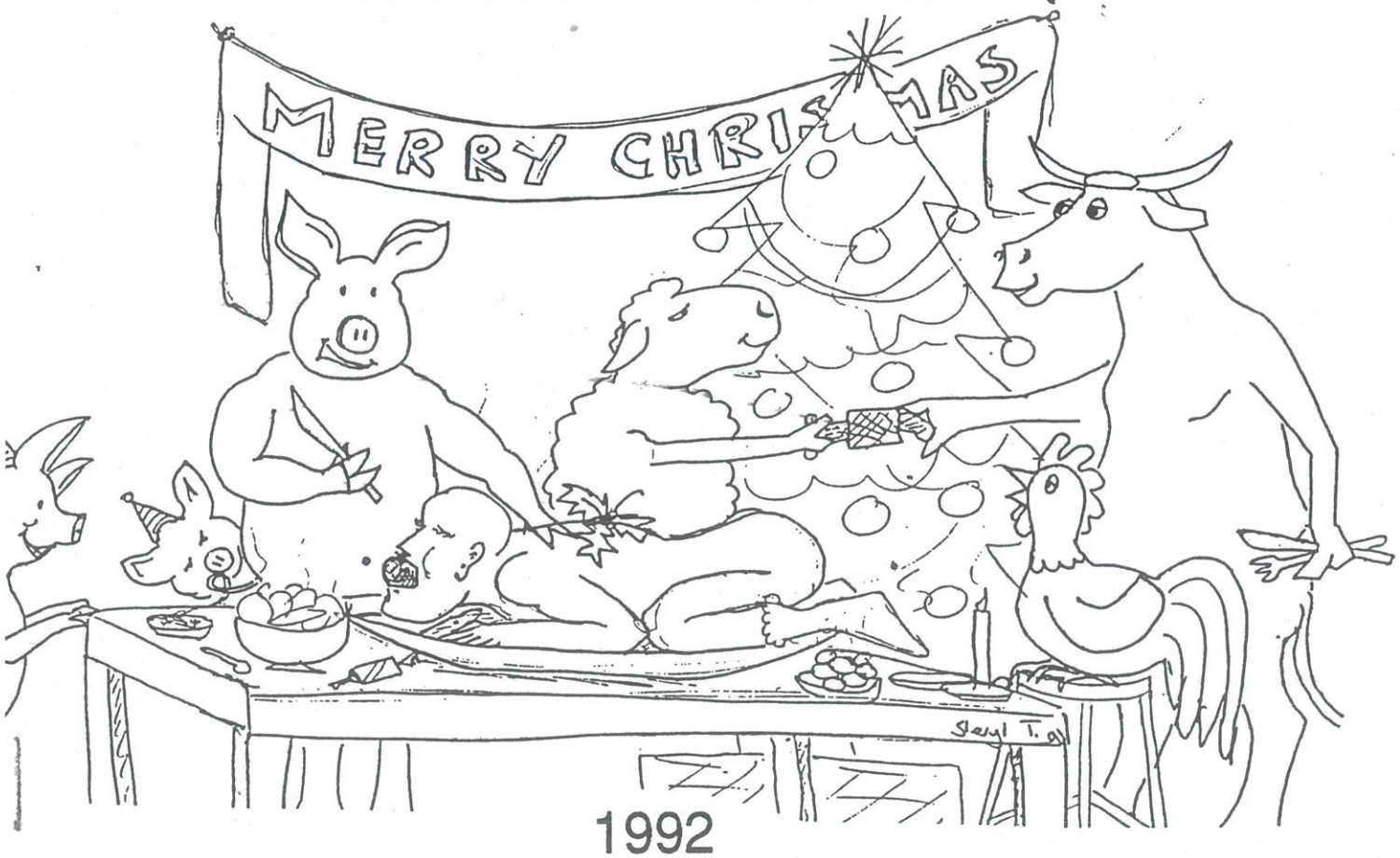
1992 HSC answers

B.A.A.T.

Bulletin for the Association of NSW Agriculture Teachers

Christmas /New Year Edition



1992

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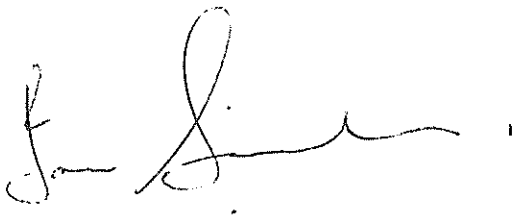
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BAAT EDITORIAL

Well were in 1992 and things still appear as though they are going to be as hectic as they have been over the past few years . Since the last edition a few changes have taken place , I am now in a new position as H/T Technology and Applied Studies , Cheerybrook High School . Yes it is one of those new positions as head of a Key Learning Area and yes I am reponsible for the I.A . , Food & Textiles Technology , Agriculture , Horticulture & Computing Studies . I felt this was an important move in my career and it was also significant to Agriculture as a whole as it was a recognition by the **POWERS TO BE** that we as Agriculture Specialists had an important role to play in the implementation and development of Design & Technology .

In this edition there has been major contributions from Micheal Thom (Parkes High) , Dave Buckley (Elderslie High) and John Wall (Our Lady of the Rosary College - Tamworth).
I would like to thank these people for their contributions and would encourage others to do the same .

Address - Cherrybrook Technology High School
Purchase Road
Cherrybrook ,2126



AGRICULTURE AT PARKES HIGH SCHOOL

Parkes is located in the Central West of New South Wales, about one hour west of Orange and an hour south of Dubbo.

Currently we have 43 Year 9 Students and a total of 29 Students in Years 11 and 12. The total school enrolment is just below 700.

The school has two plot areas. One is located about 2 minutes from the school and was the original agriculture plot in the early 70's. It is the size of a house block and is used to grow vegetables mainly for the junior classes and the students in the IM and IO classes (they do a small content of ag for about two periods per week). The second main Agriculture plot is located 10 minutes walk from the school, and was established in the late 70's from a forest of blackberry and African boxthorn, on a block of about 10 acres.

The plots have all the standard features, ie, sheds, weather station, and an assortment of machinery etc. Livestock is made up of 40 mixed sheep (Merino and X-breeds) and laying hens. Although some other stock is brought in from time to time as the need arises.

Most of the students at Parkes come from a farming background, if they don't come directly from a property then they have had a good exposure through relatives etc who are on the land. The hardest part is convincing students that agriculture is not just sheep and wheat (especially in this economic climate).

In the last couple of years we have tried to promote the work that the students do in the subject, within the general community and the results (in my opinion) have been good. The students have a big input into the local show by acting as stewards in the various sections and this year the students co-ordinated and supervised the animal nursery section with great success and praise from the show committee and the general public.

Some things which are happening at Parkes High which might not be happening at other schools are:

* Growing of tree seedlings: We have worked in with Parkes Rotary Club and Geopeko Mining (which are opening a large open cut mine in the surrounding districts. Rotary provided the money for a shade house of considerable size (8x9 metres) with shelving and automatic watering and the students and Rotary in conjunction with the school plant them out. Geopeko provide the after care (slashing, spraying etc).

* Planting of seedling trees for the R.T.A: Through the enthusiasm of the Social Science Head Teacher, the school has contracted to the R.T.A to establish trees along some of the new section of the Newell Hwy. So if you see a sign while driving, saying that the trees were planted by P.H.S you will know what it is about.

* Salinity: The school plot is suffering from a pocket of salinity (dryland) which is unfortunately spreading. Following a discussion with the Soil Conservation Service, we have written a submission for funding from 'Saltwatch' and act as a demo for local farmers on ways to overcome the problem. This would involve ripping and planting salt tolerant trees and pastures to remove the water as well a drilling a number of small bores to measure the water table, for which the students would have to keep records of.

* Aquaculture: We have been donated a 6mx3m above ground pool complete with pump and filter and are currently negotiating with council about fencing requirements. It is hoped that we will be able to stock it with silver or golden perch allowing the students to work on a range of activities eg. costing, growth and measurement.

SECTION I

QUESTION 1.

(a) 0 mk - shows little understanding of Q
1 mk - names/describes a feature OR very good explanation of how feature affects subsys.
2 mks - names/describes feature and relates to subsystem.

SUBSYSTEM: Dairy cattle

Soil: alluvial silty loam -- highly fertile -- | pasture production - -- | milk production - from cattle.

Topgraphy: all river flats -- highly suited for lucerne production - -- extra feed for cattle -- better milk production -

Vegetation: entire property is improved pastures (eg kikuyu-summer; ryegrass/clover-winter)-- year round feed for cattle to maximise milk production -

(b) 1 mk - only 2 or 3 structures/improvements given.

Milking shed; Milking machine; harvestore; use of AI; use of E.T; development of more improved pastures; irrigation systems.

(c) profit; maintain milk quality; maintain quota; provide better quality cattle from access to larger gene pool.

(d) The river flats with alluvial soil in combination with use of irrigation have enabled high protein pasture production - throughout year -- maintain high milk production. Use of AI has enabled farmer to improve genetic basis of his herd and therefore his herd's milk production.

