Leh Wi Lan

Sierra Leone Secondary Grade Learning Assessment 2018

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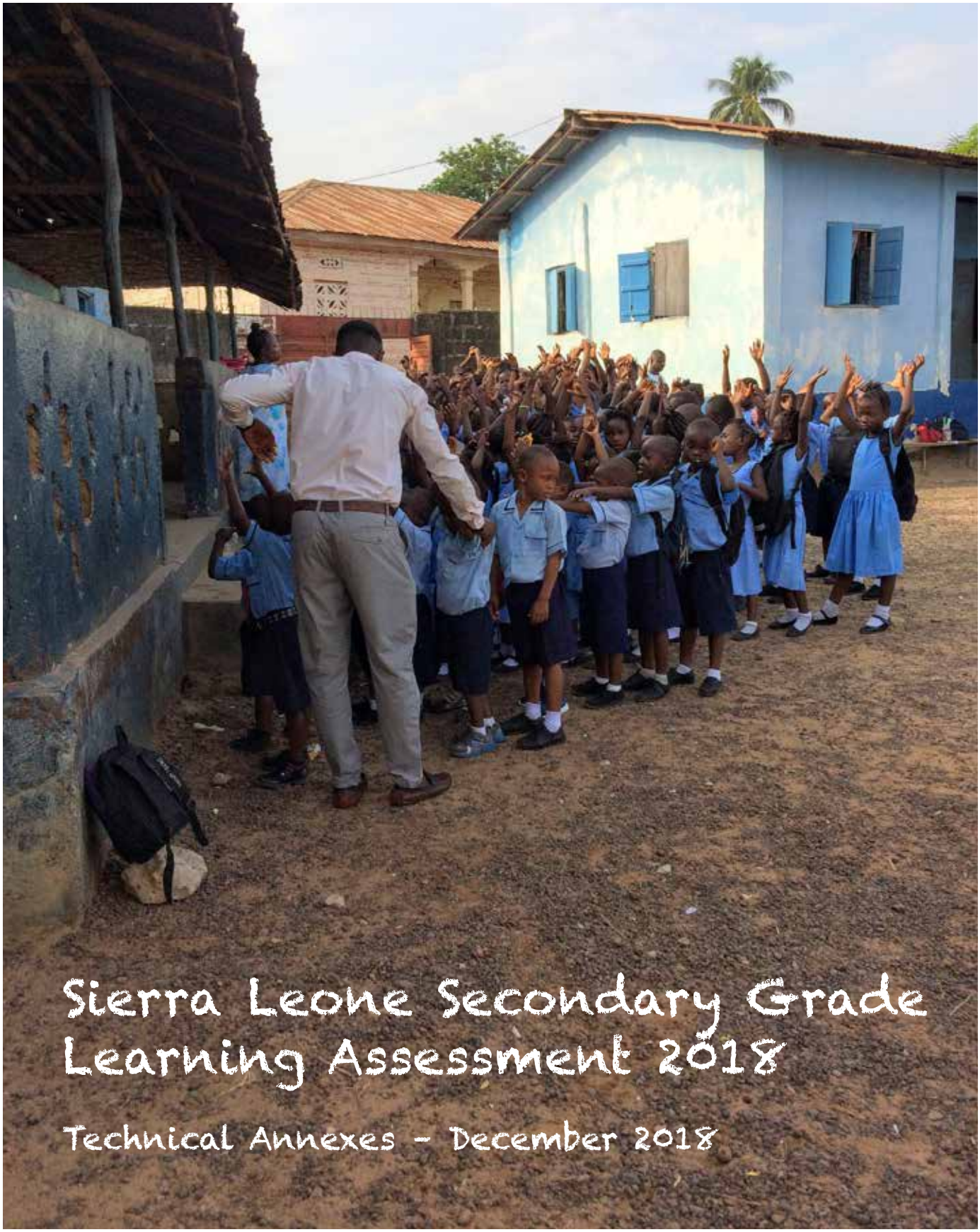

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Leh wi Lan/Sierra Leone Secondary Education Improvement Programme (SSEIP) is a five-year (2016-2021) UKaid-funded programme aimed at improving English and mathematics learning achievement in all secondary schools of Sierra Leone, especially for girls. The second annual secondary grade learning assessment (SGLA) was designed and implemented by Leh wi Learn's monitoring, evidence and research workstream in close collaboration with the Sierra Leone Ministry of Basic and Senior Secondary Education (MBSSE). Any views and opinions expressed do not necessarily reflect those of UK Department for International Development (DFID) or MBSSE.

Contact details

The project managers for SGLA 2018 are Sourovi De and Diana Ofori-Owusu.
For more details, please contact: Diana Ofori-Owusu at **oforiowusud@yahoo.com** or **+232 76803741**.

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Note: This report is based on data collected in May-June 2018.

Abbreviations

BECE	Basic Education Certificate Examination
CAPI	Computer-Assisted Personal Interviewing
DFID	UK Department of International Development
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
EMIS	Education Management Information System
ICF	World Health Organisation's International Classification of Functioning, Disability, and Health
JSS	Junior Secondary School
MBSSE	Ministry of Basic and Senior Secondary
N	Number of observations
NPSE	National Primary School Examination
P	Primary grade (e.g. primary grade 2 or P2)
PTA/CTA	Parent-teacher or Community-teacher Associations
SGLA	Secondary Grade Learning Assessment
SSEIP	Sierra Leone Secondary Education Improvement Programme
SSS	Senior Secondary School
WASSCE	West African Secondary School Certificate Examination
WGDS	Washington Group on Disability Statistics

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Annex A: Survey design

Annex A: Survey design

A.1 Instruments used for the survey

The SGLA II administered four instruments in the 700 sampled schools:

- Learning assessments for JSS2 and SSS2 grades, in English and maths, administered to 5,600 pupils;
- Teacher's questionnaire, including topics like usage of lesson plans, administered to 2,800 teachers;
- Principal's questionnaire administered to 700 principals, covering topics like provision of supportive supervision for teachers; and
- School observation questionnaire, compiled by enumerators during schools visits for 700 schools.

Pupil learning assessments were conducted in JSS2 and SSS2 grades. Five test forms were developed and used for this based on pupils' abilities. Each test form contained approximately 40 questions covering both English and maths, and some background questions (e.g. pupil age, main language spoken at home, household assets, etc.). Pupils were automatically routed to the appropriate test forms based on their performance on an initial filter form. Tests were administered one-on-one by enumerators to individual pupils with oral assent of the pupils – this prevents any malpractices (e.g. cheating), allows adaptive testing as per pupils' abilities, as well as allows the test to assess skills (e.g. reading) which are not possible in self-administered whole-class tests. Pupils did their working in colour-printed test workbooks while enumerators concurrently recorded their responses on CAPI. Each pupil assessment took approximately 45 minutes to complete.

Principals and four English and/or maths teachers (per school) teaching at JSS/SSS level were also administered background questionnaires. Principals were asked in particular about provision of supportive supervision for teachers. Teachers were interviewed about their teaching practices, usage of MBSSE lesson plans, and about aspects of girls' safety in school and the schooling experience of pupils with disabilities. Principals' and teachers' interviews were conducted in English. The principal's interview included a written consent for his/her school to take part in the survey, and his/her permission to assess pupils. Teachers gave verbal consent before the interview. The school observation instrument complemented the principal interview and contained information on timetable, break times, school opening time and presence or absence of pupils and teachers.

To ensure consistency in administering various interviews and tests, rigorous, continous and uniform training was conducted for all enumerators and supervisors, using detailed fieldwork manuals as reference material.[1] The table below lists the instruments and respondents for each instrument as well as provides brief descriptions of their contents.

