Chapter 1 Lesson Plans

MathLinks 7 Pre-Planning for Chapter 1

STRAND/ORGANIZER: Shape and Space (Transformations)

General Outcome: Describe and analyze position and motion of objects and shapes.

1. Before getting started with lesson planning for Chapter 1 Coordinates and Design, you need to understand what skills your students have already been exposed to.

• If students in your jurisdiction have not completed the new Grade 6 WNCP (2006) curriculum, they should have some understanding of the following outcomes from the previous curriculum:

Grade 5:

- ☑ Plot whole number ordered pairs in the first quadrant with intervals of 1, 2, 5, 10.
- ☑ Identify a point in the first quadrant, using ordered pairs.

Grade 6:

- ☑ Create, analyze, and describe designs, using translations (slides) and reflections (flips).
- ☑ Draw designs, using ordered pairs, in the first quadrant of the coordinate grid.

• If students in your jurisdiction have completed the new Grade 6 WNCP (2006) curriculum, they should have some understanding of the following:

- ☑ Perform a combination of translations, rotations, and/or reflections on a single 2-D shape, with and without technology, and draw and describe the image.
- ☑ Perform a combination of successive transformations of 2-D shapes to create a design and identify and describe the transformations.
- ☑ Identify and plot points in the first quadrant of a Cartesian plane using whole number ordered pairs.

☑ Perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian plane (limited to whole number vertices).

2. To familiarize yourself with the features of *MathLinks 7*, you may wish to do the following:
• Review **A Tour of Your Textbook** (pp. viii–xiii) and **Problem Solving** (pp. xiv–xvii) to familiarize yourself with the features of the textbook.
• Review **Answers** (pp. 462–498), **Glossary** (pp. 499–503), and **Index** (pp. 504–508) to familiarize yourself with their contents.

3. Note that not every section within each chapter is meant to be a stand-alone lesson. In order to allow students time to experience the depth and breadth of the concept, some sections may take two or three classes to complete. The Teacher's Resource has suggested time lines.
Before starting Chapter 1, read through the **Chapter Opener** (p. 2), **Key Words** (p. 2), **Math Links** (pp. 2, 11, 17, 29), and **Wrap It Up!** (p. 39). These sections will provide a sense of how the chapter concepts are tied together and how students will be asked to apply their learning.

4. Each chapter begins with a **Foldables** feature (p. 3). Foldables provide unique ways for students to:
• organize their learning
• keep track of key words and examples
• organize their thinking
• keep track of what they need to work on in the particular chapter and for review later in the course

Foldables are exciting ways for students to engage themselves in learning. Most take approximately 10 min to make.

A materials centre at the back of the classroom can make it easier for students to produce Foldables. This centre could be as large as a table at the back of the classroom with scissors, glue, tape, and markers, or as simple as a box of materials on a handy shelf.

Most chapters have one Foldables design in the textbook and another Foldables design for vocabulary in the Teacher's Resource. However, Chapter 1 (p. 5) has an additional Foldable that will help students with the chapter content.

You may wish to help students stay organized and keep their Foldables for year-end reference by either:
• providing a file folder and storage box in the classroom, or
• using a page-protector pouch that students can keep in their binders. These can be purchased at a dollar store.

5. As part of your pre-planning for each chapter, review the related chapter in:

- the *MathLinks 7 Practice and Homework Book*
- the Teacher's Resource for support in meeting the needs of all learners, a list of common errors, language learning skills, and scoring rubrics for the Wrap It Up! Questions
- the related blackline masters (BLM) for additional questions, scaffolding of all Math Links, a chapter test, and assessment assistance
- the *MathLinks 7 Practice and Homework Book* for additional exercises and scaffolding for concepts
- the *MathLinks 7* Online Learning Centre for examples of student work for the challenges and tasks, scoring rubrics as well as additional challenges for students, and year-end final exams

MathLinks 7 Chapter 1, Lesson 1

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcomes:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Resource/Materials:

- BLM 1–1 *MathLinks 7* Scavenger Hunt
- blank paper

Lesson Objective:

Getting to Know the Textbook

It is important for students to learn the different parts of the textbook. Choose from among the following approaches:

1. If you have the Teacher's Resource, you might use **BLM 1–1 *MathLinks 7* Scavenger Hunt**. Allow 20–30 min for this activity. Review the answers with the students.
2. If you do not have the Teacher's Resource, use the introductory pages of the student textbook: **A Tour of Your Textbook** (pp. viii–xiii) and **Problem Solving** (pp. xiv–xvii). Review these with the students, which should take approximately 20 min.
3. The introductory pages could also be referenced after the Scavenger Hunt so that students are familiar with them and can go back to them at a later date. These also serve as excellent pages for parents to read, allowing them to better understand the instructional material.
4. Make sure that students are aware of the location of the **Answers** (pp. 462–498), **Glossary** (pp. 499–503), and **Index** (pp. 505–508).

