Sustainable Resources 12: Agriculture

Module 1 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.

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Assign 1.1: BC Agriculture Timeline

Introduction:
In this assignment you will use the information below to create a timeline of BC's early agricultural history.

Resources:
Visit the *Sustainable Resources 12: Agriculture Companion Website* (http://www.openschool.bc.ca/courses/agriculture/ag12v03/mod1.html) to see some examples of timelines. Links have also been included showing how to make a timeline. Visit these links as well. These links are listed under *Module 1 Section 1 Lesson A: Roots in the Past*.

Instructions:
Use the following information to complete your timeline.

British Columbia's Early Agricultural History
The first signs of agriculture in BC can be traced back to 1786. That's when Captain James Strange and his crew landed at Nootka Sound on the west coast of Vancouver Island. They were on a fur trading mission. To provide a change of diet, Strange had his men clear land and plant vegetables. Spaniards seized the land the next year. They later raised cattle, swine, goats, and poultry.

Agriculture resumed in 1811 at Stuart Lake, near Prince George. Here a fur trader with the North West Company named David Harmon planted a small garden. Harsh weather, insects, and wild animals slowed his progress. It took Harmon several years to harvest any crops.

Fur traders from the Hudson's Bay Company soon began growing grain, vegetables, and fruit at their own posts. One of these posts was Fort Langley, built on the lower Fraser River in 1827. The Hudson's Bay Company started a farm at Fort Langley that stretched for hundreds of hectares. This farm initially provided food for just the people living at the fort. Eventually the farm began selling agricultural products to others. Other agricultural operations popped up at HBC posts on Vancouver Island, and at Fort St. James, Fort Fraser, and Fort George in the Interior. However, these operations were very small.

Gold was discovered on the Fraser River in 1858, and in the Cariboo region in 1863. The arrival of gold seekers brought a demand for more food. However, production lagged far behind demand. And when the gold rushes ended, many of the miners left. Without a market for its goods, agriculture declined in importance.

Agriculture became more firmly established with the arrival of the Canadian Pacific Railway in the early 1880s. Farms and ranches popped up to feed the men building the line. When the CPR was completed in 1885, BC gained access to distant markets. BC agricultural products could easily be shipped across the

country. The CPR wasn't good news for everyone, though. BC's wheat industry couldn't compete in price or quality with wheat from the Prairies, and fell on hard times.

As the 1800s came to a close, lumber, fishing, and mining became increasingly important in BC. Thousands of people flocked to the province to work in these industries. More people meant a greater demand for food. BC's agriculture industry grew as a result.

Three regions of BC soon emerged as superior for agriculture. One of those regions was the Okanagan Valley. At first, the valley was mainly used for cattle ranching, but by the 1880s, extensive irrigation had opened the land for other agricultural uses. Many of the cattle ranches were turned into fruit orchards. Lord Aberdeen, soon to be the Governor General of Canada, purchased several large parcels of land in the Okanagan Valley in 1890 and began a commercial fruit orchard. Other farmers followed. The valley quickly developed one of the most productive tree fruit industries in the country. In 1889 the British Columbia Fruit-Growers' Association was created to promote and market BC fruit across Canada. Sales of BC fruit (much of it from the Okanagan) increased dramatically.

At the same time, the Fraser Valley was also developing into a very important agricultural region. One problem the valley experienced, though, was extensive spring flooding. In 1924 engineers responded by draining Sumas Lake (between Chilliwack and Abbotsford). Water was pumped out of the lake and into the Fraser River. And the rivers that flowed into the lake were redirected into the Vedder Canal. Flooding in the Fraser Valley was reduced and vast tracts of farmland were created on the former lake bottom.

These are just a few of the events that contributed to the development of BC's early agricultural history.

Evaluation Guidelines:
Your timeline must meet the following requirements:

- It is arranged on a horizontal or a vertical axis with a line or hash mark that marks off each event. **(3 marks)**
- It contains a minimum of seven (7) events from the information provided in the article. **(7 marks)**
- The events are arranged chronologically from left to right. **(1 mark)**
- Each event is described briefly but completely. **(2 marks each = 14 marks)**

Total = 25 marks

Submission:
You can complete your timeline on paper or using a word processing program with graphics.

If you complete your timeline on paper you will need to mail it to your instructor for marking. Include your name and the title of the assignment on your timeline before you submit it.

If you complete your timeline electronically, save the file in the Ag 12 Assignments folder on your computer desktop. Save it as **Ag 12 assign 1.1 timeline.doc**. Click Add Attachments to add the file here. Click Submit to send it to your instructor for marking.

Assign 1.1: Examining Farm Population Statistics (45 marks)
This table shows the total population and farm population of Canada and BC from 1931–2006. The farm population percentages are blank. Study the table carefully then complete the following questions.

