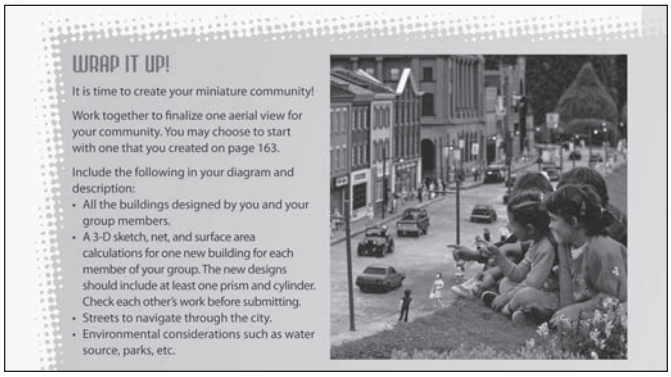
# Wrap It Up!




***MathLinks 8*, page 191**

**Suggested Timing**
80–100 minutes

**Materials**
- grid paper
- building materials (e.g., boxes, cans, glue, tape) (optional)
- ruler
- coloured pencils

**Blackline Masters**
Master 1 Project Rubric
Master 8 Centimetre Grid Paper
BLM 5–1 Math Link Introduction
BLM 5–7 Section 5.1 Math Link
BLM 5–10 Section 5.2 Math Link
BLM 5–12 Section 5.3 Math Link
BLM 5–15 Section 5.4 Math Link
BLM 5–17 Chapter 5 Wrap It Up!

**Specific Outcomes**
**SS2** Draw and construct nets for 3-D objects.
**SS3** Determine the surface area of:
- right rectangular prisms
- right triangular prisms
- right cylinders

to solve problems.
**SS5** Draw and interpret top, front and side views of 3-D objects composed of right rectangular prisms.

## Planning Notes

Throughout the Math Links in this chapter, students have been drawing buildings for a miniature community. You may wish to provide an opportunity for groups of students or for the class as a whole to build a model of a miniature community based on their aerial views.

### *Meeting Student Needs*

- Depending on time and the ability of your students, you may wish to have students work in groups or as a whole class to complete the task. If you choose to have them work as a class, be sure to decide on one aerial view for the class to use.

### *Common Errors*

- Students may create buildings of incongruent sizes, such as houses that are vastly larger than hospitals.

**$R_x$** Ensure students understand that residential houses should be close in height, whereas public institutions such as hospitals and community centres should be larger. Encourage students to check with each other while they are planning their construction efforts.

| Assessment | Supporting Learning |
|---|---|
| **Assessment *of* Learning** | |
| **Wrap It Up!**<br>This chapter problem wrap-up gives students an opportunity to apply and display their knowledge of views, nets, and the surface area of 3-D objects, including prisms and cylinders. It is important for students to be realistic and creative and to communicate with their classmates.<br>**Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this Wrap It Up! Page 248 in this TR provides notes on how to use this rubric for this Wrap It Up! | • It is important that students complete the Math Links in sections 5.1, 5.2, 5.3, and 5.4, as they will need to include their work on these Math Links as part of the chapter problem.<br>• If students have not completed the Math Links earlier, you may wish to provide them with **BLM 5–1 Math Link Introduction**, **BLM 5–7 Section 5.1 Math Link**, **BLM 5–10 Section 5.2 Math Link**, **BLM 5–12 Section 5.3 Math Link**, and **BLM 5–15 Section 5.4 Math Link**.<br>• You may wish to have students use **BLM 5–17 Chapter 5 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<br>❑ Procedures are **efficient and effective** and may contain a **minor mathematical error** that does not affect understanding<br>❑ Uses **significant** mathematical language to explain their understanding and provides **in-depth** support for their conclusion | • provides a complete and correct solution, which may contain a minor labelling omission that does not hinder the solution |
| **4 (Above Acceptable)** | ❑ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding<br>❑ Procedures are **reasonable** and may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution<br>❑ Uses **appropriate** mathematical language to explain their understanding and provides **clear** support for their conclusion | • provides a complete response but the miniature community lacks one of the requirements. For example, it may lack labelling, ignore a major environmental consideration (water, sewage, power, parks, roads), or does not represent an aerial view<br>*or*<br>• provides a response that addresses all the environmental considerations and includes an aerial view, but shows an error in one of the new buildings' requirements (net or 3-D sketch or surface area calculation) |
| **3 (Meets Acceptable)** | ❑ Applies/develops **relevant** strategies and mathematical processes making **some** comparisons/connections that demonstrate a **basic** understanding<br>❑ Procedures are **basic** and may contain a **major error or omission**<br>❑ Uses **common** language to explain their understanding and provides **minimal** support for their conclusion | • provides a significant start to the community design, which includes some correct nets and some incomplete calculations of surface area; the response does not go beyond basic understanding due to errors or omissions |
| **2 (Below Acceptable)** | ❑ Applies/develops **some relevant** mathematical processes making **minimal** comparisons/connections that lead to a **partial solution**<br>❑ Procedures are **basic** and may contain **several major mathematical errors**<br>❑ Communication is **weak** | • identifies minimal structures and attempts the designs with several errors; includes basic calculations that deal primarily with rectangular prisms; may or may not provide nets; 3-D diagrams have errors and lack labels |
| **1 (Beginning)** | ❑ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution<br>❑ Communication is **weak or absent** | • makes an initial design *or* lists the buildings for the community; provides some initial calculations but the work does not make any significant step in the solution of the problem |