Starting Chapter 1

Scan the teaching notes in the Teacher's Resource before starting any chapter; then, review the notes for each lesson as you plan it. Note that time frames can change depending on your particular mix of students.

If you do not have access to the Teacher's Resource, begin Chapter 1 by telling students that this chapter is about using geometric transformations to create

designs. It will involve plotting points and creating shapes on a coordinate grid. Discuss with students when they might have used transformations (translations, reflections, and rotations) to make designs. This oral discussion will help students share their ideas and prompt those who might have forgotten some of the terminology.

Before starting to work on Chapter 1, have students use a blank sheet of paper to diagram, web, and/or write what they remember about the coordinate grid or Cartesian plane. Collect these from students before they leave the class. Reviewing this material will give you a better understanding of your students' recall and understanding of this concept.

MathLinks 7 Chapter 1, Lesson 2

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcomes:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Resource/Materials:

- *MathLinks 7*, pp. 2–3
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–4 Section 1.1 Extra Practice
- sample chapter Foldable produced by you ahead of the class
- grid paper
- scissors
- ruler
- glue
- stapler
- Get Ready (pp. 2–3 *MathLinks 7 Practice and Homework Book* or alternative in the Teacher Centre of the Online Learning Centre)

***MathLinks 7* Adapted Resource/Material:**

Get Ready, pp. 2–3

Introduction:

Have students turn to page 2 and read the **Chapter Opener** together. Read through the **What You Will Learn** and the **Key Words**. Check to see how many of the students can already give a definition or description for some or all of the key words.

Point out the pattern in the large picture and ask how a coordinate grid might be used to create a design like the one shown.

Read the **Math Link** and brainstorm with students how they might create a design on a grid. You might wish to discuss how such designs are used by various cultures familiar to students.

Have students complete the appropriate sections of **BLM 1–2 Chapter 1 Self-Assessment** to help them identify what they already know, understand, and can do related to the work in Chapter 1. Have students refer back to this page regularly to see whether they feel their level of understanding has changed.

Procedures/Activities/Instruction:

1. Explain the purpose of a Foldable, and show students the one you have made. Identify the materials they need to make their own. Have them complete their own by following the instructions on page 3. They could label it as shown or according to your directions.

2. Having previously reviewed the **Get Ready** (pp. 2–3 *MathLinks 7 Practice and Homework Book* or alternative forms in the Teacher Centre of the Online Learning Centre), decide whether you wish students to complete this two-page spread before going into the chapter sections.

The purpose of the Get Ready is to provide you, the teacher, with an opportunity to assess how well students know the pre-requisite skills for this chapter. At the same time, students have an opportunity to determine whether they have the prerequisite skills to begin Chapter 1 and to check their understanding.

For section 1.1, it is suggested that the students complete #1–4 in the Get Ready. You may wish to have students do this now. If you choose to go directly to the lesson, you could skip to Lesson 3.

BLM 1–4 Section 1.1 Extra Practice can be used for additional review of plotting points in quadrant I or for students who are strong enough in the pre-requisite skills not to have to complete the Get Ready sections 1–4.

ASSESSMENT/EVALUATION:

1. Get Ready (Assessment *for* Learning)

2. Have students use **BLM 1–2 Chapter 1 Self-Assessment** and then consider their level of understanding of chapter content.

Math Link:

Have students start a section in their notebooks or use the back side of their Foldable to sketch a rough idea for a bead design. Have them keep all of their Math Links materials together.

Foldable Entry:

Encourage students to add the following words from the Get Ready to their Foldable. Have them use diagrams, illustrations, or explanations to define each word.

integers ordered pair *x*-coordinate *y*-coordinate
transformation translation reflection rotation

MathLinks 7 Chapter 1, Lesson 3

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane

Resource/Materials:

- *MathLinks 7*, pp. 4–8
- 1.1 Warm-Up (Online Learning Centre)
- grid paper or Master 8 Centimetre Grid Paper
- ruler
- 11 × 17 paper
- scissors
- glue

***MathLinks* 7 Adapted Resource/Materials:**

1.1 Warm-Up, p. 4
Section 1.1, pp. 5–6

Introduction:

Start the lesson by inviting students to relate a time when they may have gotten lost. Explain how maps were created to help people find their way. This lesson uses grids to help describe and understand location.

Read the opening paragraph on page 4 for some history on graphing points.

