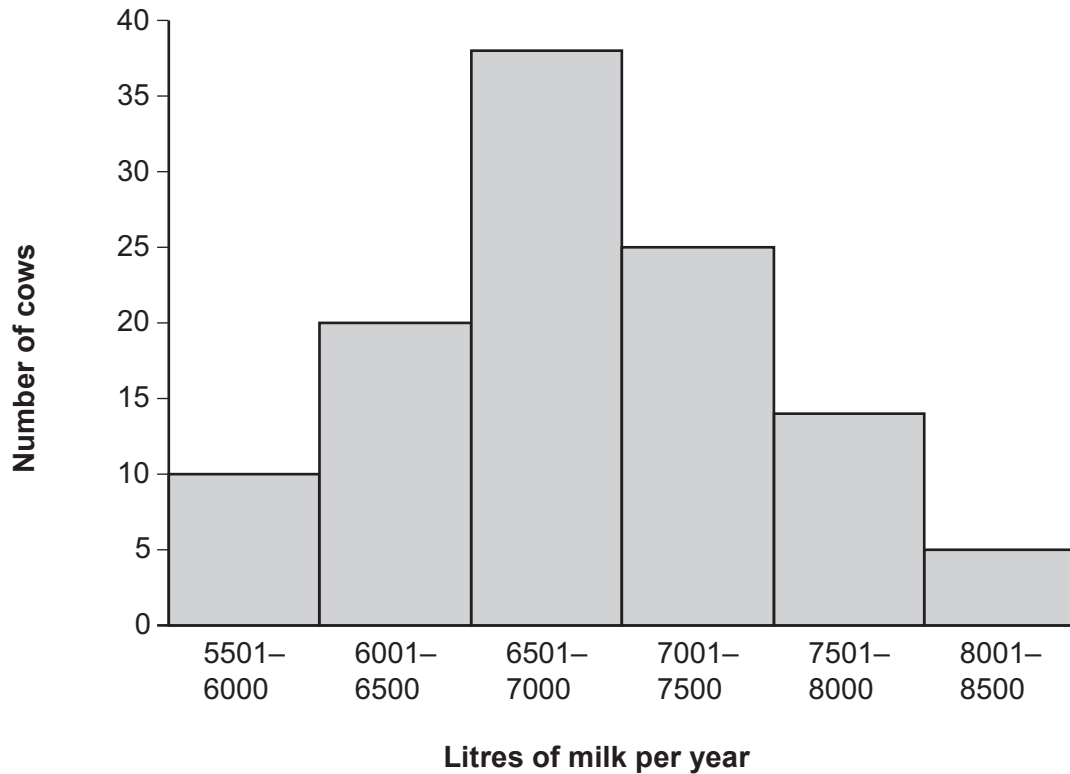
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- (i) During the winter months, the herd is kept indoors in large barns. All the cows in the herd are fed exactly the same quality and quantity of food. Suggest a reason why the volumes of milk produced by the cows varied during the winter months. [1]

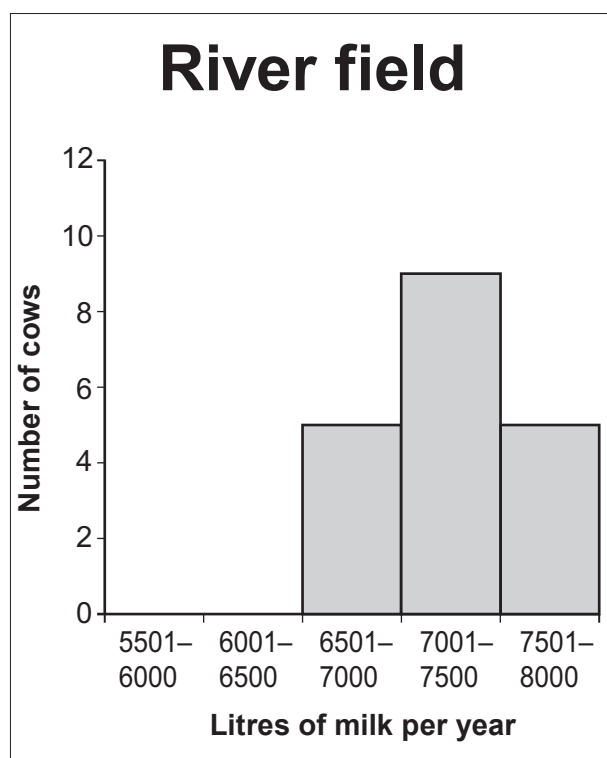
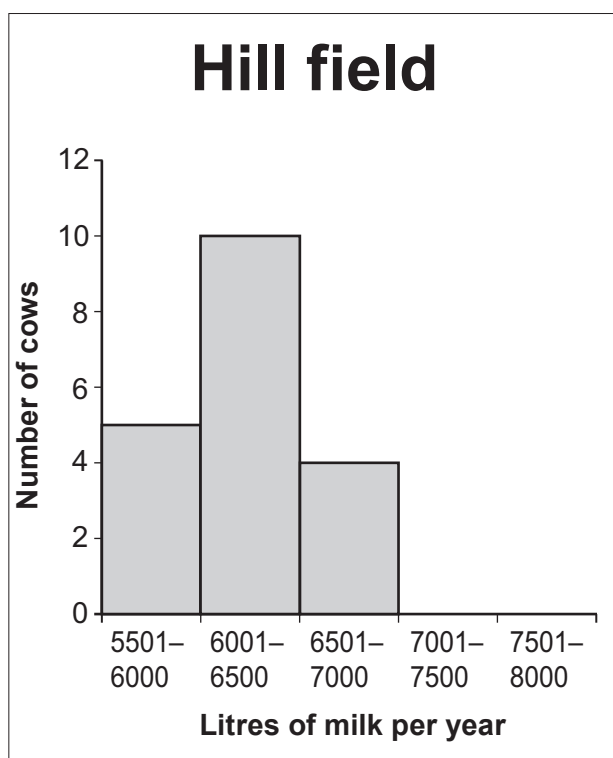
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- (ii) Explain the differences in the results shown in the graphs.

