



Grade 4 Mathematics Lesson Plan

Date: June 27, 2017  
Grade 4 Classroom 1 (33 students)  
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1 Name of the Unit Let's investigate quadrilaterals

2 Goals of the Unit

Through activities of observing and constructing spatial relationships of lines and quadrilaterals, students understand perpendicular and parallel lines, trapezoids, parallelograms, and rhombi. Students will enrich their spatial sense and ways of observing geometric figures.

3 Assessment Standards for the Unit

Interest, Eagerness, and Attitude	Mathematical Way of Thinking	Mathematical Skills	Knowledge and understanding
<p>Students try to find perpendicular and parallel lines, trapezoids, parallelograms, and rhombi in their surroundings, and they try to think about how those figures are being used.</p> <p>Students try to discuss with their friends to solve problems based on their prior learning.</p>	<p>Students can identify and represent characteristics of different types of quadrilaterals based on the relationships of sides and other constituent parts.</p> <p>Students can grasp the characteristics of diagonals in various quadrilaterals.</p>	<p>Students can construct perpendicular and parallel lines, trapezoids, parallelograms, and rhombi.</p>	<p>Students understand the meanings and characteristics of perpendicular and parallel lines, trapezoids, parallelograms, and rhombi. Students have rich spatial sense.</p>

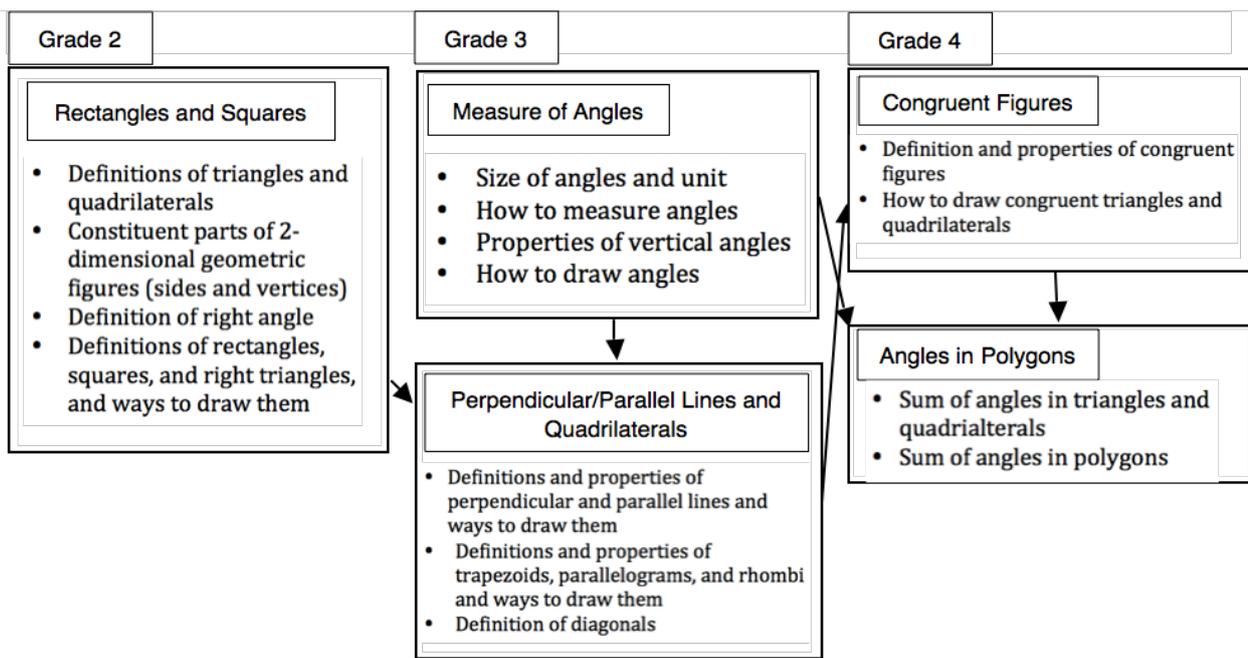
## 4 About the Unit

The National Course of Study states the following about the content of this unit.

