SDG Goal 4.1, Indicator 4.1.1

Reading and Mathematics Assessment Blueprint

AMPL a and b

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Contents

Introduction

The AMPL a and b project aims to measure primary learning outcomes so that assessment results can be scaled to international benchmarks, reporting against SDG 4.1.1 (a) and (b).

This document provides a detailed assessment blueprint for the AMPL a and b assessment instruments. A separate framework is provided for the contextual questionnaires. This assessment blueprint describes the learning areas and target population for the AMPL project, the domain and constructs assessed, the item types included, the final AMPL test booklet design, alignment with minimum proficiency levels for SDG4.1.1 (a) and (b) and the sources of items with a description of how they were selected for AMPL (b).

Learning areas and target population

The two learning areas assessed in AMPL a and b are Reading and Mathematics. In line with the Global Proficiency Frameworks (GPFs), and the Minimum Proficiency Levels Unpacked[1] document, Reading and Mathematics are referred to as 'learning areas', which are then broken down into domains, constructs, and sub-constructs.

The focus of the AMPL (a) assessment is on learners at the end of lower primary and the focus of the AMPL (b) assessment is on learners at the end of primary school. However, the definition of the end of lower primary and end of primary schooling differs across systems and countries. In reporting against SDG indicator 4.1.1(b) the UIS also allows the flexibility for countries to report at grade levels close to the end of lower primary and the end of primary schooling if the quality and appropriateness of the outcomes data is more suitable for purpose.

The benchmarks that will be used to indicate learning outcomes in this study are aligned with Sustainable Development Goal (SDG) indicator 4.1.1(a) and 4.1.1 (b):

> (a) *the proportion of children and young learners … at the end of lower primary … achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.[3]*

> (b) *the proportion of children and young learners … at the end of primary … achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.[3]*

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[1] Australian Council for Educational Research. (2020) Minimum Proficiency Levels Unpacked. Commissioned by UIS and developed by ACER (2019) revised and endorsed after the seventh Global Alliance for the Monitoring of Learning (GAML) meeting (Oct 2020)

Three documents have been used to support judgments of strong alignment with the minimum proficiency levels:

- **Alignment Criteria** for reading and mathematics proposed by the SDG 4.1.1 Review Panel convened by the UNESCO Institute for Statistics (UIS) on March 2021.
- **Minimum Proficiency Levels Unpacked** (MPLS Unpacked) for reading and mathematics commissioned by UIS and developed by ACER (2019) and endorsed after the seventh Global Alliance for the Monitoring of Learning (GAML) meeting (Oct 2020). This document has subsequently been revised in the light of its use in the ACER Global Education Monitoring (GEM) International Standard Setting Exercise (February-March 2022).
- **Global Proficiency Framework** (GPF) for Reading and Mathematics: Grades 1 to 9 (USAID & UIS, 2020) https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2019/05/GAML6-REF-16-GLOBAL-PROFICIENCY-FRAMEWORK.pdf

The MPLs Unpacked for SDG4.1.1(a) are broadly aligned with the descriptors for Grade 2 in the GPF for each of reading and mathematics. The MPLs Unpacked for SDG4.1.1(b) are broadly aligned with Grades 4 and 5 in the GPF for each of reading and mathematics.

All tests will include items that are below, at and above a targeted level of proficiency to obtain an accurate measure of students' skills in relation to this level.

AMPL assessment instruments

The AMPL a assessment instruments were developed for this project.

The AMPL b assessment instruments were previously used in the MILO study in 2021 in six African countries as shown in Table 1. The tests were quite difficult for the target populations, so subsequently four of the items in each of reading and mathematics were replaced with easier items and the tests were then administered in Sierra Leone in 2022.

Table 1: MILO participants

Participating Country	Language of assessment	Target grade
Burkina Faso	French	G6 (CM2)
Burundi	French	G6
Cote d'Ivoire	French	5/6
Senegal	French	G6 (CM2)
Kenya	English	G7
Zambia	English	G5

Reading construct

Reading includes the domains of Listening Comprehension, Decoding and Reading Comprehension. The details of the alignment to the MPLS Unpacked and the GPF are explained later in this document under the headings 'AMPL a alignment' and 'AMPL b alignment'.

AMPL a

Listening comprehension and decoding are assessed in the AMPL (a) tests as well as Reading Comprehension.

