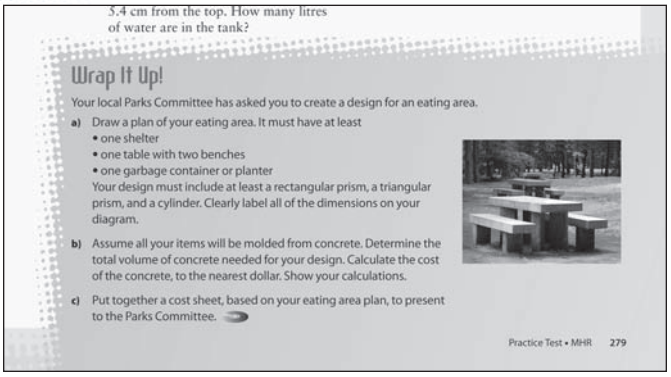
Wrap It Up!



5.4 cm from the top. How many litres of water are in the tank?

Wrap It Up!

Your local Parks Committee has asked you to create a design for an eating area.

a) Draw a plan of your eating area. It must have at least
- one shelter
- one table with two benches
- one garbage container or planter

Your design must include at least a rectangular prism, a triangular prism, and a cylinder. Clearly label all of the dimensions on your diagram.

b) Assume all your items will be molded from concrete. Determine the total volume of concrete needed for your design. Calculate the cost of the concrete, to the nearest dollar. Show your calculations.

c) Put together a cost sheet, based on your eating area plan, to present to the Parks Committee.

Practice Test • MHR 279

***MathLinks 8*, page 279**

Suggested Timing
80–100 minutes

Materials
- ruler
- calculator

Blackline Masters
Master 1 Project Rubric
BLM 7–1 Chapter 7 Math Link Introduction
BLM 7–6 Section 7.1 Math Link
BLM 7–8 Section 7.2 Math Link
BLM 7–10 Section 7.3 Math Link
BLM 7–12 Section 7.4 Math Link
BLM 7–14 Chapter 7 Wrap It Up!

Specific Outcomes
SS4 Develop and apply formulas for determining the volume of right prisms and right cylinders.

Planning Notes

Introduce the problem and clarify the assessment criteria.

Once all students have started their designs, consider having a gallery walk so students can see the partially completed designs of others. Consider having students provide constructive feedback before having them complete their designs.

Meeting Student Needs

- Scaffold the task for students who are overwhelmed. Consider having a partially completed task on hand that students can use as a starting place for their own design. Some students may benefit from creating a checklist of the requirements before starting their design.

Answers

Wrap It Up!

Answers will vary depending on the dimensions chosen for each item. Ensure that the dimensions are reasonable for each item.

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 determining volume of prisms and cylinders. It is important for students to label their diagrams clearly and show all of their work. **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this Wrap It Up! Page 377 in this TR provides notes on how to use this rubric for the Wrap It Up!	• You may wish to have students review the work they have completed in the Math Links in sections 7.1, 7.2, 7.3, and 7.4 before they begin. • If students have not completed the Math Links earlier, you may wish to provide them with **BLM 7–1 Chapter 7 Math Link Introduction**, **BLM 7–6 Section 7.1 Math Link**, **BLM 7–8 Section 7.2 Math Link**, **BLM 7–10 Section 7.3 Math Link**, and **BLM 7–12 Section 7.4 Math Link**. • You may wish to have students use **BLM 7–14 Chapter 7 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
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 to parts a) and b) *or* • provides a complete response to parts a) and c) based on an error in part b) *or* • provides a complete response with weak communication in part c) Note: A complete response to all parts based on answers only (showing no work) merits a 3.
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 correct volume calculations only for parts a) and b) *or* • provides a correct response to parts a) and b) with no justification, and a correct part c) based on an incorrect part a) *or* • provides a correct response to parts a) and b), with the cost calculation based on incorrect volume calculations (one volume must be correctly done)
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 correct volume calculations for two of the 3-D objects in part a) *or* • provides correct calculations for the cost of the concrete based on incorrect volume calculations
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 initial start to part a), with three 3-D objects that may not all be labelled or with fewer than three 3-D objects that are labelled *or* • provides a correct volume calculation based on an incorrectly labelled diagram