Grade 4 Domain C: Geometric Figures  
 (1) Students will deepen their understanding of geometric figures by paying attention to the elements that compose them and their positional relationships, through observing and composing geometric figures.  
 a. To understand relationships such as parallelism and perpendicularity of lines.  
 b. To recognize parallelograms, trapezoids and rhombuses.

In the domain of Geometric Figures, students learned about "rectangles, squares and right triangles" in Grade 2 and "isosceles and equilateral triangles" in Grade 3. Up to this point, students have used the lenses of "number of sides or vertices," "right angles", and "sizes of angles" to observe geometric figures. In this unit, the new lenses of "perpendicular," "parallel," and "the lengths of diagonals and spatial relationships of diagonals" are introduced.

### (1) Scope and sequence of topics related to this unit



### (2) About mathematics in this unit

As stated above, up to this point, students have used the lenses of "number of sides or vertices," "right angles", and "sizes of angles" to observe geometric figures. By the end of this unit, students will add new lenses of "perpendicular," "parallel," and "length of diagonals and how they intersect."

First, we will define perpendicular lines through activities of sorting various quadrilaterals into those with right angles and those without. Next, through activities to

observe various quadrilaterals, help students notice that there are different ways sides of quadrilaterals are positioned.

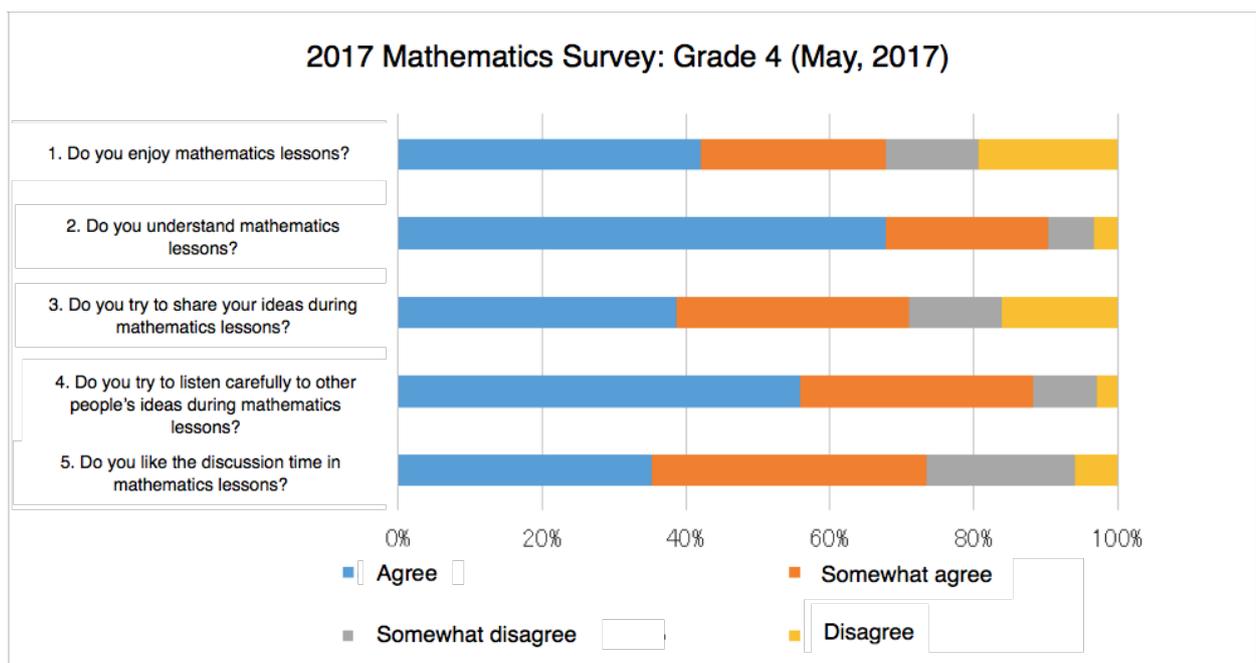
In order to create this flow of learning, we will set up learning activities intentionally so that they will promote students' own noticing. By engaging in sorting activities based on their prior learning, we want to help students recognize new ways of viewing geometric figures.