1 One or two page 'cheat-sheets' for key instruments and sampling processes were also provided as easy access, hands-on support material for data collectors while in school.

Table 1: Overview of instruments and respondents	
Instrument description	**Respondent per school**
Pupil Learning Assessment in English and maths	
Pupil gender, age, language and grade	Eight randomly sampled JSS2/SSS2 pupils
Indicators of disability (extent to which the child can hear, speak, see and write)	
English and maths skills at JSS2 and SSS2 levels	
Pupil's background and asset index	
Principal Interview	
Principal's background characteristics (gender, age, years of experience, qualifications)	Principal (one per school)
School background characteristics (type of school, CTA/PTA)	
Frequency/type of interaction with and supervision of teachers (lesson observation practices, meetings, external supervision, teachers absenteeism)	
School records (enrolment, number of teachers)	
Teacher Interview	
Teacher's background characteristics (gender, age, years of experience, qualifications)	Four sampled English and/or maths teachers
Current teaching practices (instructional time and disruptions, teacher absenteeism, levels and subjects taught)	
Interaction with and supervision by principal	
Teaching aids and guides, particulary the use and perceptions of MBSSE Lesson Plans	
Girls' safety in school	
Schooling experience for pupils with health impairments or disability	
School observation instrument	
School breaks and opening time	One observation per school
School timetable, total number of classrooms, empty classrooms	
Note: SGLA team.	

A.2 Sample size and coverage

The SGLA II targeted a total sample of 700 JSS and SSS schools among the 16 districts. Smaller districts had 24 JSS and 24 SSS schools randomly sampled; large districts had 30 JSS and 30 SSS schools randomly sampled and the largest district, Western Urban, had 36 JSS and 36 SSS schools randomly sampled. Some districts and levels had less than the target number of sample schools in the frame, especially for SSS, in which case all the schools in the frame were selected.

Within each school, the data-collection teams interviewed the principal, four teachers who teach maths and/or English and eight pupils. Unless the total number of teachers teaching maths and/or English was four or less, data collectors randomly selected only four of them for teacher's interview using the staff attendance register. In all-boys and all-girls schools, all the eight pupils assessed were boys or girls while in mixed gender schools, four boys and four girls from JSS2/SSS2 were randomly selected from those present in school on the day and interviewed. Both the teacher and pupil randomisation was done through pre-programmed rosters on enumerators' handheld tablet devices.

The actual sample coverage, by district, is given in the table below.

Table 2: Summary of survey sample sizes

Sample coverage						
Region	**Sample schools**	**Schools completed**	**Principals**	**Teachers**	**School Observation**	**Pupils**
Number of schools and respondents covered						
East	145	144	131	425	144	1,102
North	144	143	125	417	143	1,126
South	157	157	129	441	157	1,126
North-West	122	119	103	333	119	911
West	132	132	128	407	132	1,018
Total	**700**	**695**	**616**	**2023**	**695**	**5383**
Sample coverage (% of targeted sample size)						
East	145	99	90	73	98	95
North	144	99	87	72	99	98
South	157	100	82	70	100	90
North-West	122	98	84	68	98	93
West	132	100	97	77	100	96
Total	**700**	**99%**	**88%**	**71%**	**99%**	**96%**

The coverage rate for principals is lower than 100 per cent because some of the schools either did not have principals or any other staff in a senior leadership/administerative position on the day of the interview or because principals in these schools did not give consent to be interviewed. Moreover, 78 of the principals interviewed were heading both the JSS and SSS streams in one sample school. Such principals were interviewed only once. However, the questionnaire was designed to capture information on both the JSS and SSS streams of the school in one interview. The number of maths and English teachers interviewed was 71 per cent of the targeted sample size. It points to the fact that not all the schools visited had four or more teachers who taught English and/or maths present on that day. It was particularly true for rural areas where maths teachers moved from school to school to teach, and were thus shared across multiple schools. Around 96 per cent of the intended sample of pupils were interviewed because in several schools less than a total of 8 boys and girls were present on the day of the survey in JSS2/SSS2.

A.3 Data collection, cleaning and analysis

The field teams collected data from 15th May to 27th June 2018 and comprised five field teams, one for each of the five provinces and managed by a provincial coordinator per province. Within each of the five province teams were five to six teams, each comprising a field supervisor and two enumerators. The enumerators primarily assessed pupils while the field supervisor interviewed the principals and the teachers. The provincial coordinators worked closely with the field supervisors and ensured that data was collected and sent to the central database on a daily basis.

Multiple levels of validation were programmed in CAPI to ensure that the data collected was of the highest standards. There were built-in automatic checks in the CAPI programming while the enumerator was punching the data in the field. For example, CAPI did not allow the enumerator to enter age of respondent outside a certain reasonable range. Moreover, data managers also programmed checks for internal consistency of respondent's answers. For example, a respondent could not have more years of experience than his/her age above the minimum.

The second layer of data cleaning happened at the central office. When the data came in everyday from the field, the data manager checked all the observations of the day for completion, and errors or outliers and corrected the data after contacting the field supervisors and enumerators. After the data collection was completed, a team of analysts further cleaned the data using STATA. Data cleaning at this stage looked for incomplete and inconsistent responses, creating new variables and finally analysing the data using STATA.

A.4 School, teacher and pupil replacements

Given the changes in some sample schools since the time the EMIS sampling frame was compiled, they were no longer eligible for the survey; also, it was found that a few sample schools had been used for the pilot survey. In order to maintain the effective sample size for the survey, it was decided to substitute such schools with a replacement school selected randomly with PPS from the same stratum and district.

A list of replacement schools by district and school level (JSS or SSS) was also prepared before the fieldwork started so that if a sample school was not accessible, it would be replaced by another school from the same district and same level. The schools were replaced for one or more of the following reasons:

- The school does not exist on the ground, or there is no school with the name given in the area;
- The school is closed for the duration of the survey team's stay in the district for whatever reason;
- The school does not have the required grade (JSS2/SSS2); and
- There are security concerns about visiting the school.

In total, 10 schools ended up being replaced. These replacement schools do not affect the analysis or findings in any way since sample weights were adjusted based on the actual number of schools replaced. The number of replacements by province is listed in the table below.

Table 3: Distribution of SGLA II sampled schools not enumerated, schools not eligible and replacements by district and school level

Province	District	Level	Sample schools not enumerated	Sample schools not eligible	Sample Schools replaced
Eastern	Kenema	SSS	1	1	0
Northern	Koinadugu	JSS	1	1	1
Northern	Koinadugu	SSS	1	1	0
Northern	Tonkolili	JSS	1	1	1
Southern	Bo	SSS	1	1	1
Southern	Moyamba	JSS	2	2	2
Western	Western Rural	JSS	2	1	2
Western	Western Rural	SSS	2	2	2
Western	Western Urban	SSS	1	1	1
North Western	Port Loko	SSS	3	3	0
Total			**15**	**14**	**10**

A.5 Dealing with sensitive research topics

A.5.1 Girls' safety and sexual harassment

Some issues may have been sensitive for our respondents to discuss in the schools. For example, teachers were asked to share their views about girls' safety and harassment in school. Similarly, conversations around disabilities, and inclusive teaching and learning practices may have been difficult for some respondents. Pupils, teachers and principals are likely to be nervous at first about revealing potentially negative, critical, or self-damaging views or information. A longer-term engagement with respondents would help to gain their trust, but this was not possible given resource constraints and the need to visit a large number of schools within a limited period of time. Nevertheless, enumerators were trained to recognise and be mindful of these sensitivities and to put respondents at ease by respecting their personal space and opinions. Questions and statements for respondents were also designed not to ask about personal or individual experiences, but were phrased in more objective, third-person terms. Wherever the environment allowed, enumerators ensured that discussions took place in private so that only the respondents for each instrument were present. Strict codes of data confidentiality were followed and participants were reassured that their responses will not be shared more widely. Consent was obtained from all respondents irrespective of their legal age.