- Listening comprehension (called 'Comprehension of spoken or signed language' in the GPF) is relevant for the end of lower primary. It is not described in the GPF past Grade 3.

- Decoding for English or French languages is also relevant for the end of lower primary. The GPF only includes Decoding above Grade 2 for languages with complex, extensive orthographies where it might be necessary to teach and assess new decoding skills beyond Grade 2.

- For the AMPL (a) Reading, the sub-component of retrieving was the primary focus, as the subcomponents of interpreting and reflecting items are above the proficiency required for SDG4.1.1(a). A few items addressing interpreting and retrieving were still included in AMPL (a).

The Alignment Criteria for strong alignment of reading at Grade 2 requires a minimum of 5 items that address a minimum of 50 percent of the four GPF reading sub-constructs at Grade 2. AMPL (a) includes 25 reading items many of which address three of the four Grade 2 sub-constructs. Some items will also address some of the GPF Grade 1 and Grade 3 subconstructs.

Minimal alignment will also be made for Grade 2 in the domains of Listening Comprehension (10 items) and Decoding (10 items) which are combined for

alignment purposes, by covering 50 percent of the GPF Grade 2 sub-constructs.

AMPL (b)

For AMPL (b) the Reading Comprehension construct only was relevant. The domain of 'Reading Comprehension' is further broken down into three constructs: R1- Retrieve information, R2 – Interpret information and R3- Reflect on information.

For the AMPL (b) test, the targets for each of the three constructs within the domain of Reading Comprehension are as follows:

- Retrieve information: 35-45%

- Interpret information: 45-55%

- Reflect on information: 15-25%

These targets were developed with reference to existing large-scale and regional assessments, and the work of the GPF alignment group. In relation to the former, this breakdown is analogous to that used in the large-scale international assessment PIRLS2, in which the equivalent breakdown is 20%, 60% and 20%. The slightly greater emphasis on items relating to retrieving information is explained by the likely greater familiarity of this style of item for the target population.

The Draft Alignment Criteria developed for reviewing assessments' suitability for reporting against SDG 4.1.1 specify that in order to be considered "strongly aligned" with the GPF for Grades 4-9, at least 5 items for each of the three constructs should be included. The AMPL b assessment allow this specification to be met as shown in Table 2.

Table 2: Classification and targets for reading assessment items

Construct	Number of items	Percentage of items	Target percentage
Retrieve information	11	35%	35-45%
Interpret information	14	45%	45-55%
Reflect on information	6	19%	15-25%

An additional 2 retrieve items were subsequently added to the AMPL b reading test making the proportion of retrieve items slightly higher. This was done to ensure retrieve items of a range of difficulty, including close to the end of lower

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[2] The IEA Progress in International Reading Literacy Study

primary benchmark were included in the test. This makes the total number of reading items in the AMPL (b) test 32.

Mathematics construct

Mathematics includes the domains of Number and Operations, Measurement, Geometry, Statistics and Probability and Algebra. The details of the alignment to the MPLS Unpacked and the GPF subdomains are provided later in this document under the headings 'AMPL a alignment' and 'AMPL b alignment'.

AMPL (a)

For alignment purposes Number operations stands alone, Measurement and Geometry are bundled together and so are Statistics, Probability and Algebra. The number of items in each domain meets or exceeds the minimum requirements of 5 items for each of these three groupings.

The current alignment specifications are that the selection covers at least 50% of all subconstructs for Grades 2/3 in the GPF. This has been achieved.

The AMPL (a) test includes:
- 16 Number items with 11 aligned at or below MPL4.1.1(a) and 5 above. Of these items five are aligned at each of GPF Grade 1, GPF Grade 2 and GPF Grade 3.
- 8 items Measurement and Geometry items altogether aligned at MPL4.1.1 (a) and GPF Grade 2.
- 6 Statistics, Probability and Algebra items altogether aligned at MPL4.1.1 (a) and GPF Grade 2.

AMPL (b)

The proportion of items addressing each of the mathematics domains in AMPL b is:

- Number and operations 35-45%

- Measurement 15-20%%

- Geometry 15-20%%

- Statistics and Probability 5-10%

- Algebra 5-10%

The mathematics targets were also developed with reference to existing large-scale and regional assessments, and the work of the GPF alignment group. The content breakdown is analogous to that used in the large-scale international

assessment TIMSS3 at Grade 4, in which the equivalent breakdown is 50% Number, 30% Measurement and Geometry and 20% Data. The slightly variations between the TIMSS targets and the AMPL targets is explained by the fact that the Algebra domain of the GPF at end of primary is content that would have been incorporated into the Number domain within the TIMSS Framework (in the topic area called Expressions, simple equations, and relationships).

