



PHONE-BASED ASSESSMENT EXPERIENCE FROM NEPAL

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Acknowledgments

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Abstract

This report discusses the results from a phone-based survey on foundational numeracy and literacy, conducted as part of the Teaching at the Right Level (TaRL) pilot in three local governments (LGs) across three provinces in Nepal. The TaRL pilot's main goal is to support foundational education to fast-track learning recovery in Nepal. The results from this assessment helped provide initial literacy and numeracy learning baselines for TaRL. As part of the phone survey, numeracy and literacy assessments were administered to children in grades 4 and 5. A curriculum mapping exercise was also undertaken to align the literacy and numeracy assessments with the country-specific curriculum in Nepal. Literacy scores were analyzed by gender, grade level, and local governments. Analysis of performance by gender, grade, and local government shows the general trend of weaker performance with increasing difficulty level.

The pilot also collected data on how the adult survey respondents thought their child would perform mathematical operations and literacy tasks. Disparities were found between the caregiver's perception of their child's ability level and the child's demonstrated proficiency.

Key Findings and Recommendations

To administer the phone-based survey, attempts were made to contact and assess a total of 2,163 children studying in public schools. Enumerators were able to reach only 1,467 students on the phone to fully or partially complete the survey. Information on various student demographic factors such as grade, gender, caste, language of instruction, and language spoken at home were collected. The main findings are as follows:

1. Analysis by question type shows that as the questions progressed in terms of difficulty, fewer students could answer correctly.
2. Analysis of performance by gender, grade, and local government shows that the general trend of weaker performance with increasing difficulty level held true. For each of the seven math questions, males performed better than females, and except for the fraction problem, the differences were statistically significant in other cases.
3. Students from a higher grade (grade 5) were able to correctly answer more questions than lower grade (grade 4) students. However, even the performance of grade 5 students indicated low learning levels.
4. At the local government level, it was seen that students from Tripurasundari performed considerably better than those from Siddhakumakh Rural Municipality and Ganeshman Charnath Municipality. Even schools in Tripurasundari can do a lot more to ensure their students master basic math problems.
5. Students from low-literacy households performed poorly compared to students from literate households.
6. Analysis of literacy scores by gender, grade level, and local governments showed no significant differences in children's scores by gender. Overall, grade 5 students performed better than grade 4.
7. The assessment also collected data on how the adult survey respondents thought their child would perform mathematical operations and literacy tasks. There is a disparity between the caregiver's perception of their child's ability level and the child's demonstrated proficiency.
8. To ensure participation of all students, it would help to involve headteachers in providing information to caregivers in advance of the calls. This will contribute in building the trust among the caregivers to allow students to participate in the survey.

1. **Context and Background:** COVID-19 has affected the education system in Nepal and has brought to light the vulnerabilities of the education system, especially for providing remote learning and support. Nepal announced school closures in response to the COVID-19 pandemic in March 2020. Since then schools have opened intermittently, and currently the schools reopened on February 13, 2022, after nearly one month of closures due to the third wave of infections. The Government of Nepal (GoN) has implemented several alternative learning programs including radio and TV-based programs, online learning portal, SMS and phone-based teaching support, as well as small-group community-based teaching to provide learning continuity during school closures. However, access to these programs remains a challenge. Two-thirds of school children were unable to access remote learning during school closures.¹ Fewer than half of households have access to TV and only about one-third own radios. Computer and internet access is low and uneven across provinces, ethnicities, and socioeconomic backgrounds. While mobile penetration is high, with 80 percent of households reporting access, the use of phones to access learning platforms consistently remains low.

2. Learning outcomes as measured by the National Assessment of Student Achievement (NASA) are low across all levels and showed a declining trend in certain subjects, even before the COVID-19 pandemic. Learning is expected to fall further as a result of COVID-19 shutdowns. A recent study in 10 local governments (LGs) in Nepal covering all seven provinces² shows that nearly 35 percent of grade 5 students could not perform two-digit addition with carry-over.³ For Nepal, the Learning Adjusted Years of Schooling (LAYS) was 7.2 years before the pandemic.⁴ Even conservative estimates suggest that LAYS will likely drop to 6.3 years—a 0.9 year drop.⁵ This is a significant decrease.

3. Nepal has previously undertaken three rounds of phone-based surveys as part of the low-tech intervention on foundational numeracy using mobile phones between December 2020 and July 2021. The three rounds of phone-based surveys included assessing the foundational numeracy skills of grades 3–5 in 10 LGs as mentioned in the paragraph above. Building on those previous experiences, this report discusses the results from the survey on foundational numeracy and literacy conducted as part of Teaching at the Right Level (TaRL) pilot (currently ongoing) in three additional LGs across three provinces in Nepal using mobile phones. The literacy component was introduced under this pilot in addition to the numeracy component. The experience from the surveys done in 2020 and 2021 were useful in developing this survey including the literacy assessment. The enumerators, many of whom had worked in earlier rounds, also benefited from the previous experience and were better able to anticipate potential problems and address them. The TaRL pilot's main goal is to support foundational education to fast-track learning recovery in Nepal. The results from this phone-based assessment helped provide initial literacy and numeracy

¹ UNICEF. 2020. *Remote Learning Reachability Report*.

² Suryodaya and Duhabi Municipality from Province 1, Mithila Bihari Rural Municipality and Thori Rural Municipality from Madhesh Province, Melamchi Municipality and Siddhalek Rural Municipality from Bagmati Province, Hupsekot Rural Municipality from Gandaki Province, Rampur Municipality from Lumbini Province, Birendranagar Municipality from Karnali Province and Dhanagadhi Sub-Metropolitan City from Sudurpaschim Province. These provinces were not randomly selected.

³ Radhakrishnan, Karthika, Noam Angrist, Peter Bergman, Claire Cullen, Moitshepi Matsheng, Anusha Ramakrishnan, Shwetlena Sabarwal, and Uttam Sharma. 2021. "Learning in the Time of COVID-19 : Insights from Nepal." World Bank, Washington, DC

⁴ "World Bank. 2018. *The Human Capital Project*. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/30498> License: CC BY 3.0 IGO."

⁵ Sharma, U., M. Sherpa, and K. Radhakrishnan. 2021. "Learning Loss as a Result of COVID 19 in Nepal." Unpublished Manuscript. World Bank.

learning baselines for TaRL. The phone-based assessment involved SMS messages and phone calls to households to assess children in grades 4 and 5 on literacy (Nepali) and numeracy.