A.5.2 Experience of schooling as a pupil with disability

This survey reports on the schooling experience of pupils with disabilities. However, these findings must be interpreted with caution as there are certain limitations stemming from the complexity of the term 'disability'. Identification of pupils with disability was done by selecting those pupils who reported some difficulty in either hearing, seeing, walking, communicating, remembering or taking care of themselves, which may have led to a biased sample, e.g., pupils may have thought they would be given extra goods if they reported some form of difficulty, or they might have mis-interpreted the questions. As there was no medical examination as part of the SGLA 2018 to cross-check and confirm the disabilities reported, the results and findings rely on these self-reported responses only and may be subject to measurement errors.

Photo credit: Saccoh Mansaray

Annex B: Sampling design and weighting procedures

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B.1 Sampling frame and stratification

Sierra Leone is divided into five provinces (Eastern, Northern, North-Western, Southern and Western), which are further divided into districts. There are 16 districts in total. Since it was planned to obtain indicators of educational achievement for pupils and teachers at the district level, it was decided to design the sample for reliable indicators at the district level. Given the emphasis of the programme on the educational progress for girls, it was also important to have a separate disaggregation of the indicators by gender.

The grade levels chosen for the achievement tests are the second level of the junior secondary schools (JSS2) and the second level of the senior secondary schools (SSS2). A stratified two-stage sample design was used for the midline survey, with a sample of JS and SS schools selected within each district at the first stage, and a sample of pupils and teachers in these schools selected at the second stage to be tested. The pupils were selected from the enrolled pupils who were present at the time of the survey in the two specific classes of the sample schools, while the teachers were selected from all of the teachers present in the schools on the day of the survey and teaching English and/or maths in JS and SS grades in the sample schools.

An updated database with all JS and SS schools in Sierra Leone in 2017 was obtained from the Education Management Information System (EMIS) of the Ministry of Education, Science and Technology (MBSSE). This frame contained information on the name of the school; province, district, local council, chiefdom and town; education level (JSS or SSS); school gender composition (co-ed, all-girls, all-boys); management of school (community, government, mission, private and other); and the number of students by grade (1 to 4) and gender. This database was used to examine the distribution of JS and SS schools by district and stratum. Given that student indicators will be tabulated by gender, an equal number of female and male students were selected for all the tests. In Sierra Leone most of the JS and SS schools are co-ed, but there are also all-girls and all-boys schools which were assigned to individual strata within each province.

The stratification of the frame of JS and SS schools was based on the objectives of the survey in terms of the domains of analysis (district, education level, gender), as well as considerations for sampling effectiveness. Initially we considered taking into account collocation in the stratification, given the logistic advantage of having part of the sample JS and SS schools at the same location. However, upon further consideration it was determined that selecting collocated schools directly may introduce a bias since these schools may be found in larger urban areas and may therefore have different characteristics from the non-collocated schools. As a result collocation was not included in the stratification of the frame of JS and SS schools. Within each district, the schools in the frame were divided into the following six strata:

1. JSS Co-ed

2. JSS All-Boys

3. JSS All-Girls

4. SSS Co-ed

5. SSS All-Boys

6. SSS All-Girls

The schools in the sampling frame for each of the 16 districts were stratified by these six categories, for a total of 96 strata at the national level. Within each stratum the schools were sorted by local council, chiefdom and town, in order to provide further implicit geographic stratification.

The sampling frame included a total of 1,616 JS and SS schools. The distribution of the sampling frame of schools in Sierra Leone by province and stratum is shown in the table below. It can be seen that the number of secondary schools varies by district, from 18 schools for Falaba to 323 schools for Western Urban.

Table 4: Distribution of JS and SS schools in the SGLA II sampling frame by district and stratum

Province	District	Stratum						Total
		JSS coed	JSS all-boys	JSS all-girls	SSS coed	SSS all-boys	SSS all-girls	
Eastern	Kailahun	44	0	0	16	0	0	**60**
	Kenema	88	2	1	19	2	1	**113**
	Kono	86	3	3	29	1	3	**125**
Northern	Bombali	97	1	1	23	0	0	**122**
	Koinadugu	33	0	1	8	0	0	**42**
	Tonkolili	67	1	3	15	1	1	**88**
	Falaba	15	0	0	3	0	0	**18**
Southern	Bo	99	4	6	31	3	1	**144**
	Bonthe	29	0	0	11	0	0	**40**
	Moyamba	62	2	5	8	2	2	**81**
	Pujehun	19	1	1	3	1	1	**26**
Western	Western Rural	100	0	3	47	0	0	**150**
	Western Urban	186	5	9	111	5	7	**323**
North Western	Kambia	66	0	3	9	0	0	**78**
	Port Loko	134	1	2	29	0	2	**168**
	Karene	32	0	0	6	0	0	**38**
Total		**1,157**	**20**	**38**	**368**	**15**	**18**	**1,616**

The sampling frame based on the Sierra Leone EMIS included information on the number of teachers and pupils by gender. In order to improve the efficiency of the sample design, the schools within each stratum were selected at the first stage with probability proportional to size (PPS), where the measure of size was based on the number of pupils in each school from the sampling frame. In the case of the SSEIP baseline survey the measure of size for the PPS selection was based on the number of teachers. Actually the number of teachers and the number of students are highly correlated, and the measure of size is only used to determine the first stage probability of selection for the schools. Therefore this use of different measures of size for the selection of schools in the baseline and second round of the SSEIP Survey does not present a problem of comparability of the results from each round.

The table below shows the distribution of pupils in the JS and SS schools in the sampling frame by district and stratum.

Table 5: Distribution of pupils in the JS and SS schools in the sampling frame by district and stratum

Province	District	Stratum						Total
		JSS coed	JSS all-boys	JSS all-girls	SSS coed	SSS all-boys	SSS all-girls	
Eastern	Kailahun	4,113	0	0	1,370	0	0	**5,483**
	Kenema	7,939	834	360	3,094	723	242	**13,192**
	Kono	6,643	462	635	3,199	58	120	**11,117**
Northern	Bombali	7,087	421	205	4,081	0	0	**11,794**
	Koinadugu	3,017	0	44	1,620	0	0	**4,681**
	Tonkolili	5,778	229	304	2,446	211	238	**9,206**
	Falaba	1,097	0	0	143	0	0	**1,240**
Southern	Bo	8,136	1,174	1,139	3,922	424	34	**14,829**
	Bonthe	2,272	0	0	861	0	0	**3,133**
	Moyamba	4,583	360	280	487	150	168	**6,028**
	Pujehun	1962	202	225	250	144	138	**2,921**
Western	Western Rural	6,996	0	253	3,874	0	0	**11,123**
	Western Urban	15,618	1,619	2,415	11,414	1,421	1,954	**34,441**
North Western	Kambia	5,185	0	164	1,307	0	0	**6,656**
	Port Loko	8,462	168	157	2,816	0	146	**11,749**
	Karene	2,735	0	0	506	0	0	**3,241**
Total		**91,623**	**5,469**	**6,181**	**41,390**	**3,131**	**3,040**	**150,834**

B.2 Sample size and allocation

The sample size was determined taking into account logistical and budget considerations as well as the need for statistical precision in the estimates of key indicators of educational achievement for JSS2 and SSS2 students by gender and teachers at the district level. Based on these considerations, it was decided to select 8 students per school for each level (JSS2 and SSS2). In addition to being operationally effective, this number of sample students per school will keep the design effects related to intraclass correlation (which affects the level of precision) to an acceptable level. The design effect is a relative measure of the efficiency of the sample design. Given the potential similarity of some characteristics of students within the sample schools, selecting additional sample students per school would increase the design effects. In the case of co-ed schools, 4 male and 4 female students will be selected per school for each level, and in the case of all-girl or all-boy schools, 8 students of the same gender will be selected. This implies that the same number of all-boys and all-girls schools have to be selected within each district. Based on similar considerations, it was decided to select 4 teachers per JS or SS sample school. This is consistent with the sampling approach used for the baseline survey.