Then, by using the new lenses of "perpendicular" and "parallel," students will sort quadrilaterals and define trapezoids, parallelograms, and rhombi. After students develop the understanding of the definitions and properties of each type of quadrilateral, students will learn to draw those figures based on their prior learning.

In this way, students will repeatedly engage in sorting activities and activities of solving novel problems by making use of prior learning throughout the unit. Through these activities, we hope to develop students' abilities to identify similarities and differences, as well as their abilities to apply their prior learning based on solid understanding.

## 5 About the Students (Grade 4 Classroom 1)

### (1) From a survey



① Although almost 90% of students responded positively to "2. Do you understand mathematics lessons?" more than 30% of students responded negatively to "1. Do you enjoy mathematics lessons?"

② Although almost 90% of students responded positively to "4. Do you try to listen carefully to other people's ideas during mathematics lessons?" about 30% of students responded negatively to both "3. Do you try to share your ideas during mathematics lessons?" and "5. Do you like the discussion time in mathematics lessons?"

From observation ①, we can say that a fairly significant part of the students "do not always enjoy mathematics lessons, but they are understanding the materials discussed in the lessons." From observation ②, we can say that about the same proportion of the students "listen carefully to the teacher and other students in the class, but they do not

often volunteer to share their ideas. Moreover, they do not enjoy discussion mathematics lessons, and they probably do not volunteer their ideas even in the group discussion."

This tendency can be sensed during everyday mathematics lessons, and only a certain group of students seem to raise their hands to share their ideas. In addition, a good number of students will preface their ideas by saying, "I might be wrong, but..." These observations also suggest that some of the students find it difficult to share their ideas and participate in discussion.

To deal with these issues, we have been implementing several strategies. Those strategies include: try to pose questions in such a way that what students must think about and address is clear; participate in class discussion indirectly by using hand signals; and creating a student-centered discussion atmosphere by having students call on next speakers. In addition, when students make good points in their own notebooks, we try to share it with the whole class as a model of exemplary ideas and value their contribution to our learning.

In teaching of this unit, in order to continue to address these issues, we will emphasize the use of small group (3-4 students) discussion time. This is because we feel students are more willing to share their ideas with a smaller number of people. Moreover, instead of just simply presenting their ideas, we want students to come up with a group consensus. This additional task will, hopefully, result in more active discussion in the group.

## (2) Current state of the students (from the readiness test)

Content	All correct	Partially correct	All incorrect
① Students can construct isosceles triangles using compass. (Skills)	53 %		47%
② Students can know the size of a right angle, and express other angles in terms of the number of right angles. (Knowledge)	83%	14%	3%
③ Students can identify geometric shapes with their correct names. (Knowledge)	50%	43%	7%
④ Students can think about properties of shapes made up of pieces of set squares. (Thinking)	20%	40%	40%
⑤ Students understand the property of vertical angles. (Knowledge)	53%	33%	14%
⑥ Students understand perpendicular and parallel lines. (Content of this unit)	17%	20%	63%

As we planned the unit, what we focused on were the shaded items in the table. From item ⑥, we can tell that the students in our class, with the exception of a very few, have no prior knowledge of the content of this unit. As for their prior learning, their success rates are not exceptionally high, but the number of students with very limited mastery is rather small. However, the results of item ④ suggests that many students may have difficulty reasoning with their prior knowledge.

In addition, from item ①, we can also see that many students have trouble with drawing/constructing figures. A more detailed results on drawing/construction items are as follows.

Students can construct isosceles triangles using compass. (Skills)	53%
Students understand the methods of drawing, but their skills are lacking.	7%
Students do not understand the methods of drawing.	37%
No response	3%

These results also support the observation that many of the students have difficulty applying their prior knowledge.

