THE PRESIDENT'S
RECOVERY
PRIORITIES
Education

Ministry of Education, Science and Technology

Lesson plans for

PRIMARY *Mathematics*

6
CLASS

1
TERM

NOT FOR SALE

Foreword

Our country's future lies in the education of our children. The Government of Sierra Leone is committed to doing whatever it takes to secure this future.

As Minister of Education, Science and Technology since 2007, I have worked every day to improve our country's education. We have faced challenges, not least the Ebola epidemic which as we all know hit our sector hard. The Government's response to this crisis – led by our President – showed first-hand how we acted decisively in the face of those challenges, to make things better than they were in the first place.

One great success in our response was the publication of the Accelerated Teaching Syllabi in August 2015. This gave teachers the tools they needed to make up for lost time whilst ensuring pupils received an adequate level of knowledge across each part of the curriculum. The Accelerated Teaching syllabi also provided the pedagogical resource and impetus for the successful national radio and TV teaching programs during the Ebola epidemic.

It is now time to build on this success. I am pleased to issue new lesson plans across all primary and JSS school grades in Language Arts and Mathematics. These plans give teachers the support they need to cover each element of the national curriculum. In total, we are producing 2,700 lesson plans – one for each lesson, in each term, in each year for each class. This is a remarkable achievement in a matter of months.

These plans have been written by experienced Sierra Leonean educators together with international experts. They have been reviewed by officials of my Ministry to ensure they meet the specific needs of the Sierra Leonean population. They provide step-by-step guidance for each learning outcome, using a range of recognised techniques to deliver the best teaching.

I call on all teachers and heads of schools across the country to make best use of these materials. We are supporting our teachers through a detailed training programme designed specifically for these new plans. It is really important that these Lesson Plans are used, together with any other materials you may have.

This is just the start of education transformation in Sierra Leone. I am committed to continue to strive for the changes that will make our country stronger.

I want to thank our partners for their continued support. Finally, I also want to thank you – the teachers of our country – for your hard work in securing our future.

Dr. Minkailu Bah

Minister of Education, Science and Technology

Table of Contents

PRIMARY

Mathematics

Introduction

to the Lesson Plan Manual

These lesson plans are based on the National Curriculum and meet the requirements established by the Ministry of Education, Science and Technology.

1 The lesson plans will not take the whole term, so use spare time to review material or prepare for exams

2 Teachers can use other textbooks alongside or instead of these lesson plans.

3 Read the lesson plan before you start the lesson. Look ahead to the next lesson, and see if you need to tell pupils to bring materials for next time.

4 Make sure you understand the learning outcomes, and have teaching aids and other preparation ready – each lesson plan shows these using the symbols on the right.

5 Quickly review what you taught last time before starting each lesson.

6 Follow the suggested time allocations for each part of the lesson. If time permits, extend practice with additional work.

7 Lesson plans have a mix of activities for the whole class and for individuals or in pairs.

8 Use the board and other visual aids as you teach.

9 Interact with all students in the class – including the quiet ones.

10 Congratulate pupils when they get questions right! Offer solutions when they don't, and thank them for trying.

Learning outcomes

Teaching aids

Preparation

Lesson Title: Place value system up to 1,000,000	**Theme:** N & N Knowing and using numbers up to 1,000,000	
Lesson Number: M-06-001	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to tell the place value of any digit of a number up to 1,000,000.	**Teaching Aids** None	**Preparation** Draw the place value table for the lesson.

Opening *(2 minutes)*

1. **Say:** Today we are going to learn about the place value system. This means that we will learn how much or what value each digit in a big number represents.
2. **Write** the number 978,264 on the board.
3. **Ask:** Can somebody tell me how to read this number? Raise your hand to answer. (Answer: Nine hundred seventy-eight thousand, two hundred sixty-four)
4. Accept answers until a pupil gives the correct answer to the question.
5. **Say:** Today we will learn how much each of those digits represents.

Introduction to the New Material *(10 minutes)*

1. Draw a table on the board that represents place value as shown. Use the number from the opening to explain place value.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
	9	7	8	2	6	4

2. Explain each of the place values in the original number. Go through each digit and explain what it represents numerically.
3. **Say**: The 9 represents 900,000; the 7 represents 70,000; the 8 represents 8000; the 2 represents 200; the 6 represents 60; and the 4 represents 4
4. **Write** and **say:** Another way to look at this is by expanding the number:
   978,264 = 900,000 + 70,000 + 8000 + 200 + 60 + 4
5. Then extend the table to have another row. Put the number 1,000,000 into the table and explain what 1 million looks like with place value and that the seventh digit to the left represents millions.

Guided Practice *(10 minutes)*

1. **Write** and **say**: What is the place value and value of the 5 in 85,987?

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
	9	7	8	2	6	4
		8	**5**	9	8	7

2. **Say**: You can see that the place value for the 5 is Thousands so the 5 represents 5000.
3. Extend the table to have 5 more rows. Put the following numbers into the table:
   a. 82,037 (Answer: units, 7 x 1 = 7 or seven)
   b. 173,024 (Answer: ten thousands, 7 x 10,000 = 70,000 or seventy thousand)
   c. 7465 (Answer: thousands, 7 x 1000 = 7000 or seven thousand)
   d. 798,346 (Answer: hundred thousands, 7 x 100,000 = 700,000 or seven hundred thousand)
   e. 183,675 (Answer: tens, 7 x 10 = 70 or seventy)
4. Give pupils 2 minutes to identify the place value and value of the digit 7 in each of the numbers and to write their answers on a piece of paper. Remind pupils to look at the table columns to identify place value.
5. Once pupils have thought about their answers, they will compare answers with their partner for 1 minute.
6. Once partners have come to an agreement, call on pairs to share their answers.