# Math Games

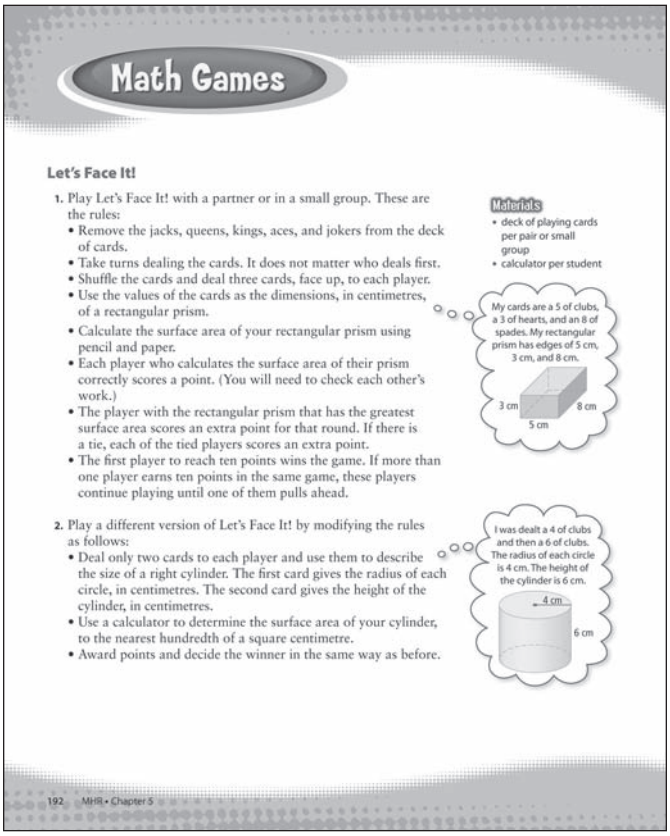
***MathLinks 8*, page 192**

**Suggested Timing**
20–40 minutes

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

**Specific Outcomes**
**SS3** Determine the surface area of:
- right rectangular prisms
- right triangular prisms
- right cylinders

to solve problems.


Math Games

Let's Face It!

1. Play Let's Face It! 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 surface area of your rectangular prism using pencil and paper.
- Each player who calculates the surface area of their prism correctly scores a point. (You will need to check each other's work.)
- The player with the rectangular prism that has the greatest surface area scores an extra point for that round. If there is a tie, each of the tied players scores an extra point.
- The first player to reach ten points wins the game. If more than one player earns ten points in the same game, these players continue playing until one of them pulls ahead.

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

My cards are a 5 of clubs, a 3 of hearts, and an 8 of spades. My rectangular prism has edges of 5 cm, 3 cm, and 8 cm.

3 cm, 8 cm, 5 cm

2. Play a different version of Let's Face It! 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 of each circle, in centimetres. The second card gives the height of the cylinder, in centimetres.
- Use a calculator to determine the surface area of your cylinder, to the nearest hundredth of a square centimetre.
- Award points and decide the winner in the same way as before.

I was dealt a 4 of clubs and then a 6 of clubs. The radius of each circle is 4 cm. The height of the cylinder is 6 cm.

4 cm, 6 cm

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## Planning Notes

Before students play the game, consider reading the directions as a class and then play a demonstration round. Have players calculate the surface area of their prism and classmates check the calculations. Discuss who has the greatest surface area and how to award the points.

