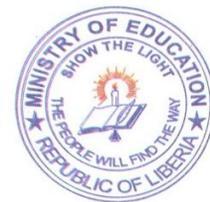
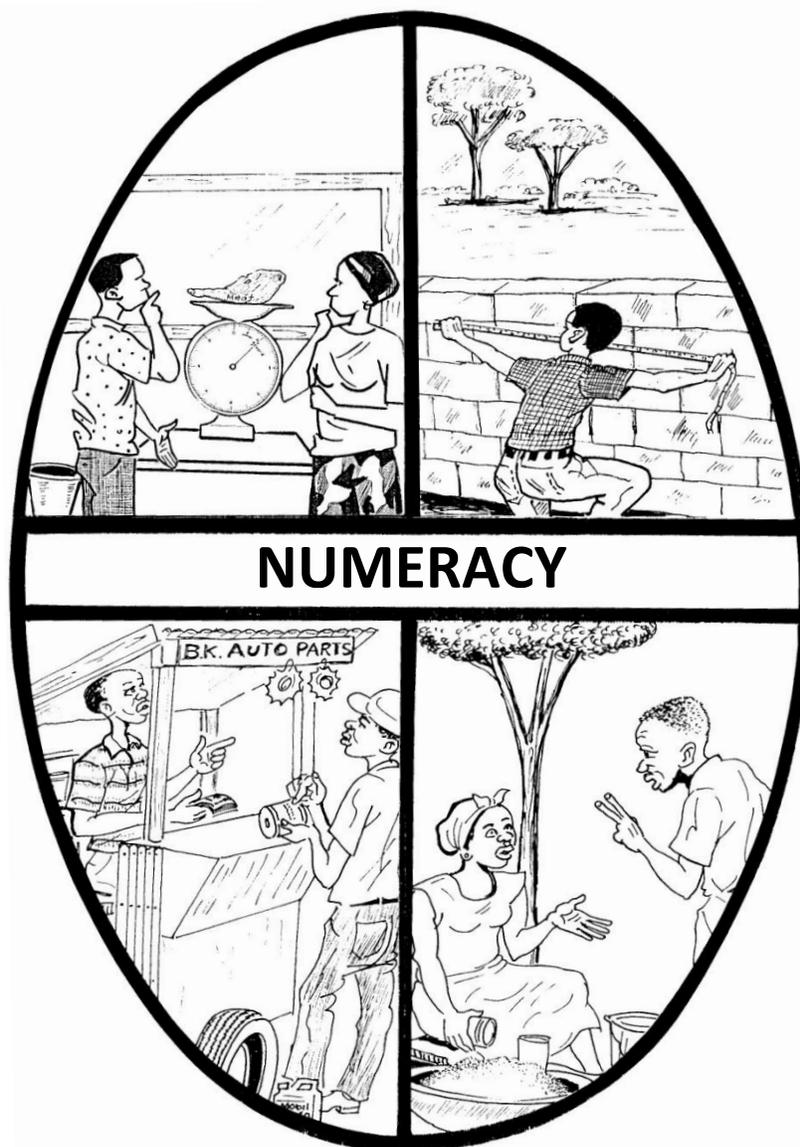




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Alternative Basic Education Curriculum



NUMERACY

Facilitator's Manual for Numeracy Level 1, Semester 1

August 31, 2011

Ministry of Education, Government of Liberia

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Non-formal Education Curriculum

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Introduction to the Facilitator's Manual

Section 1: Background on the Curriculum

Purpose and Audience for this Manual

This manual is designed for the facilitators of the Level 1 Numeracy curriculum of the alternative basic education system in Liberia.

The lessons contained in this manual have been field tested and revised based on feedback from facilitators and their students in six counties of Liberia. Facilitators who use this manual should be sufficiently trained and prepared in order to accomplish the learning objectives for the curriculum. Basic minimal preparation for numeracy facilitators includes:

- Familiarity with the Liberia's alternative basic education program Experience with the best practices in instruction, specifically on teaching beginning numeracy for non-literate persons
- Experience and knowledge of facilitation skills
- Knowledge and appreciation of youth development, youth and adult learning theories and practices.
- Creativity and flexibility in preparing and facilitating lessons
- Familiarity with the instructional methods and materials used in the lessons

Overview of the Alternative Basic Education Program and Curriculum

Liberia has had a range of alternative basic education programs for adults and out-of-school youth for over half a century, including basic literacy programs and accelerated learning programs. These programs have been implemented throughout the country by various government agencies and nongovernmental organizations.

The need for alternative programs to reach youth who the missed to chance to attend formal school at the age-appropriate level, is greater now than ever. For over 25 years, because of civil conflict, young adults in Liberia have missed opportunities for sustained,

high-quality formal schooling. Large numbers of youth and young adults who grew up during the conflict are now too old to attend conventional formal school with children; they need education and training to live full and productive lives. Because of the pressing need for basic and functional literacy, for employment-related learning, for inclusion and support for women and girls' education, and for other important daily living skills and knowledge in health, management money, conflict resolution and environmental practices, the Ministry of Education has created a national system of alternative basic education.

The purpose of the Ministry of Education's Alternative Basic Education program is to provide learning opportunities in basic education, including literacy and numeracy, and work-related and life skills for all out-of-school youth and adults age 13 and older, who want to learn new skills or strengthen existing skills. As stated in the approved alternative basic education policy, the Ministry will provide a single national system for planning, implementing, monitoring and evaluating of alternative basic education services for out of school youth and adults throughout the country.

The curriculum of the Alternative Basic Education (ABE) program is designed to help learners meet the learning outcomes described in the educational policy:

- Achieve functional literacy and numeracy levels
- Obtain life skills needed for successful living in family and community
- Obtain work readiness skills needed for success in the world of work
- Prepare for apprenticeship or vocational skills training
- Prepare for 6th grade equivalency or to enter Junior Secondary School

Section 2: Guidance and Tips for the Facilitator

Teaching and learning practices in alternative basic education programs tend to be different from those found in formal conventional school settings, though good practices in alternative basic education can be found in reformed formal schooling. In general, instruction in alternative basic education involves less lecture and presentation and more active learning and service learning projects in both the classroom and community. Learning may be derived from or immediately connected to students'

interests, goals and needs.

In alternative basic education programs, the individuals who deliver instruction are often called facilitators, to reflect their role of guiding and assisting participants in the learning process. To facilitate literally means ‘to make easier’. In effective alternative basic education programs, the role of the facilitator is to make it easier for people to learn by creating and maintaining a supportive environment; to make it comfortable for learners to participate in group processes; and to make sure that the content is meaningful and appropriate for the learners. Experienced facilitators are flexible and creative, yet able to follow a sequence of learning activities in order to ensure that participants have the opportunity to fully develop their skills in the specific content area.

Of course, facilitators need to be proficient in the content area. Facilitators of the Liberian alternative basic education numeracy curriculum should be familiar with best practices in numeracy instruction, knowledgeable about the use of numeracy on a day to day basis in Liberia, and comfortable communicating in English, both verbal and written. It is also very helpful to have some background in principles of youth development and in adult learning theory.

This section provides guidance and tips for facilitating the learning process and a few more details about the organization of the lessons that follow. In the next draft of this Manual, this section will include information about the Service Learning component of the alternative basic education program as well as guidance on documenting the progress of learners.

Activity-Based Teaching and Learning

In working with youth, it is important that the curriculum be delivered using active learning -methodologies that encourage full participation, in an environment that is open and accepting. Creating and maintaining a respectful and collaborative learning environment will enable participants to participate fully, and in a way that maximizes their learning. At the same time, norms should be established with the participants in the beginning and should reflect the rules or guidelines one would find in daily life at work and in the community. These norms might include (especially in the workplace): being on time, having regular attendance, dressing appropriately, being accepting and

open to everyone's contributions, speaking respectfully to one another, not interrupting when someone else is talking, working in a team, and taking on responsibility.

It is also important that the learning environment provides participants with the opportunity to take on leadership roles. In addition to learning the basic academic skills of literacy and numeracy, many learners are also interested in improving the interpersonal, problem-solving skills and leadership skills that are needed at work and in the community. Especially in the life skills and work-related learning courses, but also in the literacy and numeracy strands, there are opportunities for participants to lead activities and discussions; report on or summarize for the larger group the results of small group discussions; assist the facilitator in preparing materials; etc. The facilitator will need to be aware of who is and who is not participating and find ways to balance their participation so those who tend not to speak or take a leadership role get the opportunity to be active within the class.

Through the use of a variety of active, learner-centered teaching methods, the alternative basic education courses aim to build on and enhance participants' existing knowledge and skills and provide them with opportunities for practical experiences, not just academic work. Actively engaging youth in activities through participatory and practical methods will strengthen their confidence levels as well as develop their skills in literacy, numeracy, and the range of interpersonal, problem-solving, and leadership skills that are included in the life skills and work related learning courses.

The following types of active learner-centered teaching and learning methods may be found in alternative basic education programs. Some of them are used in the Liberia alternative basic education courses; others may be adopted by facilitators as they become familiar and experienced with the new curriculum.

Pair share and pair work: When introducing a new activity or when working with the large group, the facilitator may find it useful to have two people sitting next to each other to work together or share their ideas on a topic. This encourages participation from those that are less comfortable speaking in front of the large group, gives an opportunity for participants to share their experiences and ideas with someone, and helps to build trust among participants as they get to know each other better. The facilitator should remember to give clear instructions and keep to time.

Small and large group discussion: Discussions happen in every activity whether it is working in small groups or large groups. As a facilitator it is important to be clear on what the task/topic of discussion is; keep participants focused on the topic; make sure everyone has the opportunity to participate; keep to time and gauge participants' levels of energy and interest. During small group discussions, it is important for the facilitator to go around to all of the groups to make sure they have understood the task and are staying on course and to check their understanding of the topic. During large group discussions the facilitator needs to manage the flow of the discussion; help make connections among ideas and points that are expressed by participants; engage those who are not participating and repeat or sum up the main points discussed.

Small group work: Many activities get carried out in small groups to allow maximum participation. When working in small groups, it is important to:

- divide participants in different ways and in groups of different sizes, depending on the activity (and mix the groups each time so they aren't always working with the same people);
- give clear instructions on the task, time allotted, the expected outputs, and how the output or outcome will be reported back to the full group. If the output will be presented on flip chart paper, someone will need to be designated as the recorder. If literacy levels are low, verbal feedback is better;
- visit groups to make sure they are on the right track;
- manage the time well, especially when the small groups are sharing their output with the large group.

Individual work: Throughout the literacy and numeracy courses, learners will engage in some individual work, most of which will be done in their work/copy books. It is important for the facilitator to be available to help and encourage learners, as well as to ensure that there is a quiet atmosphere in which to work. Individual work doesn't mean that learners cannot consult with or help each other; rather it means that each person is writing, reading, or calculating on their own first. For most people, learning is a social activity; we learn from and with others.

Role plays: Role plays provide the opportunity for participants to practice new skills and attitudes in the safety of the workshop setting before trying it out in the real world. Role plays can be planned ahead of time with a script or be developed by the participants themselves around a particular issue. They can be done by a few people in front of the large group to demonstrate a skill, attitude or situation, or they can be done in small groups of three where people switch roles after a period of time. Typically, in the small group one person acts as an observer and gives constructive feedback back to the other group members. When doing role plays, it is important to give the participants information on the objectives of the role play, their specific roles and a checklist for the observer. Role plays should always be processed afterwards, where the facilitator can lead the discussion with some guided questions prepared beforehand.

Case studies/ scenarios: Case studies provide participants with the opportunity to put their newly acquired knowledge into practice, to identify, analyze and solve a problem. The case study can be based on a real life situation or be created to reflect an issue they might face at home, at work or in the community. Case studies can be read aloud to participants or handed out, depending on the literacy level. They can also be completed in pairs, small groups or large groups. The information in the case study /scenario should be clearly presented and a set of questions should be provided to help guide the participants in their analysis. The ultimate goal of the case study is to generate possible solutions to issues that may arise in the course of daily life.

Games: Games are a fun way of learning new information or applying newly acquired information. They can be based on popular games or made up. Games can introduce an element of competition and can energize a group. Participants should be clear on what the objectives are and how to play the game.

Brainstorming: Brainstorming is an element of many of the activities, and is used when one wants the participants to generate ideas. During a brainstorming session, participants share one idea at a time, all of which are written down. All ideas are accepted and should not be judged. Participants can further discuss the

items after the list has been generated, and depending on the objective of the activity, they might rank the ideas in order to prioritize or categorize their responses.

Presentation: Presentations are a more traditional way of providing information to participants and are useful when active learning methods will not effectively get at the information you are trying to provide. Presentations are best kept to a minimum, interspersed with methods that are more engaging and participatory. When giving a presentation, it is best to plan it ahead, keep the time to a minimum and break it up with questions and answers from the participants.

Panel discussion: Panel discussions involve bringing in experienced people to discuss a particular topic. Participants are given the opportunity to ask questions and those on the panel provide information based on their experience. The people on the panel may be experts in a particular area (e.g. business owners, workforce development specialists, health care workers) or they may be the participants themselves who have had a particular type of experience. When outsiders are brought in, it is important to contact them at least a week ahead of time, explain the objectives of the session and the type of information you would like them to share with the participants.

Pictures: Pictures can be used in different ways. They can be created by the participants to reflect something they have learned or they can be used as an aid by the facilitator to generate discussion on a particular topic. When using a picture(s), make sure that it clearly presents the issues that you are trying to get at and make sure it is culturally appropriate. Provide the participants with guided questions when they are trying to interpret or analyze a picture.

Reflection activities - individual, guided, journal writing: Reflection activities, when participants get the opportunity to step back and think about their own experiences, behavior or attitudes, can be done during or at the end of an activity. Reflection might be guided by the facilitator, where the facilitator creates a quiet, comfortable environment and poses a series of questions for the participants to think about. These thoughts might be shared with other participants after enough time is provided for individual reflection. Reflection activities may also happen at the end of an activity, in the form of guided writing in copy books.

Review activities: Review activities can take on many forms, such as round robin (when people go around in a circle and share something they learned during the session), quiz competition, ball throwing, question and answer, etc. These activities can be done at the end of every session to review the main topics, concepts and ideas that were covered. Review activities provide the opportunity for participants to recall main points and for facilitators to check the level of understanding of the participants.

Facilitator's Role

The role of the facilitator is:

- To teach the learners with positive and respectful encouragement, remembering that the learners are adults
- To be well-prepared for every class, preparing the day before
- To provide a professional example to the learners
- To keep careful track of the progress of his/her learners
- The facilitator must take his/her work seriously, and make sure to come to class fully prepared ahead of time every day in order to lead and inspire the learners.

Reminders for Facilitators

In addition to being familiar with a range of activity-based teaching and learning approaches, there are many things a facilitator needs to remember when conducting a class. The following list provides some reminders to the facilitator. As a facilitator, it is important to remember to:

- Be respectful
- Listen and observe
- Speak clearly

- ☑ Maintain good eye contact
- ☑ Write neatly and so everyone can see it
- ☑ Position visuals so that everyone can see them
- ☑ Be flexible and adjust approach when necessary
- ☑ Be patient
- ☑ Be open and approachable
- ☑ Encourage participation by all participants
- ☑ Provide positive feedback to all participants to encourage participation
- ☑ Repeat and/or rephrase questions you ask or points you make
- ☑ Repeat points made by participants to show you are listening and make sure you have understood correctly
- ☑ Write and repeat instructions for small group activities
- ☑ Ask questions to clarify points made and probe further
- ☑ Build upon participants' experiences and knowledge
- ☑ Link information from one unit to another unit
- ☑ Be aware of the level of understanding and interest of the participants
- ☑ Give people time to respond to questions
- ☑ Re-direct comments and questions back to other participants to encourage discussion
- ☑ Manage time well by keeping yourselves and participants on task
- ☑ Summarize the main points at the end of an activity or unit
- ☑ Be honest: If you don't know the answer to a question, say so, and direct the participant to the appropriate place or person for the information (or find the information and get back to the participant with the information the next day)
- ☑ Use icebreaker activities to make participants feel more relaxed and energizers when the group is low in energy

Section 3: Numeracy Level 1 Overview

What is Numeracy?

Numeracy is understood as the process by which people use numbers to calculate and reason to solve problems and communicate information to others in their daily lives. To use numeracy in this way, learners must be able to:

- Read and understand information given by numbers and symbols in

simple graphical, numerical and written material

- Apply math concepts and calculations to answer a question, solve a problem, make a prediction, or carry out a task that involves mathematics
- Solve problems using data, make predictions, draw conclusions, answer a question or carry out a task that has a mathematical dimension; and determine the degree of precision required by the problem
- Solve problems and verify that the results are reasonable.
- Communicate results using mathematical representations, such as graphs, charts, tables, and grids

These statements guide the teaching and learning of mathematical reasoning and problem solving at each of the four levels of the Ministry of Education's Alternative Basic Education curriculum for numeracy.

This Numeracy Content Standard reflects the four strands of mathematics learning that are essential to being able to work with numbers in daily life:

- Numbers and Number Sense
- Patterns, Functions and Relationships
- Space, Shape and Measurement
- Data and Statistics

These strands are woven into the lesson modules that comprise each of the 3 levels.

STANDARD FOR THE CONTENT AREA

Numeracy is defined as the skills and working knowledge of mathematics, as well as the development of a mathematical mind. Thus numeracy includes mathematical skills such as facility with the decimal number system, being able to read, write, compare and order numbers, as well as being able to complete basic operations with numbers.

However, numeracy is more than just possessing the skill of calculation. A

mathematically developed mind is also able to recognize patterns, able to see relationships among numbers and shapes, and is able to solve problems through analysis and interpretation. It means being able to understand different ways that information is presented, such as graphs, maps, and diagrams.

Numeracy is deeply embedded in daily activities in all cultures: numeracy and the mathematical mind are involved in counting, measurement and spatial reasoning, all required in order to be able to cook a meal, to make a pattern and sew new clothes, to make purchases in the market, to construct a house, to calculate the timing of a journey, to keep track of time-sensitive events such as religious holidays and loan repayment schedules, to understand medication dosages, and much more.

Many people develop strategies for doing many of those activities even without a formal mathematics education. Thus it is critical that adult numeracy education content build upon the strategies the learners have developed in their lives, and that the formal mathematical content they learn be directly applicable to their lives.

Receiving more formal, thorough and applicable mathematics instruction and practice:

- increases confidence and accuracy in social and marketplace interactions.
- gives power and knowledge needed to improve individual financial circumstances, whether through starting one's own business, being more competent in dealing with the banking system, or establishing a household budget and savings.
- improves understanding and analysis of health, economic and political issues.
- improves the ability to make more sense of statistics and information shared in the media.
- improves analytical problem-solving abilities.

Chart of Levels:

This numeracy program is comprised of three Levels: I, II, III

The chart on the following pages gives an overview of the application of this standard to the first Level of the numeracy curriculum, and indicate the four strands of mathematics learning defined above:

Learners exiting **Level 1** will be able to:

Read, write, and interpret very simple types of mathematical information such as:

Numbers and number sense: whole numbers up to 3 digits, common monetary values, and basic common fractions ($\frac{1}{2}$, $\frac{1}{4}$)

Patterns, functions and relationships: very simple patterns, commonly used groupings (2s, 5s, 10s) and sets

Space, shape and measurement: geometric shapes, commonly used standard units of measurement

Data and statistics: Demonstrate very simple ways to interpret and represent data (picture graphs)

Recall and use a few simple math procedures such as basic counting, sorting, ordering, grouping, measuring, simple addition and subtraction, and multiplication

Figure out the degree of precision needed for a solution

Organize simple information and measure, describe, or use simple computation to solve a problem

Communicate the solution orally, in pictures or role plays, or by entries in a simple chart

Examples of the kinds of real-life math activities that learners can do at each level:

Count, order and group, in order to accomplish a variety of purposes (or goals) such as:

Sort money into like piles and determine the value of each pile

Figure out how much lumber is needed to floor a room by counting square units of material within the shape of a room

Estimate weekly wages by adding on (counting) per-day amounts.

Use tallies (check marks) to determine the number of people attending a gathering

Background Information and Curriculum Structure:

Teaching and learning activities for Numeracy Level 1 incorporate the four strands or threads of numeracy instruction described in the introduction to this manual: number sense, patterns and relationships, space and measurement, data and statistics. Because number sense is foundational to all other strands and to the next three levels of this curriculum, it is the focus of Level 1. However, all strands are woven throughout the four Modules. Each module has a theme:

As stated earlier, the four strands of numeracy content are woven into the lesson modules:

Modules for Level 1

Module A: “Knowing Numbers” (the number system, place value, ordering and comparing numbers)

Module B: “Working with Numbers” (operations, fractions)

Module C: “The World in Numbers” (measurement and geometry)

Module D: “News and Numbers” (data, statistics and representation)

The first two modules in particular are cumulative, with mastery of skills in the first module required in order to master the topics of the second module. The skills mastered in those two modules will then be utilized in the third and fourth modules, which involve more applications and spatial reasoning.

Number of Modules and Lessons:

Numeracy Level 1 has 4 instructional modules. Each module contains 27 lessons, for a total of 108 lessons. The lessons are planned to be delivered in sequence over a period of 9 months.

Level 1 Learner Outcomes:

The 4 instructional modules in Level 1 are designed to help learners achieve the Level 1

outcomes described in the chart on page 8, and the specific competencies defined for each module. Learners who successfully complete Level 2 should be able to easily select and apply the knowledge, skills, and strategies described for this level to independently accomplish simple, well defined, and highly structured math tasks in the classroom, at home or in another comfortable and familiar setting.

For example, youth and adult learners completing Level 1 should be able to complete some or all of the following illustrative real-live activities: Make correct; determine the amount of flooring needed in a room by counting square units of material within the shape of the room; estimate daily/weekly wages by adding on (counting) per-hour amounts; fit boxes or furniture into a space by counting square units within the shape of the space or by estimating using informal measurement units; interpret a simple clear horizontal or vertical bar graph in a brochure from a local clinic; measure ingredients for simple recipes using benchmark fractions; use tallies to determine number of useable items from total number of items produced; sort coins into like piles, and then determine the value of each pile; use manipulatives, mental math, or paper and pencil to calculate how much it will cost for two people to take a shared taxi to Monrovia or another town; develop a schedule for how and when to take medication according to a doctor's order.