Procedure/Activities/Instruction:

1. Students will need the supplies listed above to make a Foldable for the Explore the Math. Do one of the following to assist students:

- Give them their grid paper prior to starting the Foldable so that they can glue it onto the sheet prior to folding, or

- glue a grid onto an 11 × 17 sheet of paper, photocopy it, and hand this out to students for them to use for the Foldable.

To create the Foldable, have students follow the steps on page 5. They should use this Foldable to complete the Explore the Math. Completed Foldables should be labelled and used as a student reference. They could also be used for classroom display.

2. Once students have completed the Explore the Math, have them discuss their findings and address any questions.

3. Discuss Examples 1 and 2 with students. Have them do the Show You Know after each example.

Assessment:

1. Have students complete the Show You Know for both examples. (Assessment *for* Learning)

Foldable Entry:

Encourage students to add the following words from section 1.1 to their Foldable. Have them use diagrams, illustrations, or explanations to define each word.

Cartesian plane origin quadrants coordinates
Optional: vertical horizontal

Encourage students to come up with a memory device to help them remember the order for plotting points on a coordinate grid. For example, *x* comes before *y* in the alphabet, so put the *x*-coordinate before the *y*-coordinate in an ordered pair.

Learning Log:

How is the Cartesian plane different from quadrant I?

MathLinks 7 Chapter 1, Lesson 4

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane

Resource/Materials:

- *MathLinks 7,* pp. 4–8
- Foldables made in previous lessons
- BML 1–2 Chapter 1 Self-Assessment
- BLM 1–4 Section 1.1 Extra Practice
- *MathLinks 7 Practice and Homework Book*, pp. 4–5

***MathLinks* 7 Adapted Resource/Materials:**

pp. 7–11

Introduction:

Start the lesson by reviewing the plotting skills that students completed in the Explore the Math of the previous lesson. You may wish to have them answer questions such as the following. Allow them to use their Foldable with the coordinate grid.

- In what quadrant would you find the following ordered pairs?
  (2, 4), (–4, –6), (0, 6), (–3, 5), (–2, 0), (0, –7)
- Give an example of a coordinate for each quadrant and on each axis.

An oral review of the terminology placed in the Foldable would also be beneficial.

Procedure/Activities/Instruction:

1. Review the Key Ideas on page 8. Is there anything students would like to add to their Foldable from this section?

2. Assign questions as outlined in the Assessment section below.
3. Have students begin with the Communicate the Ideas. They could write their answers in their Math Learning Log. Collect this part of the assignment and review students' responses. This will provide additional insight into students' understanding.

Assessment:
1. Have all students complete Communicate the Ideas #1. Either assign #2–4, or let students choose one additional question to respond to. (Assessment *as* Learning)
2. Student assignments (Assessment *for* Learning)

Essential: #1, 5, 7, 9, 11, Math Link
Typical: #1, 2–4, 5, 7, 9, 11, 12, 14, 16, Math Link
Extension/Enrichment: #13–18

Struggling learners may benefit from completing **BLM 1–4 Section 1.1 Extra Practice.**
Note: BLM 1–5 Section 1.1 Math Link is available for students who require some extra support or guidance with the Math Link.

3. Have students use **BLM 1–2 Chapter 1 Self-Assessment** to assess how far they have progressed during this section.

Math Learning Log:
Have students complete Communicate the Ideas #1 and at least one other question from the section or page 10 of the Teacher's Resource.

Math Link:
If students complete the assigned question before the end of class, have them complete the Math Link on page 11.

MathLinks 7 Chapter 1, Lesson 5

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Create a design on a Cartesian plane
- ☑ Identify the points used to make a design
- ☑ Identify the coordinates of vertices of a 2-D shape

Resource/Materials:

- *MathLinks 7*, pp. 12–17
- *MathLinks 7 Practice and Homework Book,* pp. 6–7
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–6 Section 1.2 Extra Practice
- 1.2 Warm-Up (Online Learning Centre)
- grid paper or Master 8 Centimetre Grid Paper
- ruler
- coloured pencils

***MathLinks* 7 Adapted Resource/Materials:**

1.2 Warm-Up, p. 12
pp. 13–15

Introduction:

Students will now apply their skills in plotting points to drawing 2-D shapes. A number of flags are illustrated on page 12. Students could use coordinate points to draw flag designs or logos similar to the ones shown.