Once the number of sample students and teachers per school was determined, the total sample size depends on the number of sample schools to be selected in each province. In order to provide a sufficient level of precision for the teacher and student indicators at the district level, it was decided to have a target of 24 JS and 24 SS sample schools for the smaller districts, and 30 sample schools each for the larger districts. In the case of the largest district of Western Urban, given the large number and variability of schools, the target number of sample schools was increased to 36 JSS and 36 SSS. Some districts and levels had less than the target number of sample schools in the frame, especially for SSS, in which case all the schools in the frame were selected for the corresponding stratum. Within each district and level the target number of sample schools was allocated to the strata (coed, all-boys and all-girls) in proportion the total number of JSS2 or SSS2 students in the stratum, with the constraint that the number of sample all-boys and all-girls schools in each district and level should be equal. This sampling strategy resulted in a total sample size of 700 schools (420 JSS and 280 SSS).

The table below shows the resulting allocation of the sample schools by district and stratum.

Table 6: Allocation of sample JS and SS schools by district and stratum

Province	District	Stratum						Total
		JSS coed	JSS all-boys	JSS all-girls	SSS coed	SSS all-boys	SSS all-girls	
Eastern	Kailahun	24	0	0	16	0	0	**40**
	Kenema	28	1	1	19	1	1	**51**
	Kono	26	2	2	22	1	1	**54**
Northern	Bombali	28	1	1	23	0	0	**53**
	Koinadugu	24	0	0	8	0	0	**32**
	Tonkolili	22	1	1	15	1	1	**41**
	Falaba	15	0	0	3	0	0	**18**
Southern	Bo	24	3	3	28	1	1	**60**
	Bonthe	24	0	0	11	0	0	**35**
	Moyamba	20	2	2	8	2	2	**36**
	Pujehun	19	1	1	3	1	1	**26**
Western	Western Rural	30	0	0	30	0	0	**60**
	Western Urban	30	3	3	30	3	3	**72**
North Western	Kambia	24	0	0	9	0	0	**33**
	Port Loko	28	1	1	29	0	0	**59**
	Karene	24	0	0	6	0	0	**30**
Total		**390**	**15**	**15**	**260**	**10**	**10**	**700**

The table below presents the corresponding distribution of sample pupils

Table 7: Distribution of sample JSS and SSS pupils by district and stratum (divided equally by gender)

Province	District	Stratum						Total
		JSS coed	JSS all-boys	JSS all-girls	SSS coed	SSS all-boys	SSS all-girls	
Eastern	Kailahun	192	0	0	128	0	0	**320**
	Kenema	224	8	8	152	8	8	**408**
	Kono	208	16	16	176	8	8	**432**
Northern	Bombali	224	8	8	184	0	0	**424**
	Koinadugu	192	0	0	64	0	0	**256**
	Tonkolili	176	8	8	120	8	8	**328**
	Falaba	120	0	0	24	0	0	**144**
Southern	Bo	192	24	24	224	8	8	**480**
	Bonthe	192	0	0	88	0	0	**280**
	Moyamba	160	16	16	64	16	16	**288**
	Pujehun	152	8	8	24	8	8	**208**
Western	Western Rural	240	0	0	240	0	0	**480**
	Western Urban	240	24	24	240	24	24	**576**
North Western	Kambia	192	0	0	72	0	0	**264**
	Port Loko	224	8	8	232	0	0	**472**
	Karene	192	0	0	48	0	0	**240**
Total		**3,120**	**120**	**120**	**2,080**	**80**	**80**	**5,600**

The table below shows the distribution of sample teachers.

Table 8: Distribution of sample JSS and SSS teachers by district and stratum

Province	District	Stratum						Total
		JSS coed	JSS all-boys	JSS all-girls	SSS coed	SSS all-boys	SSS all-girls	
Eastern	Kailahun	96	0	0	64	0	0	**160**
	Kenema	112	4	4	76	4	4	**204**
	Kono	104	8	8	88	4	4	**216**
Northern	Bombali	112	4	4	92	0	0	**212**
	Koinadugu	96	0	0	32	0	0	**128**
	Tonkolili	88	4	4	60	4	4	**164**
	Falaba	60	0	0	12	0	0	**72**
Southern	Bo	96	12	12	112	4	4	**240**
	Bonthe	96	0	0	44	0	0	**140**
	Moyamba	80	8	8	32	8	8	**144**
	Pujehun	76	4	4	12	4	4	**104**
Western	Western Rural	120	0	0	120	0	0	**240**
	Western Urban	120	12	12	120	12	12	**288**
North Western	Kambia	96	0	0	36	0	0	**132**
	Port Loko	112	4	4	116	0	0	**236**
	Karene	96	0	0	24	0	0	**120**
Total		**1,560**	**60**	**60**	**1,040**	**40**	**40**	**2,800**

B.3 Sample selection procedures

Since the schools within each stratum vary considerably in size (number of teachers and students), at the first sampling stage the schools within each stratum were selected systematically with probability proportional to size (PPS), where the measure of size was the number of JSS2 or SSS2 students in each school based on the data in the frame. Within each stratum the schools in the frame were sorted by local council, chiefdom and town, in order to provide further implicit geographic stratification. This will ensure a geographically representative sample of schools within each district and stratum. Given the relatively small size of the frame at the district level, some strata had schools with a measure of size that was larger than the sampling interval for the stratum, in which case these large schools were selected with a probability of 1. The sampling interval is equal to the total number of JSS2 or SSS2 students in the stratum (that is, the cumulated measure of size) divided by the number of sample schools to be selected in the stratum. In the case of a systematic PPS selection of the schools within each stratum, the first stage probability of selection for each school is equal to the measure of size (number of JSS2 or SSS2 students in the school from the frame) divided by the sampling interval.

Therefore any school with a measure of size larger than the sampling interval will be selected in the sample with certainty. Consequently the first step was to calculate the initial sampling interval and identify all the schools which had a total number of JSS2 or SSS2 students in the frame greater than the sampling interval for the stratum. All these self-representing (SR) schools were treated as separate strata for a one-stage selection of students and teachers. The remaining sample schools in each stratum were selected from the smaller non-self-representing (NSR) schools in the frame systematically with PPS, after adjusting the sampling interval for the remaining NSR schools in the frame.

Within each sample school, it was necessary to compile a list of all of the eligible enrolled female and male students for the relevant grade (JSS2 and SSS2) who were present on the day of the tests. Then a random systematic sample of 4 female and 4 male students were selected from the corresponding lists for the sample co-ed schools. For each sample all-girls and all-boys school, 8 students of the same gender were selected. In the case of teachers, a list of all the eligible JSS or SSS teachers (i.e. present on the day of the survey and teaching English or mathematics in these grades) was used to select a systematic random sample of 4 teachers. If less than 4 teachers were present, then all were selected to be interviewed.

It should be pointed out that the sampling frame has 44 schools with no JSS2 or SSS2 students specified. Of these schools 11 are included in the sample because they are in small districts where all the schools in the stratum were selected with certainty. Since the NSR schools were selected with PPS based on the number of JSS2 or SSS2 students, the 33 NSR schools in the frame with zero students were effectively excluded from the frame.