4. **Design:** The survey was conducted in three LGs across three out of seven provinces in Nepal (Table 1). Local governments were selected purposively based on ownership/interest and geographical topology. Two of the LGs were rural municipalities and one was an urban municipality. Of the three provinces, two provinces selected are classified as lagging provinces⁶ in Nepal.

Table 1: Name of the LGs

Name of the LG	District	Name of the Province
Ganeshman Charnath (Urban)	Dhanusha	Madhesh (lagging)
Siddhakumakh (Rural)	Salyan	Karnali (lagging)
Tripurasundari (Rural)	Dhading	Bagmati

5. The pilot comprised 2,163 students in grades 4 and 5 from 64 schools in three LGs (see Table 2). The phone-based survey was led by the World Bank, with support from Global Partnership for Education (GPE) Trust Fund, in collaboration with the Ministry of Education, Science and Technology (MoEST), LGs of Nepal, and the organizations Street Child, Pratham USA, and Nepal Development Research Institute (NDRI). The survey was undertaken in October 2021.

Table 2: Sample Size by Local Government

Province	Local Government	Total Number of Students	Number of Boys	Number of Girls	Grade 4	Grade 5
Madhesh	Ganeshman Charnath Municipality	1,008	452	556	502	506
Bagmati	Tripurasundari Rural Municipality	631	331	300	304	327
Karnali	Siddhakumakh Rural Municipality	524	271	253	255	269
	Total	2,163	1,054	1,109	1,061	1,102

6. Phone numbers of the students/households were collected from the school headteachers (facilitated by the LGs with the help of the implementation partner/Street Child) and verified by the survey firm. Efforts were made to also re-verify the phone numbers when the households were either not reachable or had an incorrect phone number, wherever possible. This additional verification was facilitated by the headteacher. An initial list of 2,305 students was provided, of which 334 did not have access to a mobile phone, including through caregivers. In other words, only 1,971 children had a family member who had a mobile phone. It was further explored if some of the neighbors of students without phone numbers had a phone through which the children could be reached. The final list contained 2,163 students who could potentially be assessed over the phone.

7. **Inception phase:** The survey aimed to collect several outcomes, including foundational skills based on the Annual Status of Education Report (ASER)—an assessment conducted in over 14 countries across the world. Data were also collected on caregiver and student demographics (caste, gender, access to school, grade, and so on) and engagement in learning at home during school

⁶ Based on the lower literacy rates.

closures. During the inception phase, the survey tools were prepared, reviewed, and feedback was provided in contextualizing the survey to the Nepali curriculum. The survey tools were translated to the Nepali language and protocols and survey training materials were also translated to the Nepali language, as required. The data collection application was designed in the SurveyCTO Collect software.

8. As part of the phone survey, numeracy and literacy assessments were administered. The math assessment was based on the ASER (Banerji et. al 2013⁷) and adapted for phone delivery (Angrist et. al 2020⁸). The assessment included two addition, two subtraction, one multiplication and one division question that grade 2 students in Nepal were expected to answer. A basic fraction question at a grade 3 level was also asked. Multiplication, division, and fraction questions were asked only if the child was able to answer either the addition or subtraction problem correctly. The literacy assessment was also at a grade 2 level and children were tested on the alphabet/letters first, followed by words, a paragraph, and finally a simple short story. A comprehension question was also asked if the child was at the story level. A curriculum mapping exercise was also undertaken to align the literacy and numeracy assessments with the country-specific curriculum in Nepal.

9. **Survey team composition:** The team included a project manager, a data quality manager, three supervisors, 21 enumerators, 1 translator, and 1 administrative officer for the smooth execution of the survey.⁹

10. **Data collection and application:** Both literacy and numeracy questionnaires were programmed into SurveyCTO Collect and were tested rigorously to check the constraints, logic, and flow of the questionnaire as well as to identify any other potential issue. A password-protected centrally located data server center was used. Since the application is user-friendly, all the variables used in the questionnaire were minutely designed. Necessary steps and techniques were used to capture the real information such as a single option, multiple options, skip logic, validation, mandatory field, text filling, other, specify, blank space for possible answers, and so on. After designing the application, a pretest was carried out to ensure the accuracy of the application and questionnaire. Apart from other question-related matters, a unique code was also assigned at the beginning of the form to identify the particular child.

Implementation phase

11. **Training of the enumerators:** Two days of intensive training on Children/Parents Survey was provided to the enumerators/supervisors. The training for preparation of data collection was conducted virtually over Zoom. The training focused on the background and objectives of the study, delivering consent forms, survey tools/questionnaire, interview techniques, survey protocols, rapport building techniques, and courtesy ending. After completion of the training on tools and protocols, orientation on the data collection application (SurveyCTO Collect) was delivered. At the

⁷ Banerji, R., S. Bhattacharjea, and W. Wadhwa. 2013. "The Annual Status of Education Report (ASER)." *Research in Comparative and International Education* 8 (3): 387–396.

⁸ Angrist, N., P. Bergman, C. Brewster, and M. Matsheng. 2020. "Stemming Learning Loss During the Pandemic: A Rapid Randomized Trial of a Low-tech Intervention in Botswana." Available at SSRN 3663098.

⁹ Note that a larger number of supervisors and enumerators were initially selected to account for drop-outs.

end of the training session, mock surveys were conducted among the enumerators. This was helpful in assessing the understanding of the enumerators on tools and basic protocols of the survey, and to identify any problems such as unclear wording or the questionnaire taking too long to administer, as well as the flow of the languages used. The enumerators were observed and provided feedback on their performance during the mock surveys. All the discrepancies identified during the mock survey were addressed and the questionnaire was finalized in advance of the pilot survey.

12. **Operations pilot/pretesting:** The pilot was carried out after completion of the training, with 5 percent of the total sample size to examine the consistency and correctness of the questionnaire. Undeclared pretesting was conducted with children/parents and teachers who were not part of the actual survey sample. The results of the pretesting were used for additional refinement of the survey tools.

13. **Quality check:** Data collection instruments went through a thorough development, pre-piloting process, and review to increase the accuracy of the results and ensure data quality. For example, for the literacy assessment, fonts in the SMS messages were changed to ensure that they appeared similar to alphabets in the textbooks.

