

PACE: Using qualitative assessment data to drive teaching and learning of Mathematics for lower primary students

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Abstract

Purposeful Assessment Collaboration for Educators (PACE) is a programme to guide Singapore teachers to identify learning gaps surfaced by the reports of a standardised assessment. It is also an opportunity for teachers to work collaboratively with test developers and their colleagues to use assessment data to adapt instruction to improve student learning. PACE programme sees teachers through a four-step approach, known as PACE Approach, which comprises four stages of guided activities – Plan, Adapt, Check and Evaluate. In this approach, qualitative information on student performance is provided to give teachers greater clarity of their students' learning gaps so that leveling-up efforts could be prioritised to focus on fundamental skills that affect future learning. To ensure teachers could effectively achieve the learning outcomes of their intervention programmes, information such as common errors observed in students' responses are analysed and their possible underlying learning-related causes are discussed to enable teachers to adjust their classroom instruction for the target group of students. This paper describes teachers' journey with the PACE Approach in Singapore schools that participated in MathsCheck@P2, a standardised online test that assesses fundamental mathematical knowledge and skills, and provides qualitative feedback on students' performance. Teachers' effort to bridge students' learning gaps using PACE Approach have been effective to the extent that they reported students' progression and positive change in behaviour after the implementation of their intervention programmes. This paper shares a key finding in that for assessment to ensure effective teaching and learning, learning-related information given to teachers should be interpreted for strategic instructional adaptation.

Key words: Use of results, intervention, instructional adaptation

Introduction

In 2013, Singapore Examinations and Assessment Board (SEAB) launched a standardised online assessment tool, known as Singapore Mathematics Skills Check – Primary 2 (MathsCheck@P2), for Singapore primary schools to provide them with four assessment reports (see Appendix 1) for their Primary 2 students to complement their Assessment for Learning (AfL) efforts. Although the reports contain qualitative information about students' strengths and weaknesses in Mathematics, it was unclear how teachers were making use of the information to address their students' learning gaps. It was this concern that the PACE programme was designed to systematically guide teachers to use the assessment information to strategically bridge learning gaps promptly so that students would be more ready to learn Mathematics at higher levels. Teachers were guided to further analyse and interpret the information to gain greater clarity of students' difficulties in learning Mathematics. This paper discusses the details of the PACE Approach and how it results in positive changes in the students of schools that adopt this approach as part of their AfL efforts.

How PACE Approach Enhances Schools' AfL Efforts

After the dissemination of MathsCheck@P2 assessment reports, two or three teachers from each school attend PACE teacher-training seminar conducted by SEAB. During the seminar, teachers are guided on analysing the reports to plan and implement an intervention programme for their students to achieve the intended learning outcomes. The four assessment reports and their purposes are listed in Fig. 1 below.

Report	Purpose
<i>Class Report by Topics and Skill Descriptors</i> (For Teachers)	To provide teachers with an overview of the class' strengths and weaknesses in lower primary Mathematics
<i>Student Guidance Report</i> (For Teachers)	To identify students who may be in need of help in specific Mathematics topics
<i>Student Performance Report</i> (For Students)	To provide students with specific qualitative feedback of their performance
<i>School report by Topics and Skill Descriptors</i> (For School Leaders)	To present a summary of the school's Primary 2 cohort performance

Fig. 1: Types of MathsCheck@P2 assessment reports and their purposes

The PACE Approach comprises four steps of planning and execution as shown in Fig. 2 below.

Step	SEAB-led Approach	Support Provided By SEAB	Action Taken By Schools
Step 1	P lan: PACE Seminar Part 1	SEAB deepens teachers' understanding of their students' weaknesses through sharing of findings such as common errors and underlying causes	Teachers use different sets of findings to prioritise intervention plans for their target group(s) of students
Steps 2 & 3	A dapt and C heck: Implementation Period (6 months)	SEAB guides teachers in decision-making for instructional adaption and to check students learning	Teachers implement intervention plan in their respective schools by adapting instruction and checking learning
Step 4	E valuate: PACE Seminar Part 2	SEAB facilitates the review of the efficacy of schools' intervention programmes through a review framework	Teachers evaluate, discuss and share strengths and areas for improvement of their programmes using SEAB review framework

Fig. 2: The 4-step PACE Approach in the SEAB-led AfL Cycle

Step 1: Plan – How to plan appropriate follow-up actions using assessment information

The seminar begins with guiding teachers in reading the MathsCheck@P2 reports to achieve a comprehensive understanding of the information in the reports. The reports provide different sets of information at various levels of resolution of students' strengths and weaknesses in Mathematics. During this part of the programme, teachers have to actively discuss in pairs and complete their tasks to plan out an intervention programme which will purposefully address the learning gaps of the students.

