Western Cape Government

Western Cape Education Department
Directorate: Curriculum FET

AGRICULTURAL SCIENCES

REVISION BOOKLET

TERM 3 and 4

2025

Grade 10

This revision program is designed to assist you in revising the critical content and skills covered from term three and four. The purpose is to prepare you to understand the key concepts and to provide you with an opportunity to establish the required standard and the application of the knowledge necessary to succeed in the NCS examination.
The revision program covers the following topics:

- Agro-Ecology
- Soil science
- Animal studies
- Plant Studies
- Biological concepts

TABLE OF CONTENT

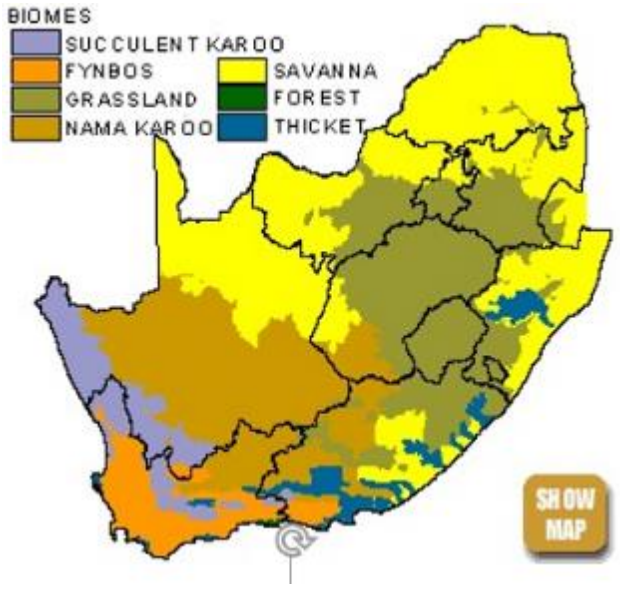
Ecology and Agro- Ecology:

- Basic concepts
- Levels of ecological organization
- Components of an Ecosystem

Interactions in Ecosystems:

- Energy flow in Ecosystems
- Nutrient cycling
- Interactions between organisms
- Ecological farming methods

Biomes:



- Biomes and their characteristics
- Human impact
- Importance for agriculture

Grazing Ecology:

- Natural and Artificial Pastures
- Grazing ecology
- Optimal Grazing
- Veld types of South Africa
- Characteristics of grazing plants
- Condition of pastures

Agro-Ecology

Pasture and Veld Management:

- Importance of pastures for the livestock industry in SA
- Pasture management and Pasture condition
- Veld Management Practices
- Veld Management Systems
- Different grazing Systems
- Veld management that leads to poor veld conditions

Climate change and the effect of weather phenomena:

- Causes of global warming
- Impact of climate change on agriculture
- Long term weather predictions and rainfall patterns
- Short term climate and weather predictions
- Agricultural adaptation measures to overcome climate change

Term 3: Week 1: Weathering of rocks

1. 1.1 Weathering is very important in soil formation. Mention THREE ways in which this process is important. (3)

   1.2 Suggest TWO ways in which plants can speed up weathering of rocks. (2)

   1.3 Indicate THREE agents of physical weathering. (3)

   1.4 Define the following terms:
   a. Inversion (2)
   b. Leaching (2)

2. State FIVE soil forming factors. (5)

3. 3.1 Mention THREE biological factors involved in soil formation. (3)

   3.2 Indicate THREE climatic factors involved is soil formation. (3)

4. Briefly explain how temperature contributes to the weathering of rocks. (4)

5. 5.1 Soil formation can be described by the following equation:
   S = f (P,R,Cl.O.T)
   Identify each of the factors contributing to soil formation. (5)

   5.2 Provide a brief description on how each of the identified factors contribute to soil formation. (5x3) (15)

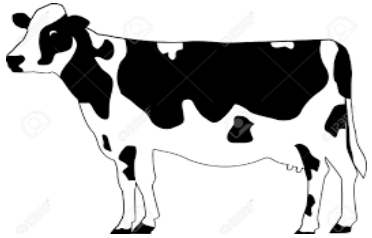
Animal Studies

Importance, economic value and classification of farm animals:

- The development and domestication of farm animals
- The economic importance of the livestock industry in SA
- Ruminants & Non- ruminants

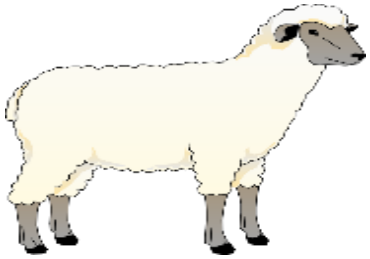
Cattle breeds

- Beef breeds
- Dairy breeds
- Dual purpose breeds



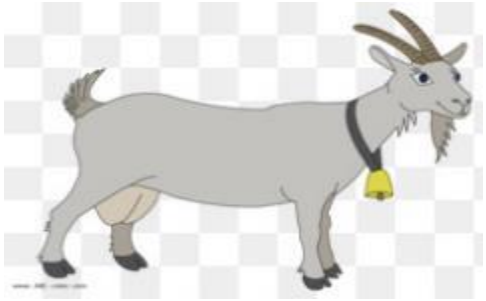
Sheep breeds:

- Breeds based on their utilization.
- Characteristics of a functional ram & ewe
- Wool breeds
- Mutton breeds
- Dual -purpose breeds
- Pelt breeds



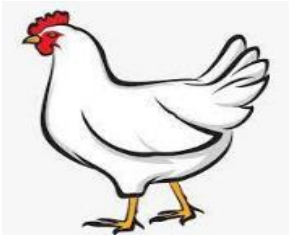
Goat breeds:

- General characteristics of goats
- Meat breeds
- Milk breeds
- Mohair breeds



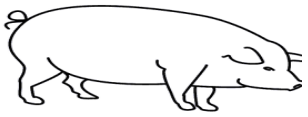
Poultry breeds:

- Broilers
- Layers
- Dual purpose breeds
- Basic requirements on successful poultry production



Pig Breeds:

- Classification based on production purposes
- Indigenous breeds vs improved breeds



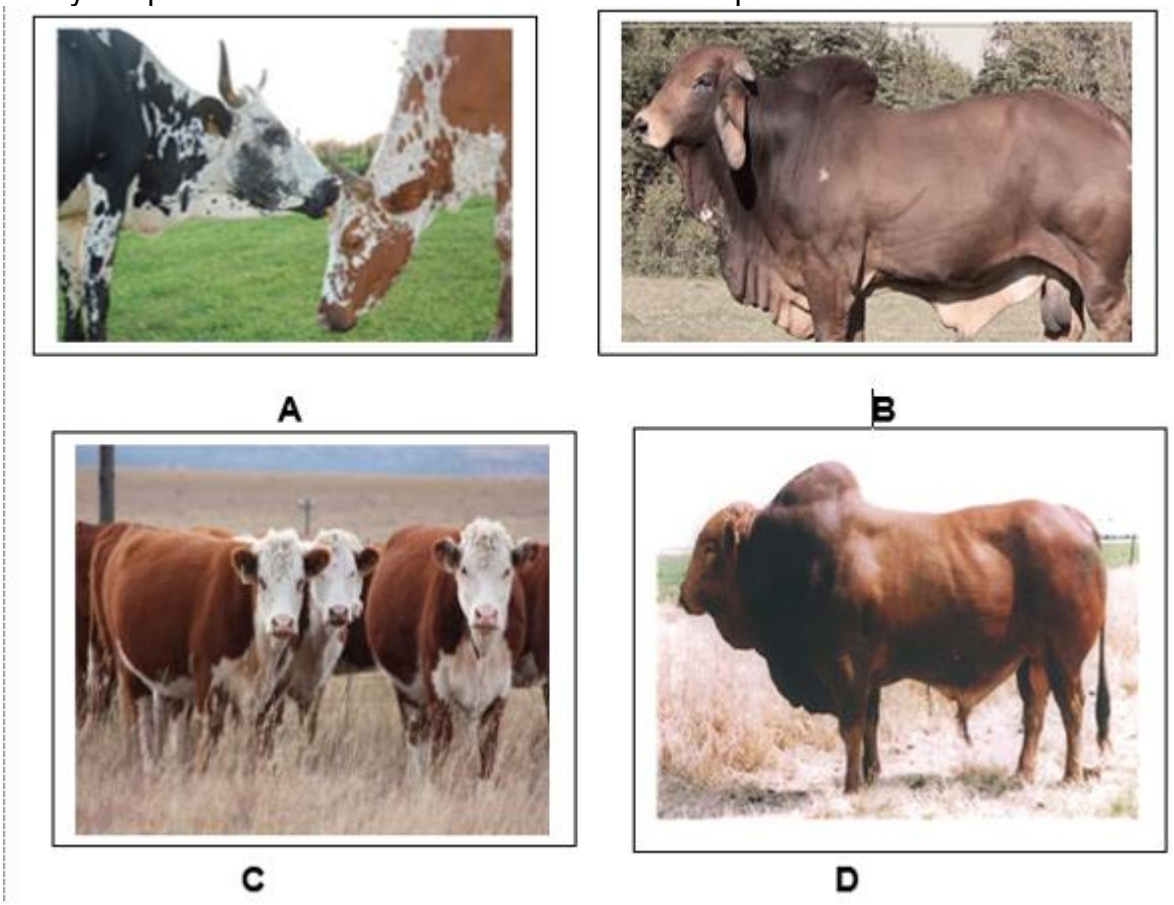
Horses, Donkeys & Mules

- Classification

Game animals:

- Classification of game animals
- Importance of game farming

4. Study the pictures of cattle breeds and answer the questions that follow.



4.1 Identify breeds A – D. (4)

4.2 Identify the breed that matches the descriptions below and write only the letter of the correct answer:

a. Cattle of Bos indicus type, with good carcass quality, relatively small frame and a strong walker. They are also tolerant to external and internal parasite and diseases.
b. Cattle of Bos Indicus type adapted to mountainous sourveld, cold conditions and have calm temperament.
c. Bos Taurus type originated from Europe adapted to cooler conditions and heavy snow in winter and hot summers. (3)

4.3 Farmers need to consider many factors when choosing which cattle breed for livestock farming. Mention FIVE factors to be considered when choosing cattle breed. (5)

4.4 Indicate the difference between ruminants and non-ruminants. (4)

5. 5.1 The following list indicated the examples of ruminants and non-ruminants

Sheep, horses, pigs , cattle, goats, poultry,

Classify these animals according to ruminants and non-ruminants. (6)

5.2 Give THREE basic production requirements for farm animals. (3)

6. 6.1 In 2009, beef production in South Africa was between 500 000 and 600 000 tons and rose to just above 800 000 tons in 2010. Beef production adds to the value of the economy.

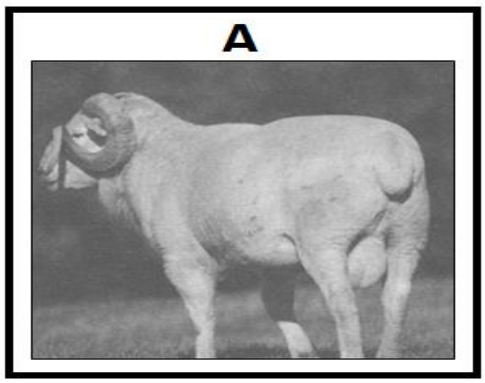
Indicate FOUR facts to highlight the economic importance of beef cattle in South Africa (4)

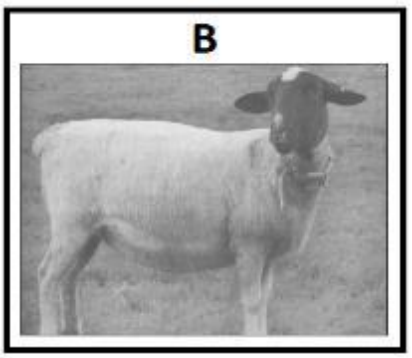
6.2 Give a comparison between indigenous and European cattle breeds using the following table:

Features	Indigenous breed	European breeds
Skin types		
Height		
Body mass		

(6)

7.





7.1 Identify the name of the sheep breed in **A** and in **B**. (2)

7.2 Indicate the gender of the sheep breed labelled **A**. Give TWO reasons for your answer. (2)

7.3 The product from breed **A** is useful in a textile industry. Justify this statement by giving FOUR characteristics of this product that make it suitable as a textile. (4)

7.4 Name ONE adaptation feature of breed labeled **B**. (1)

8.

8.1 Identify the goat breed above. (1)

8.2 Indicate the main product obtained from this breed. (1)

8.3 List TWO examples of other products obtained from goats. Indicate ONE breed for each of these products. (4)

8.4 Mention FIVE unique characteristic and special adaptive features for the breed mentioned in Question 8.1. (5)

9 9.1 Mention THREE classes of pigs. (3)

9.2 There are two production systems whereby pigs can be farmed. Briefly discuss each of these. Your discussion must include:

a) The advantages of each system (4)
b) The disadvantages of each system (4)
c) The managerial input for each system (4)

10 10.1 Classify the THREE types of poultry according to their purpose and give one example each. (6)

10.2 State the basic requirements for successful poultry production. (4)

10.3 Indicate, commercially the most important type of poultry in our country. Provide TWO examples of the identified type. (3)

11 11.1 Name five game animals that are classified as the “BIG FIVE”. (5)

11.2 Briefly discuss the economic importance of Game farming for South Africa. Use the following headings:

a) Conservation
b) Travel and Tourism
c) Products
d) Earning potential
e) Value adding

(10)

MEMORANDUM

Term 3: Week 1: Weathering of rocks:

1. 1.1
- It is responsible for soil formation✓
- It helps with the release of minerals into the soil✓
- It influences soil texture, which in turn influence the suitability of soil for plant to grow in ✓ (3)

1.2
- Plant roots can grow in cracks in the rock, therefore forcing them apart ✓
- Plant deposits organic materials into smaller cracks in the rocks, which eventually contributes to chemical weathering of rocks, when these organic material releases chemical minerals due to the addition of rainwater✓ (2)