14. **Actual survey:** For the data collection, the details of the respondents to be contacted were provided to the enumerators by the World Bank. The standard call protocol was followed to maximize re-contacts with the target respondents (at least three calls to establish contact). The survey was conducted using computer-assisted telephone interviewing (CATI). The survey was administered remotely. It was ensured that the enumerators had a separate workspace, full set of electronic devices including a smartphone and a headphone, stationaries including questionnaire and guidelines (as required), and a reliable internet connection. Supervisors were responsible for the regular coordination with respective enumerators, monitoring the Daily Tracking Sheet, and validating the submitted data with the audio recordings (audio audits). All the supervisors were required to report survey progress, issues and challenges faced by the enumerators, and other related information to the project manager every day. In fact, a daily meeting at a specific time was held with the field team to go over the progress and challenges encountered.

15. **Methodology:** The enumerator called the parents to schedule a time to talk with them and their child to conduct the assessment. The rule was to call each parent at least three times on different days if the phone was not picked up. Most enumerators tried many more times! Even for those they were able to reach, the average number of phone calls tried was more than five. The enumerators usually tried to reach the parents in the morning/evening but if the call was not picked up, then the enumerators tried other times.

16. The enumerators first spoke to the parent/guardian to seek their consent to talk with their children. Of the respondents, 50 percent were mothers, almost 32 percent were fathers, and the remaining 18 percent were other members of the family. To incentivize respondents, they were informed that Rs. 100 would be transferred to their mobile numbers to be used for phone call expenses later. The children were requested to bring a notebook and pencil/pen with them and their assent was also obtained for the assessment. The enumerators also requested the parents not to help their children with the assessment. The parent/ guardian was requested to put their phone on loudspeaker mode to the extent possible and hand the phone over to their child. If parent/guardian did not know how to switch their phone in loudspeaker mode, the enumerators helped them. The enumerators also ensured that, to the extent possible, there were no distractions on

child's side. The child was urged to go to a place where they felt comfortable and could concentrate. Once the parents handed the phone to their child, enumerators spent some time building rapport with the child. The enumerators were also instructed to talk with children politely (in a friendly manner) to ensure that the children felt comfortable.

17. The math assessment was conducted only over phone calls. On the other hand, the literacy tasks were implemented using both SMS and phone calls (please see below paragraphs).

18. **Math assessment:** Mathematics questions were first asked verbally to the child. If the child was not speaking aloud while solving the math problem, the enumerators asked the child to explain the steps used for solving the problem. The children were also informed that two minutes would be provided to them to solve the math question. The two-minute limit was to indicate to the children that they did not have unlimited time. Though there were instances when an explanation may not have been necessary, the enumerators needed to be fully confident that the child answered the question correctly before they entered that the child answered the solved problem correctly. Since it was possible that the child may have misheard the question (for example, the numbers) and their answers could be different, the enumerators marked the given problem correct if the child had the correct answer for the question he/she heard.

19. **Procedure for assessing numeracy:**

- a. The first math question was a two-digit addition question that tested a carry-over concept.
- b. The second question was a two-digit subtraction question that tested a borrowing concept.
- c. Multiplication, division, and fraction questions (one each) were asked only if the child answered either of the previous addition or subtraction question correctly.
- d. Students were also assessed on the word problem that tested whether they knew when to add and when to subtract.

20. **Literacy assessment:** Text messages in Nepali were sent to children in real time to assess whether they were able to read various kinds of texts. The text messages were sent in real time to minimize cheating. The enumerator first asked the child whether they knew how to read the message while talking on the phone. If he/she did not know how to do that, the enumerator taught them how to look at the message while being on the phone. The alphabets/letters were sent first, followed by words, a paragraph, and finally a short story.

21. **Procedure for assessing literacy:**

- a. After sending five letters to the mobile phone number associated with the child, the enumerator asked the parent or child if there was any problem in reading the question sent to their mobile in Unicode font. If there was no problem, the child was asked to read aloud the five letters sent on their phone.
- b. If the child had trouble reading in Unicode fonts on their mobile, they were asked if any other member of their household had a phone (such as a smart phone). If someone else had a phone, the message was sent to another phone number. Children who had

difficulty reading Unicode fonts on their mobile phones were not common. Only six percent of the children said that they had trouble reading Nepali text on their parent's phone, and three-fourths of them found another phone which was used for the Nepali language assessment.¹⁰

- c. After the child read the five letters, five word problems were sent, followed by a paragraph, and a story. The paragraph was divided in two parts and sent separately as sending a long message would have taken more time to reach on some phones. Similarly, the fourth message related to a story was divided into four pieces for quick delivery.
- d. The children were also asked two simple questions related to the story to check their reading comprehension skills.

22. The child was assessed on the next question only if they answered correctly at least a certain number of problems. For the first two questions on alphabets and words, students were required to read at least three letters or three words correctly to proceed to the next question. For the third question, if the students could read eleven or more words correctly in the paragraph, they were asked to read the story.

23. **Categorization of call outcomes:** As mentioned earlier, attempts were made to contact and assess a total of 2,163 children studying in public schools. But enumerators were able to reach only 1,467 students on the phone to fully or partially complete the survey. With regard to incomplete cases, some parents did not provide their phone to the child after they spoke, some never picked up the phone after scheduling the call with the child, while some even blocked the enumerator's number after talking on the phone earlier. The reasons for not being able to communicate with others are shown in Table 3.

Table 3: Categorization of Call Outcomes

S. No.	Cases with different issues	Freq.	Percent
1	Fully completed	1,437	66.44
2	Partially completed	30	1.39
3	Child unavailable/didn't talk	10	0.46
4	Phone number wrong/Invalid number	243	11.23
5	Child's information (grade or name) incorrect	43	1.99
6	Child moved to another school	73	3.37
7	Not reachable	169	7.81
8	Switched off	54	2.50
9	Call not received	31	1.43
10	Call rejected	5	0.23
11	Call ended automatically	34	1.57
12	Incoming call barred	32	1.48
13	Disabilities of the Child	2	0.09
	Total Cases	2,163	100.00

¹⁰ For the Nepali assessment, 75 percent used smartphones and 25 percent used regular/feature phones.

