Task

***MathLinks 8*, page 327**

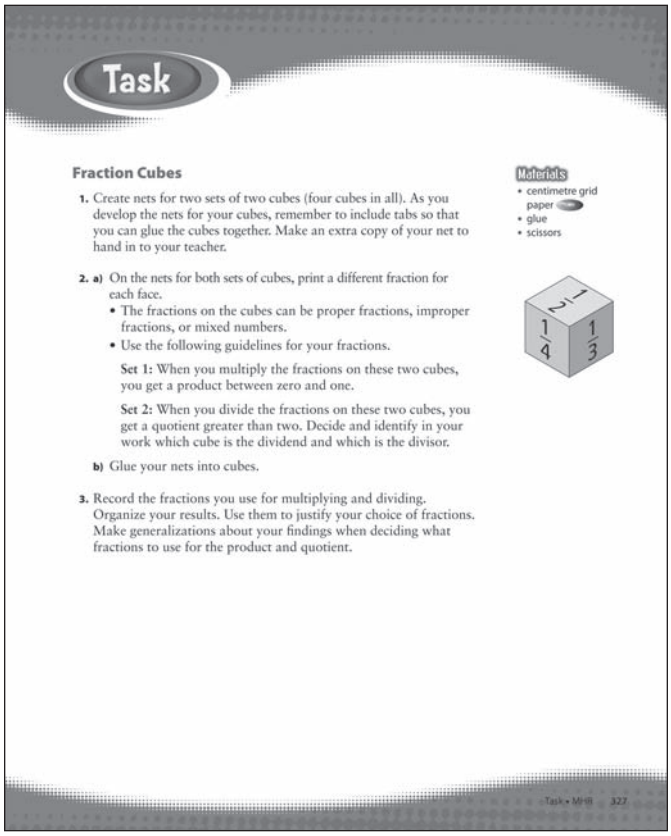
Suggested Timing
60–75 minutes

Materials
- glue
- scissors
- ruler

Blackline Masters
Master 1 Project Rubric
Master 8 Centimetre Grid Paper
BLM 8–14 Net for Cubes
BLM 8–15 Fraction Set Tables

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.
N6 Demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially and symbolically.


Task

Fraction Cubes

1. Create nets for two sets of two cubes (four cubes in all). As you develop the nets for your cubes, remember to include tabs so that you can glue the cubes together. Make an extra copy of your net to hand in to your teacher.

2. a) On the nets for both sets of cubes, print a different fraction for each face.
   - The fractions on the cubes can be proper fractions, improper fractions, or mixed numbers.
   - Use the following guidelines for your fractions.

   Set 1: When you multiply the fractions on these two cubes, you get a product between zero and one.

   Set 2: When you divide the fractions on these two cubes, you get a quotient greater than two. Decide and identify in your work which cube is the dividend and which is the divisor.

   b) Glue your nets into cubes.

3. Record the fractions you use for multiplying and dividing. Organize your results. Use them to justify your choice of fractions. Make generalizations about your findings when deciding what fractions to use for the product and quotient.

Materials
- centimetre grid paper
- glue
- scissors

Planning Notes

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

1. Discuss with students the characteristics of a cube (e.g., six sides identical, right angles). Ask how this is similar to dice.
2. Review the task with students and discuss the difference between the expectations of Set 1 and Set 2.
3. Remind students to write the fractions on the nets before gluing or taping the cubes together.
4. Encourage students to organize the fractions in a table that identifies what fractions they have used on each die of each set.
5. Clarify that the task is to
   - create nets for two sets of cubes
   - on the nets for both sets of cubes, print a different fraction on each face
   - glue the nets into cubes
   - record the fractions used for multiplying and dividing in a table
   - justify the choice of fractions
   - make generalizations about findings when deciding what fractions to use for the product and quotient
6. Review the **Master 1 Project Rubric** with students so that they will know what is expected.

Meeting Student Needs

- Students may benefit from using **BLM 8–14 Net for Cubes** and **BLM 8–15 Fraction Set Tables**.
- Some students might find it helpful to use $\frac{1}{2}$ and equivalent fractions to $\frac{1}{2}$ on the dividend cube. This provides a better starting point for students in finding quotients greater than 2.

Gifted and Enrichment

- Have students use the cubes from parts a) or b) to find a target range for the answers when multiplying or dividing the fractions.

Assessment	Supporting Learning
Assessment *of* Learning	
Fraction Cubes Introduce the task to the class. Have students work on #1 and #2 and share their answers with a partner. Then, have students complete #3 independently.	• **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this task. Page 446 provides notes on how to use this rubric for this task. • To view student exemplars, go to www.mathlinks8.ca, access the online Teacher Centre, go to Assessment, and then follow the links. • For a second task, 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.

The chart below shows the **Master 1 Project Rubric** for tasks such as this one 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 complete and correct responses
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 complete and correct responses to #1 to #3, with no generalization for products and quotients
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 and correct responses to #1, #2a), and #3 *or* • provides complete and correct responses to #1, #2b), and #3 *or* • provides responses to #1 to #3 with errors in calculations or in meeting the required parameters *or* • provides responses to #1 to #3 with a correct generalization but no work evident to justify the generalization
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 responses to #1 and #2a) *or* • provides correct responses to #1 and #2b)
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 correct response to #1

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