

Sustainable Resources 12: Agriculture

Module 3 Blackline Masters

This blackline master package, which includes all section assignments, as well as selected worksheets, activities, and other materials for teachers to make their own overhead transparencies or photocopies, is designed to accompany Open School BC's ***Sustainable Resources 12: Agriculture*** course. BC teachers, instructional designers, graphic artists, and multimedia experts developed the course and blackline masters.

Please note that the rights to reproduce materials from the *Sustainable Resources 12: Agriculture 12 Blackline Masters* is restricted to the individual purchaser. Teachers may reproduce solely for use with their own classes.

The Sustainable Resources 12: Agriculture course consists of five modules, the blackline master CD, a *Source File* for each module, and the *Sustainable Resources 12: Agriculture Companion Website*. Sustainable Resources 12: Agriculture is available in both print and online versions. Sustainable Resources 12: Agriculture components can be purchased individually or as a complete resource, the ***Sustainable Resources 12: Agriculture Resource Package***. All are available from Open School BC.

To order, contact:

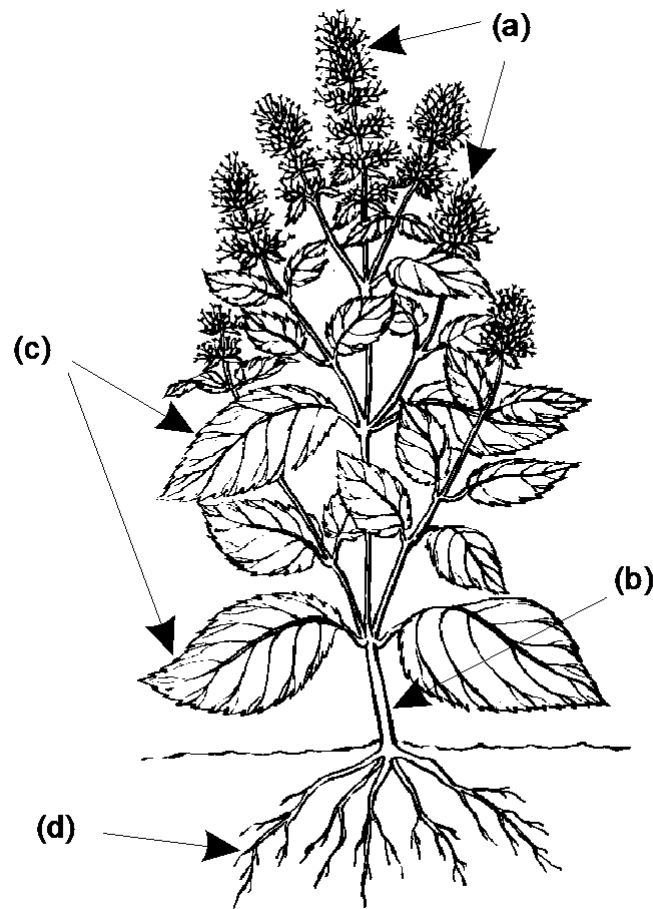
Open School BC Customer Service Team
Phone: 250-356-2820 (Victoria)
1 888 883 4766 (Toll-free)
info@openschool.bc.ca

or Visit our website at
<http://www.pss.gov.bc.ca/osbc/>

Copyright 2010 Open School BC, Victoria, British Columbia. ALL RIGHTS RESERVED. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited publication, storage in a retrieval system, or transmissions in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. For information regarding permission, contact Open School BC.

Assign 3.1: Parts of an Angiosperm

Label the four main parts of an angiosperm.