Student Demographics

24. The pilot collected information on various student demographic characteristics such as grade, gender, caste, language of instruction, language spoken at home, and so on. Tables 4–10 summarize these factors. While most of the students in the pilot (98 percent) were going to school every day at the time of the survey, a small percentage reported going to school only a few days a week, presumably because of the COVID-19 restrictions that were in place in their schools.

Table 4: Study Situation

Study situation	Total number of students	Percent
Goes to school every day	1,407	97.91
Goes to school every alternate day	15	1.04
Goes to school 1–2 days a week	4	0.28
Others	11	0.77
Total	1,437	

25. Among the 1,437 respondents, the most common castes reported were Chhetri and Madhesi. While there were more females (52 percent) compared to males (48 percent) overall, this gender imbalance does not exist for all ethnic groups. For example, 63 percent of the Dalit children are girls, while the corresponding figure among Brahmins is 46 percent. It is possible that some of these ethnic groups are sending more boys to private schools, as these schools are, on average, perceived to be of higher quality.

Table 5: Caste, by Gender

Caste	Total Number of Students	Percent Males of Total Males	Percent Females of Total Females
Brahmin	56 (4%)	4.52	3.33
Chhetri	391 (27%)	28.28	26.23
Tibeto-Burman	267 (19%)	21.43	15.98
Newar	49 (3%)	4.08	2.80
Madhesi	386 (27%)	24.64	28.89
Dalit	216 (15%)	11.37	18.38
Does not want to answer	5 (0.35%)	0.29	0.40
Other	67 (5%)	5.39	3.99
Total	1,437	686	751

26. The language of instruction for over 68 percent of the students is only Nepali only, while for 14 percent of the students it is only English. Another 12 percent reported that their language of instruction is both Nepali and English. A few students (5 percent) reported a different language of instruction other than English or Nepali.

Table 6: Language of Instruction, by Gender

Language of Instruction	Total Number of Students	Percent Males of Total Males	Percent Females of Total Females
Nepali	974 (67.78%)	69	67

Language of Instruction	Total Number of Students	Percent Males of Total Males	Percent Females of Total Females
English	198 (13.77%)	15	13
Both	180 (12.52%)	11	14
Other	70 (4.87%)	4	5
Missing/Unknown	15 (1.04%)	1	1
Total	1,437	686	751

27. Some students reported more than one language while selecting the language they spoke at home. The majority of the students (almost 80 percent) chose Nepali, followed by Maithili (29.2 percent), with the least (less than 1 percent each) reporting English and Bajjika.

Table 7: Language Spoken at Home

Language Spoken at Home	Total (N = 1,437)	Percent (out of 1,437)
Nepali	1,157	79.74
Maithili	424	29.22
Bhojpuri	9	0.62
Tharu	1	0.07
Tamang	11	0.76
Bajjika	4	0.28
Magar	23	1.59
Khas	24	1.65
Urdu	7	0.48
Hindi	21	1.45
English	5	0.34
Others	46	3.17
Total	1,732	

Note: * The total number of children who have answered this question is 1,437. However, since some children spoke more than one language, the table total is more than 1,437.

28. Each LG had a different caste composition. Ganeshman Charnath Municipality had the highest number of students belonging to the Madhesi caste (75 percent). In Siddhakumakh Rural Municipality, the majority was from the Chhetri caste (68 percent). Tripurasundari had the highest number of students belonging to Tibeto-Burman (36 percent).

Table 8: Local Government,* by Caste

Caste/Local Governments	Ganeshman Charnath Municipality (Percent of Total students in the LG)	Siddhakumakh Rural Municipality (Percent of Total students in the LG)	Tripurasundari (Percent of Total students in the LG)
Brahmin	1.17	1.74	8.27
Chhetri	2.15	68.16	19.88
Tibeto-Burman	10.37	6.97	36.02
Newar	0.98	0.00	8.66
Madhesi	75.15	0.00	0.00
Dalit	5.48	18.16	22.05
Does not want to answer	0.00	0.25	0.79
Other	4.70	4.73	4.33

Total	511	402	508
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Note: * Of the 1,437 completed responses, 16 did not specify their LG.

29. The education level of mothers is much lower than that of fathers. Almost 76 percent of the fathers have received some level of formal education compared to 51 percent of the mothers. Among students' fathers, 22 percent had no education or non-formal education, while 32 percent had received education until the primary level (up to grade 5). In the case of the students' mothers, 27 percent had not received any education, and another 20 percent had received non-formal education. Around 6 percent of mothers and 9 percent of fathers had completed higher secondary level or more than higher secondary education.

Table 9: Respondents' Demographics

Parents' Level of Education	Father (%)	Mother (%)
None	14.78	26.73
Non-formal education	6.63	20.03
Primary (Grades 1 to 5)	32.39	24.17
Lower Secondary (Grades 6 to 8)	21.34	12.43
Secondary (Grades 9 and 10)	13.67	8.29
Higher Secondary (Grades 11 and 12)	5.52	4.97
More than Higher Secondary	2.76	1.66
Don't know	2.90	1.73

30. **Remote learning during closures caused due to COVID-19:** We collected data modalities used during closures caused due to the pandemic. More than half (53 percent) stated that they did not use any learning modality while schools were closed for in-person teaching. While the use of individual modalities seems lower, 13 percent reported using a multimodal approach—relying on more than one modality to continue learning remotely. Mobile education (Ghumti Shiksha) and temporary learning centers also had relatively higher use than others, such as radio, TV, and mobile phones.

Table 10: Remote Learning Modality due to COVID

Remote Learning Modality	Total number of students	Percent
TV	40	2.78
Radio	31	2.16
Learning Portal	5	0.35
Temporary learning center	115	8.00
Phone-based teaching by teachers, including messages or group	11	0.77
Online class run by school	28	1.95
Mobile education/Ghumti Shiksha	115	8.00
Others	117	8.14
None of these	770	53.58
Multimodal	190	13.22
Unknown/Missing	15	1.04
Total	1,437	

31. **Learning Outcomes for Math:** As a part of the phone survey, we tested math skills by administering seven questions. We tested addition, subtraction, multiplication, division, and fraction skills, including numerical and word problems. Overall, only 1 percent of grade 4 students, 4.2 percent of grade 5 students, and 2.75 percent of all the students answered all the questions on the math assessment correctly.