Procedure/Activities/Instruction:

1. Collect, orally mark, or take up the previous day's homework.

2. You may wish to review what students have done by using the Warm-Up in the Teacher's Resource (p. 12).

3. Hand out grid paper and have students complete the Explore the Math on page 12.
4. Have students complete the Reflect on Your Findings and compare their answers with a partner. Listen to student discussions to gauge whether they have understood the big question in the Explore the Math or whether further reinforcement is needed.
5. Go over Example 1 with students and have them do the Show You Know.
6. Review Example 2 with the class. Have students complete the Show You Know, then exchange their instructions with a partner and have the partner draw the square.
7. You may wish to review the names of shapes as students will be asked to identify the shapes they have drawn in #3 and 4. Include square, triangle, parallelogram, rectangle, trapezoid, and arrow.

Assessment:
1. Have students complete the Show You Know for both examples. (Assessment *for* Learning)
2. Assign **BLM 1–6 Section 1.2 Extra Practice** #1 to students who need additional practice after the Explore the Math.
3. Have students complete Communicate the Ideas #1 individually and complete #2 as a class response. Either collect the Math Learning Log or go down the rows and review responses while students are working. (Assessment *as* Learning)
4. Assign #3 or 4 and 5 on page 15 for students to do before the next class and/or questions on page 6 of the *MathLinks 7 Practice and Homework Book.* (Assessment *for* Learning)
5. Have students update **BLM 1–2 Chapter 1 Self-Assessment**.

Foldable Entry:
Have students place the following term in their Foldable.

vertex

Math Learning Log:
Have students complete Communicate the Ideas #1.

MathLinks 7 Chapter 1, Lesson 6

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Create a design on a Cartesian plane
- ☑ Identify the points used to make a design
- ☑ Identify the coordinates of vertices of a 2-D shape

Resource/Materials:

- *MathLinks 7*, pp. 12–17
- *MathLinks 7 Practice and Homework Book,* p. 7
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–6 Section 1.2 Extra Practice
- BLM 1–7 Section 1.2 Math Link
- grid paper or Master 8 Centimetre Grid Paper
- ruler
- coloured pencils

***MathLinks* 7 Adapted Resource/Materials:**

pp. 16–20

Introduction:

Students will continue to use their skills and apply their understanding to questions related to plotting points and creating 2-D shapes.

Procedure/Activities/Instruction:

1. Collect, orally mark, or take up the previous day's homework.

2. You may wish to have students who had difficulty with questions complete **BLM 1–6 Section 1.2 Extra Practice** #2. Also, remind students to complete the section called What I Need to Work On in their Foldable. Samples of questions or concepts that they are having difficulty with should be listed there.

3. Make sure that students have grid paper for the Practice, Apply, and Extend questions. Assign questions as outlined in the Assessment section below.

Assessment:

1. Have all students complete Communicate the Ideas #1. (Assessment *as* Learning)

2. Student assignments (Assessment *for* Learning)

Essential: #8, Math Link
Typical: #7, 8, 10, Math Link
Extension/Enrichment: #21–25, Math Link
MathLinks 7 Practice and Homework Book, p. 7

Note:

- **BLM 1–7 Section 1.2 Math Link** is available for students who require some extra support or guidance with the Math Link.
- If assigning #8, be aware that some students may want to create inappropriate words. Brainstorm appropriate suggestions with students.
- If assigning #11, have students create a similar climate graph for the community in which they live.
- If assigning #12, you may wish to advise students to use a table to list lengths and widths as ordered pairs.

3. Have students comment on two or three items they feel they have improved on — and how they have improved. (Assessment *as* Learning)

Math Learning Log:

Have students complete Communicate the Ideas #1.
Students could also comment on two or three items they feel they have improved on and how they have improved, or use the question found on page 17 of the Teacher's Resource.

MathLinks 7 Chapter 1, Lesson 7

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Perform a translation, reflection and rotation
- ☑ Describe the image resulting from a transformation

Resource/Materials:

- *MathLinks 7*, pp. 18–29
- *MathLinks 7 Practice and Homework Book,* pp. 8–9
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–8 Section 1.3 Extra Practice
- 1.3 Warm-Up (Online Learning Centre)
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- scissors
- ruler
- coloured pencils

***MathLinks* 7 Adapted Resource/Materials:**

1.3 Warm-Up, p. 21
pp. 22–31

Introduction:

Students will expand their understanding of transformations through hands-on activities that will allow them to apply their understanding. You may wish to start by using the Warm-Up and Mental Math activity on Teacher's Resource page 18.

Review the term *transformation* with students; ask them to describe any transformations they see in the visual on page 18. They might comment on the reflection of the mountains in the water. Point out that the kayak moving across the water is also a transformation. Invite students to share other real world examples.

For this section, the lessons have been designed in three parts, each addressing one transformation. Students combine all three transformations in the final assignments. Alternatively, you may choose to cover all three types of transformations in one class and use the remaining two for practice and application.