Evaluation Guidelines:

1 mark per question

Total:

4 marks

Assign 3.1: Matching

Column A		Column B
_____	1. Process by which sunlight converts water and carbon dioxide into sugars.	A. roots
_____	2. Stored energy in the form of starches, sugar, and cellulose.	B. stem
_____	3. Central to angiosperm reproduction.	C. photosynthesis
_____	4. Part of the plant that draws nutrients and water from the ground.	D. leaves
_____	5. Transports materials from the roots and leaves to various parts of the plant.	E. flowers
_____	6. Where the process described in #1 takes place.	F. carbohydrates

Evaluation Guidelines:

1 mark per question (6 marks)

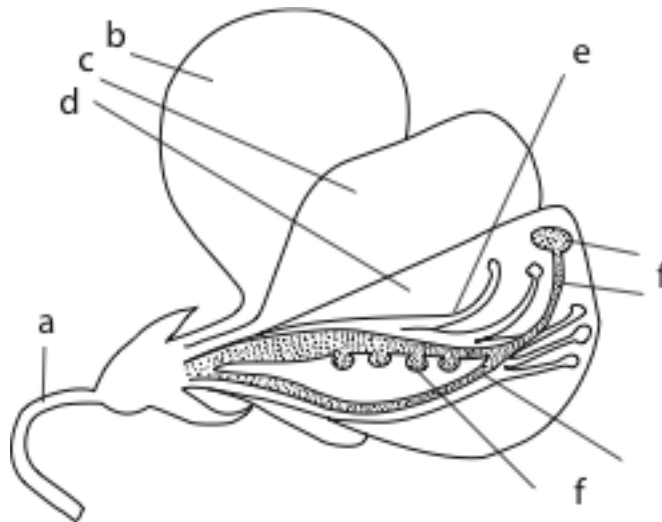
Total:

6 marks

Assign 3.1: The Parts of a Flower

Complete the table below using information from the blank flower diagram.

1. In the middle column, write the name of the flower part that matches each letter.
2. In the right hand column, write a short description (in your own words) for each flower part.



Letter	Flower Part Name	Description
a		
b		
c		
d		
e		
f		

Assign 3.1: Pollination

1. In a paragraph or two, describe the process of flower pollination. Include the different methods of pollination and the agents of pollination in your answer as well. (6 marks)

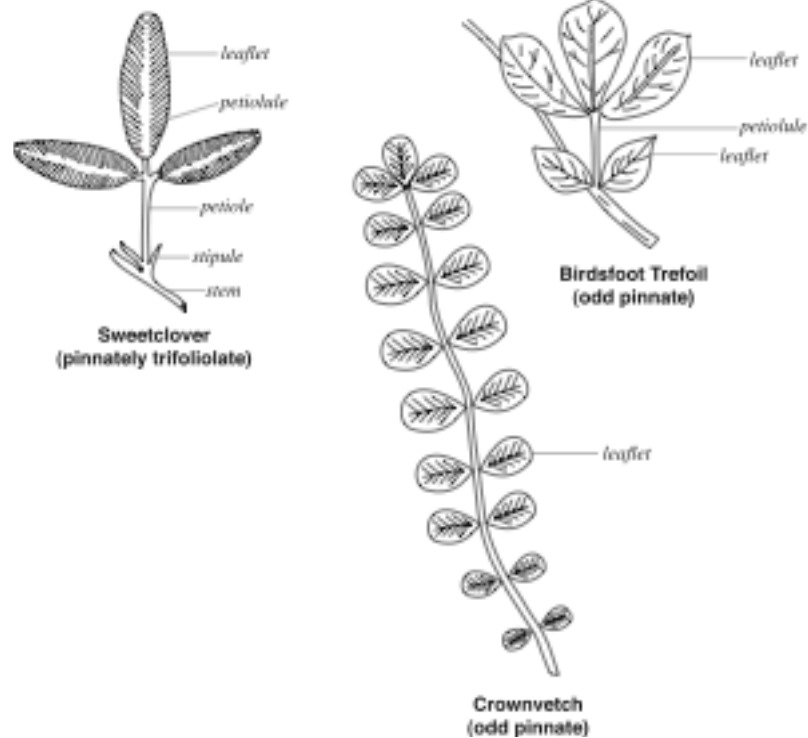
2. The physical characteristics of a flowering plant are partly determined by the method of pollination it uses. Explain what this means. (2 marks)

Evaluation Guidelines:
See individual questions

Total:
8 marks

Assign 3.1: Identifying Leaves

Using the information provided in Lesson C, identify the required leaf characteristics for each of these images.