In addition to the smaller districts where all of the schools were selected, there were also larger schools in most other districts selected with certainty because of their relatively large size. Because of the district-level allocation of the sample schools for the second round of the SSEIP Survey and the corresponding larger number of sample schools compared to the baseline survey, the proportion of SR schools in the second round sample is also higher. Overall the sample has 356 SR schools (295 JSS and 125 SSS) and 344 NSR schools (295 JSS and 29 SSS). Although there are less SSS in the sample, they are mostly SR, in which case there is a one-stage sample of teachers and students within each of these schools. This will probably result in design effects lower than 1 for the SSS teacher and student indicators for these districts, and the corresponding level of precision for these indicators should be good.

B.4 Weighting procedures

In order for the sample estimates of indicators for schools, teachers and students from the second round SSEIP Survey to be representative of the population at the district and national levels, it is necessary to multiply the data by a sampling weight. The basic weight for each sample school, teacher or student is equal to the inverse of its probability of selection (calculated by multiplying the probabilities at each sampling stage).

Given that the SR sample schools were selected at the first sampling stage with a probability of 1, and a one-stage selection of students and teachers was selected in these schools, the probabilities and weights are specified separately for the SR and non-self-representing (NSR) schools.

B.4.1 Self-representing schools (selected with a probability of 1 at the first stage)

The SR school probabilities and weights are equal to 1.

The probability of selection for the sample teachers in SR schools can be defined as follows:

$$p_{(SR)Thi} = \frac{t_{(SR)hi}}{T_{(SR)hi}}$$

where:

$p_{(SR)Thi}$ = Probability of selection of the sample teachers in the i-th SR school in stratum (district by type of school) h.

$t_{(SR)hi}$ = Number of sample teachers successfully tested, observed or interviewed in the i-th SR school in stratum h.

$T_{(SR)hi}$ = Total number of eligible teachers listed in the i-th SR school in stratum h.

The corresponding teacher weight in the SR schools would be calculated as the inverse of this probability, as follows:

$$W_{(SR)Thi} = \frac{1}{p_{(SR)Thi}} = \frac{T_{(SR)hi}}{t_{(SR)hi}}$$

where:

$W_{(SR)Thi}$ = Weight of the sample teachers in the i-th SR school in stratum h.

The probability of selection for the sample pupils in SR schools and the corresponding weight are calculated separately by gender as follows:

$$p_{(SR)Shig} = \frac{s_{(SR)hig}}{S_{(SR)hig}} \quad \text{and} \quad W_{(SR)Thig} = \frac{S_{(SR)hig}}{s_{(SR)hig}}$$

where:

$p_{(SR)Shig}$ = Probability of selection of the sample pupils of gender g (male, female) in the i-th SR school in stratum h.

$s_{(SR)hig}$ = Number of sample pupils of gender g successfully tested in the i-th SR school in stratum h.

$S_{(SR)hig}$ = Total number of eligible pupils of gender g in the i-th SR school in stratum h.

$W_{(SR)Shig}$ = Weight for the sample pupils of gender g in the i-th SR school in stratum h.

B.4.2 Non-self-representing schools (selected with PPS at the first stage)

The non-self-representing (NSR) schools are selected at the first sampling stage with PPS, based on the number of JSS2 or SSS2 students in the frame for each school. Therefore the probability of selection for the NSR sample schools can be calculated as follows:

$$p_{(NSR)hi} = \frac{n_{(NSR)h} \; x \; S_{(NSR)hi}}{S_{(NSR)h}}$$

where:

$p_{(NSR)hi}$ = Probability of selection of the i-th sample NSR school in stratum h.

$n_{(NSR)h}$ = Number of sample NSR schools selected in stratum h.

$S_{(NSR)hi}$ = Total number of JSS2 or SSS2 stuents in the frame for the i-th sample NSR school in stratum h.

$S_{(NSR)h}$ = Total number of JSS2 or SSS2 students in the frame for all NSR schools in stratum h.

For the sample NSR schools that were replaced, the measure of size (S(NSR)hi) of the replacement school was used for calculating the weight instead of that of the original sample school, since the replacements were also selected with PPS within the corresponding strata. In the case of NSR sample schools that were found to be ineligible, it was necessary to subtract the number of grade 2 students in the frame for these schools from the corresponding original value of the total number of students in the frame for the stratum (S(NSR)h).

The corresponding weight for the NSR schools would be calculated as the inverse of this probability, as follows:

$$W_{(NSR)hi} = \frac{1}{p_{(NSR)hi}} = \frac{S_{(NSR)hi}}{n_{(NSR)h} \; x \; S_{(NSR)hi}}$$

where:

$W_{(NSR)hi}$ = Weight for the i-th NSR sample school in stratum h.

In the NSR sample schools the teachers are selected from the list of eligible teachers in the sample school with equal probability. The overall probability of selection and weight for the sample teachers in the NSR sample schools would be calculated as follows:

$$p_{(NSR)Thi} = \frac{n_{(NSR)h} \; x \; S_{(NSR)hi}}{S_{(NSR)h}} \; x \; \frac{t_{(NSR)hi}}{T_{(NSR)hi}} \quad \text{and} \quad W_{(NSR)hi} = \frac{S_{(NSR)h}}{n_{(NSR)h} \; x \; S_{(NSR)hi}} \; x \; \frac{T_{(NSR)hi}}{t_{(NSR)hi}}$$

where:

$p_{(NSR)Thi}$ = Probability of selection of the sample teachers in the i-th NSR sample school in stratum h.

$t_{(NSR)hi}$ = Number of sample teachers successfully tested, observed or interviewed in the i-th sample NSR school in stratum h.

$T_{(NSR)hi}$ = Total number of eligible teachers listed in the i-th sample NSR school in stratum h.

At the second stage the sample pupils are selected separately by gender within each NSR sample school. Therefore the overall probability of selection and corresponding weight for the sample pupils in the NSR sample schools can be expressed as follows:

$$p_{(NSR)Shig} = \frac{n_{(NSR)h} \; x \; S_{(NSR)hi}}{S_{(NSR)h}} \; x \; \frac{s_{(NSR)hig}}{S'_{(NSR)hig}} \quad \text{and} \quad W_{(NSR)hig} = \frac{S_{(NSR)h}}{n_{(NSR)h} \; x \; S_{(NSR)hi}} \; x \; \frac{S'_{(NSR)hig}}{s_{(NSR)hig}}$$

where:

$p_{(NSR)Shig}$ = Probability of selection of the sample pupils of gender g (male, female) in the i-th NSR sample school in stratum h.

$s_{(NSR)hig}$ = Number of sample pupils of gender g successfully tested in the i-th NSR sample school in stratum h.

$S'_{(NSR)hig}$ = Total number of eligible pupils of gender g listed in the i-th NSR school in stratum h.

$W_{(NSR)Shig}$ = Weight for the sample pupils of gender g in the i-th NSR sample school in stratum h.

B.5 Calculation of sampling errors

In calculating the sampling errors for key indicators using Stata, it is important to correctly reflect all the aspects of the stratification and clustering in the sample design in the Stata svy application, and ensure that appropriate codes are generated for identifying the strata, PSUs and weights.

As mentioned previously, the self-representing (SR) sample schools should be treated as individual strata, and the teachers and students within each SR school are individual PSUs. In the case of the NSR sample schools, the strata are defined by the 6 categories for types of school within district, and the PSUs are the sample schools.

Given the relatively small size of the frame of schools in most strata, it is important to take into account the finite population correction (fpc) factor, based on the first stage probability of selection. In the case of the NSR sample schools that were selected with PPS, the average of the first stage (sample school) probabilities within each stratum can be used for determining the fpc parameter. A specifications table was developed which can be used as a reference for defining the strata, PSUs and fpc parameters for the Stata svy analysis. These specifications are shown in the table below.

