

HUE RISE Resource Series No.2

# **Practical Introduction to Multi-grade Teaching in Japan**

Hokkaido University of Education  
Research Institute for Remote and Small School Education  
(HUE RISE)

## Preface

This English booklet is a detailed version of “the Guidebook for Multi-grade Teaching in Remote Areas” (2021), published in Japanese by Hokkaido University of Education - Research Institute for Remote and Small School Education (HUE RISE). It expands upon our previous publication, “HUE RISE Resource Series No.1 - Brief Introduction to Multi-grade Teaching in Japan” (2020).

Originally the Japanese guidebook was designed for teaching our university students and assisting their internship programs. It has been downloaded many times by students, in-service teachers, and education administrators not only in Japan but also in many other foreign countries.

Multi-grade classes can be seen everywhere both in industrial and developing countries. Some are small-sized, and some are bigger due to the degree of remoteness and/or the availability of teachers. Every country has their own creative ways to manage multi-grade classes based on their educational policies and culture. However, many teachers tend to struggle to manage multi-grade teaching particularly, in developing countries. Educational development projects implemented by JICA (Japan International Cooperation Agency) and NGOs focus on teaching and managing multi-grade classes and they sometimes request us to make professional contributions. We sincerely hope this Japanese style of multi-grade teaching will be helpful to other countries, however, no system is perfect and so we hope to continue to develop and learn by cooperating and sharing knowledge and techniques with all nations.

This paper mainly contains examples of teaching and lesson plans, teaching techniques, assessment viewpoints, and styles of learning environment. It is also recommended to refer to the previously published simplified version which covers some of the basic principles.

We hope this publication will be useful to anybody who is involved in multi-grade teaching around the world.

May 2021

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The latest Japanese and English version of this booklet can be downloaded from the link below.

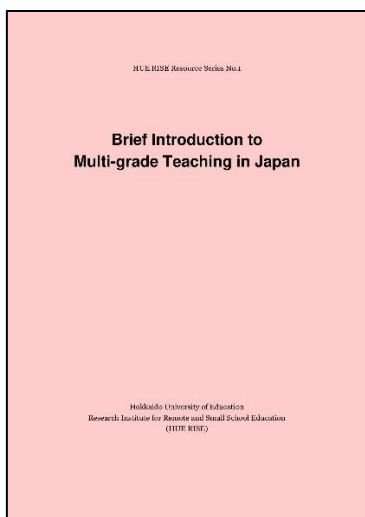
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<The full version in Japanese>



- 『へき地・複式学級における学習指導の手引』  
“Guidebook for Multi-Grade Teaching in Remote Areas”
- Edited & Published by Hokkaido University of Education - Research Institute for Remote and Small School Education (HUE RISE)
- Published in March 2019

<The simplified version in English>



- “HUE RISE Resource Series No.1: Brief Introduction to Multi-grade Teaching in Japan”  
『日本の複式学級における学習指導の手引』  
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# 1. Designing a Grade-based Teaching Plan

## 1.1 Before Entering Each New Unit

In the process of writing a grade-based teaching plan, the teacher needs to understand the subjects of both grades thoroughly and allocate each grade teaching hours in a unit. Also, the teacher should consider the learning activities of both student grades in each lesson (45 minutes in primary schools in Japan) and how to combine the contents of each in the teaching process.

It is important to define the objectives of the units for each grade according to the curriculum followed. Assessment criteria, its elements and assessment methods should be prepared in the plan. Characteristics of the four elements of assessment are described in section 2.4 (p 3-4).

**Chart 1. Description of Objectives and Assessment Criteria for Unit**

	Grade 3				Grade 4			
Name of Unit	“XXXXXXXXXXXX”				“XXXXXXXXXXXX”			
Objectives of Unit	-XXXXXXXXXXXXX -XXXXXXXXXXXXX				-XXXXXXXXXXXXX -XXXXXXXXXXXXX			
Assessment Criteria	1	2	3	4	1	2	3	4
	-Attitude -Interest -Willingness	-Expression -Judgement -Thinking	-Skills	-Understanding -Knowledge	-Attitude -Interest -Willingness	-Expression -Judgement -Thinking	-Skills	-Understanding -Knowledge

## 1.2 Designing a Grade-based Teaching Plan

In the brief introductory version of this booklet, a technique of shifting schedules called Zurashi in Japanese was introduced. It is a common technique in multi-grade teaching to enable a balanced combination of different learning content between two grades both in the process of the four sections of teaching and learning and the series of lessons as a whole unit.

The following chart shows how both grade 3 and 4 students could experience Zurashi in the whole unit. Comparatively, the beginning and end of each unit need more direct and intensive teaching time than other stages in the teaching plan. When preparing the plan, the teacher should carefully consider and decide upon which assessment criteria to employ.

**Chart 2. Zurashi and Assessment Criteria in Unit Teaching**

Grade 3					Grade 4				
Contents	Assessment Criteria				Contents	Assessment Criteria			
	1	2	3	4		1	2	3	4
1 - Beginning of Unit I	✓	✓			6 - Unit I		✓		
2 - Unit I		✓		✓	7 - End of Unit I			✓	
3 - Unit I			✓		1 - Beginning of Unit II	✓			
4 - End of Unit I			✓		2 - Unit II		✓		✓
1 - Beginning of Unit II	✓		✓		3 - Unit II			✓	
2 - Unit II		✓			4 - Unit II		✓		
3 - Unit II			✓		5 - End of Unit II	✓		✓	

Assessment Criteria: 1 - Interest/Willingness/Attitude, 2 -Thinking/Judgement/Expression, 3 - Skills, 4 - Knowledge/Understanding

### 1.3 Designing a One-hour Lesson Plan

Based on a framework with four sections of teaching and learning, the degree of the teacher’s involvement and distribution of time should be considered when producing a one-hour lesson plan, including the points below.

- Lesson objective and assessment criteria should be prepared.
- Time for direct teaching and for student self-learning should be clearly separated and combined in the lesson plan.
- The students’ self-learning process should be considered and any materials necessary to it should be produced.

**Chart 3. Framework with Four Sections of Teaching-Learning Process**

Grade 3		Grade 4	
Teaching-Learning Process	Teacher's Movement		Teaching-Learning Process
Section A Recognizing Problems	Direct Teaching	Indirect Teaching	Section D+ Familiarization and Application (previous lesson)
Section B Solving Problems	Indirect Teaching	Direct Teaching	Section A Recognizing Problems
Section C Complete Understanding	Direct Teaching	Indirect Teaching	Section B Solving Problems
Section D Familiarization and Application	Indirect Teaching	Direct Teaching	Section C Complete Understanding

Before planning lessons, it’s important to consider what teaching style would be effective to achieve the objectives of each lesson and/or unit.



## 2. Enriched Assessment Activities

### 2.1 Basic Issues for Assessment of Learning Achievement

To produce lessons that all students understand and can participate in, it's important to assess the achievement against assessment criteria and use the results to improve teaching methods. The assessment activities also give suggestions to review the quality of the learning and teaching process and to enrich teaching techniques for each individual student.

### 2.2 Period of Assessment

Teachers can conduct several types of assessment to evaluate students' levels of understanding at specific periods of time by preparing paper tests.

- Pre-Assessment: checking prior understanding and degree of interest at the beginning of the lesson and/or unit.
- Formative Assessment: checking understanding during the lesson process.
- Summative Assessment: checking understanding after the lesson or at the end of the unit.

### 2.3 Procedure of Assessment

The following steps are the standard procedure to assess the attainment of students.

- 1) Set assessment objectives
- 2) Clarify assessment elements
- 3) Choose setting and opportunity for assessment
- 4) List and consider assessment tools
- 5) Collect, record and analyze assessment results
- 6) Give assessment results to students



#### <What are Assessment Criteria?>

Assessment criteria are the standards to judge progress and to achieve the objectives in the government curriculum. The objectives are specifically described as the students' learning attainment not only in each subject but also in each field of study and individual lesson content.

### 2.4 The Four Elements and Aims

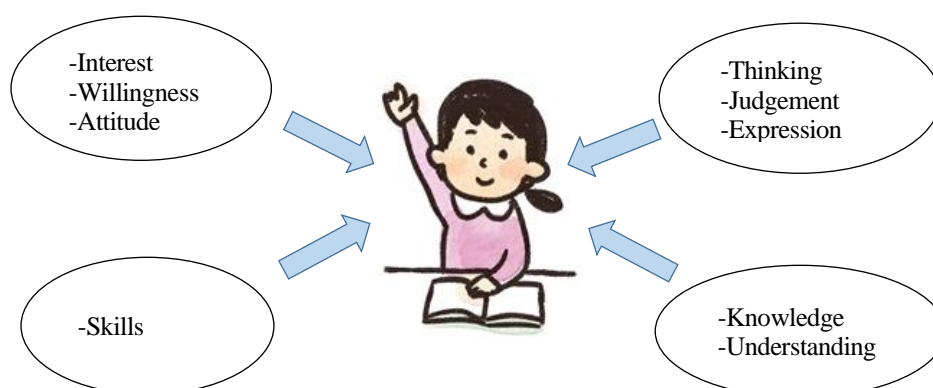
In the learning and teaching process, it is important to grasp progress students make toward objectives in each subject. Furthermore, assessment criteria should be set up to evaluate learning progress with the four elements below and utilized to support individual students.