The following chart summarizes the competencies for each module in Level 1, with the topics covered in the module:

Module	<u>COMPETENCIES</u> Teaching and learning activities in this module will help the learner develop the following competencies:	Unit Topic	<u>LESSON TOPICS</u> This module includes the following lesson topics:
FIRST SEMESTER – LEVEL 1			
Module A: Knowing Numbers (Numbers and number sense)	<ul style="list-style-type: none"> • Be able to count, read and write into the hundreds • Be able to order and compare the value of numbers • Be able to skip count by 2’s, 5’s, 10’s • Understand place value system in the decimal number system • Understand the concepts and symbolic representation of addition and subtraction • Be able to tell time on a clock • Be able to read dates on a calendar • Be able to count money <p>Be able to use an addition chart in order to learn single digit addition and subtraction facts</p>	1. Numerical Symbols and Quantities	<ol style="list-style-type: none"> 1. Introduction to the class: The Symbols for 0 - 9 2. Practicing With Numbers 0 to 9 3. Ordering, Comparing Numbers 0 to 9 4. Numerical Symbols and Quantities, 10 to 20 5. Practice 0 to 20 Place Value, Ordering and Comparing 6. Skip Counting 2’s Up to 20
		2. Estimation, ordering and comparing to be interspersed in the lessons	<ol style="list-style-type: none"> 7. Counting Money Up To 20, Practice With Ordering and Comparing 8. Introducing the Concept of Addition 9. Concept of Subtraction
		3. Addition and Subtraction	<ol style="list-style-type: none"> 10. The Numbers from 20 to 100, and the 10’s 11. Getting to Know How much Is 20 to 100 – Estimation for a Prize 12. Practice Sequencing the numbers from 20 to 100’s 13. Skip Counting by 5’s and 10’s 14. Counting Money by Skip Counting 15. Introduction to Telling Time, The Clock and Hours

			<ul style="list-style-type: none"> 16. Telling Time Using skip Counting to Understand Minutes 17. Practice Telling Time, Writing Times 18. Making A Personal Map of How Time Is Spent In A Day 19. Reading A Calendar, Reading Dates 20. Using A Calendar, Writing Dates, Adding and Subtracting Days 21. Experience with addition tables and solving problems 22. Addition, Using Money 23. Experience with subtraction 24. Subtraction with Money 25. Practice with Addition and Subtraction 26. What the Place of the Numbers Tell Us: Place Value of Ones and Tens and Hundreds 27. Evaluation
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<p>Module B:</p> <p>Working with Numbers</p> <p>(Operations and Fractions)</p>	<ul style="list-style-type: none"> • Solve 2-digit addition and subtraction problems, including with carry-over • Be able to apply the operations of addition and subtraction to monetary transactions • Understand that whole number multiplication is ‘compressed’ addition, and that division means to share out equally, and that sometimes division results in a remainder • Be able to use a 10x10 chart for single-digit multiplication facts • Understand the relationship between multiplication and division • Use multiplication and division facts to solve story problems • Be able to properly read, write and interpret geometrical representations of fractional quantities • Understand that a fraction is a part of a whole, and that the parts of a whole must be 	<p>4. 2-Digit Addition and Subtraction Without Carry-over</p>	<ol style="list-style-type: none"> 28. 2-Digit Addition, Part 1: Place Value Review 29. 2-Digit Static Addition, Part 2: Addition without Carryover 30. Practicing Vertical addition – story Problems (without carryover) 31. Subtraction Without carry-Over (No Borrowing) 32. Subtraction Practice With No Borrowing(story problem) 33. Addition With Carryover 34. Practicing Addition With carryover 35. Subtraction with Carry-Over 36. Practice subtracting With Borrowing(story problems) 37. Practice Adding and Subtracting by buying and Selling 38. Introduction to the Concept of multiplication 39. What Multiplication Means, and Building the Multiplication Chart 40. Multiplication practice Game – Using the Chart 41. More About the Chart, and Patterns 42. Multiplication Story Problems 43. Introduction to the
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			<p>Concept of Division (Without a Remainder)</p>
	<ul style="list-style-type: none"> • the same size • Understand relative sizes of commonly used fractions <p>Be able to interpret the information given in a circle graph</p>	<p>5. Single-digit Multiplication and Division</p>	<p>44. Division Without Remainder, part 2 – Using the Multiplication Chart</p> <p>45. Division Comes to Life – Story Problems</p> <p>46. Practice with Multiplication and Division</p> <p>47. Simple Division With Remainder</p> <p>48. Quantities of Time</p> <p>49. Dividing One’s Life</p>

		6. Fractions	<p>50. Introduction to the Concept of Fractions</p> <p>50 Fraction Concepts, continued</p> <p>51. Fractions with Different Shapes</p> <p>52. Using Circle Graphs to Show Information</p>
			53. Evaluation
SECOND SEMESTER – LEVEL 1			
<p>Module C:</p> <p>The World in Numbers</p> <p>(Geometry and Measurement)</p>	<ul style="list-style-type: none"> • To understand the meaning of the placement of digits in a number • To be able to read numbers up to 999 • To be able to read and write numbers up to 1000 • To be able to enter numbers into a calculator properly • To be able to use a calculator for basic calculations • To understand geometry as the mathematics of measuring the world • To be able to identify the 	7. Numbers and Function(Whole Number Operation)	<p>54. What the place of the number Tell us:</p> <p>55. Reviewing Numbers to 1000, And Introduction To Using A Calculator.</p> <p>56. Correct Use of a calculator for Calculation</p>
		8. Geometry – Structures and principles	<p>57. Introduction to Basics Geometry and Fundamental Shapes</p> <p>58. More Fundamental Shapes: Squares and Circle.</p> <p>59. Finding and Tallying Shapes</p>

	<p>names and parts of fundamental geometrical shapes: point, line, angle, triangle and rectangle</p> <ul style="list-style-type: none"> • To be able to identify square and circle and the parts of each • Be able to use skills of observation to identify geometrical shapes in patterns 	<p>9. Fundamental Measurement</p> <p>(Map-Making</p> <p>Map Reading: Africa and the World, Service Activity)</p>	<p>60. Introduction to Measurement</p> <p>61. Measurement of Time – Units of Time.</p> <p>62. Measurement of Time – Digital Clocks.</p> <p>63. Introduction to Reading Skills Interval: Preparation for Thermometers</p> <p>64. Measuring Temperature</p> <p>65. Measurement of length – Standard and Non-Standard Units.</p> <p>66. Using Feet and Inches</p> <p>67. Using Yard and Feet</p> <p>68. Miles, and Practice with Measurement and Estimation.</p> <p>69. Measuring Weight – Pounds</p> <p>70. Measuring Weight – Ounces</p> <p>71. Measuring Volume(Capacity) – Gallons, Quarts, and Pints</p> <p>72. Using Volume Units to Make Oral Rehydration Solutions (Cups, Ounces</p> <p>73. Proportional Drawing and Map- Making</p> <p>74. Making a Map of the Classroom</p> <p>75. Making a Home</p>
	<ul style="list-style-type: none"> • To be able to identify shapes and use precise observation skills • To be able to use a table to organize and present information • To understand what, how and why we measure • To understand details of how time is divided • To be able to use a digital clock to tell time • To be able to read scale intervals • To be able to read a thermometer • To know important temperature benchmarks such as body temperature, the boiling and freezing point of water, etc. 		

<ul style="list-style-type: none"> • To understand the need for standard units • To be able to measure using inches • To understand the relationship between feet and inches • To be able to measure objects in feet and inches • To understand the relationship between feet and yards • To be able to measure in feet and inches and yards 		<p>Neighboring Map</p> <p>76. Reading Map of the World and Africa</p> <p>77. Reading Map of Liberia and Determining Distance</p> <p>78. Making a Community Map. Part 1</p> <p>79. Making a community Map, Part 2</p> <p>80. Finalizing the community Map, and Review</p>
<ul style="list-style-type: none"> • To be able to understand the relative size of a mile • To be able to choose appropriate estimates of lengths • To know pounds are the standard unit of weight • To know some important benchmark weights • To understand the relationship between ounces and pounds • To understand the concept of capacity (volume) • To know the relationship between gallons and quarts • To understand the relationship between volume units including cups, pints, 	<p>10. Evaluation</p>	<p>81. Evaluation Questions Module C</p>

	<p>and quarts</p> <ul style="list-style-type: none"> • To be able to use volume measurements to make Oral Rehydration Solution • To be able to draw a simple map using proportional drawing • To complete the classroom map, and an outdoor map as well if time allows • To make presentations to the group and to assess accuracy of a map • To be able to make a map of a larger geographical space – a neighborhood • To develop skills of observation and visual memory • To understand the cardinal directions of the earth • To be able to read basic information from a map of Liberia • To be able to identify Liberia on a map of Africa • To be able to read a map of Liberia and identify features • To be able to estimate distances between points on a map using the map scale • To be able to organize efforts to make a community map • To make the foundation of a 		
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	<p>community map showing the major roads</p> <ul style="list-style-type: none"> • To be able to gather information about community resources in order to make a map • To place various community resources on the community map with accurate placement • To be able to label community resources • To be able to work in a group on a project • To be able to produce the finished community map • To be able to assess Learners' mastery of the topics in Module C, as well as earlier fundamental skills 		
<p>Module D</p> <p>The News in Numbers</p> <p>(Data and Statistics)</p>	<ul style="list-style-type: none"> • To review and practice addition and subtraction of larger numbers • To be able to read and write and add numbers in the thousands • To be able to add lists of numbers • To be able to subtract numbers in the hundreds and thousands 	<p>11. Numeration(Whole number operation</p>	<p>82. Addition and Subtraction practice: 3-digit numbers</p> <p>83. Introducing the Thousands and Adding/Subtracting</p> <p>84. Adding Lists of Numbers</p> <p>85. Subtraction and Practice</p> <p>86. More Addition and Subtraction Practice – perimeter, and shopping lists</p> <p>87. Multiplication Practice and 2- Digit x 1-Digit Multiplication with no carryover</p> <p>88. Practicing Long Multiplication with no carrying over yet</p> <p>89. Long multiplication with</p>

	<ul style="list-style-type: none"> • To gain more skill at adding and subtracting • To apply skills of addition and subtraction to measurement and geometry, as well as money • To review the operation of multiplication and the facts up through 10x10 • To be able to multiply 2 digits by 1 digit without carrying over • To apply multiplication skills to story problems • To be able to solve 2-digit x 1-digit multiplication problems with carry-over • To develop confidence in multiplication • To review the basic concept of fractions • To be able to read and write and represent commonly used fractions • To be able to measure objects in fractions of feet • To be able to measure objects in fractions of inches • To be able to apply measurement skills to design shelves • To be able to gather information to calculate how 	<p>12. Measurement</p> <p>Structures and properties</p> <p>Graphing and Statistics</p>	<p>carry-over</p> <ol style="list-style-type: none"> 90. Games to Practice long Multiplication 91. Fraction Review 92. Measuring Feet and inches with Fractions 93. Using Fractions – a classroom shelving project 94. Introduction to percents 95. Showing Information with percents 96. Project 1: Class Surveys and Making bar Graph 97. Project 1: Continued – more class surveys 98. Project 1: Conclusion of class surveys 99. Project 2: Community survey, part 1 100. Project 2: Community survey, part 2 Data 101. Community survey: Conclusion, bar graphs and results 102. Project 3: Family finance, part 1: Setting up record – keeping 103. Project 4: Nutrition, part 1: introduction to nutrition 104. Project4: Nutrition, part 2: Planning a garden 105. Project 3: Nutrition, conclusion: Finishing the gardens 106. Returning to Project 3: Family Finance, conclusion – “Where does the money go?” 107. Review of level 1 108. Evaluation
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	<p>much the project would cost</p> <ul style="list-style-type: none"> • To understand the relationship between commonly used fractions and percents • To be able to interpret circle graphs as representations of percents • To be able to interpret percent information presented in circle graphs • To be able to estimate relative percents • To be able to organize a survey • To be able to gather and organize the information from a survey • To be able to generate a bar graph from survey data • To use survey and graphing skills to conduct a survey of community issues • To present information and interpret the results • To record expenses in an accounting format • To be able to use this financial information to analyze a family's expenses • To be able to enter information into a table • To be able to interpret a 		
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	<p>circle graph</p> <ul style="list-style-type: none"> • To understand basics of nutrition, and become aware of eating habits • To plan a garden • To use nutrition information as well as measurement and calculations to design a garden • To be able to analyze data from a long-term finance project • To review topics from this Module and all of Level 1 • To be able to assess Learners' mastery of the topics in Module C, as well as earlier fundamental skills 		
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Structure of the Class

Each lesson is designed to last 45 minutes long. The lesson materials in this manual include information on how to prepare for the lesson (gathering or making supplies needed), and how to give instructions about each topic, as well as how to structure the class to give the learners experience and practice with new concepts.

Each class will start with an **Opener** activity, just 3-5 minutes long, in order to warm up the learners and to either review previous material or to try something new and challenging, such as mathematical patterns, or geometrical challenges.

After the Opener, the class will have 1-2 **Activities** lead by the Facilitator in order to learn the numeracy content. Instructional time will last about 30 minutes.

The last 5-10 minutes of the class will be spent with a **Practice** activity, designed to give

the learners time to work with the new concepts. If there is not time to do the Practice activities, then the learners will be given the activity to do at home as a small homework assignment.

At the end of each module, the last lesson will be a time for **Evaluation**. But as the classes are underway, the facilitator should always be checking to see if the learners are understanding the material.

Resources Used or Adapted for the Purposes of Numeracy Curriculum

Materials adapted from Learning for Life Literacy Project, Kabul, Afghanistan, 2006. (Through UMass/Amherst, USAID funded). Author: Allison Lide

MODULE A

After these lessons, learners will be prepared to:

- Read and write the numbers from 0 – 999
- Skip count by 2's, 5's, and 10's
- Count money
- Tell time
- Estimate, order and compare numbers
- Solve addition and subtraction problems up to 20

Overview

Learning Objectives: The learner who successfully completes all lessons in the module should be able to:

Read and write the numbers from 0 – 999

Skip count by 2's, 5's, and 10's

Count money

Tell time

Estimate, order and compare numbers

Solve addition and subtraction problems up to 20

Links with other modules: Module B, C, D, E

Estimated length of module: 27 lessons = 3 lessons per week = 9 weeks

List of numbered lesson titles:

LESSON	MODULE A LESSON TITLES
1	Intro to The Class.
2	Practice with Numerals 0-9
3	Ordering. Comparing Numbers 0-9
4	Numerical Symbols and Quantities 10-20
5	Practice with Numbers 0-20 Place Value, Ordering and Comparing
6	Counting Money Up To 20
7	Skip Counting by 2's
8	Introducing the Concepts of Addition for Numbers 0-10/Evaluation
9	Introducing the Concept of Subtraction
10	Numerical Symbols and Quantities 20-100
11	Estimating
12	More Practice with Numbers 0-100, Ordering and Comparing
13	Skip Counting by 5's
14	Using Money to Practice Skip Counting Up to 100
15	Intro to Telling Time, the Clock and Hours
16	Telling Time Using Skip Counting to Understand Minutes
17	Practice Telling Time, the Clock and Hours
18	Making a Personal Map (List) of How Time is Spent In a Day/Evaluation
19	Reading a Calendar, Reading Dates
20	Using a Calendar, Writing Dates, Adding an Subtracting Days/Evaluation
21	Further Work with Addition (Addition Chart)

22	Addition, Using Money (Up to 10 dollars)
23	Further Work with Subtraction (Using Addition Chart)
24	Subtraction, Using Money (Giving Change, Up to 10 Dollars)
25	Practice with Addition and Subtraction (Story Problems, Addends 0-10)
26	Symbols and Quantities for Numbers Up to 999/Place Value
27	Review and Evaluation

Materials Needed for Module A:

- Chalkboard and chalk
- Initially, a supply of beans or stones, but then learners should have their own supply each day of 9 beans/stones and 9 sticks
- Wall chart of number symbols from 0-9, then 10-19
- Number cards written from 0 - 20, with corresponding dots on the back of the cards
- Number cards of the 10's: 10, 20, 30, 40, etc to 100
- Symbol cards +, -, x, ÷, =
- Stones or beans or beads and small sticks in sets of 9, and at least 2 different kinds of objects– **After the first few lessons, each learner should assemble her/his own kit of 9 small objects (example: beans, stones or beads) and bring to class each day – objects within a set should be close to the same size (same size stones, same size sticks, etc)
- Fake money sets: 1 US Dollar, 2 US Dollars, 5 US Dollars, 10 US Dollars, 20 US Dollar notes
- Fake money sets: 5LD, 10, LD, 20 LD, 50, LD, 100 LD notes
- Addition Chart poster
- A calendar (and earners are encouraged to bring their own calendars as well.)

Module A:

Lesson 1: Introduction to the Class. The Symbols for 0 – 9

Lesson Learning Objectives:

- To identify the numbers 0-9

Preparation and Materials:

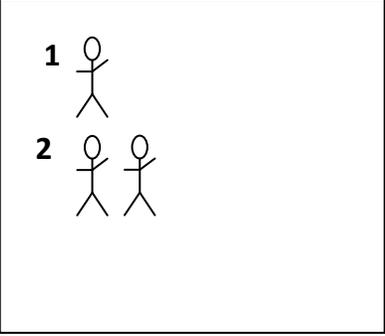
- Chalkboard
- Number cards 0-9 with the corresponding number of dots on the back
- Chalk
- Paper
- Small stones or kidney beans or candy
- Beans
- Objects

Opener: Have a jar filled with pieces of candy (or beans or stones). Pass the jar around the room telling the learners not to open the jar and guess how many pieces are inside the jar. Have each learner write down this number OR express it in any way they can. You can help the learners to write this down if they need to. They should write it in their notebooks to save it for the future...



Activities

Part 1: Learning to recognize the number symbols

Step 1	<ul style="list-style-type: none">• Give each learner about 9 small squares of paper. Ask the learners to make a drawing of a child on a piece of paper for each of their children. If they can, they should also write the name of each child underneath the picture. Collect any unused pieces of paper.
Step 2	<ul style="list-style-type: none">• Draw a picture of a child on the board and asks who has this many children (1). Write the number 1 beside the picture and explains that this means one child. 
Step 3	<ul style="list-style-type: none">• Draw two children on the board, ask who has this many children, write 2 and explain that this means two. Demonstrate the correct way to write the number, starting at the top and drawing the symbol downwards.
Step 4	<ul style="list-style-type: none">• Now draw three children and the number 3. Make sure to COUNT 1, 2, 3, and point out that the symbol 3 means these 3 children.• Continue in this way up to 9. Count the children drawn each time you introduce a new number, and demonstrate the proper way to write the number.
Step 5	<ul style="list-style-type: none">• Now to give the learners practice in recognizing the symbols, give them some pebbles or beans, and the number cards 1-9. Ask them to choose a card and then count out that many pebbles. Make sure you leave the drawings up on the board for them to use to check if they need.• So if they pick up a card that says 3, they must count out 3 pebbles and put them in a line.

	<ul style="list-style-type: none"> • Make sure ALL the learners practice this!!
Step 6	<ul style="list-style-type: none"> • Now set out sets of the pebbles with 1 through 9 pebbles in a row. Give the learners the cards. Ask them to come up and match their card with the line of pebbles, and also read/say their card, and count out loud, one at a time. • Now point to an empty space on the paper and ask how many children are there. Of course there are none, in that empty space! So that is shown with the number 0, which means none, zero, empty. • Explain that these are actually the only symbols they need to learn! If they learn these symbols 0- 9 they can read and write ANY number in the world of any size!! And that's what they will be learning in this class. But all they need to start is those simply ten symbols. • The learners should write the numbers 0-9 in their notebooks, along with pictures to represent the quantity of each number, as you did on the board.

Practice:

Give additional counting practice by giving each learner a set of small objects (9 or less stones, etc) which they must then count out loud and write the symbol for that quantity in their notebooks. They should exchange sets of objects with other learners to have practice counting different amounts.

Homework:

The learners should practice *writing* the numbers 0 – 9

Module A:

Lesson 2: Practicing With Numbers 0-9

Lesson Learning Objectives:

- To practice counting, reading and writing up to 9

Preparation and Materials:

- Chalkboard
- Chalk
- Number cards (no dots), pile of small stones

Opener: Have the learners stand in a large circle, and give each learner a number card. Tell the learners they will sing a song with the numbers from one 0 to 9. Sing in different tones 0,1,2,3,4,5,6,7,8,9. Ask the learners to sing along, and when they hear their number, they should hold up their card. Next one person asks the learner to sing the first number. Then the person to the right sings the next number. Have the learners repeat this until they get up to 9. Once the learners get up to 9 have them start at 0 again. Have them exchange cards with someone else, and repeat this a couple times to practice identifying the written form of the numbers.



Activities

Step 1	<ul style="list-style-type: none">• Put a pile of objects (example: small stones) at the front of the room. Give each learner a small card with a number from 0 to 9 written on it.• Each learner must come to the front and collect that number of stones from the pile and return to her/his seat.• Each learner then in her/his turn counts her/his objects and confirms with the number card.
Step 2	<ul style="list-style-type: none">• Write several questions on the boards which are questions about countable objects that have answers of less than 9. Examples: How many windows are in this room? How many pencils do you have? How many days are in the week? How many sisters do you have? Etc. When you ask each question, ask the learners to write their answer in their notebook first, THEN share their answers. Make sure to WRITE all these numbers on the board as you discuss the responses.
Step 3	<ul style="list-style-type: none">• Draw sets of pictures on the board. (Such as 5 flowers, or 8 suns, or 7 books, etc.) The learners should copy the drawing of the objects accurately, count them and write the number of objects and their names. Example: 5 flowers
Step 4	<ul style="list-style-type: none">• First, do a demonstration: Tell the learners that when you say a number, they should write that number, and then make that number of dots or marks beside the number in her notebook. Show the learners how to make their dots nice and neat and in rows. For example: <div style="display: flex; align-items: center; justify-content: center;"><div style="border: 1px solid black; padding: 5px; margin-right: 10px;">6</div><div style="display: flex; flex-direction: column; align-items: center;"><div style="margin-bottom: 5px;">● ●</div><div style="margin-bottom: 5px;">● ●</div><div style="margin-bottom: 5px;">● ●</div></div></div> <ul style="list-style-type: none">• Numbers should be given randomly, and to make it more game-like, you

	<p>can push to make it happen faster, saying more numbers faster and faster. Make sure you include 0! And make sure you repeat the numbers several times to give plenty of practice with each number.</p> <ul style="list-style-type: none"> • CHECK THE LEARNERS' WORK!!! If you see errors, you must correct them (gently) right away. • The next stage is to have the learners <i>only</i> write the symbol for the number when you say it, without drawing the quantity pictures. This can then be done rapidly to help the learners develop ease with the numbers.
	<ul style="list-style-type: none"> •

Practice:

Read aloud the short text below. It should be read slowly and the learners listen carefully for the use of numbers in the story. As you read, slow down and emphasize when you read something that involves a number. You may want to read the story twice.

After the story has been read, ask the learners what they remembered that was related to numbers.

The learners should draw pictures of those aspects of the story that are numerical, and then write the symbol for each number that was in the story.

They should write the name of the object as well, if possible, such as 2 older children, 4 trees, etc.

Module A:

Lesson 3: Ordering and Comparing Numbers 0 to 9

Lesson Learning Objectives:

- to identify the sequence of numbers 0 to 9
- to compare quantities 0 to 9

Preparation and Materials:

- Number cards
- Dot cards

Opener: Color game: Ask all learners who are wearing any red to stand up. Ask the class to count everyone standing. How many people are there? Do the same for the colors blue, green, yellow, and orange, black, white. Have the learners write down the number after they count the number of people standing wearing each color. HOWEVER, be careful if there are more than 9 people wearing any color, since the learners are not yet ready to write the numbers greater than 9 yet! If there are more than 9 of any color, divide those up by some other way, like people wearing red *hats* and people wearing red *shirts*.



Activities

Step 1	<ul style="list-style-type: none">• Give 10 learners a number card from 0 – 9 in mixed up order. The learners must then get up and arrange themselves so they are holding their number cards and standing in order from 0 to 9. The people in line should then count themselves, each one saying her/his number when her turn comes, starting from 0.• Again, to make this more interesting/challenging, tell the learners to do it as quickly as they can.
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Step 2

- Take the cards back and the learners sit. She/he mixes and then redistributes the cards to another 10 learners. This time they must order themselves backwards, starting with the number 9 and going down to 0.

Step 3

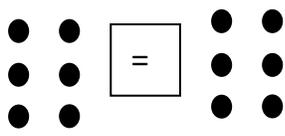
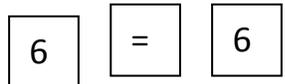
- They must then count themselves backwards, from 9 to 0.

Step 4

Learning Point: Symbols are signs that mean something just as a word used to mean something.

The Symbol for 'Equals'

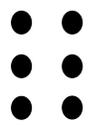
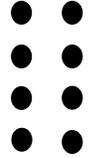
- Explain the use of **symbols**: *symbols are signs that mean something without words being written*. The symbol = means 'equal'. So 7 equals 7, $7 = 7$, $2 = 2$, etc.
- Show this with pebbles and symbols at the same time, using the symbol card for = and the number cards.
- Ask the learners for other examples:
 $8 = ?$ $9 = ?$

Step 5

Greater Than and Less Than symbols

- Now, is $6 = 8$ right?
- What is the relationship between 6 and 8? 8 comes after 6, 8 is **more than** 6. Show this with pebbles:

6

8

- So to show this with a symbol, we use this <.

- So we would write:

●	●
●	●
●	●

●	●
●	●
●	●
●	●

6

<

8

- Show other examples, such as $5 > 3$, $2 < 9$, $1 > 0$. Use the pebbles and the cards!! Let the learners do it too.

Note: Refer learners to lesson 3 in the workbook for more practice.