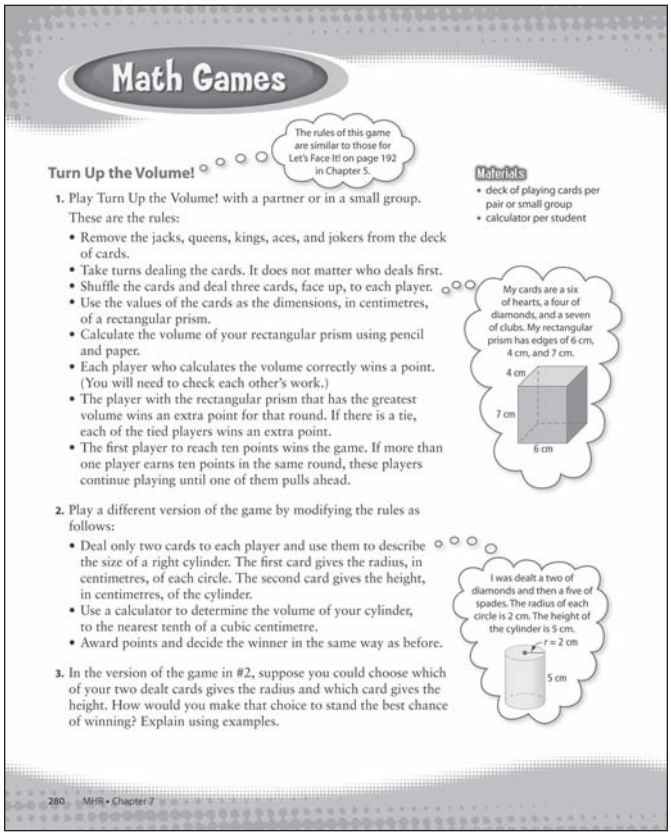
Math Games

***MathLinks 8*, page 280**

Suggested Timing
20–30 minutes

Materials
- deck of playing cards per pair or small group
- calculator

Specific Outcomes
SS4 Develop and apply formulas for determining the volume of right prisms and right cylinders.


Math Games

Turn Up the Volume!

The rules of this game are similar to those for Let's Face It! on page 192 in Chapter 5.

Materials
- deck of playing cards per pair or small group
- calculator per student

1. Play Turn Up the Volume! with a partner or in a small group.
These are the rules:
- Remove the jacks, queens, kings, aces, and jokers from the deck of cards.
- Take turns dealing the cards. It does not matter who deals first.
- Shuffle the cards and deal three cards, face up, to each player.
- Use the values of the cards as the dimensions, in centimetres, of a rectangular prism.
- Calculate the volume of your rectangular prism using pencil and paper.
- Each player who calculates the volume correctly wins a point. (You will need to check each other's work.)
- The player with the rectangular prism that has the greatest volume wins an extra point for that round. If there is a tie, each of the tied players wins an extra point.
- The first player to reach ten points wins the game. If more than one player earns ten points in the same round, these players continue playing until one of them pulls ahead.

My cards are a six of hearts, a four of diamonds, and a seven of clubs. My rectangular prism has edges of 6 cm, 4 cm, and 7 cm.

4 cm
7 cm
6 cm

2. Play a different version of the game by modifying the rules as follows:
- Deal only two cards to each player and use them to describe the size of a right cylinder. The first card gives the radius, in centimetres, of each circle. The second card gives the height, in centimetres, of the cylinder.
- Use a calculator to determine the volume of your cylinder, to the nearest tenth of a cubic centimetre.
- Award points and decide the winner in the same way as before.

I was dealt a two of diamonds and then a five of spades. The radius of each circle is 2 cm. The height of the cylinder is 5 cm.

r = 2 cm
5 cm

3. In the version of the game in #2, suppose you could choose which of your two dealt cards gives the radius and which card gives the height. How would you make that choice to stand the best chance of winning? Explain using examples.

280 MHR • Chapter 7

Planning Notes

In this game, students use values on playing cards to calculate volumes of rectangular prisms and cylinders. Have students play each version of the game with a partner or in a small group. If all students do not have a calculator, this game will take longer to play.

Consider having students play the version of Turn Up the Volume! in #2 again, but have them choose which dealt card gives the radius and which card gives the height.

Answers

Turn Up the Volume!

3. Given the choice, players will get a greater volume by using the higher value for the radius. This works because the radius is squared and then multiplied by 3.14 in order to give the area of the circular base. Cylinders with a larger circular base have a larger volume than cylinders of a similar height and a smaller base. Examples will vary but should support this.

Assessment	Supporting Learning
Assessment *for* Learning	
Turn Up the Volume! Have students play the game with a partner or in a small group.	• Remind students to calculate volume (and not surface area) to determine the winner.

