# Unit 1: Celebrating 7

## Lesson Outline

### Big Picture

English language learners will:
- start their own personal vocabulary lists;
- begin to work productively in flexible student groupings.

<table>
<thead>
<tr>
<th>Day</th>
<th>Lesson Title</th>
<th>Language Goals*</th>
<th>Expectations</th>
</tr>
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</table>
| 1   | Celebrating 7         | • Rely on the home language and culture to think, communicate, and process new experiences (Stage 1).  
• Begin to work with a partner on a common academic task (Stage 1).  
• Participate in social and academic discussions, using short phrases and short sentences (Stage 2).  
• Write appropriate responses (using short sentences, phrases or graphic organizers) to written questions based on familiar academic content (Stage 2). | 7m12, 7m16, CGE 3c, 4a, 4e |
| 2   | Tangram Tune-Up       | • Follow simple directions with support from visual cues (Stage 1).  
• Give straightforward directions and instructions (Stage 2). | 7m39, 7m47, 7m48, 7m53, CGE 2c, 4f |
| 3   | Summer Survival       | • Begin to apply some reading strategies (Stage 1).  
• Organize information around a central idea, using graphic organizers, e.g., graphs (Stage 2). | 7m47, 7m64, 7m81, CGE 2c, 5a |

*English Language Learner Language Goals*

*The Ontario Curriculum Grades 1–8, English As a Second Language and English Literacy Development (A Resource Guide) 2001*

Stage 1 – Using English for Survival Purposes
Stage 2 – Using English in Supported and Familiar Activities and Contexts
Math Learning Goals
• Investigate patterns.

Materials
• BLM 1.1.1, 1.1.2
• coloured markers

Assessment Opportunities

Minds On ...

Whole Class ➔ Discussion
To set the stage for the development of positive attitudes toward mathematics, briefly identify how the class learning community will operate by reviewing key succinct messages for posters.
Students suggest why the rules or procedures are necessary.

Whole Class ➔ Brainstorm
Ask: Where do we find 7 in our world?
Accept all answers and have students explain their response.

Action!

Pairs ➔ Investigation
Pairs of students use a calculator and BLM 1.1.1 to discover patterns involving the number 7.
Pose the question: Could there be more than six digits in the length of the period of these decimals? Explain.
Students create other 7-related patterns or statements, using a calculator.
Clarify the term perfect square, linking it to measurement activities from previous years.
Students complete BLM 1.1.2 and record the solutions on overheads using different colours. Overlay the overheads so they can see the overall patterns

Selecting Tools and Computational Strategies/Observation/Checklist:
Observe students, watching their calculator use and patterning skills.

Consolidate Debrief

Whole Class ➔ Student Presentations
Students report on their findings from BLM 1.1.1 and 1.1.2.
Encourage communicating using oral or written presentations that include precise language, diagrams, and charts.

Home Activity or Further Classroom Consolidation
Summarize your activities using sentence stems, e.g., I learned…, I discovered…, I remembered…, Our class will be great if we all…, I wonder why….
Unit 1: Day 1: Celebrating 7

Terminology
identify
fractions
decimals
pattern
perfect square
prime numbers
product
sum

Language Goals
• Rely on first language and culture to think, communicate, and process new experiences (Stage 1).
• Begin to work with a partner on a common academic task (Stage 1).
• Participate in group discussions using phrases and short sentences (Stage 2).
• Write appropriate responses (using short sentences, phrases, or graphic organizers) to written questions based on familiar academic content (Stage 2).

Materials

Assessment Opportunities

Minds On… Whole Class → Discussion
Include small-group interaction before proceeding to whole-class discussion, e.g., groups of 3 in which the English language learner can listen to the conversation of two peers. English language learners record key vocabulary in their personal vocabulary lists.

Whole Class → Brainstorm
Print “Where do we find 7 in our world?” on the board and provide an example.

Action! Pairs → Investigation
Chunk tasks into smaller components and provide assistance in helping them to understand the academic language.
Print and point to key terms each time as you are speaking.
Check for prior experiences with calculators.
If possible, pair English language learners with a peer who speaks their first language so they can discuss their understanding of the concepts as they work.

Consolidate Debrief
Whole Class → Student Presentations
Encourage English language learners to participate in sharing their solution by modelling, by using a visual format, or by communicating with single words and phrases.

Explore with increased language focus

Home Activity or Further Classroom Consolidation

Math Learning Goals

- Sort and classify triangles and quadrilaterals.
- Identify perpendicular bisectors.
- Create 2-D composite shapes.
- Compare similar shapes and congruent shapes.