(ii) PROBLEM: Poor soil structure
Poor soil structure reduces fertility and water holding capacity which reduces plant growth. Animals production and crop production yeilds are therefore reduced which reduces farm productivity profitability.

(iii) The farmer could increase organise matter in the soil by planting on green manure crop which would improve structure and water and nutrient holding capacity.

QUESTION 2.

(a) PROBLEM: Disease; Low nitrogen levels in the soil; weeds; Low rainfall.

(b) Weeds to test the effect weeds have on the yield of potatoes.

(c) 1. Weeded
2. Weeded
3. Unweeded
4. Weeded
5. Unweeded
6. Unweeded
7. Weeded
8. Unweeded

-Randomly allocate plots, weeded or unweeded by drowning numbers out of a hat.

-Replicate the experiment.

-Ensure all plots receive the name amount of water and fertilizer.

(ii) By the use of RANDOMISATION and REPLICATION and STANDARDIZATION.

(iii) To account for biological variation.
To allow for accurate results. To increase the validity of the results.

(d) No The trial needs to be carried out on;
-different sexes eg rams, ewes
-different locations around the state (environmental conditions)
-different breeds of sheep
-resistance of worms
-long-term effect (residual).

SECTION II

QUESTION 1.

(ii) NEW: 150 piglets/month OLD: 140 piglets/month.

(iii) 1. Better shed design in new shed allowing for better control of temperature -- increased survival of piglets. 2. Better shed design allowing better hygiene reduces incidence of disease in new shed -- incrassed survival.

(iv) Increased weight gains in the new shed due to better conditions such as temperature control, ventilation, hygiene and therefore reduced stress in the piglets.

(v) Gross margins for each shed should be calculated. GROSS MARGIN = INCOME - VARIABLE COSTS. The income from the sale of piglets should be determined and variable costs such as labour, feed, veterinary costs should be subtracted from the income.

(b) (i) PLANT: Rust in cereal crops the fungis causing rust proliferates in warm, humid weather.
ANIMAL: footrot in sheep. The be bacterla reproduces and spreads to other sheep in wet conditions.

(ii) PLANT: The farmer can spray his crops in a fungicide and/or can plant varieties which are resistant to rust.
ANIMAL: Paddocks can be drained, sheep moved to drier paddocks. Sheep can be vaccinated and affected sheep have feet pared and soaked in footrite.

(iii) high moisture encourage fungal/bacterial growth warm temperatures encourage fungal/bacterioral growth contamination due to presence of pests.

(iv) Similar conditions of high temperatures and high moisture can cause food spoilage and predispose disease in animals and plants as these conditions are suitable for rapid microbial growth.

QUESTION 2.

(a) (i) Super phosphate.

(ii) lime is an alkaline substance. Lime also neutralizes the acid in the soil.

(iii) A change in soil pH to either too acid (<5) or too alkaline (>9) could cause reduced microbial activity * poor nutrient availability for plants * reduced OM breakdown.

(b) (i) The super and super + lime paddock are receiving phosphorus + calcium which provide for greater hay production.

(ii) Fertilized paddocks produce more hay -- The more hay removed, removes more alkaline chemicals -- increases the acidity of the soil.

(c) (i) Co_2 - converted to glucose through photosyathesis
N_2 - converted to NH_4 + NO_3 via microbial action.

(ii) Nitrogen Cycle - legumes have rhizobia bacteria which fix atmospheric N into NO_2.

(d) super provides for extra plant growth Extra growth require CO_2. More CO_2 would be converted to glucose with added super.

(f) Adding legumes to a pasture causes *increased N in the soil, increased grass growth therefore of N *Greater OM in soil if legumes are used as a green manure crop.

(g) * Provide cash, grant
* Subsidize farm inputs - fuel, fertilizer, Chemicals
* Provide low interest loans
* Provide advice - Dep of Ag. soil Con Servies.

QUESTION 3.
(i) Australia produces 3% of the worlds wheat,a small producer by world standards running 6th (or equal 5th by percentages).

(ii) While Australias total production is only 3%, it exports 95% of its production and ranks highly 4th in the exports of wheat.

(iii) The E.C has a large consumption (domestic market) and only exports 25% of production while Australias position is almost opposite, exporting 75%.

(iv) By monitoning over seas production Australia adjusts its production or shifts its market to given maximum advantage from exports, saving costly gluts or storage.

(b) Events such as the IRAQ war, US and EEC subsidies, and large directional changes such as the USSR's political upheaval all affect demand for Australian products, and the offered price.

(c) i) Grow more to maintain income
ii) Diversify + Thus maintain income
iii) Store produce on farm till demand/price increases.

(d) COMMODITY: eg wool. Higher prices are offered for wool with desirable fibre diametre and yield. State relationship between the qualitative factor and price received.

(e) Lack of knowledge about or confidence in new Enterprises
Cost of changing enter prise.
Inertia, tradition or reluctance to change due to perceived risk of failure.

(f) (i) Diversification reduces risk of market or other problems causing big loses.

(ii) Crop rotation assists by increasing fertility, reducing pests + diseases and allowing a mixed crop/livestock enterprise.

(g) (i) Pure bread seed has homzygous genotype and little or no variation production is consistent but lower. ¦ Hybrid seed has advantage of heterosis, higher production + other built in desirable features.

(ii) The seed collected from the crop would be extremely variable and there would be nobe no guarantee of achieving all or any of the good characteristics of the parents.

QUESTION 4.
(a) (i) Digestion, respiration, assimilation, heart activity.

(ii) Growth, repair of tissues, production of sex cells, production of milk, wool eggs, etc.

(b) (i) Animal Type: eg sheep.

(c) Fresh pastures provided.
Supplementary fodder supplies hay, grain.
supplying concentrates like molasses, area.

(d) (i) eg Fresh pastures supplied means resting + recovery through renovation of rest of farm.
(ii) By supplying supplements or concentrates, the nutrient pool on the farm is increased at cost to the farm budget.

(c) (i) An increase in liveweight corresponds with increased soil phosphate up to 8-10 ppm.

(ii) No - above 8-10ppm no difference is noted from the graph in those given + not given a supplement of P.
(iii) It is absorbed by the plant roots osmotically. It is incorported in plant cells by chemosynthesis. It is eatedn by the animal eventually becoming by assimilation, animal protein.

(iv) A) Below 4ppm Add phosphate
becuase legumes need it and cattle will do better.

B) Between 5-10 ppm May add some but
because past 8ppm no increase, not much cost could outweigh benefits.

C) Greater than 10ppm Not needed
because no difference is noted in the graph at this level and above.

QUESTION 5.
(i) Cultivation causes a reduction in both structural stability and yield. Once stability falls below a certain level, yield drops rapidly.
(ii) The degree of structural stability has an effect on soil water retention, soil aeration and nutrient holding capacity. Grain yield is increased where water availability, nutrients and oxygen are at high levels.
(iii) *The fact that cultivation has a negative effection structure and yield.
*The availability of machinery.
*Cost of changing.
*Tradition.
*Lack of knowledge.
*Personal preference/prejudice.

(b) (i) nitrogen has been removed in the plant grain at harvest and has not been replaced by fertiliser. Cultivation over a long period has lowered O.M. levels and increased leaching/erosion leading to a loss of N.

(ii) Nitrogen is an essential component of all proteins as nitrogen level decreases so does the level of protein synthesis.

(iii) Young stock require a high level of dietary protein. The drop in nitrogen will mean the level of protein in the grain is also dropping. If this is not compensated for in the diet than growth rate will drop.

(c) Nitrogen can be leached into the groundwaterand find its way into water systems such as rivers and lakes. This can result in algal blooms which can cause toxicity problems.

(d) (i) $200/ha (up to about & 220) (must have $/ha)

(ii) $300-$150 = $150/ha = 2 marks

(iii) Total Revenue - total Variable Costs.

(iv) Does not take into account fixed costs. eg machinery As with any analysis it is at a point in time and does not take account of changes over time or other sources of income.

QUESTION 6.
(a) (i) The use of living things to control other living things.

(ii) The cactoblastis moth lays its eggs in the prickly pear plant and the larvae eat through the plant and this, together with bacterial infection, kills the plant.

(iii) The cactoblastis moth has reduced the prickly pear incidence greatly so that now a low population of predator and control exists.

(iv) Biological agents depend on the pests for servival and dynamic balance usually exists. some pests may be resistent and isolated or widely dispersed pests may build up numbers in the short term.

(b) (i) Change the pH of the soil
Increase the phosphorus content

(ii) effect of the scale + Virus on Sifton Plants and other organisims. A bility of scale + Uirus to survive. What are the predators on the Scale? Can the virus mutate? Alternatives? Logistics of implementation (cost, propagation etc)

(iii) The canopy affects
1. Light/shadding -0 photosynthesis
2. alleleopathic affects
3. Water Shadding
4. Affects soil temp
5. Carbon dioxide concentration.

(iv) lucerne has a long tap root to withstand dry periods, is fast growing (shading other plants), the crown provides a base for regeneration. self fertilising and prolific seeder.

(c) In any population genetic variation or mutation allows some individuals to survive the chemicals. Offspring of these resistant individuals are naturally selected to survive and breed up numbers in the population to eventually become resistant of the chemical.

