Wrap It Up!

MathLinks 8, page 73

Suggested Timing
80–100 minutes

Materials
• access to recipes in print material and/or on the Internet
• recipe from section 2.3 Math Link
• ruler
• logo design from section 2.1 Math Link
• grid paper (optional)
• art materials to make invitations (including coloured pencils or markers)

Blackline Masters
Master 1 Project Rubric
Master 8 Centimetre Grid Paper
BLM 2–1 Chapter 2 Math Link Introduction
BLM 2–6 Section 2.1 Math Link
BLM 2–9 Section 2.2 Math Link
BLM 2–11 Section 2.3 Math Link
BLM 2–13 Chapter 2 Wrap It Up!

Specific Outcomes
N4 Demonstrate an understanding of ratio and rate.
N5 Solve problems that involve rates, ratios and proportional reasoning.

Planning Notes

Introduce the problem and clarify the assessment criteria. Make the chapter problem as realistic as possible by having students plan an international meal. Ensure that students research recipes and calculate the cost of ingredients. Consider giving students the option of presenting their project in a four-page foldable using the following format:

Cover Invitation (including logo design)	Recipe #1	Recipe #2	Recipe #3

If there is time, have them bring prepared recipes to school and serve an international meal for students and teachers. If so, have students consider any allergies or food sensitivities among their classmates and teachers in their menu planning.

Meeting Student Needs
• You may wish to allow students who have an interest in trades to design, calculate the cost of materials for, and build a scale model of a building project, such as a shed or deck, as an alternative Wrap It Up! problem.
• Consider allowing students to use spreadsheet software to help them complete the Wrap It Up!

ELL
• Consider having English language learners use their first language for the invitation and the recipes. After doing so, students might find it easier to express their work in English. You might display all of the invitations and recipes on a classroom wall.

Gifted and Enrichment
• Challenge students to calculate the cost of one of the dishes per guest or break down the cost of the entire meal per guest.

@ WWW Web Link
For information about an alternative activity requiring students to plan pizza for a family reunion, go to www.mathlinks8.ca and follow the links.

Assessment	Supporting Learning
Assessment *of* Learning	
Wrap It Up! This chapter problem wrap-up gives students an opportunity to apply and display their knowledge of ratios and rates. It provides a real-life example of using proportional reasoning. **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this Wrap It Up! Page 88 in this TR provides notes on how to use the rubric for this Wrap It Up!	• Provide or have students bring in recipe books from various cultures. Alternatively, consider allowing students to use the Internet to research recipes. • It is important that students complete the Math Links in sections 2.1 and 2.3, as they will need to include their work on these Math Links as part of the chapter problem. • If students have not completed the Math Links earlier, you may wish to provide them with **BLM 2–1 Chapter 2 Math Link Introduction, BLM 2–6 Section 2.1 Math Link, BLM 2–9 Section 2.2 Math Link**, and **BLM 2–11 Section 2.3 Math Link**. • You may wish to have students use **BLM 2–13 Chapter 2 Wrap It Up!**, which provides scaffolding for the chapter problem wrap-up.

The chart below shows the **Master 1 Project Rubric** for tasks such as the Wrap It Up!
and provides notes that specify how to identify the level of specific answers for the project.

Score/Level	Holistic Descriptor	Specific Question Notes
5 (Standard of Excellence)	❑ Applies/develops **thorough** strategies and mathematical processes making **significant** comparisons/connections that demonstrate a **comprehensive** understanding of how to develop a complete solution ❑ Procedures are **efficient and effective** and may contain a **minor mathematical error** that does not affect understanding ❑ Uses **significant** mathematical language to explain their understanding and provides **in-depth** support for their conclusion	• provides a complete and correct solution with possibly a minor calculation error that does not affect understanding of the problem
4 (Above Acceptable)	❑ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding ❑ Procedures are **reasonable** and may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution ❑ Uses **appropriate** mathematical language to explain their understanding and provides **clear** support for their conclusion	• provides a complete response with weak communication or missing justification *or* • provides a complete response with one recipe missing *or* • provides a complete response with an error in calculation or area or one incorrect ratio for part a)
3 (Meets Acceptable)	❑ Applies/develops **relevant** strategies and mathematical processes making **some** comparisons/connections that demonstrate a **basic** understanding ❑ Procedures are **basic** and may contain a **major error or omission** ❑ Uses **common** language to explain their understanding and provides **minimal** support for their conclusion	• correctly completes parts a) and b) with justification of one of the recipes and at most two minor calculation errors *or* • correctly completes parts b) and c) *or* • correctly completes parts a), b) and c) for one recipe *or* • provides a correct response to parts a) and c) based on an incorrect part b)
2 (Below Acceptable)	❑ Applies/develops **some relevant** mathematical processes making **minimal** comparisons/connections that lead to a **partial solution** ❑ Procedures are **basic** and may contain **several major mathematical errors** ❑ Communication is **weak**	• correctly completes part a) with correct proportions but for an incorrect area *or* • correctly completes part b) with no justification and possibly no more than three calculation errors *or* • provides a correct response to part c) based on an incorrect part b)
1 (Beginning)	❑ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution ❑ Communication is **weak or absent**	• makes an initial start to part a) or part b)