Year	Canada Total Population	Canada Farm Population	Canada Farm Pop as % of Total Pop	BC Total Population	BC Farm Population	BC Farm Pop as % of Total Pop
1931	10,363,240	3,289,140		694,263	102,367	
1941	11,489,713	3,152,449		817,861	102,446	
1951	13,984,329	2,911,914		1,165,210	120,292	
1956	16,049,288	2,746,699		1,398,464	112,668	
1961	18,200,621	2,128,327		1,629,082	84,655	
1966	19,971,760	1,960,273		1,873,674	91,443	
1971	21,515,115	1,589,360		2,184,620	75,660	
1976	22,928,155	1,255,700		2,466,610	74,665	
1981	24,274,287	1,142,420		2,744,467	71,185	
1986	25,233,590	999,800		2,883,370	64,130	
1991	27,211,413	869,305		3,282,061	61,070	
1996	28,751,593	854,220		3,724,500	68,875	
2001	29,914,315	729,400		3,907,738	61,420	
2006	31,511,587	684,265		4,113,487	60,765	

Courtesy of Statistics Canada. Retrieved from: http://www.statcan.gc.ca/pub/95-633-x/2007000/t/6500026-eng.htm

1. How has Canada's total farm population changed over time? Describe what has happened in 1–2 sentences. Include numbers from the table to support your answer. (2 marks)

2. How has BC's total farm population changed over time? Describe what has happened in 1–2 sentences. Include numbers from the table to support your answer. (2 marks)

3. Calculate Canada's farm population percentage in the first blank column. To do this, divide Canada's total population by its farm population for each census year. (0.5 marks each = 7 marks)

4. Calculate BC's farm population percentage in the second blank column. To do this, divide BC's total population by its farm population for each census year. (0.5 marks each = 7 marks)

5. (19 marks)
   a. Make a line graph showing the farm population percentage for Canada (Line 1) and the farm population percentage for BC (Line 2). Follow the steps you were shown in Lesson B when you make your graph.

      - Give your line graph an appropriate title. (1 mark)
      - Label the vertical axis and divide it into the appropriate units (percentage) using hash marks. (2 marks)
      - Label the horizontal axis and divide it into units (years) with hash marks. (2 marks)
      - Plot the percentage statistics for Canada from the table above on the graph. Connect the points with straight lines. (0.5 marks per point = 7 marks)
      - Plot the percentage statistics for BC from the table above on the graph. Connect the points with straight lines. (0.5 marks per point = 7 marks)

   b. How has Canada's farm population percentage changed over time? Describe what has happened in 1–2 sentences. Include numbers from the line graph to support your answer. (2 marks)

   c. How has BC's farm population percentage changed over time? Describe what has happened in 1–2 sentences. Include numbers from the line graph to support your answer. (2 marks)

   d. Compare the two lines. Was BC more urbanized or less urbanized than Canada as a whole during this period? How do you know? (2 marks)

6. What do the statistics in this assignment suggest about the job prospects on farms in Canada and in BC? (2 marks)

Assign 1.1: The Agricultural Land Reserve (25 marks)

1. Define the following terms:

   a. Agricultural Land Reserve (2 marks)

   b. Agricultural Land Commission (2 marks)

2. Describe four arguments in favour of keeping the Agricultural Land Reserve. (4 marks)

3. Describe two arguments in favour of abolishing the Agricultural Land Reserve (2 marks)

4. a. A recent case that came before the Agricultural Land Commission involved land on Barnston Island (on the Fraser River, near Surrey). The applicants wanted the land removed from the ALR so they could develop it for industrial use. Opponents argued that the land should remain for agriculture only.

   Learn more about the Barnston Island application then write a letter to the editor of the local newspaper against the application.

   Resources
   To learn more about the Barnston Island case, consult these resources:

   - *Sustainable Resources 12: Agriculture Companion Website* (http://www.openschool.bc.ca/courses/agriculture/ag12v03/mod1.html): Under *Section 1*, *Lesson C*: *The Agricultural Land Reserve* click on the *Barnston Island* link. Click on the Barnston Island video near the bottom of the page.
   - Module 1 Source File article: *A Blow for Sanity*

   Evaluation Guidelines
   - Clear description of the Barnston Island application (**2 marks**)
   - Two or more well thought-out and plausible reasons for why you oppose the land being removed from the Agricultural Land Reserve.

Reasons clearly explain how the removal would harm Barnston Island and other regions also under threat. (**6 marks**)