Materials

- square paper
- BLM 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.2.7
- tangram set

Assessment Opportunities

Minds On ... Whole Class — Reflection

Ask several students to share their math journal entries from Day 1.

Action! Whole Class — Model Making

Using a transparency of BLM 1.2.1, model how to make tangram pieces.
1. After making the first cut, ask: What shapes have been made?
2. After the second cut, ask: How are these triangles the same as the larger triangle?
3. Point out the fold between the midpoints of the shorter sides of the remaining large triangle. Ask: What kind of shapes, lines, and angles do you see?
4. Show the perpendicular bisector (lines of symmetry) of the trapezoid. Ask: How are these smaller trapezoids different from the larger one?
5. Indicate steps 5 and 6 on BLM 1.2.1, asking about the shapes as they are cut out and labelled.

Students make their own tangram pieces, using plain square paper.
Scaffold: Provide a tangram ready to be cut out and ask students to describe the pieces as they are cut out (BLM 1.2.2).

Small Groups — Discussion

Students complete selected activities from BLM 1.2.3 and 1.2.4 and describe the shapes, using precise vocabulary.
Show solutions on an overhead (BLM 1.2.5).

Pairs — Game

Partner A creates a figure using the tangram pieces, and then provides instructions so that Partner B can recreate the figure with another tangram set. Partner B may not ask questions for clarification, but may only respond to Partner A’s directions.
Students compare the two figures and assess the quality of Partner A’s instructions. The partners exchange roles and work together on BLM 1.2.6.

Communicating/Observation/Mental Note: Focus on communicating fluent, accurate, and effective use of mathematics vocabulary.

Consolidate Debrief

Whole Class — Note Making

List the mathematics terminology and represent the meaning of each term, using words and diagrams.

Home Activity or Further Classroom Consolidation

Challenge someone at home or in class with tangram puzzles (BLM 1.2.7). Ask if he/she knows any paper-folding techniques. Practise the activities to show the class the next day.
### Unit 1: Day 2: Tangram Tune-up

#### Terminology
- isosceles triangle
- parallelogram
- right-angled triangle
- square
- tangram

#### Language Goals
- Follow simple directions with support from visual cues (Stage 1)
- Give straightforward directions and instructions (Stage 2)

#### Materials

#### Assessment Opportunities
- **Make It Language Rich**
  - Post a chart that includes the geometric shape and its name. Point to the shape as you provide instructions for the activity.

- **Assess with Sensitivity**
  - Use students' worksheets to assess their use of Mathematics vocabulary.

- **Make Sure They Are Ready**
  - Provide practice with academic language.

#### Minds On...
**Whole Class → Reflection**
Post the sentence stems. As English-speaking students share their journal entries, have them point to the appropriate sentence stems.

#### Action!
**Whole Class → Model Making**
Provide oral prompts as students describe pieces they cut out, e.g., Is this a triangle or a parallelogram?

Point to the words and shapes as you ask the question.

Model giving simple directions. Peers model following simple directions.

**Small Group → Discussion**
When students work on BLM 1.2.3 and 1.2.4, pair English language learners with a peer who speaks their first language, if possible, so they can discuss their understanding of the concepts as they work.

**Pairs → Game**
Pair English language learners with peers who speak the same first language, if possible. Alternatively, English language learners assume the role of Partner B only.

#### Consolidate Debrief
**Whole Class → Note Making**
Students add to their personal Math word lists.

#### Exploration
**Home Activity or Further Classroom Consolidation**
Math Learning Goals
- Collect data by conducting a survey.
- Select an appropriate type of graph to represent a set of data.
- Identify bias.

Materials
- graph paper
- graphing software

Assessment Opportunities

Minds On ...

Whole Class → Review
Ask several students to report on their tangram activities. Recall kinds of graphs and their different purposes, e.g., circle graph shows parts of a whole, line graph shows change, bar graph shows relationship between separate items. Review important parts of a graph such as titles, labels, and scales.

Discuss how one event might prompt several questions for which different graphs might be appropriate, e.g., going to the beach.
- What type of graph would we use to show the number of students likely to be at the beach at different times during a day? (pictograph or line graph)
- What type of graph would we use to show the portion of time spent at the beach swimming, playing volleyball, and/or sunbathing? (circle graph)
- What type of graph would we use to show attendance at favourite local beaches? (bar graph)

Action!

Small Groups → Brainstorm
Brainstorm seven topics that relate to summer activities. Discuss the importance of avoiding bias, asking clear questions, and having a fair sample in a survey.

Each group prepares survey questions for one of the topics, and shares its questions. The class critiques them for suitability as part of a survey.