HILLTOP – AN AGRICULTURAL PROBLEM



Introduction – the problem at Hilltop

The Hilltop area is an imaginary part of the United Kingdom, though the information is based on real-life investigations. This unit involves studying data about the Hilltop area in order to understand why some farms in the area are losing money.

Question

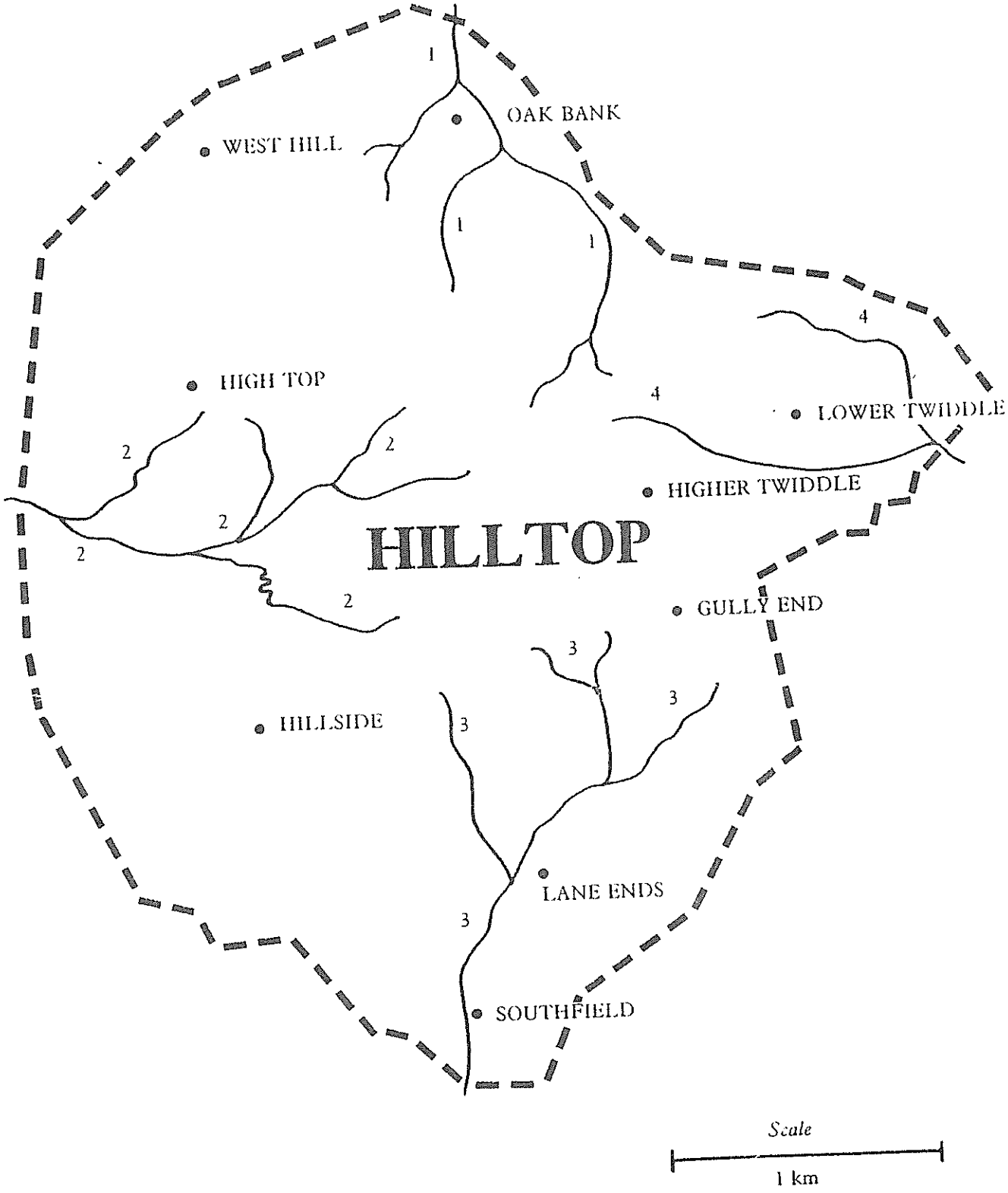
1 *Describe in your own words the problem you will be trying to solve in this unit.*

Map 1 on page 2 shows the nine farms in the Hilltop area and its four streams. The farms are similar in size and use similar farming methods. Five of the farms are successful in rearing cattle but four of the farms are unsuccessful and are losing money. These unsuccessful farms are:

Lane Ends, Oak Bank, Southfield and West Hill.

Animals on these farms are underweight and do not grow healthily. The cows produce small, sickly calves and they give much less milk than they should. The unhealthy cattle have a dull coat and their hair tends to fall out. They develop a strange walk which farmers call 'staggers'.

The object of this study is to discover why the animals on some farms are affected in this way.



Map 1 The natural drainage of the Hilltop farms

The streams are numbered 1 to 4.

Trace elements

All animals need traces of certain elements in their diet. Each element has a particular job to do in the body and may be vital for an animal's health. For example, in the human diet, iodine is an important trace element which helps the thyroid gland work properly. Some trace elements can be poisonous if their concentration is too high.

The sickness in the animals is due to either

(i) deficiency (too little) of certain trace elements, or
(ii) excess (too much) of a poisonous trace element.

Many trace elements build up in the liver, which acts as a kind of filter and a store for certain elements. Analysis of the livers of healthy animals provides a standard for comparing with other animals.

Table 1 shows the concentrations of various trace elements in the livers of healthy and unhealthy animals from the Hilltop area.

Table 1 The average concentrations (in p.p.m.) of various trace elements in the livers of healthy and unhealthy animals from the Hilltop area

Element	*Symbol*	*Concentration in parts per million (p.p.m.)* *Healthy animals*	*Unhealthy animals*
chromium	Cr	2.0	1.1
copper	Cu	70.0	16.0
iron	Fe	180.0	44.0
lead	Pb	0.05	0.05
manganese	Mn	40.0	12.0
mercury	Hg	0.01	0.01
molybdenum	Mo	3.5	24.0
nickel	Ni	4.0	1.3
zinc	Zn	4.0	3.0

Questions

2 *Compare the figures for healthy and unhealthy animals in Table 1. Which element(s) may be greatly deficient (at least 3 times too low) in the diets of the unhealthy animals?*

3 *Which element(s) may be present in excess in the diets of the unhealthy animals?*

From studies in other areas, the sickness was known to be caused by a deficiency of one of the trace elements in Table 1. This deficiency *might* be because there is too little of this element in the soil. But it could also be the result of another element blocking the uptake of a vital element.

The normal method of correcting deficiency of a trace element is to provide additional amounts of the deficient element. This is done either in fertilizers added to the soil or as chemicals in the animal's food.

Both methods of treatment were tried in the Hilltop area. Neither method improved the health of the animals. The next step was to carry out a geological examination of the area. Scientists examined the local rocks, soil and streams to find which elements were deficient or in excess in the soil. Deficiency or excess in the soil would be passed on to the grass eaten by the cattle.

Geology of the Hilltop area

Several years ago a thorough geological survey had been made of the Hilltop area.

Extracts from the geological survey of the Hilltop area

Extract 1 – Stream sediments

Analysis of stream sediments can be used to compare the elements present in different drainage areas. Elements that are found in the sediments of rivers and streams are also likely to be found in the grass. Samples were dug from the stream beds, dried and analysed. The samples were labelled according to the streams on Map 1. The results are shown in Table 2.

Table 2 Concentrations of elements present in the sediments of the different streams, in parts per million (p.p.m.)

Stream	*Cr*	*Cu*	*Fe*	*Pb*	*Mn*	*Hg*	*Mo*	*Ni*	*Zn*
1	2	40	280	30	180	0.5	34	3	60
2	1	32	170	4	140	–	4	1	16
3	1	94	420	44	310	–	60	4	81
4	2	54	340	28	220	0.5	5	2	74

Questions

4 *Which four farms are unsuccessful and losing money because of unhealthy animals?*

5 *Look carefully at Map 1. Which streams drain towards the unsuccessful farms?*

6 *Look carefully at Table 2. Are the streams draining towards the unsuccessful farms deficient in the element or elements listed in your answer to question 2?*

7 *Do the streams draining towards the unsuccessful farms have an excess of the element or elements listed in your answer to question 3?*

8 *What do you think is the cause of the problem?*

Extract 2 — The underlying rocks

Map 2 shows a geological map of the Hilltop area. Samples were taken from the different rock types in the area. The analysis of these samples is given in Table 3.

Table 3 Analysis of rock samples. (Values show the elements present as parts per million (p.p.m.))

