

Volume, Surface Area and Capacity

Overall Expectations

Students will:

- Estimate, measure, and record quantities, using the metric measurement system (6m29)
- Determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism (6m30)
- Use variables in simple algebraic expressions and equations to describe relationships (6m56)

Specific Expectations

Students will:

- Estimate, measure, and record length, area, mass, capacity, and volume, using the metric measurement system (6m32)
- Solve problems requiring conversion from larger to smaller metric units (6m34)
- Determine, through investigation using a variety of tools and strategies, the relationship between the height, the area of the base, and the volume of a triangular prism, and generalize to develop the formula (i.e., Volume = area of base x height) (6m40)
- Determine, through investigation using a variety of tools and strategies, the surface area of rectangular and triangular prisms (6m41)
- Solve problems involving the estimation and calculation of the surface area and volume of triangular and rectangular prisms (6m42)
- Demonstrate an understanding of different ways in which variables are used (6m63)
- Identify, through investigation, the quantities in an equation that vary and those that remain constant (6m64)
- Solve problems that use two or three symbols or letters as variables to represent different unknown quantities (6m65)
- Determine the solution to a simple equation with one variable, through investigation using a variety of tools and strategies (6m66)

| Lesson | Learning Focus | Specific Expectations |
|------------------------------------|---|-----------------------|
| Surface Area of Rectangular Prisms | <ul style="list-style-type: none"> • Through investigation, using a variety of tools and strategies, find the surface area of rectangular prisms <ul style="list-style-type: none"> o nets o concrete materials o dynamic geometry software o Polydrons | 6m32 6m41 |
| Surface Area of Triangular Prisms | <ul style="list-style-type: none"> • Through investigation, using a variety of tools and strategies, find the surface area of triangular prisms <ul style="list-style-type: none"> o nets o concrete materials o dynamic geometry software o Polydrons | 6m32 6m41 |

Volume, Surface Area and Capacity (Continued)

| Lesson | Learning Focus | Specific Expectations |
|--|--|--------------------------------------|
| Surface Area Practice | <ul style="list-style-type: none"> • Solve problems that involve the estimation and calculation of the surface area of rectangular and triangular prisms using a variety of tools and strategies • Solve problems requiring conversion from larger to smaller units <ul style="list-style-type: none"> o side length conversions to the same unit | 6m32 6m34 6m42 |
| Volume of Triangular Prisms | <ul style="list-style-type: none"> • Through investigation, using a variety of tools and strategies, determine the relationship between the height, area of the base and the volume of a triangular prism and generalize to develop the formula <ul style="list-style-type: none"> o decomposing rectangular prisms into triangular prisms o stacking congruent triangular layers of concrete materials to form a triangular prism • Solve problems involving the estimation and calculation of the volume of triangular prisms | 6m32 6m40 6m42 6m63 6m64 |
| Volume and Capacity Practice | <ul style="list-style-type: none"> • Use the formula generated to solve problems about volume of rectangular and triangular prisms • Estimate measure and record volume and capacity using the metric measurement system • Solve problems requiring conversion from larger to smaller units <ul style="list-style-type: none"> o side length conversions to the same unit | 6m32 6m34 6m42 6m65 6m66 |
| Surface Area versus Volume versus Capacity Problem Solving | <ul style="list-style-type: none"> • Solve real-life contextual problems that require determining whether surface area volume or capacity is needed • Estimate to check for reasonableness | 6m32 6m42 |
| Consolidation and Summative Tasks | | |

Surface Area of Rectangular Prisms

Specific Expectations: 6m32, 6m41

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|---|--|--|
| | | Teacher Guide Unit 2 Activity 3: Surface Area OERB ID: ELO1474960 | Guide to Effective Instruction: Measurement Grades 4 – 6 <ul style="list-style-type: none"> • pp 35 – 37 • pp 109 – 119: Grade 6 Learning Activity: Packaging the Chocolongo Bar |
| Minds On | <ul style="list-style-type: none"> • Review area formula of rectangles | Unit 2 Activity 3: Minds On OERB ID: ELO1474930 <ul style="list-style-type: none"> • Think Tank | |
| Action | <ul style="list-style-type: none"> • Through investigation, using a variety of tools and strategies, find the surface area of rectangular prisms <ul style="list-style-type: none"> o nets o concrete materials o dynamic geometry software o Polydrons | Unit 2 Activity 3: Action <ul style="list-style-type: none"> • Surface Area <ul style="list-style-type: none"> o information video on how to decompose a net and find surface area • Surface Area of Prisms <ul style="list-style-type: none"> o practice finding the surface area of different rectangular prisms | |
| Consolidation | | | |