Practice:

Give the learners several sets of numbers to write the symbol between:

<u>8</u> <u>3</u>	<u>7</u> <u>7</u>	<u>3</u> <u>5</u>	<u>1</u> <u>1</u>	<u>4</u> <u>2</u>	<u>6</u> <u>7</u>
<u>9</u> <u>9</u>					

Answers:

<u>8 > 3</u>	<u>7 = 7</u>	<u>3 < 5</u>	<u>1 = 1</u>	<u>4 > 2</u>	<u>6 < 7</u>
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9 = 9

Module A:

Lesson 4: Numerical Symbols and Quantities, 10-20

Lesson Learning Objectives:

- Count the numbers from 10 to 20

Preparation and Materials:

- 20 objects
- Pebbles
- Small sticks about 10 cm long (close to the same length)

Opener: Write several greater than and less than problems on the board for the learners to solve:

8 4 1 0 5 6 2 9



Activities

<p>Step 1</p>	<p>Quantities</p> <ul style="list-style-type: none"> • For this first exercise, 20 objects are needed: 20 pebbles or 20 pencils, etc. • Ask the class to count the objects/people. They should easily count up to 9. This first set of 9 objects be set a little bit separate from the rest of the objects. • Continue the counting of the rest from 10, counting out loud each. The class should repeat the counting beginning with 0 through to 20. • <i>If anyone has trouble with this stage (counting out loud to 20), make sure they practice counting out loud and can count objects up to 20. Check this ability by asking someone to count 15 pebbles, or 13 pebbles, etc. This is ONLY orally at this stage, not written.</i> 														
<p>Step 2</p>	<p>Introducing the symbols for the numbers 10-20</p> <p>Symbols and Their Meaning.</p> <ul style="list-style-type: none"> • Now write the numbers 0-9 vertically on the board, starting at the top with 0 and writing to 9. • At 10, start a new column on the board, putting 10 next to the 0. 11 is then written next to the 1, 12 is written next to the 2, etc. → • Carefully draw attention to the pattern – that the same 9 symbols are used again, but this time with the addition of a 1 in front. <table data-bbox="1218 1365 1347 1806" style="margin-left: 20px;"> <tr><td>10</td><td>0</td></tr> <tr><td>11</td><td>1</td></tr> <tr><td>12</td><td>2</td></tr> <tr><td>13</td><td>3</td></tr> <tr><td>14</td><td>4</td></tr> <tr><td>15</td><td>5</td></tr> <tr><td>16</td><td>6</td></tr> </table> • To show this relationship, you will use stones and sticks. Start with a pile of stones and start counting. Place a 0 number card on the table. Count 1 stone, put it on the table under the 0. Place the number card 1 beside it, under the 0 card. Count out 2 stones, put them underneath the 1, and place the number card 2 beside them under the 1 card. Do the same with 3 stones, 4 stones, etc. Count up to 9 stones, but then 	10	0	11	1	12	2	13	3	14	4	15	5	16	6
10	0														
11	1														
12	2														
13	3														
14	4														
15	5														
16	6														

	<p>stop.</p> <ul style="list-style-type: none"> Explains that the rule is that we cannot have more than 9 stones. If we have 10 stones , we must instead use one small stick. 10 is equal to 1 stick. Put one stick beside the 10.
<p>Step 3</p>	<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <ul style="list-style-type: none"> For 11, take one stick and one stone, showing that 11 is 10 and 1. These are placed below the 10 and the stick. Do the same thing for 12: one stick and 2 stones, a 12 card, explaining that 12 is 10 and 2. This continues through to 19. At 20, place 2 sticks at the top, along the same line as the 0 and 10, with a 20 card. Explain that 20 is equal to two 10's. (2 sticks, which is the same as 20 pebbles.) During this process also draw the learners' attention to the similarity in the names of the numbers and the repetition of "teen" that means ten in the name of each number over 10, such as four-TEEN, fif-TEEN, six-TEEN, etc. </div> <div style="flex: 1; text-align: center;"> </div> </div>

Practice:

To practice, point to various numbers and stones and sticks and ask the learners to say the numbers.

The learners should then copy the list of numbers in their notebooks, with drawings to accompany (copying the style shown in the lesson).

Module A:

Lesson 5: Practice from 0 to 20 Place Value, Ordering And Comparing

Lesson Learning Objectives:

- be able to sequence and compare the numbers 0-20

Preparation and Materials:

- Number cards
- Small objects (pebbles or beans, etc)
- A calendar

Opener:

The learners should quickly as possible put the following numbers in order from LARGEST to smallest. (reverse order, counting backwards)

8, 5, 9, 0, 4



Activities

Step 1	Review <ul style="list-style-type: none">• To review from the previous class, give the learners various amounts of objects to count: count the number of students in the room, count stones, count shoes, etc (any number under 20). The learners should count out loud.• Then write numbers on the board (from 10 to 19) and ask the name of the numbers along with the objects to give the learners practice in
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	<p>recognizing the written numbers and reading the words.</p> <ul style="list-style-type: none"> • Show a calendar and the learners count how many months are in a year. They can also find the numbers 1-20 on the calendar.
Step 2	<ul style="list-style-type: none"> • From 10 to 20: Mix up the cards from 10 to 20 and give one to each learner. They should stand up and arrange themselves from lowest to highest number. • From 0 to 20: Mix up the cards from 0 to 20 and give one to each learner. They must again arrange themselves in order. They can then exchange cards and repeat the activity, but must do it silently, without talking.
Step 3	<ul style="list-style-type: none"> • Then collect and give out the cards and the learners must order themselves from 20 down to 0, backwards. • The Greater Than/Less Than Game can also be played with the number cards. <ul style="list-style-type: none"> ○ Ask the learners how many people are in their family: the learners should write the names of their family members in their notebooks if they can, count them, and write the number. • The Rat's Tale Game: <ul style="list-style-type: none"> ○ Write several numbers on the board in a mixed-up fashion: ○ A learner comes to the board and starting with the lowest number, must draw lines connecting the numbers in the correct order, but without crossing other lines. [example below: 5-8-10-12-15-16-19.

Module A:

Lesson 6: Skip Counting By 2's Up To 20

Lesson Learning Objectives:

- to be able to count by 2's, up to 20

Preparation and Materials:

- Chalkboard and chalk
- Number cards
- Stones
- Board or chart paper
- Fake money of 2's, 5's US Dollars bills

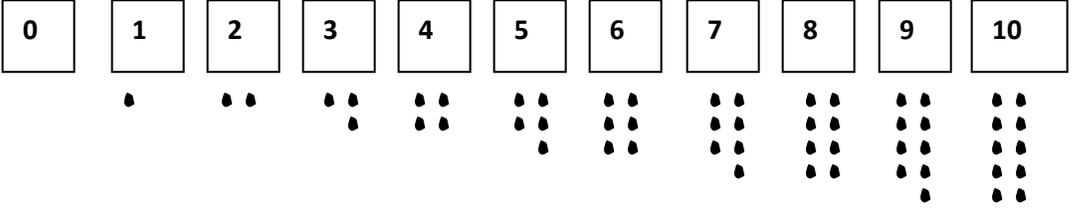
Opener:

Draw the numbers 2,4,6,8,10 on the chalkboard. Ask the learners if they can tell what the pattern is, and what the next number will be.



Activities

Step 1	<ul style="list-style-type: none">• Write the numbers 0 – 20 across the board in one line.
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<p>Step 2</p>	<ul style="list-style-type: none"> Underneath each number draw dots (or for a small group she/he can lay out number cards and small stones.) The dots or stones should be laid out systematically to show the doubling of the even number. 
<p>Step 3</p>	<ul style="list-style-type: none"> Circle the even numbers showing the even pairs of dots, and turn over the odd number cards or erase the odd numbers.
<p>Step 4</p>	<ul style="list-style-type: none"> The learners practice reading the even numbers, skip counting by 2's: 2-4-6-8-10-12-14-16-18-20. Ways to practice counting by 2's: count how many feet are in the room by 2's, how many eyes, etc. count a pile of stones by 2's, count people in the class by 2's.
<p>Step 5</p>	<ul style="list-style-type: none"> Give each learner 10 or less 5-US dollar bills, and they count their money by 2's.

Practice:

Give the learners each 10 US 1 dollar bills. Ask the learners to lay out the one dollar bills on the table then count them by 2 to see how many there are.

Module A:

Lesson 7: Counting Money Up To 20, Practice With Ordering and Comparing

Lesson Learning Objectives:

- Practice using numbers up to 20 with money

Preparation and Materials:

- Chalkboard and chalk
- sets of fake money in US Dollars: 1's, 2's, 5's, 10's bundled in sets that add up to 20 or less

Opener:

Lay out the fake US Dollar bills: 1 dollar, 5, 10 dollar. Ask the learners to say what the bills are called out loud. The answer is one dollar bill, five dollar bill, ten dollar bill. Ask the learners what an item is that costs one US dollar, five US dollars, and ten US dollars, or how many of something they can buy for one dollar, or five, etc. Write objects and their prices on the board.



Activities

Step 1	<ul style="list-style-type: none"> • Give each learner a variety of bills, but adding up to 20 US Dollar bills or less. Each learner should count her money and write down the amount. Example: 10, 2, 5, 1 = 18 US Dollars.
Step 2	<ul style="list-style-type: none"> • The learners can exchange money with each other and count new amounts of money. Do this several times! Lots of practice. Encourage them to do it faster and faster.
Step 3	<ul style="list-style-type: none"> • If you have enough 2 dollar bills, have the learners practice counting money by 2's to go faster as well.

Practice:

Ask the learners to work in groups to come up with arrangements and combinations of bills that add up to 15 dollars, using 1's, 2's, 5's, and/or 10's. (The answer should be 16 US dollars.) You can give them other amounts to add up to also, like 18 dollars, or 13 dollars, etc. for additional challenges.

Module A:

Lesson 8: Introducing the Concept of Addition

Lesson Learning Objectives:

- To demonstrate the meaning of addition and subtraction,
- To be able to represent addition with mathematical symbols (+,=)

Preparation and Materials:

- small objects like pebbles or beans
- 9 larger real objects such as kola nuts or grapes, or candy
- fake money(1's,2's,5's),
- operation cards +,-, =,
- small number cards 0-9

Opener: Draw $+$ Write the word 'addition' underneath it. Draw $-$ and write the word 'subtraction' underneath it. Ask the learners if they have ever seen these symbols and if so where? Explain that they will learn what these symbols mean.



Activities

<p>Step 1</p>	<ul style="list-style-type: none"> Give one learner 3 large objects like candies (or kola nuts or whatever) and give another learner 4 candies, and ask each learner to count how many they have. Ask the group how many candies there will be if they put their candies together. Physically put all the candies in one group together, and ask the learners to count them. 					
<p>Step 2</p>	<ul style="list-style-type: none"> Explain the term 'addition', that they have added the number of candies, which means 'to put together' or 'to combine'. The symbol for adding is +. 					
<p>Step 3</p>	<ul style="list-style-type: none"> On the board, draw 3 candies and write 3 underneath, and then 4 candies and write 4 underneath. Write the + sign in between, explaining that the symbol means to add, and then = at the end, explaining that it means 'equal' or the result. And then write the answer 7. Reread out loud the complete number sentence correctly: Three plus four equals seven. <div style="text-align: center; margin: 10px 0;"> <table style="border: none; margin: auto;"> <tr> <td style="border: 1px solid black; padding: 5px 10px; margin: 0 5px;">3</td> <td style="border: none; padding: 0 10px;">+</td> <td style="border: 1px solid black; padding: 5px 10px; margin: 0 5px;">4</td> <td style="border: none; padding: 0 10px;">=</td> <td style="border: 1px solid black; padding: 5px 10px; margin: 0 5px;">7</td> </tr> </table> </div> <ul style="list-style-type: none"> Write a problem on the board, such as $4 + 2 = ?$ Show how to set up the candies on the table in one group of 4 and one group of 2, place the number cards 4 and 2 underneath, place the symbol cards + and = in the proper places to make the written work concrete, and then physically 'combine' the candies to show the act of addition, and count the candies to find the final answer. 	3	+	4	=	7
3	+	4	=	7		
<p>Step 4</p>	<ul style="list-style-type: none"> Discussion: "When is addition REAL?" You can lead the learners in a discussion of real examples of addition in their lives: like when a new baby is born and adds to the family (+1), or twins (+2), or a marriage, or when a gift is given and adds to someone's possessions, or when someone buys more land, or when someone adds more food to their plate, or tea to their glass, or when someone earns money and adds it to the money they have. The 					

	<p>learners should generate a list of real addition events, and you should emphasize that this is what the + sign means in math.</p> <ul style="list-style-type: none"> • Repeats the math addition activity by giving 2 candies to one learner and 6 candies to another learner and asks them to add. As much as possible, the learners should do the work and write the number sentence on the board in the same way as before, and read it completely.
Step 5	<ul style="list-style-type: none"> • The learners then have their own sets of 9 small objects (stones, etc), number cards and symbol cards. Write problems on the board, but only problems which add up to 9 or less: $2+3=$, $4+1 =$, $7+2 =$, $4+5=$, $6+3 =$, $8+1 =$, $3+3 =$, $4+2 =$, $5+1=$, etc.

Practice:

The learners then work with their pebbles or beans, setting up each problem, combining the stones and writing the correct answer in their notebooks.

Module A:

Lesson 9: Concrete Concept of Subtraction

Lesson Learning Objectives:

- to discuss what it means to subtract, and how to represent subtraction mathematically with symbols (-,=)

Preparation and Materials:

- Small objects like pebbles or beans
- 9 larger real objects such as kola nuts or grapes, or candy
- Fake money(1's,2's,5's),
- Operation cards +, -, =,
- Small number cards 0-9

NOTE: The same process as Activity 8 will be followed, except that subtraction will be presented as meaning 'to take away', as the opposite of addition. Addition means to increase, subtraction means to decrease. And we can only take away from a larger number.

Opener:

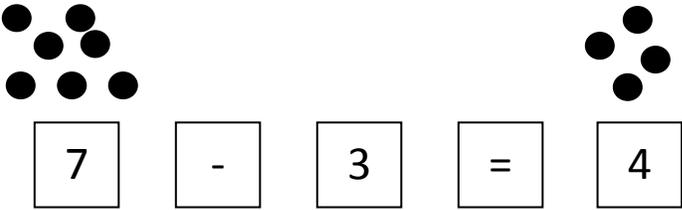
Write the following pattern on the board and ask learners to continue the pattern:



[Hint: notice the number of dots on the bottom row goes from 1 to 2 to 3...]



Activities

Step 1	<ul style="list-style-type: none">• Give one learner 7 kola nuts. Explain that you are going to take 3 kola nuts from her. Do this, and asks how many are left. There will be 4.
Step 2	<ul style="list-style-type: none">• Use number cards and also explain the idea of subtraction. Explain that taking a number away is called “Subtraction”, and the symbol is -, called a subtraction or minus sign. And when it is written it looks like this: <div style="text-align: center;"></div>
Step 3	<ul style="list-style-type: none">• Write another example such as $6-2 = ?$ on the board and asks two learners to demonstrate the subtraction with the kola nuts to find the answer.• Repeat the math subtraction activity by giving 5 kola nuts to one learner and ask another learner to subtract 3 kola nuts. As much as possible, the learners should do the work and write the number sentence on the board in the same way as before, and read it completely along with the answer.• Discussion: “What does subtraction look like?” Ask the learners to think of examples of situations in life that are examples of subtraction – such as if a girl gets married and leaves the family (-1), or a child goes away to school, or something is stolen, or someone loses weight, or food is served (subtracted from the pot), buying something at a shop (subtracting to find the change). The learners should generate a list of examples of subtraction, while you emphasize the meaning of the – symbol.
Step 4	<ul style="list-style-type: none">• The learners then use their own sets of stones and symbol cards to solve problems that you write on the board, such as $9-1=$, $9-2=$, $9-3=$, $7-3=$, $5-$

$4=$, $8-5=$, $7-7=$, $6-3=$ etc.

NOTE: The first encounter with an example like $9-9$ or $5-5$ might be confusing at first, and you will have to clarify the meaning of a result of 0.

Make these examples as real as possible – if there are 4 kola nuts and all of them are taken, how many are left? tc.

Practice: Ask learners to continue practicing, making their own subtraction examples with their stones and completing activities in the workbook.

Discussion Usually when something is subtracted, or taken away, it means there is less and less. But what is something that you can give away again and again, and yet never finish? Answers: love, a smile, caring, a kind word, etc.

Module A:

Lesson 10: The Numbers from 20 to 100, and the 10's

Lesson Learning Objectives:

- Count the numbers from 20 up to 100
- Tell the role of 10 using the names and symbols

Preparation and Materials:

- Small sticks
- Stones
- Number cards 0-20
- Small pieces of paper
- Number cards, the 10's

Opener:

Ask the learners to complete the pattern. What are the next 3 numbers in the pattern? How did they figure it out? What is the pattern? [*counting by 2's starting at 3*]

3, 5, 7, __, __, __

with the stones: 31 = 3 sticks and 1 stone.

0	10	20	30	40	50	60	70	80	90	100
1	11	21	31							
2	12	22								
3	13	23								
4	14	24								
5	15	25								
6	16	26								
7	17	27								
8	18	28								
9	19	29								

Step 3

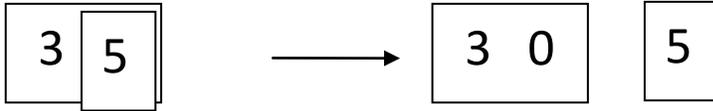
- Now the learners should copy the large chart in their notebooks and then fill in the missing blanks with the numbers. They should be encouraged to say each number as they write.
- **NOTE: Make sure you check that the numbers are being properly written from left to right and not right to left.**
- Once the chart is completed, the learners should work in groups to 'test' each other: they should take turns saying a number, writing it, and then representing it with stones and sticks. Example: "Seventy-three" – others then write 73, and gather 7 sticks and 3 stones to show 73.

Step 4

- You should also use the number cards to show the idea of the 10's and the 1's.
- For example, you can make the number 35 using the 30 card and the 5 card. Placing the 5 on the 30 so that it covers the 0, it shows that 35 is made of 3 tens (30) and 5 ones (5).

Practice:

Ask the learners make numbers out of the cards in this way, practicing find the cards, putting them together, and saying the final number: example: 40 and 9 is 4 tens and 9 ones is forty-nine. Refer the learners to exercises in the workbook.



Module A:

Lesson 11: Getting To Know How Much Is 20 to 100 – Estimation for a Prize

Lesson Learning Objectives:

- develop a sense of how much a number represents
- develop skill in recording information in an organized way (in a table format)

Preparation and Materials:

- A large number of small objects (but less than 100) – pieces of candy or boiled peanuts or rice grains, etc. Try to have 3 different types of things.
- Put different amounts of each into jars or in piles on paper. For example, 53 boiled peanuts in a jar, one handful of rice grains on paper, 28 pieces of candy in a bag.

Opener:

Give the learners the following numbers, and have them put them in order from smallest to largest:

80 30 90 10 70 50 60 40 20



Activities

<p>Step 1</p>	<ul style="list-style-type: none"> • Show the 3 amounts and objects to the learners. First the learners write down the names of the objects , Then <i>only by looking (no touching or counting!)</i>, they should try to <i>guess</i> how many of each is there. • For example, a learner might write: <i>boiled peanuts 44, rice grains 82, candy 35</i>. Each learner should do this on their own, write her own idea of the amount of each thing, although they will discuss among themselves. This is a contest, where the winner will be the person whose guess is closest to the actual amount without being greater than the actual amount.
<p>Step 2</p>	<ul style="list-style-type: none"> • Once everyone has made their estimates, a small group works together to count the actual amount of each object. They write on the board the name of the object and the number of each. Each learner then comes to the board and writes her name and the estimate she had made underneath. • The group then looks at the results and decides whose guess was closest without going over. • Then the groups can <i>divide</i> the things and share them equally.
<p>Step 3</p>	<ul style="list-style-type: none"> • In this example, Kika wins for boiled peanuts, Fanta wins for rice grains, and Saah wins for candy. • This can be repeated at other times with other amounts for more practice as well.

	<table border="1"><tr><td><u>Boiled peanuts 44</u></td><td><u>Rice grain 82</u></td><td><u>Candy 25</u></td></tr><tr><td>Fanta 35</td><td>Fanta 75</td><td>Fanta 46</td></tr><tr><td>Saah 70</td><td>Saah 90</td><td>Saah 22</td></tr><tr><td>Kika 40</td><td>Kika 95</td><td>Kika 30</td></tr></table>	<u>Boiled peanuts 44</u>	<u>Rice grain 82</u>	<u>Candy 25</u>	Fanta 35	Fanta 75	Fanta 46	Saah 70	Saah 90	Saah 22	Kika 40	Kika 95	Kika 30
<u>Boiled peanuts 44</u>	<u>Rice grain 82</u>	<u>Candy 25</u>											
Fanta 35	Fanta 75	Fanta 46											
Saah 70	Saah 90	Saah 22											
Kika 40	Kika 95	Kika 30											

Module A:

Lesson 12: Practice Sequencing the Numbers from 20-100's

Lesson Learning Objectives:

- Practice more skills at putting numbers from 20 up to 100 in order

Preparation and Materials:

- About 30 or more small cards
- Each with a different number from 20-100 written on it (NOT in order – for example: 15, 76, 94, 25, 56, 73, 38, 45, etc)

Opener:

Ask each learner to tear out a piece of paper from their notebooks. Ask the learners to guess how many times they can fold the paper in half. Have them write down this number. Have the learners fold the piece of paper in half. Have them fold it in half again. Have them keep doing this until they can't. Ask the learners how many times were they able to fold it? Was it close the number you guessed?



Activities

Step 1	Game 1 <ul style="list-style-type: none">• The cards are placed upside down on the table. Each learner takes 4 cards, and she must arrange them in order from smallest to largest. At first they practice this a couple times, and then mix up all the cards again.

Step 2	<p>Game 2</p> <ul style="list-style-type: none"> • This time, each learner takes 4 cards but does not look at them. Once everyone has 4 cards, someone says Go. Then the learners turn over their cards and try to arrange their cards in order quickly. Whoever is done first is the winner. This can be done several times, and can also be done with 5 or 6 or 7 cards.
Step 3	<p>Game 3</p> <ul style="list-style-type: none"> • Then for the next part, each learner takes one card and then the learners must get up and arrange themselves in a line in order of their numbers. If there are enough learners to make 2 groups of more than 4 learners each, then the 2 groups can compete to arrange themselves the most quickly. <p>*It is important to mix the cards up after each game so that the learners work with different numbers.</p>
Step 4	<p>Game 4</p> <ul style="list-style-type: none"> • Comparing: Put the number cards in two piles. Have the greater than, less than, and equal symbol cards out. Quickly turn over a number card from each stack and compare them. Put the correct symbol in between to identify which one is greater. Example: 65 > 33

Practice:

Do number dictation, where you read 10 numbers out loud, and the learners must write them down: 56, 71, 85, 34, 26, 55, 93, 17, 67, 49. After you have finished, write the numbers on the board so the learners can check their work. You check too!

Module A:

Lesson 13: Skip Counting By 5's and 10's

Lesson Learning Objectives:

- Be able to use the patterns of 5's and 10's to count quickly

Preparation and Materials:

- Chalkboard
- Chalk

Opener:

Review the process of skip counting by 2's. The class practices counting by 2's past 20, perhaps to 40 or 50.



Activities

Step 1	Counting by 5's				
	<ul style="list-style-type: none">• For skip counting by 5's, write the numbers 1-30 in 5 rows, with blanks underneath as shown: Make sure to underline the 5's:				
	1	2	3	4	<u>5</u>
	6	7	8	9	<u>10</u>
	11	12	13	14	<u>15</u>
	16	17	18	19	<u>20</u>
	21	22	23	24	<u>25</u>

	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; background-color: #cccccc;"></td> </tr> </table>																																								
<p>Step 2</p>	<ul style="list-style-type: none"> • Ask the learners what numbers will come in the 3 remaining spaces (shaded here). Let the learners figure out that it is 30, 35, 40, 45 and see if they can continue, naturally counting by 5's to 45. • If they can't, they can just continue to count by ones, filling in the boxes in order, until the shaded boxes are filled in and they can see what goes there. <p>Point out the pattern of counting in 5's and the repetition of 0's and 5's:</p> <p>0, 5, 10, 15, 20, 25, 30, etc.</p> <ul style="list-style-type: none"> • The learners should then continue the pattern and count to 100 by 5's. Don't count for them! Let the learners do it themselves, even if they do it slowly. When they become more confident, erase the chart on the board. • Give lots of practice, and ask they get better at it, have the learners start counting at different numbers, such as starting at 20, or starting at 45, etc and then counting by 5's 																																								
<p>Step 3</p>	<p>Counting by 10's</p> <ul style="list-style-type: none"> • Now use make a similar chart to show how to count by 10's. The learners should help you fill in the chart, let them write it! <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td><u>10</u></td> </tr> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td><u>20</u></td> </tr> <tr> <td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td><u>30</u></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td style="background-color: #cccccc;"></td> </tr> </table>	1	2	3	4	5	6	7	8	9	<u>10</u>	11	12	13	14	15	16	17	18	19	<u>20</u>	21	22	23	24	25	26	27	28	29	<u>30</u>										
1	2	3	4	5	6	7	8	9	<u>10</u>																																
11	12	13	14	15	16	17	18	19	<u>20</u>																																
21	22	23	24	25	26	27	28	29	<u>30</u>																																

Practice:

Same as with the 5's, give lots of practice counting quickly by 10's, and give them different numbers to start with, like starting at 30, or starting at 60.