**Chart 4. Four Elements of Assessment Criteria**

Assessment Criteria	Contents of Assessment
1. Interest/ Willingness/ Attitude	Does the student maintain interest in the content of each subject and acquire the willingness and attitude to consider the themes by him/herself?
2. Thinking/ Judgement/ Expression	Does the student acquire the abilities of thinking, judgement, and expression to solve questions through the application of knowledge and skills in each subject?
3. Skills	Does the student acquire the skills taught in each subject?
4. Knowledge/ Understanding	Has the student gained the knowledge and understanding of the important concepts taught in each subject?

From “Improving and Enriching Assessment Criteria” (Hokkaido Pref. Board of Education, March 2012)



### 2.5 Examples for Assessment Elements and Aims

When the four elements of Assessment Criteria are written in lesson plans, they can be arranged into appropriate categories according to each subject as shown below.

**Chart 5. Example of Assessment Criteria for “Japanese language”**

Interest, willingness, and attitude toward the Japanese language	Speaking and listening abilities	Writing ability	Reading ability	Knowledge and understanding about the Japanese language
Willing to improve communication ability in the Japanese language and develop an interest and love for it.	Discussing purposely on set targets and development of individual ideas.	Writing purposely on set targets and development of individual ideas.	Understanding the meaning of written sentences and stories and development of individual ideas.	Writing characters and sentences correctly and understanding and utilizing traditional lingual culture, features, and rules.

**Chart 6. Example of Assessment Criteria for “Mathematics”**

<b>Interest, willingness and attitude toward Mathematics</b>	<b>Mathematical thinking</b>	<b>Skills about Quantity and Shapes</b>	<b>Knowledge and understanding about Quantity and Shapes</b>
Developing interest in mathematics, realizing the importance and pleasure of the activities, and willingness to apply knowledge gained to daily life and further lessons.	Understanding the relationship between daily life and mathematics, considering mathematics at a deeper level, expressing views logically in order to acquire the basic ability of mathematical thinking.	Acquiring skills in mathematical expressions and processes regarding Quantity and Shapes.	Having a deep understanding of Quantity and Shapes and their meanings and characteristics.

## 2.6 Devised Methods of Assessment

### 1) Importance of Observation by Teachers

To assess the learning capacity and abilities acquired by each student and how much his/her attitude and potential have improved and increased, observation of the student’s expressions, speech, and behavior is necessary.

<Observation Points (Example) >

- ① Does the student think about points of confusion and attempt to solve them enthusiastically?
- ② Does the Student summarize the problems they have solved and express them in their own way?
- ③ In group learning sessions, do students cooperate to confirm and clarify their own ideas and thoughts?
- ④ Does the student apply what they have learnt and show motivation for new challenges and learning?

### 2) Self-Assessment and Mutual Assessment

To encourage students to learn continuously, they need to have opportunities to review what they have learned by themselves. Self-assessment to improve their learning process and mutual assessment to receive praise and learn in groups are recommended.

**Chart 7. Self-Assessment**

<b>Means of Self-Assessment</b>	<b>Considerations</b>
<ul style="list-style-type: none"> <li>- Writing (notes, essays, etc.)</li> <li>- Checklists</li> <li>- Assessing own work (newspaper, Kamishibai, etc.)</li> <li>- Physical expression (dramatization)</li> <li>- Discussion</li> </ul>	<ul style="list-style-type: none"> <li>- Let them set own targets</li> <li>- Let them assess aspects of their emotions</li> <li>- Let them gain awareness and new challenges</li> <li>- Let them think reasons after receiving assessment results</li> </ul>

## 2.7 Assessment in Small Classes

It is important to understand that there are always pros and cons when the teaching-learning process is assessed in small classes, as shown Chart 8.

**Chart 8. Features in Assessing a Small Class**

<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"><li>- Possible to watch each student and to assess according to each objective</li><li>- Possible to assess each student holistically</li><li>- Possible to conduct assessment easily and to set up multiple formative assessments</li><li>- Ease of follow-up teaching</li></ul>	<ul style="list-style-type: none"><li>- Difficult to assess some content if it needs to be supported by mutual cooperation with a group</li><li>- The results of assessments conducted but may be inaccurate due to the teachers' unconscious bias</li><li>- Ambiguity by subjectivity</li><li>- Teachers often create an expectation of what a student may achieve and fail to see the need for assessment.</li></ul>

## 2.8 Assessment to Further Develop Each Strength

In multi-grade classes, one strength is that a teacher can easily understand each student's learning progress due to the small-size of the class. However, the assessment tends to be one-sided sometimes because of a teacher's subjective views and/or difficulties caused by the period of indirect teaching. It is important to assess performance against well-prepared objectives and to reflect on the results to improve the teaching process.

Basically, the assessment is conducted in accordance with standard objectives defined by the government curriculum. The following three considerations should be followed in the process of actual assessments.

### **Considerations for Assessment**

1. Defining Objective: Define each teaching objective in every unit
2. Setting Assessment Criteria: Indicate detailed achievement criteria to measure students' performance.
3. Improving Teaching: Analyze assessment results to improve teaching approach.

## 2.9 Enriched Assessment Methods

The following methods are effective in enriching assessment process.

Assessment Criteria	Assessment Method
1. Interest/ Willingness/ Attitude	speech and attitude during lessons, worksheets, reports, presentation etc.
2. Thinking/ Judgement/ Expression	worksheets, reports, note-taking
3. Skills	worksheets, note-taking, drawing and painting etc.
4. Knowledge/ Understanding	written examinations, worksheets

### 1) Assessment by Questioning

It is important to be clear about what aspects should be assessed in which phases of the learning process. Specific questions will contribute to draw effective answers for the assessment.

Students who often raise their hand or speak are not always highly interested and willing. A teacher should pay attention to the student's thinking process and speaking content and assess accurately according to the lesson objective.



### 2) Assessment by Worksheets

These records will also contribute to personal/closed assessment to understand the development of each student in a specific time period.

### 3) Assessment by Written Examinations

Written examinations are commonly employed for assessment; however, it is important to note that the results won't provide an entire picture of the student's learning performance.

<Relevancy between Teaching and Assessing Process>

The assessment of student's performance should be relevant to review the lesson processes and methods and to improve teaching techniques.



## 2.10 Considerations of Assessment in Lesson Plan

The following points should be considered when producing a lesson plan.

- Which phases in the learning process need to be assessed?
- What aspects do students need to focus on?
- Which method needs to be used for assessment?
- What help needs to be provided for students who fall behind in the class?

### Chart 9. Example Assessment Items in a Lesson Plan

**Grade Level:** 2

**Subject:** Japanese Language

**Name of Unit:** Read the series of stories and introduce what the student likes about the stories to friends.

**Lesson Objective:** To introduce what a student likes about the story, "Letters" and make some connections with other stories in the same series. (Reading)

**Lesson Assessment Standard:** To be able to introduce what a student likes about the story, "Letters" and make some connections with other stories in the same series. (Ability to read)

Chart 9. Example Assessment Items in Lesson Plan (Continued)

Grade 2			
Process	○ Student's Role	◇ Teacher's Considerations ■ Assessment Standard □ Means of Assessment ▲ Help students in need	Teacher's Movement
Section A Recognizing Problems	○ Understand the problem/theme based on the unit lesson plan (confirming language activities throughout the unit).  Write about what you like about the story "Letters" to introduce your opinions to your friends.	◇ Check the student's understanding of the story and how they are introducing scenes and illustrations, actions of characters, comparisons with other stories in the same series	Direct Teaching
	○ Confirm what content should be written on an introduction card. -Favorite scene -Reason the student likes it (Describing scenes and illustrations, actions of characters, comparisons with other stories in the same series.)	◇ Elicit reasons why students may like "Letters" or other stories in the series.	
Section B Solving Problems	○ Write an introduction card -The student looks for a point they like and reason why while reading "Letters" and then write the introduction card. -Mention the contents of other stories in the same series as well.		Indirect Teaching Direct Teaching
Section C Complete Understanding	○ Introduce the favorite scenes from "Letters" to each other while showing the introduction cards.	○ Emphasize examples and describe together with action and dialogue from other stories.  <Assessment> ■ To be able to introduce what the student likes about the story, "Letters" and make some connections with other stories in the same series. (Ability to read) □ Introduction card, presentation ▲ Let the students pay attention to the characters and scenes in "Letters" and other stories in the same series as well.	Direct Teaching



It is important to understand the relationship between the lesson objectives and the lesson assessment standard.



<Lesson Assessment Standard>  
Students' almost achieving the lesson objective would be able to Introduce what they like about "Letters" while describing common points in other stories and similar events and dialogue made by the characters such as "Gama-kun" and "Kaeru-kun".

<Example of a Student's Response>  
"Kaeru-kun wrote a letter to Gama-kun and they waited for letters from each other with happy feelings. That's my favorite part. Other stories also have many scenes where Kaeru-kun is kind to Gama-kun."

This is an example of how to support children who fall behind in class. At this moment, a teacher must speak in a creative way to motivate students receiving advice.