The GPF advisory group on alignment specified that in order to be considered 'strongly aligned' with the GPF the following targets need to be met:

- At least 5 items from the Number and operations domain

- At least 5 items from the Measurement and Geometry domains

- At least 5 items from the Statistics and Probability and Algebra domains

- A total of 50% of all the sub-constructs in the mathematics GPF that are relevant to the target grade level. For example, if there are 20 sub-constructs at Grade 5, at least 10 of the sub-constructs should be included in the assessment.

The AMPL b mathematics assessment allow this specification to be met as shown in Table 3.

Table 3: Classification and targets for mathematics assessment items

Domain	Number of items	Percentage of items	Target percentage
Number and operations	11	37%	35–45%
Measurement	5	17%	15–20%
Geometry	6	20%	15–20%
Statistics and Probability	4	13%	10–15%
Algebra	4	13%	10–15%

Additionally, out of the 22 relevant sub-constructs in the GPF at end of primary, a total of 16 different sub-constructs are used in the mathematics assessment, well above the target of 50% set by the GPF advisory group on alignment.

Item types

All items for the AMPL project were designed for paper-based administration rather than digital. Only closed item types – those which require no expert judgement to score – were included. The closed item types included were multiple choice, in which students select the correct answer from a set of options, and complex multiple-choice, in which students select the correct option for each of a series of statements (eg a select true or false for a number of different

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[3] The IEA Trends in Mathematics and Science Study

statements). Restricting the assessment to closed item types allows for efficient administration and data entry, since there is no need to train coders to score the items.

Test booklet design

There are 8 AMPL a and b tests. All tests begin with an introduction and some practice questions to show the students how to record their answers.

The tests are in pairs, with identical items for each pair (1/2, 3/4, 5/6, 7/8, but the order reversed as to whether Reading or Mathematics comes first. Apart from tests 1 and 2 all tests begin with Audio. This targets SDG4.1.1(a) and includes 10 listening comprehension items and 5 decoding items. The administrators play an audio file over a speaker system for this part of the test and students record their answers in their test booklets.

Table 4: AMPL a and b test booklet design

	Part 1 Audio	Part 2	Part 3
Test 1		Read(b) 32 items	Maths(b) 30 items
Test 2		Maths(b) 30 items	Reading(b) 32 items
Test 3	Listen Comp(a) 10 items Decoding(a) 5 items	Maths(b) 30 items	Reading(b) 32 items
Test 4	Listen Comp(a) 10 items Decoding(a) 5 items	Read(b) 32 items	Maths(b) 30 items
Test 5	Listen Comp(a) 10 items Decoding(a) 5 items	Maths(a) 15 items Maths(b) 15 items	Read(a) 15 items Read(b) 15 items
Test 6	Listen Comp(a) 10 items Decoding(a) 5 items	Read(a) 15 items Read(b) 15 items	Maths(a) 15 items Maths(b) 15 items
Test 7	Listen Comp(a) 10 items Decoding(a) 5 items	Maths(a) 30 items	Decode(a) 5 items Read(a) 25 items
Test 8	Listen Comp(a) 10 items Decoding(a) 5 items	Decode(a) 5 items Read(a) 25 items	Maths(a) 30 items

For countries assessing SDG4.1.1(b) only, tests 1 and 2 are rotated across learners. For countries opting to assess both SDG 4.1.1(a) and (b), tests 3, 4, 5, 6, 7, and 8 are rotated across learners. For countries opting to assess SDG4.1.1(a) only, tests 7 and 8 are rotated across learners. Rotating allows any position effects, such as the fact that students might be more fatigued when completing the second cluster, to be dealt with.

AMPL a alignment

Reading

The following section provides the blueprint specifications and alignment details for each of the Reading domains of Listening Comprehension, Decoding and Reading Comprehension for the AMPL (a) tests.

Listening Comprehension

Table 5 shows the AMPL test (a) specifications for the Aural Comprehension Domain. The task is outlined in the first column. The MPLs Unpacked column provides the descriptive text for the two constructs of retrieving information and interpreting information for MPL 4.1.1a. There are no sub-constructs in this document. The last two columns outline the relevant GPF constructs (e.g. C1) and sub-constructs (e.g. C1.1) showing which grades each sub-construct applies to in brackets.