Sweetclover

Leaf type:

Leaf arrangement:

Crownvetch

Leaf type:

Leaf arrangement:

Assign 3.1: Stems and Roots

Create a list of ten questions of your own having to do with the content in this section. Your questions can be true or false, multiple choice, definitions, or short answer. Provide the questions, options (if applicable), and the answers. Include at least two questions for each lesson.

Evaluation Guidelines:

1 mark per question (10 marks)

2 marks per answer (20 marks)

Total:

30 marks

Assign 3.2: Four Steps to a Good Pasture

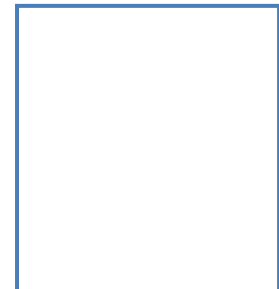
After years of neglect, you decide it's time to turn one of your unused fields into a grazing pasture for your livestock. But how? You ask around and learn there are four main things you need to do.

Summarize these four things in a pasture tip sheet for other farmers. Your tip sheet is to include:

- a. The title: Four Steps to a Good Pasture
- b. A brief introduction stating why a good pasture is important and what the purpose of the tip sheet is. (2 marks)
- c. Descriptions (in your own words) of each of the four tips. Include a heading for each one as well (e.g. Tip #1: XXX). (5 marks each = 20 marks)
- d. A quote from a make-believe farmer speaking about the importance of one of the tips (e.g., explaining what he/she did or planted or how the tip improved his/her pasture). Present the quote in a way that makes it stand out from the rest of the text in that tip, for example as a sidebar like this. (2 marks)

Tip # _____

Susto cor aut dolobore mod ercillam quis doloreet
diatio od dolum elit ilisci ex eugiamcommy nos
exeros alit eu feu facipis modolore dunt aciliquat. An
ulla augai digna facipis accum augalt utpat. Ut
alismol orting eugiam aliquam vendrierum quat,
conulla faciduisl essequat at. Ipit, sequamet nibh
estrud dolortle ex euissed ent wis essi tat.



- e. A brief summary/conclusion. (1 mark)

Evaluation Guidelines:

See individual questions

Total:

25 marks

Assign 3.2: Pasture Management

1. What three things affect how many animals a farmer can graze on a pasture over the course of a whole growing season? (3 marks)

2. In your own words, explain the advantages and disadvantages of continuous grazing. (4 marks)

3. In your own words, explain how rotational grazing works. (3 marks)

4. A pasture produces 42 000 kg of forage during the grazing season. How many animal units can the pasture support? Show your answer plus an explanation of how you worked it out. (2 marks)

5. How many animal units of each of these species can the pasture in Question 4 support?

- a. To answer this question, first determine the animal unit equivalent for each species. Multiply that number by the amount of forage consumed per month by one full animal unit (350 kg/month). (4 marks)

Heifer: _____

Bull: _____

Assign 3.2: Rangeland Management

Rangeland is a vital component of BC's agriculture industry. Using it improperly can have serious consequences.

1. Develop a list of five ways that rangeland might be improperly used. What do you think the short-term and long-term consequences to rangeland would be if these practices continued uncontrolled? (10 marks)

Assign 3.2: Weed Posters

Do some research to find out about two species of weeds that are a big problem in your area, then make one poster for each weed that will help bring attention to the problem.

These may be poisonous or invasive weeds, or both. If one of the weeds discussed in the course is a problem in your area, you may include it in your report, but you must do additional research.