Rock type	*Cr*	*Cu*	*Fe*	*Pb*	*Mn*	*Hg*	*Mo*	*Ni*	*Zn*
Limestone	0.75	4.2	120	3.5	160	0.03	1.25	0.65	4.5
Grit	1.10	3.7	65	40	145	0.03	1.80	1.3	3
Mudstones	1.20	5.6	165	5	125	0.04	3.5	1.45	2
Shales	1.45	7.7	175	4	137	0.03	62	1.5	2.5
Sandstones	1.50	11.5	200	5	157	0.04	5	1.8	6.2

Questions

9 *Consult Maps 1 and 2. (They can be viewed at the same time by holding them up to the light together, one on top of the other.) Which rock types may affect the streams draining towards the unsuccessful farms?*

10 *Now consult Table 3 and your answer to question 9. Which rock seems the most likely source of the element you suspect?*

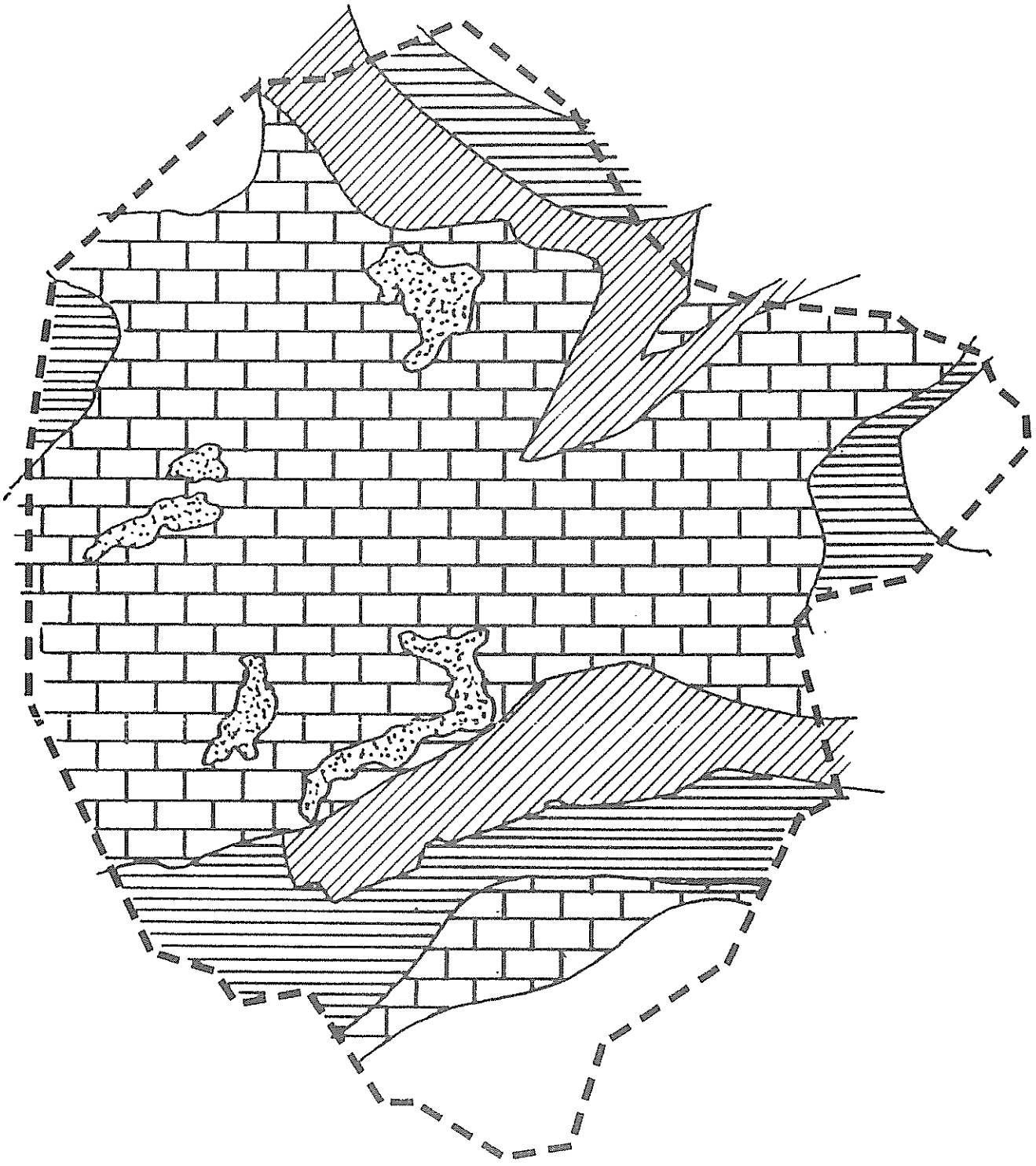
11 *State the basic cause of the sickness in the animals and explain how the rocks in the area are causing the problem.*

Easing the problem

Having found the element that was making the animals unhealthy, the scientists were unable to find a complete cure. However, they were able to help the farmers cut down the sickness in their animals.

Question

12 *What advice would you give to the farmers of the unsuccessful farms?*



	Limestone
	Grit
	Mudstones
	Shales
	Sandstone

Map 2 Geological map of the Hilltop area

QUARANTINE

Explain in your own words what is meant by the term quarantine.

_____

_____

Name one disease which quarantine laws have helped keep out of Australia._____

On the world map below, shade in those areas that are not affected by the disease that you named above.



Name three of the countries that you shaded._____

_____

Discuss reasons why those nations not affected by the disease have been so successful in keeping it out._____

_____

What steps can farmers take to prevent diseases entering his property ?_____

_____

In which agricultural industries are quarantine procedures particularly important ?_____

YEAR NINE AGRICULTURE ASSIGNMENT

FOOD SPOILAGE AND PRESERVATION

This assignment is divided into two parts;

1. The Role of Micro-organisms in Food Spoilage.
   A brief description of the ways in which microbes spoil food is required.

2. Methods of Preventing Food Spoilage.
   This section should contain a description of the various ways we treat foods to prevent spoilage by micro-organisms together with some examples of foodstuffs that are preserved by each method. The methods used include;

1. Heat treatment (eg. sterilizing and pasteurization).

2. Refrigeration and Freezing.

3. Dehydration.

4. Salting.

5. Syruping.

6. Using Chemical Preservatives.

7. Any other methods that you can find.

For each method listed above ensure that your description explains how the method prevents microbes from spoiling food (eg. sterilizing destroys microbes, refrigeration slows down their growth).

Remember that assignments are a compulsory part of the Agriculture course and that they form a part of the assessment of your achievement in Agriculture.

DATE DUE:_____

FERMENTATION

Fermentation is the process in which sugars are converted into *alcohols* or *acids* by micro-organisms. Alcohols are widely used in the manufacture of paints, plastics and textiles, as fuels and in alcoholic beverages.

Fermentation is a process that is similar to *respiration*. However it occurs in the absence of *oxygen* (under *anaerobic* conditions), while *respiration* can only occur when oxygen is present (*aerobic* conditions).
The following chemical equations summarise the two processes.

Respiration

Sugars + Oxygen ⟶ Carbon Dioxide + Water + Energy

Fermentation

Sugars ⟶ Alcohol or Acids + Carbon Dioxide + Energy

Less energy is produced from the same amount of sugar in fermentation than in respiration.

HOW WINE IS MADE

Grapes crushed
↓
Sulphur dioxide added to kill spoilage bacteria
↓
Sugars converted to alcohol by wine yeast (grows naturally on grapes or may be added)
↓
Alcohol destroys yeasts
↓
Fermented liquor aged in vats. Sediments deposited. Wine filtered and bottled (many chemical changes occur during this time).
↓
Chemical changes continue in bottle

NOTE: Wine yeasts grow on the skins of the grape.
White wines - mainly steel vats are used.
Red wines - wooden vats used, the wood (oak) adds flavour.
Some red wines continue to age for 10 years or more.

BEER PRODUCTION

Barley grain germinated.
starches → sugars
proteins → amino acids
This is called ***malting***.

↓

Malted grain crushed.
Hot water added.

↓

Dried hops added.

↓

Boiled.

↓

Cooled and filtered.

↓

Brewers yeast added.

↓ } ***fermentation***

Sugars changed to alcohol and carbon dioxide.
When desired alcohol content is reached beer is filtered, enriched with carbon dioxide and packaged.

NOTE: Different yeasts give rise to different styles of beer eg. ales (light coloured) old beer (dark coloured).

YOGHURT MAKING

Early in the 16th century, King Francois I of France was a lover of yoghurt.He believed that yoghurt was a miracle food which lead to a long life. While this has not been proved scientifically, many people still believe that yoghurt is very good for your health.

Yoghurt is the result of the action of special **bacteria** on milk. It is very easy to make.

Making Yoghurt

1. Heat some milk to almost boiling in a saucepan.
Explain why we do this._____

_____

_____

_____

2. Remove from the heat and cool to around 40^0C. Some people add a tablespoon of dried milk powder at this stage. This increases the solids content of the milk and leads to yoghurt with a thicker consistency.
3. Pour your milk into jars which you have **sterilised** by boiling in a saucepan of water for at least 5 minutes. Now add a teaspoonful of fresh natural yoghurt to each jar.
4. Cover the top of the jar with a piece of plastic food wrap.
5. **Incubate** the jars at a temperature of about 35^0C for 8-10 hours or until a thick yoghurty consistency is reached.
6. Refrigerate your jars until you are ready to eat your yoghurt.
7. Add some honey and/or dried fruit or simply leave *'au naturale'*. Eat-mm...yummy!
8. Dip a piece of **litmus paper** into some fresh milk and another piece into some fresh yoghurt. Record your results below.
Colour of litmus paper in fresh milk = _____
Colour of litmus paper in yoghurt = _____
This indicates that fresh milk is _____ while yoghurt is_____.
9. **Carefully** add a few drops of **hydrochloric acid** to a small amount of milk in a testube. What happens to the milk?