For another challenge, they can try counting *backwards* by 10's.

Refer learners to their workbook for additional practice.

Module A:

Lesson 14: Counting Money by Skip Counting

Lesson Learning Objectives:

- Use the skills of adding larger numbers and counting by 2's or 5's to count money

Preparation and Materials:

- Fake money with notes up to 100 LDs

Opener:

Show the learners 8 LD notes of 5 LD. Ask the learners to count by 5's and add up how much LD this is. (The answer is 80 LD. The learners should arrive at this answer by counting 5, 10, 15, 20, 25, 30, 35, and 40)



Activities

Step 1	<ul style="list-style-type: none">• First, give the learners bundles of money made of 5's, 10's, and 20's. The bundles should NOT add up to more than 100 LDs, so for example a bundle could contain three 5's, six 10's, and one 20, all adding up to 85 LDs. Each learner's bundle of money should be different, and the money should be mixed up and out of order.
Step 2	<ul style="list-style-type: none">• The learners should first count their money on their own, in any way they like. They should write down the total.
Step 3	<ul style="list-style-type: none">• Now show them how to group the bills together, starting with the largest size bill and then counting by skip counting.• Example: one 20, six 10's, three 5's.

	<ul style="list-style-type: none"> Count starting with : 20 → 30,40,50,60,70,80 → 85,90,95 10's 5's Now show them how to group the bills together, starting with the largest size bill and then counting by skip counting. Example: one 20, six 10's, three 5's. Count starting with : 20 → 30,40,50,60,70,80 → 85,90,95 10's 5's
Step 4	<ul style="list-style-type: none"> Now show them how to group the bills together, starting with the largest size bill and then counting by skip counting. Example: one 20, six 10's, three 5's. Count starting with : 20 → 30,40,50,60,70,80 → 85,90,95 10's 5's Now the learners again count their money by first organizing it in this way and then counting by skip counting by 5's or 10's. They should exchange bundles of money with other learners and count and compare their results. They should do this several times for lots of practice!

Practice:

Add 1's and 2's to each bundle for additional practice in counting money.

Module A:

Lesson 15: Introduction To Telling Time, The Clock and Hours

Lesson Learning Objectives:

- Tell the mathematical relationship between the numbers on a clock and the time that is measured
- Explain that the numbers represent minutes counted by 5's

Preparation and Materials:

- Chalkboard and chalk

Opener:

Ask the learners “what time does class start?” Call on one volunteer to answer this question. Ask the learners how do they know to get to class on time? Do they wear a watch? Do they look at a clock? Introduce the lesson by telling the learners they will learn how to tell time on a clock.



Activities

Step 1	<ul style="list-style-type: none">• Explain how a clock works, that the numbers on the clock each represent 1 hour. How many hours are in one day? The English numbers on a clock are from 1 to 12 for the 12 hours in one day, and also 12 hours in one night. The small hand of the clock points to the hour number and moves slowly, moving to the next number each hour. The long hand of the clock points to the minutes and moves every minute.
Step 2	<ul style="list-style-type: none">• The learners should count through the numbers on the clock to

	begin to learn the English numbers.
Step 3	<ul style="list-style-type: none"> The long hand of the clock moves fast, going all the way around the numbers every hour. One hour contains 60 minutes. In between the numbers are 5 small little marks. These represent the minutes. Counting from the 12 on the clock counting by 5's, starting at 0, we can tell how many minutes are in an hour: 0, 5, 10, 15, 20, 25, 30...etc ...60. In one hour there are 60 minutes.
Step 4	<ul style="list-style-type: none"> Show the learners how to read the time on the clock accurately, and how to write it properly. Draw several pictures of clocks with different times on it.
Step 5	<ul style="list-style-type: none"> The learners should then draw clocks in their notebooks and show various times on the clocks. Start with hours such as 3:00, 9:00, 6:00, 8:00, etc. Then give practice with the half hours: 7:30, 10:30, 5:30, etc. Then give practice with the minutes: 9:10, 4:15, 8:50, etc ONLY if the learners have mastered the hour and half-hours.

Practice:

Ask the learners to look at the clock at the end of the session and ask them to write down in their notebooks what time it is. Write the time on the chalkboard so they can see if they got the right answer. Refer learners to workbooks for further practice.

Module A:

Lesson 16: Telling Time Using Skip Counting To Understand Minutes

Lesson Learning Objectives:

- To be able to tell the time using skip counting by 5's to understand minutes

Preparation and Materials:

- Chalkboard and chalk

Opener:

Have the learners stand up in one long line. Tell the learners that each person will count by 5's until they reach 60 (5,10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60). Once they reach the number 60 they will start over. If they say the wrong number they have to leave the line and sit down in their seats. Do a couple rounds of this game. Tell the learners that there are 60 minutes in one hour and they will learn how to read minutes on a clock by counting by 5's like in the game.



Activities

Step 1	<ul style="list-style-type: none">• Ask the learners, "How many minutes are in one hour?" (answer is 60 minutes)• Have the learners draw a clock in their notebooks or look at the clock they drew in the previous lesson. Ask the learners to think back to the lesson when they learned how to skip count by 5.• Explain that to count minutes the clock shows every fifth number in BOLD.
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Step 2	<ul style="list-style-type: none">• Explain that the time displayed between each bold number is 5 minutes. Have the learners write down the number 5 next to the '1' on the clock. Explain that it is 5 minutes from the 12 to the 1.
Step 3	<ul style="list-style-type: none">• Next tell the learners there are 5 more minutes from the '1' to the '2'. Have the learners write down '10' next to the two. Have the learners skip count by 5 and show the number of minutes for each bold number on the clock. 1 = 5 minutes 2=10 minutes 3 = 15 minutes 4 = 20 minutes, 5 = 25 minutes, 6 = 30 minutes, 7 = 35 minutes, 8 = 40 minutes, 9 = 45 minutes, 10 = 50 minutes, 11 = 55 minutes, 12 = 60 minutes.• Have the learners look at a clock and count by 5's in this way. Have each learner practice saying this out loud. Next have the learners write this in their notebooks.

Practice:

Draw particular times on a clock on the board, and have them read the time and then write it down.

Then if they are ready, draw a clock on the board, and ask learners to come up and draw a particular time you tell them, such as 1:35, 8:20, 6:50, etc.

Module A:

Lesson 17: Practice Telling Time, Writing Times

Lesson Learning Objectives:

- To demonstrate how to quickly and easily tell time
- To be able to write times
- To tell the meaning and use of a.m. and p.m.

Preparation and Materials:

- Chalkboard and chalk

Opener:

Draw three clocks on the chalkboard. The first clock draw the time 10:30, the next clock draw 10:35, the third clock draw 10:40. Ask the learners to look at the pattern. What time do they think should come next? (The answer is 10:45 – the pattern of time increases every 5 minutes)



Activities

Step 1	<ul style="list-style-type: none">• Ask the learners to draw 5 clocks in their notebooks but not to draw the “hands”, just the numbers.
Step 2	<ul style="list-style-type: none">• Explain to the learners that you will call out a time and the learners need to draw the correct hands on one clock. Call out 5:00, 6:30, 8:20, 9:30, and 12:10.

<p>Step 3</p>	<ul style="list-style-type: none"> • Draw these clocks on the chalkboard after the activity and show how the correct time should look for each clock. • Now show how to write the time in numbers, such as five o'clock is written 5:00. Write this underneath that clock. Explain that the hours are written to the left of the : symbol (called a colon), and the number of minutes is written to the right. • The learners should write the times underneath each clock. Review the answers with the class.
<p>Step 4</p>	<ul style="list-style-type: none"> • But now, point out that 5:00 could be early in the morning, or early in the <i>evening</i>. How can we tell the difference by writing? • Explain that writing a.m. after the time means morning, from 12 midnight until 12 noon. (it means 'before noon' in Latin). So five in the morning would be written 5:00 a.m. • Explain that writing p.m. after the time means afternoon/night, from 12 noon to 12 midnight (it means 'after noon' in Latin). So five in the evening would be written 5:00 p.m. • Ask the learners to write other times that you say to them, such as six-thirty in the morning (6:30 a.m.) , ten-fifteen at night (10:15 p.m.), etc.
<p>Step 5</p>	<ul style="list-style-type: none"> • Have the learners draw a clock of what time they get up each morning. Have them write down the time, including a.m. or p.m. • Ask them additional times to draw: what time do you leave for class? What time does class start? What time do you have dinner? What time do you go to church/mosque, etc? What time do your children go to school?

Practice

Ask the learners, “Why do you think it is important to be able to tell time? How is it useful in your life? (Possible answers to get to class on time, to get to work on time, to get to an important meeting on time, to get to a football match on time.)

Refer them to their workbooks for more practice.

Module A:

Lesson 18: Making a Personal Map of How Time is Spent

Lesson Learning Objectives:

- To be able to apply knowledge of telling time and clocks to make a personal map of time spent in a day
- To organize and represent information of how time is spent in a day

Preparation and Materials:

- Chalkboard and chalk

Opener:

Read this story problem to the learners and ask them to answer the questions. (You may need to write the times on the board for them.)

“Sonie walks to class each day. She left for class at 9:00. She arrived at 9:30. How long did she walk? Her class was supposed to start at 9:15. Was Sonie late, early, or on time?”



Activities

Step 1	<ul style="list-style-type: none">• Explain to the learners that they are going to create a personal time map of their day.• Ask the learners to think of the previous day, and to remember what they did and in what order. For example, “got up, made breakfast, did laundry, went to the market and worked, came home, practiced writing and reading, made dinner...” etc.• In their notebooks, the learners should write their activities in
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	<p>a list, in order. They can also draw pictures of the activities.</p> <ul style="list-style-type: none"> • Now ask the learners to also think about how long each activity took. Beside each activity written down, they should write the time they started the activity, and the time they end. They should draw clocks showing these times. Even if they don't know <i>exactly</i> what time these things are happening, they should estimate.
Step 2	<ul style="list-style-type: none"> • Now looking at their list, they should find the activity that took the most time and circle it. And also find which activity took the least time. And find an activity they wish they had had more time to do. • The learners can share their personal time maps and compare with each other how they spend their days.

Discussion

The group can discuss topics about time and their lives, such as, what takes up most of my time? If I had more time, what would I do instead? What do I do when I have free time?

Practice:

Homework: Draw a time map for the next day, and bring it to class. OR, draw a time map of someone else in their family.

Module A:

Lesson 19: Reading a Calendar, Reading Dates

Lesson Learning Objectives:

- To be able to use a calendar – reading dates and months

Preparation and Materials:

- The names of the months written on cards
- A calendar

Opener:

A math biography: Ask the learners to choose a person they know really well (it can be themselves) and write down all the numerical information about that person that they can think of. For example: age, weight, number of children, number of sisters and brothers, etc . etc.

You should do yourself as an example first!



Activities

Step 1	<ul style="list-style-type: none">• Mix up the cards with the names of the months written on them.
Step 2	<ul style="list-style-type: none">• Give the cards to the group of learners. They should read the cards and put them in order. If they cannot, they should use a calendar to find the names of the months and put them in the correct order.• This can be practiced by mixing up the cards again and putting them in order, trying to do it more quickly each time

<p>Step 3</p>	<ul style="list-style-type: none"> • Now get out the calendar and first make observations about how the calendar is arranged – where are the days of the week? [make sure the learners can read the names of the days] • Notice the pattern – the lines repeat in 7's, because of 7 days in a week. • Now learners should look at the calendar and starting with January, write down how many days are in each month, making a list and recording this in their notebooks. <p style="text-align: center;">Example: January = 31 days. February = 28 days</p> <ul style="list-style-type: none"> • After this is completed, make sure to tell the learners that a whole year is 365 days.
<p>Step 4</p>	<ul style="list-style-type: none"> • Next, the learners should write down the day of the week of the <u>first</u> day of each month from the calendar for this year. <p style="text-align: center;">Example: January = 31 days January 1, 2011 = Sunday.</p> <ul style="list-style-type: none"> • They should find today's date on the calendar and record this date in their notebooks. They should understand that the days change with the year, and so to write the date properly they must include the year as well: <p style="text-align: center;"><i>5 January, 2011 (For example)</i></p> <ul style="list-style-type: none"> • Give the learners some dates, and ask them to find the dates on the calendar and tell what <u>day</u> those dates are: <p style="text-align: center;">Example: Find the days: <i>25 February, 14 September, 2 December, 9 May.</i> You can also give special holiday dates, such as Christmas, or Eid,</p>
<p>Step 5</p>	<ul style="list-style-type: none"> • Ask them to find patterns in the dates and days. For example, if the 5th of _____ is a Tuesday, then the 12th will also be a Tuesday, because $5+7 = 12$ and there are 7 days in a week. • They can explore the calendar, looking for holidays such as the Liberian Independence Day, Easter, New Year's Day, etc. They may

	see symbols for the phase of the moon on the calendar. Any of these dates that they are interested in, they should record in their notebooks.
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Practice:

Tell the learners the current date out loud. Ask the learners to write down the current date. Ask them to list dates important to their family, such as birthdays, holidays, etc. and they should then find what day those events will fall on this year.

NOTE: For the next class, ask learners to bring their own calendars.

MODULE A:

Lesson 20: Using a Calendar, Writing Dates, Adding and Subtracting Days

Lesson Learning Objectives:

- Be able to use a calendar to plan and record dates

Preparation and Materials:

- A calendar. Hopefully some of the learners will have their own personal calendars as well.

Opener:

Put the learners into 12 small groups. Assign one month to each group, and ask them to make one page of a calendar for that month. Then combine all 12 groups, and you will have a calendar for the year.



Activities

Step 1	<ul style="list-style-type: none">• Discussion: There are many events that we use a calendar for. If we know the dates and then write the information on a calendar, then we can organize ourselves better.• The learners should think of events that have specific dates, and list them. Some examples:<ul style="list-style-type: none">○ Class dates○ Scheduled meetings○ Important days at work○ Liberian holidays
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	<ul style="list-style-type: none"> ○ Weddings ○ Medical things such as operations, or taking medicine, etc.
Step 2	<ul style="list-style-type: none"> ● The learners should be shown how to make notes on a calendar such as ● “2nd vaccine for Sonie” or “Fanta’s wedding”, etc. finding the specific dates. They should practice with some sample dates, writing these notes on the correct places on a calendar: <ul style="list-style-type: none"> ○ <i>Fanta’s Wedding: 12 May</i> ○ <i>2nd vaccine for Sonie: 3 August</i> ○ <i>Moses born: 22 January</i> ○ <i>School holiday begins: 1 March</i>
Step 3	<ul style="list-style-type: none"> ● Ask the learners, as a group, to think of dates that are important to the community or the country – holidays, celebrations, events, class dates, etc. ● Have them label these community dates on the calendar they made as a group during the opener. ● They can then hang the pages of the calendar in the classroom and can add to it, refer to it, etc over the next weeks and months. ● Ask the learners, “How is a calendar helpful to you the next month?” “The next year?” Call on the learners to answer this question.

Practice:

- Give the learners a sheet of paper and ask them to write their names at the top. (They will turn in the evaluation at the end of the lesson) This will be a short evaluation involving time, and dates on a calendar.

- Ask the learners to draw a clock with the time 12:45, 1:30, and 4:00.
- Ask the learners to find the date January 25 on the calendar, and see what day of the week it is.
- Ask them to properly write “April 26, 2011”
- The learners should turn in their papers so you can check the answers to make sure they are correct.

Module A:

Lesson 21: Experience with Addition Tables and Solving Problems

Lesson Learning Objectives:

- To tell some of the properties of addition (different combinations that add to the same number, reversing numbers ($4+3=3+4$), adding 0, etc)
- To be able to use a 10 + 10 addition chart to learn addition facts and solve problems

Preparation and Materials:

- Sets of 20 pebbles/beans for the learners, either one set per learner, or pairs of learners can share one set of 20 pebbles/beans.
- Symbol cards + and =
- Number cards 0-20
- Addition chart poster

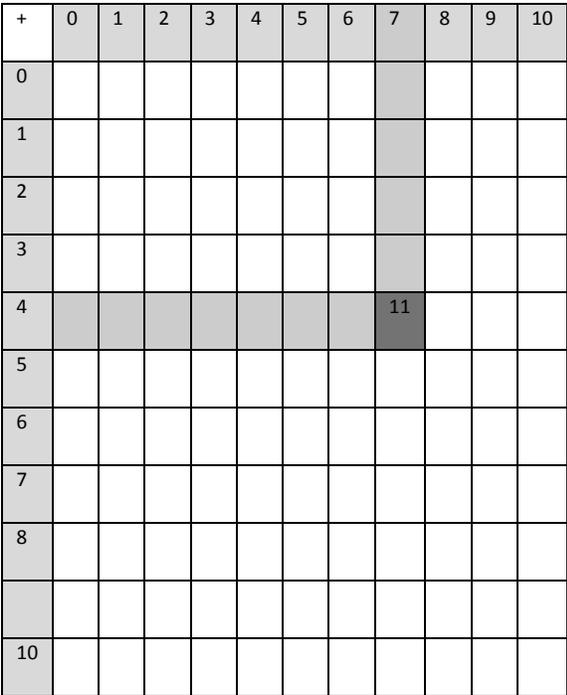
Opener:

- To review addition, remind the learners of the earlier lesson on addition, and write an example problem on the board, $5 + 3 = ?$

NOTE: First, make the problem real by relating it to a life experience, such as, if you have 5 people in your family and 3 guests arrive to stay the night, how many people will you have to make dinner for? Ask the learners to use the pebbles to solve the problem $5 + 3 = 8$ and write it down.



Activities

Step 1	<ul style="list-style-type: none">Ask a learner to show how to solve the problem using pebbles and symbol cards and combining to find the final answer and write it properly: $7 + 4 = 11$
Step 2	<ul style="list-style-type: none">Then show the Addition Table to the learner. Point out the numbers 0 through 10 on the top and the side. These are called the <i>addends</i>. (The numbers that are added together.)Show how to find $7+4$ on the chart (7 on the top and 4 on the side, meeting in the middle) and write 11 in the correct space.Go through other examples using the chart, doing small numbers that the learner s have already solved such as $5+3$, $2+2$ and $4+3$, etc.Do one more example with higher numbers such as $7+9$.Now the learners will make their own chart, and do the work to fill in the chart. They need to copy an empty chart in their notebooks so they can fill it in.Make sure the learners understand that they will be using this chart a LOT in the future, because it will give them the answers to addition problems WITHOUT using the beans, etc, after they

	have filled it in.																																																																																																																																																
Step 3	<p>Filling in the chart</p> <ul style="list-style-type: none"> • Make sure than the learners have 2 sets of 10 stones each (or the learners can work in pairs and share stones). The learners should then begin adding stones in order to fill in the chart on their own. • Each learner should complete a chart, even if they are working in pairs. But they can share their findings, and work together on it. • The learners should then compare their charts with others in order to double-check their work, and then should save the chart to use later, such as in the next activity. 																																																																																																																																																
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Practice: If learners didn't finish the chart, they need to finish it at home for homework and bring next time, completed.

If they finish the chart, you can look at the chart and find patterns, such as the same numbers going along diagonal lines. Ask them to look carefully for any repeated numbers they can find. Refer learners to the workbook for more practice.

Module A:

Lesson 22: Addition, Using Money

Lesson Learning Objectives:

- To be able to apply addition skills to practical situations using money

Preparation and Materials:

- Fake US Dollar money of 1's, 2's, 5's, 10's.
- Small items with prices less than 10 dollars each

Opener:

Review from the Addition chart: Ask learners, if you have 6 dollars, and your friend has 8 dollars, how much do you have altogether? Use the addition chart to find the answer to $6 + 8$.



Activities

Step 1	Counting Money Using Addition <ul style="list-style-type: none">• Each learner is then given a set of bills adding up to 20 dollars or less. They must write down the bills they were given, such as 1 1 1 2 5 5
Step 2	<ul style="list-style-type: none">• They must then count their money, adding bills one at a time. You will probably have to demonstrate this process with the money. Show them to start adding with the <i>largest</i> bill.• For example: If someone has 10, 2, 2, and 5, then first $10+5 = 15$, then $15+2 = 17$, then $17+2 = 19$.• You may also have to point out that even though something like $15+2$ is not on the chart, it can be calculated by counting 2 more past 15:

	15, 16, 17.
Step 3	<ul style="list-style-type: none"> • Now set up a series of small items in front of the group with prices assigned to each, such as 1 pencil = \$3, 1 apple = \$5, 1 book = \$12, etc. • The learners make a list in their notebook of what they can buy with the money they have been given – what item, and how many – and then the learners or groups share with each other, to both double-check the work as well as see the variety of combinations that can be made.

Practice: Ask the learners to write down what they would do if they were given \$100. Refer learners to the workbook for further practice.

Module A:

Lesson 23: Experience with Subtraction

Lesson Learning Objectives:

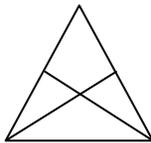
- Tell the relationship between subtraction and addition,
- To use addition facts to solve subtraction problems.

Preparation and Materials:

- Learners' addition charts
- Fake money
- Small items with prices less than 10 dollars each

Opener: (Note: This geometry activity is different from other Openers! Make sure you explain it carefully and give the learners time to work on it.)

- First make sure the learners know what a triangle is.
- If they do, then draw the following diagram on the board:



- Ask the learners *how many triangles are in the diagram?*
- [The answer is at least 6. Can you find them??]



Activities

Step 1	Review the concept of subtraction <ul style="list-style-type: none">• Remind the learners that subtraction is the opposite of addition, taking away from a larger number and resulting in a smaller number. A sample problem is shown with a real example, again, such as if a family has 7 children and 4 of them are old enough to go to school, how many children stay at home? $7 - 4 = 3$ children stay home. This can be shown using stones if necessary.• Point out that since $4+3 = 7$, then $7-4 = 3$. This information is on the Addition Chart.
Step 2	<ul style="list-style-type: none">• Remind how to use the Addition Chart to solve subtraction by working backwards: Start at 4 on the side, move across to 7, then move up to the answer: 3.
Step 3	<ul style="list-style-type: none">• You can do some practice oral problems with the learners subtracting small numbers, asking questions such as What is $12-2$? $15-1$? $17-2$, $8-1$, etc. showing that for small numbers, it just means counting backwards 1 or 2 or 3, whatever is being taken away.
Step 4	<ul style="list-style-type: none">• Write a series of about 10 subtraction problems on the board for the learners to solve either mentally or using stones or using the Chart. I.e, $10-3=?$, $15-7=?$, $12-8=?$, $11-7=?$
Step 5	<ul style="list-style-type: none">• Point out to the learners that if they remember the Addition facts, then they can/should use them to calculate subtraction as well, as shown just above.

Practice:

Give the following problems to the learners to solve.

$$5-1 = \underline{\quad} \quad 10-2 = \underline{\quad} \quad 15-5 = \underline{\quad}$$

And ask them to solve the following challenging story problem: (it will help a lot to draw pictures of the chickens!)

Mina has 12 chickens. She sold 8 of them. Then one more died. Then someone gave her 2 more chickens. How many chickens does she have now?

MODULE A:

Lesson 24: Subtraction with Money

Lesson Learning Objectives:

- Practice applied subtraction, using subtraction skills to calculate expenses and change with money

Preparation and Materials:

- learners' Addition Charts
- Fake money LD 5's, 10's, 20's
- Small items with prices less than 10 LDs each

Opener:

Hold up one 20 LD bills. Tell the learners that if you bought a bag of boiled peanuts for 15 LD with this money how much would be left? (The answer is 5 LD)



Activities

Step 1	<ul style="list-style-type: none">• As in the last class, the learners are given money up to 20 dollars with a variety of bills, and you set up small items with prices like last time.
Step 2	<ul style="list-style-type: none">• The learners must count how much money they have, and then determine how much or how many things they can buy with their money.
Step 3	<ul style="list-style-type: none">• This time, however, they must also determine then how much money they will have left after they buy the items, and/or how much change

	they should receive from their purchase.
Step 4	<ul style="list-style-type: none"> • This is best done by actually carrying out the transaction: one learner in the group acts as the shopkeeper and others come forward and 'buy' whatever they would like, and the 'shopkeeper' will then give change. The learners must be careful to count their change!
Step 5	<ul style="list-style-type: none"> • This kind of practice should be repeated with different items, different prices, and different amounts of money. • If the learners are ready to do it with larger amounts, then let them take on that challenge! But make sure that they are always writing down what they do, since that is what they need to practice.