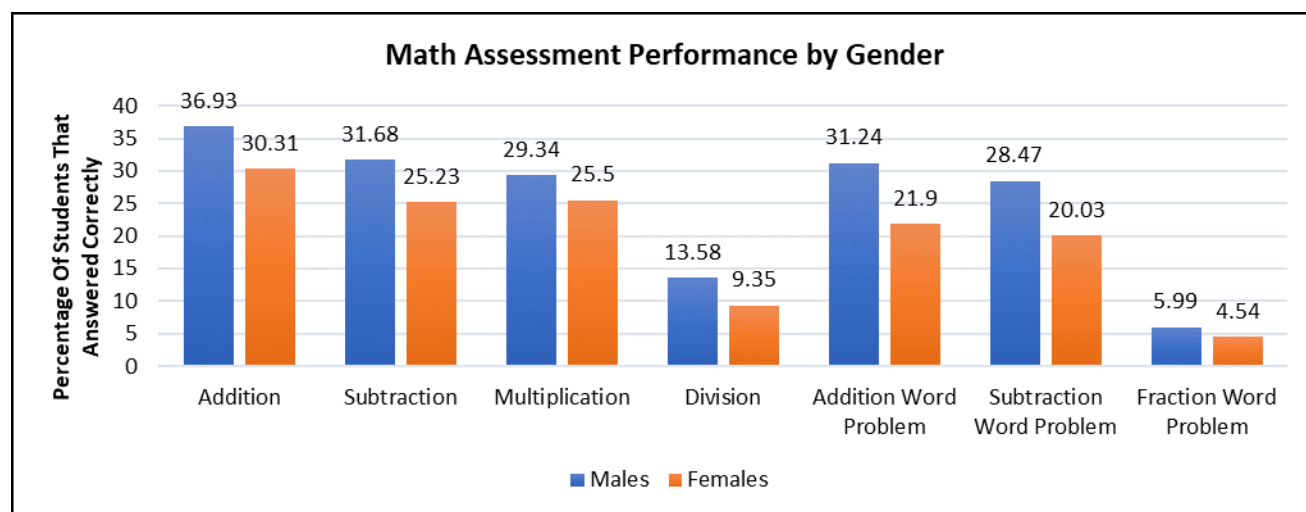
32. Analysis by question type shows that as the questions progressed in terms of difficulty, fewer students could answer the question correctly. This was true for numerical as well as word problems, with the least number of students being able to solve numerical problems testing division or problems related to fraction.

Table 11: Responses for Each Question

Skill tested	% of students that answered correctly
Addition	33.38
Subtraction	28.21
Multiplication	27.30
Division	11.31
Addition word problem	26.33
Subtraction word problem	24.02
Fraction problem	5.17

33. Analyzing the performance by gender, grade, and local government, we notice that the general trend of weaker performance with increasing difficulty level held true. For each of the seven questions, males performed better than females. Except for the fraction problem, the differences were statistically significant.¹¹

Figure 1: Math Assessment Performance by Gender

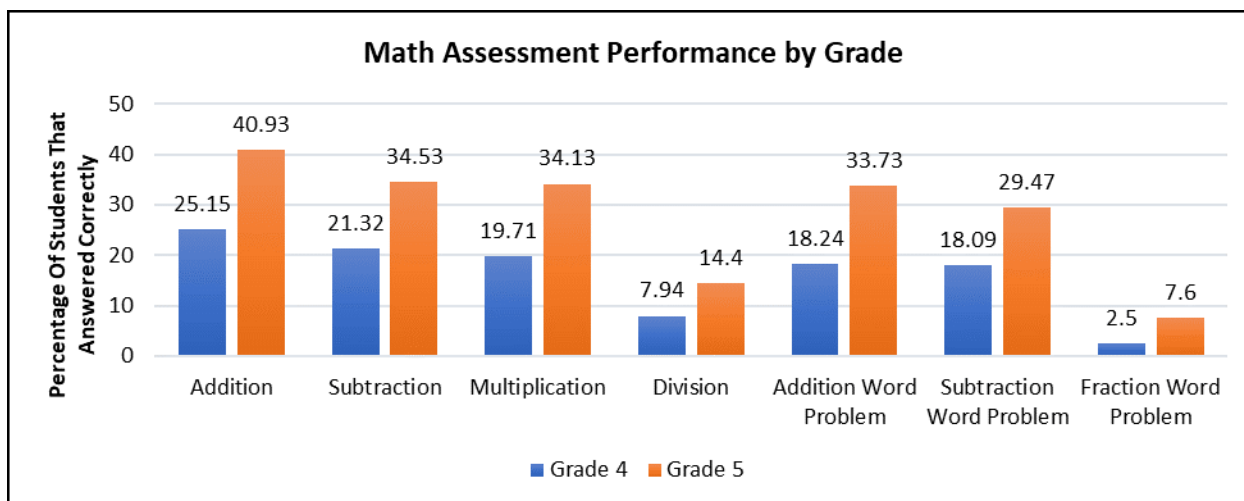


34. Factoring in grade level, we see that students from a higher grade (grade 5) are able to correctly answer more questions than lower grades (grade 4) students. However, even the

¹¹ For multiplication, it was significant at the 10 percent level, while for others at the 1 percent level.

performance of grade 5 students indicates low learning levels. For example, less than 41 percent of grade 5 students could answer two-digit addition questions that required employing a carry-over concept.