_____

_____

_____

_____

Questions For You To Answer

1. Why were you asked to put the jars in boiling water for at least 5 minutes?

_____

_____

_____

_____

2. Why was the milk cooled before the yoghurt starter was added?_____

_____

_____

3. Why was the warm mixture incubated at about 35°C?

_____

_____

_____

4. Explain the results of your litmus paper and acid tests.

_____

_____

_____

_____

_____

A Summary of Yoghurt Making

Choose words from the following list to complete the summary below.

grow lactose pasteurised lactic destroyed sheep curdle goats flavour

Yoghurt is made by inoculating _____ milk with _____ known as ***Lactobacillis bulgaricus*** and ***Streptococcus thermophilis***. These bacteria _____ the milk, giving it a semi-solid consistency and the characteristic _____ of yoghurt. They do this by multiplying rapidly in the warm conditions and using the sugar (_____) present in the milk to make _____ acid.

If the milk is too hot when the starter culture is added the bacteria will be _____. If the milk is incubated at a low low temperature they will fail to _____ and produce yoghurt.

Yoghurt can be manufactured from the milk of many animals eg cows, _____ , _____ .

Follow-up Exercises

Give the meaning of the following words that have been used above.

Sterilised_____

_____

Incubate _____

_____

Starter Culture _____

_____

Curdle _____

_____

Pasteurised _____

_____

Legumes and Nitrogen Fixing Bacteria

A typical improved pasture consists of grasses and legumes growing together. The grasses provide bulk and carbohydrates to an animals diet. Legumes provide a high protein feed and contribute to soil fertility.

High protein pastures are essential to livestock producers trying to increase meat growth. All plants contain protein. Plants manufacture these proteins from simple nitrogen compounds (nitrates) which are absorbed by the roots from the soil. Due to the demand for nitrogen as nitrates, much of the nitrogen in the soil and air is unavailable.

A group of bacteria (*Rhizobium* spp.) help legume plants get nitrogen. The bacteria live in cysts or nodules on the roots of the plant. In these nodules the *Rhizobia* convert nitrogen gas (unavailable to plants) into proteins that the plant can utilize. In return the legume provides the bacteria with a place to live and food in the form of sugar and starch. Relationships where two different organisms live together in an association where each one benefits the other is called **symbiosis**.

Activity 1

Clover is an example of a legume. Use a specimen of white clover to help you write a list of characteristics that are common to most legumes. Note leaf shape, number of leaflets per leaf, growth habit, flower structure and root system.

Activity 2

Draw a labelled diagram of the roots of the clover plant clearly showing the Rhizobium nodules. Note the colour of the nodules (pink nodules are are healthy, white/grey ones are less active).

Activity 3

There are a number of *Rhizobium* bacterial species in the soil. Different legumes need different strains of *Rhizobium*.

Name some other plants besides white clover (*Trifolium repens)* which would belong to the legume group of plants.

Activity 4

Nitrate nitrogen is released when the whole legume or part of the plant dies and the root nodules break down in the soil. This nitrogen improves grass growth.

What implications would this have for a graziers fertilizer and pasture management program ?

Activity 5

Traditionally wheat farmers have grown their wheat (a grass) in the same paddock for several years in a row. Good crop yields are experienced in the first few years but yields in the later years are generally very poor.

How would you explain such a decrease in yield with time ?

Describe a plan incorporating the use of a legume, which could remedy such a situation.

Activity 6

Write a creative passage about the life of one *Rhizobium*.

BOARD OF SECONDARY EDUCATION

MEMORANDUM NO 65/90 Date of Issue: May 1990

ATTENTION: PRINCIPALS AND TEACHERS OF AGRICULTURE

Subject:	3 Unit Agriculture – Research Project Log
Groups Affected:	Candidates for the 1991 Higher School Certificate Examination in 3 Unit Agriculture
Effective From:	May 1990
Contact Phone Nos:	(02) 925 8183, 925 8177

The Board of Secondary Education has determined that the 3 Unit Agriculture research project should be supported by a log which is verified by the candidate's teacher. The Board has developed a log format which is attached together with an explanation of the requirements.

As advised in Administrative Circular No 80, 1984, candidates may commence their research project at any time in either Year 11 or Year 12. The log is mandatory from Year 11, 1990 and Year 12, 1991.

Schools are reminded that the research project is not just the material submitted for examination. That is the project report. The research project consists of all the work done by the student in conceiving the project and in carrying out appropriate library research and experimentation and in writing the report.

G G Weller
Executive Officer

35-51 Mitchell Street North Sydney 2060 PO Box 460 North Sydney 2059 Tel: (02)925 8111 Fax: (02) 955 3557

BOARD OF SECONDARY EDUCATION

3 UNIT AGRICULTURE
RESEARCH PROJECT LOG

The Purpose of the Log

The log will improve the value of the project by formalising the interaction between the teacher and the student during the learning process. The committee encourages students to keep a fuller log which becomes a form of diary during the project.

The log will help the marking of the project report by allowing the examiners to get a picture of how the project has been managed by the candidate. It will also help teachers and examiners to validate the candidate's work. The log itself will not be marked but has to be submitted with the research project.

Teachers need to assist students to develop the research skills required to complete the process of investigation. To this end students should be introduced to the nature of systematic investigation as early as possible in the course. This should involve discussion of research methods relevant to the major areas of investigation in agriculture. Maintaining the log can help teachers to formalise the development of the skills.

The Role of the Teacher

The teacher's role is one of a facilitator and a monitor of student progress. The log is designed to record progress and interaction. Teachers are to initial and date each section of the log once it is completed.

Log Format

The log is set out in five sections which are described below.

1. **Area of Investigation**
   The purpose of this stage of the log is for students to identify the broad area of study in which they are interested. Students should also outline what specific problem or investigation they want to carry out.

2. **Background Reading**
   Students should read about the specific problem and the kinds of research which have already been undertaken. This section could include comments about where the students intend to find and do find information (i.e., from people and from written sources).

3. **Research Methods**
   Students should note the experimental design or means of collecting information. The teacher should make sure the choice of research method is relevant to the kind of investigation being carried out. Physical, biological, economic, and social investigation each have appropriate research methods. Students should outline resources used to carry out the investigation.

4. **Implementation**
   Students should list the steps they intend to follow and note the times at which each step occurred. Any variations should also be noted.

5. **Writing**
   This stage of the research project is crucial, after all it is what the examiner sees! The interpretation of results and discussion is often the area where students have considerable problems. Filling in the log will help to overcome this problem as in this section students should outline how they will present their results and discussion.

While the five sections are presented here in sequential order, students may be completing activities from more than one section concurrently. The dates associated with the teacher's comments may well reflect this.

BOARD OF SECONDARY EDUCATION

3 UNIT AGRICULTURE
RESEARCH PROJECT LOG

Research Project Title: .....

.....

Candidate Number: .....

Centre Number: .....

STUDENT DECLARATION

I.....(student's name) declare that the planning, development, content and presentation of this research project is primarily my own work, except for the limited material, if any, drawn from acknowledged sources, and has not been copied from any other person's work; and I understand that a false declaration may jeopardise my results in the Higher School Certificate examination.

Student's signature: ..... Date: .....

TEACHER DECLARATION

I.....(teacher's name) declare that I have supervised the planning, development, content and presentation of this research project and I confirm that it is primarily the student's own work, except for the limited material, if any, drawn from acknowledged sources. The attached log is a correct record of the student's planning and progress throughout the project.

Teacher's signature: ..... Date: .....

(Please return this form with the project)

3 Unit Agriculture Research Project Log

(This is a sample format only. Other formats may be devised by schools if more suitable)

Student No. _____ Centre No. _____

Stage	Student proposals	Teacher Comments and Initials	Student Action
Area of Investigation			
Background Reading			
Research Methods			
Implementation			
Writing			

An Example of a
3 Unit Agriculture Research Project Log

Student No. 876543 **Centre No.** 2109

Stage	Student proposals	Teacher Comments and Initials	Student Action
Investigation	Comparison of dry matter production from rye and oats	Area of investigation is fine – how many varieties? DR 14/2	One variety of each, Cooba oats and Concorde rye.
Background Reading	I intend to find out about: • varieties from Dept. of Agriculture • expected production • conditions for growth • research in the area	In conditions for growth find recommended fertilizer rates, sowing rates, so you can gather materials needed. Plan your reading time DR 18/2	1 hour per week in the library for reading. Spoke with District Agronomist. Ordered seed and fertilizer
Research Methods	Set up trial. 2 replicas, 1 metre squares. Harvest using shears to 5 cm. Dry the cut material and weigh it.	Maybe you need more replicas? How many harvests? How do you replicate? What about randomization? What statistics do you need? DR 27/2	5 replicas, allocate using random no.s. 3 harvests over 6 weeks, 8 weeks after planting. See maths teacher about analysing the statistics.
Implementation	Action Plan: • Stake out plots 1st week March • Plant Week 3 March • First harvest in middle May 2nd & 3rd over next four weeks • analyse results by end of June • write up results • starting writing up literature review in April	1. This looks fine Do you have any plans to cater for poor weather conditions? DR 1/3 2. How is the literature review going? Growing problems? Have you explained what analysis of variance does? 5/4 DR	If by May there is a weather problem I could switch to a reduced trial using pots in the glasshouse. Harvest held up till end of May by a football injury.