Practice:

Give each learner 4 fake 5LD bills. Ask the learners to subtract 10 LD from this. Ask how much is left? (The answer should be 10LD) Go around the classroom to make sure that everyone gets this right.

Module A:

Lesson 25: Practice with Addition and Subtraction

Lesson Learning Objectives:

- To be able to solve story problems using addition and subtraction
- To develop problem-solving skills associated with reading, comprehension and organization of information

Preparation and Materials:

- Chalkboard and chalk
- Prepared story problems on pieces of paper
- Beans/pebbles
- Addition Charts

Opener:

Write on the board $10+10= \underline{\quad\quad}$ - 5 = $\underline{\quad\quad}$

Ask the learners to copy this problem in their notebook and try and solve it.

(The answer is $10+10=20$, then $20 - 5= 15$)



Activities

Step 1	<ul style="list-style-type: none">• You are going to give a series of realistic word problems for the learners to solve. However, first you must show the steps in how to solve the problems, how to set up the problems on paper to calculate the answer. Learners can use their Addition Chart if they need to when they are ready to solve the answers. <p>NOTE: At first, they might want or need to use stones or beans, etc. This is ok at first. But then try to help them make the switch to solving the problems by writing numbers on paper.</p>
Step 2	<ul style="list-style-type: none">• Show the learners these steps. Steps in solving a story problem:<ul style="list-style-type: none">○ READ the problem twice, and make sure you understand the story! Retell the story.○ Decide what math is involved – is it addition or subtraction that is happening?○ What numbers needed to be added or subtracted?○ Write them down in proper form.○ Solve the math to get the answers.
Step 3	<ul style="list-style-type: none">• Solve one problem WITH the learners together, to show them the steps:• If you make 5 brooms to sell, and your daughter makes 4 brooms, how many brooms will you have to sell? Answer: $5 + 4 = 9$ brooms
Step 4	<p>Sample problems:</p> <ul style="list-style-type: none">• If your family has 10 members, and you all visit your sister’s family, which has 7 people, how many people will be at your sister’s house all

together?

- If you have 15 goats and you sell 9 of them, how many will you have left?
- If you make 8 carpets to sell and your sister-in-law makes 6 carpets to sell, how many carpets will you sell all together?
- If you have 6 chickens and then 4 chicks grow into chickens, how many chickens will your family have?
- If you have 18 dollars and you need to buy 12 dollars worth of sugar, how much money will you have left?
- If your daughter has 7 dollars and you give her another 5 dollars, how much money will she have?

Practice: If learners are still having difficulty solving the problems, more practice problems should be given.

Module A:

Lesson 26: What the Place of the Numbers Tell Us: Place Value of Ones and Tens and Hundreds

Lesson Learning Objectives:

- To demonstrate the meaning of the placement of digits in a number,
- To be able to read numbers up to 999

Preparation and Materials:

- Chalkboard and chalk
- sticks
- Stones
- Number cards 0-9
- The 10's cards

Opener:

Write the number 75 on the board and asks the learners: if they were to make this number out of sticks and stones, with each stick representing 10, and each stone representing 1, what would the number be? They should answer 7 sticks and 5 stones.



Activities

Step 1	<ul style="list-style-type: none">• Remind the learners that each stick represents a 10, and the stones each represent a 1. So 75 means 7 tens and 5 ones. It is important to say it in this order (7 tens and 5 ones) so that the learners learn to write numbers in the correct place value from left to right.
---------------	---

Step 2	<ul style="list-style-type: none"> 75 is 7 tens and 5 ones. 7 tens is 70, and 5 ones is 5. So $75 = 70 + 5$. This can also be shown again with the number cards as in the earlier activity. Show how to represent this number in a place value table: <table border="1" data-bbox="539 472 995 745"> <thead> <tr> <th></th> <th>Tens</th> <th>Ones</th> <th></th> </tr> </thead> <tbody> <tr> <td>75 =</td> <td>7</td> <td>5</td> <td>$70 + 5$</td> </tr> <tr> <td>52 =</td> <td>5</td> <td>2</td> <td>$50 + 2$</td> </tr> <tr> <td>30 =</td> <td>3</td> <td>0</td> <td>$30 + 0$</td> </tr> </tbody> </table> 		Tens	Ones		75 =	7	5	$70 + 5$	52 =	5	2	$50 + 2$	30 =	3	0	$30 + 0$
	Tens	Ones															
75 =	7	5	$70 + 5$														
52 =	5	2	$50 + 2$														
30 =	3	0	$30 + 0$														
Step 3	<ul style="list-style-type: none"> Now other examples, writing numbers on the board or giving prepared cards with different numbers on them: 45, 27, 18, 35, 77, 8, 60, 40, 9, 10 etc. The learners should make the chart in their notebooks and write the numbers in the proper columns. If there is any problem, they can always build the number with sticks and stones. After they are finished they should check their work (especially check the numbers with 0 such as 60, or just 8, that 60 is 6 tens but 0 ones, and 8 is 0 tens but 8 ones.) 																
Step 4	<ul style="list-style-type: none"> Now ask about the number 99. It is 9 tens and 9 ones. Now if we add one more, that will be 10 tens, and it will be 100. So 10 tens is 100. Now ask about the number 100. Ten tens is one hundred. But we can't write the number '10' in the tens column, so we need a new <i>place</i> – for the hundreds. This is the third column. 																
Step 5	<ul style="list-style-type: none"> Now draw a new chart with hundreds: <table border="1" data-bbox="441 1522 1286 1732"> <thead> <tr> <th></th> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> <th></th> </tr> </thead> <tbody> <tr> <td>100 =</td> <td>1</td> <td>0</td> <td>0</td> <td>$100 + 0 + 0$</td> </tr> <tr> <td>136 =</td> <td>1</td> <td>3</td> <td>6</td> <td>$100 + 30 + 6$</td> </tr> </tbody> </table> 		Hundreds	Tens	Ones		100 =	1	0	0	$100 + 0 + 0$	136 =	1	3	6	$100 + 30 + 6$	
	Hundreds	Tens	Ones														
100 =	1	0	0	$100 + 0 + 0$													
136 =	1	3	6	$100 + 30 + 6$													

- Another example is 136 . The number 136 means :
1 hundred
3 tens
6 ones $100 + 30 + 6 = 136$.
- Give several examples of numbers between 100 and 200

Step 6

- Now move into the 200's: $200 = 2$ hundreds.
 $246 = 2$ hundreds + 4 tens + 6 ones

	Hundreds	Tens	Ones	
$200 =$	2	0	0	$200+0+0$
$236 =$	2	3	6	$200+30+6$

- Do many examples in the chart, showing how the hundreds work up to 999.

$$300 = 3 \text{ hundreds}$$

$$400 = 4 \text{ hundreds, etc.}$$

- Make sure the learners have this chart in their notebooks and they are copying down examples.

Other examples:

$$563$$

$$479$$

	842 307 Etc.
Step 7	Practice <ul style="list-style-type: none">• Ask lots of examples, for example: In the number 463, how many tens are there? (6) how many hundreds are there? (4)• Write the number 463 in long form: $463 = 400 + 60 + 3$• The ability to do this is very important!!

Practice:

Ask the learners to put the numbers in order from smallest to largest:

539, 427, 872, 136, 721

Refer learners to the workbook for further practice.

Module A:

Lesson 27: Evaluation

During this review session you will evaluate the learners' understanding of the major topics of this module:

Opener: No opener activity. Explain the evaluation process of answering the questions and then discussing the answers:

Activity: In order to evaluate their skills and learning, write the following questions on the board. Give the learners a sheet of paper and have them write down the answers to the following math problems. Ask the learners to work alone, and encourage them to just do their best:

1. Put the following numbers in order: 34, 23, 56, 78

2. Put the correct symbol < or > or = between the numbers below:

$$\underline{75} \quad \underline{80}$$

$$\underline{549} \quad \underline{249}$$

$$\underline{37} \quad \underline{68}$$

$$\underline{467} \quad \underline{46}$$

3. Solve the following problems:

$$5 + 8 = \underline{\quad}$$

$$7 + 3 = \underline{\quad}$$

$$6 + 6 = \underline{\quad}$$

$$8 - 2 = \underline{\quad}$$

$$18 - 7 = \underline{\quad}$$

$$20 - 10 = \underline{\quad}$$

4. Draw a clock that shows 3:15.

5. Write the time shown on this clock



6. Solve this problem:

You have 17 dollars in your pocket. You buy a pencil for 5 dollars. How much change should you get back?

7. Solve this problem:

Fanta's class starts at 8:00 am. It ends at 11:00 am. How long is her class?

8. Complete the patterns:

2, 4, 6, __, __, __

5, 10, 15, __, __, __

10, 20, 30, __, __, __

Collect the learners' papers when they're done.

Afterwards, talk to the learners and have a discussion about how they are feeling about their math skills and what they have learned. Ask them to write a few words about how

they are feeling about math right now.

Then check their papers and mark it on the Evaluation Sheet.

If there is time, it is an excellent idea to go over the questions with the learners, discussing the correct answer.

Make sure you give the learners their papers back after you check them, so they can learn from any mistakes they might have made in their answers.

MODULE B

After these lessons, learners will be prepared to:

- Add and subtract 2-digit numbers, carrying and borrowing as needed
- Multiply and divide numbers up to 10x10 in the multiplication table
- Solve story problems involving addition, subtraction, multiplication and division
- Relate the concepts of the four mathematical operations to real life
- Read and write fractional quantities
- Interpret a circle graph (pie chart)

Overview

Learning Objectives: The learner who successfully completes this 9 week module should be able to:

- Add and subtract 2-digit numbers, carrying and borrowing as needed
- Multiply and divide numbers up to 10x10 in the multiplication table
- Solve story problems involving addition, subtraction, multiplication and division
- Relate the concepts of the four mathematical operations to real life
- Read and write fractional quantities
- Interpret a circle graph (pie chart)

Links with other modules: This module immediately follows Module A: Knowing Numbers, and is cumulative. This module will then be followed by Module C: The World and Numbers, then Module D: News and Numbers. While not directly cumulative, the basic skills learned in Module B will be drawn up on and developed further through the topics covered in Modules C and D.

Estimated length of module: This numeracy module containing 27 lessons will be covered in 9 weeks, with the assumption that learners will put in 3 instructional days per week, with a 45 minute class period. Some lessons will also require short homework assignments.

Evaluation:

Students will be evaluated through opening activities that will review previous material, from topical practice at the end of each lesson, and occasional homework assignments to check for mastery. At the end of each module an evaluation will be conducted to assess the mastery level of the learners.

List of numbered lesson titles:

LESSON	MODULE C LESSON TITLES
28	2-Digit Static Addition, Part 1: Place Value Review.
29	2-Digit Static Addition, Part 2: Addition <i>without Carryover</i>
30	Practice with More Vertical Addition (without carryover) - story problems
31	2-digit Subtraction Without Borrowing
32	Subtraction Practice, Without Borrowing
33	Addition with Carryover, Introduction
34	Practicing Addition with Carryover
35	Subtraction with Borrowing
36	Subtraction with Borrowing Practice
37	Addition and subtraction practice - use money (buying and selling)
38	Introduction to the Concept of Multiplication
39	What Multiplication Means, and Building the Multiplication Chart
40	Multiplication Practice Game - Using the Chart
41	More About the Chart, and Patterns
42	Multiplication Story Problems
43	Introduction to the Concept of Division (Without a Remainder)
44	Division Without Remainder, Part 2 - Using the Multiplication Chart To Solve
45	Division Comes to Life
46	Practice with Multiplication and Division
47	Simple Division with Remainder

48	Quantities of Time
49	Dividing One's Life
50	An Introduction to the Concept of Fractions
51	Fraction Concepts, Continued
52	Fractions with Different Shapes (Circles)
53	Using Fractions and Circle Graphs to Show Information
54	EVALUATION

Materials Required for the Lessons in this Module

- Number cards 0-9
- Operation cards (+, -, X, ÷, =)
- Index-card size pieces of blank paper
- Addition charts (learners have their own from Module A)
- Prepared questions on separate paper (given in the lesson instructions)
- Small objects such as pebbles, beans, or pieces of candy, etc.
- Sets of \$100 in fake money of all denominations
- Small items frequently purchased in a shop, such as soap, comb, pencil, etc.
- Large pieces of blank paper
- Large version of multiplication chart (10x10)
- Scissors
- Round pieces of paper, about 6 inches in diameter

- A large round object, preferably food like round bread, or pizza, or cake

Module B

Lesson 28: 2-Digit Static Addition, Part 1: Place Value Review

Lesson Learning Objectives:

- To practice the proper place value method for adding 2-digit numbers

Preparation and Materials:

- Chalkboard and chalk
- several sets of number cards 0-9

Opener: *Review of Addition Facts Game*

- First, the learners should review addition facts of single digits by playing a game. Each person has a number card from 0 to 9. The learners should be standing or walking around, holding their cards up.
- When you, the facilitator, say a number less than 20, the learners must group themselves by finding those whose numbers add up to that number and standing together. For example, if you say, "Make 9!" then the 6 and 3 will stand together, the 5 and 4 will stand together, the 7 and 2 will stand together, the 9 and 0 will stand together, etc.
- Each group should read their number as a number sentence, such as "Five plus four equals nine." Any learners left over have to tell what their group adds up to. And the person with the 0 card can stand with any group.
- This should be done for several minutes as you say numbers such as 9, 10, 12, 8, 14, etc. There can be groups of 3 or more also. (For example, to make 14, the people with the number 2 and 4 and 8 can stand together).
- This is to remind the learners of their addition facts. If they have trouble remembering them, they should get out their addition charts that they made earlier and use them



Activities

Step 1	Review of Place Value <ul style="list-style-type: none">• Write some 2-digit numbers on the board such as 75, 24, etc, and ask the learners to write them in a place value chart as in the earlier Module A. Refer to lesson #26 in Module A This is to help the learners remember what the digits' place means, and remind of the importance of keeping the numbers in line.
Step 2	<ul style="list-style-type: none">• Ask them to tell what the numbers and columns mean, such as '75 means 7 tens and 5 ones', which is the same as 70 and 5.• Give many example numbers, asking learners to either write the number that is said (such as '75') or writing a number and asking a learner to break it down into tens and ones. Make a game of it, going fast.• Some sample numbers to ask: 64, 38, 99, 14, 80, etc.

Practice:

If the learners are ready, you can also include numbers in the hundreds. (246, 379, etc)
Remember that 246 means 2 hundreds, 4 tens and 6 ones: 200 and 40 and 6.

Module B:

Lesson 29: 2-Digit Static Addition, Part 2: Addition without Carryover

Lesson Learning Objectives:

- To explain the steps in double-digit addition, without carrying-over

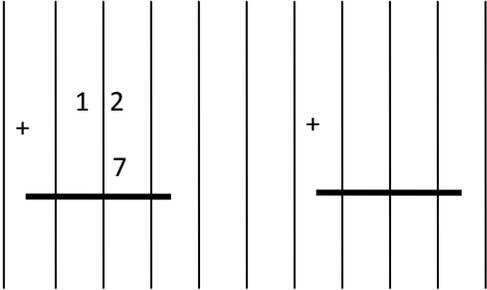
Preparation and Materials:

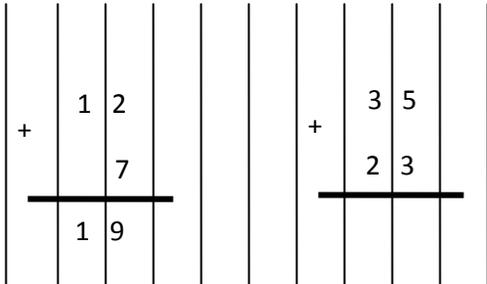
- Chalkboard and chalk
- Addition chart (learners should have their own from Module A)

Opener: Write the following numbers on the board and ask what the missing numbers in the pattern are: 22, 24, 26, __, __, 32, __, 36, _8, __, 4_



Activities

Step 1	<p>Introduction to the lesson</p> <ul style="list-style-type: none">Write this problem on the board: $\begin{array}{r} 12 \\ + \quad 7 \\ \hline \end{array}$ <p><i>Watch the alignment of the numbers!!!</i></p> <p>Note: To help the learners keep the tens and ones in lined up, have them turn their notebooks sideways so they write vertically in the lines. They should copy the sample problems this way.</p> <div style="text-align: center;"></div> <ul style="list-style-type: none">Ask a learner to read the problem out loud, and then point out the place value: the 2 and 7 are lined up in the one's place, and the 1 is in the ten's place. The + means we need to ADD the numbers that are lined up. The line underneath means EQUALS.
Step 2	<ul style="list-style-type: none">Explain the steps followed in adding these two numbers:Make sure the numbers are lined up with each other from the <i>right side</i>. (from the ones)We add straight down, so we add the ones together first ($2+7 = 9$) and write that in the one's column below. And then we add the tens ($1+0 = 1$) and write that answer in the tens column below. We ALWAYS add the ones first! <i>Never</i> start with the tens!

	
<p>Step 3</p>	<ul style="list-style-type: none"> You should do 2-3 more examples with the learners, showing them clearly and repeating the steps orally. <p>Note: It is VERY important that the problems given to the learners do NOT involve carryover at this point!! Example problems should be such as 25+32, or 53 + 4, or 61+24, or 18 + 71, etc.</p> <ul style="list-style-type: none"> Make sure that the learners follow the steps of adding the ones first, and then the tens. Give the learners a problem to do, such as 23 + 41, and ask them to do it themselves in their notebooks, then afterwards do it on the board.

Practice: The learners should be given about 10 problems to copy from the board and solve on their own in their notebooks.

EXAMPLE PROBLEMS: 64+22, 72+11, 42+7, 80+15, 5+34, 60+7, 54+35, 45+54, 30+50, 75+23, 65+31, 40+31, 55+40, 73+3

After they have solved them, they should work with a partner or group to compare their answers and resolve any differences. They must communicate and work together to determine the correct answers – you should NOT give them the answers!!!! After all answers have been discussed and agreed upon, you should check each group’s work and tell them if any of the answers are incorrect. The learners should try to find their mistake themselves and correct the answer.

Make sure you are checking the learners' work, that they are lining up the numbers properly.

Refer learners to the workbook for further practice.

Module B:

Lesson 30: Practicing Vertical Addition - Story Problems (without carryover)

Lesson Learning Objectives:

- To solve 2-digit addition problems while also practicing reading and solving word problems

Preparation and Materials:

- Chalkboard and chalk
- story problems written on pieces of paper (problems are given below)

Opener: Write the following numbers on the board, and ask the learners to put them in order from smallest to largest: 15, 23, 8, 53, 36



Activities

<p>Step 1</p>	<p>Introduction to the activity:</p> <ul style="list-style-type: none"> • “You are going to read a story, and then use math to figure out the answer to the question. So read the story, and then write in your notebook to find the answer. You can work by yourself or with others.” • Give the learners the paper with the story problems. The learners must read the problems and solve them in their notebook. They can work individually or in groups.
	<p>Problems to be solved:</p> <ul style="list-style-type: none"> • The Binda family has 45 chickens. When their neighbors, the Kollehs, left to go to Bassa, they asked their neighbors the Bindas to take care of their chickens too. The Kollehs had 23 chickens. How many chickens must the Bindas take care of all together? • Fatu and Mamie wanted to buy a box of candles. The box cost \$65. Fatu had \$35, and Mamie had \$32. Together, did they have enough money to buy the box of candles? • Korlu went to the medicine store. She had to buy two kinds of medicine. One kind cost \$60, and the other cost \$30. How much money would she need to buy both medicines? • Zena wanted to visit her relatives near Banjor. She knew that it was 25 kilometers from her village to Banjor, and then their house was 13 kilometers farther past Banjor . How many kilometers will her whole journey be to the relatives’ house?
<p>Step 2</p>	<ul style="list-style-type: none"> • Give plenty of time for the learners to read and solve the

	problems.
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Practice: They should present their work to the group, and discuss how they solved the problems.

Refer learners to the workbook for further practice.

Module B:

Lesson 31: Subtraction Without Carry-Over (No Borrowing)

Lesson Learning Objectives:

- To use the proper method for writing and subtracting 2-digit numbers, and how to check for correctness through addition

Preparation and Materials:

- Chalkboard and chalk

Background Information: *If the learners have learned vertical addition well, then subtraction will not be difficult for them. If they struggle, they will need more review of addition and subtraction.*

Opener: Review subtraction by writing problems on the board such as 10-4 and 9-5 and 8-2. Discuss the answers and what subtraction means. Make it real, such as “spending 4 dollars from 10 dollars, you will have 6 dollars left.” If the learners cannot answer these from memory, then they should look at their addition chart to answer.



Activities

Step 1	Introduction <ul style="list-style-type: none">• “Today we will use the similar method of addition as we’ve been using in the last few lessons, but subtraction instead of addition.”
Step 2	<ul style="list-style-type: none">• First, write one of the sample review problems vertically, such as 8-2. Discuss how important it is to write the larger number on top, since it means taking 2 away from 8. We can’t take 8 away from 2.
Step 3	<ul style="list-style-type: none">• Now write 15 – 3 vertically. Solve this problem starting with the ones place, reminding how the lining up of the numbers is just like adding. So 5 minus 3 is 2. And 1 minus 0 is 1. Write the answer underneath.

<p>Step 4</p>	<ul style="list-style-type: none"> Now write a 2-digit subtraction problem on the board such as $56 - 32 =$. Show again how to write the problem neatly and with the numbers lined up. <div style="text-align: center;"> <table style="display: inline-table; margin-right: 20px;"> <tr><td style="border-right: 1px solid black; height: 40px;"></td><td style="border-right: 1px solid black; text-align: center;">5</td><td style="text-align: center;">6</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">-</td><td style="border-right: 1px solid black; text-align: center;">3</td><td style="text-align: center;">2</td></tr> <tr><td colspan="3" style="border-top: 2px solid black;"></td></tr> <tr><td style="border-right: 1px solid black; text-align: center;"></td><td style="border-right: 1px solid black; text-align: center;">2</td><td style="text-align: center;">4</td></tr> </table> <table style="display: inline-table;"> <tr><td style="border-right: 1px solid black; height: 40px;"></td><td style="border-right: 1px solid black; text-align: center;">6</td><td style="text-align: center;">7</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">-</td><td style="border-right: 1px solid black; text-align: center;">4</td><td style="text-align: center;">2</td></tr> <tr><td colspan="3" style="border-top: 2px solid black;"></td></tr> <tr><td style="border-right: 1px solid black; text-align: center;"></td><td style="border-right: 1px solid black; text-align: center;"></td><td style="text-align: center;"></td></tr> </table> </div> <p>Note: It is again very important to again show that the largest number must be on top. $56-32$, not $32-56$.</p> <ul style="list-style-type: none"> Show how the problem is solved following the same steps as in addition: starting from the one's first, subtracting, and writing the answer below, and then subtracting the 10's column and writing below. 		5	6	-	3	2					2	4		6	7	-	4	2						
	5	6																							
-	3	2																							
	2	4																							
	6	7																							
-	4	2																							
<p>Step 5</p>	<ul style="list-style-type: none"> Write a new problem: $67-42$ on the board. The learners should turn their notebooks sideways again and copy and solve the problems, as you solve it on the board. The learners should share their solutions. You can also then show how that the answer can be checked by adding: $56-32 = 24$. To check, $24+32 = 56$, so the answer of 24 was correct. 																								

Practice: Write the following word-math game on the board:

NOTE: The answer here is "honey". The word is made up of the answers to the problems. By writing the letter for each number, a surprise word will appear. The learners must correctly solve the problems to discover the word. You can make more games like this with other words. And learners also can make up puzzles like this. This can also be done using addition problems.

OR

Give the learners the same problems to practice, but without the game if the game is not appealing.

1. Solve the problems below.

$$87-52= \underline{\quad} = O$$

$$55-21= \underline{\quad} = E$$

$$79-52= \underline{\quad} = H$$

$$68-24= \underline{\quad} = N$$

$$93-21= \underline{\quad} = Y$$

2. Match the numbers with the letters, and read the word to get the final answer.

27 35 44 34 72

? **DISCUSSION:**

- *Addition and subtraction are opposites, like day and night.*
- *Is one bad and one good, or are they equal?*
- *What are some other opposites in life? Make a list or draw pictures of opposites in life, and in the world.*
- *What are some things in the community that you think should be added to?*
- *What are some things in your community that should be subtracted, or reduced?*

Module B:

Lesson 32: Subtraction Practice with no Borrowing (story problems)

Lesson Learning Objectives:

- To practice setting up and solving subtraction problems that do NOT require carry over (borrowing)

Preparation and Materials:

- Chalkboard and chalk
- Prepared story problems, as below (problems must NOT require borrowing!)