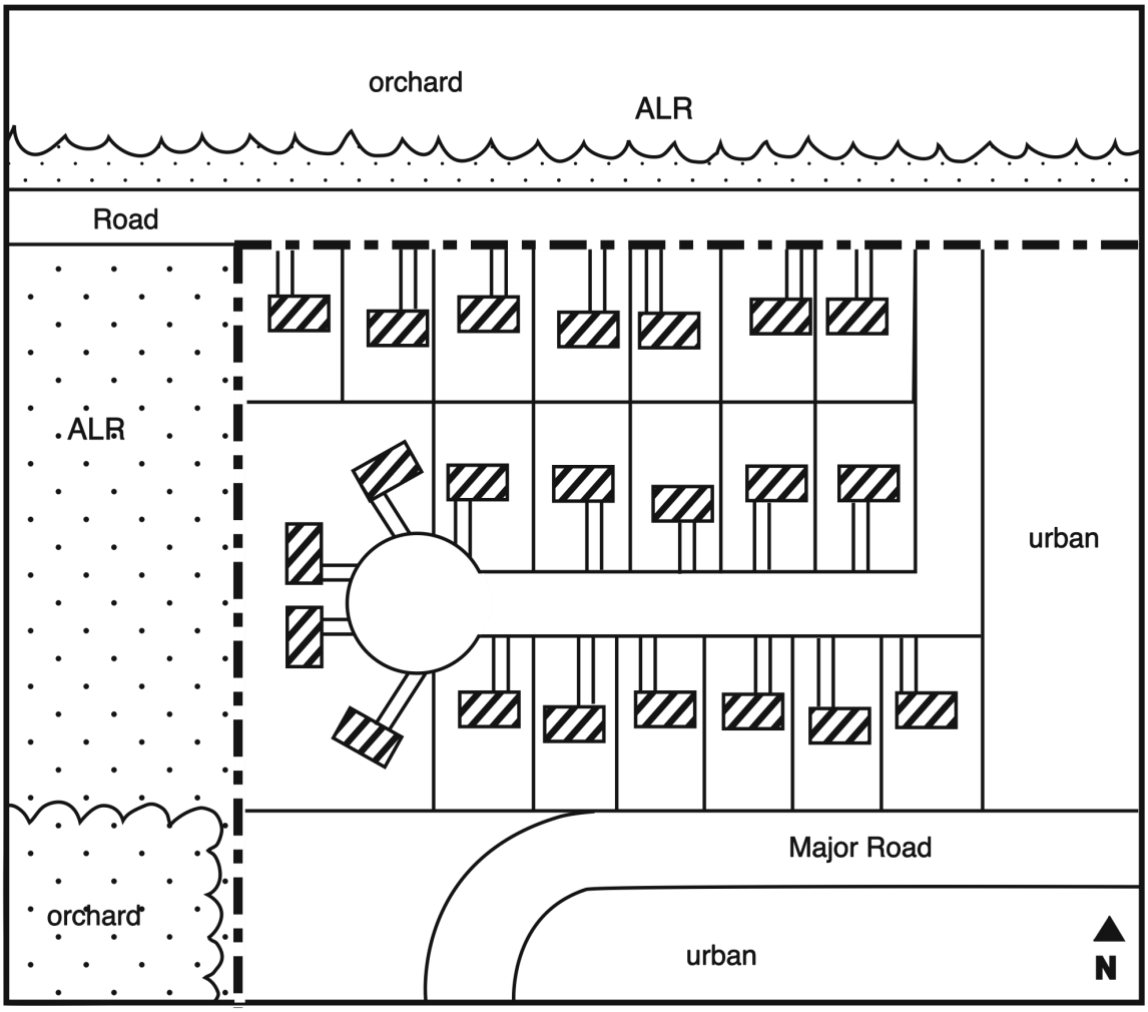
- Letter is formatted as follows: Begins with the date (choose a date sometime in July 2006—before the hearing), a salutation (Dear XX), your content in two or more paragraphs, and a closing (*Sincerely, your name*). (**2 marks**)

b. What did the Agricultural Land Commission decide? Do you agree with their decision? Why or why not? (5 marks)

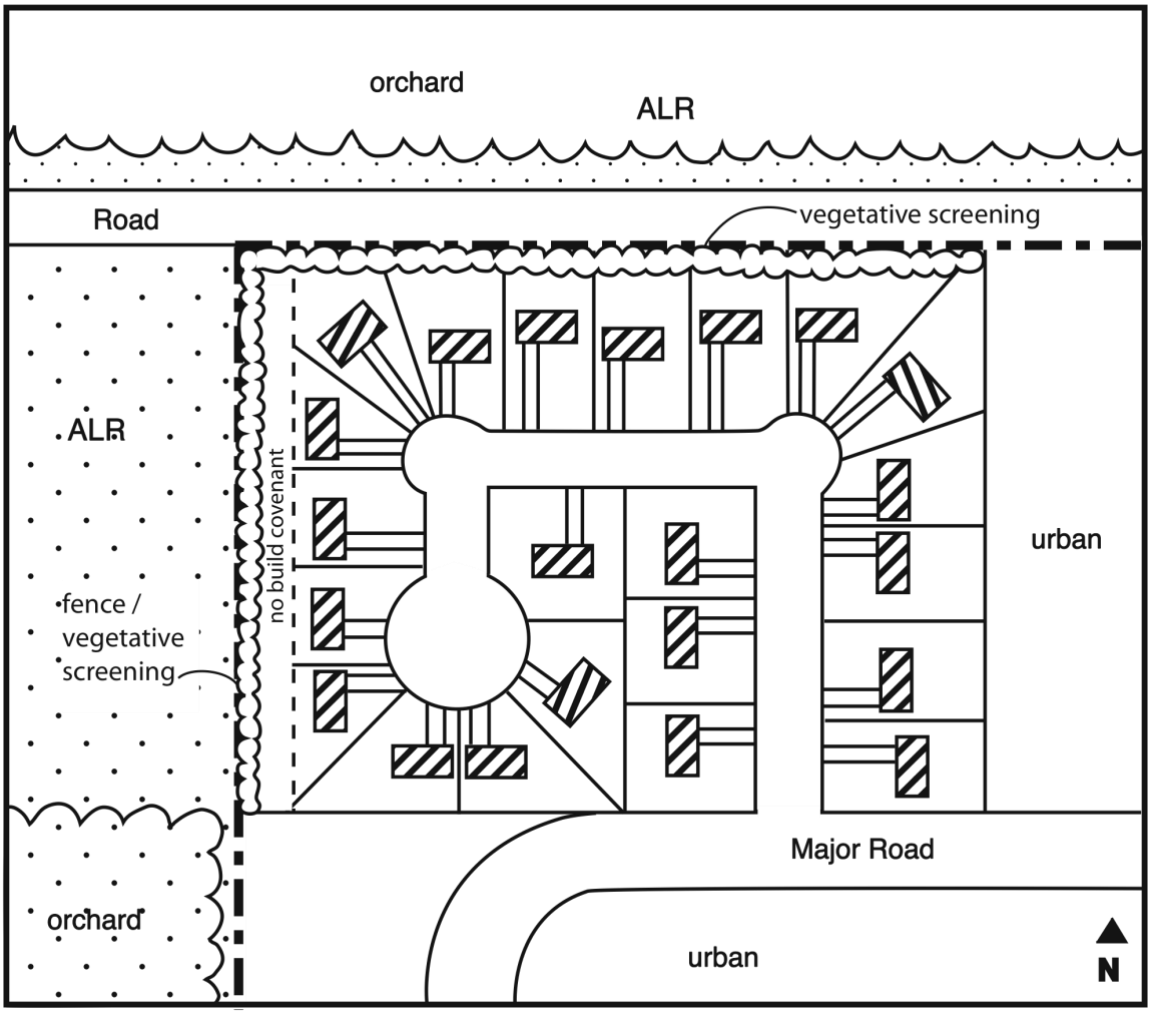
Assign 1.1: Planning the Edge (8 marks)