3 Unit Agriculture Research Project Log

Student No. 876543 Centre No. 2109

Stage	Student proposals	Teacher Comments and Initials	Student Action
Writing	Set out all sections Collect photographs Prepare tables and graphs Compare data with background reading Write up the results and discussion	S like your action plan for the research. You should do the same for writing up. The synopsis is important – think about how you might write it. Be sure to use the statistical results to support your statement 15/5 R	.I had a go at the synopsis – still having problems • Research trends match mine • I plan to do my first draft by the end of July, then check with you.

BOARD OF STUDIES
MEMORANDUM

MEMORANDUM NO. BOS 14/91 DATE OF ISSUE: February 1991

ATTENTION: **Principals and teachers of subjects with small candidature in the Higher School Certificate Examination**

Subject:	Order form for Examination Reports of Subjects with a small candidature in the 1990 Higher School Certificate Examination.
Groups Affected:	Teachers of subjects with a small candidature in the Higher School Certificate Examination.
Contact Phone Nos:	(02) 925 159, (02) 925 8160

The Board has available for distribution a limited number of 1990 Examination Reports in subjects with a small candidature in the Higher School Certificate Examination.

Schools wishing to obtain a copy of any of these reports are asked to fill in the order form overleaf and return it to:

Dispatch Inquiries Clerk
Communications Branch
PO Box 460
North Sydney
NSW 2059

John Lambert

J.L. Lambert
President

35-51 Mitchell Street (PO Box 460) North Sydney 2060 NSW Australia
Telephone (02) 925-8111 Fax (02) 955-3557

BOARD OF STUDIES
MEMORANDUM

MEMORANDUM NO.BOS 43/91 Date of Issue: March 1991

ATTENTION: PRINCIPALS OF SECONDARY SCHOOLS AND COLLEGES OF TAFE

Subject:	Withholding of School Certificate/Higher School Certificate/Record of Achievement/ Result Notice due to unsatisfactory attendance and/or application.
Group Affected:	School Certificate and Higher School Certificate students in 1991 and thereafter.
Effective From:	March 1991
Contact Ph. Nos:	(02) 925-8215, (02) 925-8268 or (02) 925-8213

The Board of Studies recently amended the rules governing the withholding of the School Certificate/Higher School Certificate/Record of Achievement/Result Notice on the basis of unsatisfactory attendance and/or application. These rules are detailed in this memorandum.

SCHOOL CERTIFICATE

Attendance

Students whose overall attendance is deemed unsatisfactory will receive neither a School Certificate nor a Record of Achievement. Section 5.5.1 of the *Assessment Certification Examination* (ACE) Manual outlines rules and guidelines for schools to follow in applying the attendance provisions of the *Education Reform Act (1990)*.

The attention of Principals is drawn to Section 8.5.2 of the ACE Manual concerning warnings which must be given to students at risk of being deemed unsatisfactory in attendance and/or application:

..../2

If at any time it appears that a student is at risk of being deemed unsatisfactory in attendance or application, or receiving an "N" award in any course, the principal must:

(a) advise the student in time for the problem to be corrected;

(b) advise the parent or guardian in writing;

(c) request from the student/parent a written acknowledgement of the warning; and

(d) retain copies of relevant documentation.

Application

The Board will withhold the award of a School Certificate on the grounds of unsatisfactory application provided that the student has been given "N" determinations in at least two of the courses undertaken. Students receiving two or more "N" determinations are not automatically deemed as having overall unsatisfactory application. The final determination is to be made by the Principal. Students whose overall application is deemed unsatisfactory will receive neither a School Certificate nor a Record of Achievement.

A sample warning letter is enclosed. This letter conforms to the Board's attendance and/or application requirements. Principals may wish to use this letter to standardise the school's procedures in this matter.

It is most important that all Year 10 students are aware that they will receive no credentials whatsoever should their School Certificate and/or Record of Achievement be withheld on the basis of either overall unsatisfactory attendance and/or application.

HIGHER SCHOOL CERTIFICATE

Attendance

Students whose overall attendance is deemed unsatisfactory will receive neither a Higher School Certificate nor Record of Achievement nor Result Notice. Section 11.8.1 of the ACE Manual outlines rules and guidelines for schools to follow in applying the attendance provisions of the *Education Reform Act (1990)*.

.../3

Memo No. BOS 43 /91 Withholding of School Certificate/Higher School Certificate/Record of Achievement/Result Notice due to unsatisfactory attendance and/or application. 3.

The attention of Principals is drawn to Section 15.3.2 of the ACE Manual concerning warnings which must be given to students at risk of being deemed unsatisfactory in attendance and/or application:

If at any time it appears that a student is at risk of being deemed unsatisfactory in attendance or application, or receiving an "U" award in any course, the principal must:

(a) advise the student in time for the problem to be corrected;

(b) advise the parent or guardian in writing (if the student is under 18 years of age);

(c) request from the student/parent a written acknowledgement of the warning (if the student is under 18 years of age); and

(d) retain copies of relevant documentation.

Application

The Board will withhold the award of a Higher School Certificate on the grounds of unsatisfactory application provided that the student has been given "U" determinations in at least two of the courses undertaken. Students receiving two or more "U" determinations are not automatically deemed as having overall unsatisfactory application. The final determination is to be made by the Principal. Students whose overall application is deemed unsatisfactory will receive neither a Higher School Certificate nor Record of Achievement nor Result Notice.

A sample warning letter is enclosed. This letter conforms to the Board's attendance and/or application requirements. Principals may wish to use this letter to standardise the school's procedures in this matter.

It is most important that all Year 12 students are aware that they will receive no credential whatsoever should their Higher School Certificate and/or Year 12 Record of Achievement and/or Result Notice be withheld on the basis of overall unsatisfactory attendance and/or application.

Your co-operation in ensuring these procedures are followed when determining students as unsatisfactory in relation to attendance and/or application, is appreciated.

J L Lambert
President
Board of Studies

SAMPLE LETTER

REQUIREMENTS FOR THE AWARD OF A SCHOOL CERTIFICATE AND RECORD OF ACHIEVEMENT

Dear (Parent/Guardian Name)

I would like to draw to your attention the Board of Studies' requirements for the award of a School Certificate and Record of Achievement.

1 ATTENDANCE

Students whose overall attendance is deemed unsatisfactory will receive neither a School Certificate nor a Record of Achievement.

2 APPLICATION

Satisfactory application is essential for the award of a School Certificate and Record of Achievement. The Board requires a judgement to be made by the principal as to whether students have applied themselves at school to a degree which warrants the award of a School Certificate and Record of Achievement. In making this judgement I will take into account the degree of effort shown by students and their attitude to their studies.

Students whose overall application is deemed unsatisfactory will receive neither a School Certificate nor a Record of Achievement.

Any course where an unsatisfactory determination ('N' award) is made will not appear on the Record of Achievement.

The purpose of this letter is to warn you that _____(name)_____ is in danger of not receiving School Certificate awards for the following reason(s):

_____

_____

Please regard this letter as an official warning which the Board of Studies requires schools to give in order that students have the opportunity to redeem themselves.

Further information, if required, may be obtained by contacting the school.

Yours sincerely

_____
Principal

Please detach and return to the school

- -

I have received the letter dated _____

indicating that my son/daughter/ward _____

is in danger of not receiving School Certificate awards.

Signature: _____
(Parent/Guardian Name)

Date: _____

SAMPLE LETTER

REQUIREMENTS FOR THE AWARD OF A HIGHER SCHOOL CERTIFICATE OR RESULT NOTICE AND RECORD OF ACHIEVEMENT

Dear (Parent/Guardian Name)

I would like to draw to your attention the Board of Studies' requirements for the award of a Higher School Certificate or Result Notice and Record of Achievement.

1 ATTENDANCE

Students whose overall attendance is deemed unsatisfactory will not receive a Higher School Certificate, Record of Achievement or Result Notice.

2 APPLICATION

Satisfactory application is essential for the award of a Higher School Certificate or Result Notice and Record of Achievement. The Board requires a judgement to be made by the Principal as to whether students have applied themselves at school to a degree which warrants the award of the Higher School Certificate or Result Notice and Record of Achievement. In making this judgement I will take into account the degree of effort shown by students and their attitude to their studies.

Students whose overall application is deemed unsatisfactory will not receive a Higher School Certificate, Record of Achievement or Result Notice.