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(b) The table below shows the milk composition of five breeds of dairy cattle.

breed	milk composition (g/l)		
	fat	protein	milk sugar
Ayrshire	3.97	3.26	4.63
Brown Swiss	3.80	3.18	4.80
Guernsey	4.58	3.49	4.78
Holstein	3.56	3.02	4.61
Jersey	4.97	3.03	4.70

Milk from which breed of cattle would you recommend to a person suffering from heart disease? Give a reason for your answer. [2]

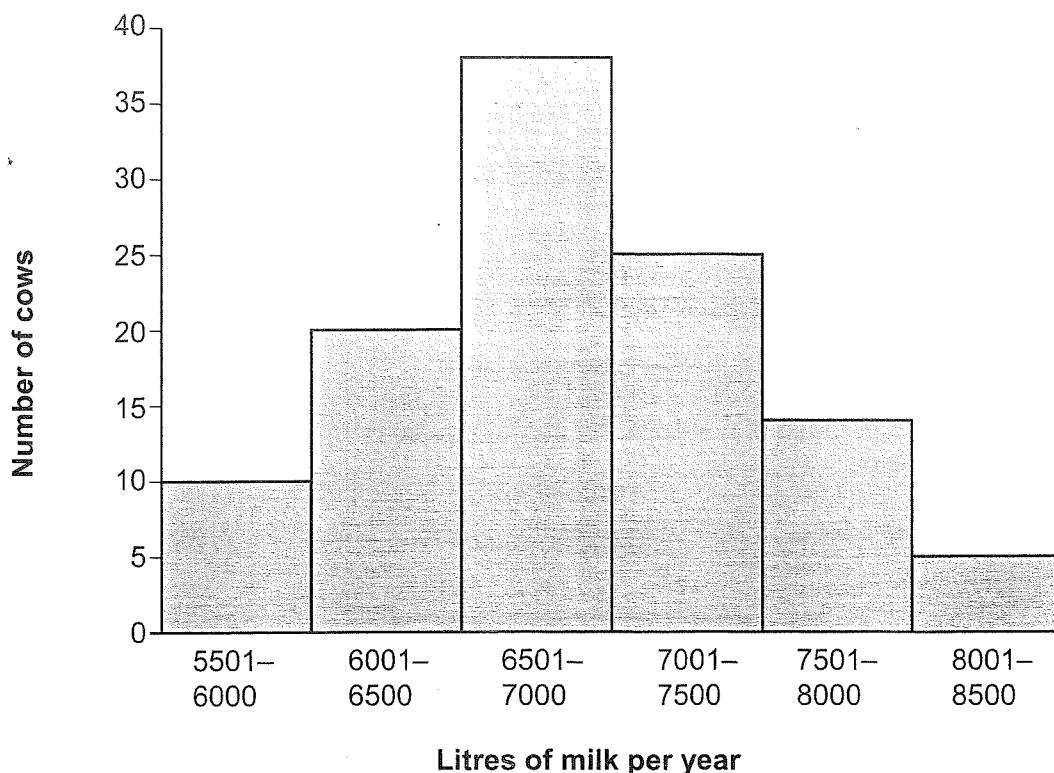
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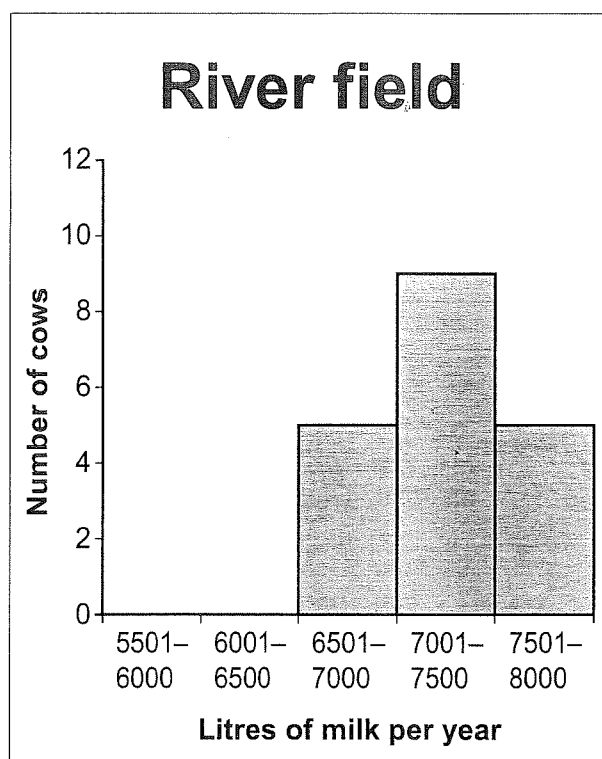
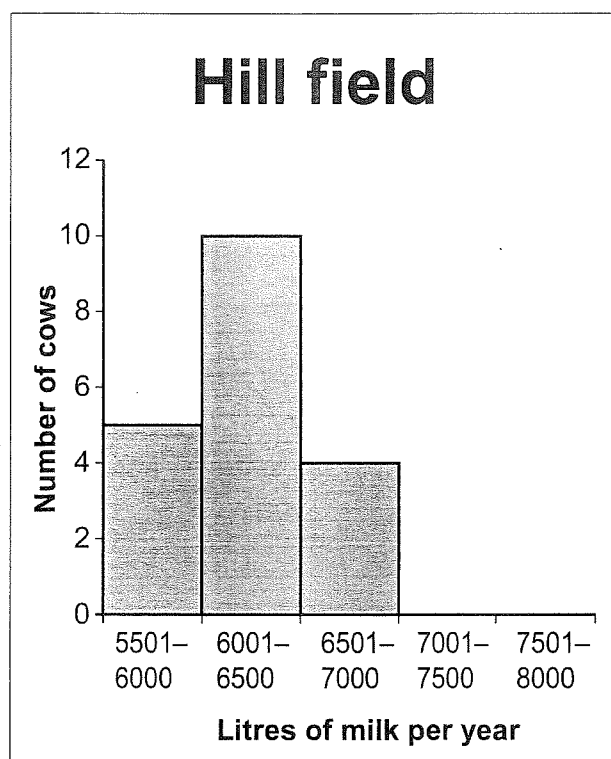
- (i) During the winter months, the herd is kept indoors in large barns. All the cows in the herd are fed exactly the same quality and quantity of food. Suggest a reason why the volumes of milk produced by the cows varied during the winter months. [1]