### *Meeting Student Needs*

- Partner students with others of similar skill. Having evenly matched players will make the game more interesting.

### Gifted and Enrichment

- You may wish to have students mentally estimate the surface areas for the first game, then do the calculations for the second game.

### *Common Errors*

- Students may calculate volume, rather than surface area, to determine the winner.

**$R_x$** Have students check each other's work to ensure they are using the proper formula.

| Assessment | Supporting Learning |
|---|---|
| **Assessment *for* Learning** | |
| **Let's Face It!**<br>Have students play the game with a partner or small group (three or four students) of similar ability. | • Encourage students to write out the dimensions, showing their thinking.<br>• Listen to the discussion about calculation of surface area. Clarify any misunderstandings.<br>• After students have played the game in #1, have them play the game in #2.<br>• This game could be played at different times; with rectangular prisms after section 5.3, and with cylinders after section 5.4.<br>• After students have played the game once or twice, brainstorm whether it matters which card is assigned which dimension. Ask: If the three cards you received were assigned differently, would it change the surface area of the prism? Would the surface area of the cylinder change if you could decide which value was the radius and which was the height?<br>• You may wish to have students replay the game, asking them to decide which value to assign to radius and height. |

# Challenge in Real Life

***MathLinks 8*, page 193**

**Suggested Timing**
two classes of 40–50 minutes, with possible follow-up

**Materials**
- scissors
- magazine images of bedroom designs

**Blackline Masters**
Master 1 Project Rubric
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**
**SS2** Draw and construct nets for 3-D objects.
**SS3** Determine the surface area of:
- right rectangular prisms
- right triangular prisms
- right cylinders

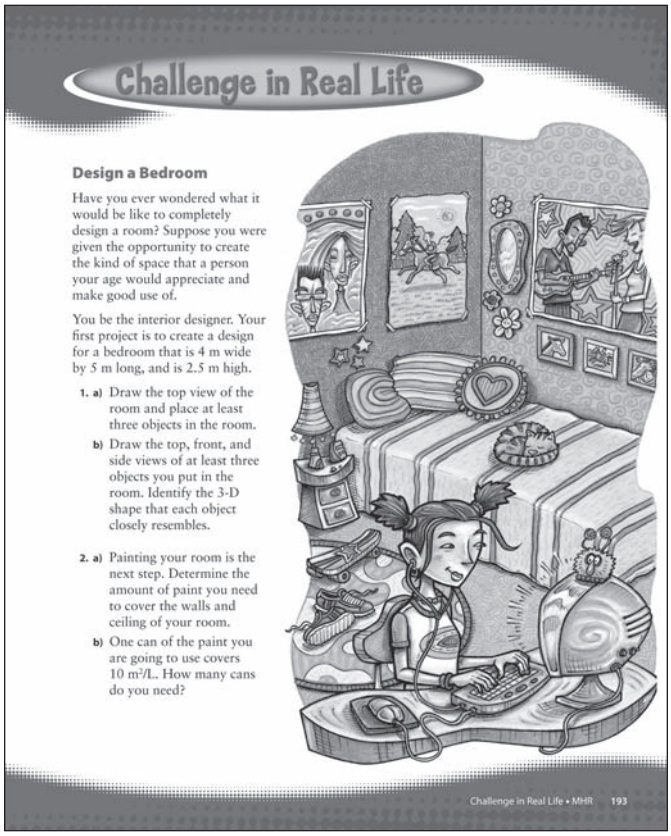
to solve problems
**SS5** Draw and interpret top, front and side views of 3-D objects composed of right rectangular prisms.

## Planning Notes

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

1. Introduce the challenge by asking students to envision their classroom as an empty space that could be used to create a student lounge. Ask them what sort of furniture would be needed to make a space where students could relax, eat lunch, do homework, or play indoor games. Then, ask students how thinking in 3-D might help them design a useful space. Ask when they might need to calculate surface area in order to redecorate a space.
2. Challenge students to imagine that they have a job designing an amazing bedroom for a student their age. Discuss the following questions:
   - What furniture might they include?
   - Where would they place each piece?
   - How might thinking in 3-D help them place the furniture?
   - How might a net be helpful in showing the design of an object?
   - When might they need to know the surface area of an item (e.g., for painting, re-covering furniture)?
3. Provide students with **Master 8 Centimetre Grid Paper** or **Master 9 0.5 Centimetre Grid Paper**, depending on how large or small the room is going to be.
4. Clarify that the task is to
   - create a design for a bedroom and draw the top view of the room
   - draw the top, front, and side views of at least three objects to be placed in the room
   - calculate how many litres of paint they would need to paint the walls and ceiling of the room

   Note: Scale is not part of the grade 8 curriculum. It is not necessary for students to do any of this activity to scale.
5. Review **Master 1 Project Rubric** with students so that they will know what is expected.