Table 9: Variables for sampling parameters for Stata SVY analysis of SGLA 2018 data

Level of indicator	Type of school	Stratum code	PSU code	FPC value
School and principal	SR schools	999	School ID	1
	NSR schools	Sampling_ stratum2 + '0'	School ID	Average first stage (school) probability for stratum
Pupils	SR schools	Boys: School ID + '1'	Boy ID	Boys within-school probability
		Girls: School ID + '2'	Girl ID	Girls within-school probability
	NSR schools	Sampling_ stratum2 + '0'	School ID	Average first stage (school) probability for stratum
Teachers	SR schools	School ID + '0'	Teacher ID	Teachers within-school probability
	NSR schools	Sampling_ stratum2 + '0'	School ID	Average first stage (school) probability for stratum
Teachers and teaching principals	SR schools	999 for principal/ teacher; school ID + '0' for teachers	School ID for principal; teacher ID	1 for principal; teachers within-school probability
	NSR schools	Sampling_ stratum2 + '0'	School ID	Average first stage (school) probability for stratum

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Annex C: Learning assessment design

Annex C: Learning assessment design

C.1 Purpose of the pupil learning assessment test

The purpose of the pupil test was to annually track learning outcomes, assessing students' abilities in English and mathematics across time and grades. The test is to provide information complementary to information derived from Sierra Leone's extensive examination system. The test will therefore focus more on providing information about learning outcomes linked to the curriculum, rather than on curriculum content coverage.

The purpose of the pupil test was to gather information about students' learning outcomes. This meant that the range of items and test forms had to be aligned with a wide range of student abilities and skills. This range was sufficiently wide that several test forms were required.

At the start of the administration of the test form, enumerators used filter questions to determine the appropriate test form and record any indicators of disabilities that may affect students' test responses as well as administer a module to know what assets the student or his/her family possessed.

C.2 Development of the test construct

The development of the test construct (i.e. the skills the test is to measure) are in line with the P4-6, JSS and SSS curriculum and take into account:

- Everyday reading skills: extracting and using information from written English text found in everyday Sierra Leone contexts;
- Everyday mathematics skills: using operations, mathematical reasoning in everyday Sierra Leone contexts;
- Skills required in English at school ('school English items');
- Skills required in mathematics at school ('school maths items');
- The relationship between oral fluency and expression when reading English and everyday reading skills; and
- Differences in urban and rural contexts.

The test construct also took into account the importance of aligning any content assumptions with the curriculum relevant to the youngest students who took a particular test form. Some assumptions about content are inevitable in any item – for example, the formula for the area of a circle may be assumed or it may be given in the item. Since any given test form may be administered to students from a range of grades (e.g. JSS2 and SSS2), it was ensured that any content assumptions were no more than those expected by the curriculum for grades 5, 6, JSS1 and JSS2.

C.3 Test administration

The test was administered one-on-one by enumerators to individual students. It is the only method that allows us to test the full range of skills in literacy – speaking, reading, writing and listening. It is also an appropriate method when we cannot rely on all learners being able to read questions in the language of the test. The results of early reading assessments suggest, for example, that by the end of primary Grade 3, the majority of children have not mastered the alphabet and show great difficulty in reading simple words.

As the language of instruction is English, local languages can be used by enumerators for instructions and for mathematics items that are orally administered.

C.4 Test forms

There were five test forms to cover JSS2 and SS2. These align with grades 8 and 11 although the age range within a grade may be wide. There were 40 items per test form (maths and English) plus filter questions to guide the choice of the appropriate form for an individual student. Testing took about 45 minutes per pupil. On the assumption that there will be a sufficient relationship of ability in mathematics and English, there were five booklets, one for each test form (rather than having separate English and mathematics booklets).

School maths and school English were the focus of five to six items per test form.

Multiple choice items were 36 of 40 items per test form.

To allow for longer passages in stimulus material while reducing the total number of words a student must read, a test form had up to five or six testlets (a set of items around a single stimulus).

Where required, stimulus material included colour.

C.5 Vertical linking

To put results on the five test forms onto a common scale some items were common across the forms.

The following table shows the expected pattern of these links.

Table 10: Vertical linking of items across test forms

Test form level 1	Test form level 2	Test form level 3	Test form level 4	Test form level 5
30 items plus 10 link	10 link from lower level plus 20 plus 10 link to next test	10 link from lower level plus 20 plus 10 link to next test	10 link from lower level plus 20 plus 10 link to next test	10 link from lower level plus 30 items

This means the final test required 160 items plus about 12 filter questions – 172 items in total. The test will be used for several years but this does not mean a requirement to change items from year to year. It is assumed that there is only a low chance of the same student being sampled and administered the same test form in successive years.

C.6 Test reliability and person separation

The length of the test, the sampling scheme and the requirement for meaningful disaggregated data place a value on higher reliability/person separation that is in tension with the need for validity in the test construct.[2] For resource (time and budget) reasons, the test development process collapsed the item field trials and pilot testing phases and there were smaller than desirable numbers of students involved in the pilot tests (total students covered in pilot = 500).

2 These factors all interrelate. The smaller the sample within each disaggregation group the greater is the reliability (person separation in IRT terms) required. Shorter tests are more likely to have lower reliability than longer tests. The shorter the test, the lower the validity in terms of sampling a complex domain.

C.7 Test development

Sierra Leonean secondary grade teachers provided some qualitative feedback about the contextual and cultural appropriateness of draft items during the item development phase. The pilot test forms were taken by a total of 500 students. This means creating 7 pilot test forms (two at test levels 3 and 4, one at each of levels 1, 2 and 5) with at least five common items across each pair of pilot test forms – hence about 230 items in total plus variations in filter questions. About 280 draft items were developed from which to choose these. Each pilot test was taken by at least 70 students – 500 in total. The pilots administered using CAPI. There was qualitative feedback from the enumerators administering the pilot forms.

A key aspect of effective test development is having a clear statement of the underlying construct or skill that is to be assessed. The SGLA test construct is based on:

- A review of available curriculum documents (including accelerated teaching syllabi and draft JSS English curriculum, a version of WASSCE English syllabus);
- A review of examples of English examination papers – NPSE, BECE, WASSCE; and
- A web review of material about everyday life in Sierra Leone, a film about the daily life of a teenager from less affluent urban area attending secondary school; text based material about gender differences in participation; newspapers and blogs; and Sierra Leone poetry.

The likely impact on teaching practice of the NPSE and BECE examinations (success in these examinations is normally required if a student is to continue to the next stage of schooling) means that we may assume that students are familiar with these sorts of questions, although the high rates of low scores in these exams meant that we also planned for a wide range of familiarity with the language, content and skills required by these examinations.

The likely difference for many students, especially for those with rural and urban disadvantaged backgrounds, between their daily environment and the language and content of school meant that the construction of test items made only very limited demands on assumed knowledge about weights, lengths and distances and only very limited demands on assumed knowledge about the calendar (although the primary school curriculum is explicit about using "units of time to estimate and measure the duration of an event; determine the number of months, weeks, days, hours and minutes between two events including in word problems"). Maps appear in the junior secondary curriculum but the extent to which north, south etc. are part of everyday life, especially in rural areas, is uncertain and therefore general care was taken with the assumed knowledge required.

The diversity of students' daily contexts (e.g. between village and urban life) suggested the potential value of noting when item contexts are urban, rural or school-based.

Curriculum statements refer to the importance of students' developing fluent and confident use of Sierra Leone's official language (English) for official business and communicating with the rest of the world and as the foundation for becoming fully functional members of society and the world community. Curriculum statements refer to the importance of mathematics in solving problems in everyday life.