Teacher Action: 1.1 Consider what to adjust in lesson delivery at class level

Understanding the class' performance helps teachers to adjust pace of lesson delivery for different topics in the Mathematics syllabus. The information in the *Class Report by Topics and Skill Descriptors* serves as a basis for teachers' discussion about the overall class performance in the topics assessed. While all teachers understand common mathematical terminology used in the reports such as Maximum, Minimum and Mean, they need to know that this information have to be integrated so that they can infer their class' achievements in the various topics assessed. Schools are also provided with the list of topics ranked according to how easy the Primary 2 cohort finds the items under each of the topics as shown in Fig. 3.

Mathematical Process....	<i>Hardest</i>
Fractions	
Money	
Data Analysis	
Measurement	
Whole Numbers.....	<i>Easiest</i>

Fig. 3: List of topics in decreasing order of difficulty for the cohort

Teachers could use the information in Fig. 3 and their findings on their class' performance to help them determine the appropriate pace of lesson delivery for each of the topics. For instance, if a teacher finds the class generally weak in Fractions, he could teach the topic at a slower pace by giving the class more time to digest the concept, seek clarifications, or by preparing more activities using manipulatives to help his students learn better.

Teacher Action: 1.2 Consider how to formalise an intervention structure at group level

Teachers should act on the weaknesses in the skills that will affect future learning for students whose understanding is not on par with the rest of the class. In many classes, the ability of the students is often heterogeneous. Therefore, it is not always possible to slow down the pace of teaching for the minority in a time-constraint classroom. Teachers are guided to use the *Student Guidance Report* to design an intervention programme for a group of students who have similar weaknesses in core skills. This group of students is identified in the *Student Guidance Report*. The students' inability to grasp the concept of core topics will have added difficulty in learning the same topics at higher levels and other cognate topics. Teachers are guided to make plans to address the learning gaps of these students who are critically in need of help.

Teachers complete 'A Plan for Action' after selecting the group of students who has a common topic to re-learn. 'A Plan for Action' is a template (see Appendix 2) created to help teachers clarify their new learning goals for the group, lesson structure, number of lessons needed to close the gaps and the class size. In the process of completing the plan, teachers have to think through how to use their school's existing resources for this group of students such as the number of teachers involved and the new learning schedule for the group.

Teacher Action: 1.3 Consider how to adapt classroom instruction for the target group

Knowing the topics in which students experience difficulties is insufficient to inform appropriate instructional adaptation. Interventions are often carried out alongside daily lessons. Teachers need clarity at which point within each topic their students' understanding is weak. To that end, all the students' wrong responses captured by the system are extracted for analysis and categorised under each of the four types of learning gaps (Toh, 2014) as shown in Fig. 4.

Learning Gap	Possible Causes (by inference)	Suggested Instructional Action
Slips	Careless procedural mistakes/ Lack of a systematic approach	Learn: Feedback on tasks and processes
Lack of understanding	Missing bit of conceptual or procedural knowledge	Re-Learn: Re-teach the missing bits
Unable to apply or generalise	Narrow understanding; Lack of practice/ concrete experience; Lack of opportunity to apply	Over Learn: More and varied practices or scenarios for application of concepts
Misconceptions	Persistent conceptual or procedural confusion	Un-Learn to Re-Learn: Re-teach at the level where understanding breaks down to enable students to relearn the concepts

Fig. 4: Types of learning gaps and their possible underlying causes

The errors observed in students' responses have commonalities that could shed light on the nature of students' learning gaps. For each type of common errors, some possible underlying causes are hypothesised to inform appropriate instructional adaption. Fig. 5 shows the students' response analysis of Whole Numbers by skill sets in increasing order of difficulties. This information is shared with teachers to increase their understanding of the problems students faced during the assessment.