There are two AMPL aural comprehension tasks: one with a narrative stimulus and one with an information text stimulus. Both will be administered in the same way. Students will hear the text read aloud. They do not see the stimulus text. Students can see the written multiple choice items which are also read aloud to them. The administrator will pause while students answer an item before reading the next item aloud

Table 5: Listening Comprehension

Task	No of items	MPLs Unpacked	GPF construct	GPF sub-constructs
(i) Listen to and answer questions about a **narrative text** of approx. 80 words. mcq items with 3 options that will be read aloud.	2 retrieve 3 interpret	In a longer text, that is read aloud to them… **Retrieving information** …identify key events, ideas and major characters. **Interpreting information** …make simple inferences and identify the meaning of key words	C1 Retrieve information at the word level	C1.1– not addressed (G1/2) C1.2 recognise the meaning of common grade-level words in a short grade-level text (G1/2)
			C2 Retrieve information at the sentence or text level	C2.1 retrieve explicit information in a short grade-level text (G1/2/3)
			C3 Interpret information at sentence or text level	C3.1 Interpret information (G2/3) • Make simple inferences (G2) • Infer meaning of words (G3) • Associate noun-pronoun references (G3) • Demonstrate broad understanding (G3)
(ii) Listen to and answer questions about an **information text** approx. 80 words mcq items with 3 options that will be read aloud.	2 retrieve 2 interpret 1 reflect	In a longer text, that is read aloud to them… **Retrieving information** …identify key events, ideas and major characters. **Retrieving information** …make simple inferences and identify the meaning of key words		C2.1 as above
				C3.1 as above
Coverage		Good coverage at, below and just above		2 out of 3 G1 sub-constructs 3 out of 4 G2 sub-constructs 2 out of 2 G3 sub-constructs
Alignment to SDG 4.1.1 Review Panel 'Strongly aligned' criteria		NA		NA for Reading If combined with decoding this meets the Minimally Aligned G1-2 criteria.

Decoding

Table 6 shows the AMPL test (a) specifications for the Decoding Domain. The tasks are outlined in the first column. The MPLs Unpacked column provides the descriptive text for Decoding for MPL 4.1.1(a). The last two columns outline the relevant GPF constructs (e.g. D1) and sub-constructs (e.g. D1.1) showing which grades each sub-construct applies to in brackets. There are two decoding tasks each with 5 items.

Table 6: Decoding

Task	No of items	MPL Unpacked	GPF constructs	GPF sub-constructs
(i) Identify a spoken word in a written sentence (tick a box)	5 aural delivered items	**Decoding:** In a short, simple connected text of one or two sentences decode most words, including some unfamiliar words with familiar sound-symbol patterns.	D1 Precision	D1.1 identify symbol-sound correspondences (G1/2/3) D1.2 decode isolated words (G1/2/3)
(ii)Fill the gap in a word with correct letter (mcq)	5 pen and paper items		D2 Fluency	Not addressed
Coverage		Fits within the scope of MPLa with focus on decoding some words including unfamiliar words.		2 out 2 G1 sub-constructs 2 out of 3 G2 sub-constructs
Alignment to SDG 4.1.1 Review Panel 'Strongly aligned' criteria		NA		NA for Reading If combined with aural comprehension this meets the Minimally Aligned G1-2 criteria.

All AMPL items are administered to the whole class at once. It is not possible to include decoding items requiring students to individually read text aloud or say the sounds of letters. The GPF construct of Fluency (D2) cannot be addressed.

The first decoding task (i) is aurally delivered. Students are asked to look at a specific written sentence, or list in their test booklet. They hear a spoken word from the sentence/list. The student must locate and mark the word that they heard (e.g. tick a box under the word). Students need to accurately match the sounds they hear in the spoken word to the written word. They do not need to know the meaning of the word.

For the second decoding task (ii), students see an image for a very familiar object or action in their test booklet. It is assumed the word for this image would be in the vocabulary of all students. The word is written below the image with one gap. Students need to select the letter, based on their knowledge of letter-sound relationships that fills the gap to complete the written word. While some meaning is

involved, the extreme familiarity of the spoken word for the image means the difficulty of the task is mainly in selecting the correct letter-sound to represent the missing phoneme.