Because the cows have more energy available to produce more milk to increase amounts. This is due to lack of exercise and excess respiration.

During the summer months, the farmer noticed that the volume of milk produced by the cows varied depending on which fields on the farm the cows were grazing on.

He divided the cows that produced 6501 – 7000 litres of milk per year into two groups. One of these groups grazed on a field by the river and the other on a field on the hill.

The graphs below show the results.



- (ii) Explain the differences in the results shown in the graphs.

[2]

The cows grazing in the river field gained more nutrients from the river and were healthier than the cows in the hill field, a less biodiverse area.

- (iii) When the farmer breeds from his cows he uses a method called artificial insemination (AI). The sperm are introduced into the cows mechanically rather than by using a bull directly.

How does this information suggest that AI is a method of sexual reproduction? [1]

Because the sperm will still eventually fertilise the cows, however method practised.

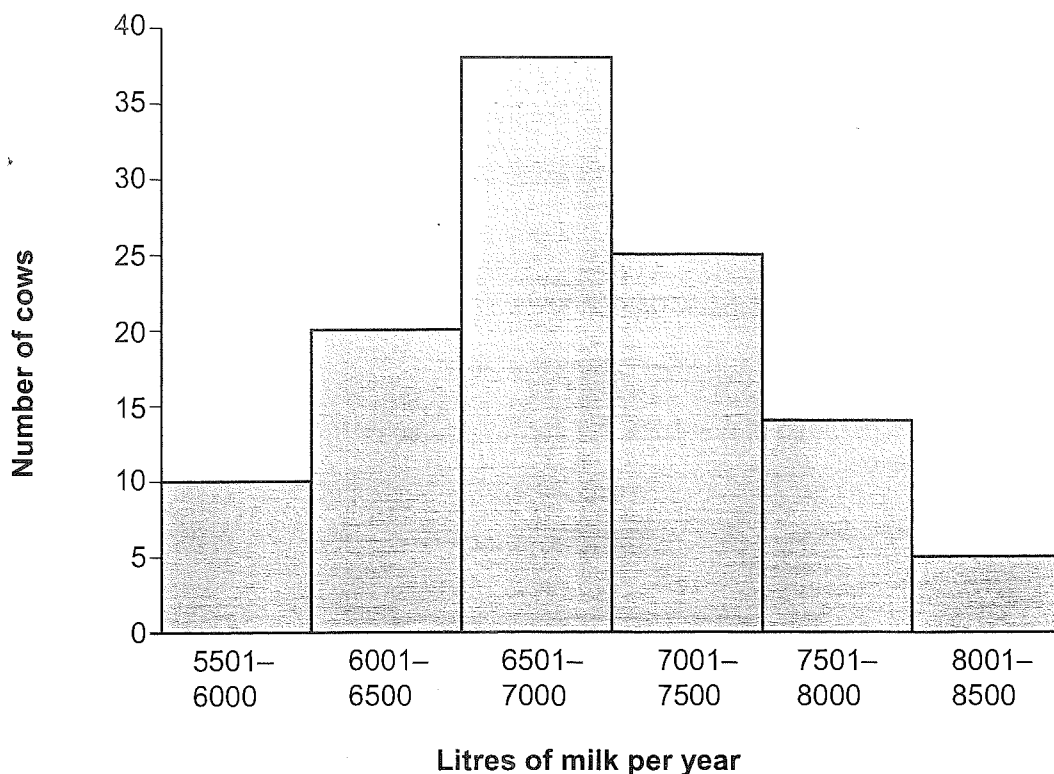
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Milk from which breed of cattle would you recommend to a person suffering from heart disease? Give a reason for your answer. [2]

I would recommend the breed 'Holstein' because their milk contains less fat, protein and milk sugar by grams per litre. The less fat and sugar intake, over a long period of time, will cause a ~~less~~ decreased chance of the person being diagnosed with heart disease.