Based on these observations, we want to treat the basic/foundational ideas very carefully. Moreover, in teaching skills such as construction, we want students to fully master the use of tools such as set squares and compass. To do so, we want to figure out ways to incorporate many individual instruction opportunity with multiple teachers. Furthermore, in order to consolidate students' understanding, it is important that they will be asked to express their ideas in an orderly manner using their own words. This will help them reflect on and organize their ideas. To do so, we want to emphasize discussion in our instruction.

## 6 "Students who can feel, think, and extend" in this unit

### (1) Students who can feel

- Students who feel the problem is their own and try to solve the problem independently  
 → Students are tackling problems using the lenses of parallel lines, perpendicular lines, lengths of the diagonals and the way the diagonals intersect, building on their prior knowledge of the number of sides and vertices, right angles, lengths of sides, and measure of angles.

### (2) Students who can think

- Students who can think about way to solve problems by making use of their prior knowledge.
- Students who can acknowledge other people's ideas and incorporate them into their own thinking.  
 → Students can solve problems using a variety of reasoning, applying ideas such as the definitions of perpendicular lines, parallel lines, and various quadrilaterals.

### (3) Students who can extend

- Students who can explain their solutions to others by actually drawing figures and using their own words instead of simply solving problems.
- Students who can make use of their prior learning in mathematics in various situations in their daily life and also in problems in other subject areas.  
 → Students can demonstrate how to construct figures and explain their ideas using their own words so that others can understand them.

## 7 Situations in this unit where discussion will be incorporated

- Situations in which students learn the definitions of perpendicular and parallel lines and identify which cases are which.
- Situations in which student think about ways to draw perpendicular or parallel lines using set squares.

- Situations in which students sort quadrilaterals by focusing on the number of pairs of parallel sides.
- Situations in which students investigate properties of parallelograms.
- Situations in which students think about ways to draw parallelograms using their properties.
- Situations in which students think about ways to draw rhombi using their properties.
- Situations in which students make various quadrilaterals using diagonals.

## 8 Unit Plan

#	Goal	Learning Activity	Main Assessment Standard
<b>(1) Ways lines intersect (2 lessons)</b>			
1	<ul style="list-style-type: none"> <li>○ Through activities to investigate ways 2 lines intersect, students will learn the definition of perpendicular lines, and they can distinguish perpendicular lines from those that are not.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate ways 2 lines intersect.</li> <li>• Learn the definition of "perpendicular" lines.</li> </ul>	<p>[Interest] Students try to investigate ways lines intersect by focusing on the angles formed by the lines.</p> <p>[Knowledge] Students understand the definition of perpendicular lines.</p>
2	<ul style="list-style-type: none"> <li>○ Students will learn to draw perpendicular lines using set squares.</li> </ul>	<ul style="list-style-type: none"> <li>• Think about ways to draw perpendicular lines using set squares.</li> <li>• Student draw perpendicular lines.</li> </ul>	<p>[Thinking] Student think about and explain ways to draw perpendicular lines using set squares by focusing on the right angles in set squares.</p> <p>[Skills] Students can draw perpendicular lines using set squares.</p>
<b>(2) Ways lines are arranged (4 lessons)</b>			
3	<ul style="list-style-type: none"> <li>○ Through activities to investigate ways 2 lines are arranged, students will learn the definition of parallel lines, and they can distinguish parallel lines from those that are not.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate how lines are arranged.</li> <li>• Learn the definition of parallel lines.</li> <li>• Investigate sides of rectangles that are perpendicular and parallel to each other.</li> </ul>	<p>[Skills] Students can distinguish parallel lines and those that are not.</p> <p>[Knowledge] Students understand the definition of parallel lines.</p>