Math Games

Suggested Timing
30 minutes

Materials
• three dice per pair of students
• calculator

Specific Outcomes
N4 Demonstrate an understanding of ratio and rate.

Planning Notes

In this game, students record ratios of least value to the sum of rolled values, then use a calculator to convert the ratios to decimal form. Before having students play the game, you may wish to read the directions with the class and play a demonstration round.

Meeting Student Needs

Gifted and Enrichment
• You may wish to have students use the ratio of the least value to the highest value, or the ratio of the highest value to the sum of the rolled values. You might also alter the winning value from 2.5 to another value.

Common Errors

• Students may add the rolled values or the decimal equivalents incorrectly.

R$_x$ Have students check each others' calculations.

Assessment	Supporting Learning
Assessment *for* Learning	
Rolling Ratios Have students play the game with a partner.	• Encourage students to use a table to record their ratios in fraction and decimal form. • For #2, suggest students modify one rule at a time.

Challenge in Real Life

Suggested Timing
40–50 minutes

Materials
• map of Northwest Territories
• 30-cm ruler
• compass
• calculator

Blackline Masters
Master 1 Project Rubric
BLM 2–14 Map of the Northwest Territories

Mathematical Processes

☑ Communication (C)

☑ Connections (CN)

☑ Mental Mathematics and Estimation (ME)

☑ Problem Solving (PS)

☑ Reasoning (R)

☐ Technology (T)

☑ Visualization (V)

Specific Outcomes
N4 Demonstrate an understanding of ratio and rate.
N5 Solve problems that involve rates, ratios and proportional reasoning.

Challenge in Real Life

Life of a Bush Pilot

Doug is a bush pilot who flies needed medical supplies and personnel to remote areas in the Northwest Territories. You be the flight planner. Calculate the distances and times for Doug's next flight plan.

Materials
• map of Northwest Territories per pair or small group
• ruler
• compass

1. To the nearest tenth of a centimetre, use a ruler to measure and record the distances on the map of the Northwest Territories between
   a) Hay River and Tuktoyaktuk
   b) Tuktoyaktuk and Paulatuk
   c) Paulatuk and Hay River

2. Write and solve a proportion to calculate the actual flying distances between
   a) Hay River and Tuktoyaktuk
   b) Tuktoyaktuk and Paulatuk
   c) Paulatuk and Hay River

3. Doug needs to fly some emergency serum from Yellowknife to Inuvik. He needs to do this flight in 4.5 h. What average cruising speed will you recommend that he use in kilometres per hour? Justify your suggestion mathematically.

4. Doug is based in Sachs Harbour. His usual cruising speed is 220 km/h. You have some clients who want to take a 2-h flight from Sachs Harbour. List all of the communities they can visit within two hours of flying time. Justify your answer.

Challenge in Real Life • MHR   75

Planning Notes

You may wish to use the following steps to introduce and complete this challenge:

1. Read through Life of a Bush Pilot as a class. Encourage students to share what they know about what bush pilots do and where they work. Students may say that bush pilots fly people, cargo, and medical supplies to remote settings, or fly people to fishing or hunting sites inaccessible to cars or trucks. You may need to explain the term *flight plan*.