Introduction
You are the approving officer for the city of Prince George. It's your job to review subdivision proposals and approve or reject them.

Last month you received a proposal from a homeowner on the edge of the ALR. He would like to subdivide his property and build a small housing development. His plan looks like this:



You believe the development would negatively affect the neighbouring farm, so you reject it. You ask the homeowner to improve his plan. He comes back with this design:



Instructions

1. Identify three major changes the developer made to the design. For each change, describe how it will minimize the impact of the subdivision on the neighbouring farm. (6 marks)

2. Would you approve the housing development? Why or why not? (2 marks)

Assign 1.1: The Right to Farm Act (12 marks)

Research the *Farm Practices Protection (Right to Farm) Act*. Explain what this Act is and what rights and responsibilities it includes for BC farmers. Explain as well what options are available to urban neighbours who have complaints about farming practices. (12 marks)

See the *Sustainable Resources 12: Agriculture Companion Website* (http://www.openschool.bc.ca/courses/agriculture/ag12v03/mod1.html) for more information on the Right to Farm Act.

Assign 1.2: The Basics of Soil (20 marks)

1. Name the four main components of soil. (4 marks)

2. What is humus? (2 marks)

3. Describe four ways that organic matter is important for agriculture. (4 marks)

4. What is soil texture? (1 mark)

5. What effect does soil texture have on crop growth? Provide a specific example to support your answer. (3 marks)

6. What is soil structure? (1 mark)

7. Why is soil structure important? (2 marks)

8. Describe three ways soil structure can be maintained or improved. (3 marks)

Assign 1.2: Analyzing Soil Texture (10 marks)

Introduction

In Lesson A you were introduced to the scientific method for classifying soil texture. In this assignment you'll practise the *feel* method.

