

| What All Students Should Know | What All Students Should Be Able To Do | Sample Learning Activities | | | | | | | | | | | | | | | | | | |
|--|--|---|------------------|-------------------------|----------------------|--------------|--------|---|----------------|-----|---|---------------|-----|---|------------|------|---|---------------|-----|---|
| <p><i>By the end of grade 8, all students should know</i></p> <ol style="list-style-type: none"> The language of mathematics may be used through reading, writing, listening, and speaking. How to represent mathematical ideas with visual models. Mathematical symbols may be used to represent a variety of situations. That information may be organized in a variety of ways. | <p>NOTE: Each item in this column is designed to address several elements of “what all students should be able to do.”</p> <p><i>By the end of grade 8, all students should be able to</i></p> <ol style="list-style-type: none"> model situations using oral, written, concrete, pictorial, graphical, technological, and algebraic methods (NCTM Standard 2; MO 1.8, 2.1) reflect on and model mathematical ideas and mathematical situations common to the classroom and the workplace (NCTM Standard 2; MO 2.6, 4.8) reflect on and clarify their own thinking about mathematical ideas and situations (NCTM Standard 2; MO 2.2) develop common understanding of mathematical ideas, including the role of definitions (NCTM Standard 2; MO 2.2, 2.3) draw mathematical ideas and conclusions from reading, listening, and viewing (NCTM Standard 2; MO 3.5, 4.1) discuss mathematical ideas, make conjectures, and present convincing rationales (NCTM Standard 2; MO 2.4) connect mathematical notation and its role in the development and structure of mathematical ideas (NCTM Standard 2; MO 1.6, 1.9, 2.4) | <p>NOTE: Each activity is designed to address several items from ‘what all students should know’ and “what all students should be able to do.” The activities may also relate to strands other than communication.</p> <ul style="list-style-type: none"> Make a diagram to represent the following situation: There are 30 students in an algebra class. Eleven of these students are in band and 15 play basketball. Five students are in both band and basketball. Write a narrative to explain your diagram. Design a spinner in two colors, blue and green. Make the spinner in such a way that it is twice as likely to land on blue as on green. Explain your rationale for the way you designed your spinner. Given a dart board with the point values of only 4 and 7, and an unlimited number of darts, find the largest impossible score. Describe in writing why the given solution must be the largest impossible score. Use the information below to construct a mathematical problem and write a narrative of how to solve your problem. <table> <tr> <th><u>Ice cream</u></th><th><u>Cost per serving</u></th><th><u>Flavor rating</u></th></tr> <tr> <td>Cherry Berry</td><td>\$1.25</td><td>7</td></tr> <tr> <td>Chocolate Rave</td><td>.89</td><td>4</td></tr> <tr> <td>White Sparkle</td><td>.95</td><td>3</td></tr> <tr> <td>Candy Cane</td><td>1.09</td><td>3</td></tr> <tr> <td>Fruit ‘n’ Fun</td><td>.85</td><td>7</td></tr> </table> | <u>Ice cream</u> | <u>Cost per serving</u> | <u>Flavor rating</u> | Cherry Berry | \$1.25 | 7 | Chocolate Rave | .89 | 4 | White Sparkle | .95 | 3 | Candy Cane | 1.09 | 3 | Fruit ‘n’ Fun | .85 | 7 |
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| MATHEMATICS | | | | | | | | | | | | | | | | | | | | |

| What All Students Should Know | What All Students Should Be Able To Do | Sample Learning Activities |
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| <p><i>By the end of grade 12, all students should know</i></p> <ol style="list-style-type: none"> 1. The language of mathematics may be used through reading, writing, listening, and speaking. 2. Mathematical ideas may be represented with visual models. 3. Mathematical symbols may be used to represent a variety of situations. 4. Information may be organized in a variety of ways. | <p>NOTE: Each item in this column is designed to address several elements of “what all students should be able to do.”</p> <p><i>By the end of grade 12, all students should be able to</i></p> <ol style="list-style-type: none"> a. reflect upon and clarify thinking about mathematical ideas and relationships (NCTM Standard 2; MO 1.6, 2.2) b. interpret generalizations discovered through investigations to formulate, revise, and adjust mathematical definitions (NCTM Standard 2; MO 1.2, 1.7, 2.2) c. visualize mathematical ideas by reading about, listening to, or viewing concrete models (NCTM Standard 2; MO 1.9, 2.4) d. plan and create effective verbal and non-verbal forms of communicating mathematics for a variety of purposes and audiences (NCTM Standard 2; MO 2.1) e. present mathematical ideas and logical justifications, both written and oral (NCTM Standard 2; MO 2.1, 3.5, 4.1) f. ask clarifying and extending questions about the mathematics read about, heard about, or viewed through models (NCTM Standard 2; MO 2.3) | <p>NOTE: Each activity is designed to address several items from “what all students should know” and “what all students should be able to do.” The activities may also relate to strands other than communication.</p> <ul style="list-style-type: none"> • Read a piece of literature such as <i>Gulliver’s Travels</i> or <i>Through the Looking Glass</i> looking for relationships in mathematics. Discuss how mathematics is used in the literature. Write an essay or short story describing situations, visual images and objects in terms from mathematics using both numerical relationships and geometric relationships. • Design a three-dimensional scale model to illustrate a given structure such as a shopping mall, an amusement park, or a sports arena. • Design an acceptable popcorn container to hold the greatest amount of popcorn and use the least possible amount of materials. • Contact a business such as a financial institution, construction company, local industry, or chamber of commerce to collect information so you can prepare charts and graphs representing information collected for a presentation or to convince a customer to buy your product. • Using number sets such as natural, whole integer, rational, irrational, and real numbers, design some diagram, model or video to describe the relationships of the sets. |

II. Communication

What All Students Should Know

What All Students Should Be Able To Do

Sample Learning Activities

- g. recognize the economy, power, and elegance of mathematics notation and its role in the development of mathematical ideas (NCTM Standard 2; MO 1.6, 1.9, 2.4)
- h. read, write, and talk about mathematical ideas as they relate to real-life applications and multiple workplace situations (NCTM Standard 2; MO 1.10, 2.6, 3.2, 4.8)

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Sample Learning Activities