Independent Practice *(10 minutes)*

1. Extend the table to have 5 more rows. Put the following numbers into the table and ask pupils to copy them into their exercise book.
   a. 183,452 (Answer: a. 4 x 100 = 400; b. 3,000)
   b. 173 (Answer: a. 1 x 100 = 100; b. 3)
   c. 396,087 (Answer: a. 0 x 100 = 0 hundreds; b. 300,000)
   d. 17,930 (Answer: a. 9 x 100 = 900; b. 3 x 10 = 30)
   e. 937,276 (Answer: a.2 x 100 = 200; b. 3 x 10,000 = 30,000)
2. Ask pupils to write down in their exercise books:
   a. Which digit is in the 'Hundreds' place for each example and what that number represents?
   b. What does the digit 3 represents in each example?
3. Walk around the room to answer questions and to see how pupils are doing as they answer the two prompts.

4. Once pupils are finished, invite pupils to raise their hands to share their answers. Call on different pupils who have raised their hands to share their answers. Record the correct responses on the board.

Closing *(3 minutes)*

1. **Say**: Place value is important to understand how much numbers represent in value.
2. **Ask**: When is place value important to use? Raise your hand to answer.

(Example answers: when you are paying a bill; when you are adding or subtracting numbers with different place value)

Lesson Title: Counting forward and backwards from any number in multiples of powers of 10 up to 1,000,000	**Theme:** N & N Knowing and using numbers up to 1,000,000	
Lesson Number: M-06-002	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to count forwards and backwards from any number in multiples of powers of 10 up to 1,000,000.	None	None

Opening *(5 minutes)*

1. **Say:** Today we are going to count using different powers of 10. We will use what we learned yesterday about place value to count. First we will review place value.
2. **Write** the number 3,927,854 on the board.
3. **Ask**: What does each digit represent in this number? Raise your hand to answer.
   (Answer: 3 = 3 million; 9 = nine hundred thousand; 2 = twenty thousand; 7 = seven thousand; 8 = eight hundred; 5 = fifty; and 4 = four)
4. **Say:** Today we will learn how each of those place values increases and decreases by counting forwards and backwards.

Introduction to the New Material *(10 minutes)*

1. Have pupils raise their hands and ask a pupil to choose a number. It doesn't matter what the number is. Write the number on the board. Then, ask pupils to count forward from that number by 1. This can be done chorally as a whole class or pupils can be chosen individually to give the next number. As pupils say the numbers, write them on the board in rows of 10. For example, if pupils started at 23, numbers 23 – 32 would be in the first row, and then 33 will be written below 23. This is important because it will highlight what is changing.
2. Once a few rows are on the board, stop the pupils from counting. Emphasise that the unit's place is what is changing as they count forward.
3. Point to the 23, 33, and 43 in each row and show pupils that if they look down each row, they are counting by tens and the tens place is the only thing that is changing going through the rows.
4. **Say**: The powers of ten are 1; 10; 100; 1000; 10,000; 100,000; and 1,000,000. Tell pupils that they can easily count forward or backward by any power of ten by increasing or decreasing the number in that specific place value

Guided Practice *(7 minutes)*

1. Rewrite, if erased, the number 3,927,854 on the board.
2. Tell pupils that they will be counting backwards by hundred thousands. With pupils, write a list on the board of the next 10 numbers if they are counting backwards by hundred thousands.

(3,827,854; 3,726,854; 3,627,854; 3,527,854; 3,427,854; 3,327,854; 3,227,854; 3,127,854; 3,027,854; 2,927,854).

3. **Ask:** What do you notice changed in the last number? Raise your hand to answer. (Answer: The millions place had to change to a 2 because there were zero hundred thousands left.)
4. Use this time to make sure pupils know that sometimes other place values are affected by our counting.
5. If time permits, count up from the same example with the class by thousands to show how the ten thousands place changes when we increase beyond 9. (3,927,854; 3,928,854; 3,929,854; 3,930,854; 3,931,854)

Independent Practice *(10 minutes)*

1. Pupils will use the number 5,183,978 and count 5 times by the following:
   a. Forwards by hundreds (Answer: 5,184,078; 5,184,178; 5,184,278; 5,184,378; 5,184,478)
   b. Backwards by thousands (Answer: 5,182,978; 5,181,978; 5,180,978; 5,179,978; 5,178,978)
   c. Forwards by tens (Answer: 5,183,988; 5,183,998; 5,184,008; 5,184,018; 5,184,028)
   d. Backwards by ten thousands (Answer5,173,978; 5,163,978; 5,153,978; 5,143,978; 5,133,978)
2. During this time, walk around the room and assess if pupils understand what they are doing.
3. After 5 minutes, invite one pupil per question to come to the board and write the answers. With pupils, discuss if the answers put on the board are correct and how to change them if they need improvement.

Closing *(3 minutes)*

1. Remind pupils that this is important to understand how numbers are changing as they increase.
2. **Ask:** Can you think of a time when knowing this might be useful? Raise your hand to answer. (Example answers: when counting money; when figuring out how much things may cost at the market; when counting in large groups; when counting tally marks)
3. **Say:** Good job today pupils! You learned how to count forwards and backwards by powers of 10.