Procedure/Activities/Instruction:

There are three concepts in the Explore the Math. This lesson will focus on the first: translations (slides).

1. Collect, orally mark, or take up the previous day's homework.

2. If you did not complete the Get Ready earlier, have students review #5 on page 3 of the *MathLinks 7 Practice and Homework Book* (translation or slide) before proceeding. Take up any questions.

3. Have students complete #1 and 2 of Explore the Math.

4. Ask them to look at the original coordinates and then those of the translation. Is there a pattern they could identify for what happens to the *x*-coordinate and the *y*-coordinate after a translation? (If they are having difficulty with this, have them perform two or three translations on the original coordinates and then determine whether they see a pattern.)

5. You may wish to have students respond orally or in writing to the Reflect on Your Findings at the bottom of page 18.

6. Review Example 1 with students (p. 20).

7. Ask students who are still having difficulty to predict what 9 units right and 4 units down or 6 units left and 5 units up would do to the original. You may wish to do this in a small group.

Those students who have grasped the concept could move on to their Math Learning Log and respond to the Show You Know, followed by assigned questions.

Assessment:

1. Have students complete the Show You Know on page 20. (Assessment *for* Learning)

2. Student assignments (Assessment *for* Learning)

Essential: #5
Typical: #3, 5
Extension/Enrichment: #21–25, Math Link
Selected questions from the *MathLinks 7 Practice and Homework Book,* pp. 8–9

3. Students who need some remediation could complete **BLM 1–8 Section 1.3 Extra Practice** #4. (Assessment *for* Learning)

4. Have students comment on two or three items they feel they have improved on — and how they have improved. (Assessment *as* Learning)

Foldable Entry:
Have students place the following terms in their Foldable.

transformation translation

Math Learning Log:
Show You Know, page 20
Students could also comment on one or two items they feel they have improved on — and how they have improved.

MathLinks 7 Chapter 1, Lesson 8

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Perform a translation, reflection and rotation
- ☑ Describe the image resulting from a transformation

Resource/Materials:

- *MathLinks 7*, pp. 18–24
- *MathLinks 7 Practice and Homework Book,* pp. 8–9
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–8 Section 1.3 Extra Practice
- scissors
- ruler
- coloured pencils
- Mira or mirror (optional)

***MathLinks* 7 Adapted Resource/Materials:**

pp. 21–31

Introduction:

You may wish to start with a quick oral review of translations and how the original shape moved to a new location (slide). For this section, discuss how reflections are mirror images. The mirror is the line of reflection.

Procedure/Activities/Instruction:

There are three concepts in the Explore the Math; this lesson will focus on the second: reflections (mirror images).

1. Collect, orally mark, or take up the previous day's homework.

2. Have students do the second part of the Explore the Math. Once students have completed #4–6, ask them why we say a figure is flipped when it is reflected.

3. Review Example 2 on page 21 with the students. Make sure that students understand that, however many units away from the line of reflection a point is, its reflection will be the same number of units away on the other side of the line of reflection.

4. Work in a small group with students who are still having difficulty. Have them reflect points or shapes in the *y*-axis and then reflect in the *x*-axis. Once they become more proficient, have them use a different vertical and horizontal line for reflecting.

Those students who have grasped the concept could move on to their Math Learning Log and respond to the Show You Know on page 23, followed by assigned questions.

Assessment:

1. Have students complete the Show You Know on page 21. (Assessment *for* Learning)

2. There are several questions from which to choose on pages 24–29. It is not necessary to assign all as they are repetitive. You may wish to include one question from translations to review student knowledge from the previous lesson. (Assessment *for* Learning)

Essential: #4, 11
Typical: #4, 11, 12
Extension/Enrichment: #21–25, Math Link
Selected questions from *MathLinks 7 Practice and Homework Book,* pp. 8–9

3. Students who need some remediation could complete **BLM 1–8 Section 1.3 Extra Practice** #5. (Assessment *for* Learning)

4. Have students comment on two or three items they feel they have improved on — and how they have improved. (Assessment *as* Learning)

Foldable Entry:

The following term should be placed in the students Foldable.

reflection

Math Learning Log:

Show You Know, p. 21
Students could also comment on one or two items they feel they have improved on — and how they have improved.

MathLinks 7 Chapter 1, Lesson 9

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Perform a translation, reflection and rotation
- ☑ Describe the image resulting from a transformation

Resource/Materials:

- *MathLinks 7*, pp. 18–24
- *MathLinks 7 Practice and Homework Book,* pp. 8–9
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–8 Section 1.3 Extra Practice
- BLM 1–9 Section 1.3 Math Link
- scissors
- ruler
- coloured pencils
- tracing paper

***MathLinks* 7 Adapted Resource/Materials:**

pp. 21–31

Introduction:

You may wish to start with a quick oral review of translations and reflections and how the original shape moved to a new location as a result of each transformation.