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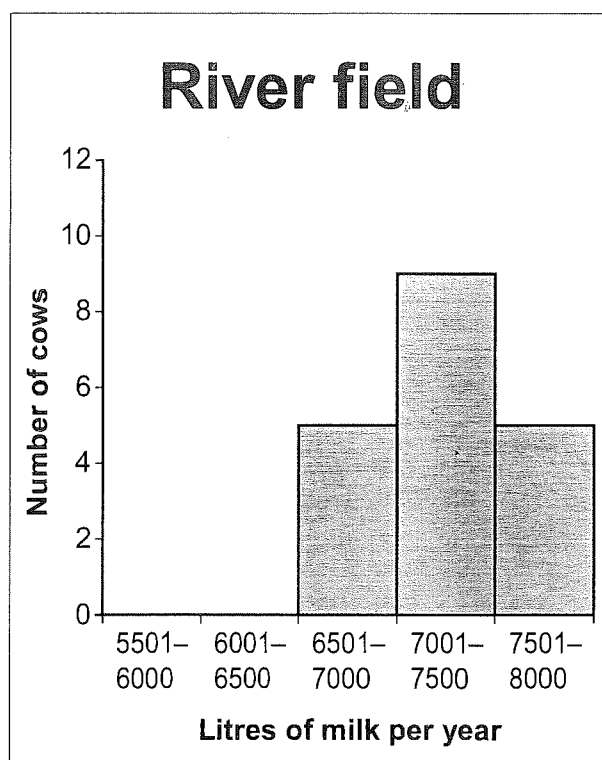
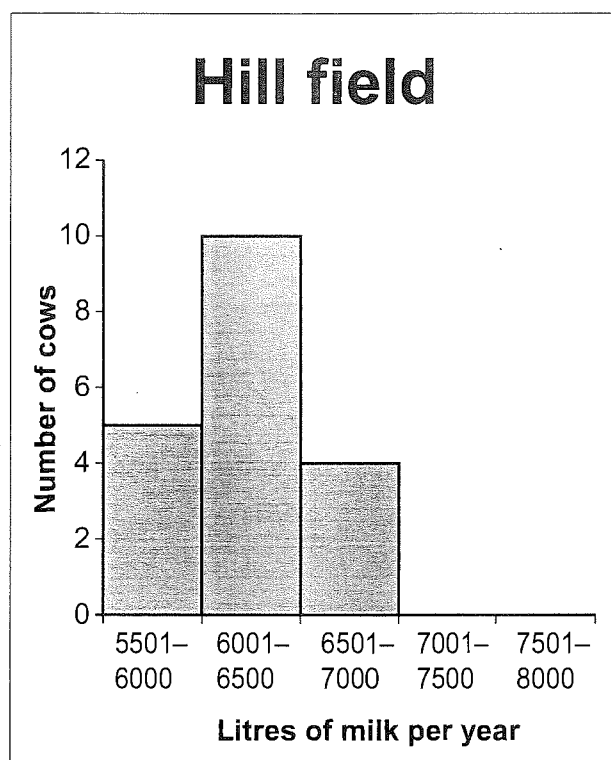
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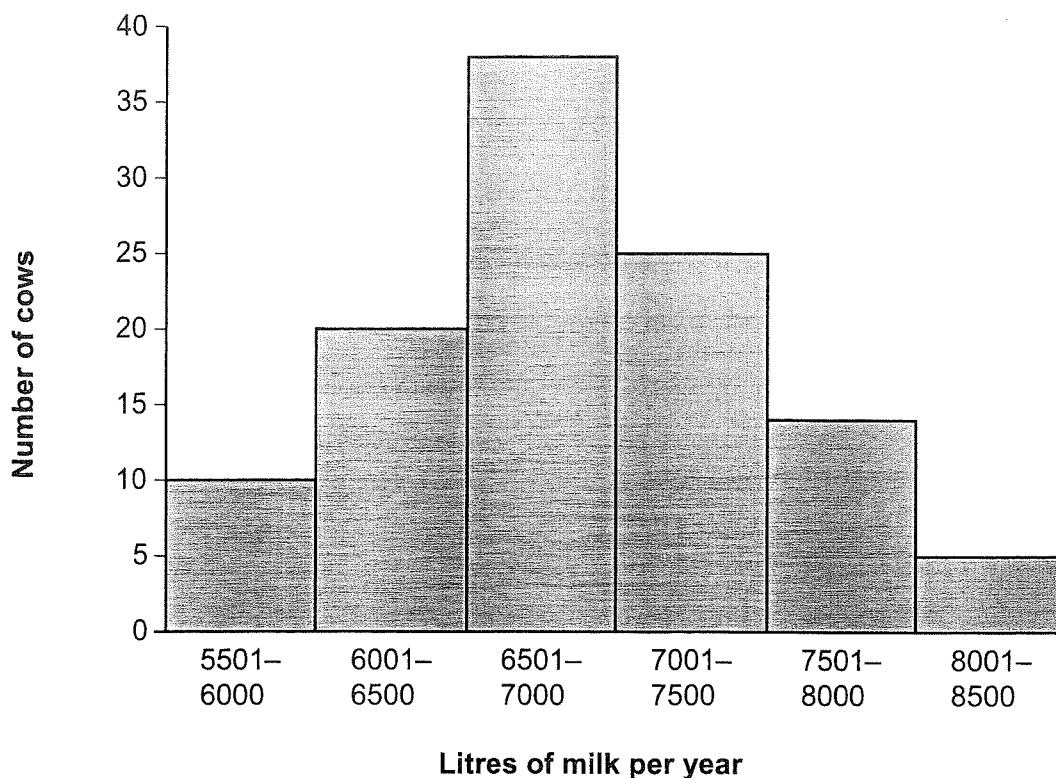
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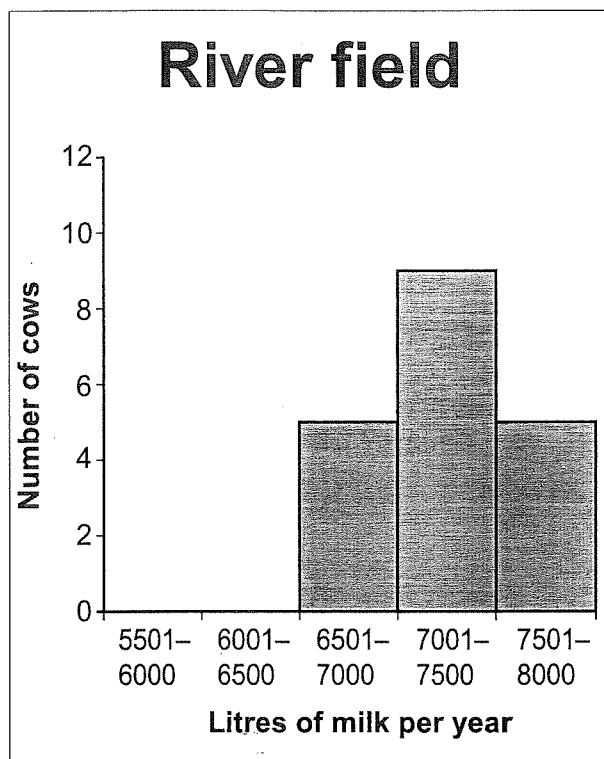
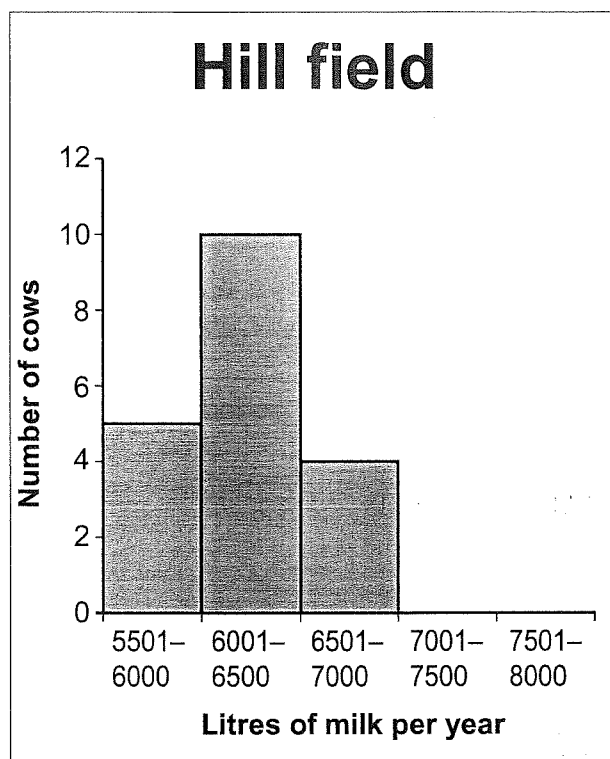
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Because of the temperature,
it was too cold to produce milk.