Lesson Title: Write and read numbers in numerals up to 1,000,000	**Theme:** N & N Knowing and using numbers up to 1,000,000	
Lesson Number: M-06-003	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to write and read numbers up to 1,000,000.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** Today we are going to use what we learned over the past two lessons to be able to read big numbers. The most important thing we need to remember is that it is important to know our place value names. We already know how to read smaller numbers, so let's practice some of those.
2. **Write** the following numbers on the board and have a pupil read them out loud.
   a. 534 (Answer: five hundred thirty-four)
   b. 802 (Answer: eight hundred and two)
3. **Say:** Now you will practice writing numbers when say them out loud. The first number is three hundred seventy-eight. Please write your answer in your exercise book.
4. Then have one pupil write their answer on the board. (378)

Introduction to the New Material *(10 minutes)*

1. **Say:** You did a good job on being able to say and write numbers using the hundreds place. Now we will practice the same skills with numbers bigger than that up to 1,000,000.
2. **Write** the following number on the board: 2,755,863. The teacher will show pupils that numbers are grouped in threes and separated by commas.
3. **Say:** You read each number to the left of the comma as though it is its own number and then tell the place when you get to the comma. For example, this number on the board is read as two million, seven hundred fifty-five thousand, eight hundred and sixty-three.
4. Point to the number as they are reading it, emphasising the 755 before they say thousand.
5. **Say:** The same thing is true when you write numbers that are large. You must listen for words like 'million' and 'thousand' so that you know when to write a comma. Let's try one. Write the number in your exercise book as I say it.
6. **Say:** Three million, seven hundred eighty-three thousand, nine hundred seven.
7. Repeat the number two more times so pupils can hear it correctly. Circulate as they read the number to ensure pupils are getting it.
8. Repeat the number one last time and write it on the board as they say it, with emphasis on the commas.
9. Repeat steps 2 – 7 for 874,063. (Answer: eight hundred seventy-four thousand, sixty-three)

Guided Practice *(7 minutes)*

1. **Write** six numbers on the board. Pupils will be called on at random to practice reading the numbers to the class. Have pupils copy the number in written words as pupils say it aloud.
   a. 17,824 (Answer: seventeen thousand, eight hundred and twenty-four)
   b. 827,012 (Answer: eight hundred twenty-seven thousand and twelve)
   c. 8,927,734 (Answer: eight million nine hundred twenty-seven thousand, seven hundred and thirty-four)
   d. 7,283,417 (Answer: seven million, two hundred eighty-three thousand, four hundred and seventeen)
   e. 142,705 (Answer: one hundred forty-two thousand, seven hundred and five)
   f. 6,000,354 (Answer: six million, three hundred fifty-four)
2. Read three numbers and have pupils come to the board to write them using numerals.
   a. Seven million, eight hundred thirty-two thousand, one hundred and forty-seven (Answer: 7,832,147)
   b. Two hundred forty-one thousand, five hundred and seventy (Answer: 241,570)
   c. Five million and twenty-six (Answer: 5,000,026)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 10 numbers on the board. Pupils will work in pairs practicing reading the numbers.
2. Pupils will then work with their partners to come up with their own practice. Partners will alternate roles. One partner will say a number while the other pupil writes it down. They will compare the answers to see if they got it right.

Closing *(3 minutes)*

1. Conclude class by asking pupils what they found to be the easiest part of the lesson. Also, ask pupils what was the most difficult part.
2. Tell pupils that they will practice reading and writing numbers in words tomorrow.
3. **Say**: Good job today pupils! Today you learned how to read and write numbers up to 1,000,000.

Lesson Title: Write and read numbers in words up to 1,000,000	**Theme:** N & N Knowing and using numbers up to 1,000,000	
Lesson Number: M-06-004	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Read numbers in words up to 1,000,000. 2. Write numbers in words.	None	None

Opening *(3 minutes)*

1. **Say:** As you know, we have been working with numbers and place value up to the millions place. We have learned how to read big numbers that are written numerically.
2. **Write** 8,920,328 on the board. Ask for a volunteer to read the number. The pupil should say: eight million, nine hundred twenty thousand, three hundred and twenty-eight.
3. **Say:** Today we are going to learn how to write numbers using words. This is like writing out the full name for a number as we say it.

Introduction to the New Material *(10 minutes)*

1. **Write** the following words on the board to assist pupils in writing the names of numbers and to ensure spelling: one; two; three; four; five; six; seven; eight; nine; hundred; thousand; ten thousand; hundred thousand; million.
2. **Say:** The words on the board are here to help you. They are not the only words you will use to write big numbers, but they are important to be successful. We write numbers in words the same way we read them.
3. Refer back to the number 8,920,328 that was written on the board. Read the number as was done at the beginning of class. Invite a pupil to write the words to correspond with each number. (Answer: 8,920,328 = eight million, nine hundred twenty thousand, three hundred and twenty-eight)
4. Remind pupils that we use the major place value words (million and thousand) whenever there is a comma and otherwise write the number out in three digit segments.
5. **Write** a new number, 896,283, on the board.
6. **Say:** Let's look at the new number on the board. We only have one comma and six digits, so we know that we go up to the hundred thousands place value. We can look at the first part of this number and see eight hundred ninety-six. We will write that next to the number.
7. **Write** 'eight hundred ninety-six' on the board. Then explain that since there is a comma (and only one), that we will write thousand next to indicate that there are eight hundred and ninety-six thousands. Continue by showing pupils that we then write 'two hundred and eighty-three' to finish the number.

8. **Say:** As you can see from the number written on the board, we read and write numbers in words the exact same way. This number is 'eight hundred ninety-six thousand, two hundred and eighty-three'.

Guided Practice *(7 minutes)*

1. **Write** three numbers on the board. Pupils will be asked to try to write them out in words in their exercise books. Give pupils some time to try it. Then call their attention as you write the correct numbers in words on the board.
   a. 17,824 (Answer: seventeen thousand, eight hundred and twenty-four)
   b. 827,012 (Answer: eight hundred twenty-seven thousand and twelve)
   c. 8,927,734 (Answer: eight million, nine hundred twenty-seven thousand, seven hundred and thirty-four)
2. **Write** three numbers in words on the board. Ask pupils to write them using numerals. Give pupils some time to try it. Then call their attention as you write the correct numbers in numerals on the board.
   a. Seven million, eight hundred thirty-two thousand, one hundred and forty-seven (Answer: 7,832,147)
   b. Two hundred forty-one thousand, five hundred and seventy (Answer: 241,570)
   c. Five million and twenty six (Answer: 5,000,026)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 5 numbers in words and 5 numbers in numerals on the board. Pupils will work in their exercise books by writing the numbers out in words or numerals as needed.
2. Pupils will then work with their partners to compare their answers. If there are any differences, pupils will try to come up with the correct solution.
3. Walk around and help any groups who are having difficulty.