### 3. Designing a Unit Teaching Plan

#### 3.1 Setting a Unit Objective

A unit teaching plan is created by including contents from the annual teaching plan and prepared to facilitate teaching opportunities.

<Steps to Prepare>

- Clarify the annual teaching objectives and assessment standards.
  - ↓ ⇔ Actual academic level of the students and practical
  - ↓ use of local materials.
- Set up the unit objective and assessment standard, and clarify the learning contents.
  - ↓ ⇔ Consider the thinking process of students and distribution
  - ↓ of teaching hours.
- Include learning contents for a unit hour.

While considering the learning capacity and ability of the students, the unit objective is set up based on the objectives and contents of each subject written in the Government's Curriculum. It is important that it is also based on the students' actual situation and the progression of the teaching contents.

#### 3.2 Setting Unit Assessment Criteria

The assessment standard should be set up clearly by imagining specific and ideal conditions which enable the teaching objectives to be achieved.

### 3.3 Designing a Unit Teaching Plan - Mathematics

**Chart 10. Example of a Unit Teaching Plan (“Mathematics” at Primary Level)**

Unit Teaching Plan of Grade 3 - Mathematics					Unit Teaching Plan of Grade 4 - Mathematics								
Lesson Process	Objectives	Themes	Assessment Criteria				Lesson Process	Objectives	Themes	Assessment Criteria			
			1	2	3	4				1	2	3	4
1	Understand multiplication of a double-digit number $\times$ a single-digit number in figures.	Think how to calculate $23 \times 3$ .	✓	✓		✓	1	Understand the meaning of degrees as angles when rotated, the function and usage of a protractor, and "°" as a symbol to indicate degrees.	Check sizes of degrees.	✓			✓
2							2						
3	Understand multiplication of a double-digit number $\times$ a single-digit number in figures by moving up to the tens digit.	Think how to calculate $26 \times 3$ .		✓			3	Understand how to calculate angles using a right angle. Understand additivity of degrees by measuring the degrees of triangles.	Think how to indicate and measure degrees.			✓	
4	Understand multiplication of a double-digit number $\times$ a single-digit number in figures by moving up to the hundreds digit.	Think how to calculate $42 \times 3$ .		✓			4 - Lessons at the same time	Be able to think how to measure degrees of more than $180^\circ$ .	Measure degrees larger than $180^\circ$ .		✓		
5	Understand multiplication of a double-digit number $\times$ a single-digit number in figures by dealing with 0 (zero) in the process.	Think how to calculate $65 \times 3$ .			✓			5	Be able to draw angles.	Draw angles using a protractor.			✓
6	Understand multiplication of a triple-digit number $\times$ a single-digit number in figures.	Think how to calculate $312 \times 3$ .		✓			6	Be able to draw triangles.	Think how to draw the same shaped triangles.		✓		
7	Understand multiplication of a triple-digit number $\times$ a single-digit number in figures by moving up to the tens/hundreds digit.	Think how to calculate $253 \times 3$ .		✓	✓		7						
8	Understand multiplication of a triple-digit number $\times$ a single-digit number in figures by moving up to the thousands digit and dealing with 0(zero) in the process.	Think how to calculate $423 \times 3$ . Think how to calculate $302 \times 8$ .			✓	✓	8	Summarize this unit.	Understand deeply through exercises.			✓	
9	Understand the relationship of quantities by using tape diagrams and understand the concept of “- times ( $\times$ )” applied to division and multiplication.	Use lengths of tape A and B to show the concept of “-times ( $\times$ )”.		✓									
10	Be able to do mental multiplication.	Think how to multiply $23 \times 4$ mentally.		✓									
11	Exercise key points of this units.	Understand deeply through exercises.			✓								
12	Summarize this unit.	Understand deeply through exercises.			✓								

## Lesson Plan of Grade 3-Mathematics

### 1. Name of the Unit

-Multiplication by calculation with figures (Vol.1).

### 2. Unit Objectives

-To know to how to calculate “a double-digit number/triple-digit number  $\times$  a single-digit number” in figures based on methods such as a multiplication table.

-To master multiplication of “a double-digit number/triple-digit number  $\times$  a single-digit number”.

- To master simple mental multiplication.

### 3. Unit Assessment Standard

(1) Interest/willingness/attitude to Mathematics

-To understand it's possible to calculate “a double-digit number/triple-digit number  $\times$  a single-digit number” based on simple methods learned previously.

(2) Mathematical ways of thinking

-To understand “a double-digit number/triple-digit number  $\times$  a single-digit number” in figures and formulas based on simple methods learned previously.

(3) Skills about quantity and figures

-To master multiplication of “a double-digit number/triple-digit number  $\times$  a single-digit number”.

(4) Knowledge/Understanding about quantity and figures

-To understand how to calculate “a double-digit number/triple-digit number  $\times$  a single-digit number” in figures.

### 4. About the Unit

-Omitted.

### 5. System of the Unit

-Omitted.

### 6. Actual Situation of Students

-Omitted.

Remarks:

The general data items for No. 4-6 are not described here due to the priority of contents and the limited number of pages in this lesson plan.

## Lesson Plan of Grade 4-Mathematics

### 1. Name of the Unit

- Angles.

### 2. Unit Objectives

-To understand angles as results of rotation and the meaning of angle sizes and the units and measurements used.

-To understand units to show angles, “degrees”.

-To be able to measure and draw angles using a protractor.

### 3. Unit Assessment Standard

(1) Interest/willingness/attitude to Mathematics  
-To pay attention to angles and try to compare angle sizes to something familiar in students' daily lives.

(2) Mathematical ways of thinking

-To think of a total angle size based on smaller units by illustrating it with numbers.

(3) Skills about quantity and figures

-To master how to measure angles and draw angles using a protractor.

(4) Knowledge/Understanding about quantity and figures

-To understand angles as rotated areas and the meanings of angle sizes, unit degree ( $^{\circ}$ ), and measurement. To have a good understanding of angles.

### 4. About the Unit

-Omitted.

### 5. System of the Unit

-Omitted.

### 6. Actual Situation of Students

-Omitted.

Remarks:

The general data items for No. 4-6 are not described here due to the priority of contents and the limited number of pages in this lesson plan.



## 4. Clarification of Learning Stages

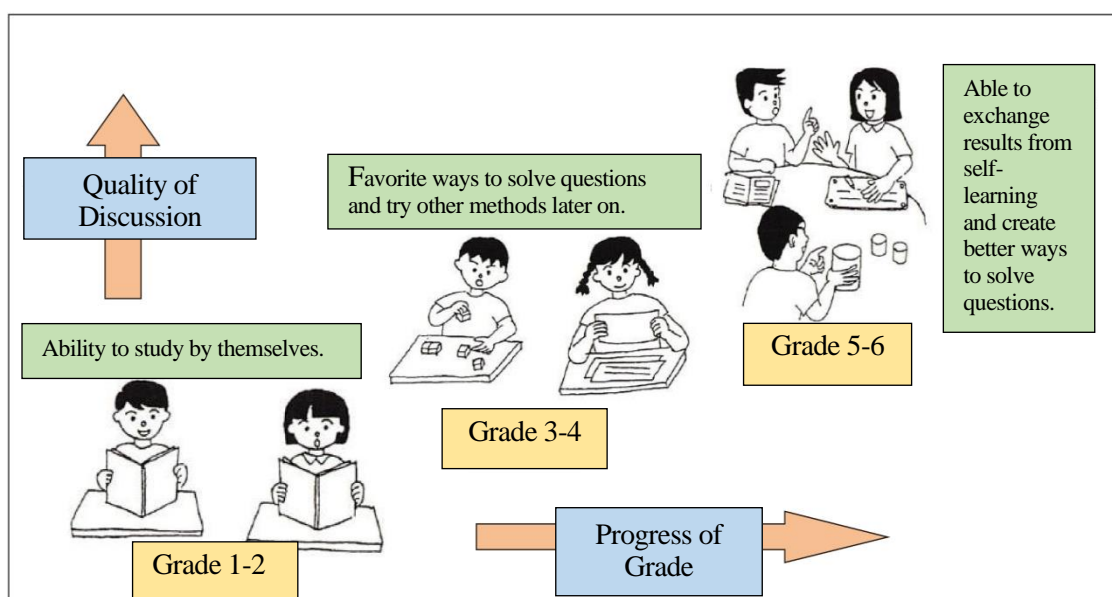
### 4.1 Systematic Ways to Learn

In multi-grade schools, the students are expected to master systematic learning methods during indirect teaching periods in the grade-based teaching approach. The learning stages should be clarified throughout the 6-year period in elementary school (3 years in junior high school) to achieve school education objectives together. Based on the below chart, teachers need to understand the characteristics of learning stages for each grade in the same classroom.