Resources

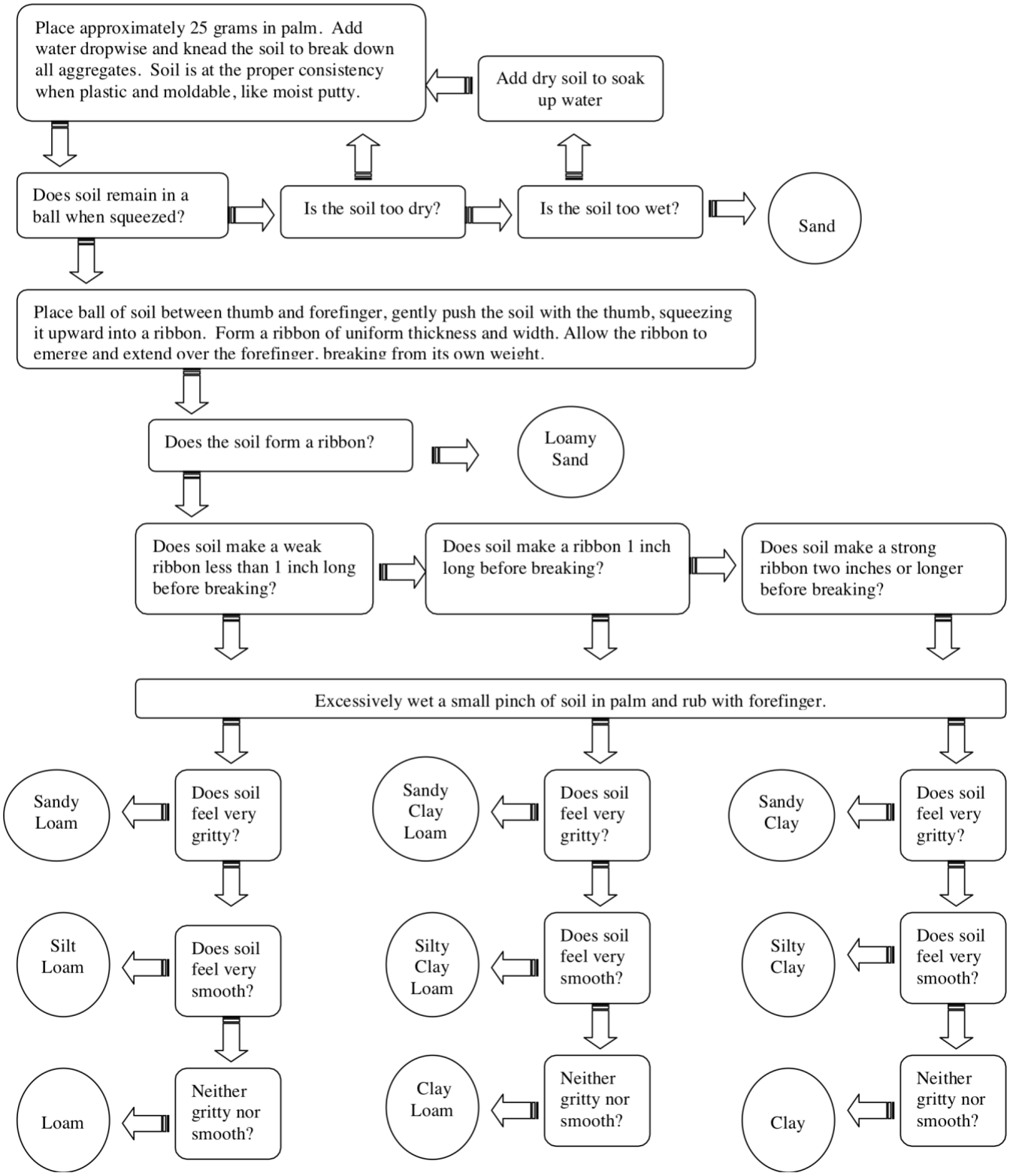
Shovel or trowel
Soil
Digital camera or video camera

Instructions

1. Use your shovel or trowel to gather a sample of soil. Set it aside then wash your hands.

2. Follow the steps on the next page carefully to determine the texture of your soil sample.

TEXTURE BY FEEL PROCEDURE



Questions

1. What is the texture of your soil sample? Use the steps in the chart to fully explain how you determined this.

2. Take a digital photograph or short movie of you working with your soil sample. Your photograph or movie must clearly show you holding the soil as a ball or as a ribbon, depending on its texture. Attach your photograph or movie file to this lesson as evidence you completed this assignment and so your teacher can look at it to see if you have correctly identified your soil's texture. Your photograph should resemble the one shown below.

Evaluation Criteria

- Photograph or movie is submitted with the assignment. It clearly shows either a ball of soil in your palm or a ribbon of soil stretching out between your thumb and forefinger. (**2 marks**)
- Description of how you used the chart to determine your soil texture is clear and complete. (**5 marks**)
- Soil texture is properly categorized, based on the flow chart. This categorization is supported by what is shown in the photograph or movie. (**3 marks**)

Assign 1.2: Soil Erosion Strategies (18 marks)

Introduction
As a farmer in BC, you're constantly looking for ways to protect your crops from the ravages of the weather. In the attached chart, describe what you can do to lessen the chances your soil will be eroded by wind and water.

Instructions
Column 1 describes some common problems associated with soil erosion. In Column 2, describe the action(s) you will take to address each problem. In Column 3 explain how each action will help reduce/eliminate the problem.

Evaluation Criteria
1 mark per correct action = 6 marks
2 marks per explanation of how the action will help = 12 marks

Problem	Action(s)	How the action(s) will help
Bare and exposed soils are very susceptible to wind and water erosion.		
Compacted soil is more prone to water erosion because water cannot penetrate it. Water remains on the surface where it washes soil away.		
Fields with hills or slopes are susceptible to water erosion.		
Soil exposed to strong wind is more susceptible to erosion.		

Assign 1.2: Soil Compaction (7 marks)

1. In your own words, what is soil compaction? Why is it a problem for agriculture? (4 marks)

2. Identify three things a farmer can do to minimize soil compaction. Again, be sure to answer in your own words. (3 marks)

Assign 1.2: Multiple Choice (8 marks)

Identify the correct type of fertilizer.

1. Made from natural matter and can increase humus content of soil
    a. organic fertilizer
    b. inorganic fertilizer
2. Contains guaranteed amounts of nutrients
    a. organic fertilizer
    b. inorganic fertilizer
3. Overuse is more likely to “burn” plants
    a. organic fertilizer
    b. inorganic fertilizer
4. Breaks down and releases nutrients to plants slowly
    a. organic fertilizer
    b. inorganic fertilizer
5. Exact amount of nutrients in it is highly variable
    a. organic fertilizer
    b. inorganic fertilizer
6. They are inexpensive to transport in large volumes
    a. organic fertilizer
    b. inorganic fertilizer
7. Delivers nutrients to the soil slowly
    a. organic fertilizer
    b. inorganic fertilizer
8. The production of this nitrogen fertilizer requires significant amounts of fossil fuels
    a. organic fertilizer
    b. inorganic fertilizer

Assign 1.2: Proper Manure Management (30 marks)

Answer the following questions based on what you have learned.