C.8 English construct

Students are able to:

- Understand, use and interpret continuous and non-continuous English texts;
- Use spelling and punctuation conventions; and
- Use conventions of English grammar.

Examples of continuous texts include sentences, paragraphs and stories. Examples of non-continuous texts include lists, public notices, advertisements and tables.

C.9 Mathematics construct

Students should be able to:

- Extract, interpret and use mathematical information from text, barcharts, pictures, diagrams, maps and graphs; and
- Use basic arithmetical operations on integers, decimals and fractions in a school context.

The following table shows the anticipated range of the level of demand/difficulty for each of the key elements in this construct in the context of the intended test forms covering the ranges of abilities expected in grades JSS2 and SSS2. The requirements of test length and coherence required sampling from the domain defined by the construct rather than a test where all aspects are equally present.

A testlet (group of items with a common stimulus material) contained a mixture of items, some focused on the English construct and some on the mathematics construct.

Some items in the forms at the lowest level of difficulty were administered orally.

Table 11: Illustration of expected range of difficulty within each element of the proposed construct for English

Element of construct	Approx. items	Expected lower level of demand/difficulty	Medium level of demand/ difficulty	Expected highest level of demand/difficulty
Understand, use and interpret continuous English texts	10-12	• Meanings of words in the context of a sentence • Retrieve information from a short passage	• Meanings of phrases in the context of a passage of three paragraphs • Retrieve information by relating two sentences from a passage • Identify overall meaning of a short passage	• Integrate an understanding of two passages
		• Read two simple sentences aloud with fluency and expression	• Read a paragraph about Sierra Leone aloud with fluency and expression	• Read a poem (rhyme and metre) aloud with fluency and expression
Understand, use and interpret non-continuous English texts	3-5	• Extract information from a short warning notice	• Find information from a table to complete information required by a form	• Relate different aspects of a complex webpage – e.g. a government webpage
Use spelling and punctuation conventions	1-2	• Choose the correct spelling of a common word	• Identify the correctly punctuated version of a short sentence • Choose the correct contraction to fill in a sentence	• Identify the correct combination of spelling and punctuation in a sentence from alternatives correct in other contexts
Use conventions of English grammar	1-2	• Choose correct Subject-verb agreement present tense	• Identify correct preposition • Choose adverb or adjective to complete a sentence • Pronoun agreement	• Choose correct version of a sentence in the present to put it into past or future

Table 12: Illustration of expected range of difficulty within each element of the proposed construct for Mathematics

Element of construct	Approx. items	Expected lower level of demand/difficulty	Medium level of demand/ difficulty	Expected highest level of demand/difficulty
Arithmetical operations in school context	1-2	• Add/subtract two digit numbers with/without regrouping	• Add/subtract four digit numbers with/without regrouping	
	1-2	• Multiply/divide (exact) 2 digit by 1 digit	• Multiply/divide four digit numbers by two-digit number (exact)	• Multiply/divide with decimal numbers set in context of percentages, ratios/ rates, proportions, VAT (15%)
	1-2	• Fractions in numbers and picture representation	• Proper fractions (add/ subtract/multiply/divide)	• Improper fractions • Solution of simple linear equations by inspection
Extract, interpret and use mathematical information from text, barcharts, pictures, diagrams, maps and graphs	15	• Read values from a bar chart • Identify largest/ smallest value in a table • Name idealised geometric object (e.g. circle) best matching a picture of a real object	• Draw conclusions from information presented in a bar chart • Calculate an average from information presented in text • Interpolate values presented in a non-linear graph • Estimate areas of simple figures	• Extract information about a negative trend from a complex barchart and estimate an extrapolation • Rearrange and apply a linear formula in a real-world context • Reason about the perimeter of a non-rectangular parallelogram • Estimate the number of people who can fit into a rectangular arena • Apply assumed knowledge about areas of simple figures (e.g. circle) to estimate volumes of simple objects (e.g. cylinder)

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Annex D: Household asset index

Annex D: Household asset index

Collecting data on socioeconomic status of the households and communities of pupils in the sample will allow the learning assessment data to answer wider questions about inequalities in learning outcomes and pupils' socioeconomic status. Precedents for such instruments include the Trends in International Mathematics and Science Study (TIMSS), and Young Lives. Sampled pupils were be asked the following questions about assets owned by their families, mostly taken from the Sierra Leone Living Standards Measurement Survey (Statistics Sierra Leone, 2011).[3]

Does your family have the following items in your home? Please look at the pictures on this card one by one and tell me if your family has any of these items in your home.

Bed	Television
Mobile phone	Fan
Chair	Radio
Bench	Truck
Sewing machine	Bicycle
Culture stove	Sofa (set)
Computer	Modern stove (gas/Afrigas)
Electric iron	Stool
Refrigerator/freezer	Air conditioner
Boat	Mattress (grass)
Car	Mattress (foam)
Generator	Mat
Motorcycle	Table
Charcoal iron/coal goose	

A composite household asset index was constructed using Principal Component Analysis (PCA), by retaining the first principal component.

3 These factors all interrelate. The smaller the sample within each disaggregation group the greater is the reliability (person separation in IRT terms) required. Shorter tests are more likely to have lower reliability than longer tests. The shorter the test, the lower the validity in terms of sampling a complex domain.

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Annex E: School Leadership and Management (SLM) index

Annex E: School Leadership and Management (SLM) index

Leh wi Lan plans to introduce training and support for secondary school principals in Sierra Leone to improve their school leadership and management (SLM). For this reason, and to provide useful information generally on SLM for policy makers and Ministry of Education staff, a number of indicators relating to SLM have been added to the SGLA for its midline round. An SLM index has been constructed based on these indicators.

The proposed index gives equal weight to five areas of SLM:

1. Leading teaching: The extent to which the principal, and other staff who manage the school, lead the development of teaching through training, observation, and monitoring (This includes people management but also what comes under 'lean operations' in the WMS framework);
2. Administration and planning: The administrative processes that the school has in place to keep lessons on schedule, ensure curriculum coverage, and finance the school (This is somewhat similar to operations management in the WMS framework);
3. Interaction with the community: This refers to the quantity and quality of interaction between the school, parents, other members of the community, and other local organisations;
4. The inclusiveness of the school to children whose performance is weaker or who come from marginalised groups; and
5. Positive learning environment: The extent to which the school is a positive learning environment where school staff, as well as students, share common values and vision, and can discuss their progress and issues, and learn from each other (This section combines aspects of the instructional leadership construct used in TALIS, as well as aspects of the Leadership for Learning concept).

Four types of question are used to measure these constructs:

1. The principal is asked about the frequency of certain practices and to provide evidence for them;
2. The principal is asked about how often he or she has undertaken a specific set of activities in the past term;
3. The principal's attitudes are examined through his or her agreement with a number of statements; and
4. Teachers in the school are asked about the frequency of certain activities and this information is aggregated at the school level. This data triangulates the information provided by the principal him or herself and is hoped to reduce the desirability bias which would arise from basing scores purely on the principal's own answers.

The five categories and the survey indicators associated with each are listed in the table below.