**Chart 11. Characteristics of Learning Stages 1**

Description	Grade 1-2	Grade 3-4	Grade 5-6
Image of the ideal student	To be able to keep promises for the classes and learn cheerfully.	To be able to know how to facilitate the learning process and learn ambitiously.	To be able to make a learning schedule by him/herself and learn independently.
Preparation to Learn	To be able to prepare learning materials for the next lesson.	To be able to review or prepare for lessons voluntarily at the appropriate time.	To be able to understand the summary of the previous lesson and to confirm their own learning themes.
Presentation Objectives	To be able to respond and present words until the ending when appointed.	To be able to present briefly with the appropriate volume and speed of speech.	To be able to present logically and simply.
Listening to Others	To be able to listen to a speaker until they finish while paying attention to him/her.	To be able to ask some questions and listen carefully.	To be able to listen to another's point of view and to contrast the differences with their own.
Discussion Objectives	To be able to present to each other facilitated by the teacher.	To be able to listen to another's presentation carefully and ask questions.	To be able to compare their own point of view with other's and to summarize the results of discussion.

**Chart 12. Characteristics of Learning Stages 2**



## 4.2 Development of Speaking Skills

The Grade Based Teaching Approach has comparatively much more time for indirect teaching. Therefore, fulfilling the indirect teaching time will lead to deepening learning using presentation, listening, and discussion activities without teachers. It's important to teach and consider how speaking and listening skills should be developed through the entire period of 6 years in elementary school (3 years in junior high school).

**Chart 13. How to Speak Up/Listen in Classroom**

	Model Speech	How to Listen
Lower Grade (Grade 1-2)	<ul style="list-style-type: none"> <li>- "My answer is ..."</li> <li>- "My answer is the same as it." "My answer is close to it." "I want to add to it."</li> <li>- "I have another answer."</li> </ul>	<ul style="list-style-type: none"> <li>- Turn towards a person and listen to him/her.</li> <li>- Listen to a person and compare how his/her idea is similar or different from their own idea.</li> <li>- Listen to a person's speech until they finish.</li> </ul>
Middle Grade (Grade 3-4)	<ul style="list-style-type: none"> <li>- "I think, the answer is ... because it is ..."</li> <li>- "My answer is the same as ..., but part of it ... is different."</li> <li>- "I have a question to ... How did you get it?"</li> <li>- "I would like to add some ideas."</li> <li>- "Is the idea of ... like ...?"</li> </ul>	<ul style="list-style-type: none"> <li>- Turn towards a person and listen to him/her.</li> <li>- Listen to a person and compare how his or her idea is similar or different from own idea.</li> <li>- Listen to a person's speech until they finish.</li> </ul>
Higher Grade (Grade 5-6)	<ul style="list-style-type: none"> <li>- "My idea is ... The reason why I think like that is ..."</li> <li>- "My answer is the same as ..., but part of it ... is different."</li> <li>- "I have a question to ... How did you get it?"</li> <li>- "I would like to add some ideas."</li> <li>- "Is the idea of ... like ...?"</li> </ul>	<ul style="list-style-type: none"> <li>- Turn towards a person and listen to him/her.</li> <li>- Listen to a person and compare how his/her idea is similar or different from own idea.</li> <li>- Listen to a person's speech until they finish.</li> <li>- Make clear when they understand or don't understand something.</li> </ul>

## 4.3 Lesson Progress Employing a Student Guide

In each step of the learning process, students need to understand how to make progress in the lesson by themselves and support should be provided by a student guide to facilitate each activity.

**Chart 14. Lesson Progression with a Student Guide (Grade 5-6 Students)**

Learning Process	The Role of the Student Guide
Recognizing Problems (Understanding Problems or Themes)	"Please read out today's problem." "What do you know about this problem, what do you want to pursue?" "Today's problem is about ..." "Please work on this ... (exercise) until ... (time)."
Solving Problems (Solve Them Individually)	"Please think and solve the problem individually." - Look at the textbook and materials, compare with previous lessons, think of various ideas, think about how to meet expectations, think and consider other viewpoints ...
Complete Understanding (Solve Problems Collectively and Summarize)	"Please share and discuss your results in a group." "... (name), please share what your group understands about the problem." "Do you have any questions/comments on the ideas from ... (name)?" "Let's summarize what we have learnt."
Familiarization and Application (Exercise)	"Please work on this exercise of ... until ... (time)." "Let's check the answers." "The homework is ..."

Remarks: The words in parentheses in the Learning Process are descriptions from the viewpoint of the problem-solving approach.

## 5. Enriched Indirect Teaching

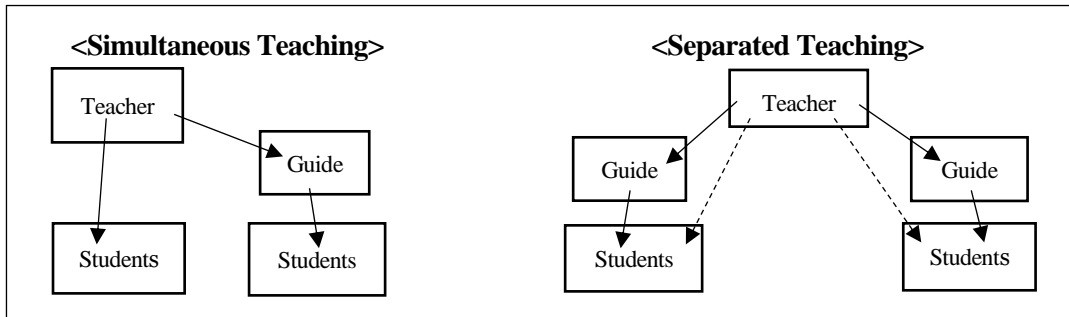
### 5.1 Student Guides and Student Leaders

To create effective indirect teaching, two major roles are usually taken by the students. Student guides can be described as assistants for the teacher or class representatives who take an important role in preparing, facilitating, and controlling indirect learning. On the other hand, student leaders are like class announcers whose duty is to let all other students in the class know the process or stages of the lesson. It is suggested that students take turns to be the leader. The details are described as follows.

### 5.2 Learning with Student Guides

Learning with a student guide is used to increase effectiveness during periods of indirect teaching in small groups. According to a facilitation plan prepared under supervision by the teacher, selected student guides will lead some sessions mainly in the period of indirect teaching.

**Chart 15. Simultaneous and Separated Teaching**



### 5.3 Aims and Roles of Student Guides

Learning with a student guide aims to facilitate the indirect teaching process effectively and efficiently and increase the quality of indirect teaching by developing an independent learning attitude. The major roles are described below.

**Chart 16. Roles of Student Guides**

Roles	Activities (Examples)
1. Preparation for Lessons	-Prepare balls for a physical education class. -Distribute papers in an art class.
2. Facilitation of Learning Sessions	-Conduct learning sessions following instruction cards and a facilitation plan.
3. Following the Rules	-Arrange the order of activities and caution students who misbehave.

<How to select guides>  
At first, it's easy to select a guide if you have students with leadership qualities. Later, it's desirable to train all students to take the role of the guide.



Source: National Federation for Research on Rural Education (1995), "Guidebook for Rural Education".

### 5.4 Types of Learning with Student Guides

When learning with guides, there are three teaching stages, the primary stage (Grade 1-2), the middle stage (Grade 3-4), and the Upper stage (Grade 5-6) according to the student’s development. The process starts with learning with cards, then moves to learning the basics and learning to step-up, and finally shifts to learning through discussion.


**Chart 17. Types of Learning with Student Guides**

Types	Key Points to Teach	
1. Learning with Cards	This is applicable to practice letters and concepts of numbers. With instructions with cards, students acquire the steps to learn and basic skills by being led by guides in the learning group.	Primary stage Grade 1-2
2. Learning the Basics	This is to learn, practice and familiarize basic knowledge and skills facilitated by a guide. The quality of the learning group is developed if the quick/accurate learners start encouraging the slow learners.	Middle stage Grade 3-4
3. Learning to Step-Up	Students can practice to make questions/answers by themselves for familiarization and application. Communicative speeches from each student become active and expanded for more the qualified group.	Upper stage Grade 5-6
4. Learning with Discussion	Based on the lessons previously learnt, there is a focus on creating and gaining new concepts through discussion. Through the training of speakers and listeners as well, the students develop ways to integrate previous knowledge with new information, and/or their own ideas to other student’s ones.	

### 5.5 Learning with Student Leaders

Learning with student leaders is a way to conduct lessons with leaders chosen from the students. The major roles of leaders are described below.

**Chart 18. Major Roles of Student Leaders**

<ol style="list-style-type: none"> <li>1. Follow the prepared flow of the learning.</li> <li>2. Ask students to contribute and give suggestions on simple matters.</li> <li>3. Set times for self-learning and group-learning.</li> <li>4. Summarize comments/ideas of the learning groups.</li> </ol>	<p>&lt; Teacher Replacements &gt;</p> <p>It is important for motivating students that they solve questions by themselves because it’s their lesson. For that, teachers need to provide encouragement, effective hints or clues, and appropriate further questions according to their</p> 
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### 5.6 Considerations when Conducting Learning with Student Leaders

There are some points to consider when conducting teaching/learning activities such as:

- Not to fix the role of the leader to the same student every lesson, students should take turns doing it.
- The student needs to understand role of the leader and how to conduct the lesson.

### 5.7 Procedure of Learning with Student Leaders

The chart below is an example of the learning procedure in the subject of Japanese language for the higher-grade students. Most of basic speech by the leader and group members could be used in other subjects.