Surface Area of Triangular Prisms

Specific Expectations: 6m32, 6m41

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|--|---|-----------------|
| | | Teacher Guide Unit 2 Activity 3: Surface Area OERB ID: ELO1474960 | |
| Minds On | <ul style="list-style-type: none"> • Review area formula of triangles | Unit 2 Activity 3: Minds On OERB ID: ELO1474930 <ul style="list-style-type: none"> • Discussion <ul style="list-style-type: none"> o how to decompose shapes into familiar shapes Unit 2 Activity 3: Action <ul style="list-style-type: none"> • Explore and Play with Prisms <ul style="list-style-type: none"> o animation tool to explore the faces and nets of various prisms | |
| Action | <ul style="list-style-type: none"> • Through investigation, using a variety of tools and strategies, find the surface area of triangular prisms <ul style="list-style-type: none"> o nets o concrete materials o dynamic geometry software o Polydrons | Unit 2 Activity 3: Action <ul style="list-style-type: none"> • Assignment 2: Finding the Surface Area of a Triangular Prism <p><i>Note: supplementation required for using concrete materials to find the surface area of triangular prisms</i></p> | |
| Consolidation | | | |

Surface Area Practice

Specific Expectations: 6m32, 6m34, 6m42

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|--|--|--|
| | | Teacher Guide Unit 2 Activity 3: Surface Area OERB ID: ELO1474960 | Guide to Effective Instruction: Measurement Grades 4 – 6 <ul style="list-style-type: none"> • pp 35 – 37 • pp 109 – 119: Grade 6 Learning Activity: Packaging the Chocolongo Bar |
| Minds On | <ul style="list-style-type: none"> • Use a net of a prism to find the surface area | | |
| Action | <ul style="list-style-type: none"> • Solve problems that involve the estimation and calculation of the surface area of rectangular and triangular prisms, using a variety of tools and strategies • Solve problems requiring conversion from larger to smaller units <ul style="list-style-type: none"> o side length conversions to the same unit | Unit 2 Activity 3: Action OERB ID: ELO1474930 <ul style="list-style-type: none"> • Assignment 1: Surface Area of Rectangular Prisms <p><i>Note: supplementation required for solving problems involving estimation of the surface area of rectangular and triangular prisms and metric unit conversion</i></p> | |
| Consolidation | | | |

Volume of Triangular Prisms

Specific Expectations: 6m32, 6m40, 6m42, 6m63, 6m64

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|--|------------------|-----------------|
| Minds On | <ul style="list-style-type: none"> Review and practise estimation and calculation of the volume of rectangular prisms | | |
| Action | <ul style="list-style-type: none"> Through investigation, using a variety of tools and strategies, determine the relationship between the height, area of the base and the volume of a triangular prism and generalize to develop the formula <ul style="list-style-type: none"> decomposing rectangular prisms into triangular prisms stacking congruent triangular layers of concrete materials to form a triangular prism Solve problems involving the estimation and calculation of the volume of triangular prisms | | |
| Consolidation | | | |

Volume and Capacity Practice

Specific Expectations: 6m32, 6m34, 6m42, 6m65, 6m66

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|---|------------------|-----------------|
| Minds On | <ul style="list-style-type: none"> Review formulas for finding the volume of a rectangular prism and the volume of a triangular prism | | |
| Action | <ul style="list-style-type: none"> Use the formula generated to solve problems involving volume of rectangular and triangular prisms Estimate measure and record volume using the metric measurement system Solve problems requiring conversion from larger to smaller units <ul style="list-style-type: none"> side length conversions to the same unit | | |
| Consolidation | | | |