1. Describe three benefits of using manure as a fertilizer. (3 marks)

2. Identify four problems that might occur when too much manure is applied. (4 marks)

3. Describe what happens when manure is properly composted. (2 marks)

4. Identify two advantages that manure has over chemical fertilizers. (2 marks)

5. Give two reasons why manure must be stored at certain times of the year. (2 marks)

6. Identify two things that must be incorporated into permanent manure storage facilities to prevent water from being contaminated. (2 marks)

7. Under what conditions is it ok to store solid manure in the field? (2 marks)

8. Why is field storage a temporary solution only? What are the risks of leaving the manure out in the open? (1 mark)

9. Identify three practices required for field storage of solid manure. (3 marks)

10. Read the procedures required for storing solid, semi-solid, and liquid manure. In your opinion, does it seem reasonable to expect farmers to do all of these things? Why or why not? (3 marks)

11. What is the difference between aerobic and anaerobic decomposition? Which is the preferred way from manure to decompose, and why? (3 marks)

12. What are three factors that help determine the best time to apply manure as a fertilizer? (3 marks)

Assign 1.3: Pesticide T-Chart (10 marks)

Complete the t-chart provided with advantages and disadvantages of using pesticides. Summarize the information in your own words. (10 marks)

Advantages of Pesticides	Disadvantages of Pesticides

Assign 1.3: Pesticides: Yes or No (10 marks)

Introduction

As you've learned, there are advantages and disadvantages to using pesticides. Where do you stand on this issue? If you were a farmer, would you use pesticides on your fields? Are the risks worth it or are they too great?

Instructions

In a well thought-out paragraph, state your position on the use of pesticides. Before you write your paragraph, review the information in the Sierra Club of Canada and the CropLife articles in particular. These articles have opposing views on the issue. Reading them again carefully you may be drawn to one side more than the other. (10 marks)

Evaluation Criteria

You will receive a base mark out of 4 for your paragraph. This will be multiplied by 2.5 for a total out of 10 marks. Part marks may be awarded.

Exceeds expectations **4**	Your paragraph: • is clear and logical • has a strong topic sentence stating your opinion • has three or more details that clearly and convincingly support your opinion • includes a concluding statement that restates your point of view • has few, if any errors in spelling, grammar, capitalization and punctuation
Fully meets expectations **3**	Your paragraph: • is clear and logical • has a clear topic sentence stating your opinion • has three or more supporting details that support your opinion • includes a concluding statement that restates your point of view • has few errors in spelling, grammar, capitalization and punctuation
Meets expectations (minimal level) **2**	Your paragraph: • has a topic sentence that does not clearly state your opinion • has less than three supporting details, and they don't necessarily support your argument • may not have a concluding sentence • has several errors in spelling, grammar, capitalization

	and punctuation
Not yet within expectations **1**	Your paragraph: • may not include a topic sentence • doesn't clearly show your opinion on the issue • lacks some or any supporting details • may not have a concluding statement • has many errors in spelling, grammar, capitalization and punctuation

Assign 1.3: Identify the IPM Steps (4 marks)

Match each of these statements to the correct step in the IPM program.

pest identification	monitoring
injury threshold determination	control method selection
evaluation	

1. A farmer finds two different types of fungus on his tomatoes. One causes minor damage and the other can wipe out his whole crop. Which step should come first?

2. Farmer John looks back on his IPM program and makes changes for next year.

3. A farmer watches her fruit trees carefully to see if they are infected with apple crop fungus.

4. Leaf rollers are moth larvae that spin silk webs around leaves then roll the leaves together and eat them. In the spring, Farmer John estimates that more than 10 percent of the leaves on his fruit trees have been affected, so he decides to use an insecticide.

Assign 1.3: Identify the Control Method (6 marks)

Classify each of the following pest control methods as *behavioural*, *biological*, *physical*, *cultural*, or *chemical*.

1. Dan prunes his apple trees to remove tent caterpillar nests.

2. The introduction of two moth species and one flea beetle species has provided successful control of the noxious weed Tansy Ragwort on parts of Vancouver Island and in the Fraser Valley.

3. Removal of waste material from confined livestock and poultry operations at least once every 10 to 12 days during the fly breeding season helps with fly control.

4. Netting on blueberry farms provides non-toxic, non-lethal, and effective bird control.

5. These control methods include insect mating disruption using sex attractants (pheromones), odour-baited traps, yellow sticky traps, distress recordings, repellents, and black light electrocutors.