**Chart 19. Learning Procedure in Japanese Language (for Grade 5-6)**

A leader	All group members
1. Are you ready to learn?	1. Yes, we are ready.
2. Tell (me) what you learned in the previous lesson?	2. We learned about ...
3. What are we going to learn today?	3. It's ...
4. ... (name), please read out the scene.	4. Yes. I'll read now.
5. Tell (me) what are we learning today.	5. Today we'll learn about ...
6. Teacher, tell us about today's lesson.	6. (Students pay attention to the teacher)
7. Learn individually for ... minutes.	7. (Learning by themselves)
8. Discuss it in your group for ... minutes.	8. (Moving desks/chairs and discussing)
9. Stop discussing in your group. To learn more about the theme, share what you discussed with all. - Talk about what the main character did. - Explain your ideas about theme. - Explain the reason why you think so.	9. (Stopping and moving desks/chairs) - He/she did ... He/she said ... - I think that ... - It's because it's written like ... The book said ...
10. We'll summarize today's lesson. - What did you find? - Write what you learned in your notebook. - Do exercise on a worksheet.	10. (Summarizing) - I found that ... - The students write something in their notebooks. - The students complete the worksheet.
11. This is the end of today's lesson.	11. OK, thank you.

## 5.8 Connecting Indirect Teaching to Direct Teaching (Before the Lesson)

The period of indirect teaching is regarded not only as learning time by students but also as an opportunity to develop their ability of self-learning. Therefore, a teacher's approach during direct teaching is very important for the students to be able to manage their indirect teaching time by themselves.

### 1) Unit Lesson Plan

To achieve unit objectives well, the unit lesson plan should be written considering the school characteristics and the current situation of the students.

### 2) Understand the Current Situation of Students

To achieve the lesson objectives, the lesson plan should be prepared based on students' level of understanding and an estimation of their current learning capacity.

<Example>

-A (student) is interested in the next lesson, so it's better to let him work on the practical contents.

-For B (student), a slow learner, hint cards should be prepared for him.

-It'll be effective to use Internet for C (student) because she is good at typing.

<Take advantage of small classes>

It is easy to understand the learning situation of each student thoroughly and prepare each learning activity for indirect teaching time.



### 3) Preparation to Assist Active Learning

Preparation of educational materials to assist each student's active learning and consideration of individual teaching according to their abilities should be done before the lesson.

## Chart 20. Preparation and Considerations for Learning/Teaching

<Preparation to Assist Learning Activity of Each Student>

- Practical and supplemental questions
- Hint cards
- Teaching tools such as math equipment
- Dictionaries and reference books
- Small white boards and presentation boards
- Computers



<Considerations for Each Student>

- What are the suggestions when students complete their exercises?
- What are the actions when students are stuck with exercises?
- Are students allowed to work on exercises out of the classroom?
- Which plates/sheets/boards etc. do student's use to summarize their answers?
- Do they need to think by themselves or in groups?
- How do they share their answers?

## 5.9 Connecting Indirect Teaching to Direct Teaching (During the Lesson)

### 1) The Step of “Recognizing Problems”

#### ① Presentation of Problems and Setting the Theme

- Think out ways to present problems in order to enhance motivation (e.g. connecting with them to previous learning, or showing them related items to inspire interest).
- Clarify the learning themes of the lesson. They may be pursued by including the students’ curiosities and interests.

#### ② Connection to “Solving Problems”

- Show the steps to learn through a poster/notice in the classroom and a learning procedure manual.
- Prepare the educational assistance materials/tools for the learning such as dictionaries, math tool box, whiteboard, small plates, hint cards, computers, and exercise sheets (for simple, advanced, and supplemental questions).

### Chart 21-1. Direct Teaching Process: “Recognizing Problems”

<Example: Decimal Multiplication (Grade 4)>

- Objective: To be able to explain how to calculate “decimal x integer”.

Process	Learning Activities	Considerations
Recognizing Problems	1. Presentation of Problem <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">                     Yumi calculated like below. Is it correct?  <math>0.3 \times 4 = 0.12</math> </div>	<div style="border: 1px solid green; padding: 5px; background-color: #e0f0e0;">                     -Encourage by showing what has been learnt.                 </div>
	2. Prediction “Correct” or “Incorrect”	
	3. Let’s think about it. - It’s correct because $3 \times 4 = 12$ . - It’s strange that four times of 0.3 is less than 0.3. - It’ll be 1.2 if it was calculated correctly.	<div style="border: 1px solid green; padding: 5px; background-color: #e0f0e0;">                     -Give a way to solve the problem.                      -Show viewpoints to think about and discuss.                 </div>
	4. Presentation of Theme <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">                     Let’s explain how to calculate <math>0.3 \times 4</math>.                 </div>	
	5. Think how to explain the theme. - By chart/picture - By words - By formula	

-You are advised not to take much time for the “Recognizing Problems” step. To get students to focus in quickly, the problems should be well presented and compared to the previous lessons by saying, “let’s review a moment”.

-You can connect with active learning during indirect teaching by helping them understand the methods to pursue the themes.



- 2) The Steps of “Complete Understanding” to “Familiarization and Application”
- ① Enriched Discussion
    - Focus on the similar and different viewpoints from each student’s presentation.
  - ② Generalizing Today’s Learning
    - Confirm if it is possible to apply the result to others by showing similar examples.
  - ③ Setting the exercises according to each student’s ability
    - Prepare exercise sheets for similar, advanced, and supplemental questions.

**Chart 21-2. Direct Teaching Process: “Complete Understanding”**

<Example: Decimal Multiplication (Grade 4)>

■ Objective: To be able to explain how to calculate “decimal x integer”.

Process	Learning Activities	Considerations
<b>Complete Understanding</b>	1. Summarize the result of discussion <ul style="list-style-type: none"> <li>- It’s 1.2 because it’s four times 0.3.</li> <li>- It’s 1.2 because of twelve 0.1 (0.1 x 3 x 4)</li> <li>- Calculating on paper               <math display="block">\begin{array}{r} 0.3 \\ \times 4 \\ \hline 1.2 \end{array}</math> </li> </ul> 2. Work on familiarizing questions <ul style="list-style-type: none"> <li>- Is it possible to apply this to the other case? 0.6 x 7</li> </ul> 3. Summarize <ul style="list-style-type: none"> <li>- It’s good to count, how many “0.1”.</li> <li>- It’s good to align the decimal points with each other.</li> </ul>	<ul style="list-style-type: none"> <li>-Acknowledge the process and result of each discussion.</li> <li>-Let them think about whether it’s applicable to other similar cases.</li> <li>-Summarize this lesson clearly.</li> </ul>

**6. Preparing the Learning Environment**

**6.1 Preparation of the Classroom Environment**

In multigrade teaching, a well-prepared classroom environment is essential to encourage students’ active, self-learning including:

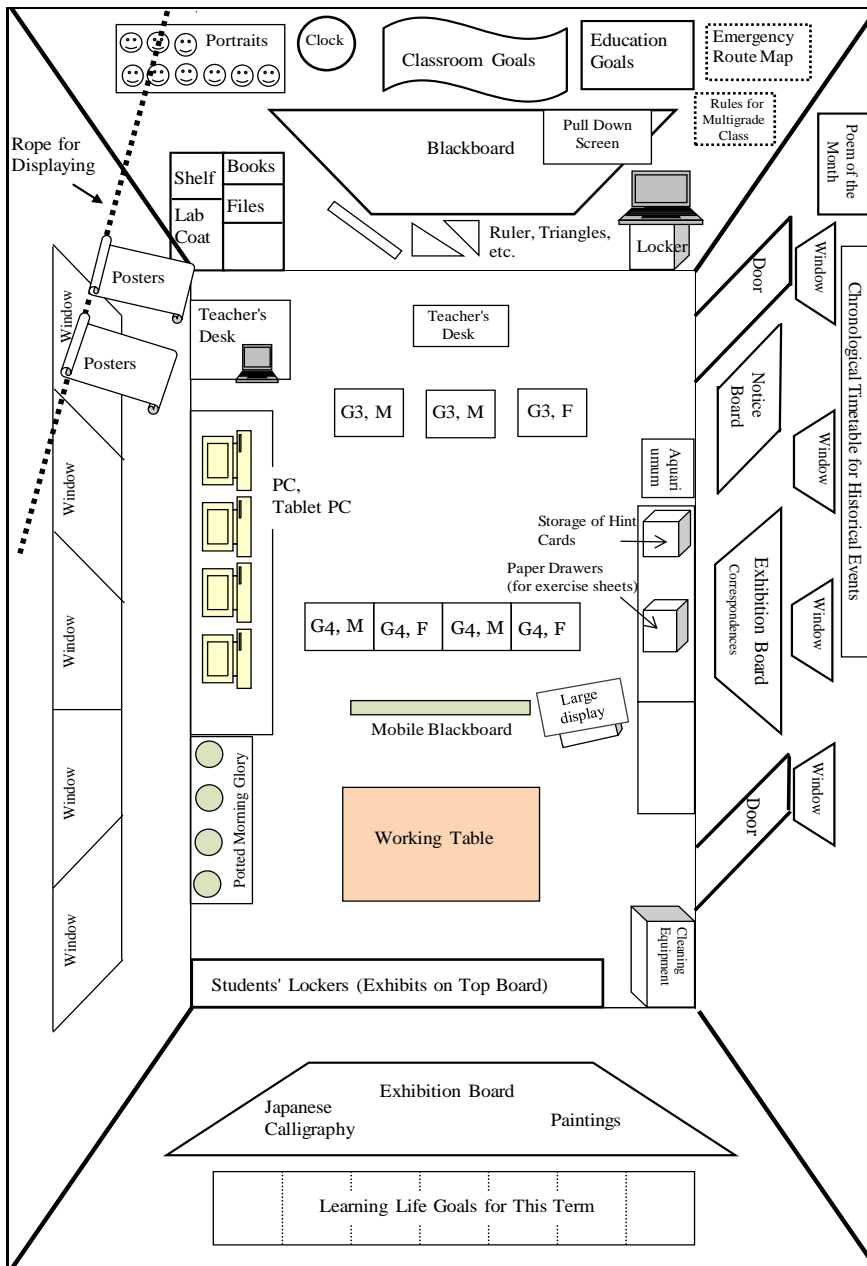
- displaying the learned contents for reference,
- providing useful materials such as cubes and ohajiki (flat glass marbles) etc.,
- placing computers in an appropriate space, and
- arranging a space for activities including a working table.



