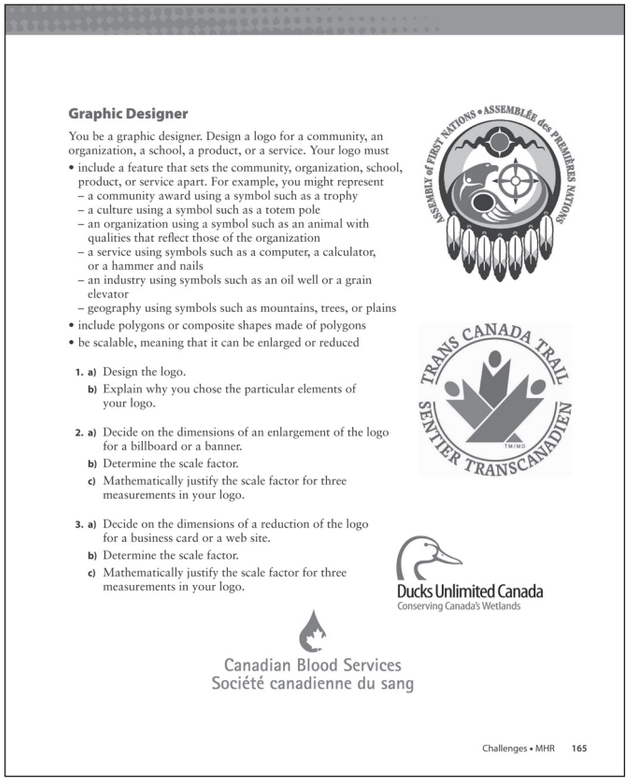

Graphic Designer

You be a graphic designer. Design a logo for a community, an organization, a school, a product, or a service. Your logo must

- include a feature that sets the community, organization, school, product, or service apart. For example, you might represent
  - a community award using a symbol such as a trophy
  - a culture using a symbol such as a totem pole
  - an organization using a symbol such as an animal with qualities that reflect those of the organization
  - a service using symbols such as a computer, a calculator, or a hammer and nails
  - an industry using symbols such as an oil well or a grain elevator
  - geography using symbols such as mountains, trees, or plains
- include polygons or composite shapes made of polygons
- be scalable, meaning that it can be enlarged or reduced

1. a) Design the logo.
   b) Explain why you chose the particular elements of your logo.
2. a) Decide on the dimensions of an enlargement of the logo for a billboard or a banner.
   b) Determine the scale factor.
   c) Mathematically justify the scale factor for three measurements in your logo.
3. a) Decide on the dimensions of a reduction of the logo for a business card or a web site.
   b) Determine the scale factor.
   c) Mathematically justify the scale factor for three measurements in your logo.

ASSEMBLY of FIRST NATIONS • ASSEMBLÉE des PREMIÈRES NATIONS

TRANS CANADA TRAIL
SENTIER TRANSCANADIEN

Ducks Unlimited Canada
Conserving Canada's Wetlands

Canadian Blood Services
Société canadienne du sang

Challenges • MHR 165

***MathLinks 9*, page 165**

Suggested Timing
40–50 minutes

Materials
- ruler
- grid paper
- coloured pencils or markers

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
SS3 Demonstrate an understanding of similarity of polygons.
SS4 Draw and interpret scale diagrams of 2-D shapes.

Planning Notes: Graphic Designer

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

1. In advance, ask students to bring examples of logos to class. (You may need to clarify what a logo is.) Suggest they find logos from items such as business cards, magazine or newspaper ads, letterheads, ads on the Internet, pictures of highway billboards, and pictures of banners. Have some samples on hand, in case students do not provide any.
2. As a class, have students share the logos they brought. Prompt students to discuss:
   - the purpose of a logo
   - possible reasons for the design of a particular logo
   - what makes a logo pleasing to the eye
   - what makes a logo memorable, including its placement

   You may wish to mention the following information when you discuss the logos in the student resource.

– Logo of the Assembly of First Nations: The visual provides information about the meaning of the various parts of this logo.

– Logo of the Trans Canada Trail: When completed, the Trans Canada Trail will be a 21 500-km recreational trail that goes through every province and territory. People use the Trail to walk, hike, cycle, horseback ride, ski, canoe, and snowmobile.
– Logo of Junior Greenwings: These are Ducks Unlimited members who are younger than 17. The members participate in the conservation, restoration, and management of wetlands and associated habitats for waterfowl.
– Beaver logo of Parks Canada: Parks Canada protects and presents Canada's national historic sites, national parks, and national marine conservation areas.
– Logo of Canadian Blood Services: This agency manages the blood and blood products supply for Canadians. The agency collects about 850 000 units of blood annually through its blood donor clinics.

3. Read and discuss the Challenge. Ask students to decide on a theme for their logo. Have them consider how to include geometric shapes or composite shapes containing polygons.

4. Discuss possible dimensions for the different places the logo will be displayed.
- The average size of a business card is 9 cm by 5 cm.
- The average size of a sheet of paper used for letter writing is 21.5 cm by 28 cm.
- The average size of a billboard (along a highway) is 15 m by 6 m.
- A banner might be 1 m by 3 m.

Discuss what part of each space a logo might take up.

5. Students may find it helpful to draw their logos on grid paper. This will make it easier to take the measurements needed to find the scale factor.

6. Clarify that the task is to
- select a theme for a logo
- design and draw a logo that includes polygons or composite shapes made of polygons
- explain the choice of elements in the logo design
- decide where the logo will be placed and the size of the new location (one enlargement, one reduction)
- take measurements
- determine the scale factor for the enlargement and reduction
- determine the actual dimensions of the enlargement and the reduction

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

Meeting Student Needs

- Allow students who are artistically challenged to find a logo in the public domain and scan it to a computer drawing program. They could then use the logo to complete the Challenge.
- Students may need prompting to determine the scale factor. Suggest that they take measurements to the nearest millimetre of the logo drawing. They can then set up proportions based on their measurements and the size of the enlargement or reduction.

Gifted and Enrichment

- Have students design and make a scale drawing of a set for a drama or a musical production.

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

Assessment	Supporting Learning
Assessment *for* Learning	
Graphic Designer Discuss the Challenge as a class. Have students provide individual responses.	• Consider allowing students to work with a partner and then write individual responses.
Assessment *of* Learning	
Graphic Designer Introduce the Challenge to the class. Have students provide individual responses.	• **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this Challenge. Page 228 provides notes on how to use this rubric for the Challenge. • To view student exemplars, go to www.mathlinks9.ca, access the Teacher Centre on the Online Learning Centre, go to Assessment, and then follow the links.

The chart below shows the **Master 1 Project Rubric** for tasks such as this Challenge, Graphic Designer, 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	Demonstrates one of the following: • provides a complete response to all parts of the problem, with a weak justification in one part • provides a complete and correct response to #2 and 3, based on an incorrect #1
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	Demonstrates one of the following: • correctly completes #1, 2a) and b), and 3a) and b) but provides justification for only one of #2 or 3 or the justification for both contains numerous errors • completes #1, 2a) and b), and 3a) and b), and provides answers only with no justification for #2c) and 3c)
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**	Demonstrates one of the following: • correctly completes #1 and 2; mathematical justification may contain some errors • correctly completes #1 and 3; mathematical justification may contain some errors
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**	Demonstrates one of the following: • provides a correct #1 • makes an initial start to #1 that does not meet the design requirements

For student exemplars, go to www.mathlinks9.ca and follow the links.