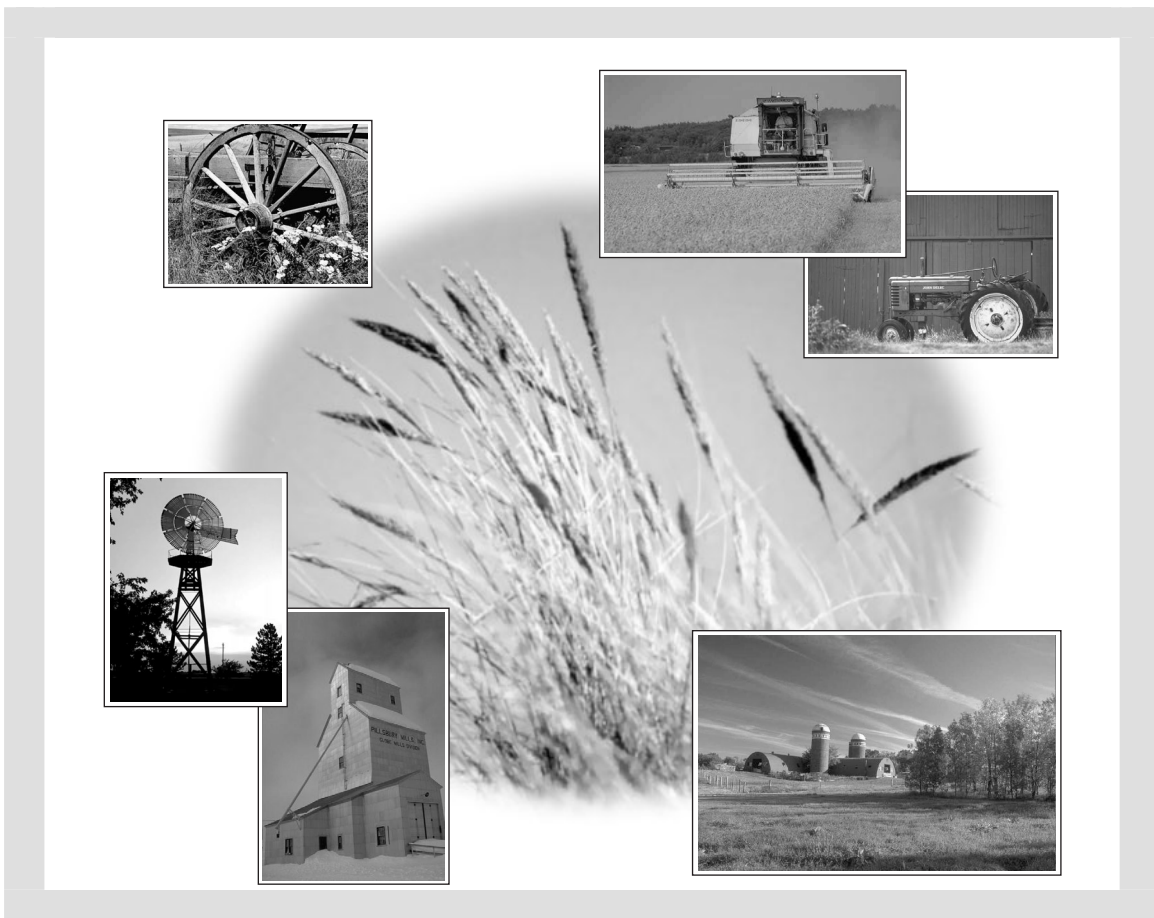


# *Applied Mathematics 30*

## **Teacher Notes: Farming in Alberta**



**February 2006**

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# Applied Mathematics 30

## Teacher Notes: Farming in Alberta

### Introduction

This project is related to several aspects of farm business in Alberta and allows students to use their knowledge from the Matrices and Pathways unit, the Statistics and Probability unit, the Finance and Spreadsheets unit, the Vectors unit, and the Design unit. It is designed to be completed in three to five hours of student time. The use of this project is optional; however, you may choose to use it as part of your assessment. A hard copy will be mailed to your school in January 2006. Sample solutions can be found on the Alberta Education extranet <https://phoenix.edc.gov.ab.ca>.

One of the written-response questions worth 10% on the Applied Mathematics 30 June 2006 and on the Applied Mathematics 30 August 2006 Diploma Examinations will be related to this project. Students who do not complete the project but who have completed the course will have the knowledge to answer the written-response question; however, students who do complete the project will gain experience with the related mathematical skills.

### Specific Notes

The assumption of independence used in Part A, question 3, is the best assumption possible. Changes in rural society over the last 40 years, however, may cast some doubt on this assumption.

Teachers may want to provide students with the following spreadsheet template for part B, question 3.