1.3 Thermal weathering,✓Mechanical weathering✓& Biological weathering✓ (3)

1.4 **a) Inversion:**
Inversion is the process which **mixes soils** and, in so doing, destroys the horizons. Inversion takes place when cracks form in the soil and are filled with infiltrating soil material from above. When the soil is wetted, it causes the soil to push upwards and, in so doing, moves over the soil itself. ✓✓ (2)

b) Leaching:
Is the movement of chemical nutrients in the soil due to water that carries the nutrients to the deeper layers of the soil, making it unavailable to plants✓✓ (2)

2.
- Parent material✓
- Relief (topography) ✓
- Climate✓
- Organisms✓
- Time✓ (5)

3. 3.1 Plants, ✓Animals ✓& Micro-organisms✓ (3)

3.2 Heat, Cold, Rainfall (3)

4. In extreme heat (during the day) heat causes the rocks to expand. ✓ When these rocks cool down it shrinks in again. ✓This continuous process leads to rocks cracking, flaking, or breaking apart✓✓ (4)

5 5.1. P = Parent material✓
R = Relief✓
Cl = Climate✓
O = Organisms✓
T = Time✓

The weathering of materials is all interdependent and the following factors play a role:

•P = Parent material
The geological parent rock from which break down of rocks will take place to eventually form soil√ The chemical composition of the parent rock will eventually influence the resulting chemical characteristics of the soil √ And the organic material involved (break down of organic plant and animal material) in the formation of the soil resulting in the organic and nutrient composition of the soil√

•R= Relief
This includes the topography √– whether the soil is on hilly or in valley areas- Soils on hilly areas are normally shallow, where soils in valleys are deeper. √ Slope, aspect and landscape position- Northern slopes are normally warmer (in the Southern hemisphere) influencing the breakdown of rocks√

•Cl= Climate
Primarily precipitation and temperature√ Both these factors influence the physical break down of rocks to from soils, since it has an influence on the expanding and contraction of rocks √, which eventually leads to cracking√ and formation of smaller pieces

•O = organisms √
This is the biota component that assist in the weathering of soils and can be plants or animals or even humans√ The trampling effect of animals, the role of micro-organisms in the breakdown of organic material. Plant roots growing in cracks √

•T= Time
The period of time since the parent material became exposed to soil formation√√ This is normally a very slow process. √ (15)

Term 3: Week 2-9: Animal Studies

4 4.1 A = Nguni✓
B = Brahman✓
C = Hereford✓
D = Afrikaner✓

4.2 a- A✓
b- B✓
c- C✓

4.3
- The type of animal – Meat/ milk/ dual purpose✓
- The animal's ability to adapt to the environment✓
- The animal's temperament✓
- Disease resistance✓
- The feed conversion rate possible✓
- The type of system (Intensive/ Extensive) ✓ (Any 5) (5)

4.4
- Ruminants are animal that have a compound stomach, they can digest celluloses and regurgitates. ✓ ✓
- Non – Ruminants have a single stomach (mono- gastric) and cannot digest cellulose✓ ✓ (4)

5 5.1
- Ruminants- Sheep, ✓cattle, ✓ goat✓
- Non- ruminants – Horse, ✓pig, ✓poultry✓ (6)

5.2
- Suitable environment✓
- Suitable feed✓
- Suitable disease control✓ (3)

6 6.1
- Beef is a major part of the populations diet✓
- Beef is a form of wealth for the indigenous population✓
- Beef has got cultural value – Lobola✓
- Beef farming creates jobs in the agricultural industry – Primary✓ (Production) and secondary industry- Processing) ✓ (4)

6.2

Features	Indigenous breed	European breeds
Skin types	Lighter / reddish Thicker skin✓	Black or dark✓ Thinner skin
Height	Smaller framed animals ✓	Larger framed animals✓
Body mass	Lower✓	Higher✓

(6)

7. 7.1 A- Merino✓ B – Dorper (Swart kop Persie) ✓ (2)

7.2 Male – Horns✓ & testes✓ (2)

7.3
- Wool has natural UV protection. ✓ ...
- Wool has antibacterial and antimicrobial properties. ✓ ...
- Wool is stained resistant. ✓...
- Wool is easy to care for. ✓...
- Keeps you warm in winter and cool in summer. ✓...
- Insulates even when wet. ✓...
- Wool is durable. ✓ (Any 4) (4)

7.4 Breed B are disease resistant, suitable for extensive farming, can manage extreme heat and cold, Can eat shrubs and grass✓ (Any 1) (1)

8. 8.1 Boer goat✓ (1)

8.2 Meat ✓ (1)

8.3 Mohair – Angora✓
Milk – Saanen / Toggenburger✓ (4)

8.4 The Boer goat is considered far superior to any other breed for:
- meat production.✓

- These compact, muscular goats have a high growth rate, muscular carcass, ✓
- good fertility, and✓
- functional conformation. ✓
- Good mothering abilities✓
- Calm nature✓ (Any 5) (5)