This section discusses rotations. This concept sometimes causes difficulty so make sure students understand that a centre of rotation, like a line of reflection, can be placed anywhere on the coordinate grid. Rotations can be clockwise or counterclockwise; they can be any angle (90°, 180°, 270°, or 360° respectively).

Procedure/Activities/Instruction:
There are three concepts in the Explore the Math; this lesson will focus on the third: rotations.

1. Collect, orally mark, or take up the previous day's homework.
2. If you have not completed the Get Ready section, have students complete #6 on page 5 of the *MathLinks 7 Practice and Homework Book*.
3. Have students complete #7–10 (p. 19).
4. Review Example 3 on pages 22–23. Make sure that students understand the concept; provide sufficient hands-on learning, tracing and rotating the paper so that students understand and are comfortable with several different points of rotation.
5. Work in small groups with students who are still having difficulty. Have them rotate points on the vertices of a shape. You may also find #1–3 on **BLM 1–8 Section 1.3 Extra Practice** useful.

Those students who have grasped the concept could move on to their Math Learning Log and respond to the Show You Know on page 25, followed by assigned questions.

Assessment:
1. Have students complete the Show You Know on page 23. (Assessment *for* Learning)
2. There are several Practise questions from which to choose on pages 27–29, as well as application questions that allow students to apply their understanding of all three transformations. It is not necessary to assign all of these, as they are repetitive. (Assessment *for* Learning)

Essential: #16, 19, Math Link
Typical: #16, 19, 20, Math Link
Extension/Enrichment: #21–25, Math Link, Wrap It Up!
MathLinks 7 Practice and Homework Book, p. 9 #7–8

3. Students who need some remediation could complete #1–3 on **BLM 1–8 Section 1.3 Extra Practice**. (Assessment *for* Learning)
4. Have students comment on two or three items they feel they have improved on, and how they have improved. (Assessment *as* Learning)

Foldable Entry:
Have students place the following term in their Foldable.

rotation

Math Learning Log:
Show You Know, p. 23
Students could also comment on one or two items they feel they have improved on — and how they have improved.

MathLinks 7 Chapter 1, Lesson 10

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Describe the movement of a point on a Cartesian plane using the terms horizontal and vertical
- ☑ Determine the horizontal and vertical distances between two points
- ☑ Describe how the vertices of a 2-D shape change positions when they are transformed one or more times

Resource/Materials:

- *MathLinks 7*, pp. 30–35
- *MathLinks 7 Practice and Homework Book,* pp. 10–11
- BLM 1–2 Chapter 1 Self-Assessment
- BLM 1–10 Section 1.4 Extra Practice
- BLM 1–11 Chapter 1 Key Words Puzzle
- BLM 1–12 Chapter 1 Test
- 1.4 Warm-Up (Online Learning Centre)
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils
- overhead projector (optional)

***MathLinks* 7 Adapted Resource/Materials:**

1.4 Warm-Up, p. 28
pp. 28–33

Introduction:

Brainstorm the names of video and board games that involve grid movement. This will create excitement in the class as students apply math to games!

Procedure/Activities/Instruction:

1. Collect, orally mark, or take up the previous day's homework.

2. Have students work in pairs to complete the Explore the Math on pages 30–31. If possible, have groups share their solution to #3 on the overhead with the rest of the class.

3. Review Example 1 with the students. Have them complete the Show You Know. Encourage them to come up with two solutions. Let them share their solution with a partner so they can test out each other's plan. Listen to the discussions and note students who may not yet understand. You may wish to encourage those having difficulty to use a more straightforward transformation that will get the golf ball into the hole. For a), use one translation; for b), use one reflection and one translation. Note the Literacy Link on page 32.

4. Complete Example 2, including the Show You Know, and discuss with students whether the distance would change if the order of the transformation changed.

5. Review the Key Ideas with students. Have them add anything to their Foldable that they feel would be helpful.

Assessment:

1. Show You Know on pages 31 and 33. (Assessment *as* Learning)

2. Communicate the Ideas, #1 and 2. Have students complete these in pairs and then discuss the answers to #1c) and #2 with the class. (Assessment *as* Learning)

3. Student assignments (Assessment *for* Learning)

Essential: #1–3, 6, 9, Math Link
Typical: #1–3, 6–9, 11, Math Link
Extension/Enrichment: #10–14, Math Link, Wrap It Up!
Selected questions from the *MathLinks 7 Practice and Homework Book*, pp. 10–11

4. Use **BLM 1–10 Section 1.4 Extra Practice** for students who still require some remediation. (Assessment *for* Learning)

5. Have students comment on two or three items they feel they have improved on — and how they have improved. (Assessment *as* Learning)

Math Learning Log:

Show You Know (pp. 31 and 33)
Students could also comment on one or two items they feel they have improved on, and how they have improved.