Skill Descriptor	Common Error Observed	Possible Underlying Cause
<i>Recognise place values up to 1000</i>	Unable to determine the number notation in relation to the place values	Lack of understanding of place values e.g., 2 ones, 5 tens & 3 tens 6 ones
	Unable to recognise the correct ordinal number notation	Unable to distinguish left from right; Lack of understanding to include the first object in counting
<i>Perform 4 operations on whole numbers</i>	Varied wrong answers for multiplications of numbers <5	Lack of varied practice in multiplication table for numbers up to 5
	Answers derived from using the larger digit to subtract a lesser digit disregarding the order of the equation in vertical subtraction	Lack of understanding to subtract with renaming
	Computational errors for addition of 3 digit-numbers	Procedural slips
<i>Solve routine problem on whole numbers involving 4 operations</i>	Added the values of two entities instead of subtracting when the problem requested for the difference in value	Lack of understanding of comparative language e.g.: 'more than'; 'less than'
	Unable to find the value of the other associated entity having given the value of the total and one of the entities	Lack of understanding of two associated entities of a group – by subtracting one value of one entity from the total of the entities will get the value for the other entity of the group. E.g.: Children = boys and girls
	Use the wrong method to find the remaining amount	Lack of understanding of 'left' and 'the rest' in the context of remaining items
	Computational errors in addition and subtraction	Procedural slips

Fig. 5: Students Response Analysis of Whole Numbers

There are three ways to use the information in Fig. 5 meaningfully to focus on the discrete skill set to re-teach. First, teachers are to review to confirm the groupings of students to achieve their intended learning outcomes of their intervention programmes. Teachers will relook at their initial list of students selected during the activity mentioned in Teacher Action 1.2. They then confirm their students' weaknesses by analysing each of their individual *Student Performance Report*. Students, whose reports show that they cannot manage '*Recognise place values up to 1000*', should be grouped together. The intervention programme should be designed to help this group of students re-learn the skills relating to '*Recognise place values up to 1000*'.

Second, teachers should use such learning-related information to investigate deeper into the root cause of their students' poor performance in a topic. This is to impress teachers that a student's weakness in a topic may not only be due to his inability to cope with the hardest skill set, in this case, '*Solve routine problem on whole numbers involving 4 operations*'. If a student's report shows that he cannot manage '*Perform 4 operations on whole numbers*' and '*Solve routine problem on whole numbers involving 4 operations*', the teacher should tailor a remediation programme to re-teach the skills relating to '*Perform 4 operations on whole numbers*' first.

Third, teachers should customise their remediation actions to address the set of hypothesised underlying causes. Having the knowledge of students' common errors is not useful unless teachers relate the students' errors to causes associated with the way students learn Mathematics. Teachers could infer the causes of their students' errors based on their daily interactions with them in the classroom, through marking their assignments and by observing their learning behaviours. By synthesising all the sources of information, instructional adjustment could be purposefully tailored to benefit the target group of students.

After teachers have gone through sufficient discussion of the above procedures, they have to complete a Table of Specifications (TOS) designed with two-pronged purpose – using the TOS to conceptualise student learning and to guide the assembly of a test. A sample of the TOS is as shown in Fig. 6 below. Teachers would have to finalise their TOS before they return to schools for further collaboration with their colleagues.

TOPIC: WHOLE NUMBERS		
Assessment Objectives:		
1. <i>To assess students' ability to recognise place values</i>		
2. <i>To assess students' ability to recognise ordinal number notations</i>		
SKILLS	No. of Items	Question Numbers
Strand 1: Recognise place values	9	9m
1.1 Recognise place values – hundreds, tens and ones	3	Q1, Q2, Q3
1.2 Notate numbers presented in place values	3	Q4, Q5, Q6
1.3 Compare numbers presented in place values	3	Q7, Q8, Q9
Strand 2: Recognise ordinal number notations	6	6m
2.1: Understand 'Left' and 'right'	3	Q10, Q11, Q12
2.2: Count in sequence in the correct order	3	Q13, Q14, Q15
TOTAL	15	15m

Fig. 6: A sample of the two-pronged TOS

Step 2: Adapt – How to adapt instruction

With the new learning goals and target group of students in their plans, schools are given a six-month period to implement their intervention programmes as every school has their own schedules and work-flow. Teachers form teams to design their intervention programmes. Schools with ready resources are able to design intervention strategy across the entire grade-level while schools with limited resources are encouraged to focus their energy on a manageable group of students with similar learning gaps. Many teachers reported they use the TOS as a guide to ensure that all skills are taught during the intervention period.