Challenge in Real Life

***MathLinks 8*, page 281**

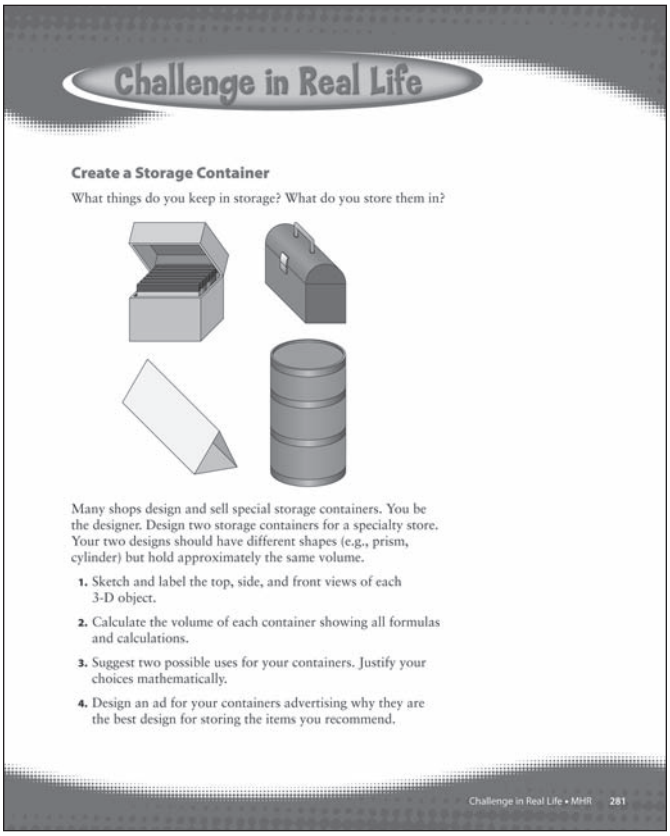
Suggested Timing
80–100 minutes

Materials
- sample storage boxes (optional)
- ruler

Blackline Masters
Master 1 Project Rubric
Master 7 Isometric Dot Paper
Master 8 Centimetre Grid Paper
Master 9 0.5 Centimetre Grid Paper

Mathematical Processes
- ☑ Communication (C)
- ☑ Connections (CN)
- ☐ Mental Mathematics and Estimation (ME)
- ☑ Problem Solving (PS)
- ☑ Reasoning (R)
- ☐ Technology (T)
- ☑ Visualization (V)

Specific Outcomes
SS4 Develop and apply formulas for determining the volume of right prisms and right cylinders.
SS5 Draw and interpret top, front and side views of 3-D objects composed of right rectangular prisms.


Challenge in Real Life

Create a Storage Container

What things do you keep in storage? What do you store them in?

Many shops design and sell special storage containers. You be the designer. Design two storage containers for a specialty store. Your two designs should have different shapes (e.g., prism, cylinder) but hold approximately the same volume.

1. Sketch and label the top, side, and front views of each 3-D object.
2. Calculate the volume of each container showing all formulas and calculations.
3. Suggest two possible uses for your containers. Justify your choices mathematically.
4. Design an ad for your containers advertising why they are the best design for storing the items you recommend.

Challenge in Real Life • MHR 281

Planning Notes

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

1. Read the introduction to Create a Storage Container as a class. Discuss what items students keep in storage and what they store them in.
2. As a class, brainstorm some different speciality stores and what they sell. Have students consider what types of special storage containers these stores might need for their merchandise.
3. Tell students that they need to design two storage containers for a specialty store. The two designs should have different shapes but hold about the same volume.
4. Clarify that the task is to
   - sketch and label the top, side, and front views of two storage containers
   - calculate the volume of each container showing all formulas and calculations
   - suggest two possible uses for the containers and justify the choices mathematically
   - design an ad promoting the containers and explaining why they are the best design for storing the items
5. Review the **Master 1 Project Rubric** with students so that they will know what is expected.

Meeting Student Needs

- Encourage students to design containers for items they own or would like to own.

ELL

- Ensure that English language learners understand the following terms: *storage*, *designer*, *specialty store*, *approximately*, *justify*, and *ad*. Have them add any new terms to their dictionary.

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

Assessment	Supporting Learning
Assessment *for* Learning	
Create a Storage Container Discuss the challenge as a class. Have students provide individual reports.	• Allow students to present their reports either in written form or orally. • For a second challenge, complete with teaching notes and student exemplars, go to www.mathlinks8.ca, access the online Teacher Centre, go to Assessment, and then follow the links.
Assessment *of* Learning	
Create a Storage Container 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 381 provides notes on how to use the 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 solution with missing calculations or justification in #2 or #3 *or* • provides a complete solution with one minor calculation error *or* • provides a complete solution but the designs are based on the same shape *or* the uses do not fit the shape of the containers *or* the ad fails to address why the containers are the best *or* • provides a complete and correct solution to #1, #2, and #3 *or* to #1, #2, and #4
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 complete sketches with labels for #1 and both volumes calculated correctly for #2 *or* • provides complete sketches with labels for #1 and both volumes calculated correctly for #2, with partial starts to #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 sketches with labels for two designs, with volume calculations for one container
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 only sketches with labels for two designs

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