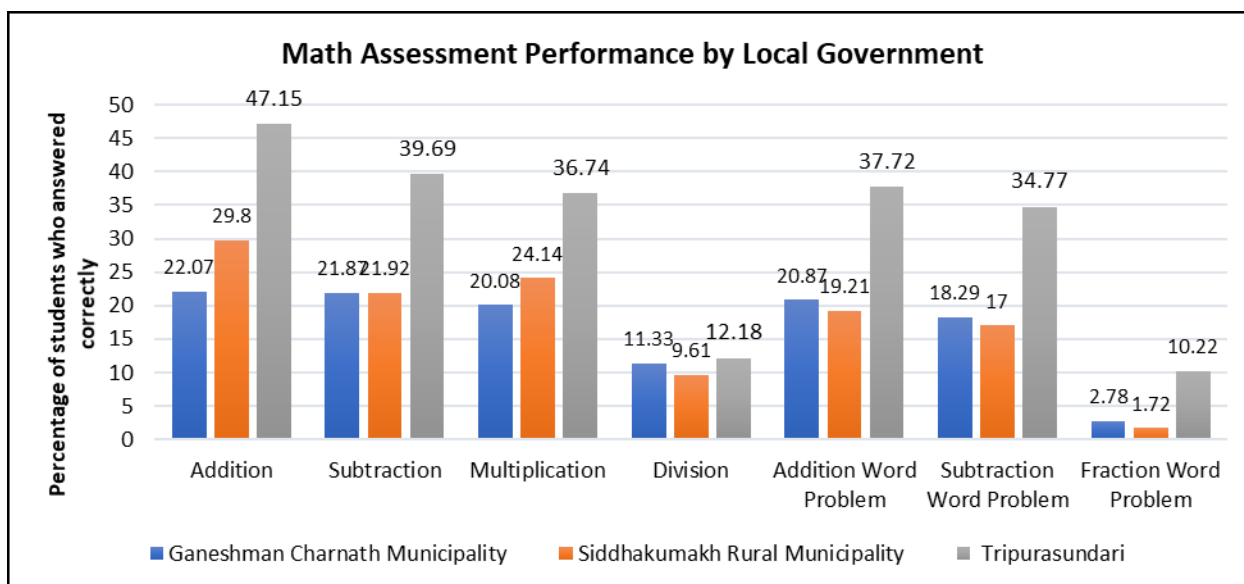
Figure 2: Math Assessment Performance by Grade



35. At the LG level, we notice that students from Tripurasundari have performed considerably better than those from the other two, that is, Siddhakumakh Rural Municipality and Ganeshman Charnath Municipality. Even then, schools in Tripurasundari can do a lot more to ensure their students have mastered basic math problems. For example, less than 50 percent in Tripurasundari could correctly answer a two-digit addition question.

36. Similarly, the performance of students from low-literacy households was poorer compared to students from literate households. For example, only 25 percent of students whose mothers had no education were able to answer an addition question correctly, compared to 63 percent of students whose mothers had completed higher secondary.

Figure 3: Math Assessment Performance by LG



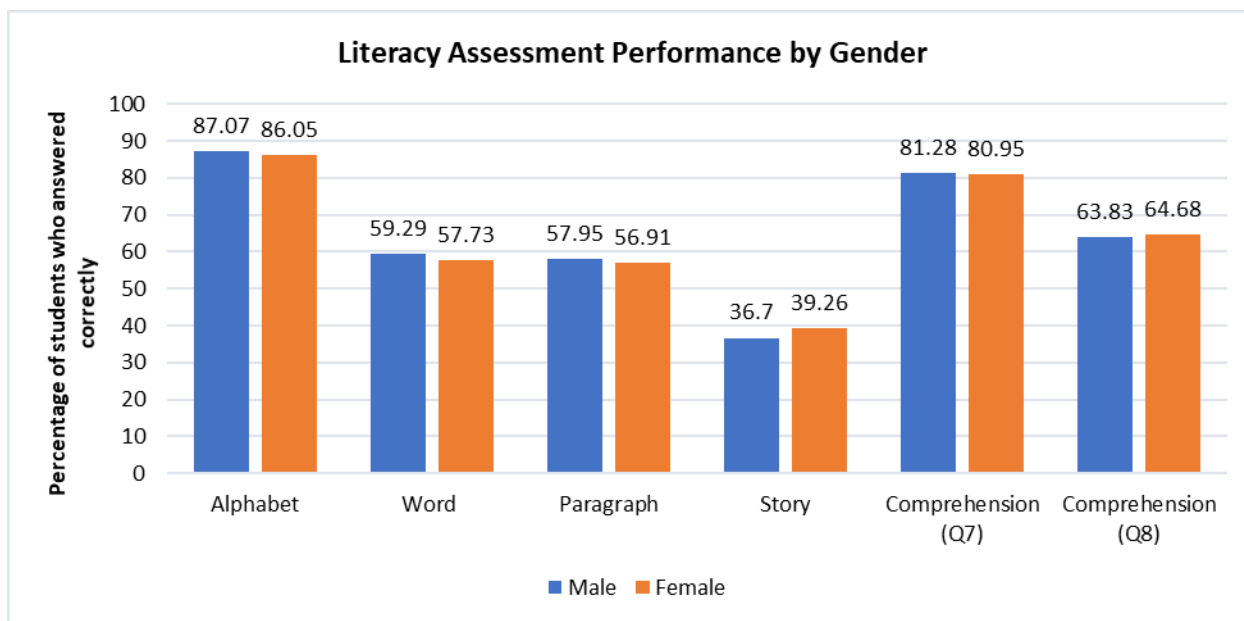
37. **Learning Outcomes for Literacy:** As mentioned in the previous section, six scaffolded questions were asked to assess students' literacy levels. One question checked if students could read alphabets, another one checked for words, one for reading a paragraph, and one for reading a story. The students were also asked two comprehension questions, thus building up the difficulty level from letters to comprehension. Based on the criteria, Table 12 provides the percentage of students proficient at each level.¹² As the level of difficulty increased, the number of students answering correctly decreased.

Table 12: Reading Proficiency

	Proficient %
Alphabet recognition (at least 4 out of 5 correct)	85.56
Word recognition (at least 4 out of 5 correct)	58.53
Paragraph reading (no more than 3 mistakes)	57.40
Story reading (no more than 3 mistakes)	38.05

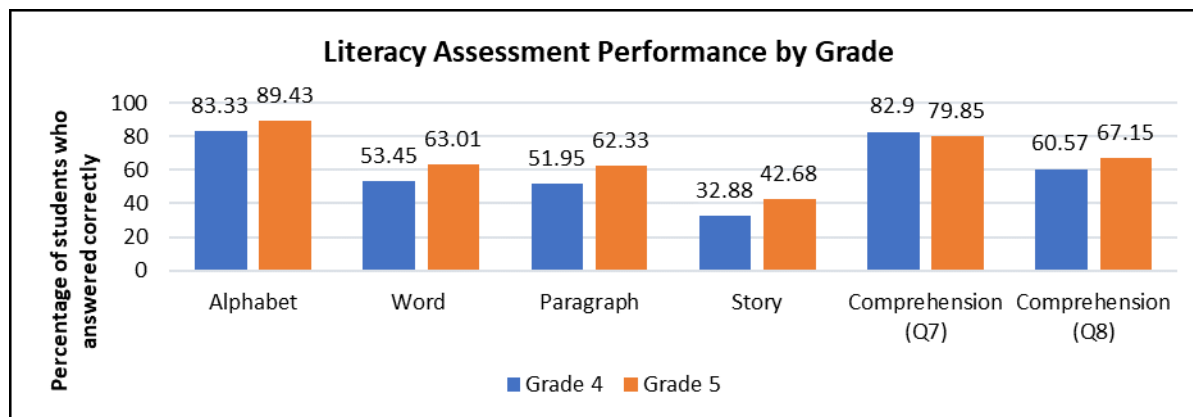
38. We analyzed literacy scores by gender, grade level, and local governments. We found no significant differences in children's scores by gender. Overall, grade 5 students performed better than grade 4. There was a difference of almost 10 percentage points in how students of both grades have performed on reading a word, a paragraph, and a story. Comprehension questions were asked to only those who were proficient at the paragraph level. As a result, higher proportion of grade 5 students were asked these questions.