Step 3: Check – How to check students learning

Schools are advised to check their students' learning at the end of their intervention programme by creating an assessment based on the designed TOS. Schools are free to decide on the mode of assessment – pen-and-paper or performance – and the type of items included in the assessment as long as they assess the skills in the TOS. This is to help teachers gather information on whether the intended learning gaps have been bridged. It is also an opportunity for teachers to identify learning-disabled students for further evaluation.

Step 4: Evaluate – How to review the efficacy of assessment process in school

After six months, all schools meet again to evaluate the efficacy of their AfL approach to bridge the intended learning gaps. Instead of focusing on assessment scores obtained by their students, teachers are guided to review their programme for alignment with the validity evidence framework (AERA, APA, NCME, 2014) in Fig. 7 below.

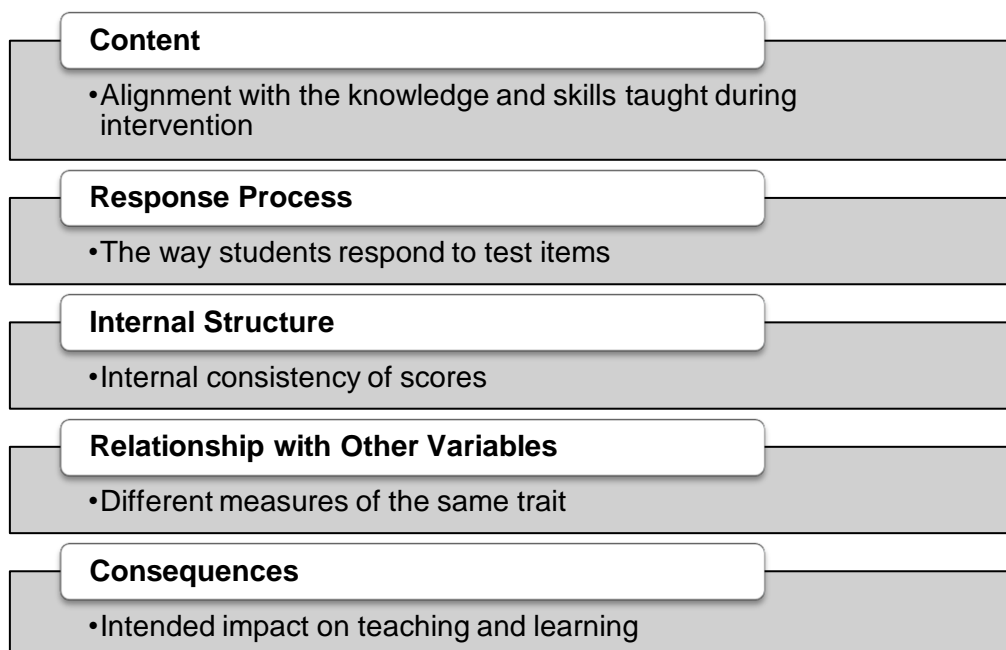


Fig. 7: Validity Evidence Framework

Teachers use the framework to systematically examine their instructional content; alignment of assessment tasks with the TOS; their students' responses against the questions; the internal consistency of test items; and the relationship of their students' performance with other school-based tests. This process helps teachers to review the extent of the validity of their claims about their students' learning with the assessment task they have developed.

In areas teachers have succeeded in helping students to bridge learning gaps, they will share how they overcome their challenges so that other schools facing similar issues may hear plausible solutions through their sharing. In areas they would like to improve on, they will indicate on the evaluation sheet their intention to adopt processes that may help their students.