Opener: Ask the learners to skip count by different numbers: skip count by 2's, by 5's, by 10's.



Activities

Step 1	<ul style="list-style-type: none">• Introduction: Today you will practice more subtraction in story problems. Work in small groups to read the stories and solve the questions. Do your work in your notebooks and write out each problem.• First, read the following problem out loud to the class (or have a learner read it) and solve the question with them together, as an example.• Then they will split into small groups and you can give them the prepared papers with the story problems. Give each group one problem to read and solve. After they have solved it, they should
---------------	---

$$\begin{array}{r} 75 \\ - 52 \\ \hline 23 \end{array}$$

	<p>exchange stories with another group until everyone has done all the problems.</p> <ul style="list-style-type: none"> • Example problem to do together with the class: <p>Read out loud. Work out the answer with the learners -[?] </p>
	<p>Other story problems:</p> <ol style="list-style-type: none"> 1. Menkor saved \$88, but his brother needed some money so he gave him \$66. How much money did Menkor have left? 2. In her shop inventory, Famatta counted 70 kg of rice. That day she sold 60 kg. How many kg are left in her shop? 3. Fiah wanted to buy some new books. They would cost \$87. But he only had \$26. How much more money does he need to save in order to buy the books? <p>Vicki 's family had 65 sheep. They sold 42 sheep. How many sheep do they have left?</p>

Practice: Ask the learners to come up with some of their own story problems that need subtraction to answer. Refer learners to the workbook for further practice.

Module B:

Lesson 33: Addition with Carryover

Lesson Learning Objectives:

- To do 2-digit addition with carryover

Preparation and Materials:

- Chalkboard and chalk
- addition charts
- two sets of number cards 0-9

Opener: Check how well the learners know their addition facts with a quick game using the number cards. Quickly take one card from each stack, hold them up, and ask the learners to add to find the answer. Example: $7+5 = ?$ $8+2=?$ $3+4=?$ Do at least 5 problems to warm up in preparation for the lesson.



Activities

Step 1	<ul style="list-style-type: none">• Write the following problems vertically, as shown: $16+1$, $16+2$, $16+3$, $16+4$, $16+5$ <div style="text-align: center;"><table style="display: inline-table; margin: 0 10px;"><tr><td>1</td><td>6</td><td></td><td></td></tr><tr><td>+</td><td>3</td><td></td><td></td></tr><tr><td colspan="4"><hr/></td></tr><tr><td>1</td><td>9</td><td></td><td></td></tr></table><table style="display: inline-table; margin: 0 10px;"><tr><td></td><td>¹</td><td>6</td><td></td></tr><tr><td></td><td>1</td><td>6</td><td></td></tr><tr><td></td><td>+</td><td>4</td><td></td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>2</td><td>0</td><td></td></tr></table><table style="display: inline-table;"><tr><td></td><td>¹</td><td>6</td><td></td></tr><tr><td></td><td>1</td><td>6</td><td></td></tr><tr><td></td><td>+</td><td>5</td><td></td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>2</td><td>1</td><td></td></tr></table></div>	1	6			+	3			<hr/>				1	9				¹	6			1	6			+	4		<hr/>					2	0			¹	6			1	6			+	5		<hr/>					2	1	
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1	6		1	6		1	6
+	3		+	4		+	5

- Notice that for 16+1, +2, +3 everything is easy, with answers of 17,18, and 19.
- But at 16+4, when we add the 6+4, it is 10 which has two digits, because it has passed into the tens place. Show the learners how to carry over the ten and add it to the tens column, so that answer becomes 20.
- Show the same process with 16+5 = 21.

Step 2

- Give the learners the examples below, showing them with each step. Be VERY careful to make sure the numbers are lined up correctly, on the **right!**

1 23 <u>+ 9</u> 32	1 37 <u>+ 6</u> 43	1 77 <u>+ 5</u> 82
---	---	---

Step 3

- Now show examples that are two-digit:

	$\begin{array}{r} 1 \\ 43 \\ + 29 \\ \hline 72 \end{array}$	$\begin{array}{r} 1 \\ 36 \\ + 47 \\ \hline 83 \end{array}$	$\begin{array}{r} 1 \\ 33 \\ + 58 \\ \hline 91 \end{array}$
	<p>Summary of Steps to Solving Addition with Carry-Over</p> <ul style="list-style-type: none"> • Write the problem with the numbers in line from the right side. • Add the numbers in the ones place and write it below in the answer, <i>one the right-hand side, in the correct column!</i> • If they add up to more than 10, keep the number in the ones place, and carry the 1 ten to the tens place. • Add the numbers in the tens column, PLUS the 1 ten carried over, and write this number in the tens column. 		

Practice: Use the rest of the class to practice, writing problems on the board one by one for the learners to solve. Make sure to discuss them together.

NOTE: Make sure that the numbers do not get too big. For example, $86 + 78$ would go into the hundreds, and the learners are not yet ready for that.

More sample problems: $46 + 27$, $75 + 18$, $65 + 27$, $48 + 33$, etc.

Give the learners 3 problems to do at home and bring for the next class.

Module B:

Lesson 34: Practicing Addition With Carryover

Lesson Learning Objectives:

- To practice addition with carrying over

Preparation and Materials:

- Chalkboard and chalk
- Small pieces of paper, like index cards, enough for every learner to have 2

Opener: Give each learner two small pieces of paper. Ask them to each write a 2-digit number less than 50 on their papers (such as 44, 35, 29, etc). Now they should sit in small groups of 3-4 people, and all the groups should then as quickly as possible put their numbers in order from smallest to largest.



Activities

Step 1	<ul style="list-style-type: none">• Now we will be using the same number cards just made in order to practice more addition.			
Step 2	<ul style="list-style-type: none">• Now the learners should sit in small groups of 3-4 people each. They should put all their papers together and mix them up.• Now each learner should take two papers, and write them as an addition problem in their notebook, and solve it: <p>Example:</p> <table style="display: inline-table; border: none;"><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">17</td><td style="border: 1px solid black; padding: 5px; text-align: center;">45</td><td style="padding-left: 20px;">$\begin{array}{r} 45 \\ +17 \\ \hline \end{array}$</td></tr></table>	17	45	$\begin{array}{r} 45 \\ +17 \\ \hline \end{array}$
17	45	$\begin{array}{r} 45 \\ +17 \\ \hline \end{array}$		

In the notebook, write:

And solve:

$$\begin{array}{r} 1 \\ 45 \\ +17 \\ \hline 62 \end{array}$$

- The group should do this for at least 4 problems, mixing up the papers so that each person's problems are different.
- You should frequently check the work of the learners, making sure they are lining up their numbers and adding the numbers properly with carry-over.

Practice:

If the learners finish quickly, or if they need more challenge, you can:

Show them how to add 3-digit numbers in the hundreds, such as $426 + 341$

OR

Show them how to add three numbers, such as $45 + 17 + 24$

OR

Ask the learners to use the number cards to make up story problems for other groups to solve. They should write the problems down and then share them with the others.

Module B:

Lesson 35: Subtraction with Carry-Over

Lesson Learning Objectives:

- To solve subtract problems using the technique of borrowing

Preparation and Materials:

- Chalkboard and chalk
- Addition charts

Opener: Write pairs of numbers on the board, and go through each pair, asking the learners to quickly tell which number is *larger*. [If they have learned the greater than/less than sign (<, >) you can ask them to come and write the correct sign between the numbers.]

Examples:

65	25
13	27
44	43
86	68
79	63

(Answers)
65 > 25
13 < 27
44 > 43
68 < 86
79 > 63



Activities

Step 1

- Ask the learners to write the problem $56 - 33$ in their notebook, and solve it. Ask them to explain how they did it, so that you know that they have learned how to write the problem and subtract properly.

$$\begin{array}{r} 56 \\ - 33 \\ \hline \end{array}$$

Step 2

- Now ask them to write the problem $56 - 37$. Ask them what is different now about the problem, and why it might be harder to solve.

$$\begin{array}{r} 56 \\ - 37 \\ \hline \end{array}$$

- Point out that now the 7 is greater than the 6 in the ones column, and we can't take 7, a larger number, away from 6, a smaller number.
- Make SURE that the learners don't try to take 6 from 8 and write 2!!!!*

Step 3

- Now explain the steps involved in borrowing:

- We can't take 7 away from 6. We don't have enough ones.

So we are going to borrow 10 from the tens column and give ten to the ones column. Here's how it works:

$$\begin{array}{r} 56 \\ - 37 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \cancel{5} 16 \\ - 37 \\ \hline 9 \end{array}$$

- Right now there are 5 tens (50) and 6 ones (6) in

the top of the problem.

3. If we take 1 ten from the 5, there will be 4 tens (40) left.

We will give the ten to the 6 ones, so there will now be 16 in the ones.

4. Since 7 is less than 16, we can subtract. $16 - 7 = 9$.

1. And now we subtract 3 from 4: $4 - 3 = 1$ in the tens column, so the answer is 19.

$$\begin{array}{r} 4 \\ \cancel{5} \ 16 \\ - 3 \ 7 \\ \hline 1 \ 9 \end{array}$$

Step 4:

- You will need to do several examples with the learners, slowly explaining and showing each step along the way. They should be copying the examples in their notebooks as well.

Examples:

- $54 - 28 = ?$ (answer = 26)
- $72 - 45 = ?$ (answer = 27)
- $33 - 19 = ?$ (answer = 14)

- Remember to also remind and show the learners that they can check their answers by addition: in the sample problem above, $56 - 37 = 19$. To check

to see if 19 is right, do $19 + 37$. It should be 56.

Practice:

Give the learners several problems to do on their own:

$$86 - 47 =$$

$$55 - 38 =$$

$$98 - 79 =$$

$$64 - 37 =$$

Refer learners to the workbook for further practice.

Take learners step by step through the example below that is listed in the learner workbook.

			Tens	Ones																			
○	○	○	5	6	/	1	8																
○	○	○	-	2	9																		
1	2	3	3	9	9	1	2										3	4	5	6	7	8	9

In the subtraction above, 68 is bigger than 29. But when you do the subtraction with the numbers lined up vertically, you cannot subtract 9 from 8. Therefore you must first borrow 1 from 6. The 1 that you borrow becomes 10. The $10 + 8 = 18$. Now you can take away 9 from 18 which equals 9. You earlier borrowed 1 from 6. So you have $5 - 2 = 3$. Check above for the summary. The answer is $68 - 29 = 39$.

Module B:

Lesson 36: Practice Subtracting with Borrowing (story problems)

Lesson Learning Objectives:

- To practice skill in subtracting with borrowing

Preparation and Materials:

- Chalkboard and chalk
- Prepared papers with story problems
- Addition charts

Opener: Review from last lesson: Ask the learners to solve $56 - 38 =$



Activities

Step 1	Introduction: <ul style="list-style-type: none">• We will be practicing subtraction by reading and solving story problems. Read the problems carefully, write the math in your notebook and answer the questions. You may work in small groups.
Step 2	<ul style="list-style-type: none">• Give each group of learners one story problem to read and solve. Once they have finished one problem, they should exchange with another group until they have done all the problems.
Step 3	<ul style="list-style-type: none">• When everyone is finished, each group should share their answer to one of the problems by reading the story and then showing how they

	got their answer.
--	-------------------

1. Fallah's goal is to make \$75 each day. He made \$68 yesterday. How close was he to his goal?

2. Fallah has an idea to make money. He is selling fresh lemon drinks on the street. He bought 85 lemons to make the drinks. By the end of the day he had 26 lemons left. How many drinks did he sell that day?

3. Watta wants to buy a gift for her friend. The gift costs \$45. Watta has \$37. How much more money does she need?

4. To get to her mother's house in Harper, Miatta must travel 73 miles. On the first day she traveled 55 miles. How far must she travel on the second day?

Practice: The learners can make up their own problems to further practice. Refer learners to the workbook: lesson 36.

Refer learners to the workbook for further practice.

Module B:

Lesson 37: Practice Adding and Subtracting by Buying and Selling

Lesson Learning Objectives:

- To be able to apply the skills of adding and subtracting to a real-life situation

Preparation and Materials:

- Chalkboard and chalk
- sets of fake money in \$100 bundles but with different kinds of bills like 20's, 10's, 5's, etc) . Need one set for every two or three students.
- at least 5 items to 'sell' in a shop (or pictures of objects) with the prices labeled. The prices of the objects should be from inexpensive to expensive, but less than \$100 each. Example: comb= \$12, earrings = \$70, book = \$22, picture frame = \$85, shoes = \$90

Opener: Ask learners to continue the pattern: 1, 3, 4, 7, ____, ____, ____

[Answer: 11, 18, 27 : adding the last two numbers in the line. $1+3=4$, $3+4=7$, $4+7=11$, $7+11=18$, $11+18=27$]



Activities

Step 1	<ul style="list-style-type: none"> • Introduction: “Today we will be practicing the math of buying and selling. Certainly you already know how to buy and sell things in the market, but now you’ll use more math to make sure your calculations are accurate. You must write down how much money you have, what you buy, what the total was, and how much money you have left.” • Identify two learners who will be the shopkeepers, or sellers. The rest of the learners will be the buyers.
Step 2	<ul style="list-style-type: none"> • The learners are given bundles of \$100. • One or two learners will be the ‘shopkeepers’. The other learners will come and “buy” items. • The buyers must write down how much money they have, what they buy, what the total was, and how much money they have left. They must do the processes of adding up the prices, deciding if they have enough money, what their change should be, etc.
Step 3	<ul style="list-style-type: none"> • The learners should take turns being the shopkeepers and buyers. Each buyer must keep a record of how much money she has, what she ‘buys’ with the money – each item and its price, how many of each, how much it all cost, and the change they received.

Practice: This can be repeated with different items with different prices for additional practice.

For more advanced practice, you can be the shopkeeper and can try ‘cheating’ by not giving back the correct change, and see if the learners catch the mistake.

Module B:

Lesson 38: Introduction to the Concept of Multiplication

Lesson Learning Objectives:

- To demonstrate the meaning of multiplication as special, repeated addition and how to represent it mathematically with symbols (\times)

Preparation and Materials:

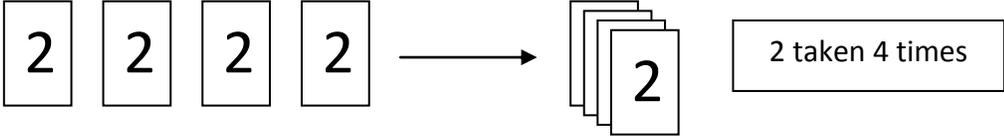
- chalkboard and chalk
- small cards (like index cards),
- pen or marker
- about 20 pebbles, grapes, candies or other small objects
- symbol cards $\times =$

Opener: Draw the following pattern on the board, and ask learners to draw the next ones to fill in the blanks:





Activities

Step 1	<ul style="list-style-type: none">Give 2 objects each to 4 learners, and asks how many objects there are all together.
Step 2	<ul style="list-style-type: none">Using the cards, write and lay out 4 cards: 2, 2, 2, 2 on the table. Then stack the 2's so only one 2 is visible, saying that we took 2 objects 4 times, and it was 8 all together. 
Step 3	<ul style="list-style-type: none">So there is a short cut. Lay the symbol card x and the 4 and = next to the 2 to make the number sentence and it can be written as $2 \times 4 = 8$ instead of 2,2,2,2. 
Step 4	<ul style="list-style-type: none">Explain the concept of multiplication as being a way to add a lot of things more quickly.
Step 5	Demonstrate with other examples such as 4×3 , 2×3 , 4×2 , using the objects to count: $4 \times 3 = 4 \ 4 \ 4 \ 4 = 12$, so $4 \times 3 = 12$

Practice: Now give examples and ask the learners to do the same process, using new examples such as 5×3 , 2×6 , 7×3 etc.

Discussion: “What does multiplication look like? What is the effect of multiplication?” The group can discuss real examples of multiplication, such as, if all the children need new shoes, they need two shoes each, so if there are 4 children then there will be 8 new shoes. ($2 \times 4 = 8$). Or that one plant produces many seeds, which then each make new plants, and the number of plants multiplies. What are some other examples?

Module B:

Lesson 39: What Multiplication Means, and Building the Multiplication Chart

Lesson Learning Objectives:

- To show multiplication as repeated addition, and to create a chart of multiplication facts

Preparation and Materials:

- many small stones,
- number cards from 0-9,
- X and = symbol cards,
- empty and completed multiplication chart (large size)

Opener: In preparation for today's lesson, the learners need to make the chart below in their notebook. They will use it later in the lesson and in other lessons.

Multiplication Chart											
X	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											



Activities

<p>Step 1</p>	<ul style="list-style-type: none"> • First review what multiplication <i>means</i> – it is a special form of addition. Ask the learners what 4×3 means. • 4×3 means 4 added three times, or $4 + 4 + 4$. $4 + 4 + 4 = 12$, and $4 \times 3 = 12$. So multiplication is a quicker way to write long addition problems. Practice this with other examples: What does 3×5 mean? (3 added 5 times: $3 + 3 + 3 + 3 + 3$) What does 7×6 mean? ($7 + 7 + 7 + 7 + 7 + 7$).
<p>Step 2</p>	<ul style="list-style-type: none"> • Now show this with stones: 4×3 means three groups of 4 stones each: (4 taken three times)  • Counting the stones, there are 12 stones in total. So $4 \times 3 = 12$. • Show this with the number cards, or write it on the board: $4 \times 3 = 12$
<p>Step 3</p>	<ul style="list-style-type: none"> • Do one more example together, such as 6×5, grouping the stones (6 stones in 5 groups) and counting them to find the answer. $6 \times 5 = 30$. This should be shown with cards or written on the board. 
<p>Step 4:</p>	<ul style="list-style-type: none"> • Now show the learners how to use the multiplication chart. Demonstrated how to fill in boxes on their blank chart using the examples you just did: $4 \times 3 = 12$, $6 \times 5 = 30$

Multiplication Chart

X	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4				12							
5											
6						30					
7											
8											
9											
10											

Step 5	<ul style="list-style-type: none"> The learners should work in groups of 2-4, and together, they must fill in the chart with all the multiplication facts. They should work in an organized way, for example, calculating 6×1, 6×2, 6×3, 6×4, 6×5, 6×6, etc. along one row, not working randomly. <p>They might start by using the stones to group and calculate. But as the learners reach larger numbers on the chart, they might want to figure out an easier way. They can do the work in any way they want, such as making marks on paper instead of using stones: (for example, 6×5:).</p> <ul style="list-style-type: none"> They may also see patterns in the numbers, and can use the patterns to solve the calculations instead of counting stones directly. (For example, that the numbers increase by 2 each time, or 3 each time, etc.) Working together, they can divide the work among themselves and share their information with their group members.
Step 6	<ul style="list-style-type: none"> Once a group is finished, they should then check their work with each other, and then you're your completed chart. To check the learners' understanding of the work they did, and to check if they understand how to use the chart, you should ask a few oral multiplication questions such as "What is 5×8? What is 9×4?" and

the learners must find the answers on their chart.

- The learners might want to make a new chart using nice paper and pen. They can also make a large chart using chart paper to place on the wall of the classroom.
- ☀ **NOTE:** You may need or want to have a brief discussion with the learners about the rules for multiplying by 0, and by 1.
- Again, demonstrate the chart, showing how it can be used to see that $8 \times 7 = 56$, etc.
- ☀ **NOTE:** You may need or want to have a brief discussion with the learners about the rules for multiplying by 0, and by 1.

Multiplication Chart - Completed											
X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Practice: Give the learners enough time to complete their chart and check that it is filled in correctly. You can also show them that the numbers in one column or row are arranged by skip counting. Point out the 2's, the 5's, the 10's. Refer learners to the workbook for further practice.

Module B:

Lesson 40: Multiplication Practice Game - Using the Chart

Lesson Learning Objectives:

- To develop skill at using the multiplication chart and facts quickly

Preparation and Materials:

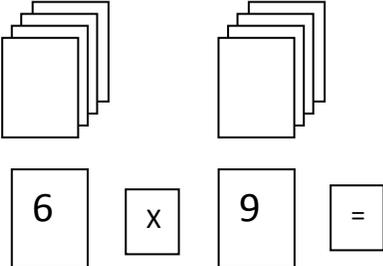
- Chalkboard and chalk
- sets of number cards from 0-10, at least one for every two learners
- X and =
- symbol cards
- large multiplication chart, and learners should have their own as well

Background Information: *If any learners have not finished their multiplication chart, this should be done first.*

Opener: Ask the learners to get out their multiplication chart and give them three problems to answer from their chart: 6×3 , 4×7 , 9×5



Activities

Step 1	<ul style="list-style-type: none"> • Introduction: Today we'll continue working on multiplication, using our new chart of multiplication facts.
Step 2	<ul style="list-style-type: none"> • Learners play this game in pairs or teams. They put the multiplication symbol (X) and equals symbol (=) on the table. The number cards should be mixed and then separated into two equal stacks, and placed upside down on the table. • Each learner takes a card from one of the stacks and places them on both sides of the X symbol to make a multiplication question. This is done quickly, and then the two players try to answer the question quickly using their charts. • Whoever answers first is the winner, and keeps the two cards. They then turn over two more cards and race to answer the question. This continues until all the cards are gone. • They can use their multiplication charts to find the answers. The winner is the one with the most cards at the end. <div style="text-align: center; margin-top: 20px;">  </div>

Practice: Once everyone has practiced and can use the chart, you can then have a game/contest: Tell everyone to close their eyes, and then you write a problem on the board, such as $7 \times 6 =$.

- The learners then open their eyes and all race to see who can get the answer first.
- They can also do this in teams, and you write a list of problems on the board, such as 5×3 , 6×8 , 9×2 , 4×6 .
- Then the teams race to get all the answers finished before the other team. But they must get them all right to win!

Module B:

Lesson 41: More About the Chart, and Patterns

Lesson Learning Objectives:

- To develop a better understanding of the multiplication facts, to identify patterns in the chart that show the rules of multiplication such as $\times 0$, $\times 1$,
- To show that the order of numbers doesn't matter in multiplication: 2×3 is the same as 3×2 ,
- Introduce the concept of multiples

Preparation and Materials:

- Chalkboard and chalk
- Multiplication charts
- a chart paper with prepared questions

Opener: First give a problem for the learners to quickly answer from their chart, such as 7×6 . $7 \times 6 = 42$.

THEN, work backwards: Ask them to find the multiplication problem that will give the answer. For example, what two numbers when multiplied will give you 35? Answer: 7×5 and 5×7 . Try this with 2 or 3 more numbers: 40, 8, 63



Activities

Step 1	<ul style="list-style-type: none">• Ask the learners to work with a partner, and look carefully at their new multiplication charts for patterns among the numbers on the chart. They can look for places of repeated numbers, or diagonal patterns, or skip counting, etc.
Step 2	<ul style="list-style-type: none">• Now explain that you have several questions for them to answer about their chart. Hang the paper with the questions on it on the board.
Step 3	<ul style="list-style-type: none">• Do the first one with the learners. Ask someone to read it out loud, and then together find the answer. The learners should write their answers in their notebooks.• If the learners get confused by the idea of different combinations making the same answer, show them with pebbles: For example, find 12 stones and make all of these combinations by putting the stones in groups. $4 \times 3 = \begin{matrix} \cdot \\ \cdot \\ \cdot \\ \cdot \end{matrix} \begin{matrix} \cdot \\ \cdot \\ \cdot \\ \cdot \end{matrix} = 12$ $3 \times 4 = \dots \dots \dots = 12$ $6 \times 2 = \begin{matrix} \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \end{matrix} \begin{matrix} \cdot \\ \cdot \\ \cdot \end{matrix} = 12$ $2 \times 6 = \begin{matrix} \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \end{matrix} = 12$

Questions About the Multiplication Chart

1. How many places can you find 35? ____
2. List the combinations that give 35:
3. Find some other numbers that can be made with only two combinations of numbers (like 35)

4. How many places can you find 17? ____
5. List the combinations that give 17:

6. How many places can you find 12 as an answer?
7. Write down the different ways that numbers can be multiplied to make 12.
[example: $4 \times 3 = 12$, $3 \times 4 = 12$, $6 \times 2 = 12$, etc.....]
8. Find some other numbers that can be made with more than two combinations of numbers (like 12)

9. How many places can you find 24 on the chart? ____
10. List the combinations that give 24:

11. How many places can you find 16 ? ____
12. List the combinations that give 16:

13. How many places can you find 49? ____
14. List the combinations that give 49:
15. Find some other numbers with only one combination, like 49.