Pairs → Data Gathering → Graphing
Each pair selects and writes one survey question on a piece of paper with their names at the top. In a chain from student to student, allowing seven seconds, circulate the questions for the class to respond to. A student at the end of the chain walks the paper to the other end of the chain. Stop the rotation of questions once enough data has been collected. Return papers to the pairs who posed the questions. Each pair chooses an appropriate graph type to display the data.

Learning Skills (Teamwork)/Observation/Rating Scale: Assess cooperation and class participation.

Consolidate Debrief

Whole Class → Sharing
Pairs show their graph and explain why they chose that type of graph. Ask:
- Were the results as predicted?
- How would rewording the question change the graph?
- Was there any bias in the questioning or in the display? Explain.

Home Activity or Further Classroom Consolidation
Present the data from your survey question in an alternative form, e.g., different scale, using technology.

Look for several types of graphs in print media and make a display.
**Unit 1: Day 3: Summer Survival**

**Terminology**
- bar graph
- line graph
- circle graph/pie chart
- scatter plot
- pictograph
- data survey
- graph title
- graph labels
- graph scale

**Language Goals**
- Begin to apply some reading strategies (Stage 1).
- Organize information around a central idea using graphic organizers, e.g., graphs (Stage 2).

**Materials**
- 

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**Minds On...**

**Whole Class ➔ Review**

Encourage English language learners to share with the help of first language buddies, or with pictures or diagrams.

As an alternative grouping, have English language learners share orally in a small group or with a partner.

**Action!**

**Individual ➔ Guided Instruction**

Work with English language learners to create their survey questions.

Create a chart as you demonstrate the parts of the question. Under each column, include relevant words and phrases, saying them out loud and pointing to them.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>When</td>
<td>How many times</td>
<td>did you</td>
<td>travel</td>
</tr>
<tr>
<td>With whom</td>
<td>Where</td>
<td>visit friends</td>
<td>this summer?</td>
</tr>
</tbody>
</table>

Illustrate how to form a question by selecting a word or phrase from each column:

<table>
<thead>
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</tr>
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</table>

English language learners form three questions of their own using the chart. They use these questions for the survey.

**Consolidate Debrief**

**Whole Class ➔ Sharing**

English language learners share their graph, using simple sentences and pointing to the relevant information.

**Concept Practice**

With more time to process language

**Home Activity or Further Classroom Consolidation**

English language learners label their graphs using their first language and English. English language learners could look in print media from their cultures to find examples of graphs.
# Unit 3: Collect, Organize, and Analyse Data

**Lesson Outline**

## Big Picture

English language learners will:
- continue with their own personal vocabulary lists;
- work productively in flexible student groupings;
- communicate in day-to-day classroom interactions;
- use graphic organizers.

## Day | Lesson Title | Language Goals* | Expectations |
|------|--------------|----------------|-------------|
| 1 | What’s the Story? | • Use short patterned questions to seek information (Stage 1).  
• Respond to oral questions and information in standard Canadian English in school settings (Stage 1).  
• Organize information around a central idea, using graphic organizers (Stage 2).  
• Participate in social and academic discussion, using short phrases and short sentences (Stage 2). | 7m27, 7m74, 7m76, 7m77  
CGE 2b, 2c, 3c, 5a, 5b, 5e |
| 2 | Designing and Conducting a Valid Survey | • Begin to use acceptable notebook formats appropriate to subject areas, using titles, dates, charts, and graphs (Stage 1).  
• Begin to adapt to a variety of teaching approaches and strategies used in a Canadian classroom (Stage 1).  
• Identify main ideas and key information in text (Stage 2).  
• Organize information around a central idea, using graphic organizers (Stage 2).  
• Participate in controlled, directed group work (Stage 2). | 7m73, 7m74, 7m77  
CGE 2b, 2c, 3c, 5b, 5e |
| 3 | Organizing, Displaying, and Presenting Data | • Respond to short, simple questions (Stage 1).  
• Share personal information and experiences (Stage 1).  
• Respond to vocabulary, questions, and instructions in a familiar context (Stage 2).  
• Participate in social and academic discussions, using short phrases and short sentences (Stage 2). | 7m74, 7m75, 7m77, 7m78  
CGE 2c, 4b, 5a, 5b, 5e |

*English Language Learner Language Goals*

*The Ontario Curriculum Grades 1–8, English As a Second Language and English Literacy Development (A Resource Guide) 2001*

- Stage 1 – Using English for Survival Purposes
- Stage 2 – Using English in Supported and Familiar Activities and Contexts
Math Learning Goals
• Make inferences and arguments based on the analysis of data.
• Distinguish between primary and secondary data.
• Distinguish between a census and a sample.
• Identify bias in data collection methods.