Here are some possible sources of information:

- plant keys for BC at your local library
- an agrologist from the Ministry of Agriculture and Lands
- the Agriculture Canada Research Stations at Kamloops or Agassiz
- BC Forage Council
- local farmer or gardener
- local feed supplier or nursery
- local farmer's institute or horticulture society
- local museum
- local naturalist or hiking club
- the Internet <http://www.weedsbc.ca/>

1. Describe where and how you got your information. (4 marks)
2. For each species, make one 8 1/2 × 11 inch (21.5 cm × 28 cm) poster that includes this information:
 - A point-form description of the key characteristics of each weed. The information should make it easy for someone to identify the weed—it does not need to include all botanical details about the weed.
 - A drawing of the plant that clearly shows what it looks like. (You may use a photocopy or photograph.)
 - One or two sentences to explain what conditions it prefers to grow under or where you are most likely to find it.
 - One or two sentences to explain why this particular plant is a problem weed.
 - Two or three sentences describing a method of control that can be used either in pasture or rangeland.

You must make **two** posters, one for each weed type.

Marks will be awarded as follows **for each poster**:

- all categories of information included (5 marks)
- information is accurate and clearly explained (5 marks)
- design is pleasing to look at (2 marks)
- design is easy to read (3 marks)

Assign 3.2: Definitions

Define each of these terms from Section 2 in your own words.
(2 marks each = 10 marks total)

1. Forage

2. Graze

3. Carrying capacity

4. Stock density

5. Weed

Evaluation Guidelines:
2 marks per question x 5

Total:
10 marks

Assign 3.3: A Grain Farmer's Journal

In Lesson A you learned about the key events that take place during each season of a typical grain production year. The seasons, as you've learned, are spring planting, summer tending, fall harvest, and winter fallow.

Pretend you're a grain farmer in British Columbia. (Most likely in the Peace River region, as that's where most of our grain production takes place.) Create a journal describing what you do in each of the four seasons of a typical year for you. Write one main entry for each season, starting with spring. Things to include in your entry will include:

- The date
- What activities you're performing
- Why these activities are important, i.e., how they contribute to the grain production process

Each entry should be at least 2 paragraphs in length and should draw on the ideas presented in Lesson A. Be sure to write in first person ("I") as well, as you're the farmer doing these things. These are key days in *your* life. A higher mark will be awarded if you can also inject your feelings (hopes, worries, etc.) into your story. For example, what are some of the things that might happen in the summer that might cause you concern about your crops? Work your feelings in with your facts – it will make your journal more realistic.

Evaluation Guidelines:

Information for each season is factually accurate and complete – 20 marks

Journal entries show evidence of feelings – you have taken on the role of the farmer and injected your feelings into your entries – 5 marks

Total:

25 marks

Assign 3.3: Cultivating and Growing Wheat

1. What are the two most important things you have to know about the variety of the wheat you're planting? (2 marks)

2. Explain what conditions are needed to grow wheat properly. (5 marks)

pH:

soil type:

drainage:

seeding rate:

seeding depth:

3. What are the two signs that wheat is ready to harvest? (2 marks)

4. Describe the three main parts of a grain (kernel) of wheat. (6 marks)

Assign 3.3: Wheat Statistics

1. Using the information in the table, create a bar graph showing the total grain production for the 9 grain-producing Canadian provinces, for September 2010. Display the provinces along the horizontal axis. Start on the left with the province with the lowest production then display the other provinces in order of increasing production. Display the total amount produced (thousands of tonnes) on the vertical axis.

You may draw this graph or complete it on the computer.

2. Which province has the highest wheat production? (1 mark)

3. Where does B.C. rank on the list? (1 mark)

4. Why do you think B.C. ranks where it does? (1 mark)

Evaluation Guidelines:

Graph is properly formatted – meaningful title, horizontal and vertical axes are properly labeled – 3 marks

Provinces are properly arranged on graph from left to right based on total wheat production (smallest on left, largest on right) – 9 marks

Questions 2, 3, 4 – 1 mark per question – 3 marks

Total:

15 marks

Assign 3.3: Barley Crossword Puzzle

Create a crossword puzzle out of words associated with barley cultivation and production. Your puzzle must include at least 10 words and clues. (10 marks)

Directions:

- Use graph paper or a word processing program to help you keep your letters straight (or find an online crossword builder and use that).
- Look through the lesson material for likely words.
- Start by selecting two very long words that share a common letter. Use one down, the other across.
- Number the words down and across.
- Finally, write your clues.