	A	B	C	D	E	F	G	H
1	<b>Shipping of Crop</b>							
2								
3	<b>Type of Crop</b>	<b>Tonnes/ Truckload</b>	<b>Shrinkage Allowance</b>	<b>Tonnes Paid/ Truckload</b>	<b>Number of Bushels/ Tonne</b>	<b>Bushels Paid/ Truckload</b>	<b>Bushels Paid/2 Truckloads</b>	<b>Bushels Paid/5 Truckloads</b>
4	Wheat							
5	Barley							
6	Canola							
7	Oats							

The specific web sites where data for this project were found are shown below.

[www.statcan.ca/Daily/English/021120/d021120a.htm](http://www.statcan.ca/Daily/English/021120/d021120a.htm)

[www.statcan.ca/english/freepub/95F0355XIE/tables/html/optab05.htm](http://www.statcan.ca/english/freepub/95F0355XIE/tables/html/optab05.htm)

[www.agric.gov.ab.ca/app19/calc/crop/bushel2tonnevalue.jsp](http://www.agric.gov.ab.ca/app19/calc/crop/bushel2tonnevalue.jsp)

[www40.statcan.ca/101/cst01/agrc18j.htm](http://www40.statcan.ca/101/cst01/agrc18j.htm)

[www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/sdd5729](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sdd5729)

[www.statcan.ca/english/agcensus2001/first/profiles/06alb.htm](http://www.statcan.ca/english/agcensus2001/first/profiles/06alb.htm)

## ***Program of Studies***

The project relates to mathematics learned in the following units of Applied Mathematics 30.

### ***Matrices and Pathways***

- Specific Outcomes**
- 1.3: Perform, using technology only for larger matrices, the matrix operations of addition, subtraction, matrix multiplication, and scalar multiplication. [C, E, R, T, V]
  - 1.4: Model and solve consumer and network problems performing matrix operations and using algebraic solution strategies as needed. [CN, PS, T, V]

### ***Statistics and Probability***

- Specific Outcomes**
- 2.1: Find the population standard deviation of a data set using technology. [CN, E, T, V]
  - 2.2: Use z-scores to solve problems related to the normal distribution. [PS, R, T, V]
  - 2.6: Use expressions for  $P(A \text{ and } B)$  to solve problems involving independent and dependent events. [CN, PS, R]

### ***Finance and Spreadsheets***

- Specific Outcome**
- 3.1: Design a financial spreadsheet template to allow users to input their own variables. [C, PS, T]

### ***Vectors***

- Specific Outcomes**
- 5.3: Determine the magnitude and direction of a resultant vector, using triangle or parallelogram methods. [CN, R, T, V]
  - 5.4: Model and solve problems in 2-D and simple 3-D, using vector diagrams and technology. [CN, PS, T, V]

### ***Design***

- Specific Outcome**
- 6.1: Use dimensions and unit prices to solve problems involving perimeter, area and volume. [E, PS, V]

## Mathematical Processes

The seven mathematical processes identified in the *Program of Studies* are addressed in this project in the following manner.

<b>Communication</b>	Create a poster to demonstrate mathematical skills used in farming.
<b>Connections</b>	Relate mathematics to real-world situations and connect different units within Applied Mathematics 30.
<b>Estimation and Mental Mathematics</b>	Check reasonableness of solutions in spreadsheet and matrix operations.
<b>Problem Solving</b>	Use matrices and a spreadsheet to determine the revenue from selling grain products.
<b>Reasoning</b>	Determine a logical manner in which to calculate revenue from hauling grain products; provide justification and reasons for results.
<b>Technology</b>	Use a spreadsheet and graphing calculator to solve and display problems.
<b>Visualization</b>	Use the normal curve to visualize and interpret the distribution of ages of farm operators. Use vector diagrams to visualize the flight path for crop dusting.

## *ICT Program of Studies*

### **C.1—Students will access, use and communicate information from a variety of technologies.**

**Specific Outcome** 4.2: Select information from appropriate sources, including primary and secondary sources.

### **C.3—Students will critically assess information accessed through the use of a variety of technologies.**

**Specific Outcome** 4.1: Assess the authority, reliability and validity of electronically accessed information.

### **C.6—Students will use technology to investigate and/or solve problems.**

**Specific Outcomes** 4.1: Investigate and solve problems of prediction, calculation and inference.  
4.2: Investigate and solve problems of organization and manipulation of information.  
4.3: Manipulate data by using charting and graphing technologies in order to test inferences and probabilities.  
4.4: Generate new understandings of problematic situations by using some form of technology to facilitate the process.

### **F.1—Students will demonstrate an understanding of the nature of technology.**

**Specific Outcome** 4.2: Solve mathematical and scientific problems by selecting appropriate technology to perform calculations and experiments.

### **F.2—Students will understand the role of technology as it applies to self, work and society.**

**Specific Outcome** 4.7: Use current, reliable information sources from around the world.

### **P.2—Students will organize and manipulate data.**

**Specific Outcome** 4.1: Manipulate and present data through the selection of appropriate tools, such as scientific instrumentation, calculators, databases and/or spreadsheets.