Feedback from Teachers

On PACE Approach

Fig. 8 shows the teachers' responses to our survey after the completion of the Plan segment of the PACE Approach.

Evaluation Statements	% Agree
<i>Performance Analysis</i>	
I understand the strengths and weaknesses of my students by topics and skills.	86
I am more aware of students with common weaknesses.	87
I would like to be guided to analyse the reports and complete 'A Plan for Action'.	63
<i>Nature of Learning Gaps</i>	
The list of common errors by topics deepens my understanding about my students' learning gaps.	98
The possible underlying causes inform instructional adaptation.	94
<i>Table of Specification (TOS)</i>	
The TOS clarifies the topics and skills to be assessed in the assessment task.	85
The TOS helps me focus on the topics and skills to bridge in my AfL programme.	100

Fig. 8: Evaluation of guidance during PACE Seminar

In terms of the usefulness of the learning-related information provided, more than 85% of the teachers indicate agreement to the statements. For statements that evaluate if they would like to be guided in analysing data and planning an intervention programme, 63% indicate that they would like to receive continuous help in this aspect. More than 85% agree that the TOS is useful to them.

Fig. 9 captures some of the positive remarks from teachers about PACE training seminar.

What is your major takeaway from this seminar?
<p><i>"I know that we can start remediation small. Knowing which topic to remediate first is also important."</i></p> <p><i>"I have a better understanding on how to interpret the vast data made available to us."</i></p> <p><i>"I understand more about my students' common errors and their possible underlying causes."</i></p> <p><i>"I can plan an AFL programme to close the learning gaps in the reports."</i></p>

"I now know how to change the AfL practice for P3 Math in my school by identifying students' weaknesses and coming up with an intervention programme to address these gaps."

What do you like about this seminar?

"The practice of writing the TOS is very meaningful as it guides me in setting the goals for my intervention programme."

"I like it that I know I am able to do it as a young teacher. The steps are simple and easy to implement."

"The training is structured and systematic. Explanation is clear to me. So are the tips and guidelines."

"It is very useful for all Math teachers. The examples and templates given are excellent."

"Time is given for us to mull over our students' results to consider appropriate follow-up action."

"I like the very detailed analysis of every student's ability and performance in every aspect of each topic and how teachers can follow up with the information."

"It allows me to relook at intervention to close the learning gaps."

Fig. 9: Some feedback from teachers

Feedback on students' behaviours after intervention

Teachers are encouraged to record their observations of their students' behaviours throughout the intervention in the journal provided by SEAB. All reported a positive change in attitude, behaviour and performance. Fig. 10 presents some the comments recorded in the teachers' journals.

Affective Aspect

"My students are more willing to try though they are not confident if their answers are correct."

"My students show more confidence in attempting picture graph questions with scales."

"My students are beginning to take an interest in Mathematics and look forward to remediation sessions."

"They find it interesting and fun to solve the questions with the use of concrete manipulatives."

"My students are more forthcoming in their participation of classroom discussions."

Behavioural Aspect

"My students' procedural fluency has improved."

"Students used Mathematical language when doing fractions."

"They attempted the questions in a systematic manner."

"Students can now link their workings to visual representations to help them solve the problem sums."

"Students are more open to communicating their thoughts when solving Mathematics sums and participate more willingly in discussions involving fractions."

"My students tend to ask more questions to clarify their misconceptions."

"My students seem to be more comfortable grouped in a class with classmates of similar ability level. The small class size also reduces their shyness and increases their willingness to ask questions if they are unsure."

"My students are more able to explain their thinking process in getting the correct answer. They show their workings for the story sums on their mini whiteboards and explained their solutions to the class."

Fig. 10: Observations of change in students' behaviour

Concluding Remarks

The purpose of the PACE programme is to guide teachers in using information of assessment results to act on the weaknesses of students. The information in the assessment reports is a form of feedback to teachers and students about how well the students are learning. While feedback is important in AfL, remedial action is critical in helping students to learn deeper and further. The underlying structure in a remedial programme includes the following steps.