9 9.1 Porker, ✓bacon, ✓meat breeds✓ (3)

9.2 **Intensive pig farming:**
Advantages: Controlled input = measurable output√
Production can be strictly managed√
Suitable for commercial enterprises√
Pest and disease control prevent losses√ (Any 2)
Disadvantages: Requires large financial inputs√
Requires strict managerial inputs√
It is labour intensive√
Can only be done in an intensive environment√ (Any 2)
Managerial Inputs: High level of management is needed to ensure productivity. √
Strict pest and disease management, √ Feeding regimes√ and reproductive control√ (Any 2)

Extensive / back yard pig farming:
Advantages: Less financial input, √ Less managerial inputs, √
More hardy animals√ (Any 2)

Suitable for subsistence farmers√
Disadvantages: Lower production√
The possibility of diseases √ (Any 2)
Managerial Inputs: Low input, √less labour√ (Any 2) (12)

10 10.1 Broiler – meat ✓– Ross/ Cob✓
Layers – eggs ✓– Leghorns /New Hampshire✓
Dual Purpose✓ – Both eggs and meat – Koek Koek, Rhode Island Red✓ (6)

10.2 Suitable housing, ✓Temperature control, ✓ feeding, pest and disease control, ✓biosecurity & management✓ (Any 4) (4)

10.3 Broilers for meat production✓ – Ross/ ✓Cob✓ (3)

11 11.1 Lion, ✓ Rhino, ✓Buffalo, ✓Leopard, ✓Elephant✓ (5)

11.2 **Game farming**
Conservation- Due to the financial value of certain types of game, conservation and reproductive management of endangered species are a priority for game farmers for example – Rhino's, lions and elephants✓✓ (2)
Travel and tourism- The game industry of South Africa is a huge beneficiary of foreign tourists that come here specially to see animals that they cannot see in their own country. ✓✓ (2)

Products – Game meat, Hides, Ostrich eggs, Ivory etc.
Earning potential: The industry has a huge earning potential which comes from tourists and hunters. The selling of products also earns some revenue.✓✓ (2)
Value adding: Value adding takes place in that it is not only the products or the animals that bring in some cash, Guest houses, Conservation parks etc. also benefit from the product – Game Value adding also takes place in the processing of meat and hides – Biltong, etc. and hide products such as shoes and handbags.✓✓ (2)

Importance of plants in agriculture:

- Commercial interest
- Volume of agricultural production
- Criteria for successful crop production
- Classification of crops

Arable crops:

- Classification – Cereals, Oilseeds & Industrial crops
- Climatic requirements
- Ground requirements

Pasture crops:

- Legumes forage crops
- Grass fodder crops

Plant studies

Forests:

- Classification of forests
- Native and exotic forests
- Commercial value of wood
- Conservation of native forests
- Eradication of invasive trees

Horticultural crops:

- Classification of-
- Vegetables
- Fruit
- Flower & Ornament
- Shrubs
- Native
- Climate and soil requirements of each

Term 4: Week 1- 4: Plant studies

1. 1.1 List FIVE criteria for successful crop production. (5)

1.2 Discuss crop production under each of the following headings:
a) Soil
b) Temperature
c) Rainfall (6)

1.3 List FOUR climatic factors that a farmer must consider when choosing suitable crops to grow in an area. (4)

2 2.1 Mention THREE economic importance of sorghum. (3)

2.2 Mention THREE soil requirements needed for maize production. (3)

2.3 Vegetables can be classified into various groups. List FIVE groups and provide ONE example of each. (10)

2.4 Fruits can be grouped into various groups. Provide their classification and give **TWO** examples of each. (9)

3 3.1 Use the following information to draw a table and classify the crops in the box below based on:
a) Field crop
b) Horticultural crop
c) Fodder crop

SUNFLOWER		CUT FLOWERS
	LUCERN	
KIKUYU GRASS		GRAPES
	MAIZE	

(6)

3.2 List any TWO grain crops other than the ones named in question 3.1 (1)

3.3 Cut flowers are often produced in a controlled environment. State ONE type of this production. (1)

3.4 Briefly provide FOUR reasons for this type of flower production. (4)

4. Choose the fruits and vegetables from the list in the box below and write only the correct one next to the correct letter:

Cabbages, Tomatoes, Potatoes, Apples, Carrots, Oranges, Cauliflower, Bananas, Grapes

(a) Tuber vegetable

(b) Citrus fruit

(c) Flower vegetable

(d) Leaf vegetable

(e) Tropical fruit

(f) Fruit vegetable

(g) Root vegetable

(h) Deciduous fruit

(8)

