



Description

- Design a cereal box that meets certain specifications (a fixed volume).
- Apply volume and surface area formulas for rectangular prisms.
- Present designs to the class.

Materials

- cereal boxes
- isometric dot paper
- orthographic dot paper

Assessment Opportunities

Minds On ...

Whole Class → Discussion

Display several cereal boxes from the class collection. Tell the students that a cereal manufacturer has hired them to create a box for a new cereal.

Discuss the parameters of the project, Cereal Box Challenge (BLM 27.1). Note that the company has set forth certain restrictions concerning the volume and surface area of the box.

Explain that in pairs they are to determine the dimensions of a box that will meet the requirements on the challenge, but that the package design will be an individual activity.

Students may wish to discuss overlaps of box board to form the box.

See TIP 6 for suggestions on how to link this activity with other curriculum.

Action!

Individual → Performance Task

Curriculum Expectations & Learning Skills/Performance Task/Checklist & Rubric: Assess students' work using a rubric.

Students use dot paper to investigate possible dimensions that meet the manufacturer's criteria. They should find at least two possible solutions before they select the dimensions that they will use for their box.



Consolidate Debrief

Whole Class → Student Presentations

Curriculum Expectations/Observation/Checklist: Some pairs sketch their box on the board and explain the process they used to determine the dimensions of their box.

What is the same with the various processes used? How do they differ?



*Application
Concept Practice*

Home Activity or Further Classroom Consolidation

In your math journal, explain the steps used to determine appropriate dimensions for the cereal box. Include nets and a 3-D sketch of the box.

27.1: Cereal Box Challenge

Cereal Box Challenge

You work for an advertising company that has been asked to submit a proposal for the design of a box for a new breakfast cereal. Through its research, the manufacturer of the cereal has determined the optimum volume of the cereal box and a range of surface areas to minimize the packaging costs.

Your job is to:

- design and construct a box to meet the following criteria:
 - * volume of $12\,000\text{ cm}^3$
 - * surface area of the box between 3200 cm^2 and 4000 cm^2
 - * the box has a stable base and pleasing proportions
- design packaging with shelf appeal, including:
 - * a unique name for a cereal that would appeal to 10 – 18 year-olds
 - * placement of consumer information
 - * appropriate graphics
 - * colour scheme

Submit the following for assessment:

- the sketches you used to determine the dimensions of your proposed cereal box
- all calculations used to determine the dimensions and surface area
- rough copies of your package designs
- the final mock-up of your cereal box (actual size)

27.2: Assessment Tool Cereal Box Design

Did the student meet basic criteria for design?

Volume is 12 000 cm ³	Yes	No
Surface Area is between 3200 cm ² and 4000 cm ²	Yes	No
Design is stable	Yes	No

Mathematical Process (Category)	Criteria	Below Level 1	Level 1	Level 2	Level 3	Level 4
Reasoning and Proving (Problem Solving) volume/surface area	Evidence of self-monitoring (revisions to dimensions)	- no evidence	- limited evidence	- some evidence	- evidence	- evidence of attention to fine detail
Communicating (Communication) design concepts	Clarity (explanations and presentations)	- unclearly	- with limited clarity	- with some clarity	- clearly	- precisely
	Use of conventions (accurately, effectively, fluently)	- demonstrates an undeveloped use of conventions	- demonstrates minimal skill in the use of conventions	- demonstrates moderate skill in the use of conventions	- demonstrates considerable skill in the use of conventions	- demonstrates a high degree of skill in the use of conventions

Learning Skills	Needs Improvement	Satisfactory	Good	Excellent
Independent Work				
• follows routines and instructions without supervision				
• persists with tasks				
Initiative				
• responds to challenges				
• demonstrates positive attitude towards learning				
• develops original ideas and innovative procedures				
• seeks assistance when necessary				
Use of Information				
• organizes information logically and creatively and manages it effectively				
• asks questions to clarify meaning and ensure understanding				