Reading Comprehension

Table 7 shows the AMPL test (a) specifications for the Reading Comprehension Domain. The tasks are outlined in the first column. The MPLs Unpacked column provides the descriptive text for Reading Comprehension for MPL4.1.1a. The last two columns outline the relevant GPF constructs (e.g. R1) and sub-constructs (e.g. R1.1) showing which grades each sub-construct applies to in brackets. There are three reading tasks.

Table 7: Reading Comprehension

Task	No of items	MPLs Unpacked	GPF constructs	GPF sub-constructs
(i) Match a word or sentence to an image(mcq)	10 retrieve	**Retrieving information**: Identify the meaning of familiar words in a sentence.	R1 Retrieve information	R1.1: Recognise the meaning of common grade-level words (G1, 2, 3)
(ii) Retrieve information from 1-2 sentences (mcq)	5 retrieve	**Retrieving information**: Locate most pieces of explicit information in a sentence when the information is prominent and there is limited competing information	R1 Retrieve information	R1.2 Retrieve explicit information in a grade-level text by direct or close word matching (G2, 3)
(iii) Retrieve and interpret information in 2 short descriptive texts and 1 information text (mcq)	3 interpret MPL4.1.1a text 2 retrieve & interpret MPL4.1.1a text 2 retrieve, 3 interpret above MPL4.1.1a text	**Retrieving information**: Identify the meaning of familiar words in a sentence. Locate most pieces of explicit information in a sentence when the information is prominent and there is limited competing information	R1 Retrieve information R2 Interpret information	R1.2 Retrieve explicit information in a grade-level text by direct or close word matching (G2, 3) R1.3 Retrieve by explicit information in a grade-level text by synonymous matching (G3) R2.1 Identify the meaning of unknown words and expressions in a grade-level text (G3) R2.2 Make inferences in a grade-level text (G3) R2.3 Identify the main and secondary ideas in a grade-level text (G3)
Coverage		Good coverage below, at and just above MPLa		1 out of 1 G1 sub-constructs 2 out of 2 G2 sub-constructs 4/5 out of 6 G3 sub-constructs

The first reading task (i) requires students to match a word or a sentence to a picture. This task is classified as retrieving. Students identify the meaning of a single word, by matching the word to the correct picture, or they identify the meaning of two, or three words in a sentence in order to locate the picture that includes images for these words. The main skill required is recognising the meaning of common words as single words or in a short sentence. These skills are at and below MPL4.1.1a.

The second reading task (ii) requires students to retrieve information from very short texts. This may be a single sentence or a few sentences. These skills are mostly at MPL4.1.1a.

The third reading task (iii) requires students to retrieve and interpret information from short texts. One or two of these texts will match the GPF criteria for a Grade 2 level text and one text will match the GPF criteria for a Grade 3 level text. All the interpret items will be above MPL4.1.1a.

Mathematics

The following sections provide the blueprint specifications and alignment details for each of the Mathematics domains of Number and Operations, Measurement, Geometry, Statistics and Probability and Algebra for the AMPL (a) tests.

Number and Operations

Construct and Subconstruct (Global Proficiency Framework)	Number of items	Minimum Proficiency Levels Unpacked
N1 Whole numbers		
N1.1 Identify and count in whole numbers, and identify their relative magnitude (G1,2,3)	5	Count, read, write, compare, and order whole numbers up to 100.
N1.2 Represent whole numbers in equivalent ways (G1,2,3)	3	Represent quantities up to 100 concretely, pictorially, and symbolically.
N1.3 Solve operations using whole numbers (G1,2,3)	4	Solve addition and subtraction problems within 20 that are presented concretely, pictorially, and symbolically.

N1.4 Solve real-world problems involving whole numbers (G1,2,3)	4	Divide a group of up to 20 objects into 2 equal sets. Solve simple real-world problems using addition and subtraction facts within 20.

Coverage: Four out of the four 'Number and operations' subconstructs relevant to Grades 1 & 2 of the GPF are covered by the 16 items. Strong alignment exists between the GPF and MPLs.

N2.1 (Fractions: Identify and represent fractions using objects, pictures, and symbols, and identify relative magnitude) is in the GPF at G3. It is not assessed here as no reference is made to fractions in the MPL Unpacked document.