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The cows that were in the hill field produced more milk each year than the cows in the river field, this is because they had water to drink from.

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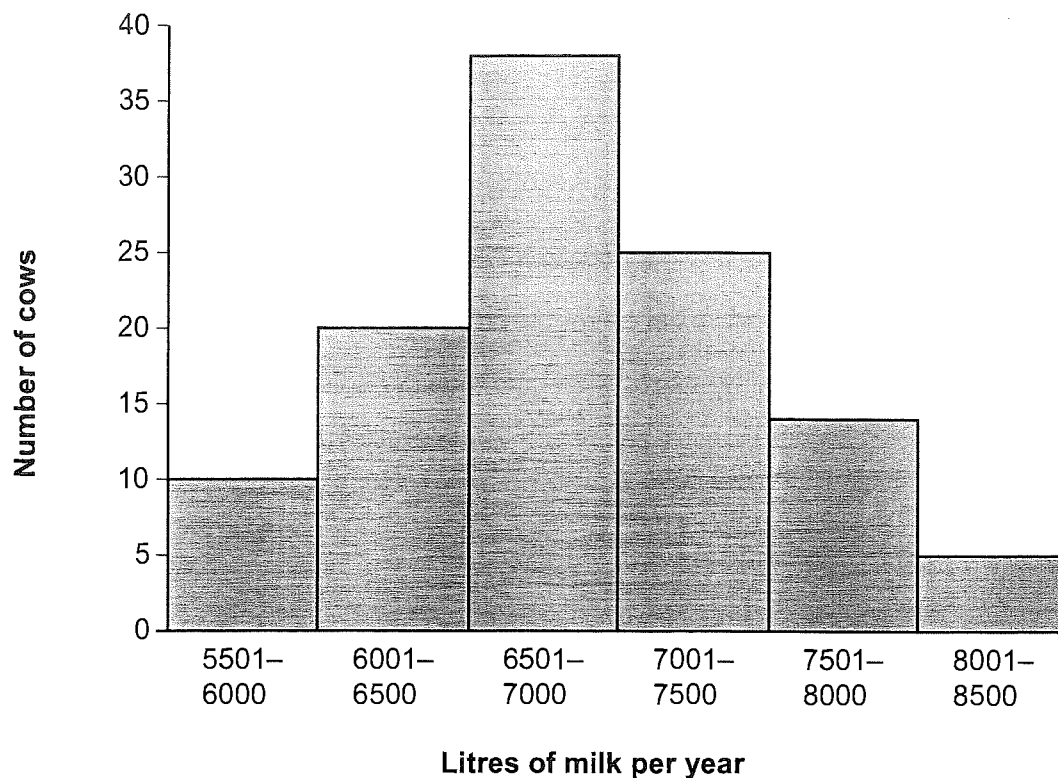