Challenge in Real Life

**Design a Bedroom**

Have you ever wondered what it would be like to completely design a room? Suppose you were given the opportunity to create the kind of space that a person your age would appreciate and make good use of.

You be the interior designer. Your first project is to create a design for a bedroom that is 4 m wide by 5 m long, and is 2.5 m high.

1. a) Draw the top view of the room and place at least three objects in the room.
   b) Draw the top, front, and side views of at least three objects you put in the room. Identify the 3-D shape that each object closely resembles.
2. a) Painting your room is the next step. Determine the amount of paint you need to cover the walls and ceiling of your room.
   b) One can of the paint you are going to use covers 10 m²/L. How many cans do you need?

Challenge in Real Life • MHR 193

### *Meeting Student Needs*

- You may wish to allow students to draw their own bedroom.
- Allow students to cut out pictures of furniture and experiment with where to place them before finalizing the design.

### Gifted and Enrichment

- Encourage students to create their own furniture, such as a combination bed and computer gaming structure.
- Challenge students by asking them to calculate the amount of material they would need to re-cover a stool in their redesigned bedroom.

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

| Assessment | Supporting Learning |
|---|---|
| **Assessment *for* Learning** | |
| **Design a Bedroom**<br>Discuss the challenge with the class. Have students brainstorm objects they would place in a bedroom for which they could draw the views. Discuss what is important to consider when drawing the views of objects. | • Help students recall different 3-D objects and how to draw views of 3-D objects.<br>• Remind students that they must draw at least three objects and show their placement in the room from a top view.<br>• Encourage students to be creative and use objects that are not rectangular prisms.<br>• Discuss what painting the walls in a room means, mathematically. You may also need to discuss what is being painted and how paint is purchased.<br>• Ask students to consider if they will use more than one colour of paint.<br>• 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** | |
| **Design a Bedroom**<br>Introduce the challenge to the class. Have students draw a sketch of the room and label the objects placed in the room. Have them share their design with a partner and get feedback. Then, have them complete the challenge independently. | • **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this challenge. Page 252 provides notes on how to use this rubric for this challenge.<br>• 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**<br>**(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<br>❑ Procedures are **efficient and effective** and may contain a **minor mathematical error** that does not affect understanding<br>❑ Uses **significant** mathematical language to explain their understanding and provides **in-depth** support for their conclusion | • provides a complete and correct solution |
| **4**<br>**(Above Acceptable)** | ❑ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding<br>❑ Procedures are **reasonable** and may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution<br>❑ Uses **appropriate** mathematical language to explain their understanding and provides **clear** support for their conclusion | • provides a complete response with a rounding error in #2b) (rounds the number of cans of paint down)<br>*or*<br>• provides a complete response with an error in #1a), correctly completes #1b), but communication is weak in #1c)<br>*or*<br>• provides a complete response with a correct #2b) or an incorrect #2a) (minor calculation error but the concept of surface area is understood) |
| **3**<br>**(Meets Acceptable)** | ❑ Applies/develops **relevant** strategies and mathematical processes making **some** comparisons/connections that demonstrate a **basic** understanding<br>❑ Procedures are **basic** and may contain a **major error or omission**<br>❑ Uses **common** language to explain their understanding and provides **minimal** support for their conclusion | • completes #1 and #2a)<br>*or*<br>• provides a partially correct start to all parts of the questions |
| **2**<br>**(Below Acceptable)** | ❑ Applies/develops **some relevant** mathematical processes making **minimal** comparisons/connections that lead to a **partial solution**<br>❑ Procedures are **basic** and may contain **several major mathematical errors**<br>❑ Communication is **weak** | • completes #1<br>*or*<br>• completes #2 |
| **1**<br>**(Beginning)** | ❑ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution<br>❑ Communication is **weak or absent** | • attempts to start one or both parts of questions<br>*or*<br>• completes #1a) |

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