16. How many places can you find 0? ____
17. List the combinations that give 0:

18. $7 \times 1 =$
 $9 \times 1 =$
 $4 \times 1 =$
What happens when you multiply a number times 1?

ANSWERS to Questions About the Multiplication Chart *(for the Facilitator)*

1. How many places can you find 35? **2**
2. List the combinations that give 35: **5 x 7 and 7 x 5**
3. Find some other numbers that can be made with only two combinations of numbers (like 35) **many answers, such as 42, 63, 15**

4. How many places can you find 17? **1**
5. List the combinations that give 17: **1 x 17 and 17 x 1**

6. How many places can you find 12 as an answer? **4**
7. Write down the different ways that numbers can be multiplied to make 12.
[4 x 3 = 12, 3 x 4 = 12, 6 x 2 = 12, 2 x 6 = 12]
8. Find some other numbers that can be made with more than two combinations of numbers (like 12)
many answers, such as 20, 18, 24

9. How many places can you find 24 on the chart? **4**
10. List the combinations that give 24: **[3 x 8, 8 x 3, 6 x 4, 4 x 6]**

11. How many places can you find 16? **1**
12. List the combinations that give 16: **4 x 4**

13. How many places can you find 49? **1**
14. List the combinations that give 49: **7 x 7**
15. Find some other numbers with only one combination, like 49. **4, 25, 64, 81**

16. How many places can you find 0? **10**
17. List the combinations that give 0: **1 x 0, 2 x 0, 3 x 0, etc up to 10 x 0**

18. $7 \times 1 = 7$
 $9 \times 1 = 9$
 $4 \times 1 = 4$
What happens when you multiply a number times 1? **It stays the same.**

Practice: Ask the learners to summarize some of the things they've noticed. Make sure they show that :

- The order of the numbers doesn't matter. Example: 6×4 is the same as 4×6
- There are some numbers that can be made with several combinations of numbers. Like 12, which is 4×3 , and 6×2
- Anything multiplied by 0 is 0. ($7 \times 0 = 0$)
- Anything multiplied by 1 stays the same. ($8 \times 1 = 8$)

Module B:

Lesson 42: Multiplication Story Problems

Lesson Learning Objectives:

- To be able to use multiplication up to 100 to solve story problems

Preparation and Materials:

- Chalkboard and chalk
- The story problems below should be written on separate pieces of paper

Opener: DISCUSSION: Multiplication means to add up or increase quickly. Is this good?

- Discuss areas of life where it is good to multiply.
- Discuss areas of life where multiplication may not be as good.
- What are some areas in your life that you wish to increase or multiply, and other areas where you don't wish to increase or multiply?
- What are some areas or aspects of your community that should be increased or multiplied? How could this be done?
- What are some areas that should NOT be multiplied? Why not?



Activities

Step 1	<ul style="list-style-type: none">• <i>Introduction:</i> Today we will be using multiplication to solve everyday problems. You can solve these problems any way you want to, using pictures or pebbles or the multiplication chart. Make sure you read the stories carefully!
Step 2	<ul style="list-style-type: none">• Give one story problem to each group of learners. They should read the problem, work out the answer, and write it down.• They should then exchange their story problem paper with another group until all the groups have done all the problems. <p>Story Problems to be solved:</p> <ol style="list-style-type: none">1. If someone went to church 3 times each day, how many times would they go in one week?2. The doctor tells you to take iron tablets 2 times a day. How many tablets do you need to buy for one week?3. Mamodou's family has 8 members. They each have one pair of shoes. How many shoes are outside their door at night?4. One cookie costs \$4. Fanta needs 9 cookies for her family and children. How much money will she need for the cookies?5. Kemu's doctor told her she must drink more water so she wouldn't get headaches. She must drink 5 glasses of water every day. How many glasses of water will she drink in 3 days?6. To practice her writing, Bendu decided to write 8 new words every night. She writes each word 10 times. How many words will she write total every night?

Practice: The learners should share their answers at the end of the class, and talk about how they figured out the answers.

For homework, the learners should watch for things at home that are examples of multiplication, and try to come up with their own story problem like these.

Module B:

Lesson 43: Introduction to the Concept of Division (Without a Remainder)

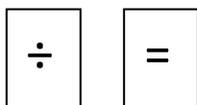
Lesson Learning Objectives:

- To show that division means sharing equally,
- To represent division mathematically with symbols (\div , =)

Preparation and Materials:

- Chalkboard and chalk
- number cards 0 - 9
- 25 pieces of candy, etc,
- symbol cards

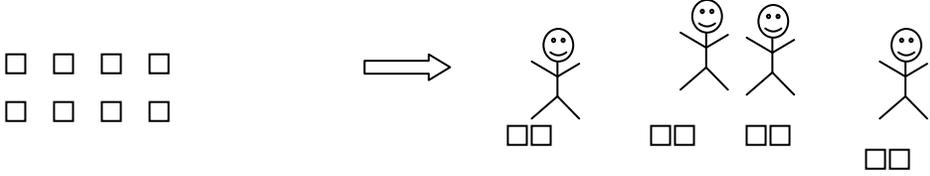
Background Information:



Division is presented as sharing out equally, distributing equally. Eventually it will be understood as the opposite of multiplication.



Activities

<p>Step 1</p>	<ul style="list-style-type: none"> • Introduction: Today we will begin something new, <i>Division</i>. It is related to multiplication. • Take 8 pieces of candy, (or whatever you have), and say that you will share with others, and you want to be fair, so you will give the same amount to each. So first give 1 candy each to 4 people, and then another candy to the same 4 people. They now have 2 candies each. 					
<p>Step 2</p>	<ul style="list-style-type: none"> • Explain that you have divided your candy among 4 people equally. This is very important!! Using the symbol and number cards, show that it is each <table border="1" data-bbox="558 852 1175 953"> <tr> <td style="text-align: center; width: 40px; height: 40px;">8</td> <td style="text-align: center; width: 40px; height: 40px;">÷</td> <td style="text-align: center; width: 40px; height: 40px;">4</td> <td style="text-align: center; width: 40px; height: 40px;">=</td> <td style="text-align: center; width: 40px; height: 40px;">2</td> </tr> </table> written as $8 \div 4 = 2$, b/c person then received 2 pieces. It is NOT division if one person gets 3 pieces and another one 1 piece, etc. Division means shared equally. 	8	÷	4	=	2
8	÷	4	=	2		
<p>Step 3</p>	<ul style="list-style-type: none"> • Gather the candy and give another demonstration, this time 9 pieces divided among 3 people: $9 \div 3 = 3$. Show this using the number cards and write it on the board. 					
<p>Step 4</p>	<ul style="list-style-type: none"> • Do a few more examples <p>20 candies divided among 4 people: $20 \div 4 = 5$</p> <p>18 candies divided among 6 people: $18 \div 6 = 3$</p>					
<p>Step 5</p>	<ul style="list-style-type: none"> • Give some examples and let the learners figure them out using the candy, and write down what they find: <p>12 candies divided among 3 people: $12 \div 3 =$</p>					

	$15 \div 5 =$
	$16 \div 8 =$
	$10 \div 2 =$

Discussion: “What does division *look like* in life? What is the effect of division? When do we see division?” Starting with these questions, a very rich discussion about real examples of division can follow in the group: dividing land, dividing (serving) food, dividing money, etc.

Emphasize that this is what the \div sign means. But in math it means *everyone gets an equal amount*.

Practice: Give the learners 3 problems to figure out on their own at home: Refer learners to use their workbook to practice more problems.

$$14 \div 2 =$$

$$12 \div 6 =$$

$$20 \div 5 =$$

Module B:

Lesson 44: Division Without Remainder, Part 2

- Using the Multiplication Chart

Lesson Learning Objectives:

- To be able to use the multiplication chart to solve single digit division questions with no remainder
- To show division as the inverse of multiplication

Preparation and Materials:

- Chalkboard and chalk
- a large pile of small stones or beans or candy, etc.
- \div symbol card
- number card sets 1-9
- learners' completed multiplication charts

Opener: Ask the learners what they remember about division – what were some of the examples of division in our lives that were talked about? (like dividing food to serve it, and dividing the land among family members, etc.) To divide means to share or distribute equally. What is the mathematical symbol for division?

Ask a learner to count out 20 candies, and solve $20 \div 5$ from yesterday's homework, and write the answer on the board.



Activities

Step 1	<ul style="list-style-type: none"> • Introduction: “Today we are continuing with division in order to see how it’s related to multiplication.”
Step 2	<ul style="list-style-type: none"> • Now this time, hidden from the view of the learners, YOU count out 12 candies. Give the 12 candies to a learner, and ask him/her to divide it to 4 people. • Each person will have received 3 candies. But now ask the learners how many candies there were originally . Try to help them see that we now have 3×4. Since $3 \times 4 = 12$, what we just did was $12 \div 4 = 3$. So multiplication and division are related to each other, but opposite of each other. Like black and white, tall and short, right side up and upside down. In the same way that addition and subtraction are opposite of each other.
Step 3	<ul style="list-style-type: none"> • Give more examples: $20 \div 5 = 4$, and $4 \times 5 = 20$, and do with the candy if anyone is confused: $15 \div 5 = 3$ and $3 \times 5 = 15$ $\div 2 = 8$ and $8 \times 2 = 16$. Etc.
Step 4	<ul style="list-style-type: none"> • This is to show that division and multiplication are opposites of each other and related to each other. Now ask the learners, “What is 7×6?” When they answer 42, write the problem on the board: $7 \times 6 = 42$. • Then ask, if 7×6 is 42, what is 42 divided by 6? Show that the answer is 7. • What is $42 \div 7$? Show that the answer is 6
Step 5	<ul style="list-style-type: none"> • Do this with several other examples, writing each one: (learners can use their multiplication charts to find the multiplication answer if they need to.)

	<ul style="list-style-type: none"> • What is 9×7? And so what is $63 \div 9$? • What is 3×6? And so what is $18 \div 6$? • What is 8×5? And so what is $40 \div 5$? Continue with several other examples.
Step 6	<ul style="list-style-type: none"> • Now use the chart to directly solve the division problem. • Example: $24 \div 6 = ?$

To find the answer on the chart:

Find 6 on the left side of the chart.

Follow it to 24.

Now follow it up to the top of the chart, and you will end up at 4.

So $24 \div 6 = 4$

Multiplication Chart – Showing $56 \div 8 = 7$

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Practice: Give the learners several problems to solve using their charts. They should copy the problems and their answers into their notebooks: Refer learners to their workbook for more practice problems.

$35 \div 7 =$

$48 \div 6 =$

$54 \div 9 =$

$72 \div 8 =$

$10 \div 2 =$

$28 \div 4 =$

$30 \div 5 =$

$49 \div 7 =$

$100 \div 10 =$

$60 \div 6 =$

$21 \div 3 =$

$56 \div 7 =$

Module B:

Lesson 45: Division Comes to Life – Story Problems

Lesson Learning Objectives:

- To be able to use simple division and the multiplication chart to solve story problems

Preparation and Materials:

- Chalkboard and chalk
- Multiplication charts
- Story problems written out on separate pieces of paper

Opener:  **DISCUSSION:** Choose one or two of the questions below to discuss. If there is more time, you can discuss more of them at the end of the class:

- In math, ‘to divide’ means to divide **equally**. In life, are things always divided equally?
- Give some examples or tell stories that involve equal or unequal division. [This may be in the family, or in the community, or in the society, the country. It may involve division of food, or water, or land. It may be division of resources such as health care. It may be division of time.]
- When should everything be equally divided for everyone, and when is it ok for things to not be divided equally? Why?
- Do you think all things should be equally divided? Why?
- What do people do when things are unequally divided? Do people fight? Complain? Talk about it? Steal? Redistribute? What do YOU do when things are unequally divided?
- How do people feel when things are unequally divided?



Activities

<p>Step 1</p>	<ul style="list-style-type: none"> • Now you will give the learners some problems to solve. The learners will work together to figure out the problems. They may draw pictures, or use stones, or use their multiplication charts, or find some other new way to solve. • When they have all finished, they should then share their results and their method with other learners. <p>NOTE: <i>If the learners have trouble reading, an advanced learner can help them read and understand the questions. It will also help if the learners draw pictures of the objects and situations being described, or if they use fake money to solve the problems.</i></p> <p>EXAMPLES. Give one problem to each small group. After they have solved the problem they should exchange with another group.</p> <ol style="list-style-type: none"> 1. Your uncle comes to your house for Christmas. He has exactly 50 L\$ total to divide among the children in the house. There are 5 children. How much will each child receive? 2. Famatta borrowed 100 L\$ from her friend to buy some medicine. After 10 days she had paid it back. How much did she give her friend each day? 3. Thelma has enough money to buy exactly 27 vitamins. The doctor told her to take 3 vitamins a day, since she is pregnant. How many days will the 27 vitamins last?
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Practice: Ask the learners to make up at least 3 more division story problems at home, using their multiplication charts. They should write their story problems in their notebooks and share them with others in the next class.

Module B:

Lesson 46: Practice with Multiplication and Division

Lesson Learning Objectives:

- To be able to determine when to multiply and when to divide

Preparation and Materials:

- Chalkboard and chalk
- Prepared story problems on separate pieces of paper

Opener: The learners should work in partners and exchange one of their story problems from the previous class homework.



Activities

Step 1	<ul style="list-style-type: none">• Introduction: Tell the learners: Now you will practice both multiplication and division by solving the stories and problems. You can draw pictures, use your charts, use pebbles, whatever you want to do to figure out the answer.
Step 2	<ul style="list-style-type: none">• The learners should work in small groups and solve the problems. After they finish each one they can exchange with another group until they have done all the problems.

1. Lawal saves 5 L\$ every day. After 1 week, how much money will he have?

Stories and Questions:

4. Imagine that every day you save 10 L\$. After 9 days, how much money will you have saved?

2. At the market, bracelets cost 6 L\$ each. You want to get one for each of your daughters. If you have 5 daughters, how much money would you need?

5. It takes Bindu 20 minutes to walk to the clinic and back home again. How many minutes does it take him to walk just to the clinic?

3. The shopkeeper has 30 boxes of fresh cookies to sell. After 6 days they are all gone. How many boxes did he sell each day?

6. It is 63 km to your aunt's house. But you can only walk about 9 km each day. How long would it take you to walk to her

Practice: When they are finished, they should share their answers and how they solved the questions.

Refer learners to the workbook for further practice.

Module B:

Lesson 47: Simple Division with Remainder

Lesson Learning Objectives:

- To understand that division is not always perfect, that there is usually some left over

Preparation and Materials:

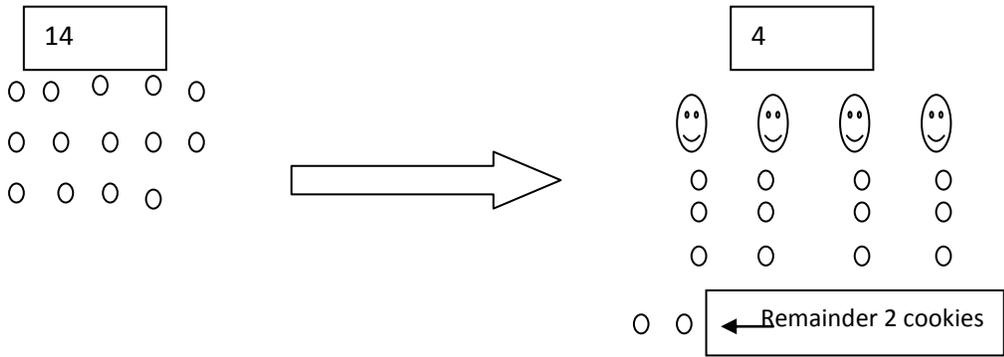
- Chalkboard and chalk
- Pieces of candy or small objects

Opener: Write the following pattern on the board and ask the learners to fill in the missing numbers: 1, 4, 7, __, 13, __, 16, ____



Activities

Step 1	<ul style="list-style-type: none">• Give one learner 7 pieces of candy. Ask her to divide the candy among the 3 people. This time when the candy is given out, there will be some left over – a <i>remainder</i>. Ask the learners: What should we do with the left-over candy?
Step 2	<ul style="list-style-type: none">• Show that this would be written: $7 \div 3 = 2 \text{ R } 1$ because the R stands for Remainder.
Step 3	<ul style="list-style-type: none">• Ask the learners what this means. What is a remainder? What are some situations where there is a remainder when we divide? Example: If there are 4 children and 14 cookies, how many will each child get, and how many will be left over? Each will get 3 cookies, and

	<p>2 cookies will be left over. Draw this on the board: $14 \div 4 = 3 R$</p> <p>What do we do with the remainder cookies??</p> 
<p>Step 4</p>	<ul style="list-style-type: none"> • Do other examples. Use the candy or pebbles to represent • Example: If there are 21 books but there are 8 students, how many books will each student get, and how much is the remainder? • Example: If the teacher had \$42, and each pen was \$10, how many pens can he buy, and how much money will be the remainder? • Example: If you have 26 fish to sell, and you sell the same amount to 4 people, how many fish did each person buy, and how many fish will remain?

Practice:

DISCUSSION: What do we do whenever there is a remainder? In the situation earlier, where there were 14 cookies for 4 children, each child got 3 cookies and there were 2 cookies left. What would you do with those 2 cookies?

- When there is a remainder in your home after dividing, remainders of food or gifts or money, what happens to it? Who makes that decision?
- When people in the community have remainders of food or money, what do they do with it? Do they keep it? Do they give it away? Do they waste it? Do they

use it for a good purpose?

- What would you do with remainders of money or food, if you had extra left over?

Module B:

Lesson 48: Quantities of Time

Lesson Learning Objectives:

- To connect division with time, as well as knowing and reading quantities of time

Preparation and Materials:

- Chalkboard and chalk
- Prepared cards:

<i>Card Set to be made and cut out separately in large size.</i>	
In one hour there are _____ minutes.	60
In one day there are _____ hours.	24
In one week there are _____ days.	7
In one month there are about _____ weeks.	4
In one month there are about _____ days.	30
In one year there are _____ months.	12
In one year there are approximately _____ weeks.	52
In one century there are _____ years.	100

Opener: *Calculations with time:* Draw a picture of a clock on the board showing a particular time, and ask them to read what time the clock shows. If this is too easy for them, give them a situation to solve, such as: If you leave the house at 3:00 and it takes you 2 hours to shop in the market, what time will you be back home? Or, if you left your house at 2:30, and it takes you 20 minutes to walk to your friend's house, what time will you get there?



Activities

Step 1	<ul style="list-style-type: none">• Introduction: Division is also used with time. We divide up time into chunks so it's easier to go through life.
Step 2	<ul style="list-style-type: none">• Mix up the all the cards and give all of them to the group of learners. Do one example with them.• Example of a completed answer: <div data-bbox="414 611 1382 730" style="border: 1px solid black; padding: 10px; text-align: center; margin: 10px 0;"><p>In one year there are 12 months.</p></div>• They must work together and share their knowledge to match the cards to fill in the blanks, laying them out neatly on the table.
Step 3	<ul style="list-style-type: none">• After they are finished, they should present their work.

Practice: Other variations:

- Mix up the cards again and have the learners match them again as quickly as they can.
- Give the learners the answer number cards, while you read the questions out loud. The person with the answer card must quickly identify him or herself as holding the answer.
- The learners can generate more such cards and questions.

Module B:

Lesson 49: Dividing One's Life

Lesson Learning Objectives:

- To apply concepts of division to the story of one's life
- To use the concept of fractions

Preparation and Materials:

- Chalkboard and chalk
- Large blank pieces of paper
- Facilitator timeline of life to show as a model (see background below for instructions)

Background Information:

Overview of the activity: In this activity, learners will use division to divide their life up into chunks of time either 5 or 10 years long. Then they will tell make a timeline of their life using these divisions, telling major aspects of their life during those chunks of time. The learners will divide their age by 5 years, if they are 20 or younger, and by 10, if they are older than 20. This way, their life will be divided up into 4 chunks of equal time, including one for the future. They will calculate how many chunks of time they have had in their life.

For example, if learner is 30 years old, he will divide his age by 10, to see that his life has had 3 10-year chunks of time: from birth to age 10, from 10 to 20, and from 20 to 30. The next part of his life will be from 30 to 40. Now he will make a timeline on paper, dividing the paper into 4 equal sections. In each section he will write and draw about what happened in his life during each chunk of time, and in the last one, he will write about his future.

Opener:/Introduction In the last lesson, we looked at divisions of time such as centuries, weeks, etc. Today we're going to make up our own division of time and use them to tell the stories of our lives.



Activities

Step 1	<ul style="list-style-type: none">• Ask the learners to write down how old they are.• If they are younger than 20, ask them to divide their age by 5, and keep track of the remainder. For example, if someone is 15 years old, their life is made up of 3 chunks of 5 years each, because $15 \div 3 = 5$. If someone• If they are older than 20, ask them to divide their age by 10.
Step 2	<ul style="list-style-type: none">• Now the learners should take a large piece of paper and fold it into equal sections, one for each chunk of time, plus one extra for the future. They should then label each section with the years.• For example: An 18 year old learner would have 3 sections of 5 years of life, plus 3 years remainder.• The learner should write his/her name on the top,• The piece of paper should be divided into 4 equal sections. This should be done by folding in half, then in half again)• Take this opportunity to point out the math involved: that you have <i>divided</i> a person's life into equal sections.• Each section should be labeled by the years, as shown below:• For someone 20 years old or younger, time is divided into 5 year chunks:

Birth - 5 years old	5-10 years old	Fanta 10-15 years old	15-20 years old
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For someone older than 20, such as a 34 year old, they should divide by 10 to create chunks of time that are 10 years long:

Birth - 10 years	10-20 years old	will be 20-30 years old	30-40 years old
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<ul style="list-style-type: none">• Now in each section, the learner should write about his or her life during that time – what they remember, major events, where they were, what they did, etc.• They can also draw pictures to go with their words.• In the LAST section, they should write about their future – what their goals are, their plans, their hopes, etc.
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Practice: These timelines can be hung in the room, or shared in the group and discussed. If not finished, the learners should finish these at home.

Module B:

Lesson 50: Introduction to the Concept of Fractions

Lesson Learning Objectives:

- To use the concept of fractions as expressing equal divisions of a whole
- To be able write simple fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$

Preparation and Materials:

- Chalkboard and chalk
- 3 larger blank pieces of paper for facilitator demonstration
- Pen or marker
- Small rectangular pieces of paper for the learners, 3 pieces per learner

Opener: Draw these shapes on the board, write the names off to the side in a different order, and ask learners to match the names with the shapes:



Diamond



Triangle



Rectangle



Square

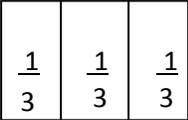
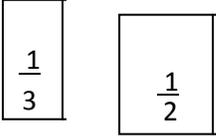
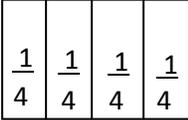
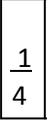


Oval



Activities

Step 1	<ul style="list-style-type: none">• Take one piece of paper and explain that this is one whole rectangle: 1.• Now take <i>another</i> piece of paper (same size) and fold it in half. Now the whole has been divided into 2 parts. Label each section with a small 2 at the bottom.• Now take another piece of paper (same size) and carefully fold it into 3 parts. (make sure they are equal!) Now the whole has been divided into 3 parts. Label each section with a small 3 at the bottom.• Now take another piece of paper (same size) and carefully fold it into 4 parts. (make sure they are equal! Fold in half, and then in half again) Now the whole has been divided into 4 parts. Label each section with a small 4 at the bottom.		
Step 2	<ul style="list-style-type: none">• Ask the learners what they notice about the sizes of the pieces being made. (There are more of them, but they are getting smaller.) <i>Make sure to point out that in each case, the small sections are all the same size!!!</i>• Explanation: in math, a <i>fraction</i> is a way to talk about a piece of a whole something, a smaller chunk of a whole. In the previous lesson, the learners divided their lives into fractions, into equal chunks of time.		
Step 3	<ul style="list-style-type: none">• Now show how fractions are written, starting with the half paper: Write a 1 and a line above the 2's on the paper: <table border="1" data-bbox="1177 1409 1365 1528"><tr><td>$\frac{1}{2}$</td><td>$\frac{1}{2}$</td></tr></table> <ul style="list-style-type: none">• Explanation: The bottom number tells how many equal pieces the whole thing has been divided into (2). The top number tells how many of the smaller pieces. (1)• Explain that each piece is one-half, 1 over 2. There are two halves in the	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$		

	whole.
Step 4	<ul style="list-style-type: none"> Show the same thing with the 3's. Explain again that the whole was divided into 3 equal pieces. Each small piece is 1 of those 3, or one-third.  To show the pieces individually, fold the paper so that only 1/3 is showing. Do this also for 1/2: 
Step 5	<ul style="list-style-type: none"> Now do the 1/4 explanation. The whole paper has been divided into 4 equal pieces. Each small piece is 1/4 of the whole, or we say one-fourth.  Point out to the learners that in the previous lesson, they wrote the story of their life in 1/4 sections. Show this with the timelines from before, if any are in the room. Show 1/4 by itself by folding the paper  Compare to the 1/2 and 1/3.