Measurement

Construct and Subconstruct (Global Proficiency Framework)	Number of items	Minimum Proficiency Levels Unpacked
M1 Length, weight, capacity, volume, area, and perimeter		
M1.1 Use non-standard and standard units to measure, compare, and order (G1,2,3)	2	Use non-standard units to measure and compare length and weight.
M2 Time		
M2.1 Tell time (G1,2,3)	1	Tell time using a digital clock.
M2.2 Solve problems involving time (G2,3)	1	Solve problems using a calendar.
Coverage: Three out of the four 'Measurement' subconstructs relevant to Grades 2 and 3 of the GPF are covered by the 4 items. Strong alignment exists between the GPF and MPLs. Please note that currency has not been included.		

Geometry

Construct and Subconstruct (Global Proficiency Framework)	Number of items	Minimum Proficiency Levels Unpacked

G1 Properties of shapes and figures		
G1.1 Recognize and describe shapes and figures (G1,2,3)	2	Recognize and name shapes that are regular and irregular (for example, if shown an irregular triangle, recognize that it is a triangle; name a hexagon). Recognise and name basic attributes of shapes (for example, straight lines, curves). Recognise when a two-dimensional shape has been translated (for example, it is the same shape when it has been translated).
G2 Spatial visualisations		
G2.1 Compose and decompose shapes and figures (G1,2,3)	**1**	Compose a larger two-dimensional shape from a small number of given shapes. Decompose a larger two-dimensional shape into a small number of given shapes.
G3 Position and direction		
G3.1 Describe the position and direction of objects in space (G1,2,3)	1	Accurately use the terms left and right (for example, answer, 'Where is the teacher's desk?' 'To the [left] of the chalkboard.'). Interpret and use positional terms (for example, in front of, behind, opposite, between).
Coverage: The three 'Geometry' subconstructs relevant to Grades 1, 2 and 3 of the GPF are covered by the 5 items. Strong alignment exists between the GPF and MPLs		

Data Management (Statistics and probability)

Construct and Subconstruct (Global Proficiency Framework)	Number of items	Minimum Proficiency Levels Unpacked
S1 Data management		
S1.1 Retrieve and interpret data presented in displays (G1,2,3)	4	Compare between categories of simple data displays (for example, tally charts, pictographs) with up to four categories and a single unit scale.

Coverage: The only 'Data Management' subconstruct relevant to Grades 1, 2 and 3 of the GPF is covered by these 3 items. Strong alignment exists between the GPF and MPLs.

Algebra

Construct and Subconstruct (Global Proficiency Framework)	Number of items	Minimum Proficiency Levels Unpacked
A1 Patterns		
A1.1 Recognize, describe, extend, and generate patterns (G1,2,3)	2	Extend non-numerical repeating patterns, recognise repeating units, and identify a missing element
A3.2 Demonstrate an understanding of equivalency (G2,3)		
Coverage: One of the two 'Algebra' subconstructs relevant to Grades 1, 2 and 3 of the GPF ais covered by these 2 items. Strong alignment exists between the GPF and MPLs.		

AMPL b alignment

Reading

In the MPLS Unpacked, the Minimum Proficiency Level in reading for end of primary schooling is described as:

> Students independently and fluently read simple, short narrative and expository texts. They retrieve explicitly-stated information. They interpret and give some explanation about the main and secondary ideas in different types of texts, and establish connections between main ideas in a text and their personal experiences. (ACER, 2020, p6)

The AMPL b Reading items focus on items that meet this description while including some items that are much easier as well as some items that are more demanding. Table 8 shows how the AMPL b Reading assessment is also aligned with the GPF subconstructs.

Table 8: AMPL b GPF reading domains, constructs and sub-constructs (with constructs included in the assessment highlighted)