6. Herbicides are sometimes used to control weeds when all other methods have been unsuccessful.

Assign 1.3: Integrated Pest Management (20 marks)

1. In your own words, describe the six steps of an Integrated Pest Management Program. Be thorough in your descriptions. (10 marks)

2. One of the themes we've been discussing in this module is the importance of practicing agriculture in ways that are environmentally sustainable. Explain how Integrated Pest Management is a good example of this. (5 marks)

3. In an earlier assignment you were asked to state whether you would use pesticides if you were a farmer. Now that you know about some alternatives to pesticide use, has your opinion changed? Why or why not? (5 marks)

Assign 1.3: Agriculture and Climate Change (25 marks)

Answer these questions as you read the article.

1. What are the three main greenhouse gases (GHGs) produced by agricultural activity? (3 marks)

2. Why are GHGs like this necessary? (2 marks)

3. If these gases are necessary, then what's the problem? What effects are we seeing? (3 marks)

4. How is most of the carbon dioxide from agriculture created? (1 mark)

5. Describe the role of crops in the carbon cycle. (2 marks)

6. Describe five ways farmers can reduce their carbon dioxide emissions. (5 marks)

7. Where is most of the methane from agriculture produced? (1 mark)

8. What is the best way to cut methane emissions from agriculture? Why? (2 marks)

9. What is the second biggest source of methane on the farm? How is it created? (2 marks)

10. Describe two ways manure can be treated to avoid methane emissions. (2 marks)

11. How is nitrous oxide formed? (2 marks)

Assign 1.3: Genetically Modified Foods (15 marks)

Complete these questions as you read the article.

1. Name four reasons why food crops might be genetically modified. (4 marks)

2. GMOs are sometimes also called transgenic organisms. What does this mean? (1 mark)

3. Describe what Bt corn is and how it is genetically modified. (2 marks)

4. Supporters of GMOs claim that producing food in this way will ward off some of the things that threaten farmer's yields. Describe two specific GMOs designed for this purpose. (2 marks)

5. Describe the potential advantages of Golden Rice. (3 marks)

6. Identify three of the concerns with GMOs. (3 marks)

Assign 1.3: Monsanto vs. Schmeiser (25 marks)

Introduction

Percy Schmeiser is a canola farmer from Bruno, Saskatchewan. In 1998, Mr. Schmeiser was sued by Monsanto, one of the world's largest agricultural biotechnology companies.

Instructions

1. Research the lawsuit Monsanto launched against Percy Schmeiser. See the Resources section below for some useful Websites. Using this information, take notes on the following aspects of the case:

    a. What did Monsanto accuse Mr. Schmeiser of doing?

    b. What was Mr. Schmeiser's defense?

    c. What "evidence" did Monsanto have against him? What did some of the witnesses (scientists and fellow farmers) have to say about Mr. Schmeiser's defense?

    d. The case went all the way to the Supreme Court of Canada. What did the Supreme Court decide?

2. You are the lawyer for Percy Schmeiser or for Monsanto. Using your notes, write the opening statement you will deliver to the Supreme Court of Canada. Clearly describe the details of the case and give convincing reasons why Mr. Schmeiser is either innocent or guilty of the charges against him.

    Complete your opening statement in a word processing document. When you're finished, attach the document below then submit it to your teacher for marking.

    If you'd like, you could instead record your opening statement as an mp3 file. Prepare the statement in written form, as above, then read it aloud as you record it. Attach and submit your sound file to your teacher for marking.

Resources

To research the case, go to the Sustainable Resources 12: Agriculture Companion Website (http://www.openschool.bc.ca/courses/agriculture/ag12v03/mod1.html). Check out the links under *Monsanto vs. Schmeiser* in *Module 1 Section 3 Lesson D*.

Evaluation Guidelines

Case description (10 marks)

- Details of the case are complete and described accurately.
- All of the important people, dates, and places are mentioned.
- It is clear from your opening statement what Mr. Schmeiser has been accused of doing.

Arguments (10 marks)
Defense:
- Arguments in support of Percy's Schmeiser's innocence are clearly and accurately described.
- Arguments are also made as to why this case would set a dangerous precedent if Monsanto wins.

OR:

Prosecution:
- Arguments in support of Percy Schmeiser's guilt are clearly and accurately described.
- Scientists and neighbours poked holes in Schmeiser's defense, so be sure in your argument to summarize what they have to say.

Writing Quality (5 marks)
- Writing is free of major errors in spelling, grammar, and mechanics.

Assign 1.3: Monsanto vs. Schmeiser: The Decision (5 marks)

In May 2004, the Supreme Court of Canada ruled in favour of Monsanto in its lawsuit against Percy Schmeiser. The Court stated that it didn't matter how the Roundup Ready canola got into Schmeiser's fields; it was there and it shouldn't be. All of Schmeiser's profits from 1998 were awarded to Monsanto since there was a probability of having the genetically altered seeds throughout his fields.

Do you agree with the Court's decision? Why or why not? What impact will this decision have on other farmers? (5 marks)

Assign 1.3: Definitions (7 marks)

Match each of these terms to the correct definition.

Application rate	Availability coefficient
Available water storage capacity	Effective rooting depth
Gross amount	Maximum irrigation interval
Maximum soil water deficit	

1. The total amount of water that can be stored in the soil.

2. The actual amount of water that must be added to the soil to compensate for the inefficiency of the irrigation system.