Math exercise sheets and cards for counting 10 and 100.



**Chart 22. Room Arrangement for Multigrade Class (Example)**



## 6.2 Desks/Chairs Layout according to Learning Content

Multigrade teaching requires an appropriate layout of desks/chairs since each grade learns different contents in the same classroom. Student numbers and subject contents are also considered in the arrangement.

The “L” shaped desk layout



### 6.3 Arranging the Blackboards

There are several layouts which are beneficial to various situations. Characteristics of the six examples in the chart are described below.

**Chart 23. Six Types of Blackboard Arrangement**

Arrangement 1

- Standing between two grades gives effective supervision during indirect teaching.
- Space at the sides can be used.
- Easy for the students to focus on the lesson in hand and not be distracted by what others are doing.
- Suits a larger class.

Arrangement 2

- Easy to arrange the space according to the numbers in each grade.
- The grade with smaller numbers is suitable to be situated on the right side with a smaller blackboard.
- Easy for the teacher to move around.
- Easy to enhance communication between two grades in the same subject by showing each blackboard, for example, review for the higher grade and preparation for the lower grade.

Arrangement 3

- Effective to make communication between two grades due to the blackboards being close to each other.
- Easy for teaching common content, sharing related images or charts and materials for both.
- Effective use of space.
- Allow the teacher to access to each grade quickly.

Arrangement 4

- Easy for a smaller and lower grade including only one student and/or with Grade 1 students to create solidarity as one class.
- Easy for the teacher to reduce Watari or make Watari more flexible.
- Easy to for both grades to compare contents, give comments, and develop discussions, for example, in the subjects of math and moral education.
- Effective use of space.

Arrangement 5 & 6

- Both layouts provide separated spaces for each grade to concentrate on their own subjects including moral education which sometimes needs discussion.
- No.6 makes it easy to find space for materials and get sunlight from the windows (No.5 doesn't have equal access to sunlight).
- Easy to set up a heater during winter time.

## 7. Writing on Blackboard Reflecting Students' Thoughts

### 7.1 The Role of Writing on the Blackboard

Writing on the blackboard creates a record to show how deeply the students thought about the learning themes during a lesson period. Therefore, it should concisely outline the important content for students, including themes, students' comments, summary, and exercises according to the learning process. The Hokkaido Prefectural Board of Education mentions the roles of writing on the blackboard as below.

#### <Roles of Writing on the Blackboard>

- Facilitate students' concentration and thoughts by specifying the learning objectives and themes and presenting the learning resources.
- Draw out and expand students' thoughts, questions, awareness, and ideas
- Organize students' thoughts and summarize and familiarize the learning results.

Source: "School Education Guidebook – for New Teachers" (2015)

### 7.2 Examples of Writing on the Blackboard

#### Chart 24-1. Example of Writing on the Blackboard - Mathematics

<Example 1. "Multiplication by calculation with figures" in Mathematics for Grade 3>

Show the process and contents with magnetic plates of "theme" and "prediction" etc.

Use colored chalk to highlighting "problems", "themes", or "summary".

Remind students of calculations learned in the previous lesson with a tool.

The blackboard content includes:

- 問題 (Problem):** かけ算の筆算 (2) おり紙を1人に12まいずつ配ります。23人に配るには、おり紙は何まいいるでしょうか。 (We distribute 12 pieces of origami paper to each of 23 people. How many pieces of origami paper are needed?)
- 式 (Equation):**  $12 \times 23 =$
- 予想 (Prediction):** 240 <  $\square$  (ま) (Prediction: 240 <  $\square$  (ma))
- 筆算 (Calculation):**

$$\begin{array}{r} 12 \\ \times 23 \\ \hline 36 \\ 24 \phantom{0} \\ \hline 276 \end{array}$$
- まとめ (Summary):** ① 位ごとに分けてかける ② たし算する (1. Multiply by place value, 2. Add)

Source: HATO Project DVD (2014), "Lessons in Multigrade Class Math", February".

Enhance motivation and awareness of content by clarifying the "theme" and predicting the result.

Each student explains how to get the result using an opaque projector and compare solutions with each other.


## Chart 24-2. Example of Writing on the Blackboard (Translation)

<Contents of blackboard & screen>

May 2	Multiplication by calculation with figures (2)																														
<b>Problem</b> ★3	We serve 12 sheets of ORIGAMI papers for each. When we have 23 members, how many papers do we need in total? Formula $12 \times 23 =$	$\begin{array}{r} 12 \times 20 \\ \underline{\phantom{12} 2} \\ 240 \end{array}$	<b>Summary</b>																												
<b>Theme</b>	<u>Let's figure out how to calculate it.</u>	$\begin{array}{r} 12 \\ \times 23 \\ \hline 36 \\ \underline{24} \\ 276 \end{array}$																													
<b>Prediction</b>	<table border="1"> <tr> <td>paper:</td> <td>0</td> <td>12</td> <td>240</td> <td>?</td> <td>(pcs.)</td> </tr> <tr> <td>member:</td> <td>0</td> <td>1</td> <td>20</td> <td>23</td> <td>(per.)</td> </tr> </table>	paper:	0	12	240	?	(pcs.)	member:	0	1	20	23	(per.)	<p>Calculation with figures</p> <ol style="list-style-type: none"> <li>Multiply the ones &amp; tens places separately.</li> <li>Do addition.</li> </ol>	<p>Let's figure out how to calculate it.</p> <table border="1"> <tr> <td>paper:</td> <td>0</td> <td>12</td> <td>240</td> <td>?</td> <td>pcs.</td> </tr> <tr> <td>member:</td> <td>0</td> <td>1</td> <td>20</td> <td>23</td> <td>per.</td> </tr> </table> <p><b>Result</b></p> <table border="1"> <tr> <td><math>12 \times 23 = 276</math></td> <td></td> </tr> <tr> <td> <math display="block">\begin{array}{r} 20 \quad 3 \\ 12 \times 20 = 240 \\ 12 \times 3 = 36 \\ \hline 276 \end{array}</math> </td> <td> <math display="block">\begin{array}{r} 12 \\ \times 23 \\ \hline 36 \\ \underline{24} \\ 276 \end{array}</math> </td> </tr> </table>	paper:	0	12	240	?	pcs.	member:	0	1	20	23	per.	$12 \times 23 = 276$		$\begin{array}{r} 20 \quad 3 \\ 12 \times 20 = 240 \\ 12 \times 3 = 36 \\ \hline 276 \end{array}$	$\begin{array}{r} 12 \\ \times 23 \\ \hline 36 \\ \underline{24} \\ 276 \end{array}$
paper:	0	12	240	?	(pcs.)																										
member:	0	1	20	23	(per.)																										
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$\begin{array}{r} 20 \quad 3 \\ 12 \times 20 = 240 \\ 12 \times 3 = 36 \\ \hline 276 \end{array}$	$\begin{array}{r} 12 \\ \times 23 \\ \hline 36 \\ \underline{24} \\ 276 \end{array}$																														

## Chart 25. Example of Writing on the Blackboard-Japanese Language

<Example 2. "Gongitsune (Story about a fox)" in Japanese language for Grade 4>

Enrich the story with the related illustrations.	
Enhance linguistic activities through reading and sharing with empathy using facial expression cards.	

It is good to put illustrations, cards, and other materials on the blackboard to deepen what students read in the story and include emotions.

## 8. Application of Information & Communication Technology (ICT)

### 8.1 Significance of Activities with ICT in Subject Teaching

In teaching each subject, the effective use of Information & Communication Technology (ICT) can help make a deeper understanding among students and realize teaching objectives. Furthermore, it is also effective for students to use ICT practically by themselves in fulfilling linguistic activities.

### 8.2 List of ICT Devices in Teaching Subjects

<Output Devices>  
Projector, Large display (TV),  
Electronic blackboard, etc.

<Input Devices>  
Opaque projector, Digital textbook,  
Tablet, Digital contents, etc.

### 8.3 Effective Examples of ICT Devices in Classroom

#### <Electronic Blackboard>



Make data larger than a computer monitor.



Add comments to the displayed data.