4	<ul style="list-style-type: none"> <li>○ Students will understand properties of parallel lines such as they will intersect another line at the same angle and the distance between them is constant.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate angles formed by parallel lines and another line.</li> <li>• Summarize the property that the parallel lines will intersect with another line at the same angle.</li> <li>• Investigate the width between parallel lines.</li> <li>• Summarize the property that the width between parallel lines is constant.</li> <li>• Learn that we only use the term parallel when the geometric figures are lines and deepen their understanding of parallel lines.</li> <li>• Understand the origin of the Chinese characters used for the term "parallel" and deepen their understanding of parallel lines.</li> </ul>	<p>[Knowledge] Students understand properties of parallel lines such as they will intersect another line at the same angle and the distance between them is constant.</p>
5	<ul style="list-style-type: none"> <li>○ Students will learn to draw parallel lines using set squares.</li> </ul>	<ul style="list-style-type: none"> <li>• Think about ways to draw parallel lines using set squares.</li> <li>• Draw parallel lines.</li> </ul>	<p>[Thinking] Students can think about and explain ways to draw parallel lines by focusing on the property that corresponding angles are congruent.</p> <p>[Skills] Students can draw parallel lines.</p>
6	<ul style="list-style-type: none"> <li>○ Students understand perpendicular and parallel lines on a grid paper.</li> </ul>	<ul style="list-style-type: none"> <li>• Think about ways to draw perpendicular and parallel lines using the lines on a grid paper.</li> </ul>	<p>[Knowledge] Students can use the lines on a grid paper to distinguish perpendicular lines and those that are not and also parallel lines and those that are not.</p>

(3) Various quadrilaterals (6 lessons)			
7	○ Through activities of sorting quadrilaterals, students will understand the definitions of trapezoids and parallelograms.	<ul style="list-style-type: none"> <li>• Sort given quadrilaterals.</li> <li>• Learn the definitions of trapezoids and parallelograms.</li> <li>• By using the lines on a grid paper or given parallel lines, draw trapezoids and parallelograms.</li> </ul>	<p>[Interest] Students try to sort quadrilaterals by focusing on the number of pairs of parallel sides.</p> <p>[Knowledge] Students understand the definitions of trapezoids and parallelograms.</p>
8	○ Students will understand the properties of parallelograms.	<ul style="list-style-type: none"> <li>• Investigate the lengths of sides and measures of angles to identify properties of parallelograms.</li> <li>• Summarize the properties of parallelograms.</li> <li>• Investigate the common characteristics between rectangles and parallelograms to deepen their understanding of parallelograms.</li> </ul>	<p>[Thinking] Students can identify and explaining the properties of parallelograms by considering the relationships of sides, lengths of sides and measurements of angles.</p> <p>[Knowledge] Students understand the properties of parallelograms.</p>
9	○ Students can construct parallelograms.	<ul style="list-style-type: none"> <li>• Think about ways to construct parallelograms.</li> <li>• Construct parallelograms by making use of the definitions and properties of parallelograms.</li> </ul>	<p>[Thinking] Students can think about and explain ways to draw parallelograms by considering the definition and properties of parallelograms.</p> <p>[Skills] Students can construct parallelograms.</p>
10		<ul style="list-style-type: none"> <li>• Engage in application problems.</li> </ul>	
11	○ Students will learn the definition and properties of rhombi and can construct them.	<ul style="list-style-type: none"> <li>• Learn the definition of rhombi.</li> <li>• Summarize the properties of rhombi.</li> <li>• Construct rhombi.</li> <li>• Investigate the common characteristics of squares and rhombi to deepen their understanding of rhombi.</li> </ul>	<p>[Thinking] Students can identify and explaining the properties of rhombi by considering the relationships of sides, lengths of sides and measurements of angles.</p> <p>[Skills] Students can construct rhombi.</p>
12	○ Through mathematical activities, students will deepen their understanding of the unit contents and increase their interest in quadrilaterals.	<ul style="list-style-type: none"> <li>• Make tessellations using quadrilaterals.</li> <li>• Look for quadrilaterals in their surroundings.</li> <li>• Learn about isosceles trapezoids and kites.</li> </ul>	<p>[Interest] Students try to make use of what they learned as they engage in various activities.</p>