Domain		Construct		Subconstruct	
C	Comprehension of spoken or signed language	C1	Retrieve information at word level	C1.1	Comprehend spoken and signed language at the word or phrase level
				C1.1	Recognize the meaning of <u>common grade-level</u> words in a short, <u>grade-level continuous text</u> read to <u>or signed for</u> the learner
		C2	Retrieve information at sentence or text level	C2.1	Retrieve <u>explicit information</u> in a short <u>grade-level</u> continuous text read to or signed for the learner
		C3	Interpret information at sentence or text level	C3.1	Interpret information in a short <u>grade-level</u> continuous text read to or signed for the learner
D	Decoding	D1	Precision	D1.1	Identify symbol-sound/fingerspelling and/or symbol-morpheme correspondences
				D1.2	Decode isolated words
		D2	Fluency	D2.1	Speak aloud or sign a <u>grade-level</u> continuous text at pace and with accuracy
R	Reading comprehension	R1	Retrieve information	R1.1	Recognize the meaning of <u>common grade-level words</u>
				R1.2	Retrieve <u>explicit information</u> in a grade-level continuous text by <u>direct- or close-word matching</u>
				R1.3	Retrieve <u>explicit information</u> in a <u>grade-level</u> continuous text by synonymous matching
		R2	Interpret information	R2.1	Identify the meaning of <u>unknown words</u> and <u>expressions</u> in a <u>grade-level continuous text</u>
				R2.2	Make <u>simple inferences</u> in a <u>grade-level continuous text</u>
				R2.3	Identify the main and secondary ideas in a <u>grade-level continuous text</u>
		R3	Reflect on information	R3.1	Identify the <u>purpose</u> and audience of a text
				R3.2	Give an overall evaluation of a text, and justify that evaluation
				R3.3	Evaluate the status of claims made in a text
				R3.4	Evaluate the effectiveness of a text

Mathematics

In the MPLS Unpacked, the Minimum Proficiency Level in Mathematics for end of primary schooling is described as:

> Students recognise, read, write, order, compare and calculate with whole numbers, simple fractions and decimals. Students can measure length and weight using standard units, calculate the perimeter of simple 2D shapes and area of rectangles. They read, interpret and construct different types of data displays such as tables, column graphs and pictographs and recognise, describe and extend number patterns. They can solve simple application problems. (ACER, 2020, p4)

The AMPL b Mathematics assessment is focused on items that meet this description while including some items that are much easier as well as some items that are more demanding. Table 9 shows how the AMPL b Mathematics assessment is also aligned with the GPF subconstructs.

Table 9: AMPL b GPF mathematics constructs and sub-constructs (with sub-constructs included in the assessment highlighted)

Construct		Subconstruct	
N1	Whole numbers	N1.1	Identify, count in and identify the relative magnitude of whole numbers
		N1.2	Represent whole numbers in equivalent ways
		N1.3	Solve operations using whole numbers
		N1.4	Solve real-world problems involving whole numbers
N2	Fractions	N2.1	Identify and represent fractions using objects, pictures and symbols and identify relative magnitude
		N2.2	Solve operations using fractions
		N2.3	Solve real-world problems involving fractions
N3	Decimals	N3.1	Identify and represent decimals using objects, pictures and symbols and identify relative magnitude
		N3.2	Represent decimals in equivalent ways (including fractions and percentages)
		N3.3	Solve operations using decimals
		N3.4	Solve real-world problems involving decimals
N4	Integers	N4.1	Identify and represent integers using objects, pictures or symbols and identify relative magnitude
		N4.2	Solve operations using integers
		N4.3	Solve real-world problems involving integers
N5	Exponents and roots	N5.1	Identify and represent quantities using exponents and roots and identify the relative magnitude
		N5.2	Solve operations involving exponents and roots
N6	Operations across number	N6.1	Solve operations involving integers, fractions, decimals, percentages, and exponents
M1	Length, weight, capacity, volume, area and perimeter	M1.1	Use non-standard and standard units to measure, compare, and order

		M1.2	Solve problems involving measurement
M2	Time	M2.1	Tell time
		M2.2	Solve problems involving time
M3	Currency	M3.1	Use different currency units to create amounts
G1	Spatial visualizations	G1.1	Compose and decompose shapes and figures
G2	Properties of shapes and figures	G2.1	Recognize and describe shapes and figures
G3	Position and direction	G3.1	Describe the position and direction of objects in space
S1	Data Management	S1.1	Retrieve and interpret data presented in displays
		S1.2	Calculate and interpret central tendency
S2	Chance and probability	S2.1	Describe the likelihood of events in different ways
		S2.2	Identify permutations and combinations
A1	Patterns	A1.1	Recognize, describe, extend and generate patterns
A2	Expressions	A2.1	Evaluate, model and compute with expressions
A3	Relations and functions	A3.1	Solve problems involving variation (ratio, proportion, and percentage)
		A3.2	Demonstrate an understanding of equivalency
		A3.3	Solve equations and inequalities
		A3.4	Interpret and evaluate functions

Appendix A: AMPL item sources and criteria for selection

AMPL b

All items selected for inclusion in the AMPL b test booklets were from the UIS Global Item Bank. In the first stage of item selection, a subset of items from the Global Item Bank were identified for further review. The criteria used to select items for review were that:

i) the items were suitable for students working at the level of the upper primary MPL or below

ii) the items were multiple-choice (or another closed item format)

iii) the items did not use a sentence fragment as the item stem (since this format can be difficult to translate)

iv) the items originated in either English or French, and

v) (for reading) the item or stimulus did not rely heavily on language-specific features that would not translate well (eg, a poem based on rhyming).