Minds On… Whole Class → Brainstorm
Create a mind map with “data management” in the middle, and “sports” and “music” in two corners. Elicit answers that lead to creating some connections among these three ideas, e.g., What data could we collect from the Internet about music? (secondary data) or by surveying our class? (primary data)

Connecting/Oral Questioning/Observation/Mental Note: Assess students’ ability to connect the use of data to situations in their world.

Action! Groups of 4 → Investigation
Students examine and analyse the data and answer the questions (BLM 3.1.1). Ask specific questions from the chart to relate the data to the headings.
Groups answer the questions on BLM 3.1.1.
Note: Use this activity as a beginning for a discussion that graphs, data, and statistics are a math tool for organizing and analysing large amounts of information, i.e., data helps to tell a story.

Whole Class → Discussion
Discuss the discrepancy between the number of men vs. women who lost their lives.
To demonstrate a census vs. a sample, survey the class, by a show of hands, posing the question: Is the “women and children first” rule fair? Generalize from the data obtained that $x\%$ of the class thinks it is fair, and then survey the girls only. Introduce the term bias in data collection.

Consolidate Debrief Whole Class → Discussion
Revisit the terms introduced during Minds On… and Action! Students give evidence of when they were used during the lesson.

Home Activity or Further Classroom Consolidation
Find current statistics in a newspaper, a magazine, on television, or on the Internet to answer the following question about the data: What story might the data tell?
## Terminology
- survey
- primary/secondary data
- census
- sample
- bias
- inference
- tally chart

## Language Goals
- Use short patterned questions to seek information (Stage 1).
- Respond to oral questions and information in standard Canadian English in school settings (Stage 1).
- Organize information around a central idea using graphic organizers (Stage 2).
- Participate in social and academic discussions using short phrases and short sentences (Stage 2).

## Assessment Opportunities
- Additional vocabulary may be necessary (e.g., economic status, gender, statistics).
- Make Sure They're Ready
  - Circulate to assist English language learners with both the language and the math concepts.
- Make It Language Rich
  - Post the key words on the Word Wall for reference. Encourage use of bilingual dictionaries.
- Make It Comprehensible
  - Check often for comprehension, review instructions, and ask questions.
- Assess with Sensitivity
  - Observe growth of English language learners in their ability to share during brainstorming and discussions.

## Minds On...
### Whole Class → Brainstorm
Teach and review terminology, as needed. Say the word as you add it to the mind map.
Encourage English language learners to contribute to the mind map, using examples from their culture.
Post the mind map as reference during the investigation.

## Action!
### Groups of 4 → Investigation
Group students so that English language learners are with an English-speaking peer who also speaks their language.
Using pictures if possible, share the story and history of the Titanic to set the context for BLM 3.1.1.
Explore vocabulary specific to the story, e.g., maiden voyage, luxury liner, steerage.
Discuss the columns in the table, using an overhead version. Highlight key words during the discussion.

## Consolidate Debrief
### Whole Class → Discussion
Students point to the posted mind map during the discussion.

## Home Activity or Further Classroom Consolidation
Encourage English language learners to find articles with statistics in their own language or highlighting their own culture so that they can be shared with the class the next day.
Math Learning Goals
- Identify bias in data collection.
- Collect primary data by conducting a survey.
- Organize primary data into a tally chart.

Minds On…

Small Groups ➔ Discussion
Students share stories from the Home Activity, Day 1.

Whole Class ➔ Survey
Survey the class by a show of hands the number of minutes that should be required for homework time: Should homework in Grade 7 be limited to 15 minutes per day? Record the responses on a yes-no tally chart.

Ask: Is this a “fair” or biased sample?

Action!

Whole Class ➔ Discussion
Lead a discussion of the criteria required to conduct a valid survey by asking student volunteers to read the five scenarios on an overhead of BLM 3.2.1. Pause after each scenario to consider bias, sample size, phrasing of the question, and method of data collection.

Student volunteers read aloud the descriptions of the four rides on an overhead of BLM 3.2.2. By a show of hands, students select their favourite ride. Record results on a tally chart.

Discussion Questions
- How reliable are these results for the decision being made?
- What are some other ways data could be collected?

Small Groups ➔ Investigation
Students investigate reasons why they might want to collect data, e.g., music at a dance, fundraising, school uniforms. They share some of their suggestions with the class.

Small groups decide on a topic for which they would like to collect data and design a survey.