MathLinks 7 Chapter 1, Lesson 11

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane

Resource/Materials:

- *MathLinks 7*, pp. 38–39
- *MathLinks 7 Practice and Homework Book,* pp. 12–13
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- **BLM 1–2 Chapter 1 Self-Assessment**
- ruler
- Foldable

***MathLinks* 7 Adapted Resource/Materials:**

pp. 39–42

Introduction:

Students are now at the chapter review, which serves as a self-assessment tool.

Procedure/Activities/Instruction:

1. You will need to decide how you wish students to approach chapter reviews. These reviews are opportunities for students to verify that they have mastered the concepts and identify any areas of weakness prior to Assessment *of* Learning taking place. There are a number of approaches that could be used, including:

- The students have been noting areas that give them trouble in the Foldable under What I Need To Work On. Have them use these notes to help them select questions within the review.

- Have students complete at least one related item from each section.
- Have students review their assignments, identify areas of weakness, and select review questions accordingly.
- You, the teacher, could select the questions to be completed by the class or individual students.
- Extra practice could also come from either or both of the Link It Together or Vocabulary Links found in the *MathLinks 7 Practice and Homework Book*, or from additional material available on the Teacher Centre of the Online Learning Centre.

Assessment:

1. Chapter 1 Review (Assessment *for* Learning)
Assignments should be completed within the class time in order to allow students to get assistance.

2. After the review, students may wish to update **BLM 1–2 Chapter 1 Self-Assessment**.

Foldable Entry:

Encourage students to use the terminology in the Foldable. As they do the review, they could note what areas under What I Need to Work On that they now understand. This is a good opportunity for them to note their personal growth.

MathLinks 7 Chapter 1, Lesson 12

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane
- ☑ Create a design on a Cartesian plane
- ☑ Identify the points used to make the design
- ☑ Identify the coordinates of vertices of a 2-D shape
- ☑ Perform a translation, reflection, and rotation
- ☑ Describe the image resulting from a transformation
- ☑ Describe the movement of a point on a Cartesian plane using the terms horizontal and vertical
- ☑ Determine the horizontal and vertical distances between two points
- ☑ Describe how the vertices of a 2-D shape change position when they are transformed one or more times

Resource/Materials:

- *MathLinks 7*, pp. 38–39
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- scissors
- tracing paper (optional)

***MathLinks* 7 Adapted Resource/Materials:**

pp. 43–45

Introduction:

Students are now at the chapter test. This could serve as a final self-assessment tool or as a summative tool. (Assessment *of* Learning)

Procedure/Activities/Instruction:

1. You will need to decide how you wish students to approach the chapter test. Chapter tests are opportunities for students to verify that they have mastered the concepts and identify any areas of weakness prior to Assessment *of* Learning. Provide students with a number of questions that they can comfortably do in one class. Choose at least one question for each concept, skill, or process.

2. If the practice test is not used as an Assessment *of* Learning (summative), then you may wish to use **BLM 1–12 Chapter 1 Test** or items from the computerized assessment bank (CAB) for this purpose.

Assessment:

1. Chapter 1 Test (Assessment *for* Learning or Assessment *of* Learning) Assignments should be completed within the class time in order to allow students to get assistance.

2. BLM 1–11 Chapter 1 Key Words Puzzle

3. BLM 1–12 Chapter 1 Test Essential questions include #1–3, 5–10, and 13.

Foldable Entry:

As for the chapter review, encourage students to use the Foldable for the terminology, and to note their areas of personal growth.

MathLinks 7 Chapter 1, Lesson 13

Time: 2 classes, 40–50 min each

STRAND/ORGANIZER: Shape and Space **Wrap It Up!**

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane
- ☑ Create a design on a Cartesian plane
- ☑ Identify the points used to make the design
- ☑ Identify the coordinates of vertices of a 2-D shape
- ☑ Perform a translation, reflection, and rotation
- ☑ Describe the image resulting from a transformation
- ☑ Describe the movement of a point on a Cartesian pane using the terms horizontal and vertical
- ☑ Determine the horizontal and vertical distances between two points
- ☑ Describe how the vertices of a 2-D shape change position when they are transformed one or more times

Resource/Materials:

- *MathLinks 7*, p. 39
- Master 1 Project Rubric
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- BLM 1–13 Chapter 1 Wrap It Up!
- ruler
- coloured pencils
- scissors
- tracing paper (optional)
- string, coloured beads (optional)

***MathLinks* 7 Adapted Resource/Materials:**
pp. 46–47

Introduction:
Students are now at their first Wrap It Up! This is intended to allow students to use and display their knowledge of transformations on a coordinate grid in a useful and artistic way. It is important for the students to use mathematical language in their descriptions.