Closing *(3 minutes)*

1. **Ask**: What word do we replace the commas with when writing out numbers? Raise your hand to answer. (Answer: We replace the comma with million or thousand)
2. **Say**: Good job today pupils! You learned how to write very large numbers using their numerals and in words.

Lesson Title: Compare and order numbers up to 1,000,000 using place value and the number line	**Theme:** N & N Knowing and using numbers up to 1,000,000	
Lesson Number: M-06-005	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to compare and order numbers up to 1,000,000.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** As you know, we have been working with numbers and place values up to millions place. Today we are going to learn how to compare numbers by looking at their place value.
2. **Ask:** Who can tell me which place value we have learned about represents the biggest amount? Raise your hand to answer. (Answer: millions)
3. **Say:** Today we are going to remember that the places to the left represent the bigger amounts, and we will use that idea to compare numbers.
4. **Write** the numbers 53 and 23 on the board.
5. **Ask:** Which number is bigger? Raise your hand to answer. (Answer: 53)
6. **Say:** There are five Tens in 53 but only two Tens in 23. Because there are more Tens in 53, that number is bigger.

Introduction to the New Material *(10 minutes)*

1. **Write** the numbers 5,827,392 and 5,832,834 on the board, one on top of the other so that place values are aligned vertically. Call attention to the place values and show pupils that the place values are aligned to make comparing easier.
2. Start with the millions place and ask pupils which number has more millions. Pupils should recognise that both numbers have 5 millions.
3. **Say**: Both numbers have 5 millions so we move to the next place value and work backwards until we have 2 numbers to compare.
4. Do the same thing for Hundred Thousands, and pupils should recognise that both numbers have the same amount of hundred thousands. Then move on to Ten Thousands. Pupils should see that one number has 3 Ten Thousands while the other has only 2 Ten Thousands.
5. **Say**: Since one has more Ten Thousands, we say that 5,832,834 is the bigger number.
6. **Write** a different pair of numbers: 4,824,016 and 3,028,472. Go through the same process of asking pupils which is larger by comparing millions first. This example has more millions in 4,824,016, and pupils should see that it is the bigger number very quickly.
7. **Write** one last pair of numbers: 7,286,283 and 482,377. Tell pupils that they need to align place values in order to compare the numbers. This example is a little different because the second number does not have millions. This might be the most obvious as far as which is bigger, but use this example to emphasise comparing like place values.

8. Tell pupils that when they write numbers in order, they should write them from least to greatest (smallest on the left to biggest on the right). This is the same way that numbers are ordered on a number line. Show this order by drawing one example on a number line on the board.

Guided Practice *(7 minutes)*

1. Ask pupils to try an example in their exercise books. Write the following numbers on the board: 876,542 and 876,647. Add a number line beneath it with tick marks of tens between 876,520 and 876,670. Ask pupils to compare the numbers by place value. Once pupils have their answer, ask them to check their work by putting the numbers on the number line to see if they are correct.
2. Circulate and help pupils who are struggling. Once all pupils have gotten an answer, go over the answer with the class and show them how to check their work using a number line.
3. Ask pupils to try another example, this time with three numbers, in their exercise book. Write the following numbers on the board: 1,428,834; 1,527,273; and 1,527,142. Ask pupils to order the numbers from least to greatest in their exercise books. They can check their work using a number line.
4. Once all pupils have gotten an answer, ask for pupil responses. Confirm when the right answer is provided. (Answer: 1,428,834; 1,527,142; 1,527,273)

Independent Practice *(10 minutes)*

1. Put a list of groups of numbers for pupils to compare and write from least to greatest. Pupils will do this work in their exercise books.
   a. 4,827,327 and 4,827,482 (Answer: 4,827,327; 4,827,482)
   b. 5,273,273 and 5,723,723 (Answer: 5,273,273; 5,723,723)
   c. 823,273 and 1,823,273 (Answer: 823, 273; 1,823,273)
   d. 183,273 and 2,183,273 and 1,283,273 (Answer: 182,273; 1,283,273; 2,183,273)
2. Once pupils have had a chance to try the examples, ask them to share their answers with their partners and compare and discuss any differences in solutions.

Closing *(3 minutes)*

1. Conclude class by asking pupils if they have any further questions about place value and numbers up to 1,000,000.
2. Inform pupils that they will be working with even bigger numbers in the next lesson.
3. **Ask:** Can anyone guess what the next place value will be that is just bigger than millions? Raise your hand to answer. (Answer: 10 million).

Lesson Title: Place value system up to 10,000,000	Theme: N & N Knowing and using numbers up to 10,000,000	
Lesson Number: M-06-006	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to tell the place value of any digit of a number up to 10,000,000.	None	None

Opening *(2 minutes)*

1. **Say:** We have already learned numbers up to the millions, but today we are going to learn about even bigger numbers.
2. **Write** the number 7,978,264 on the board.
3. **Ask:** Can somebody tell me how to read this number? Raise your hand to answer.
   (Answer: Seven million, nine hundred seventy-eight thousand, two hundred sixty-four)
4. Accept answers until a pupil gives the correct answer to the question.
5. **Say:** Today we will learn about place value up to the Ten Millions place.

Introduction to the New Material *(10 minutes)*

1. Create a table on the board that represents place value as shown. Use the number 37,976,542 to explain the new place value.

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units
3	7	9	7	6	5	4	2

2. Explain each of the place values in the number. Go through each digit and explain that the first digit represents 30,000,000. Ask pupils to tell what the other digits represent as a review from the prior week's classes.
3. Explain that each digit in the Ten Millions place represents Ten of the Millions. Emphasise that this is true for each transition between place values.