Students consider:
- How will the information collected be used?
- How and why is this important?
- What collection methods will be used?
- What is an appropriate sample size?
- Are questions appropriately phrased?

Students conduct their survey by passing the survey questions between groups.

Consolidate

Debrief

Whole Class ➔ Discussion
Lead a discussion to identify possible uses of the data collected in their surveys, making the point that surveys should inform a decision of some type.

Reflecting/Application/Rating Scale: Individually student write a reflection about the kinds of decisions that could be made based on their survey data.

Home Activity or Further Classroom Consolidation
Write a journal response:
We live in the Information Age. An informed citizen needs to be able to collect, organize, display, interpret information, and identify bias. How can our study of data management help you become an informed decision maker?
**Unit 3: Day 2: Designing and Conducting a Valid Survey**

**Language Goals**
- Begin to use acceptable notebook formats appropriate to subject areas, using titles, dates, charts, and graphs (Stage 1).
- Begin to adapt to a variety of teaching approaches and strategies used in a Canadian classroom (Stage 1).
- Identify main ideas and key information in text (Stage 2).
- Organize information around a central idea using graphic organizers (Stage 2).
- Participate in controlled, directed group work (Stage 2).

**Materials**

**Assessment Opportunities**

**Minds On… Small Groups → Discussion**
English language learners can post their statistics articles from first language sources, so that classmates can see stories with data and graphs in a language other than English.

**Whole Class → Survey**
Express the survey question in simple language and post it on the overhead or board as a visual reference during the discussion.

**Action! Whole Class → Discussion**
Provide a print copy of the description of the four rides along with a visual so that English language learners can use their bilingual dictionaries and personal math vocabulary lists to record notes in their first language. Ask English-speaking students to restate responses in their own words so that each idea is shared more than once.

**Small Groups → Investigation**
If possible, pair English language learners with other students whose first language is the same.

**Consolidate Debrief**

**Whole Class → Discussion**
Reflecting/Application/Rating Scale: Provide sentence stems to help English language learners to complete the written reflection. Some examples are:
- I found out that…
- I now know that…
- I would use this data to…

**Home Activity or Further Classroom Consolidation**
Alternate journal responses for English language learners:
List three places you see data in everyday life. How does this data help you make decisions?
Math Learning Goals
• Interpret, display, graph and draw conclusions from primary data.

Minds On…
Pair/Share \rightarrow Discussion
Students share and discuss their journal entries from the previous day.

Whole Class \rightarrow Brainstorm
Brainstorm on how students’ primary data collected on tally charts from their group surveys could be displayed (Day 2). On chart paper record possible types of displays, e.g., relative frequency table, stem-and-leaf, bar graph, line graph. Briefly review key features of each.

Action!
Whole Class \rightarrow Demonstration
Lead a discussion on the most appropriate type of graph for the tally chart of Canada’s Wonderland data from Day 2. Demonstrate how to produce a relative frequency table and an appropriate type of graph (stem-and-leaf and/or bar graph).

Small Groups \rightarrow Practice Graphing
Each group creates a presentation to communicate the results of their survey conducted on Day 2 (see BLM 3.3.1). Emphasize the importance of group cooperation, time management, and delegation of tasks among all group members.

Communicating/Presentation/Checkbrick: Assess students’ ability to display data graphically, to explain the purpose and results of their survey.

Consolidate Debrief
Small Groups \rightarrow Presentation
Each small group presents its results to the class. Students use the criteria on BLM 3.3.1 as a checklist for observing the presentations of others.

After each presentation, peers comment on criteria met and provide suggestions for improvement.

Model positive review comments, e.g., Your survey may have been more accurate if you had worded your survey question in the following way....

Home Activity or Further Classroom Consolidation
Complete worksheet 3.3.2 to reflect on your participation within your group.

Learning Skills (Teamwork)/Reflection/Anecdotal Notes: Assess students’ self-reflection.
## Unit 3: Day 3: Organizing, Displaying, and Presenting Data

### Language Goals
- Respond to short, simple questions (Stage 1).
- Share personal information and experiences (Stage 1).
- Respond to vocabulary, questions, and instructions in a familiar context (Stage 2).
- Participate in social and academic discussions using short phrases and short sentences (Stage 2).

### Materials

### Assessment Opportunities

#### Minds On... Pair/Share → Discussion
English language learners can share their journal entries orally, visually, and using gestures.

#### Whole Class → Brainstorm
Add visual examples of types of displays to the charts. Post the charts as a reference. Leave them posted during the Action!