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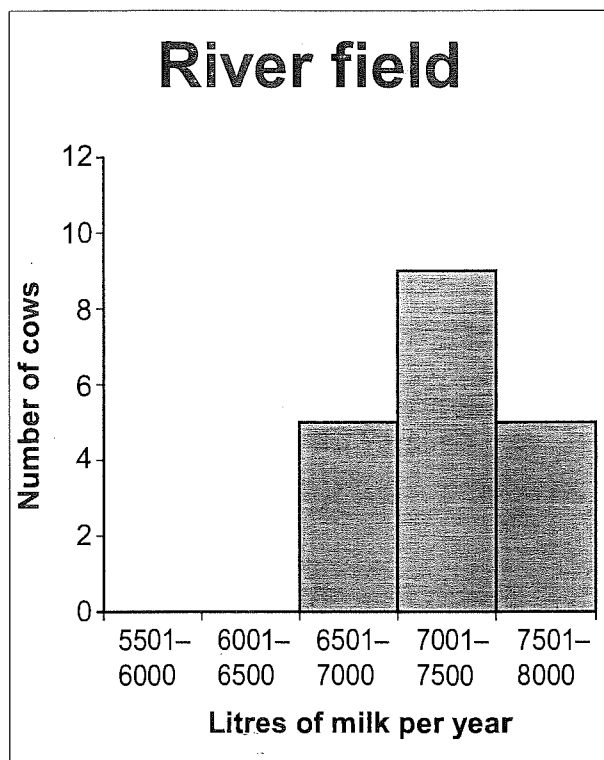
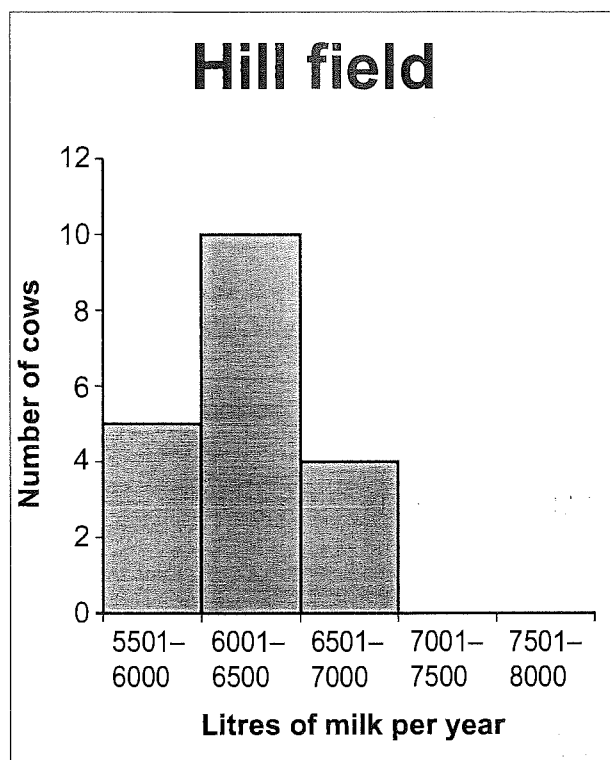
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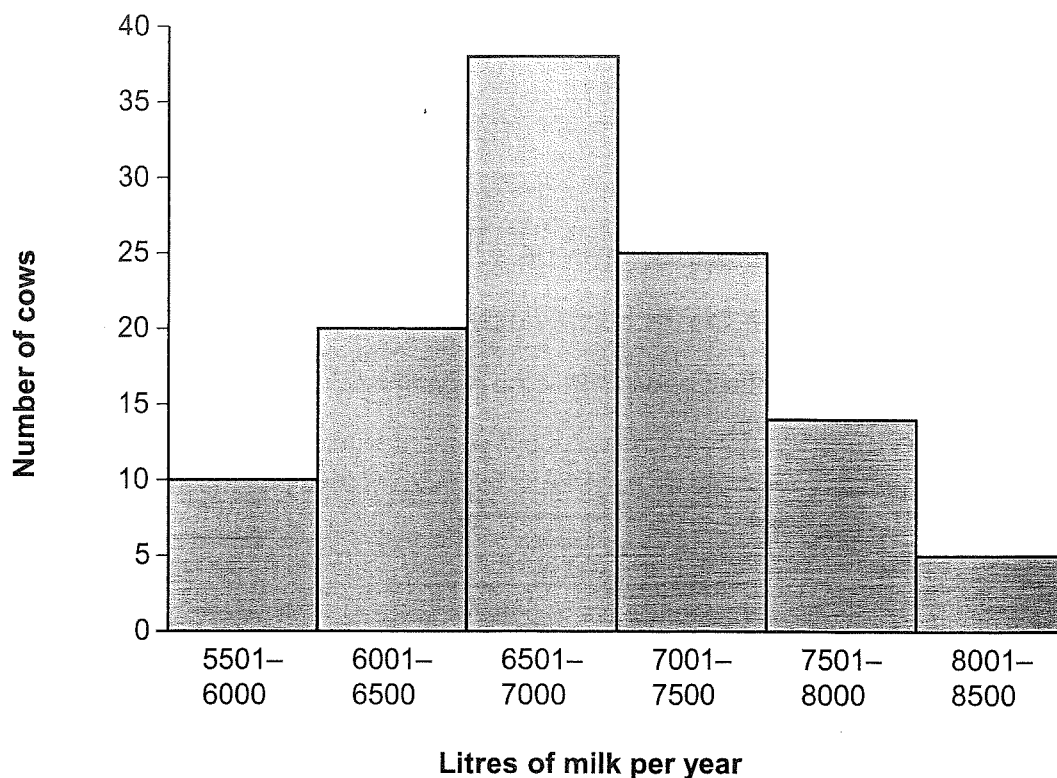
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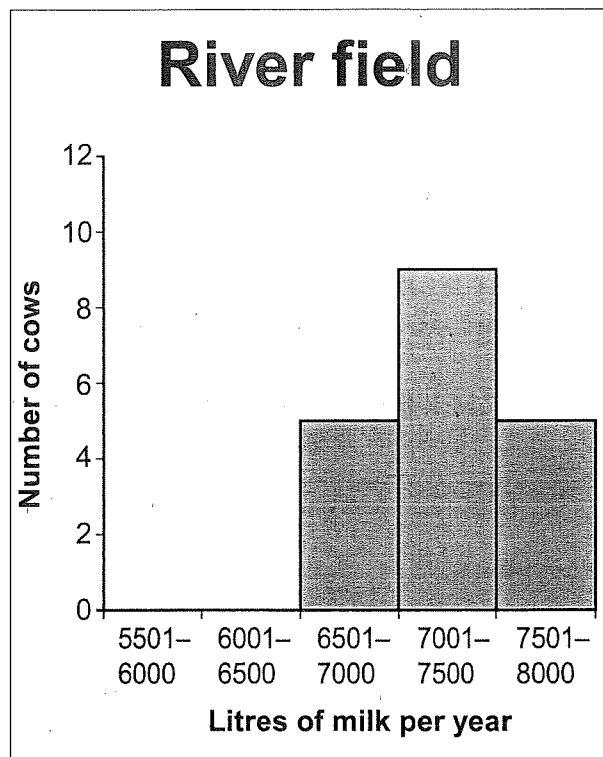
