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| About this Lesson |
| In this lesson, students compare the benefits and costs of spending decisions by working in teams to build the tallest tower on the lowest budget. |

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| **Grade Level** | **Course(s)/subject(s)** | **Learning Goal(s)** | **Suggested**  **Timing** |
| 5 & 6 | Mathematics  Science | At the end of this lesson, students will:   * compare benefits and costs of spending decisions * define budget and its importance make simple financial decisions | 40–50 minutes |

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| Curriculum Links |
| Mathematics, grades 1–8 (2005) Mathematics  Number sense and numeration   * Solve problems involving the multiplication and division of [multi-digit] whole numbers, and involving the addition and subtraction of decimal numbers using a variety of strategies.   Science and Technology, grades 1–8 (2007)  Understanding Structures and Mechanisms – Forces Acting on Structures and Mechanisms (Gr. 5)   1. Investigate forces that act on structures and mechanisms. 2. Identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms. |

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| Inquiry Questions |
| How can groups work co-operatively together to build a tall tower, while conserving resources? |

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| Materials List |
| * 400 straws * 100 paper clips * Rolls of masking tape * Scissors – one per group of five (to cut straws and tape) * Camera (for photo of towers) * Blueprint Sheet (Appendix A) * Tower Building Budget Sheet (Appendix B) |

| **Timing**  (Mins.) | **Lesson Sequence** | **Assessment for and as Learning Opportunities** (self/peer/teacher) |
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| MINDS ON | | |
| 5–10 minutes | WHOLE CLASS  Enquire if anyone in the class has made a purchase in the last few days and elicit responses about what kind of products were purchased.  Ask if any of the students who did make a purchase took the time to write down or record their purchases in order to keep a record of their spending.  Explain that people who are good with money often take extra care to track and monitor how their money is spent. At this point, introduce the concept of a budget and describe its features. Model a simple Budget Worksheet (Appendix B) and explain how this tool can help individuals control their spending.  Next, introduce the lesson’s key activity by sharing with students that today they will be comparing the benefits and costs of spending decisions by building a tower on a budget. | Assessment FOR Learning |
|  | Context for Learning   * basic knowledge of structures should be in place * measurement and design skills |  |

| **Timing**  (Mins.) | | **Lesson Sequence** | | **Assessment for and as Learning Opportunities** (self/peer/teacher) |
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| ACTION | | | | |
| 30 minutes | WHOLE CLASS  Activity: Building a tower  Form groups of five and set up the activity by stating the following:  “Imagine that this classroom is a building materials store. Working in your group, you will be given a builders’ account balance of $1,000. The goal of the activity is to build a free-standing tower with paper clips, masking tape and straws – but there is a catch. The winning team will build the HIGHEST free-standing tower on the LOWEST budget.” | |  | |
|  | Instruct students to use any knowledge they have about structures and shapes to come up with a plan. Explain that the first step involves making a blueprint of their design on a template (Appendix A).  Next, they will need to make decisions about what materials they want to purchase from the store (which should be located at the teacher desk or another central location). | | Assessment FOR Learning (Peer) | |
|  | Introduce the Budget Worksheet (Appendix B) and explain that each group will be required to track their spending using this handout. Remind students that this sheet will be collected at the end of class and emphasize that everyone in the group should either participate in filling out the sections and/or checking the final totals.  Make it clear that students will have approximately 20 minutes to plan and build the tower.  Cost of items for the tower build  Hold up each item and explain to students that all of these items will be “for sale” at the teacher’s desk during the activity. (Price List – Appendix C)  Straw: $50 Paper Clip: $10 5-cm Masking Tape: $5 Scissors: $100 (one-time investment)  Remind students that the use of scissors requires a one-time investment of $100. **Note:** Straws may only be cut with use of scissors. | | Assessment AS Learning (Peer) | |

| **Timing**  (Mins.) | | **Lesson Sequence** | | **Assessment for and as Learning Opportunities** (self/peer/teacher) |
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| ACTION (cont’d.) | | | | |
|  | Rules for the tower-building challenge  Go over the following rules with the class:   * All group members must participate in planning and building the tower and each must help make calculations on the budget sheet. * Use only the materials provided. * If you waste materials, you must pay for them. * Explain that when the timer sounds at the end of the activity, work stops, and the towers will be measured for height and stability. * The tower must be free-standing; that means that it cannot lean on anything and should stand in the middle of the work area (desk or table). * Those with the lowest budget will be rewarded at the end of the activity.   SMALL GROUPS  Before starting the activity, assign the following roles to group members:   * Timekeeper – Watches the clock; lets group members know how much time is left. * Mediator – Keeps the group on track and helps make final decisions about what to buy. * Materials Manager – Counts materials, measures and cuts tape. * Record Keeper – Tracks materials used and “money” spent (Note that everyone must audit the sheet before handing it in). * Spokesperson – Shares results with the class.   Assign stop time (approximately 20 minutes) and periodically notify students about the time remaining throughout. | |  | |

| **Timing**  (Mins.) | | **Lesson Sequence** | | **Assessment for and as Learning Opportunities** (self/peer/teacher) |
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| CONSOLIDATION/DEBRIEF | | | | |
| 10–15 minutes | Measure the tallest free-standing towers; have students calculate the total cost of their resources used and, based on height, subtract the bonus:   * Highest – subtract $100 from the total amount spent * Second highest – subtract $50 from the total amount spent * Third highest – subtract $30 from the total amount spent * Fourth highest – subtract $20 from the total amount spent * Fifth highest – subtract $10 from the total amount spent   Determine a winner or share budgets and congratulate everyone on their effort. Take photos of each tower. | |  | |
|  | WHOLE CLASS  Have students reflect on the activity by conducting a class discussion using the questions below:   1. Describe the process you used to make decisions about what and how to spend money. 2. When building the tower, what were the risks and benefits you needed to consider when making your spending decisions? 3. In what way(s) did the budget worksheet help you to control spending? 4. Sometimes it is necessary to spend more money for quality materials. Did you experience anything during this exercise that illustrates this? | | Assessment AS Learning (Teacher Observation) | |

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| Tower Building Blueprint |
| Group names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Use the space below to sketch out the blueprint of your tower: |

**APPENDIX A**

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| Budget Sheet |
| Group names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Instruction: Fill in information for all the shaded boxes.   |  |  |  |  | | --- | --- | --- | --- | | INCOME |  |  | Amount | | Bank Account |  |  | $1,000 | |  |  | Total Income | $ | | EXPENSES | Number of pieces purchased | Price for each item | Total | | Straws |  | $50 | $ | | Paper clips |  | $10 | $ | | 5 cm of masking tape |  | $5 | $ | | Use of scissors |  | $100 | $ | |  |  | **Total expenses** | $ | |  |  | **Money remaining** | $ | |  |  | **Deduction for height (# provided by teacher)** | $ | |  |  | **Final total** | **$** |   ✔Budget Checkup   |  |  |  | | --- | --- | --- | | What was your starting budget? | $ | | | How much did you spend? | $ | | | Did you stay within your budget? | YES | NO | |

**APPENDIX B**

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| Price List |
| |  |  | | --- | --- | | **Straw\*** | $50 | | **Paper Clip** | $10 | | **5-cm Masking Tape** | $5 | | **Scissors  (one-time investment)** | $100 |   **\*Note:** Straws may only be cut with use of scissors. |

**APPENDIX C**