3. The total amount of water that must be removed from the soil before irrigation is needed again.

4. The total amount of water in the soil that is available at any given time.

5. The longest recommended period of time before irrigation is needed again.

6. The spot in the soil from which a plant gets most of its water needs.

7. The optimal speed at which water should be added to the soil though irrigation.

Assign 1.3: Irrigation Calculations (13 marks)

Rhonda operates an asparagus farm in the Fraser Valley. Her soil is clay loam and is 1.5 metres deep. She has recently installed a sprinkler system that is 75% efficient. Calculate Rhonda's irrigation needs.

Review the information in Lesson E to help you complete this assignment. To earn full marks you must write out the appropriate formulas and show all your calculations.

Step 1: Calculate the Maximum Soil Water Deficit (3 marks)

Step 2: Calculate the Gross Amount to be applied (3 marks)

Step 3: Calculate the Application Rate and Total Irrigation Time (4 marks)

Step 4: Calculate the Maximum Irrigation Interval using a Peak Evapotranspiration Rate of 0.415 cm/day. (3 marks)

Assign 1.3: The Risks of Irrigation (15 marks)

Answer the following questions based on what you have learned. As always, be sure to answer in your own words.

1. Explain the importance of each of the following in determining when and how much to irrigate.

    a. Crop type (1 mark)

    b. Soil (2 marks)

    c. Natural precipitation levels (2 marks)

2. Sprinkler systems aren't just used to make up for an inadequate supply of water. Describe two other uses of sprinkler systems. (4 marks)

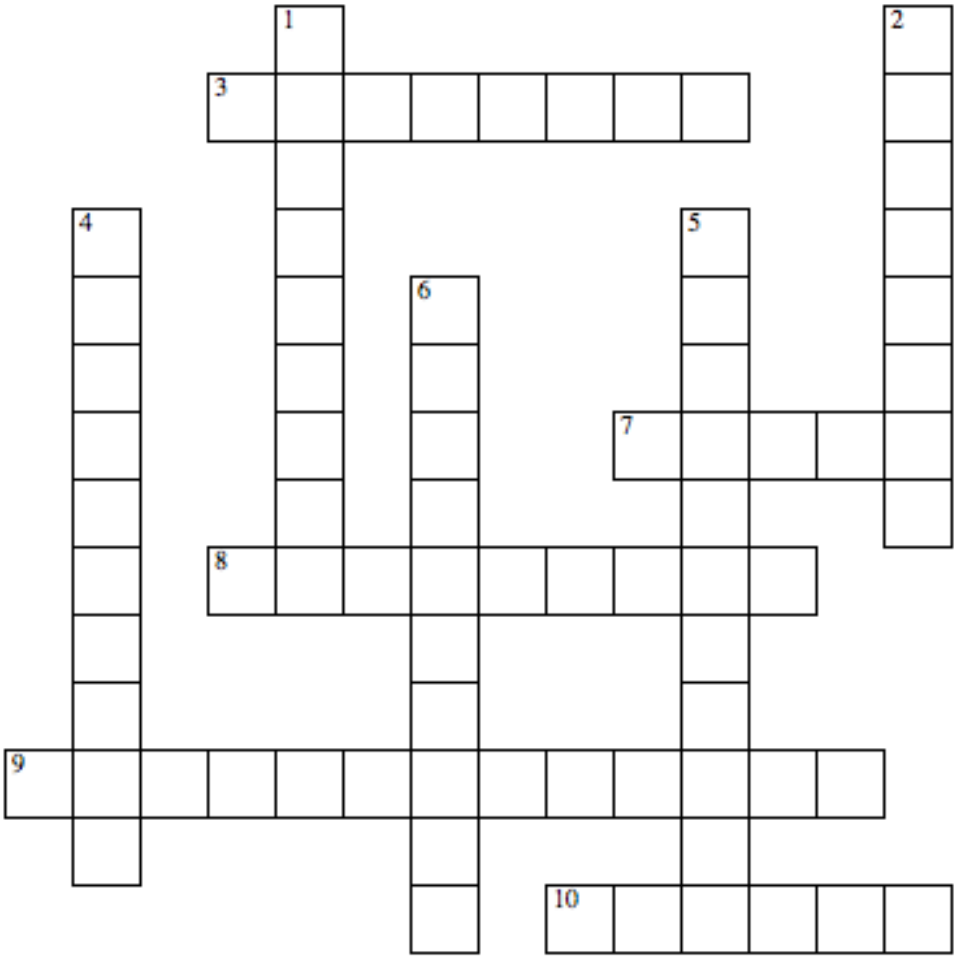
3. Describe each of the following risks of irrigation.

    a. Soil salinity (2 marks)

    b. Waterlogging (2 marks)

    c. Pollution (2 marks)

Pesticides



Across

3. The movement of a pesticide through the soil.

7. The movement of a pesticide away from the target site.

8. A pesticide used to kill weeds.

9. Another word for pollution.

10. The movement of a pesticide over a sloping surface via water.

Down

1. Any product used to deal with pests.

2. The degree to which a pesticide causes health problems.

4. The process by which a pesticide enters another substance or organism.

5. The breakdown of a pesticide in the environment.

6. How well a pesticide dissolves in water.