Any course where an unsatisfactory determination ('U' award) is made will not appear on the Higher School Certificate, Result Notice or Record of Achievement. If an unsatisfactory determination in one or more courses reduces the total number of units studied by the student to less than eleven then the student will be ineligible for the award of a Higher School Certificate. Students with 10 units or less will receive, in lieu of a Higher School Certificate, a Result Notice on which unsatisfactory courses will not be listed.

The purpose of this letter is to warn you that _____(name)_____ is in danger of not receiving Higher School Certificate awards for the following reason(s):

_____

_____

Sample Letter - Requirements for the award of a Higher School Certificate or Result Notice and Record of Achievement

Please regard this letter as an official warning which the Board of Studies requires schools to give in order that students have the opportunity to redeem themselves.

Further information, if required, may be obtained by contacting the school.

Yours sincerely

_____
Principal

Please detach and return to the school

- -

I have received the letter dated _____

indicating that my son/daughter/ward _____

is in danger of not receiving Higher School Certificate awards.

Signature: _____
(Parent/Guardian Name)

Date: _____

BOARD OF
SENIOR SCHOOL STUDIES
35-51 Mitchell Street, Box 460, P.O., North Sydney, N.S.W. 2060

BSSS
Telephone: (02) 925 8111
Our reference:

BSSS 4011
JdeM:ZH

Date of Issue: August, 1987

ADMINISTRATIVE CIRCULAR NO. 54, 1987

ATTENTION: Principals and All Teachers of Agriculture

SUBJECT: Amendments to the 2-3 Unit Agriculture Syllabus, Years 11-12

In response to a state wide survey of agriculture teachers undertaken in 1986 following the introduction of the new syllabus, a number of amendments and revisions have been made to the syllabus. These amendments do not constitute any significant change in the philosophy of the syllabus and are designed to clarify problems with depth of treatment and ambiguity.

The following changes are to be implemented in Year 11, 1988:

PRACTICAL WORK

Under "Practical Work" following the paragraph ending "...not an additional discipline imposed when the experiment has been concluded", the following is inserted to replace everything down to the "Farm Case Study" :

> "As a consequence Biometry should not be seen as a separate discipline to the student as a result of studying this syllabus. It is expected that the following ideas, under the heading of Biometry, should be developed continuously throughout the course. All the objectives should be achieved as a result of students being involved in designing, carrying out and analysing experiments during the course."

Major Ideas

1. A common characteristic of agricultural material is variability.

2. Variability can be assessed during statistical techniques.

3. Biometry plays an essential role in the design, analysis and interpretation of agricultural experiments.

4. Computers can be used to calculate and organise statistical data.

Objectives

During the study of this syllabus, students should carry out experiments which allow them to be able to:

1. collect data demonstrating the variability of soil, plant, animal, microbial and economic material;

2. define the terms 'data', 'variable', 'population' and 'sample';

3. use measures of central tendency such as 'arithmetic mean', 'median' and 'mode';

4. recognise that 'range' and 'standard deviation' can be used to estimate the variability of a population;

5. recognise that many agricultural variables follow approximately normal distributions;

6. explain the role of control, randomisation and replication in designing experiments;

7. analyse and interpret data by graphic, tabular and diagrammatic methods;

8. realise that the differences that arise in an experiment could be due to chance or experimental variables;

9. recognise the way computers can be used in design and analysis of experiments.

FARM CASE STUDY

Under "Farm Case Study", replace old Objectives 3 and 4 with:

3. be able to describe the routine management procedures for production and explain why each exists;

4. examine the relationship between inputs and outputs in farm production and make some assessment of the economic performance of this production unit.

THE RESOURCE SYSTEM

Under "Resource System", replace old Objectives 2, 3 and 4 with:

2. how management practices may influence soil fertility and relate these to an agricultural system which is being studied.

3. (a) that only a small proportion of the total energy arriving at the earth's surface is used by plants;

(b) the terms 'solar radiation' and 'net radiation';

4. that fluctuating temperature patterns of air and soil affect the growth rate of plants on a short term and a seasonal basis.

PLANT PRODUCTION SYSTEMS

Under "Plant Production Systems" replace the old Objectives 9 and 16 with:

9. and monitor the phases of development of an agricultural plant;

16. and be able to describe an experiment they have carried out to measure the effect of interference on plant growth and development (eg. density trial, alleopathy test, weed competition).

ANIMAL PRODUCTION SYSTEMS

Under "Animal Production Systems" replace the old Objectives 9, 16 and 17 with:

9. the general role of hormones in the regulation of animal physiology and behaviour through the study of the reproductive hormones in farm animals;

16. and demonstrated that they have monitored the growth and development of a farm animal in their region;

17. the relationship between the nutritional needs, growth and development and market requirements for a farm animal in the region.

SOCIO-ECONOMIC SYSTEMS

Under "Socio-economic Systems" replace the old Objectives 2, 7, 13 and 15 with:

2. how agricultural production systems interact with socio-economic forces such as demand, market prices, government regulations, changing community values and customs;

7. that the relationships among subsystems operating within a farm can be competitive, complementary or supplementary;

13. the types of farmer organisations and their political influence.

15. the ways governments can directly or indirectly control aspects of agricultural production and marketing.

NEW 3-UNIT TOPIC

In addition, there is a new 3 unit topic to replace the old E1: "Market Applications." This is in line with the stated policy in the syllabus of replacing topics with new up-to-date areas of study. The new topic "International Marketing of Australian Agricultural Commodities" is of particular relevance to Australia. This topic would be for study by Year 12 in 1989, following the introduction of the already approved 2 new topics in 1988.

Proposed New 3 Unit Elective for Study by Year 12 in 1989

Name: International Marketing of Australian Agricultural Commodities

Major Four Ideas

1. Trade in agricultural products provides significant economic benefit to Australians and people in the rest of the world.

2. Significant barriers exist to the free flow of international commodities.

3. Various policy instruments are used by Governments to intervene in agricultural markets.

4. International agreements are necessary to ensure the benefits from International Trade are fairly disturbed.

Objectives

Students should understand:

1. the contribution of Australia's agriculture exports to the domestic and world economies and the benefits gained from trade;

2. the nature of price supports, export subsidies, storage policies, exchange rate policies and common markets;

3. the effects of agricultural policies of other countries and groups (eg. EEC, USA and developing countries), on international trade, Australian agriculture and individual farms;

4. the basic rules of General Agreement on Tariffs and Trade (GATT) and multinational negotiations;

5. the significance of:

   (a) non-tariff barriers such as trade regulations and quality control;

   (b) the role of market forces and promotion;

   (c) the influence of lobby groups.

ACTION REQUIRED: For the immediate attention of teachers of Agriculture.

J. L. Lambert
Executive Officer

BOARD OF SECONDARY EDUCATION

MEMORANDUM NO. 110/1989 DATE OF ISSUE: August, 1989

ATTENTION:	Principals and Teachers of Agriculture.
SUBJECT:	Deletion and Substitution of Electives in 3 Unit Agriculture.
GROUPS AFFECTED:	Year 12 students in 1991 and thereafter.
EFFECTIVE FROM:	Day 1, Term I, 1990.
CONTACT PHONE NOS:	(02) 925 8266, (02) 925 8183

The Board wishes to advise the following changes to the 3 Unit Agriculture course for initial examination at the Higher School Certificate Examination in 1991.

Deletion: Elective B2: "A comparison of Plant or Animal Production Systems", which will be examined for the last time in 1990.

Inclusion: New Elective B2: "Researching Current Issues in Agriculture", which will be examined for the first time in 1991.

Attached to this Memorandum are 2 pages of information concerning the new elective, detailing major ideas and objectives for the topic.

In subsequent years one new 3 Unit Elective will be rotated on a regular basis in order that the study of current issues in Agriculture can be facilitated.

ACTION REQUIRED: For the immediate attention of all Teachers of Agriculture.

for G G WELLER
Executive Officer

INTRODUCTION TO "RESEARCHING CURRENT ISSUES IN AGRICULTURE"

The Board of Secondary Education feels that many students studying agriculture should have the opportunity to read and interact widely with the media and current literature about issues both affecting agriculture and arising because of the nature of agriculture. To this end, this elective provides a framework for such interaction and the collation and collection of relevant information.

Research in the context of this elective means collecting together existing arguments and ideas and the data on which these arguments are based. The elective then encourages students to put together their own arguments as a result of their research and to examine ways of presenting such arguments to others.

The Board feels that all syllabi should encourage students to be well informed and articulate about current issues in our society. This elective provides a mechanism for present and future students to be informed about current agricultural issuees important in the community.

Students at the school level should be encouraged to explore and use a range of formats to present arguments and ideas to audiences. Obviously in the HSC exam, written answers are required.

Researching Current Issues in Agriculture

Major Ideas

1. Issues in this context are topics of concern relating to social, economic and production problems of agriculture being discussed in the community.
2. There are often several possible solutions to a problem.
3. Research involves the collection and critical appraisal of information and its communication.
4. Satisfactory methods of implementation are required for any possible solution.
5. Clearer understanding of an issue occurs when preconceived ideas or attitudes do not inhibit appraisal of new ideas.