For reading, this resulted in a set of 206 items in English and 31 items in French proceeding to the next stage. (Note that in the tables below, because the pieces of stimulus to which reading items related were also rated, for English 265 ratings were given, and for French, 40).For mathematics, a set of 228 items in English and 15 items in French met the criteria to proceed to the next stage.

In the third and final stage of item selection, test booklets were constructed which drew on the results of the review process, and met the targets according to construct. Table 10 shows the results of this process for reading. Of the stimulus pieces and items chosen, the average rating out of 5 from stage 2 of the review was 4.2 for both the English material and the French material. For the stimulus pieces and items not chosen, the average rating was 3.4 for the English material, and 3.3 for the French material. The items selected for inclusion were contributed to the Global Item Bank by PASEC, the Gambia, Dominica, Brunei, Ghana, ACER, Jamaica, Canada (Ontario) and Hong Kong.

Table 10: The results of the review process for reading

	Number of ratings given (stimulus and items)	Number of ratings that met the quality criteria (stimulus and items)	Number chosen for inclusion
English	265	173	35
French	40	21	8

The final stage of item selection for mathematics took a similar approach to reading. However, for mathematics at this stage, an additional criterion for selection was that, for ease of administration, any variation in item type or format should not necessitate a large number of practice questions. This meant that 68 of the reviewed items that did not follow a conventional multiple choice or complex multiple choice format were excluded from further consideration (for example, items requiring students to draw lines to match objects or numbers in one set to objects or numbers in another set). 11 shows the results of this process for mathematics.

The average rating of the mathematics items chosen for inclusion in the test booklet was 4.2 out of 5 for the English material and 4.3 out of 5 for the French material. For the material not chosen, the average rating was 4.1 out of 5 for the English material (noting that this includes the 68 items with an inadmissible item type) and 2.9 out of 5 for the French material. Items selected for inclusion were contributed to the Global Item Bank by PASEC, Antigua and Barbuda, St Vincent and Grenadines, the Gambia, Zambia, Jamaica, Canada and Australia.

Table 11: The results of the review process for mathematics

	Number of ratings	Number of ratings that met the quality criteria	Number chosen for inclusion
English	228	142	20
French	15	10	10

AMPL a

The UIS Global Item Bank was reviewed for suitable items for the AMPL a tests in both English and French using the same criteria as for AMPL b. However, almost no suitable items could be identified. Consequently, ACER developed new items that aligned with the scope of the constructs within the constraints of automatic scoring. Where relevant, mathematics items were modelled on examples from the UIS Global Item Bank. For reading, one short text from the Global Item Bank was used, but with a modified item and a new item.

Reading

Aural language comprehension that is aligned with SDG4.1.1 requires a short text - the

GPF model texts for Grade 2 are approximately 80 words. Texts of approximately 120 words are classified as Grade 3. The items need to assess retrieving and interpreting. We did not find any suitably short texts designed for listening comprehension. We have looked at using short texts intended for reading comprehension, but they include too much competing detail (multiple names, colours, days, times, objects etc) because they are designed to support reading retrieve items. These are not suitable for listening comprehension as the purpose of listening is to understand the main ideas in a short story or information text and not to recall competing details from a text that is only heard once.

Reading Comprehension that is aligned with SDG4.1.1a requires identifying the meaning of single words or retrieving information from very short texts of one or two sentences with limited competing information. We have found word-picture matching items, but most need adapting to suit translation and for image quality. Almost all the reading texts we have found are too long, the items are interpreting rather than retrieving or they are open response.

Decoding for AMPL requires items that can be group administered, but do not require students to understand the meaning of the word(s), or they will be classified as reading. We did not find anything suitable.

Mathematics

Items of an appropriate difficulty for SDG4.1.1a almost all addressed a narrow range of Number skills and were open constructed response. Most items identified as suitable for lower primary in the UIS Global Item Bank were more difficult than the MPLs Unpacked specifications for SDG4.1.1 (a) or the GPF specifications for Grade 2.