First, teachers begin by planning an intervention programme to re-teach a discrete skill for a group of students with similar weaknesses in the topic. Second, appropriate instructional adaptation should focus on dealing with the target group's underlying learning-related causes. Third, each intervention programme should end with a check on students learning by means of an assessment task to assess the skills taught. Last, evaluation of the efficacy of the programme should encompass all aspects of assessment to find evidence to support the claims about students' achievements. With useful learning-related information and a systematic structure, teachers will be more focused and effective in facilitating the developmental progression for their students.

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Design of MathsCheck@P2

Schools were invited to register their Primary 2 students to sit MathsCheck@P2 at the end of the academic year. With the students' responses captured by the online assessment system, assessment reports are generated for their Primary 3 Mathematics teachers at the start of the following year. MathsCheck@P2 provides the Primary 3 teachers with qualitative information about pupils' performance to aid them in understanding their students' learning gaps. The purpose of addressing the gaps early is to better prepare students to learn Mathematics at higher levels.

Four types of assessment reports are generated for different audience – one for school leader, two for Primary 3 teachers and one individual student report for each of the schools. A summary of the reports and their functions are shown in Fig. 11.

<p>Class Report by Topics and Skill Descriptors (For Teachers)</p>	<p><u>Part 1: By Topics</u></p> <ul style="list-style-type: none"> • The first part of the Class Report provides teachers with an overview of the class' strengths and weaknesses in Mathematics with topic-specific data such as <ul style="list-style-type: none"> ○ the mean, minimum and maximum percentages of the class; and ○ the number of students who are below the class mean percentage for each of the topics assessed. <p><u>Part 2: By Skill Descriptors</u></p> <ul style="list-style-type: none"> • Skills Descriptors are used to illustrate the overarching skills assessed through a set of related items within a topic. There are 1 to 3 Skills Descriptors per topic. • This part of the Class Report provides teachers with the percentage of students in each of the classes who can manage the items for each of the Skill Descriptors.
<p>Student Guidance Report (For Teachers)</p>	<ul style="list-style-type: none"> • Students who have answered less than 25% of all the items in a topic correctly are identified in this report. • This report aims to highlight to teachers students who are critically in need of help in specific topics of Mathematics.
<p>Student Performance Report (For Students)</p>	<ul style="list-style-type: none"> • Individual students' strengths and weaknesses are presented in this report using Skill Descriptors • This report is meant for teachers to provide specific qualitative feedback to each student.
<p>School report by Topics and Skill Descriptors (For School Leaders)</p>	<p><u>Part 1: By Topics</u></p> <ul style="list-style-type: none"> • This report presents a summary of the school's Primary 2 cohort performance according to the topics assessed with data such as <ul style="list-style-type: none"> ○ the mean, minimum and maximum percentages of their Primary 2 students performance; and ○ the number of students who are below the mean percentage for each of the topics assessed. <p><u>Part 2: By Skill Descriptors</u></p> <ul style="list-style-type: none"> • Similar to the Class Reports, Skills Descriptors are used to illustrate the overarching skills assessed through a set of related items within a topic. • This part of the School Report provides School Leaders with the percentage of their Primary 2 students who can manage the items under each of the Skill Descriptors to inform level-wide initiative as follow-up action to address any concern surfaced by the report.

Fig. 11: Types of Performance Report and their Functions

Types of MathsCheck@P2 Performance Reports

Sample 1: Class Report by Topics and Skill Descriptors – By Topics

For teacher's use				
Singapore Mathematics Skills Check - P2 Class Report By Topics and Skill Descriptors				
P3 Class: H Size: 40		School: XYZ Primary School Test Period: Oct/ Nov 2015		
<hr/>				
By Topics				
Topic	No. of students below mean	Mean (%)	Minimum (%)	Maximum (%)
Whole Numbers	13	93	78	100
Fractions	12	88	22	100
Money	9	93	0	100
Measurement	18	36	0	100
Data Representation and Interpretation	16	77	50	100
Mathematical Processes	28	62	0	83