Evaluation Guidelines:

1 mark per word and clue x 10

Total:

10 marks

Assign 3.3: Corn Infographic

One of the cool new trends on the Internet these days is displaying statistics, text, and other information in a visual form. One way to do this is in something called an infographic.

In this assignment you'll use the information presented in Lesson D to create an infographic about corn. For those of you who like to (and can!) draw, here's your chance to show your stuff. For those who aren't artistic, don't worry. You're welcome to include visuals you find from other sources.

Examples of Infographics

Before you tackle this assignment, it's important you understand what an infographic is and what one looks like. To learn more, please visit the *Sustainable Resources 12: Agriculture Companion web site*. Here you will find links to lots of great infographics.

Remember: A well-designed infographic has clear illustrations or photos that do most of the talking. Any words you add should only clarify what the visuals already say. In other words, don't clutter the infographic with too much text.

Evaluation Guidelines	Marks
Your infographic:	
• has a descriptive and catchy title	1
• is clearly labeled	1
• is colourable and pleasing to the eye	2
• is factually accurate	5
• is easy to understand	2
• has a drawing or photo of an entire corn plant (stalk and ear) with the various parts labeled	4
• shows, visually and in a few words, how an ear of corn is fertilized	5
• shows the standard rates of corn seeding for a small scale organic farm vs. a large scale farm [a suggestion here is to show a bird's eye view of a field (draw a simple rectangle or square) with little corn plants visible – density is higher for large scale farm than small scale one – show actual seeding rates along with diagrams]	2
• includes a drawing or photo of an ear of corn that's ripe and ready to be picked. Show clearly what it looks like and include a few select words to explain how you know when the corn is ready	3
Total Marks	/25

Assign 3.4: Hay Q&A

Answer each of the following questions in complete sentences.

1. In your own words, define hay. (2 marks)

2. What is shattering? (1 mark)

3. What is done to reduce the chances of shattering? (2 marks)

4. How does a hay farmer decide when to cut hay when there is a mixture of crops in the field? (2 marks)

5. What are three disadvantages of cutting hay too early? (3 marks)

6. What is a swath? Why is it raked and turned over? (2 marks)

Assign 3.4: Understanding Hay

Answer each of the following questions in complete sentences.

1. The Baling Twine Junction Feed Store has just got in a truckload of alfalfa from a local farmer. Don, the boss, notices that the bales don't look right for alfalfa. On closer inspection, he finds that the hay is all stalks with very few leaves.

- a. What is the likely cause of this? (1 mark)

- b. Why is this a problem? (1 mark)

- c. What type of device could help avoid this problem? How does it work? (3 marks)

2. Meanwhile, back at the ranch, Dorothy breaks open a bale of mixed grass hay and finds it's mouldy inside.

- a. What conditions cause mould to form in hay? (1 mark)

- b. What two possible points at which this might happen in the hay-making process? (2 marks)

Assign 3.4: Haylage vs. Silage

Two common types of silage are haylage and corn silage. Research each and explain the difference between them. (10 marks)

[illegible]

Evaluation Guidelines:

Research and explanation for both haylage and silage – 10 marks

Total:
10 marks

Assign 3.4: All About Alfalfa

As you learned in Lesson D, alfalfa is a very important field crop. In this assignment you will learn more about alfalfa.

Go to Module 3 of the *Sustainable Resources 12: Agriculture Companion Website* now. Scroll down until you find the links for alfalfa. Visit several of these links to find the answers for the following questions.