#### Action! Whole Class → Demonstration
Review the Canada’s Wonderland survey from Day 2. Refer to the visuals to reinforce the categories of the survey.

#### Consolidate Debrief Small Groups → Presentation
English language learners highlight key words on the criteria list. Assist the group in assigning tasks so that English language learners can participate in the task.

### Home Activity or Further Classroom Consolidation

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**Terminology**
- relative frequency
- table
- stem-and-leaf plot

**Language Goals**

**Materials**

**Assessment Opportunities**

**Make It Language Rich**
Provide lots of visual aids to assist with the language required in this lesson.

**Make It Comprehensible**
Leave the Canada’s Wonderland display posted during the practice graphing work for visual reference.

**Make It Explicit**
Have students repeat instructions and refer to the criteria list so that students are clear on the task.

**Engage the Senses**
English language learners could participate in the presentation using mime.
**Unit 7: Fractions and Decimals**

**Lesson Outline**

**Big Picture**

English language learners will:
- use manipulatives to develop and demonstrate concept understanding;
- continue with their own personal vocabulary lists;
- follow instructions;
- participate in classroom activities.

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<th>Lesson Title</th>
<th>Language Goals*</th>
<th>Expectations</th>
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</table>
| 1   | Fraction Puzzles                    | • Follow simple directions with support from visual cues (Stage 1).<br>• Follow brief written instructions (Stage 1).<br>• Begin to work with a partner on a common academic task (Stage 1).<br>• Understand key vocabulary and concepts related to specific subjects and themes (Stage 2).<br>• Identify main ideas and key information in text (Stage 2). | 7m11, 7m15  
|     |                                     |                                                                               | CGE 3c, 5a, 5e  |
| 2   | Adding Fractions                    | • Recognize frequently used classroom vocabulary (Stage 1).<br>• Follow simple directions with support from visual cues (Stage 1).<br>• Work with a partner on a shared academic task (Stage 1).<br>• Ask for assistance and communicate needs (Stage 2).<br>• Understand key vocabulary and concepts related to specific subjects or themes (Stage 2).<br>• Participate with increasing comfort and confidence in classroom activities (Stage 2). | 7m11  
|     |                                     |                                                                               | CGE 3b, 3c, 5a |
| 3   | Adding Fractions with Different Denominators | • Follow brief written instructions (Stage 1).<br>• Begin to understand teacher expectations and follow classroom routines (Stage 1).<br>• Copy board notes and text accurately (Stage 1).<br>• Identify main ideas and key information in text (Stage 2).<br>• Begin to accept responsibility for own learning by recognizing consequences and managing own time (Stage 2).<br>• Begin to make notes, with assistance (Stage 2). | 7m11, 7m12  
|     |                                     |                                                                               | CGE 4b, 5e  |

*English Language Learner Language Goals*

*The Ontario Curriculum Grades 1–8, English As a Second Language and English Literacy Development (A Resource Guide) 2001*

Stage 1 – Using English for Survival Purposes
Stage 2 – Using English in Supported and Familiar Activities and Contexts
Unit 7: Day 1: Fraction Puzzles (TIPS4RM)

Math Learning Goals
- Explore/review fractional parts of geometric shapes.
- Order fractions.

Materials
- pattern blocks
- overhead pattern blocks
- BLM 7.1.1, 7.1.2, 7.1.3, 7.1.4
- 2 or 3 large imperial socket wrench sets in cases

Assessment Opportunities
See Continuum and Connections Fractions in LMS library.
Virtual pattern blocks are available at: http://arcytech.org/java/patterns/patterns_j.shtml
Briefly review the meaning of parallelogram (blue or beige block) and trapezoid (red block).
Some methods students may use include physical size of each socket, ordering of the sockets could also be accomplished using equivalent fractions, converting to decimals, or measuring in millimetres.

Minds On… Whole Class ➔ Solving a Problem
Students solve an area fraction puzzle:
- With your pattern blocks build two different triangles each with an area that is one-half green and one-half blue.

Students share their solutions, using the overhead pattern blocks. Discuss whether rearranging the blocks makes the solution “different.”

Action! Pairs ➔ Problem Solving
Students complete questions 1 to 5 on BLM 7.1.1, using pattern blocks. They show the graphic solution, labelling each colour with the appropriate fraction of the whole triangle (BLM 7.1.2).

Students complete questions 1 to 5 (BLM 7.1.3) individually. Pairs of students take turns, completing question 6, using an imperial set of socket wrenches.

Curriculum Expectations/Demonstration/Marking Scheme: Assess students’ understanding of equivalent fractions and ordering fractions.