Figure 4: Literacy Assessment Performance by Gender



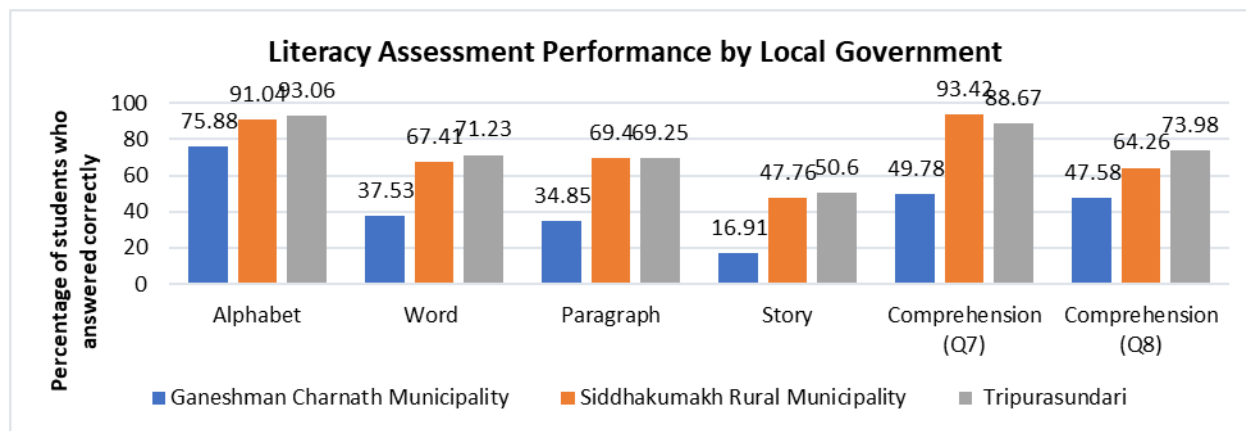
¹² To be proficient in alphabets and words, they needed to answer correctly four of the five questions. To be proficient in paragraph and story, the number of mistakes should be lower than four.

Figure 5: Literacy Assessment Performance by Grade



39. Analysis at the local levels showed that students from Tripurasundari performed better overall, compared to those from Ganeshman Charnath and Siddhakumakh Rural. Fewer students from Ganeshman Charnath were able to successfully answer the first question compared to their counterparts from the other municipalities. In particular, there was a difference of 17 percentage points between Ganeshman Charnath and Tripurasundari. Fewer students achieving proficiency in the first question led to overall lower scores, leading Ganeshman Charnath to have the lowest proficiency scores for reading a story

Figure 6: Literacy Assessment Performance by LG



40. The two comprehension questions were asked only to those children who were able to read the story proficiently. Among them, only about four-fifths were able to answer the first comprehension question correctly while less than 65 percent answered the second question correctly. At the LG level, students from Tripurasundari performed better on these two questions than their counterparts from the other two municipalities. For most of the questions, the number of proficient students from Ganeshman Charnath Municipality is lower than the students in the other two municipalities. Note that Nepali is not the mother tongue for many of these students in Ganeshman Charnath.

Table 13: Parent Perception on Math Proficiency

Highest Mathematical Operation	N	%
The child would have significant difficulty performing any operation	48	3.34
Addition	53	3.69
Subtraction	198	13.78
Multiplication	190	13.22
Division	743	51.70
Respondent refused to answer	1	0.07
Don't know	204	14.20
Total	1,437	

41. The pilot also collected data on how the adult survey respondents thought their child would perform mathematical operations. There is a disparity between the caregiver's perception of their child's ability level and the child's demonstrated proficiency. The majority of the respondents (52 percent) believed that the child would solve division-related questions, which is quite different from how students performed on the topic during the assessment. Similarly, Table 14 shows how respondents thought their children would perform on literacy-related questions.

Table 14: Parent Perception on Literacy proficiency

Highest Nepali Level	Total (N)	Total (%)
The child would have significant difficulty performing any Nepali operation	15	1.04
Letter	47	3.27
Word	103	7.17
Sentence/paragraph	118	8.21
Story	1,041	72.44
Don't know	113	7.86
Total	1,437	

42. **Characteristics of those who could not be assessed over the phone:** As mentioned earlier, a significant proportion of the children could not be reached for phone assessment despite several attempts. It would be good to explore how they differ from those who could be assessed by, for example, conducting in-person surveys. Fortunately, the teachers in the TaRL program schools had assessed their students in person before rolling out the program using their own assessment tools. Tables 15 and 16 provide the levels of these two groups of students in numeracy and literacy according to the teachers. On average, students in the phone survey performed better than those who could not be assessed through the phone survey. For example, 21 percent of those in phone survey from grade 5 are at the reading letter level, while 36 percent of those not assessed over phone are in this category. Similarly, 11 percent of those assessed over phone from grade 5 are in the division level, while the corresponding figure is 5 percent for those not assessed over phone. This discrepancy is presumably because those who could not be assessed over phone are children who are economically disadvantaged and may not have anyone in their families who can help them with their studies.

Table 15: Proficiency of Grade 5 Students¹³

Proficiency for grade 5 students

¹³ Using the same proficiency measure as Table 12.