1. What is the main use for alfalfa? (1 mark)

2. Identify two alfalfa products that are consumed by people. (2 marks)

3. What growing conditions does alfalfa like? (3 marks)

4. Why is it difficult to plant a new alfalfa crop immediately after an old one dies off? (3 marks)

5. How does alfalfa help the soil? How does it provide nitrogen? (3 marks)

6. Why should a farmer use caution when letting his livestock graze on alfalfa? (3 marks)

Assign 3.4: The Basics of Crop Rotation

1. What is a monoculture? Why has it fallen out of favour with farmers? (4 marks)

2. What is the golden rule of crop rotation? (2 marks)

3. Why is it important to add legumes to a crop rotation? (2 marks)

4. What is a nurse crop? Why should it be kept small, and how is this done? (4 marks)

5. Green manure could be called a sacrificial crop. Why would this name be appropriate? (3 marks)

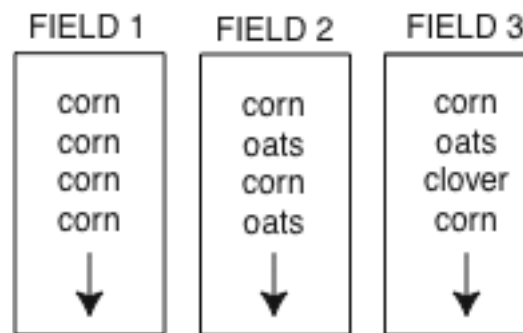
6. What is intercropping? (2 marks)

Assign 3.4: Crop Rotation Example

Let's look at an actual scientific test of the benefits of rotation.

When corn farmers in Illinois in the 1930s started to suffer from serious erosion and low yields, the Experimental Farm there decided to experiment with crop rotation. They created three fields in the same area, and worked them for twenty years.

In Field 1 they grew corn every year. In Field 2 they had a two-year rotation of corn and oats. In Field 3 they had a three-year rotation of corn, oats, and clover.



Experimental Fields

The harvest in the twentieth year was as follows:

- Field 1: 20 bushels/acre (18 hL/ha)
- Field 2: 48 bushels/acre (43.2 hL/ha)
- Field 3: 80 bushels/acre (72 hL/ha)

1. What was the key crop the rotation was set up to improve? (1 mark)

2. Okay, now let's get down to analyzing the rotation. In Field 2, what did the oat year in the rotation system do that helped maintain the fertility of the soil? (2 marks)

3. In Field 3, in what two ways did the clover further improve the soil? (2 marks)

4. On a real farm, you'd have to make sure that you had a use for the oats and clover. Suggest two different ways they could be used.
(2 marks)

5. Would this same rotation work if the key crop was wheat? (1 mark)

Evaluation Guidelines:

See individual questions

Total:

8 marks

Evaluation Guidelines:

See individual questions

Total:

17 marks

Evaluation Guidelines:

See individual questions

Total:

15 marks

3. Kayla was at first dismayed to find that her barn roof was leaking and that half the hay in her hayloft was soaking wet. She discovered it wasn't mouldy or fermenting yet, so she decided to save it by spreading it out in the sun to dry. It was a lot of work, but in the end she had dry hay again.

- a. What most likely happened to nutrients in the hay while it was wet? (2 marks)

Evaluation Guidelines:

See individual questions

Total:

10 marks

7. What is bleaching? How does it affect hay quality? (2 marks)

8. What is leaching? How does it affect hay quality? (2 marks)

Evaluation Guidelines:

See individual questions

Total:

16 marks

September 2010 estimates of the production of wheat crops in Canada

	Production Thousands of Tonnes
Canada	
Winter wheat	2667.1
Spring wheat	1649.2
Durum wheat	3043.5
All wheat	22204.8
Prince Edward Island	
Winter wheat	4.9
Spring wheat	31.8
All wheat	36.7
Nova Scotia	
Winter wheat	7.6
Spring wheat	1.4
All wheat	9.0
New Brunswick	
Winter wheat	0.7
Spring wheat	2.4
All wheat	3.1
Quebec	
Winter wheat	10.5
Spring wheat	136.0
All wheat	146.5
Ontario	
Winter wheat	1763.6
Spring wheat	166.0
All wheat	1929.6
Manitoba	
Winter wheat	400.1
Spring wheat	2673.9
All wheat	3074.0
Saskatchewan	
Winter wheat	222.5
Spring wheat	6478.6
Durum wheat	2617.6
All wheat	9318.7
Alberta	
Winter wheat	257.2
Spring wheat	6953.5
Durum wheat	425.9
All wheat	7636.6
British Columbia	
Spring wheat	50.6
All wheat	50.6

Evaluation Guidelines:

See individual questions

Total:

15 marks

Evaluation Guidelines:

Research	4
All categories of information included x 2	10
Information is accurate and clearly explained x 2	10
Design is pleasing to look at x 2	4
Design is easy to read x 2	6

Total:

34 marks

2. Now, pretend you have the power to write a law concerning BC's rangeland. In your law, specify things such as (a) how the land can be used, (b) what it can be used for, (c) how people can use it, and (d) what penalties may be imposed if these conditions are violated. (10 marks)

[illegible]

3. After you have completed Questions 1 and 2, compare your law against the excerpts from the Forest and Range Practices Act. This is the primary law dealing with rangeland in BC. You will find this in PDF format, on the assignment page in this course.

How do the terms of your law compare? Did you cover off some of the same items? Are there things that you thought were important that aren't in the actual act? Are there things in the Act that you missed? Do you think the actual Act covers what it needs to in order to adequately protect BC's rangeland? (5 marks)

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Evaluation Guidelines:

Evaluation Guidelines:
See individual questions

Total:

25 marks

Horse: _____

Sheep: _____

- b. Divide each of the values in (a) by the total amount of forage produced by the pasture. Your answers are the number of animals of each species the pasture can support. (4 marks)

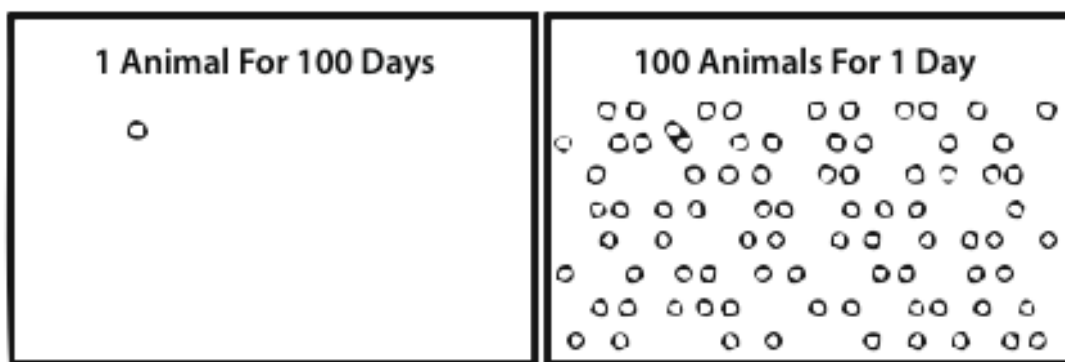
Heifer: _____

Bull: _____

Horse: _____

Sheep: _____

6. Determine the stocking rate for each of these scenarios. Answers are to be expressed in the number of animal days per hectare. (2 marks)



One animal grazing in a one-hectare paddock for 100 days.

100 animals grazing in a one-hectare paddock for one day.

7. Which of the scenarios in Question 6 would cause more overgrazing? Why? (3 marks)

Evaluation Guidelines:

See individual questions

Total:

25 marks

Birdsfoot trefoil

Vein pattern:

Leaf arrangement:



Corn

Vein pattern:

Leaf arrangement:



String Bean

Leaf type:

Leaf arrangement:

Evaluation Guidelines:

1 mark per question

Total:

10 marks

Evaluation Guidelines:

1 mark per box

Total:

12 marks