2. Have students calculate the distances and time for the pilot's flight plan using the map on **BLM 2–14 Map of the Northwest Territories**. Point out that 1 cm represents 180 km in distance. Begin by having students point out the locations on the map that the pilot plans to fly. Walk through with the students how to measure the distance on the map that 180 km covers (1 cm). They should use this information to answer #1 to #3.

3. For #4, students need to calculate the distance that the plane can travel in 2 h at a speed of 220 km/h. Have them use this information and a proportion to calculate the distance in cm on the map that the pilot can cover in 2 h. Students might draw a circle with the centre on Sachs Harbour. The radius of the circle is the length in centimetres that represents the distance the pilot can travel in all directions in 2 h. Students should list the communities within the circle.

4. Have students work individually on #1 to #4. Allow them to use a calculator.

5. Clarify that the task is to
   • measure and record the distances between several communities on a map of the Northwest Territories
   • develop and solve proportions that will determine the actual flying distances between several communities

- calculate average cruising speed for a flight from Yellowknife to Inuvik that will take 4.5 h
- list all the communities within a 2-h flight from Sachs Harbour

6. Review the **Master 1 Project Rubric** with students so that they will know what is expected.

Meeting Student Needs
- Consider allowing students to work with a partner.
- You may need to assist students with low math skills by providing the proportions needed for #2.

Gifted and Enrichment
- Challenge students to use a map of a different area of Canada and use the distances between several communities and the speed of a plane to determine the time needed to service a number of communities in the area.

This challenge can be used for either Assessment *for* Learning or Assessment *of* Learning.

Assessment	Supporting Learning
Assessment *for* Learning	
Life of a Bush Pilot Discuss the challenge as a class. Have students provide individual reports.	• Allow students to present their reports either in written form or orally.
Assessment *of* Learning	
Life of a Bush Pilot Introduce the challenge to the class. Have students provide individual reports.	• **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this challenge. Page 92 provides notes on how to use this rubric for the challenge. • To view student exemplars, go to www.mathlinks8.ca, access the online Teacher Centre, go to Assessment, and then follow the links.

The chart below shows the **Master 1 Project Rubric** for tasks such as the Challenge in Real Life and provides notes that specify how to identify the level of specific answers for this project.

Score/Level	Holistic Descriptor	Specific Question Notes
5 (Standard of Excellence)	❏ Applies/develops **thorough** strategies and mathematical processes making **significant** comparisons/connections that demonstrate a **comprehensive** understanding of how to develop a complete solution ❏ Procedures are **efficient and effective** and may contain a **minor mathematical error** that does not affect understanding ❏ Uses **significant** mathematical language to explain their understanding and provides **in-depth** support for their conclusion	• provides a complete and correct solution
4 (Above Acceptable)	❏ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding ❏ Procedures are **reasonable** and may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution ❏ Uses **appropriate** mathematical language to explain their understanding and provides **clear** support for their conclusion	• provides a complete and correct response to #2, #3, and #4 based on an incorrect #1 *or* • provides a correct and complete response with one calculation error *or* • provides a correct and complete response with weak justification
3 (Meets Acceptable)	❏ Applies/develops **relevant** strategies and mathematical processes making **some** comparisons/connections that demonstrate a **basic** understanding ❏ Procedures are **basic** and may contain a **major error or omission** ❏ Uses **common** language to explain their understanding and provides **minimal** support for their conclusion	• provides a correct and complete #1, #2, and #3 *or* • provides a correct and complete #1, #2, and #4 *or* • provides a correct #1 and #2, and a partial response to #3 and #4 *or* • provides answers only with no work shown for #1, #2, #3, and #4
2 (Below Acceptable)	❏ Applies/develops **some relevant** mathematical processes making **minimal** comparisons/connections that lead to a **partial solution** ❏ Procedures are **basic** and may contain **several major mathematical errors** ❏ Communication is **weak**	• provides a correct #1 and #2 with no proportions shown in #2 *or* • provides a correct and complete #2 for an incorrect #1 *or* • provides a correct and complete #3 or #4
1 (Beginning)	❏ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution ❏ Communication is **weak or absent**	• provides a correct #1 *or* • provides a correct #1 and an initial start to #2, #3, or #4

For student exemplars, go to www.mathlinks8.ca and follow the links.