Sample 2: Class Report by Topics and Skill Descriptors – By Skill Descriptors

By Skill Descriptors	
Skill descriptors	Percentage of students who can manage
Whole Numbers	
Recognise place values up to 1000	100
Perform 4 operations on whole numbers	95
Solve routine problem on whole numbers involving 4 operations	86
Fractions	
Identify and represent fractions	98
Perform addition and/or subtraction on like fractions	93
Order fractions	90
Money	
Count and/or solve routine problem involving money	100
Measurement	
Read time	79
Recognise unit of measurements for mass/length/volume	70
Solve routine problem involving measurements	30
Data Representation and Interpretation	
Interpret picture graph	98
Solve problem involving picture graph	85
Mathematical Processes	
Solve problem that assess mathematical processes	46

Sample 3: Student Guidance Report

Singapore Mathematics Skills Check - P2 Student Guidance Report							For Teacher's Use
School: XYZ Primary School P3 Class: H			Test Period: Oct/Nov 2015				
Table of Students with Guidance Needs							
<u>Note:</u> * * " means that the student scored less than 25% of the area assessed correctly.							
	Whole Numbers	Fractions	Money	Measurement	Mathematical Processes	Data Representation and Interpretation	
Melvin Ang		*					
Mohamad Shafie Bin Hassan			*		*	*	
Noorhawati Binte Roslan				*	*		
Yong Li Yang Jonas			*				
Aishwariya d/o Muthusamy					*		
Shanya Fong Wen Xin	*	*			*		

Sample 4: Student Performance Report

For Teacher's Use

Singapore Mathematics Skills Check - P2 Student Performance Report

Name: **Melvin Ang**
P3 Class: **G**

School: **XYZ Primary School**
Test Period: **Oct/Nov 2015**

Skill descriptors that student can manage	Number of items correct
Whole Numbers	
Recognise place values up to 1000	3 out of 3
Solve routine problem on whole numbers involving 4 operations	2 out of 3
Perform 4 operations on whole numbers	2 out of 3
Fractions	
Identify and represent fraction	2 out of 2
Money	
Count and/or solve routine problem involving money	3 out of 4
Measurement	
Read time	2 out of 2
Recognise unit of measurements for mass/length/volume	3 out of 3
Solve problem involving measurements	3 out of 3
Mathematical Processes	
Solve problem that assesses mathematical processes	2 out of 3
Data Representation and Interpretation	
Interpret picture graph	2 out of 2
Solve routine problem by retrieving information from picture graph	2 out of 3

Skill descriptors that student needs more guidance	Number of items correct
Fractions	
Perform addition and/or subtraction on like fractions	1 out of 3
Order fractions	0 out of 3

Sample 5: School Report by Topics and Skill Descriptors

For School Leader's use

Singapore Mathematics Skills Check - P2 School Report By Topics and Skill Descriptors

School: **XYZ Primary School**
Size: **300**

Test Period: **Oct/ Nov 2015**

By Topics

Topic	No. of students below mean	Mean (%)	Minimum (%)	Maximum (%)
Whole Numbers	98	86	11	100
Fractions	111	71	20	100
Money	76	86	0	100
Measurement	86	85	0	100
Data Representation and Interpretation	89	79	0	100
Mathematical Processes	120	61	0	81

By Skill Descriptors

Skill descriptors	Percentage of students who can manage
Whole Numbers	
Recognise place values up to 1000	91
Perform 4 operations on whole numbers	90
Solve routine problem on whole numbers involving 4 operations	87
Fractions	
Perform addition or subtraction on like fraction	92
Identify and represent fractions	75
Order fractions	61
Money	
Count and/or solve routine problem involving money	92
Measurement	
Recognise unit of measurements for mass/length/volume	97
Read time	91
Solve routine problem involving measurements	74
Data Representation and Interpretation	
Interpret picture graph	85
Solve routine problem by retrieving information from picture graph	45
Mathematical Processes	
Solve problem that assess mathematical processes	46

A Plan for Action

With your target group of students in mind and the new set of learning goals, work out a draft plan for action. You would need to do up a plan for each of your target groups.

Topic	
Learning Goal(s) (Specific skills)	
Intervention Period (Tentative)	
Lesson Structure	No. of Lessons/duration of each lesson:
	No. of Teachers:
	Class Size:
Assessment Mode & Period (Pen-and-Paper/ Performance Task)	
Feedback Structure (How you intend to provide feedback to your students)	