Consolidate Debrief Whole Class ➔ Sharing/Discussion
Pairs of students share their solutions to an area puzzle using the overhead pattern blocks and explain how they know their solution is correct.

Discuss possible answers to question 5 on the student worksheet (BLM 7.1.1).
Several different pairs of students share their solutions, even if the solution is merely another arrangement of the same pattern blocks. This allows more students to be recognized and reinforces multiple solutions and explanations.

Discuss the various methods students used to solve the socket set problem.
Students explain why they placed a certain socket between two others.

Home Activity or Further Classroom Consolidation
Complete worksheet 7.1.4.

Concept Practice
Provide a tangram pattern.

TIPS for English Language Learners in Mathematics – Grade 7: Unit 7, 2006 16
### Terminology
- fractions
- solution
- whole
- parallelogram
- trapezoid
- area
- equivalent
- between
- calculate

### Language Goals
- Follow simple directions with support from visual cues (Stage 1).
- Follow brief written instructions (Stage 1).
- Begin to work with a partner on a common academic task (Stage 1).
- Understand key vocabulary and concepts related to specific subjects and themes (Stage 2).
- Identify main ideas and key information in text (Stage 2).

### Materials
- coloured paper models of pattern block fractions
- plastic and paper tangrams

### Minds On… Whole Class ➔ Solving a Problem
Establish lesson vocabulary using visuals, e.g., flash cards.
English language learners record the terms in their personal vocabulary list notebook and translate in their own language.
Model solving a fraction puzzle using pattern blocks, e.g., two trapezoids are the same as one hexagon.
Pair an English language learner with an English-speaking peer who can repeat instructions, if necessary.

### Action! Pairs ➔ Problem Solving
Post labelled diagrams of geometric shapes (e.g., parallelogram, trapezoid, triangle, etc.) for reference.
Read the instructions on BLM 7.1.1 aloud. English language learners state them in their own words.
Check for understanding, e.g., read question number 1 – a student volunteer models the solution.
English language learners use diagrams and pictures to complete the explanation for question 5.
Discuss what socket wrenches are used for.

### Consolidate Debrief Whole Class ➔ Sharing/Discussion
Have another student explain the same solution in his/her own words so that English language learners can hear it phrased in different ways, using the manipulative to add clarity.

### Concept Practice
**Home Activity or Further Classroom Consolidation**
Explain the terms used in the columns of the chart and do one example together.
Math Learning Goals
- Investigate combinations of fractions using manipulatives.

Minds On... Whole Class ➔ Introducing Problems
Using pattern blocks, students show that $\frac{1}{6} + \frac{1}{2} = \frac{2}{3}$. Several students share their methods.

Students show that $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$ and share which pattern block they chose to represent one whole.

Demonstrate the use of different pattern blocks to represent one whole.

Action! Pairs ➔ Exploration
Students answer several questions involving combining fractions that can be modelled with pattern blocks. For example, $\frac{1}{2} + \frac{1}{6}$; $\frac{1}{3} + \frac{1}{6}$; $\frac{1}{3} + \frac{5}{6} + \frac{4}{3}$.

Students explain each solution, and identify which pattern block they used to represent the whole.

Consolidate Debrief Whole Class ➔ Sharing/Discussion
Students demonstrate their strategies to add fractions using overhead pattern blocks.

Discuss the idea of equivalent fractions with common denominators as it relates to the pattern blocks, e.g., using smaller blocks helps to combine fractions with different denominators.

For example, to add $\frac{1}{2} + \frac{5}{6}$, students may choose to use the hexagon as the one whole. They would use the trapezoid to represent $\frac{1}{2}$ and five triangles to represent $\frac{5}{6}$. To combine the fractions, students need to express the answer in triangles (one whole and two triangles, or one- and two-sixths, which can be simplified to one and one-third using the blue rhombi).

Students should use a variety of methods to determine the common denominator.

Curriculum Expectations/Demonstration/Checklist: Assess students’ ability to add fractions using manipulatives.

Home Activity or Further Classroom Consolidation
Complete the worksheet, Combining Fractions (7.2.1).

Concept Practice

One way: Using the hexagon as one whole, the triangle can be one-sixth, three triangles (or the trapezoid) can be one-half, and together they form four-sixths (two-thirds).

Fractions, both proper and improper, that have denominators of 2, 3, or 6 work well with pattern blocks.

As students explore and discuss they gain a deeper understanding of equivalent fractions and of the algorithm for determining a common denominator.