Guided Practice *(10 minutes)*

1. Extend the table to have 5 more rows. Write the following numbers into the table.
   a. 18,352,037

   b. 5,173,024
   c. 85,007,469
   d. 50,798,346
   e. 44,183,675
2. Give pupils 2 minutes to identify the place value of the digit 5 in each of the numbers and to write their answers in their exercise books. Remind pupils to look at the table columns to identify place value.
3. Once pupils have thought about their answers, ask them to compare answers with their partner for 1 minute.
4. Once partners have come to an agreement, call on pairs to share their answers. The correct answers to this prompt are below.
   a. 50,000 (Answer: fifty thousand)
   b. 5,000,000 (Answer: five million)
   c. 5,000,000 (Answer: five million)
   d. 50,000,000 (Answer: fifty million)
   e. 5 (Answer: five)

Independent Practice *(10 minutes)*

1. Extend the table to have 5 more rows. Write the following numbers into the table and ask pupils to copy them into their exercise book.
   a. 63,183,452 (Answer: 60,000,000; 60,000,000)
   b. 17,060,173 (Answer: 10,000,000; 60,000)
   c. 42,396,087 (Answer: 40,000,000; 6,000)
   d. 52,617,930 (Answer: 50,000,000; 600,000)
   e. 22,937,276 (Answer: 20,000,000; 6)
2. Ask pupils to write down in their exercise books which digit is in the Ten Millions place for each example and what that number represents. Pupils will also be asked to tell what the digit 6 represents in each example.
3. Walk around the room to answer questions and to see how pupils are doing as they answer the two prompts.
4. Once pupils are finished, invite different pupils, whose hands are raised, to share their answers. Record the correct responses on the board.

Closing *(3 minutes)*

1. **Say**: Place value is important to understand how much numbers represent or what their value is.
2. Ask pupils to write down in their exercise books when place value is used in their lives.
3. **Say**: Good job today pupils, you learned about the new place value, Ten Millions, today.

Lesson Title: Counting forward and backwards from any number in multiples of powers of 10 up to 10,000,000	**Theme:** N & N Knowing and using numbers up to 10,000,000	
Lesson Number: M-06-007	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to count forwards from any number in multiples of powers of 10 up to 10,000,000.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We have already learned how to count forwards and backwards by powers of ten, or by place value, with numbers up to 1,000,000. Today we are going to show that we can follow the same process for numbers up to 10,000,000.
2. **Write** 2,398,839 on the board. Ask for a volunteer to count forward by 100,000. The pupil will count forwards by 100,000 ten times. The pupil should respond with: 2,398,839; 2,498,839; 2,598,839; 2,698,839; 2,798,839; 2,898,839; 2,998,839; 3,098,839; 3,198,839; 3,298,839. Write the numbers on the board as the pupil says them.
3. **Ask:** Can anyone tell me what is changing as we count forwards by 100,000? Raise your hand to answer. (Example answer: The place value in the 100,000 is increasing by one each time.)
4. Pupils should notice that the hundred thousands place is increasing by 1 each time.
5. Ask: What happens when we reach the 9 in the hundred thousands place? Raise your hand to answer. (Answer: The millions place then increases by 1 more, the hundred thousands changes to zero again and then you increase by 1.)

Introduction to the New Material *(10 minutes)*

1. **Say:** Just as we did last week, we will be counting forwards by powers of ten, but this time we will count up to the ten millions place.
2. **Write** the following number on the board: 12,037,421. Tell pupils that they are going to count forward by 1 million. While reading the number, the teacher will write the next ten numbers: 12,037,421; 13,037,421; 14,037,421; 15,037,421; 16,037,421; 17,037,421; 18,037,421; 19,037,421; 20,037,421; 21,037,421
3. Show pupils that when we count forwards by millions that place increases. Highlight what happens as the millions place changes from 19 million to 20 million and how that makes the ten millions place increase.
4. Tell pupils to think about the number 12,037,421 again. Tell pupils that they will now count forward by Ten Millions. Explain that there will be an increase in the Ten Millions place. Write the next numbers on the board as they count up by Ten Millions: 12,037,421; 22,037,421; 32,037,421; 42,037,421; 52,037,421; 62,037,421; 72,037,421; 82,037,421; 92,037,421.
5. Remind pupils that they can no longer count up by ten millions without knowing the next place value.

Guided Practice *(10 minutes)*

1. **Write** the number 18,203,382 on the board. Have pupils raise their hands. Call on pupils one at a time to give the next number as they count forward by ten million. The pupils should give the following responses: 28,203,382; 38,203,382; 48,203,382; 58,203,382; 68,203,382; 78,203,382; 88,203,382; 98,203,382.
2. Assist pupils if they make a mistake.
3. **Write** another number on the board: 3,291,445. Ask pupils to independently count forward by ten million and write their responses in their exercise books. Remind pupils that there are zero ten millions in the given number to help them get started.
4. While pupils are working independently, walk around and make sure they are on task. Once pupils finish independent work, ask them to share their responses with their partner. Ask pairs if there were any differences that need to be explained.
5. **Write** the correct answer on the board for pupils to check their work. (Answer: 3,291,445; 13,291,445; 23,291,445; 33,291,445; 43,291,445; 53,291,445; 63,291,445; 73,291,445; 83,291,445; 93,291,445)

Independent Practice *(10 minutes)*

1. **Write** four numbers on the board and ask pupils to write the next 5 numbers if they count forwards by ten millions.
   a. 34,827,374 (Answer: 44,827,374; 54,827,374; 64,827,374; 74,827,374; 84,827,374)
   b. 10,392,328 (Answer: 20,392,328; 30,392,328; 40,392,328; 50,392,328; 60,392,328)
   c. 3,237,927 (Answer: 13,237,927; 23,237,927; 33,237,927; 43,237,927; 53,237,927)
   d. 52,203,928 (Answer: 62,203,928; 72,203,928; 82,203,928; 92,203,928; 102,203,928)
2. After about 8 minutes, write the answers on the board so pupils can check their work.