(4) Characteristics of diagonals of quadrilaterals (2 lessons)			
13	○ Students will understand the definition and properties of diagonals of quadrilaterals.	<ul style="list-style-type: none"> <li>• Connect vertices of various quadrilaterals and investigate their characteristics.</li> <li>• Learn the definition of "diagonal."</li> <li>• Summarize properties of diagonals of various quadrilaterals.</li> <li>• Investigate diagonals in isosceles trapezoids and kites to deepen their understanding of diagonals.</li> </ul>	<p>[Thinking] Students grasp the relationships of quadrilaterals by considering the characteristics of diagonals.</p> <p>[Knowledge] Students understand the definition and properties of diagonals in quadrilaterals.</p>
14	○ Students will learn that triangles obtained by partitioning rectangles, parallelograms and rhombi are congruent, and they will use those triangles to form various quadrilaterals.	<ul style="list-style-type: none"> <li>• Investigate 2 triangles obtained by partitioning rectangles, parallelograms and rhombi.</li> <li>• Compose various quadrilaterals using these triangles.</li> </ul>	<p>[Skills] Students can make various quadrilaterals using 2 congruent triangles.</p> <p>[Knowledge] Students understand that 2 triangles obtained by partitioning certain quadrilaterals are congruent.</p>
Unit Summary (2 lessons)			
15	○ Students will solve problems applying what they learned in the unit.	<ul style="list-style-type: none"> <li>• Work on problems in the problem set in the textbook.</li> </ul>	[Skills] Students can solve problems applying what they learned in the unit.
16	○ Students will solidify their understanding of contents in the unit.	<ul style="list-style-type: none"> <li>• Work on problems in the end-of-unit problem set.</li> </ul>	[Knowledge] Students have mastered the content of the unit.

## 9 About the lesson

### (1) "Feel, think, and extend" in this lesson

[Feel] Students who devise a plan to construct parallelograms by making use of their prior knowledge and persist in tackling the task.

[Think] Students who can think about ways to construct parallelograms using the definition and properties of parallelograms.

[Extend] Students who can explain what property (or properties) they used to construct parallelograms.

### (2) Discussion times in this lesson and strategies to support them

① Discussion to clearly understand the learning task (whole class)

In order for students to engage in a learning task independently, it is important to motivate them. It is important that the teacher presents the task in a way to pique students' interest so that they will say, "I want to try it" or "I want to solve it." It is also important that students feel the need for solving the task.

Therefore, we will propose a problem situation that connects students' mathematics learning and their school life. The proposal is, "Let's make a display full of various parallelograms to welcome - and surprise - our friends from Kanayama Elementary School who will be visiting us next month." (This task is coordinated with the activity in the Art curriculum.) We want to have many different color/shapes/sizes of parallelograms all over our classroom walls to welcome our friends. This way, the need to create various parallelograms efficiently will be created.

After this proposal is made, the teacher will demonstrate how to draw a parallelogram by first drawing side BC, then angle B and finally side AB. Then, the teacher will complete the parallelogram by eye-balling the remaining sides, making them intentionally close but also obviously not a parallelogram (so that students might think "That's close"). As the teacher tries to draw a parallelogram, we want to draw out students' own problem such as "I want to draw true and beautiful parallelograms," "I want to think about ways to draw parallelograms," and "I think I have an idea on how to draw parallelograms."

## ② Strategies to have active discussion times

After students clearly understood the task, students will engage in independent problem solving. We will have a worksheet in which there is a space for students to record the sequence of their steps in words. We hope that by recording each step as students construct their parallelograms, they can share their methods in an orderly manner so that others can understand more easily. Furthermore, in order for students to make use of their prior learning, various posters summarizing what they have been studying will be placed on the classroom walls so that students can constantly consider them.

## ③ Discussion with the teacher

For students who are having difficulty constructing parallelograms on their own, the teacher will gather them together and have a discussion time to look back on the definition and properties of parallelograms and how to draw parallel lines. If the number of students is large, we will first suggest to use the definition, "there are 2 pairs of parallel sides," to construct parallelograms. This is because students have studied methods of drawing parallel lines in 2 lessons prior to this research lesson. In addition, we believe it is easier for students to imagine parallel lines from the name, "parallelograms." Since students have learned to construct isosceles triangles and equilateral triangles using a compass, depending on students' understanding, we may discuss the method utilizing the property, "opposite sides are equal in length."