5 Analyse the data below in the table and answer the questions that follow:

Type of crop	**Volume of Horticultural crop production (t)**				
	2014	**2015**	**2016**	**2017**	**2018**
Vegetables	25000	25400	23020	26600	23000
Subtropical Fruit	3000	2220	3200	2900	3000
Citrus Fruit	3100	3550	3250	**A**	2000
Deciduous Fruit	2000	3000	2000	4000	3400
Total production				**35620**	

5.1 Calculate the total production for each year. (4)

5.2 What was the total production of **citrus fruit** in 2017? Show all your calculations. (2)

5.3 What does the letter **(t)** stand for on the volume of production? (1)

6. Fodder crops play an important role in supporting the agricultural industry.

6.1 How can fodder crops be utilized as cash crops? (2)

6.2 Name TWO indigenous grasses that can be used as pastures. (2)

6.3 These crops are mostly used under dry land conditions. Name THREE factors that must be considered to ensure sustainable production. (3)

7. Wood and timber production contribute to the economic basket in mainly FOUR provinces in South Africa.

7.1 List these FOUR provinces. (4)

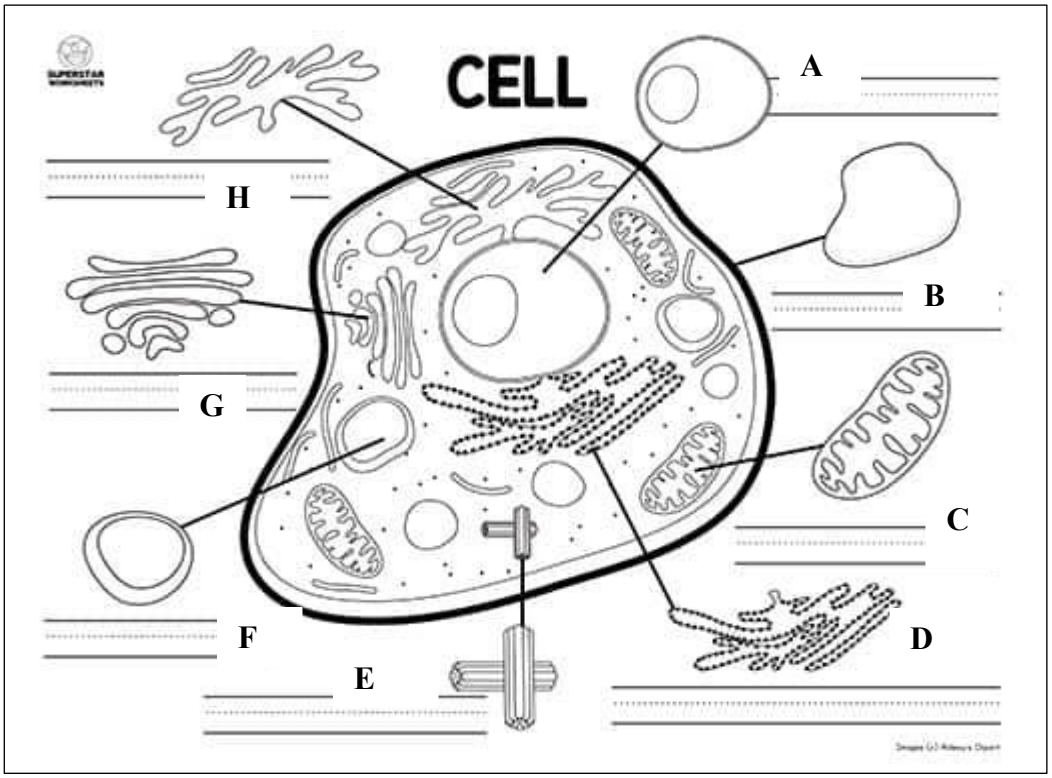
7.2 Explain the factor that mostly prevent the production of wood and timber in the other provinces. (1)

7.3 State THREE uses of wood and timber on a commercial basis. (3)

7.4 Provide the name of TWO types of wood that is produced commercially in South Africa. (2)

Week 5 & 6: Biological concepts

1. 1.1 Complete the following diagram by providing a label for A-H



(8)

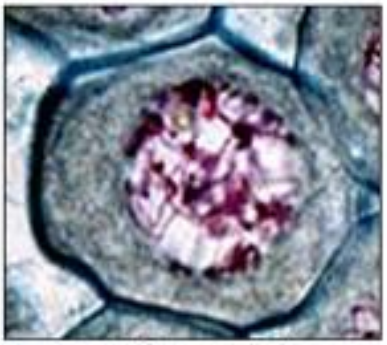
1.2 Identify this cell. (1)

1.3 Tabulate the differences between an animal and a plant cell. (4)

1.4 Differentiate between mitosis and meiosis. (4)

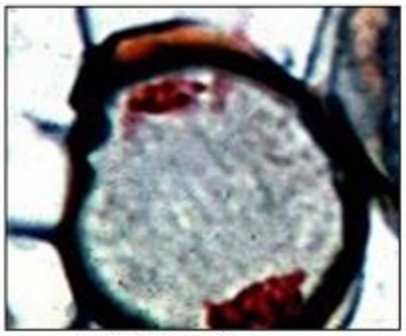
2. Examine the micrographs which show the various stages of meiosis. Note the micrographs are not in the correct sequence in which they occur when the process of meiosis takes place.