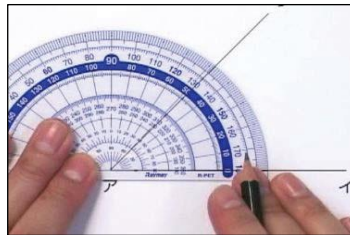


Insert answers directly onto the display.

#### <Opaque Projector>



Show textbook or documents on a larger screen.



Enlarge to explain how to use small tools, e.g., a protractor.



Teach by enlarging actual play or activities.



Students can explain with notebooks and exercise sheets on a large scale.



It helps to draw attention, give motivation, and show clear instructions.



## 8.4 Teaching Mathematics with ICT

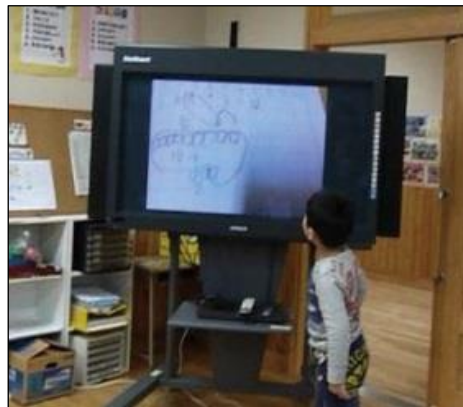
The several pictures below are taken in a mathematics class for Grade 1 (G1) and Grade 2 (G2) students. The names of their on-going units are “Addition” for G1 and “Triangles and Squares” for G2. Both students get used to handling tablets to work on exercises and/or explaining an enlarged picture taken from their own notebook.



A G1 student exercise - calculation with a tablet.



G2 student is taking a picture of their own notebook with a tablet.

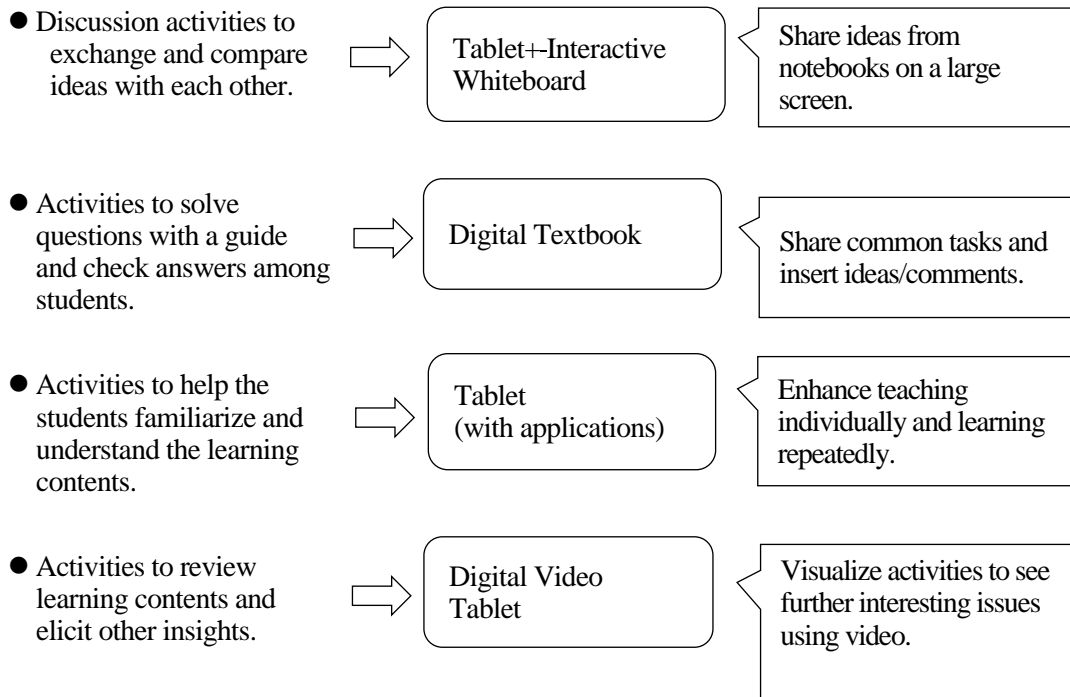


On the electronic blackboard, a G1 student explains their own idea with a picture taken with a tablet.



**Chart 26. Points for Effective Use ICT in Multigrade Classes**

To conduct multigrade teaching and learning, it is important to set up an environment where the students can learn actively. Especially, classrooms equipped with ICT devices such as computers, tablets, and an electronic blackboard will assist students when visualizing and expressing their thoughts.



## 9. Teaching Note-taking Reflecting Students' Thoughts

### 9.1 Essential Points to Teach Concerning Note-taking

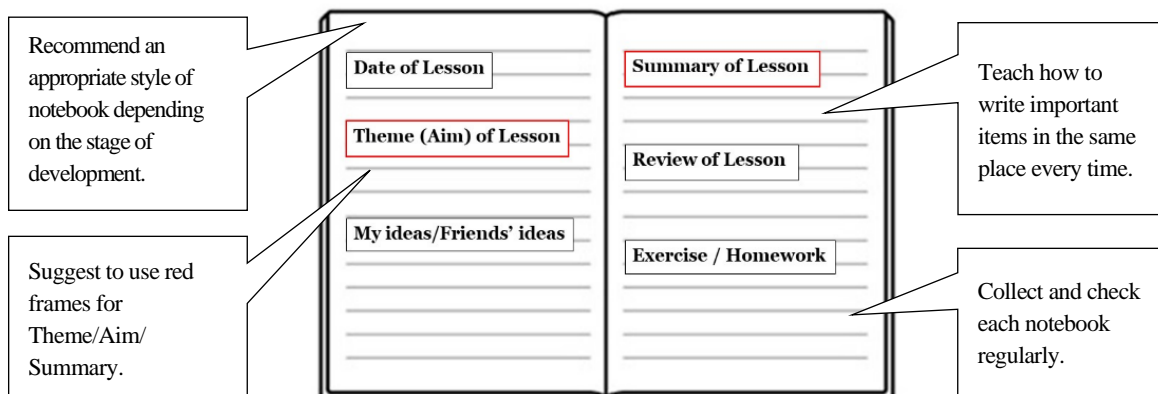
A notebook is generally prepared to keep a specific record of the learning path, including new findings, ideas/thoughts, and information studied by each student. Below are some suggestions for effective teaching of note-taking.

#### Chart 27. Points to Consider in Teaching Note-taking

- Set aside time to write records such as putting ideas in order, further study, and interpreting results.
- Consider the structure of the writing on the blackboard to encourage the students to write in their notebooks effectively and in a well-structured manner.
- Encourage students with written comments by checking their notebooks often.

Source: The Hokkaido Prefectural Board of Education (2015), "School Education Guidebook - for New Teachers".

#### Chart 28. Framework of Writing in Notebooks



What to teach on note-taking?	Note-taking in each stage of development
<ul style="list-style-type: none"> <li><input type="checkbox"/> Write the same words and expressions as they have learned in textbooks.</li> <li><input type="checkbox"/> Use Kanji characters which they have learned in the subject of Japanese study.</li> <li><input type="checkbox"/> Write according to specific instructions such as the numbers of characters and themes, etc.</li> <li><input type="checkbox"/> Write own thoughts and ideas.</li> <li><input type="checkbox"/> Write the reasons or basis for their ideas.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Lower Grade: Write carefully and slowly with instruction on correct writing style.</li> <li><input type="checkbox"/> Middle Grade: Identify and write thoughts/feelings separately.</li> <li><input type="checkbox"/> Higher Grade: Write while listening to others and/or exploring answers.</li> </ul>

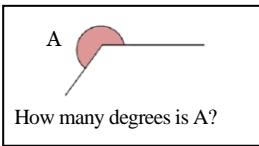
Source: The Hokkaido Education Research Institute (July, 2013), "Guide for Improving Elementary School Curriculum".