For virtual pattern blocks and related activities see: http://math.rice.edu/~lanius/Patterns/
### Terminology
- common denominator
- equal
- equivalent
- represent
- amount
- sum

### Language Goals
- Recognize frequently used classroom vocabulary (Stage 1).
- Follow simple directions with support from visual cues (Stage 1).
- Work with a partner on a shared academic task (Stage 1).
- Ask for assistance and communicate needs (Stage 2).
- Understand key vocabulary and concepts related to specific subjects or themes (Stage 2).
- Participate with increasing comfort and confidence in classroom activities (Stage 2).

### Materials
- variety of manipulatives useful for demonstrating fraction combinations

### Minds On… Whole Group → Introducing Problems
Alternatively, students work in groups of four. Group English language learners with a peer who is fluent in the first language, if possible.

Using various manipulatives, students show that \( \frac{1}{3} + \frac{1}{3} = \frac{2}{3} \). Students use words, diagrams, and/or pictures to show how they used the manipulative.

Students demonstrate their understanding of \( \frac{1}{2} \) and \( \frac{1}{6} \), using the same manipulative, and show the sum \( \frac{1}{2} + \frac{1}{6} = \frac{2}{3} \). Students share their solutions (with peers fluent in first language, if possible).

### Action! Pairs → Exploration
Provide a variety of manipulatives for the pairs to use during their exploration. English language learners and their English-speaking partners use key vocabulary words, diagrams, and pictures to explain their solutions.

### Consolidate Debrief Whole Class → Sharing/Discussion
Students write and draw their solutions on the board, or use the overhead, and provide a model using the manipulative, so that the English language learners can visualize the various strategies used.

English language learners share their solutions using manipulatives and pictures with their partner. English language learners add common denominator and equivalent fractions to their personal math vocabulary lists.

### Home Activity or Further Classroom Consolidation

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**Concept Practice**
Unit 7: Day 3: Adding Fractions with Different Denominators

Math Learning Goals
- Add fractions by connecting concrete to symbolic.
- Recognize the need for and find equivalent fractions with common denominators.

Materials
- BLM 7.3.1, 7.3.2
- pattern blocks

Assessment Opportunities

Minds On… Teacher Directed Instruction
Some students share their solutions to question 3 from the previous day’s Home Activity ($\frac{1}{2} + \frac{2}{3}$) using overhead pattern blocks.
Record the symbolic form of each solution, i.e., the fractions. Discuss how to get the solution without using pattern blocks.
Through questioning, students consider the use of equivalent fractions with a common denominator, in this case, 6. They may determine the common denominator in different ways.

Action! Pairs Think/Pair/Share
Students think individually about solving each of the questions from the Home Activity, Day 2, using equivalent fractions with a common denominator. Then with a partner, they discuss their strategies for finding equivalent fractions with a common denominator. Pairs share their strategies with a small group and/or the whole class.

Curriculum Expectations/Observation/Checklist: Assess students’ understanding of addition of fractions with common denominators.

Consolidate Debrief Whole Class Note Making
Create a note together that outlines the process for adding fractions using equivalent fractions with a common denominator. Include the multiples method of finding common denominators.
Students determine the steps to follow in the process.
Students work independently on differentiated practice, based on the teacher’s observations in Action (see BLM 7.3.1, 7.3.2).

Home Activity or Further Classroom Consolidation
Complete the worksheet, Adding Fractions with Different Denominators, and the practice questions.

BLM 7.3.2 shows scaffolding.

Provide student with appropriate practice questions.
## Terminology
- common denominator
- equivalent fractions

### Follow brief written instructions (Stage 1)
- Follow brief written instructions (Stage 1).
- Begin to understand teacher expectations and follow classroom routines (Stage 1).
- Copy board notes and text accurately (Stage 1).
- Identify main ideas and key information in text (Stage 2).
- Begin to accept responsibility for own learning by recognizing consequences and managing own time (Stage 2).
- Begin to make notes, with assistance (Stage 2).

### Materials

### Assessment Opportunities

#### Minds On...
**Whole Class → Teacher-Directed Instruction**
Support the instruction with visual cues and printed labels, pointing to the symbols and words to make the connection, e.g., common denominator.
Show the symbolic form on the board and leave posted during Action!
Use the pattern blocks, as needed, to demonstrate equivalent fractions.

#### Action!
**Pairs → Share**
Students share their strategies in groups and restate other group members’ comments in their own words, asking questions and sharing their own strategies.

#### Consolidate Debrief
**Whole Class → Note Making**
English language learners can write additional information in their own language to support the notes.
English language learners add common denominator and equivalent fractions to their personal math vocabulary list.

### Home Activity or Further Classroom Consolidation

**Differentiated Concept Practice**