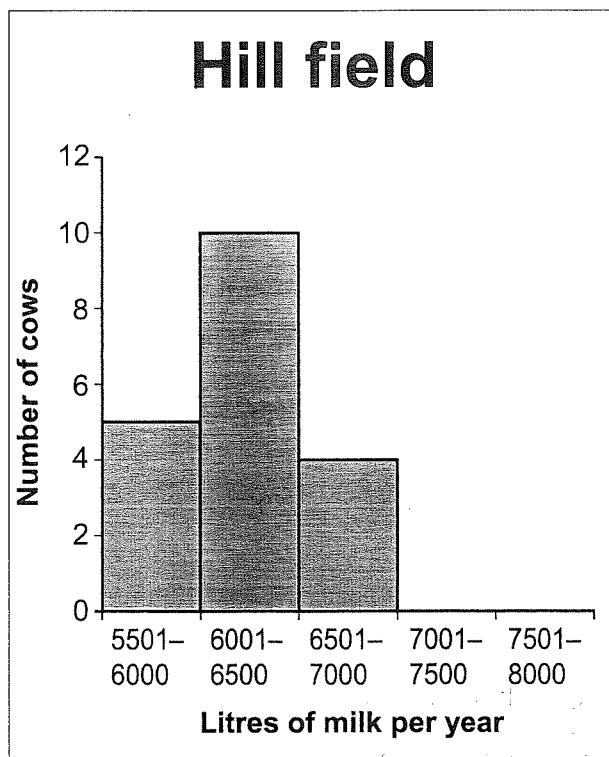
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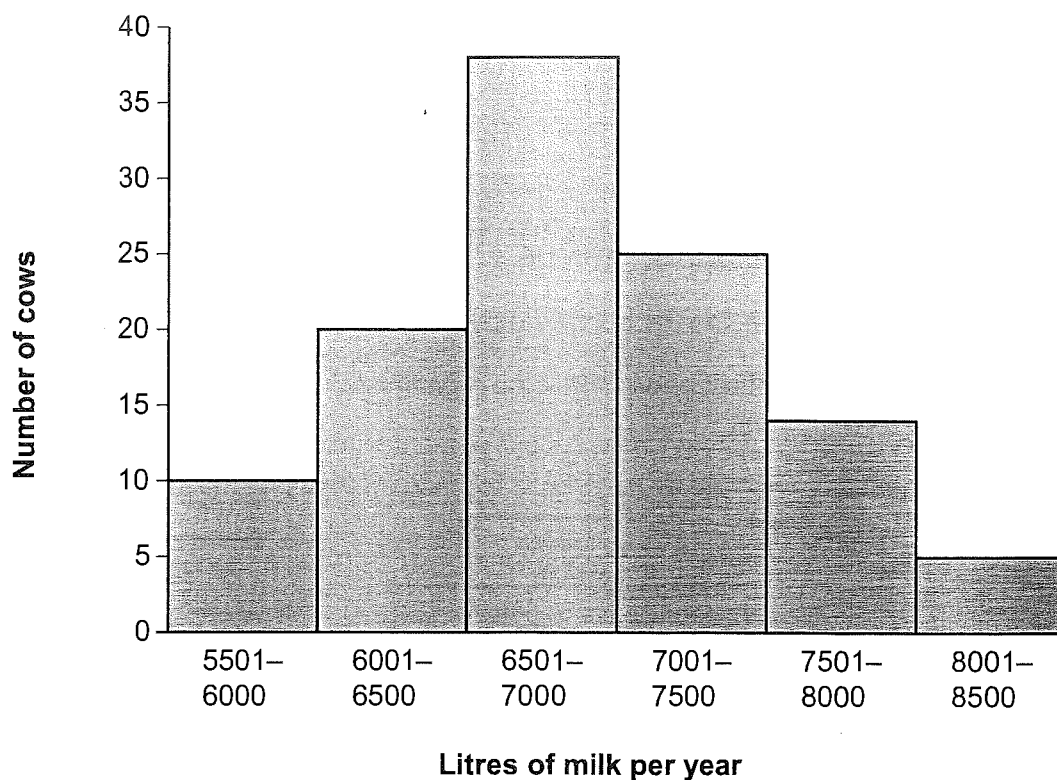
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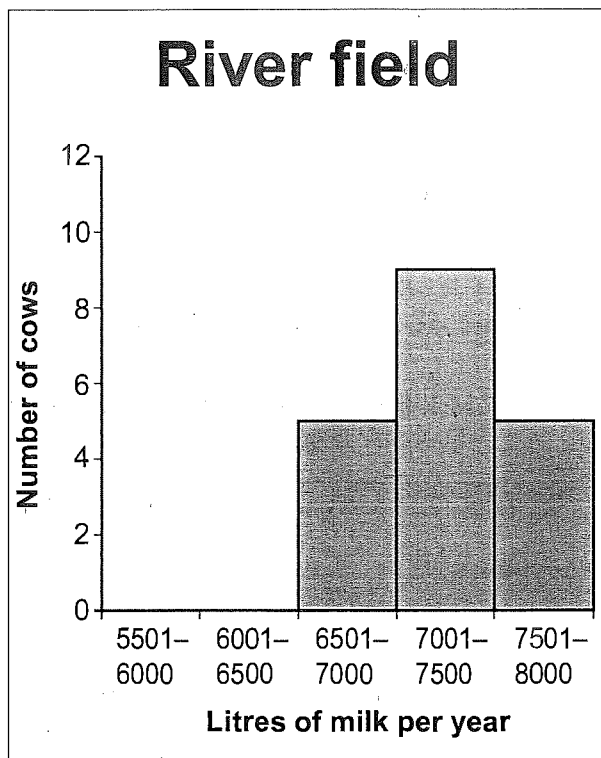
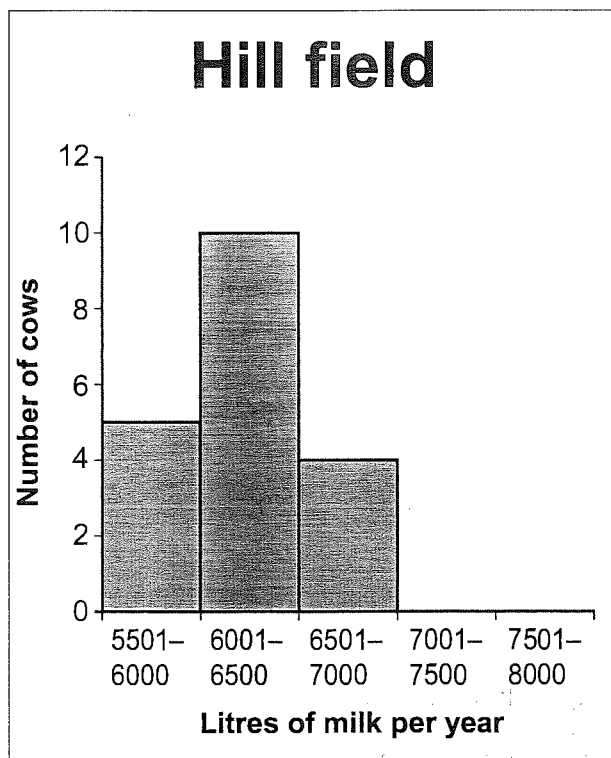
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6