Practice: Now the learners should each make their own samples of a whole paper divided into 1/2, 1/3, and 1/4. They should fold and label their papers as shown in the lesson. *They must bring these to the next lesson.*

Module B:

Lesson 51: Fraction Concepts, continued

Lesson Learning Objectives:

- To demonstrate fractional parts with numbers greater than 1 in the numerator

Preparation and Materials:

- Chalkboard and chalk
- Fraction papers from previous Lesson (50)

Background Information:

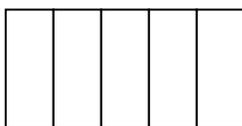
NOTE: It is important that you are consistent in how you write fractions. It is best if you write the fractions vertically, like this:

$$\frac{1}{4}$$

But sometimes you will see fractions written like this:

1/4 or 1/5. It means the **same** thing, but it can be confusing for learners. So always write your fractions vertically:

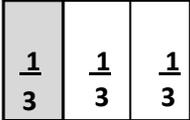
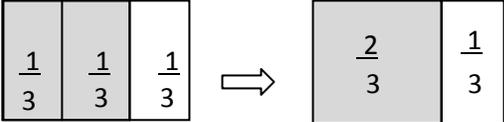
Opener: Draw the following rectangle on the board, divided into 5 equal parts.



Ask the learners to label the small fraction sections of the rectangle as we did in yesterday's lesson. [The learners should count the sections and label each one with 1/5.] Explain that 1/5 is said, "one-fifth."



Activities

Step 1	<ul style="list-style-type: none">• Ask the learners to get out their 3 fraction samples from the previous lesson. Review with them the previous lesson, and ask them questions to check for their understanding, such as, “Show me $\frac{1}{2}$.” “What is bigger, $\frac{1}{4}$ or $\frac{1}{3}$?” etc.
Step 2	<ul style="list-style-type: none">• Now take it to the next step. Use your fraction paper samples to show the following, using the back of the paper to show the second picture, shaded in.• In this picture, $\frac{1}{3}$ of the paper is shaded in. • In this picture, $\frac{2}{3}$ of the paper is shaded in: 
Step 3	<ul style="list-style-type: none">• Do the same thing for the $\frac{1}{4}$ paper, showing $\frac{1}{4}$, then $\frac{2}{4}$, then $\frac{3}{4}$ shaded in. Use extra paper if needed to show the different shadings. 

Practice: The learners should also label and shade in $\frac{2}{3}$, $\frac{2}{4}$, and $\frac{3}{4}$ on their sample papers, making more if they need to. For their homework, ask the learners to make papers showing $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$. They can make their own decorations for shading in the sections. Encourage them to make the papers beautiful and attractive.

Module B:

Lesson 52: Fractions with Different Shapes

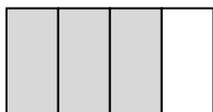
Lesson Learning Objectives:

- To be able to apply fraction concepts to shapes and situations other than just rectangles
- To emphasize that fractional pieces must all be equal size

Preparation and Materials:

- Chalkboard and chalk
- Something round, perhaps a round food? Like pizza, or pie, or bread, or a cookie, etc. Whatever is available.
- Something to cut the round object.
- About 10 pieces of paper cut into circles, about 6 inches in diameter
- Scissors, if available

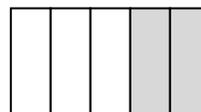
Opener: Draw the following diagrams on the board and ask learners to write the fraction that is shaded in for each one:



[Answers: $\frac{3}{4}$



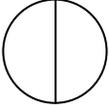
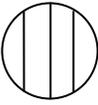
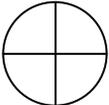
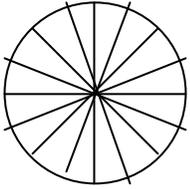
$\frac{1}{6}$



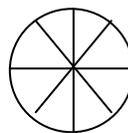
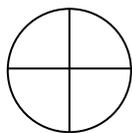
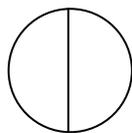
$\frac{2}{5}$]



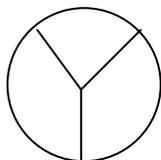
Activities

Step 1	<ul style="list-style-type: none">• Take a paper circle and ask the learners if this circle can be made into fractions. Fold the circle in half and ask them what you have made. Are these halves? [yes. Label them.] • Now, to make the circle have $\frac{1}{4}$ sections, how must it be folded? First, fold another circle like this: • Is each section now $\frac{1}{4}$?• It might SEEM like it, but in fact, these are NOT $\frac{1}{4}$ sections, because they are not the same size!!! Emphasize that fraction pieces must be the same size.• Now fold another circle in half, then in half again so it looks like this: Now each of these is exactly $\frac{1}{4}$. • If you have scissors, cut the 4 pieces out to show that they are all the same size.
Step 2:	<ul style="list-style-type: none">• Demonstrate that when dividing a circle into fractions, the circle must be cut up like cutting up a pie, using the center of the circle.• If you have a round piece of food (like a pie), ask the learners how they would slice the pie in order to share it in the class equally, and to use fractions in their explanation. [If there are 16 people in the class, each person would get $\frac{1}{16}$ of the pie, sliced like this:] • (If you do not have food, draw the 'pie' on a piece of paper and demonstrate. Cut the pieces afterwards.)

Practice: Ask the learners to draw circles and divide them into $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$. Show them how to first find the center and then draw lines through the center.



For a challenge, ask them to divide a circle into $\frac{1}{3}$ and label it.



Module B:

Lesson 53: Using Circle Graphs to Show Information

Lesson Learning Objectives:

- To use knowledge of fractions in order to interpret information from simple circle graphs

Preparation and Materials:

- Chalkboard and chalk
- Large circle graph samples (included on the next pages)

Opener: Draw the following circles on the board and ask the learners what fraction of the circles are **shaded**:



Answers:

$1/4$

$1/2$

$2/3$

$5/6$

Then ask them to write what fraction of the same circles are **unshaded**:

Answers:
(unshaded)

$3/4$

$1/2$

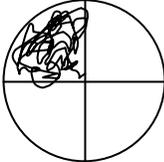
$1/3$

$1/6$

NOTE: It is very important that the learners are able to do this! If they cannot, you will have to take time to review.



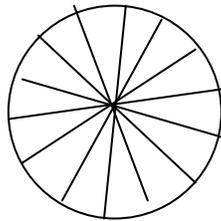
Activities

Step 1	<ul style="list-style-type: none">• Write the following information sentence on the board:• $\frac{1}{4}$ of the class was men. $\frac{3}{4}$ of the class was women.• Ask the learners: “Were there more men or women in the class?” Let them offer answers, but don’t tell them right or wrong.• Now draw on the board:  <p>And write: Men = (shaded) Women = (unshaded)</p> <ul style="list-style-type: none">• So now we can see from the circle and from the shaded fractions that there were more women than men in the class.• This shows that fractions and circles can be used to show amounts and information. These are called <i>circle graphs</i>.
Step 2	<ul style="list-style-type: none">• Now show the other circle graphs given <i>on the next pages</i>. Show them one at a time and allow for time to discuss the information given by the graph and the questions asked about the graph.

Practice: Ask the learners what other kinds of information could be shown in a circle graph. They can try making their own simple circle graphs, such as the number of men and women in the class, or in their family, etc. They will need to divide the circle into the total number of pieces, and then shade in the number needed.

For example, if a class has 14 people in it, first the circle must be divided into 14 pieces. (Each person is $\frac{1}{14}$ of the class.)

First put a dot in the center of the circle and then draw lines across the circle to make the pie pieces.

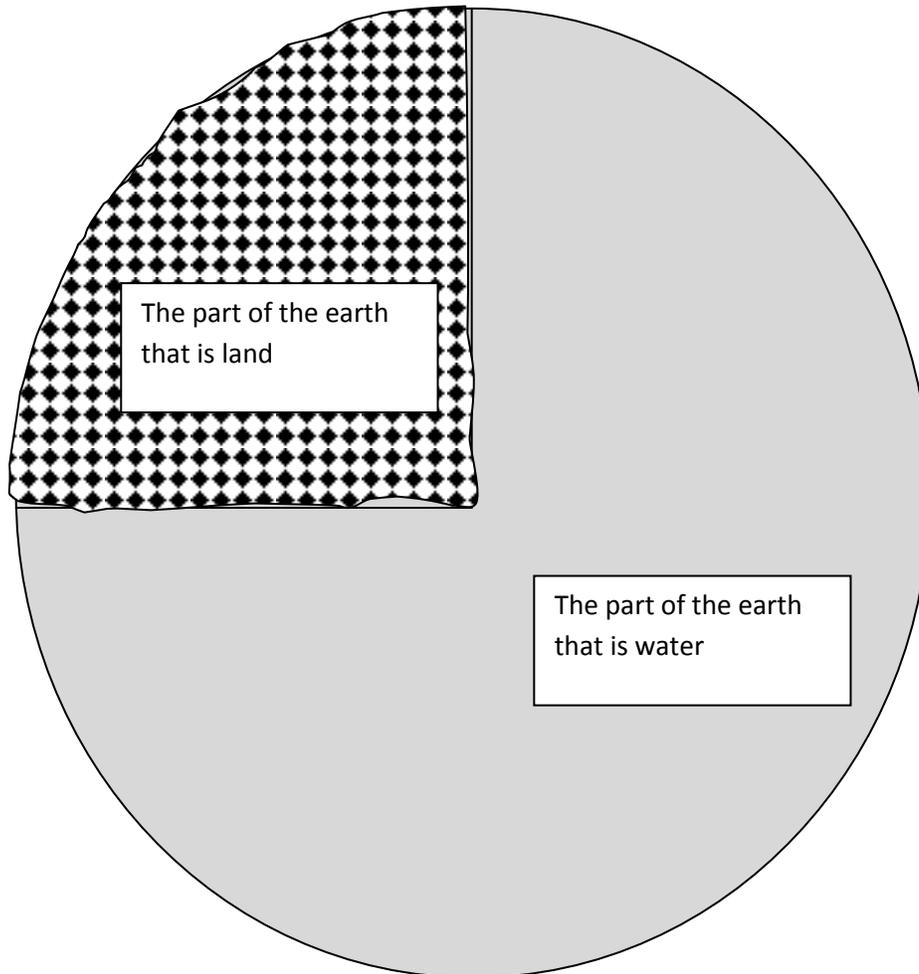


This is not easy! All the pieces must be equal size, as much as possible. This requires careful work. Encourage the learners to figure out how to do it.

Then, if there are 6 men and 8 women in the class, and we decided to shade in the number of men, we must shade in 6 of the pieces ☐

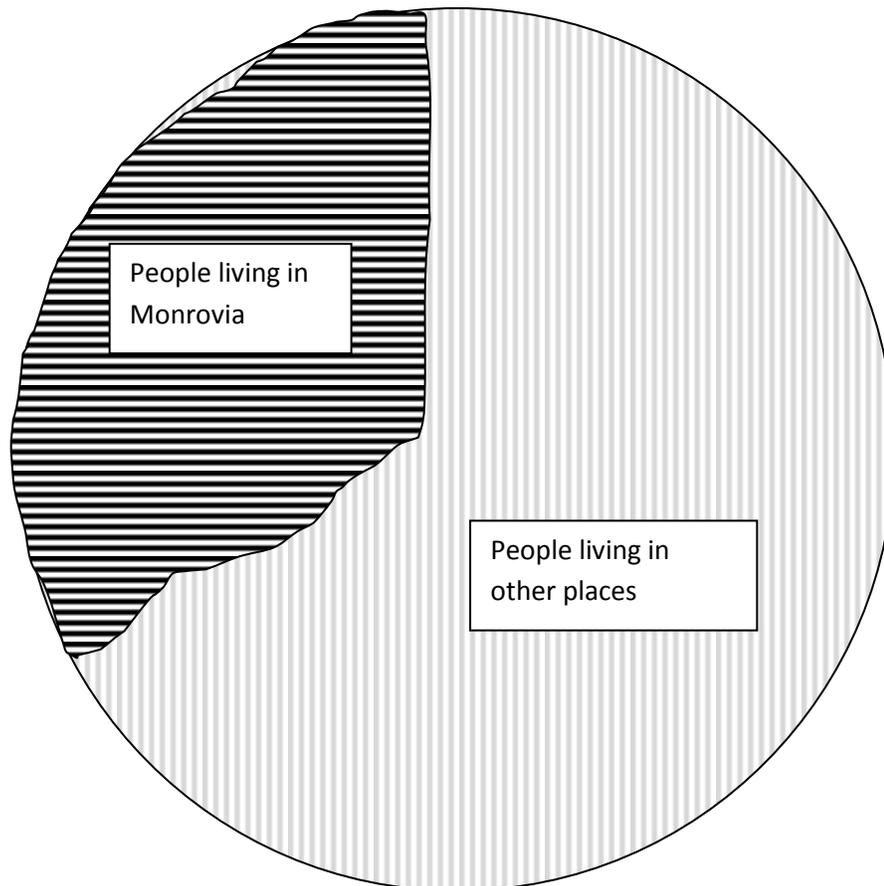
The circle sections should then be labeled, as shown in the other graphs.

The Amount of Water and Land on
the Earth



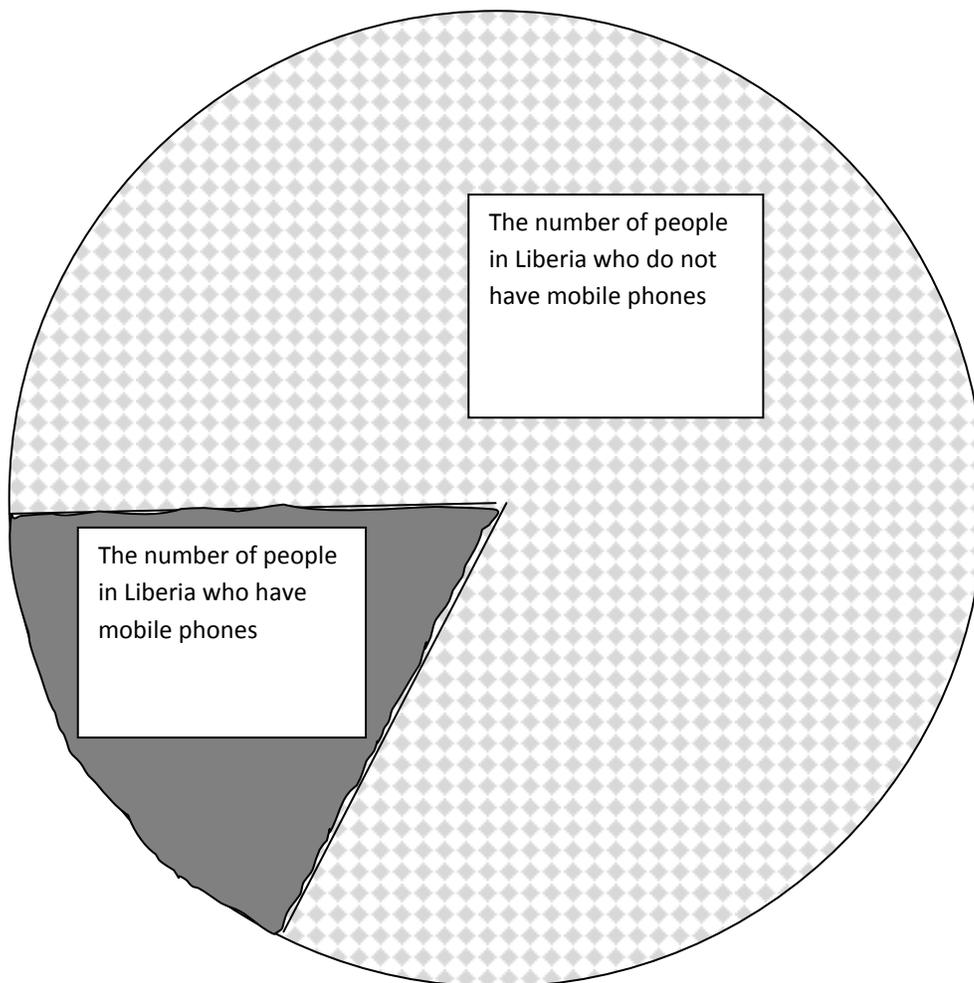
- What does this circle graph tell you?
- Is the earth mostly water, or mostly land?
- Does this information surprise you?

Where People Live in Liberia



- What does this circle graph tell you?
- Do more people live in Monrovia, or in other parts of the country?
- Why do you think this is?

Mobile Phones in Liberia

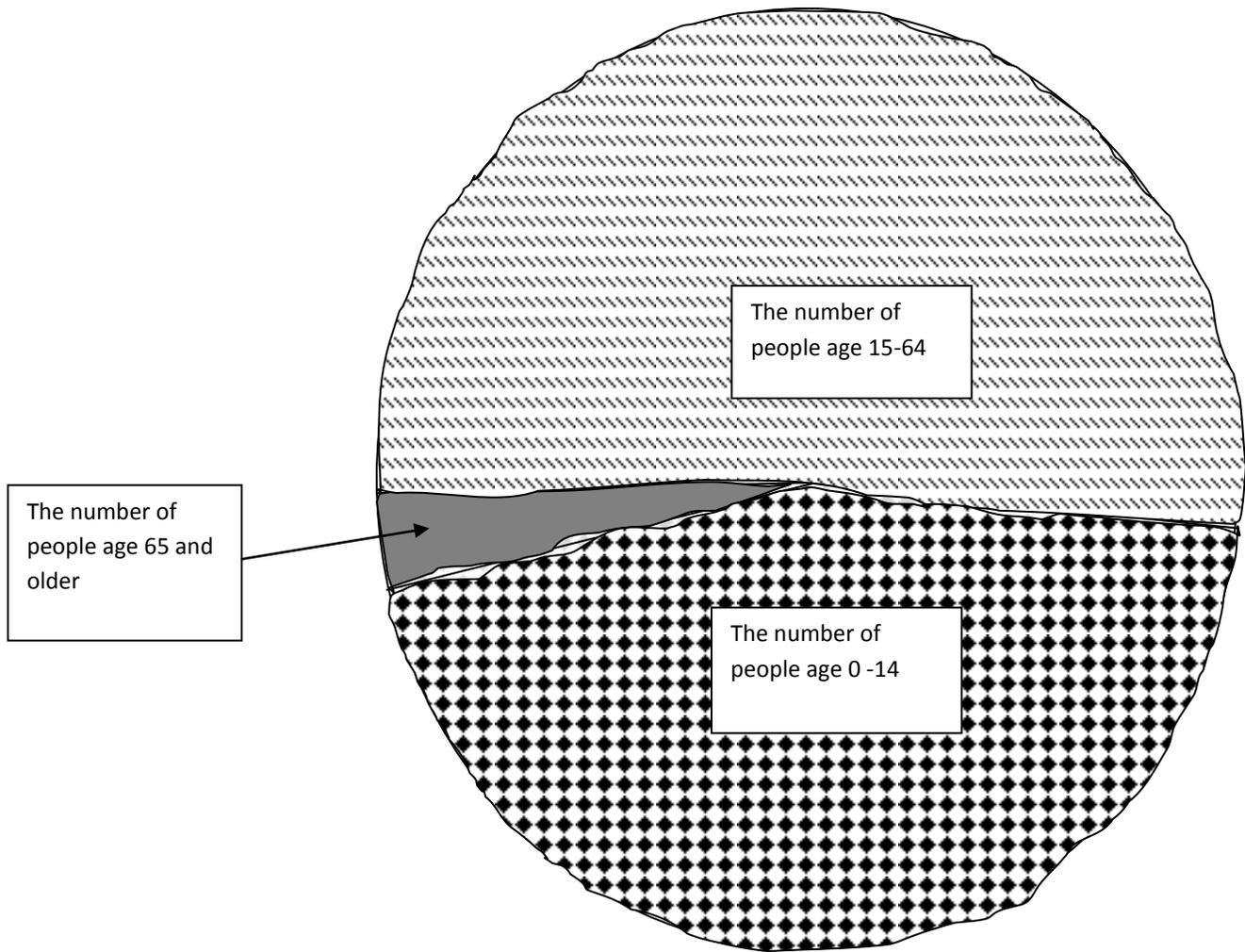


- What does this circle graph tell you?
- Is it more common to have a mobile phone, or to NOT have a phone?
- Do you think this situation changing in Liberia?

Age of People in Liberia

Level 1, Semester 1

Alternative Basic Education Curriculum, June 10, 2011



- What does this circle graph tell you about Liberia?
- Which age group are most people in Liberia?
- Which age group is the least number of people in Liberia?

Background Information:

This final lesson of the Module is an opportunity to do a brief evaluation of the learners' mastery of the concepts taught in this module. The class should be structured so that about 20 minutes is taken with the learners completing the evaluation questions, and the rest of the class should be spent discussing the answers to the questions.

Learners should be able to:

- Properly set up calculation problems using the operational symbols $+$, $-$, \times , \div , $=$
- Solve 2-digit addition and subtraction problems
- Understand the concepts of and relationship between multiplication and division
- Know the multiplication tables and be able to use them for solving division
- Interpret number patterns
- Represent fractional quantities
- Apply mathematical concepts to real life
- Interpret basic information from a circle graph
- Based on what you see with the learners' results, you will be able to help them identify what areas they need to continue to practice in, or get extra help so they can master the topics in order to continue successfully to Module C.

Module B:

Lesson 54: EVALUATION

Lesson Learning Objectives:

- To review the topics learned in the module
- To check for overall mastery of the topics

Preparation and Materials:

- Chalkboard and chalk
- A set of a variety of problems to solve, made up of addition, subtraction, multiplication and division problems as well as fractions, included below.

Opener: No opener activity. Explain the evaluation process of answering the questions and then discussing the answers, as with the Module A Evaluation.



Activities

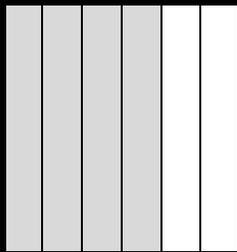
Step 1: Write the following problems on the board. The learners should copy the problems and work them out in their notebooks. They can use their addition charts and their multiplication charts, but they should work alone.

QUESTIONS:

1. $\begin{array}{r} 56 \\ +27 \\ \hline \end{array}$	2. $\begin{array}{r} 88 \\ - 62 \\ \hline \end{array}$	3. $\begin{array}{r} 73 \\ - 59 \\ \hline \end{array}$	4. Write the fraction of the rectangle that is shaded →	
6. If you have \$75 and you spend \$23, how much do you have left?	7. Kika has to take 3 pills every day for 5 days. How many pills will she take	8. What is $72 \div 8$?	9. Which is bigger, $\frac{1}{2}$ or $\frac{1}{4}$?	10. Complete the pattern: 5, 10, 15, 20, __, __, __

	all together?			
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ANSWERS:

<p>1.</p> $\begin{array}{r} 56 \\ +27 \\ \hline 83 \end{array}$	<p>2.</p> $\begin{array}{r} 88 \\ -62 \\ \hline 26 \end{array}$	<p>3.</p> $\begin{array}{r} 73 \\ -59 \\ \hline 14 \end{array}$	<p>4. Write the fraction of the rectangle that is shaded → $\frac{4}{6}$</p> 	
<p>6.</p> <p>If you have \$75 and you spend \$23, how much do you have left?</p> <p>$75 - 23 = \\$52$</p>	<p>7.</p> <p>Kika has to take 3 pills every day for 5 days. How many pills will she take all together?</p> <p>$3 \times 5 = 15$</p>	<p>8.</p> <p>What is $72 \div 8$?</p> <p>9</p>	<p>9.</p> <p>Which is bigger, $\frac{1}{2}$ or $\frac{1}{4}$?</p> <p>$\frac{1}{2}$ is bigger</p>	<p>10.</p> <p>Complete the pattern: 5, 10, 15, 20, <u>25</u>, <u>30,35</u></p>