Surface Area versus Volume versus Capacity Problem Solving

Specific Expectations: 6m32, 6m42

| | Learning Focus | Blended Learning | Other Resources |
|----------------------|---|---|---|
| | | Teacher Guide Unit 2 Activity 3: Surface Area OERB ID: ELO1474960 | Guide to Effective Instruction: Measurement Grades 4 – 6 <ul style="list-style-type: none"> • pp 35 – 37 • pp 109 – 119: Grade 6 Learning Activity: Packaging the Chocolong Bar |
| Minds On | <ul style="list-style-type: none"> • For given scenarios determine whether surface area, volume or capacity should be calculated • Review how to determine volume, surface area and capacity of rectangular and triangular prisms | Unit 2 Activity 3: Action OERB ID: ELO1474930 <ul style="list-style-type: none"> • Exploring Surface Area, Volume and Nets - Explore It <p><i>Note: supplementation required for identifying whether surface area or volume is needed</i></p> | |
| Action | <ul style="list-style-type: none"> • Solve real-life contextual problems that require determining whether surface area, volume or capacity is needed • Estimate to check for reasonableness | | |
| Consolidation | | Unit 2 Activity 3: Consolidation <ul style="list-style-type: none"> • Discussion <ul style="list-style-type: none"> o compare surface areas of rectangular and triangular prisms | |

Consolidation & Summative Tasks

Specific Expectations: 6m32, 6m34, 6m40, 6m41, 6m42, 6m63, 6m64, 6m65, 6m66

| Blended Learning | Other Resources |
|------------------|-----------------|
| | |

Surface Area of Rectangular Prisms

| Resource | URL |
|---|---|
| Teacher Guide: Unit 2 Activity 3: Surface Area | https://download.elearningontario.ca/repository/14/1474960000/Combined%20Teacher%20Notes%20for%20Activities%201%20-%203/content_3.html |
| Unit 2 Activity 3: Minds On | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/content.html |
| Surface Area | http://www.learnalberta.ca/content/mesg/html/math6web/index.html?page=lessons&lesson=m6lessonshell14.swf |
| Surface Area of Prisms | http://www.glencoe.com/sites/common_assets/mathematics/im1/concepts_in_motion/interactive_labs/M3_09/M3_09_dev_100.html |
| Guide to Effective Instruction: Measurement Grades 4 – 6 | http://oame.on.ca/eduproject/ontariomathedresources/files/Measurement%204-6.pdf |

Surface Area of Triangular Prisms

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| Teacher Guide: Unit 2 Activity 3: Surface Area | https://download.elearningontario.ca/repository/14/1474960000/Combined%20Teacher%20Notes%20for%20Activities%201%20-%203/content_3.html |
| Unit 2 Activity 3: Minds On | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/content.html |
| Unit 2 Activity 3: Action | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/content_3.html |
| Explore and Play with Prisms | http://www.learner.org/interactives/geometry/3d_prisms.html |
| Assignment 2: Finding the Surface Area of a Triangular Prism | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/assignment.html |

Surface Area Practice

| Resource | URL |
|---|---|
| Teacher Guide: Unit 2 Activity 3: Surface Area | https://download.elearningontario.ca/repository/14/1474960000/Combined%20Teacher%20Notes%20for%20Activities%201%20-%203/content_3.html |
| Assignment 1: Surface Area of Rectangular Prisms | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/assignment.html |
| Guide to Effective Instruction: Measurement Grades 4 – 6 | http://oame.on.ca/eduproject/ontariomathedresources/files/Measurement%204-6.pdf |

Surface Area versus Volume versus Capacity Problem Solving

| Resource | URL |
|---|---|
| Teacher Guide: Unit 2 Activity 3: Surface Area | https://download.elearningontario.ca/repository/14/1474960000/Combined%20Teacher%20Notes%20for%20Activities%201%20-%203/content_3.html |
| Unit 2 Activity 3: Action Exploring Surface Area | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/content_3.html |
| Exploring Surface Area, Volume and Nets - Explore It | http://www.learner.org/interactives/geometry/3d_prisms.html |
| Unit 2 Activity 3: Consolidation | https://download.elearningontario.ca/repository/14/1474940000/GRD6MTHEU02/GRD-6MTHEU02A03/content_4.html |
| Guide to Effective Instruction: Measurement Grades 4 – 6 | http://oame.on.ca/eduproject/ontariomathedresources/files/Measurement%204-6.pdf |