Because this discussion is conducted with students who were having difficulty drawing parallelograms on their own, there is a risk that this session will turn into a teacher-centered teaching by telling. In order to avoid this risk, the teacher will try to pose questions such as the followings at key moments so that it will become truly a discussion time: "What do you think we should do next?" "What property do you think we should use?" "What tool do you think will help us?"

④ Discussion to find commonalities (in small group)

After the independent problem solving time, students will be sharing their ideas in small groups of 3-4 students. [Students do many school related activities, both academic and non-academic, in the same groups.] Students will explain their methods to other members of the group, and they will identify commonalities in their methods. Then, they will try to identify and verify which property (or properties) of parallelograms that justify the commonalities. In addition, they will discuss to make sure each one's method is indeed a valid approach.

⑤ Discussion to seek better ideas among many ideas (in small group)

After discussion ④, students will remain in the groups and continue their discussion. At this point, the focus of the discussion is to identify the methods that is "fast & simple" from various ideas that have been presented. For example, students might consider the number of steps involved in construction as a criterion for a "fast" method. For a "simple" method, they might consider the number of tools used in construction. Some students might propose "accuracy" as a criterion, but since we want to focus today's discussion on the definition and properties of parallelograms, we will try not to get too deeply into this idea. In some cases, students may combine parts of several methods to create a new method.

This discussion should start from students' sharing what they wrote in the worksheet. After all students shared their ideas, the groups are instructed to come up with one idea to be shared to the whole class and write it on the whiteboards that have been distributed.

⑥ Discussion to seek better ideas among many ideas (whole class)

After each group shared their groups' methods, we will have a whole class discussion to decide which idea (or ideas) is "fast and simple." Through this discussion, we want to focus on the following 3 methods.

- i. Using 2 pieces of set squares, draw a pair of parallel lines to construct parallel sides. (about 2 steps using 2 pieces of set squares)
- ii. Using a compass, construct a pair of opposite sides that are equal in length. (about 2 steps using a compass)
- iii. Using a protractor, draw construct opposite sides by making use of the congruent angles property. (about 2 steps with a protractor)

(3) Goals of the lesson

- Students can think about ways to construct parallelograms.
- Students try to discuss with your friends to solve problems based on their prior learning.

(4) Assessment standards

- Students think about and explain ways to construct parallelograms using the definition and properties of parallelograms. (Mathematical Way of Thinking)
- Students can construct parallelograms. (Mathematical Skills)

(5) Flow of the lesson

	Main questions and anticipated students' responses	Discussion Activities	<ul style="list-style-type: none"> <li>○ Instructional points of consideration</li> <li>● Assessment</li> </ul>
Introduction/Look back	<p>1. Look back on what was discussed in the prior lesson</p> <p>T: (Posting a parallelogram on the blackboard) What is this shape?</p> <p>S: It's a parallelogram.</p> <p>T: Can you tell us how you know it is a parallelogram?</p> <p>S: Because both pairs of opposite sides are parallel.</p> <p>S: Because both pairs of opposite sides are equal in th length.</p> <p>S: Because both pairs of opposite angles are congruent.</p> <p>T: Thos were the characteristics of parallelograms, weren't they. Let's keep those characteristics in mind as we tackle today's lesson.</p>	<p>Discussion to look back on prior learning that will be the foundation for today's lesson. (Whole class)</p>	<ul style="list-style-type: none"> <li>○ Make use of posters showing students' prior learning so that they may be able to utilize them in today's learning.</li>   <li>○ Re-affirm the definition and properties of parallelograms that will be used to justify various steps in today's lesson.</li> </ul>