Closing *(2 minutes)*

1. **Say:** Tomorrow we will continue to work with this concept, but we will focus on counting backwards by Ten Millions rather than forwards.
2. **Ask**: What do you think will happen when we count backwards? Raise your hand to answer. (Answer: The number in the ten millions place will decrease.)

Lesson Title: Counting backwards from any number in multiples of powers of 10 up to 10,000,000	**Theme:** N & N Knowing and using numbers up to 10,000,000	
Lesson Number: M-06-008	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to count backwards from any number in multiples of powers of 10 up to 10,000,000.	None	None

Opening *(3 minutes)*

1. **Say:** We have been working on counting forwards and backwards by powers of 10 from different numbers. Today we are going to work on counting only backwards by powers of 10 for numbers up to 10,000,000. But first let's review what we did yesterday.
2. **Write** 17,283,193 on the board. Ask for a volunteer to count forwards by 10,000,000. The pupil will count up by 10,000,000 ten times and write their responses on the board so all can see them. (Answer: 27,283,193; 37,283,193; 47,283,193; 57,283,193; 67,283,193; 77,283,193; 87,283,193; 97,283,193)
3. Have pupils write the correct response on the board.
4. **Ask:** Can anyone tell me what is changing as we counted up by 10,000,000? Raise your hand to answer. (Answer: The ten millions place is increasing by 1 each time.)
5. **Ask:** What would the next number be after 97,283,193 if we continued to count by Ten Million? (Answer: There will be a new place value and the number would be 107,283,193)

Introduction to the New Material *(10 minutes)*

1. **Say:** Just as we did last week, we will be counting backwards by powers of ten, but this time we will count down with the ten millions place.
2. **Write** the following number on the board: 85,345,273. Tell pupils that they are going to count backwards by Ten Million. Explain that there will be a decrease in the ten millions place. While reading the number, write the next numbers below it in a column: 75,345,273; 65,345,273; 55,345,273; 45,345,273; 35,345,273; 25,345,273; 15,345,273; 5,345,273
3. Tell pupils that they cannot count backwards by Ten Million anymore because there are fewer than Ten Million in the number. Explain that without any more ten millions or any larger place values that pupils cannot go any further. Pupils can always keep counting forwards, but counting backwards has an end point.
4. Tell pupils to think about the number 242,037,421. Tell pupils that they will count backwards by ten millions again. Write the next numbers on the board as they count down by Ten Millions: 232,037,421; 222,037,421; 212,037,421; 202,037,421; 192,037,421; 182,037,421.
5. Emphasise to pupils that they were able to continue counting backwards by Ten Million because they could reduce the hundred millions place. Take this time to show the difference between the

first example and not being able to count backwards anymore and the second example where they were able to continue counting backwards when the Ten Millions place had a zero.

Guided Practice *(10 minutes)*

1. **Write** the number 74,392,283 on the board. Have pupils raise their hands and then call on pupils one at a time to give the next number as they count backwards by ten million. The pupils should give the following responses: 64,392,283; 54,392,283; 44,392,283; 34,392,283; 24,392,283; 14,392,283; 4,392,283.
2. Assist pupils if they make a mistake. Highlight that they cannot count down any more.
3. **Write** the number 543,291,445 on the board: Ask pupils to independently count backwards by ten million and write their responses in their exercise books. Pupils should write the next ten numbers counting backwards. Remind pupils that they can keep counting down after there is a zero in the ten millions place to help them get started.
4. While pupils are working independently, walk around and make sure they are on task. Once pupils finish independent work, ask them to share their responses with their partner. Ask pairs if there were any differences that need to be explained. **Write** the correct answer on the board for pupils to check their work. 533,291,445; 523,291,445; 513,291,445; 503,291,445; 493,291,445; 483,291,445; 473,291,445; 463,291,445; 453,291,445; 443,291,445.

Independent Practice *(10 minutes)*

1. Write four numbers on the board and ask pupils to write the next 5 numbers if they count backwards by a. ten millions and b. by the place value of the underlined digit.
   a. 74,394,272
      (Answer: a. 64,394,272; 54,394,272; 44,394,272; 34,394,272; 24,394,272; b. 74,393,272; 74,392,272; 74,391,272; 74,390,272; 74,389,272)
   b. 59,394,373
      (Answer: a. 49,394,373; 39,394,373; 29,394,373; 19,394,373; 9,394,373; b. 59,394,273; 59,394,173; 59,394,073; 59,393,973; 59,393,873)
   c. 205,112,293
      (Answer: a. 195,112,293; 185,112,293; 175,112,293; 165,112,293; 155,112,293; b. 205,012,293; 204,912,293; 204,812,293; 204,712,293; 204,612,293)
   d. 32,928,271
   e. (Answer: a. 22,928,271; 12,928,271; 2,928,271; b. 32,928,270; 32,928,269; 32,928,268; 32,928,267; 32,928,266)
2. After about 8 minutes, write the answers on the board so pupils can check their work.
3. Remind pupils that they cannot count backwards in the last problem anymore by ten million.

Closing *(2 minutes)*

1. **Say:** Tomorrow we will continue to work with numbers up to the ten millions place, but we will focus on reading and writing the numbers.
2. **Say**: Good job today! You learned how to count backwards from powers of ten.

Lesson Title: Write and read numbers in numerals up to 10,000,000.	**Theme:** N & N Knowing and using numbers up to 10,000,000	
Lesson Number: M-06-009	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to write and read numbers up to 10,000,000 in numerals.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We have been working on counting forwards and backwards by powers of 10 from different numbers. Today we are going to practice reading and writing numbers up to 10,000,000 in numerals. We have already learned how to read smaller numbers, so let's practice some of those.
2. **Write** the following numbers on the board and have pupils read them out loud:
   a. 843,193 (Answer: eight hundred forty-three thousand, one hundred and ninety-three)
   b. 1,392,293 (Answer: one million, three hundred ninety-two thousand, two hundred ninety-three)
3. Invite two pupils to come to the board and write the names of the prior two examples on the board in words.