Procedure/Activities/Instruction:
1. Decide and communicate how much class time the students will have to complete this and how much needs to be completed at home.
2. Read through the Wrap It Up! and discuss some possible designs that students could do. Read through the guidelines and the steps with students. Clarify any questions. Remind them that the Math Links they did in each of the previous lessons could assist them with their design. In addition, **BLM 1–13 Chapter 1 Wrap It Up!** provides guidance for students who need some extra assistance with the necessary process and steps.
3. It is important that students understand how they will be graded. Review the holistic rubric for the question. You could use the version on Teacher's Resource page 39a, or cut off the right column and work with the students to complete the expected outcomes for each level. Completing the Specific Question Notes with students allows them to identify what key criteria distinguishes each level and also allows you to guide them to those criteria that should be considered for each level. Every student should receive a copy of the scoring rubric for reference.

Assessment:
1. Use **Master 1 Project Rubric** for this Assessment *of* Learning.

Foldable Entry:
Encourage students to use their Foldable to help them use appropriate mathematical terminology.

MathLinks 7 Chapter 1, Lesson 14

Time: 40–50 min

STRAND/ORGANIZER: Shape and Space **Game / Challenge**

General Outcome: Describe and analyze position and motion of objects and shapes.

Specific Outcome:

SS4 Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.

SS5 Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).

Achievement Indicators:

- ☑ Label the origin and the axes of a Cartesian plane
- ☑ Identify points on a Cartesian plane
- ☑ Plot points on a Cartesian plane
- ☑ Create a design on a Cartesian plane
- ☑ Identify the points used to make the design
- ☑ Identify the coordinates of vertices of a 2-D shape
- ☑ Perform a translation, reflection, and rotation
- ☑ Describe the image resulting from a transformation
- ☑ Describe the movement of a point on a Cartesian pane using the terms horizontal and vertical
- ☑ Determine the horizontal and vertical distances between two points
- ☑ Describe how the vertices of a 2-D shape change position when they are transformed one or more times

Resource/Materials:

Math Games	Challenge
• *MathLinks 7*, p. 40 • coins • coloured pencils (optional) • **BLM 1–14 Going Fishing Game Boards**	• *MathLinks 7*, p. 41 • grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper • coloured pencils (optional) • stapler • scissors

***MathLinks* 7 Adapted Resource/Materials:**

pp. 48–50

Introduction:
The game allows students to use their skills in identifying and plotting points in four quadrants by applying them in a game situation.
The Challenge in Real Life allows students to apply their understanding of performing and describing transformations of a 2-D shape in all four quadrants.

Procedure/Activities/Instruction:
Math Games
1. Read through the game with students. You might want to mention that the given values are the approximate lengths of full-grown fish in metres. Discuss with students games similar to this one that they may have played.
2. Have students play the game with a partner of equal ability. You may wish to give each team a copy of **BLM 1–14 Going Fishing Game Boards**.
3. Encourage students to record their guesses in correct notation for ordered pairs.

Challenge in Real Life
You may need to have sheets of paper with reduced-size grids on them for students to cut and staple together.
1. Read through Make an Animation as a class. Discuss how animations are made and how they might apply to a coordinate grid. Ask questions such as:
• How do we make an object appear to be moving?
• Does it matter how many sheets we use to show movement?
It would be beneficial for students to see a sample. Choose a simple motion that is easy to prepare ahead of time.
It is important for students to realize that using a large number of sheets of paper with small changes in movement on each one makes the animation flow.
2. If you use this challenge for Assessment *of* Learning, it is important that students understand how they will be graded. Review the holistic rubric for the challenge. You could use the version on Teacher's Resource page 41a, or cut off the right column and work with the students to complete the expected outcomes for each level. Completing the Specific Question Notes with students allows them to identify what key criteria distinguish each level and also allows you to guide them to those criteria that should be considered for each level. Every student should receive a copy of the scoring rubric for reference.

Assessment:
1. You may decide to let students choose one activity or the other, depending on the type of assessment you are looking for.
• Math Games (Assessment *for* Learning)
• Challenge in Real Life (Assessment *of* Learning or Assessment *for* Learning)

Foldable Entry:
Encourage students to use their Foldable to help them use appropriate mathematical terminology.