

Applied Mathematics 30

Teacher Notes:
**Kayaking the Clayoquot
Sound, Tofino, B.C.**



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Introduction

The following project relates to a kayaking trip and allows students to use their knowledge from the Cyclic, Recursive, and Fractal Patterns unit, the Vectors unit; the Finance and Spreadsheets unit; and the Statistics and Probability unit. It is designed to be completed in three to five hours of student time. The use of this project is optional; however, if you do choose to use it, you may include it as part of your assessment. A hard copy will be mailed to your school in February 2007. Sample solutions can be found on the Alberta Education extranet at <https://phoenix.edc.gov.ab.ca>.

One of the written-response questions worth 10% on the Applied Mathematics 30 June 2007 Diploma Examination 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 have completed the project will gain experience with the related mathematical skills.

Specific Notes

Teachers may wish to

- determine to what extent students will carry out research for the details, costs, and masses of items on the list in Part A. All the data on the list are provided for students so that they are able to more clearly understand the outdoor activities that are described. However, a student is not required to work alone to complete the list. Student may choose to work together when researching the mass and price of items
- suggest that students use the Mountain Equipment Co-op (MEC) web site because it contains most of the items on the packing list. Masses and prices can be obtained by clicking on specific items
- consider how additional columns can be used so that the spreadsheet in Part D converts hours and minutes to decimal hours
- refer students who use a TI-83 or a TI-83 Plus graphing calculator to Utility 32 in *Applied Mathematics 12* for part D, question 3. The regression equation in the sample solution was obtained by inputting SinReg 10, L₁, L₂, 12, Y₁

Program of Studies

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

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]

Finance and Spreadsheets

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

Cyclic, Recursive, and Fractal Patterns

- Specific Outcomes**
- 4.1: Collect sinusoidal data, graph the data using technology, and represent the data with a best-fit equation of the form:
 $y = a \sin (bx + c) + d$. [C, CN, PS, T, V]
- 4.2: Use best-fit sinusoidal equations, and their associated graphs, to make predictions by interpolation and extrapolation. [C, CN, PS, T]
- 4.4: Use technology to generate and graph sequences that model real-life phenomena. [PS, T, V]

Vectors

- Specific Outcomes**
- 5.1: Use appropriate terminology to describe:
- vector quantities
 - scalar quantities. [C, CN]
- 5.2: Assign meaning to the multiplication of a vector by a scalar. [CN]

Mathematical Processes

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

Communications	Create a poster to demonstrate the mathematical skills used in planning a kayaking trip
Connections	Relate mathematics to real-world situations and connect different units within Applied Mathematics 30
Estimation and Mental Mathematics	Check the reasonableness of costs and estimate the masses of items listed in spreadsheets
Problem Solving	Decide on an appropriate route and adequate supplies to ensure a safe and enjoyable trip. Use a table and/or technology to decide on the best departure times with respect to tides
Reasoning	Determine a logical manner in which to solve budget and route problems
Technology	Use a spreadsheet and graphing calculator to solve and display problems
Visualization	Use the diagram provided to visualize an appropriate route for the kayaking trip

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.