Objectives

Students should:

1. Read a range of articles, books and magazines related to current issues in agriculture.
2. Watch and listen to a range of radio and television programs, tapes and videos related to current issues in agriculture.
3. Research one current issue affecting agriculture in depth or two issues in less detail.
4. Discuss alternative solutions to the problems involved in the issue(s).
5. Outline an action plan which attempts to resolve the issue(s) they have researched.
6. Discuss the possible short-term and long-term outcomes of the issue(s) they have investigated.
7. Recognise the need for sensitive appraisal of an audience's point of view when deciding how to communicate information and views on an issue.
8. Communicate the results of their research in formats suited to two different audiences. Some examples of audiences are farmers, parents, teachers, other students, local newspapers, television and computer users. Formats *may* include video and audio-tapes, photographic presentations, computer reports or various written forms.

BOARD OF SECONDARY EDUCATION

BSSS 3501

Date of Issue: November 1987

MEMORANDUM NO. 6/87

ATTENTION: Principals and Teachers of Agriculture, Years 11-12

SUBJECT: Amendments to 3-Unit Agriculture Assessment Guidelines

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In response to requests for clarification of the differences between assessment of the 3-Unit Electives and Research Project, the additional information set out below should be included in the 3-Unit section of the Agriculture Assessment Guidelines for implementation in Year 12, 1988:

For the assessment of:

(i) Electives – 50% knowledge and understanding

50% skills

(ii) Project – the design, conduct and recording of the research is to be taken into consideration as well as the written report.

Note: The weightings of the components remain unchanged.

ACTION REQUIRED: For the immediate attention of teachers of Agriculture.

John Lambert

J. L. Lambert
Executive Officer

Statutory Board's Directorate, 35-51 Mitchell Street, North Sydney, 2059
(PO Box 460), Telephone (02) 9258111

BOARD OF SECONDARY EDUCATION

WILKINS

Date of Issue: September 1988

MEMORANDUM NO. 91/88

ATTENTION: School Principals and Teachers of Agriculture

SUBJECT: Deletion and Substitution of Electives in the 3 Unit Course in Agriculture

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The Board has agreed to the following:

Deletion: Elective B1 - Hydroponics and Elective C1 - Some Issues in Animal Production.

Inclusion: New Electives B1 - Horticulture and C1 - Alternative Animal Production.

"Hydroponics" and "Some Issues in Animal Production" are to be examined in 1989 for the last time.

"Horticulture" and "Alternative Animal Production" may be studied by Year 12 students in 1990 when these two new Electives will be examined for the first time.

Attached to this Memorandum are 2 pages of information detailing major ideas and objectives for each new Elective.

In subsequent years one or two new 3 Unit Electives will be rotated on a regular basis so that the study of current issues in Agriculture can be facilitated.

ACTION REQUIRED: For the immediate attention of all teachers of Agriculture.

J. S. Cook
Acting Executive Officer

ELECTIVE B1 – HORTICULTURE

MAJOR IDEAS

1. Horticulture is an important component of the Agricultural System.
2. In any horticultural system, there is great diversity in production, management and marketing.
3. Some horticultural products are of high economic value.
4. There is potential for the further development of horticulture and for the marketing of its products.

OBJECTIVES

Students should be able to:

1. briefly review the major components of horticulture.
2. investigate the social and economic significance of horticulture in Australia.
3. conduct a case study of a horticultural activity, studying:
   * the reasons for carrying out this horticultural activity;
   * how location affects production methods;
   * the major management practices and the reasons for them;
   * the range of products and how this is influenced;
   * the interaction between the type of product and consumer demand;
   * the alternative ways of marketing the project.
4. assess the potential for new developments in horticulture and the marketing of their outputs.

ELECTIVE C1 – ALTERNATIVE ANIMAL PRODUCTION

MAJOR IDEAS

1. Alternative animal production includes major changes in existing animal systems and the development of production from a wider range of animal species.

2. Specialised markets require animal products not supplied by existing animal systems or in a form different from that of existing animal systems.

3. Market size dictates economic viability of alternative production systems.

4. Alternative animal production systems require innovative management and marketing.

OBJECTIVES

Students should be able to:

1. describe and evaluate examples of changes in existing animal systems and the development of production from a wider range of animal species.

2. explain why existing animal production does not meet the needs of all markets.

3. identify specialised markets for alternative animal products.

4. describe the technical information and management expertise needed for the management of an alternative animal production system. Evaluate to what degree the lack of such information and expertise is limiting to production.

5. use examples to describe biological and environmental factors which may limit alternative animal production system.

6. understand that expertise and information in alternative systems develops through the application of general animal production principles, operator experience and research activities.

FILE CCT 7 TAS WILKINS

BOARD OF SENIOR SCHOOL STUDIES

35-51 Mitchell Street, Box 460, P.O., North Sydney, N.S.W. 2060

BSSS

Telephone: (02) 925 8111

Our reference:

BSSS 4011

Date of Issue: December 1986

ADMINISTRATIVE CIRCULAR NO. 58, 1986

ATTENTION: School Principals and Teachers of Agriculture

SUBJECT: Deletion and Substitution of Electives in the 3 Unit Agriculture Course

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The Board has agreed to the following:

Deletion: Elective "E2" Farm Development Budgets and "F2" Living off the Land

Inclusion: New Electives "E2" Computers in Agriculture and "F2" Trees on Farms

"Farm Development Budgets" and "Living off the Land" are to be examined for the final time in 1987.

"Computers in Agriculture" and "Trees on Farms" may be studied by Year 12 students in 1988 when these 2 new electives will be examined for the first time.

Attached to this Circular are 3 pages of information concerning the new electives detailing major ideas and objectives for each topic.

In subsequent years one new 3 Unit Elective will be rotated on a regular basis in order that the study of current issues in Agriculture can be facilitated.

ACTION REQUIRED: For the immediate attention of all Teachers of Agriculture.

John Lambert

J. L. Lambert,
Director,
Statutory Boards Directorate

COMPUTERS IN AGRICULTURE

MAJOR IDEAS

1. Computers are useful agricultural tools.

2. Computers can be used as: processors of information about plant, animal and budgetary performance; providers of rapid feedback information for better decision making.

3. Computers can improve the flow of information from local, national and international markets to the farmer.

4. Computers and related technologies affect rural lifestyles and employment opportunities.

5. Farmers require information and advice to allow them to evaluate their computing needs.

OBJECTIVES

Students should understand:

1. the function of computers in storing, processing and retrieving information.

2. the role of computers in agriculture as processors of information for better decision-making e.g. by:

   a) keeping records of farm-performance, such as:

      * monitoring soil moisture for improved irrigation scheduling;
      * monitoring plant performance for improved fertilizer and pesticide management;
      * monitoring animal performance for improved breeding and production.

   b) improving accounting and budgeting procedures.

   c) using computer broadsheets in developing models for farm management, e.g. economic projections based on various parameters of input and output.

   d) using computers to obtain access to remote data base systems (e.g. Videotex, Information Express).

3. the use of electronic communication systems to obtain immediate access to local, national and international market information and the influence this is likely to have on marketing strategies.

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4. sale by computer (e.g. CALM) and the advantages and disadvantages of such marketing systems (e.g. requirements for computer sale by description).

5. the influence computers have on lifestyles e.g. the farm, office, labour requirements, rural accounting and merchandising, entertainment and education.

6. the costs, benefits and limitations of personal micro-computers, remote data bases and computer bureau services

TREES ON FARMS

MAJOR IDEAS

1. A significant proportion of the estimated original area of forest and woodland in N.S.W. has been partially or totally cleared of trees. This causes changes in the total eco-system.

2. Trees are part of the farm eco-system. They influence soil fertility and stability: produce oxygen during photosynethsis: provide habitat to birds and other wildlife: provide shelter or windbreaks for livestock, crops and pastures.

3. A knowledge of the benefits of trees on farms may encourage farmers to incorporate the management of trees into their whole-farm programs

OBJECTIVES

Students should understand:

1. rural tree decline and its causes.

2. the benefits of trees on farms e.g.:-

   protection for stock and crops

   control of soil erosion

   control of water quality

   control of salinity

   timber resources

   draught fodder

   habitat for birds and other wildlife

   aesthetics

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3. the role of trees in whole farm planning. This involves integrating trees and tree planting into the management strategy of crops, pastures and livestock, such as:

   (a) windbreak design and location.

   (b) factors influencing shade and shelter.

   (c) species selection and establishment.

   (d) agro forestry potential.

4. the influence of trees on the productivity of pastures, crops and livestock.

5. regeneration of forest and woodland areas and the establishment of trees on farms.

6. the economics involved in a "tree-on-farms" program.

Motor Vehicle Rates

Verification of Agreement No. 7036 of 1983
relating to officers employed under
the Teaching Service Act 1980

From the commencement of School Term 3, 1991 (ie 15 July) the following rates apply:

Official Business Rate	Up to 1600 cc Cents per Km Engine Capacity	1600 - 2700 cc	Over 2700 cc
0 - 8000 km	38.6	54.0	58.0
Over 8000 km	16.2	19.2	20.7
Specified Journey Rate	16.2	19.2	20.7
Motor Cycle Allowance	28.1		

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