Micrograph A



Micrograph B

Micrograph C



Micrograph D

2.1 Write down the numbers 1.1 to 1.8 and next to each, the answer that will best complete the table below:

Micrograph	Name of Phase	Reason for Identification
A	1.1	1.2
B	1.3	1.4
C	1.5	1.6
D	1.7	1.8

(8)

2.2 Arrange the letters of the diagrams in the order that they occur during the process of meiosis. (4)

2.3 Make a fully labelled drawing of the cell shown in micrograph A . (4)

2.4 What is the importance of meiosis? (2)

MEMORANDUM

Term 4: Week 1-4: Plant studies

1 1.1

- Climate:
- Soil:
- Topography:
- Market:
- Transportation Facilities:
- Labour:
- Capital:

✓ site selection,
✓ water supply and quality,
✓ crop and variety selection,
✓ market development.

(Any 5) (5)

1.2 **Crop production:**

a) **Soil:** Soil is one of the primary production factors needed for agricultural production. However, the characteristic of soil influences the usability of soil for production**.** Factors such as the soil structure, texture and pH have an influence on soils' production potential. The selected crop should also be suitable for the soil type in which it will be grown. Soil can be replaced by alternative mediums in intensive systems✓✓ (2)

b) **Temperature**

Plants vary in their temperature requirements for optimal growth. Hence a crop should be selected that can withstand the temperature fluctuations in the area where they will be grown. temperature can be manipulated through planting in greenhouses and tunnels✓✓ (2)

c) **Rainfall**: Plants have certain water requirements; However, additional water can be given through irrigation. ✓✓

(2)

1.3

- Minimum and maximum temperatures✓
- Rainfall✓
- Wind✓
- Seasonal changes✓
- Day length✓

(Any 4) (4)

2 2.1

- It can be planted as a cash crop✓
- It's cheaper to grow as maize✓
- It is a staple for a large portion of the South African population✓ (3)

2.2 Maize can be grown in all types of soil. ✓But for good growth and productivity of maize, loam and medium to heavy soil✓ having adequate number of bacteria and proper drainage is suitable. ✓ (3)

2.3 **Vegetable crops**

Vegetables are parts of plants that are consumed by humans or other animals as food. It applied to plants collectively to refer to all edible plant matter, including the flowers, fruits, stems, leaves, roots, and seeds

Vegetables can be divided into the following groups

- Legume crops: green beans and peas.
- Leaf crops: lettuce, spinach, cabbage and cauliflower.
- Tuber crops: potatoes and sweet potatoes.
- Bulb crops: onions and celery.
- Root crop: carrot and beetroot.
- Fruit-bearing crops: tomatoes and pumpkins

(10)

2.4 **Fruits**

- Tropical and subtropical Fruit (e.g. bananas and paw-paws, avocadoes) ✓✓
- Citrus (e.g. lemons, oranges etc. ✓ ✓
- Stone and pome fruits (peaches, apples) ✓✓
- Vines (e.g. table and wine grapes) ✓
- Berries (blue berries, raspberries) ✓
- Nuts (Cashew, pecan etc.) ✓

(9)

3 3.1

Field crops	Horticultural Crops	Fodder crops
Sunflower✓	Cut flowers✓	Lucerne✓
Maize✓	Grapes✓	Kikuyu grass✓

(6)

3.2 Wheat, ✓Sorghum. ✓ Rye, ✓ Millet✓ (1)

3.3 Green house/ Tunnel / Glass house production✓ (1)

3.4 It is a controlled environment √with strict temperature, √ moisture √and pest and disease control√ (4)

4 a) Potatoes✓
b) Oranges✓
c) Cauliflower✓
d) Cabbages✓
e) Bananas✓
f) Tomatoes✓
g) Carrots✓
h) Apples✓ (8)

5 5.1

- 2014- 33 100 t✓
- 2015- 34 170 t✓
- 2016- 31 470 t✓
- 2018- 31 400 t✓

(4)

5.2 35620 – ✓ (26600 + 2900+4000) = 2120 t✓ (2)

5.3 Tons✓ (1)

6 6.1 It can be harvested and baled and sold for cash ✓– e.g. Lucerne hay✓ (2)

6.2 Kikuyu, ✓Babala, ✓Eragrostis spp✓ (2)

6.3 Do not over- graze, t✓emperature and rainfall, ✓the type of animal that is doing the grazing✓ (3)

7. 7.1 Mpumalanga, ✓KZN, ✓Eastern Cape✓ and Western Cape✓ (4)