Introduction to the New Material *(10 minutes)*

1. **Say:** You are doing a great job on being able to say and write numbers. Now we will practice those same skills but with numbers up to the Ten Millions place.
2. **Write** the following number on the board: 83,283,574. Remind pupils that numbers are grouped in threes and separated by commas.
3. **Say:** Remember how we read each number to the left of the commas as though it is its own number and then we tell the place value when we get to the comma. The number written on the board is read as 'eighty-three **million**, two hundred eighty-three **thousand**, five hundred and seventy-four'.
4. Point to the number as they are reading it, emphasising the 83 before they say million. Tell pupils that we read numbers bigger than one million the same way. In this example, there were eighty-three million and the teacher should show how this is read normally before the millions place.
5. **Say:** I want you to practice writing numbers as I read them in words. Please use your exercise books to write down the number as I say it: Thirteen million, four hundred sixty-seven thousand, one hundred twenty-three.
6. Repeat the number two more times so pupils can hear it correctly. Circulate as they read the number to ensure pupils understand it.
7. Repeat the number one last time and write it on the board as they read it, with emphasis on the place value words at the commas. (Answer: 13,467,123)

Guided Practice *(10 minutes)*

1. **Write** six numbers on the board. Call on pupils at random after they raise their hands to practice reading the numbers to the class. Have pupils to copy them in their notebooks using words if they can. Assist or correct as necessary.
   a. 74,392,283 (Answer: seventy-four million, three hundred ninety-two thousand, two hundred and eighty-three)
   b. 37,293,273 (Answer: thirty-seven million, two hundred ninety-three thousand, two hundred and seventy-three)
   c. 94,927,172 (Answer: ninety-four million, nine hundred twenty-seven thousand, one hundred and seventy-two)
   d. 32,193,161 (Answer: thirty-two million, one hundred ninety-three thousand, one hundred and sixty-one)
   e. 46,271,112 (Answer: forty-six million, two hundred seventy-one thousand, one hundred and twelve)
   f. 72,944,997 (Answer: seventy-two million, nine hundred forty-four thousand, nine hundred and ninety-seven)
2. Read the following numbers and have pupils come to the board to write them using numerals.
   a. Fifty-three million, six hundred four thousand, five hundred and forty-three (Answer: 53, 604,543)
   b. Thirteen million, four hundred forty-two thousand, three hundred and seventy-nine (Answer: 13,442,379)
   c. Eighty million, eight hundred eighteen thousand, four hundred and eight (Answer: 80,818,408)

Independent Practice *(10 minutes)*

1. **Write** a list of 10 numbers on the board. Pupils will work in pairs practicing reading the numbers. (Example list: 54,678: fifty-four thousand, six hundred seventy-eight; 756,901: seven hundred fifty-six thousand, nine hundred one; 6,893: six thousand, eight hundred ninety- three; 2,345,678: two million, three hundred and forty-five thousand, six hundred and seventy- eight; 15,151,151: fifteen million, one hundred fifty-one thousand, one hundred fifty- one; 356: three hundred fifty-six; 1,987,005: one million, nine hundred eighty-seven thousand, five; 45,654: forty-five thousand, six hundred fifty-four; 200,300: two hundred thousand three hundred; 90,800,700: ninety million, eight hundred thousand, seven hundred)
2. Pupils will then work with their partners to come up with their own practice. Partners will alternate roles. One partner will say a number while the other pupil writes it down. They will compare answers to see if they got it right.

Closing *(2 minutes)*

1. Review the answers with pupils, make corrections and answer any questions.
2. Tell pupils that tomorrow they will learn how to compare and order numbers up to 10,000,000.
3. **Say**: Good job today pupils, you learned how to read and write very large numbers.

Lesson Title:		
Lesson Title: Compare and order numbers up to 10,000,000 using place value and the number line.	**Theme:** N & N Knowing and using numbers up to 10,000,000	
Lesson Number: M-06-010	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to compare and order numbers up to 10,000,000.	None	None

Opening *(3 minutes)*

1. **Say:** As you know, we have been working with numbers and place value up to millions place. Today we are going to learn how to compare numbers by looking at their place value.
2. **Ask:** Who can tell me which place value we have learned about represents the biggest amount? Raise your hand to answer. (Answer: Ten Millions)
3. **Ask:** Who remembers how we learned to compare numbers last week?
4. Have pupils raise their hands and ask 1-2 pupils to answer. (Example answers: We looked from left to right to compare digits. Once one of the digits was bigger, then that number was the bigger of the two numbers; if the number has more place values, then it is the bigger number.)
5. **Say:** We will continue doing this, but now with even larger numbers.

Introduction to the New Material *(10 minutes)*

1. **Write** 27,382,917 and 24,372,978 on the board, one on top of the other so the place values are aligned vertically. Call attention to the place values and show pupils that the place values are aligned to make comparing easier.
2. Start with the ten millions place and ask pupils which number has more millions. Pupils should recognise that both numbers have 2 ten millions. Do the same thing for the millions place. Pupils should say that the 7 is bigger than the 4 in the millions place. **Say:** Since one number has more millions that the other, we can say that 27,382,917 is bigger than 24,372,978.
3. **Write** a different pair of numbers, 82,389,172 and 67,283,173, and go through the same process of asking which number is larger by comparing ten millions first. This example has more ten millions in 82,389,172, and pupils should see that it is the bigger number rather quickly.
4. For the third example, write one last pair of numbers: 18,283,473 and 8,273,192. Remind pupils that they need to align place values in order to compare numbers. This example is a little different because they do not have the same number of digits in each number. Once the numbers are aligned on the board, show pupils that 18,283473 is the larger number because you are comparing a 1 with a 0 in the ten millions place.
5. Tell pupils that when they write numbers in order, they write them from least to greatest (smallest on the left to biggest on the right). This is the same way numbers are ordered on a number line. Show this order by drawing one of the previous examples (your choice) on a number line on the board. The order you write the numbers in is the same way the numbers appear on the number line.