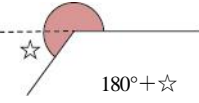
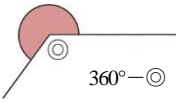
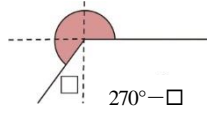





## 10. One-hour Lesson Plan-Mathematics

<p><b>■ Lesson Plan(Grade 3) (6<sup>th</sup> of 12 lessons)</b></p> <ol style="list-style-type: none"> <li>1) Objective for the Lesson Understand multiplication of the hundreds place <math>\times</math> the ones place in figures.</li> <li>2) Evaluation Standards Think how to calculate the hundreds place <math>\times</math> the ones place based on a calculation of the ten's place <math>\times</math> the one's place.</li> <li>3) The lesson procedure is below.</li> </ol>	<p><b>■ Lesson Plan (Grade 4) (4<sup>th</sup> of 8 lessons)</b></p> <ol style="list-style-type: none"> <li>1) Objective for the Lesson Be able to think how to measure degrees of more than <math>180^\circ</math>.</li> <li>2) Evaluation Standards Think how to measure degrees bigger than <math>180^\circ</math> by additivity of degrees.</li> <li>3) The lesson procedure is below.</li> </ol>
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Grade 3			Grade 4			
	Students' Activities	Teacher's Activities incl. Evaluation		Students' Activities	Teacher's Activities incl. Evaluation	
Familiarization and Application	1. Work on exercises -Textbook -Exercise sheets	-Check answers together with a student leader.	Indirect Teaching	1. Understand a question  2. Prediction - $24^\circ$ - $60^\circ$ -More than $180^\circ$ -Unable to predict 3. Recognize Problems <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">                         Think how to measure degrees bigger than <math>180^\circ</math> .                     </div> 4. Think by each student's self. -Check methods to get an answer. -Draw auxiliary lines. -Flip over the protractor.	-Distribute printed materials.  -Understand that it's bigger than $180^\circ$ .  -Check how to use a protractor if necessary.	Recognizing Problems
Recognizing Problems	2. Understand a question <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">                         Mika bought 3 meters of ribbon which cost 312 yen per meter. How much did she pay for it?                     </div>		Direct Teaching	5. Each student thinks by themselves. -Draw auxiliary lines in many ways.  -Focus on $180^\circ$ .	-Let them focus on the standard degrees such as $90^\circ$ , $180^\circ$ , and $270^\circ$ .	Solving Problems

Recognizing Problems	<p>3. Prediction</p> <ul style="list-style-type: none"> <li>-About 1,000 yen</li> <li>-About 900 yen</li> <li>- 936 yen</li> </ul> <p>-The Formula will be <math>312 \times 3</math></p> <p>-The Multiplier is a three-digit number.</p> <p>4. Recognize problems</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">Let's think how to calculate <math>312 \times 3</math>.</div> <ul style="list-style-type: none"> <li>-Tape diagram</li> <li>-Calculate by each place</li> <li>-Calculate in figures</li> </ul>	<ul style="list-style-type: none"> <li>-Let them think about what formula should be used.</li> <li>-Check differences from content previously studied.</li> <li>-Let them predict to solve.</li> </ul>	Direct Teaching	Indirect Teaching	<ul style="list-style-type: none"> <li>-Prepare to present the idea to others.</li> </ul>	<ul style="list-style-type: none"> <li>-Let them think of other ideas if any students complete the task quickly.</li> </ul>	Solving Problems
Solving Problems	<p>5. Each student thinks by themselves.</p> <ul style="list-style-type: none"> <li>-Write down their own ideas in their notebooks.</li> <li>-Prepare to present the idea to others.</li> </ul>	<ul style="list-style-type: none"> <li>-Let them think about how to make a presentation and/or other ideas if any students complete the task quickly.</li> </ul>	Indirect Teaching	Direct Teaching	<p>6. Solve problems as a group</p> <p>1) Find a solution based on <math>180^\circ +</math> how many degrees?</p>  <p>2) Find a solution based on <math>360^\circ -</math> how many degrees?</p>  <p>3) Find a solution based on <math>90^\circ</math>?</p>  <ul style="list-style-type: none"> <li>-Indicate if any similar ideas are presented.</li> </ul> <p>7. Summary</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>Methods to measure degrees over <math>180^\circ</math></p> <ul style="list-style-type: none"> <li>- Find how many degrees there are over <math>180^\circ</math>.</li> <li>- Find how many degrees there are under <math>360^\circ</math>.</li> </ul> </div>	<ul style="list-style-type: none"> <li>-Let them present using an episcopo or a projector.</li> <li>-Write down keywords said by students on the blackboard.</li> <li>*Think how to measure degrees bigger than <math>180^\circ</math> by additivity of degrees. (Assessment Criteria 3, observation &amp; notebook)</li> <li>-Let them compare to <math>90^\circ</math> and <math>180^\circ</math> Or explain using pictures. (To enable students, especially those with difficulties, to understand easily).</li> </ul>	Complete Understanding

Complete Understanding	<p>6. Solve problems as a group</p> <p>-Present ideas</p> <p>1)Tape diagram  Paid: 0 312 ? ?  (yen)   Length: 0 1 2 3  (m)</p> <p>2)Calculate by each place  <math>300 \times 3 = 900</math>  <math>10 \times 3 = 30</math>  <math>2 \times 3 = 6</math>  <hr style="width: 100px; margin-left: 0;"/> 936</p> <p>3)Calculate in figures  312  <math>\times 3</math>  <hr style="width: 50px; margin-left: 0;"/> 936</p> <p>-Confirm that total cost would be 936 yen.</p> <p>-work out one question to check understanding.  <math>423 \times 2</math></p> <p>7. Summary</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Calculate each place using a multiplication table if a multiplier has three-digits.</p> </div> <p>-Work on the exercise for complete understanding.  -Receive homework</p>	<p>-Confirm it's possible to use the same method as students have learned already.</p> <p>-Let them present using an episcope.</p> <p>-Write down keywords said by students on the blackboard.</p> <p>-Explain in order, 1), 2), and 3).</p> <p>* Think how to calculate a three-digit number <math>\times</math> a single-digit number based on the calculation of a double-digit number <math>\times</math> a single-digit number.  (Assessment Criteria 2, observation &amp; notebook)</p>		Direct Teaching		Indirect Teaching	<p>8. Work on exercises</p> <p>-Advanced exercises with the textbook and printed sheets.</p> <p>-Check answers.</p>	<p>-Distribute printed materials.</p>	

### Chart 30. Plan for Writing on Blackboard: Grade 3

Date:

<Question>

Mika bought 3 meters of ribbon which cost 312 yen per meter.  
How much did she pay for it?

Prediction

- About 1,000 yen
- About 900 yen
- 936 yen
- The Formula will be  $312 \times 3$

What's the difference from the previous lesson? Multiplier is a three-digit.

<Theme>

Let's think how to calculate  $312 \times 3$ .

1) Tape diagram

Paid	0	312	?	?	yen
Length	0	1	2	3	m

Answer is 936.

2) Calculate by each place

- $300 \times 3 = 900$
- $10 \times 3 = 30$
- $2 \times 3 = 6$

-Calculate each place.  
-The same idea as 2).

3) Calculate in figures

Is it always like that?

Let check with a calculation below:

$$\begin{array}{r} 423 \\ \times 2 \\ \hline 846 \end{array}$$

<Summary>

Calculate each place using a multiplication table if a multiplier has three-digits.

### Chart 31. Plan for Writing on Blackboard: Grade 4

Date:

<Question>

A How many degrees is A?

Prediction

- 240°
- 60°
- More than 180°

It's more than 180°. We measured until 180° in the previous lesson.

<Theme>

Let's measure degrees bigger than 180°.

- Draw auxiliary lines.
- Base upon 180°.
- Flip over the protractor.

1) How many degrees more than 180°

Lines are drawn vertically and horizontally on figure 1) & 3).

2) How many degrees less than 360°

Why?

To be able to measure using a protractor and calculate 90°, 180°, and 270° easily.

3) Focus on 90°

<Summary>

Ways to measure degrees more than 180°

- Find how many degrees more than 180°.
- Find how many degrees less than 360°.

Advanced Exercise

It's better to subtract the degrees from 360°, isn't it?

## Glossary

### Auxiliary Lines (Helping Lines)

Auxiliary Lines (Helping Lines) are extra lines needed to complete a proof/problem in plane geometry.

### Episcope

A device which displays opaque materials including documents by shining a bright lamp onto the object from above.

### Kamishibai

Kamishibai is a form of Japanese educational storytelling for younger children. It usually takes place in schools and libraries, but also, traditionally, on street corners and in parks. The term literally means “paper (*kami*) drama (*shibai*)” in English.

### Learning with Student Guides

Learning with student guides is a form of small group learning assisted by students during indirect teaching. A few students are selected and trained on how to facilitate and assist the learning processes in a collaborative manner according to the plan. In contrast to student leaders, student guides maintain their position for a longer period of time, whereas leaders could change every lesson.

### Learning with Student Leaders

Learning with student leaders is a form of small group learning assisted by students. In learning with leaders, student leaders are facilitators who make prepared announcements, give instructions and confirmation. Unlike student guides students can take turns to be the leaders. The models of answering expressions for non-leader students are also prepared.

### Ones Place/Tens Place

Ones Place/Tens Place are place values in a number system when making larger numbers. For example, the number 64 has 4 in the ones place and 6 in the tens place.

### Protractor

An instrument for laying down and measuring angles in drawing and plotting.

### Tape Diagram

A tape diagram is a rectangular visual model resembling a piece of tape, that is used to assist with the calculation of ratios.

### Unit/Learning Unit

A unit or learning unit is a separate part in the whole larger course of study, which are connected leading to one major goal. It usually consists of one chapter or section in a textbook.

### Unit Teaching Plan/Lesson Plan

A unit teaching plan consists of learning objectives, evaluation standards, and outlines of daily teaching/learning activities for one separate learning unit based on the annual teaching plan. A lesson plan is a detailed description of the course of learning and instruction for one lesson, including objectives, methods, and time distribution for each activity.

### Watari

Watari is teacher's action to move back and forth between grades to conduct direct teaching and indirect teaching in a multi-grade class. (For more information see HUE RISE Resource Series No.1)

### Zurashi

Zurashi is a technique to combine different lesson stages for two grades in one class to ensure direct teaching and indirect teaching contents and manage learning activities effectively. (For more information see HUE RISE Resource Series No.1)

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