7.2 The lack of water / rainfall✓ (1)

7.3 Furniture, Paper, ✓ Mine posts, ✓Roof trusses, ✓Packaging pallets✓(Any 3) (3)

7.4 Pine, ✓ Blue Gum✓, Saligna ✓ (Any 2) (2)

Week 5, 6 Biological Concepts

1. 1.1

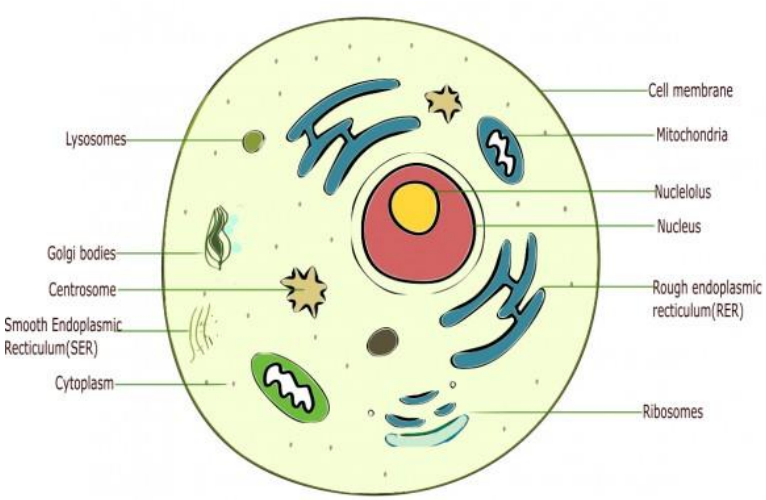
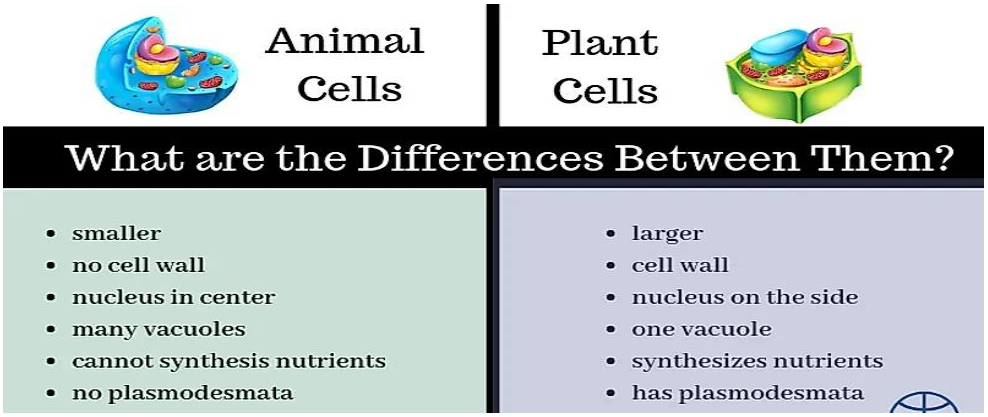


Fig: Labelled diagram of animal cell

(8)

1.2 Animal Cell✓ (1)

1.3



(4)

1.4

- Mitosis – cell division for growth and development – duplication process that results in a diploid cell✓✓
- Meiosis – reduction process for the formation of gametes – results in haploid cells✓✓

(4)

2 2.1

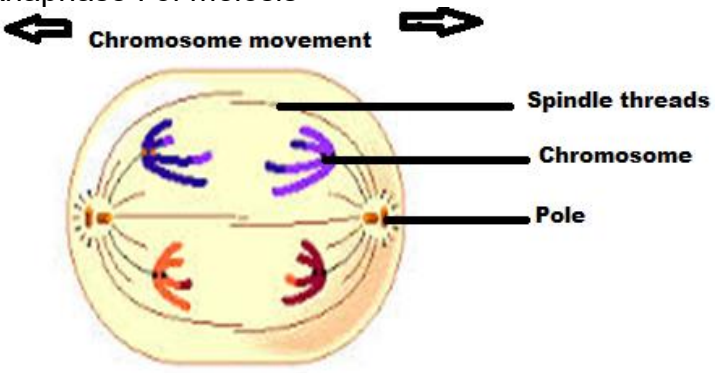
1.1 Anaphase✓
1.2 Chromatids moving to opposite poles to form a 4-cell stage✓
1.3 Prophase✓
1.4 Homologous chromosomes arranged in pairs✓
1.5 Metaphase ✓
1.6 Chromosomes arranged at equator in 2 celled stages✓
1.7 Telophase✓
1.8 Daughter cells, with daughter chromosomes are forming in nuclei✓

2.2 B, ✓✓C, ✓✓A, ✓✓D✓✓

(8)

2.3 Anaphase I of meiosis

(4)



(4)

2.4 For genetic variation Keeps number of chromosomes constant

(2)