11. Describe an experiment you would set up to investigate the positive growth response (phototropism) of plant shoots to light coming from one side. In your account you must explain the use of a control in your investigation. [6 QWC]

In my experiment I would use the same species of plant, I would use the same light, I would keep the light the same distance away for all plants and I would leave every plant for the same amount of time. I would place down the plant and measure a reasonable distance on where to place my form of light. I would then leave the plant for a certain amount of time and record my measurements and whether it was is positive or negative phototropism in a table. If the head of the plant is facing towards the light it is positive phototropism. If the head of the plant is facing away from the light it is negative phototropism.

END OF PAPER

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11. Describe an experiment you would set up to investigate the positive growth response (phototropism) of plant shoots to light coming from one side. In your account you must explain the use of a control in your investigation. [6 QWC]

To carry out an experiment to investigate phototropism, firstly you must find a plant. Once a plant has indeed been found, take a box to exclude any light to the plant. (The plant must be placed inside the box). Once the plant has been placed inside the box, make a big enough hole for a little light to get through. I would then take a lamp, put it on and place it by the box with the plant inside. Leave the plant for up to a week. Once a week has passed, check on the plant and you should see the result of the plant tip growing towards the right. This then explains that when plants look for light, we always see them growing towards the light source.

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Describe an experiment you would set up to investigate the positive growth response (phototropism) of plant shoots to light coming from one side.
In your account you must explain the use of a control in your investigation.

[6 QWC]

I would use 2 plants in pots. (Same type of plant)
I would put the first plant in a ~~box~~ cardboard box, and cut out one of the sides, so that it will get light from one side only. The second plant I would put in a well lit room - light from all sides. I would give both plants the same amount of water and the same type of plant food. And keep both plants at the same temperature. At the end of the experiment (10 days) I would check on how each plant had grown. The one in the box will show that the plant has grown towards the light. This is called positive phototropism, the process is caused by a hormone in the stem of the plant. The second plant will have grown upwards (not bended to the side).

Describe an experiment you would set up to investigate the positive growth response (phototropism) of plant shoots to light coming from one side.
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