Reading Proficiency	In phone survey	Not in phone survey
Nepali reading beginner	6.56	9.89
Nepali reading letter (at least 4 out of 5 correct)	20.99	35.96
Nepali reading word (at least 4 out of 5 correct)	12.54	14.16
Nepali reading paragraph (no more than 3 mistakes)	22.16	17.75
Nepali reading story (no more than 3 mistakes)	37.76	22.25
Total	100	100
Math Proficiency		
	In phone survey	Not in phone survey
Math Beginner (could not read even one digit in math correctly)	2.77	4.04
Math One-digit (could not read two digits in math correctly)	17.81	26.52
Math_Two-digit (could not solve subtraction question correctly)	36.20	36.63
Math_Subtraction (could not solve division question correctly)	31.97	27.42
Math_Division (could solve division question correctly)	11.24	5.39
Total	100	100

Table 16: Proficiency of Grade 4 students

Proficiency for grade 4 students		
Reading Proficiency	In phone survey	Not in phone survey
Nepali reading beginner	7.87	17.86
Nepali reading letter (at least 4 out of 5 correct)	29.84	37.47
Nepali reading word (at least 4 out of 5 correct)	15.08	14.16
Nepali reading paragraph (no more than 3 mistakes)	18.03	14.16
Nepali reading story (no more than 3 mistakes)	29.18	16.34
Total	100	100
Math Proficiency		
	In phone survey	Not in phone survey
Math Beginner (could not read even one digit in math correctly)	4.77	11.57
Math One-digit (could not read two digits in math correctly)	26.15	32.53
Math_Two-digit (could not solve subtraction question correctly)	40.3	34.93
Math_Subtraction (could not solve division question correctly)	25.82	15.5
Math_Division (could solve division question correctly)	2.96	5.46
Total	100	100

43. **Challenges and Recommendations:** One main challenge was in relation to phone numbers that were not reachable or incorrect numbers. Scheduling an hour for the interviews was also a challenge due to the availability of the parents/guardians. To address this challenge, efforts were made to reach out to headteachers/teachers to help getting the correct numbers.

44. At the end of the training session for enumerators, mock surveys were conducted among the enumerators. This was helpful in assessing the understanding of the enumerators on tools and basic protocols of the survey, and to identify any problems such as unclear wording or the questionnaire taking too long to administer.

45. To ensure participation of all students, it would be helpful to involve headteachers in providing information to caregivers in advance of the calls. This will help build the trust among the caregivers to allow students to participate in the survey.

46. The other challenge was related to sending text messages for the Nepali assessment. It was difficult to read the received text (Unicode font) in the keypad phone and sometimes it did not show the exact text as well.¹⁴ In addition, some parents were even not aware about how to navigate the text messages on their phone. Enumerators taught parents/children how to navigate through the text messages when possible.

47. **Regional disparities:** The education system in the rural areas of Nepal is weaker with low awareness level among the households. Children from hilly regions (Bagmati) performed better compared to those in the Terai region.

¹⁴ Somewhat surprisingly, students with feature phone, on average, did slightly better in literacy assessment than those with smartphones.

Annex 1: Assessment Questionnaire for Numeracy and Literacy

Maths Assessment

1. The student was to solve: $56 + 27$

DO NOT READ ALOUD: Answer: 83

Did the student get the addition question correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem

2. The student was to solve: $32 - 16$

DO NOT READ ALOUD: Answer: 16

Did the student get the subtraction question correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

[Multiplication, division, and fraction questions were asked only if the child answered the addition or subtraction question correctly]

3. The student was to solve: $23 * 6$ (23 Multiply by 6)

DO NOT READ ALOUD: Answer: 138

Did the student get the multiplication question correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

4. The student was to solve: $47/5$ (47 divided by 5)

DO NOT READ ALOUD: Answer: Answer: 9 remainder 2

Did the student get the division question correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

5. A man buys 56 copies. Then he buys another 28 copies. How many copies did he buy in total?

DO NOT READ ALOUD: Answer: 84 copies

Did the student get the addition word problem correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

6. Ram's mother bought 32 oranges from the market. Ram and his sister eat 14 oranges. How many oranges are left now?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

7. The student was to solve (fraction): $1/6 + 4/6$ (1 by 6 plus 4 by 6)

DO NOT READ ALOUD: Answer: $5/6$

Did the student get the fraction question correct?

- A. The child got the question correct.
- B. The child got the question incorrect.
- C. The child gives the correct answer but is not able to convincingly explain how they got their answer/ I don't believe they answered it themselves.
- D. The parent was answering for the child/not letting the child answer, or child used a calculator.
- E. The child refused to solve the problem.

Nepali Assessment (Literacy)

1. (Surveyor: Read the following [Nepali] letters carefully / aloud. (I have just sent a message to your phone. Please open the message and see what is written in it. Can you read it to me clearly / loudly?)

Write the marks obtained by the child in the space given below

Ka, Tha, Ma, Sa, Ksha

Note: If the child cannot read at least 2 of the given five letters correctly, do not ask him/her another question in Nepali.

Score obtained by the child (full mark: 5): _____

2. (Surveyor: Read the following [Nepali] words carefully / loudly. (I have sent another message to your phone. Open the message and see what is written in it. Can you read it to me clearly / loudly?)

Write the marks obtained by the child in the space given below

Work, light, noise, faith, laughter

Note: If the child cannot read at least 2 of the given words correctly, do not ask him another question in Nepali.

Score obtained by the child (full mark: 5): _____

3. (Surveyor: Please read the following [Nepali] paragraph carefully/ aloud. (I have sent another message to your phone. Open the message and see what is written in it. Can you read it to me clearly / aloud?)

Write the marks obtained by the child in the space given below

There is a well in Niraj's village.

One day he was bathing in the well with his father.

In the meantime Kamal came to fetch the water.

Note: If the child makes more than 5 mistakes while reading the given paragraph, do not ask him another question in Nepali. Count the number of words the child can pronounce correctly.

Score obtained by the child (full mark: 16) : _____

4. (Surveyor: Read the following [Nepali] story carefully/ aloud. (I have sent another message to your phone. Open the message and see what is written in it. Can you read it to me clearly / loudly?)

Write the marks obtained by the child in the space given below

The home where the bees live is called a hive.

Bees love the nectar of flowers.

They accumulate nectar in their hives.

They travel long distances to collect nectar.

They work hard to make honey.

Honey is also used as a medicine.

Note: Count the number of words the child can pronounce correctly

Score obtained by the child (full mark: 35) : _____

After reading the story, ask the child the following questions.

5. Where do bees live?
6. Why do bees travel so far?