Table 13: Questions and scoring

Questions	Scoring
Community involvement	
Does the school have any Community-Teacher Associations (CTAs) or Parent-Teacher Associations (PTAs)? (*and follow-up questions*) [ctapta]	0 – no CTA or PTA; 1 – CTA or PTA exists but has not met lately; 2 – CTA or PTA exists and met recently
Do you have a school development plan or a school action plan? Who was involved in developing the School Development Plan or School Action Plan? [sdpsap]	0 – no SDP or SAP; 1 – there is an SDP or SAP but parents, religious authorities, students, CTA/PTA, or Village Development Committee were not involved in developing it; 2 – there is an SDP or SAP and at least one of the above were involved
Activity F: I provided parents or guardians with information on the school and student performance.	0 – never, 1 – sometimes; 2 – often; 3 – very often
Activity M: I talked to the parents or guardians about the development of the school.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity N: I talked to local religious authorities about the school.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity O: I talked to community leaders or the Village Development Committee about the development of the school.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity P: I talked to the Community Teacher Association or Parent Teacher Association about the development of the school.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Perception C: There is a low level of cooperation between the school and the community.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Leading teaching	
Do you or someone else in the school conduct lesson observation as a standard practice? (*and follow-up questions*) [lessonobs]	0 – no one observes lessons; 1 – someone observes lessons but no documentation; 2 – someone observes lessons and there is a schedule of it as documentation
(From teacher questionnaire) How many times were your lessons observed in total by someone from this school in the second term (January-April 2018)? [lo_avg]	0-15 times (averaged at school level)
(From teacher questionnaire) Have you received any feedback from the observer or another senior member of staff based on the lesson observations? [lo_feedback_avg]	0 – no; 1 – yes (aggregated as a proportion of teachers who said yes in each school)

Table 13: Questions and scoring (continued)

Questions	Scoring
Leading teaching (continued)	
How many times did you or another senior member of staff hold staff meetings in the second term (January-April 2018)? (*and follow up questions*) [staffmeet]	0 – no staff meetings were held; 1 – 1-2 staff meetings but no documentation; 2 – 1-2 staff meetings with documentation (meeting notes/attendance); 3 – 3 or more staff meetings but no documentation; 4 – 3 or more staff meetings with documentation
(From teacher questionnaire) How many staff meetings did you attend in the second term (January-April 2018)? [staffmeet_t]	0-15 times
(From teacher questionnaire) Did you have any formal one-on-one meetings with the Principal/HOD in the second term (January-April 2018)? How many times did you have these formal one-on-one meetings in the second term (January-April, 2018)? [meeting_1o1]	0-15 times
Have you taken any action to provide training and support to teachers in this school in the current school year? (*and follow up question*) [teachsup]	0 – no teacher support provided, or cannot name any type of teacher support provided; 1 – teacher support provided and can name at least one type of support
Have you done anything to improve teacher attendance during the second term (January-April 2018)? (*with preceding question about issues with teacher attendance and follow-up question about what action was taken*) [teachatt]	0 – there were issues with teacher attendance but no action was taken/respondent cannot name any specific action; 1 – there were reportedly no issues with teacher attendance; 2 – there were issues with teacher attendance and one or more specific actions were taken
Activity B: I collaborated with teachers to solve classroom discipline problems.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity C: I took action to support co-operation among teachers to develop new teaching practises.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity D: I took action to ensure that teachers take responsibility to improve their teaching skills	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity E: I took action to ensure that teachers feel responsible for their students' learning outcomes.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity J: I discussed measures to address weakness in teaching with a teacher.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity K: I contacted the higher authority about the performance of one or more teachers.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity L: I adjusted a teacher's work responsibilities to try and improve his or her performance.	0 – never; 1 – sometimes; 2 – often; 3 – very often

Table 13: Questions and scoring (continued)

Questions	Scoring
Inclusiveness	
Have you done anything in the school to support students who are weak in their studies during the second term (January-April 2018)? (*and follow up question*) [schinc_w]	0 – Principal did nothing to support weak students, or did something but cannot name any activity; 1 – Principal did something to support weak students and can name at least one activity
(From the teacher questionnaire and averaged at the school level) Did you take any action to support the student(s) who were weak in their studies in your class last term? [schinc_w_t]	0 – Teacher reports no students were struggling or did not take any action, or cannot name any action; 1 – Teacher took action and can name the action taken
Have you done anything in the school to support marginalised students during the second term (January-April 2018)? Marginalised students can include girls, students with physical or learning impairments and students from low-income families. (*and follow up question*) [schinc_m]	0 – Principal did nothing to support marginalized students or did something but cannot name any action; 1 – Principal did something to support marginalized students and can name at least one action
Administration and planning	
Do you have a schedule or scheme of work for maths and/or English for this school year or term? (*and follow up question*) [schwk]	0 – no scheme of work; 1 – respondent says there is a scheme of work but not seen; 2 – scheme of work seen
Do you have a cash book to record school income and expenditure for the current school year? (*and follow up question*) [cashb]	0 – no cashbook, 1 – respondent says there is a cashbook but not seen, 2 – cashbook seen
Does your school have a timetable? (*Data collectors also checked whether they could see a timetable*) [timetable]	0 – the school does not have a timetable or it was not observed; 1 – timetable seen
Observation of school breaks	0 – no break observed; 1 – at least 1 break observed
Activity G: I checked for mistakes and errors in school administrative procedures and reports.	0 – never; 1 – sometimes; 2 – often; 3 – very often
Activity H: I resolved problems with the lesson timetable in this school.	0 – never; 1 – sometimes; 2 – often; 3 – very often

Table 13: Questions and scoring (continued)	
Questions	**Scoring**
Learning environment	
Perception B: The school staff share a common set of beliefs about schooling/learning	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Perception D: The relationships between teachers and students are good.	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Perception E: Teachers do not encourage students to be responsible for their own learning in school.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Perception F: Teachers do not have freedom to exercise their professional judgment in classroom teaching.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Perception G: Change in classroom practise is viewed positively by teachers.	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Perception H: School staff share common values.	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Perception I: The school staff do not share my vision of where the school is going.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Perception J: Students are told how well they have done in relation to their own previous achievement.	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Perception K: Teachers do not help students to understand the learning objectives of each lesson.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Perception L: School staff cannot have an open discussion about difficulties.	0 – strongly agree; 1 – agree; 2 – disagree; 3 – strongly disagree
Perception M: There is mutual respect for colleagues' ideas.	0 – strongly disagree; 1 – disagree; 2 – agree; 3 – strongly agree
Activity R: The school did something to recognise the success of a student.	0 – never; 1 – sometimes; 2 – often; 3 – very often

Activity questions were a set of activities introduced with the following instruction

I will now ask you about how often you engage in different types of activities. I am going to read you some statements, and I would like you to point on the card in front of you how often you engaged in each of the activities during the last 12 months.

Percpetion questions were a set of statements introduced with the following instruction

I will now ask you how strongly you agree or disagree with the statements I will read to you. These are related to how you manage your school. I am going to read you some statements, and I would like you to point at one of the circles in front of you to guide me on how strongly do you agree or disagree, with each one. You can also tell me if you do not understand any statement.

The SLM normative index constructed for SGLA II gives equal weight to the five categories detailed above and has the following properties:

- A well-defined and meaningful minimum and maximum;
- A scale that can be measured repeatedly across rounds of data collection;
- Easy to understand and interpret;
- Easy to break down into constituent components based on the normative concepts listed above (Leading teaching, working with community, administration and planning, inclusion, and learning environment).
- Gives equal weight to each of these components;
- Easy to understand how a change in one aspect of school functioning would alter the overall index; and
- Should retain validity while relationships among the survey variables may change e.g. due to training that encourages specific management practices

Simple summative scales fit these criteria well. We create summative scales by re-scaling each item in table 13 so that it lies on a scale from 0 to 1, and then calculating the arithmetic mean of the items under each category.

REPUBLIC OF SIERRA LEONE

MINISTRY OF BASIC AND SENIOR SECONDARY EDUCATION

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Contact us:

Diana Ofori-Owusu
Monitoring, Research and Learning Lead
Leh wi Lan Programme
Ministry of Basic and Senior Secondary Education
New England Ville, Freetown, Sierra Leone

Email: oforiowusud@yahoo.com
Email: info@education.gov.sl

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MOTT MACDONALD

Oxford Policy Management