Identify the Mathematical Task	<p>2 Understand' today's task</p> <p>T: What do you think about the idea of making parallelogram displays by using what we've been learning to surprise our friends from Kanayama Elementary School who will visiting us next month?</p> <p>S: Yes, we want to do it.</p> <p>T: OK, I will demonstrate how to draw a parallelogram.</p> <p>S: I don't think the parallelogram you drew isn't really a parallelogram.</p> <p>T: OK, let's think about ways to construct parallelograms.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Problem: Let's think about ways to construct parallelograms.</p> </div> <p>T: First, we will draw side BC, then side AB.</p> <p>Now, we know 3 over the vertices of the parallelogram. How can we complete this parallelogram?</p> <p>S: If we find where vertex D is, then we can complete the construction.</p>	<p>① Discussion to clearly understand the learning task (whole class)</p>	<p>○ Using a ruler only, draw a quadrilateral that is close to but not quite a parallelogram (so that students might think, "That's very close, but...").</p>
Devise a plan	<p>3. Share plans to tackle the task</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Task: What do we need to do to complete the construction?</p> </div> <p>T: Let's think about strategies to tackle this task. Which property should we use? What tool should we use (and how)?</p> <p>S: To make the opposite sides parallel, we can use 2 pieces of set squares.</p> <p>S: To make the length of opposite sides equao, we can use a compass.</p> <p>S: To make the opposite angles equal, we can use a protractor.</p>		

Independent Problem Solving	<p>4. Based on own strategies, construct parallelograms and record the steps in the worksheet</p>	<p>③ Discussion with the teacher (small group)</p>	<ul style="list-style-type: none"> <li>○ Have students turn their desks so that they are facing the side wall where the posters showing their prior learning are displayed.</li> <li>○ For those students having difficulty constructing on their own, gather them in a separate location in the room to have a discussion with the teacher and obtain hints.</li> <li>● Students can construct parallelograms. (Skills) [Worksheet]</li> </ul>
Sharing	<p>5. Share their ideas in small groups</p> <p>T: Please share your ideas in your usual groups. As you listen to each other's idea, think about the similarities in your methods.</p> <p>S: What's similar is that we were all trying to use the property, opposite sides are equal in length, but some of us used a compass while others used set squares.</p> <p>5. In small groups, develop a better method</p> <p>T: Now, as a group, try to come up with a better method to construct parallelograms.</p>	<p>④ Discussion to find commonalities (in small group)</p> <p>⑤ Discussion to seek better ideas among many ideas (in small group)</p>	<ul style="list-style-type: none"> <li>○ Have students use their worksheet to share the steps of their construction.</li> <li>○ Suggest students to actively engage in discussion by adding on to other's ideas or using hand signals to express their reactions, if appropriate.</li> </ul>
Sharing	<p>6. Identify better ideas from many</p> <p>T: We are going to have each group share what they came up with.</p> <p>T: Which idea do you think is a better one? Can you please tell us why you think it is better.</p>	<p>⑥ Discussion to seek better ideas among many ideas (whole class)</p>	

	<p>S: I think Group #'s idea is very good because it is fast and simple.</p> <p>S: I also think that idea is good because we need only a few steps.</p> <p>S: I think it is a good idea because it uses only a few tools.</p> <p>S: If we use a compass, we don't need a ruler to measure the lengths of sides.</p>		<ul style="list-style-type: none"> <li>○ Suggest, if necessary, that "fast" means the number of steps is small, and "simple" means the number of tools is small.</li> <li>○ Since we are focusing on finding out the location of vertex D, we will not count the ruler as a tool nor drawing of a side as a construction step.</li> </ul>
Summary and Reflective Journal Writing	<p>7. Summarize today's lesson</p> <p>T: What is necessary when you are constructing a parallelogram?</p> <p>S: To make use of the characteristics of parallelograms.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Summary: We can construct parallelograms by making use of their characteristics such as parallel sides, lengths of sides and measures of angles.</p> </div> <p>8. Write journal entries and share</p> <p>S: In today's lesson, what we have been learning previously were very useful. I want to make use of my prior learning in future learning.</p>		<ul style="list-style-type: none"> <li>○ Connect to the idea that "making use of prior learning" is important for problem solving</li> <li>● Students think about and explain ways to construct parallelograms by making use of the definition and properties of parallelogram. (Thinking)</li> </ul> <p>[Worksheet/Sharing]</p>