Guided Practice *(10 minutes)*

1. **Write** two numbers, 18,273,281 and 18,261,273, on the board. Add a number line on the board that has a scale of 1,000 (i.e., each tick mark on the number line represents 1,000) and goes from 18,260,000 to 18,280,000. Put both numbers on the number line in their approximate place. Ask pupils to order the numbers by looking at the number line. Have pupils order the numbers by comparing place value.
2. Circulate and help pupils who are struggling. Once all pupils have an answer, go over the answer with the class and show them how to check their work. Pupils should see that they get the same order when using the number line and when comparing place values. (Answer: 18,251,273; 18,273,281)
3. Ask pupils to try another example, this time with three numbers. Write the following numbers on the board: 18,393,173; 18,372,592; 18,372,261. Have pupils order the numbers in their exercise books. They can choose either the number line method or the comparing numbers method.
4. Once all pupils have an answer, have them raise their hands to give responses. Choose 2-3 pupils to share their answer. Confirm the correct answer if it is provided or guide pupils to find the correct answer. (Answer: 18,293,173; 18,372,261, and 18,372,592)

Independent Practice *(10 minutes)*

1. Put a list of groups of numbers on the board for pupils to compare and write from least to greatest. Pupils will do this work in their exercise books.
   a. 18,273,173 and 16,273,372 (Answer: 16,273,372; 18,273,173)
   b. 77,173,172 and 77, 271,373 (Answer: 77,173,172; 77, 271,373)
   c. 172,362; 163,271; 17,273,193 (Answer: 163,271; 172,362; 17,273,193)
   d. 1,823,629; 182,371; 1,823,719 (Answer: 182,371; 1,823,629; 1,823,719)
2. Once pupils have had a chance to try the examples, ask them to share their answers with their partners. Partners will compare and discuss any differences in solutions.

Closing *(2 minutes)*

1. **Ask**: How do you know which digit to start with? Raise your hand to answer.
   (Answer: You start from the highest place value to the left.
2. Inform pupils that you will start rounding next week. Tell pupils that rounding is important to estimate an amount. This is useful to make sure you have enough money when you go to the market.
3. **Say**: Good job today pupils, you learned how to order large numbers using place value!

Lesson Title: Reading and writing numbers up to 100,000	**Theme:** N & N Numbers and rounding up to 10,000,000	
Lesson Number: M-06-011	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to read and write numbers up to 100,000	None	None

Opening *(3 minutes)*

1. **Say:** We have been working on reading and writing numbers and knowing how to best use large numbers. To do these things, we have become very familiar with place value and being able to identify how big a number is. Today and tomorrow we are going to spend the day writing numbers in words. Today we are going to focus on numbers up to the Hundred Thousands place. Tomorrow we will work on numbers up to the Ten Millions place.
2. **Ask:** Who remembers what words we say when we get to the commas when we read big numbers?
3. Have pupils raise their hands and call on pupils until someone gives the correct response. (Example Answer: We use the place value name like thousands or millions.)
4. **Say:** Today we are going to use the same ideas that we use when we read or say numbers to write them.

Introduction to the New Material *(10 minutes)*

1. Remind pupils that they have a list of words in their exercise books that can help them write the names of numbers correctly. Have pupils reference this when practicing if needed.
2. **Write** the number 837,173 on the board.
3. **Say:** This number is eight hundred thirty-seven thousand, one hundred seventy-three. When we write this number in words, we write it exactly as it is said.
4. Have pupils raise their hands to volunteer to read the number. Call on 1 or 2 pupils to read the number. Help pupils who may be having trouble reading the number by correcting their errors.
5. **Write** the number in words next to the example number. Write 'eight hundred thirty-seven thousand, one hundred seventy-three' next to 837,173 on the board. Read the number in words to the pupils while pointing to the words as you read. Have pupils read along with you.
6. **Write** 913,723 on the board. Again, read the number out loud for pupils. Tell pupils to read along with you. Then, have pupils raise their hands, and call on 1 or 2 pupils to read the number out loud for the class. Assist pupils who may have difficulty reading the number.
7. **Write** 'nine hundred thirteen thousand, seven hundred twenty-three' on the board. Read the number again, pointing to the words on the board as you read the number.
8. It might be helpful to writ the word directly below the number and draw arrows to show the place value and comma**.**

9. **Write**:

9 1 3, 7 2 3

nine hundred thirteen thousand, seven hundred twenty-three

10. Remind pupils again that when we write numbers in words, we write them exactly as we say the number.

Guided Practice *(10 minutes)*

1. **Write** nine numbers on the board. Have pupils raise their hand to volunteer to read the numbers and then write them in words on the board. Call on one pupil per example. Assist or correct as necessary.
   a. 392,283 (Answer: three hundred ninety-two thousand, two hundred and eighty-three)
   b. 293,273 (Answer: two hundred ninety-three thousand, two hundred and seventy-three)
   c. 927,172 (Answer: nine hundred twenty-seven thousand, one hundred and seventy-two)
   d. 193,161 (Answer: one hundred ninety-three thousand, one hundred and sixty-one)
   e. 271,112 (Answer: two hundred seventy-one thousand, one hundred and twelve)
   f. 944,997 (Answer: nine hundred forty-four thousand, nine hundred and ninety-seven)
   g. 604,543 (Answer: six hundred four thousand, five hundred and forty-three)
   h. 442,379 (Answer: four hundred forty-two thousand, three hundred and seventy-nine)
   i. 818,408 (Answer: eight hundred eighteen thousand, four hundred and eight)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 7 numbers on the board. Ask pupils to write the numbers in words in their exercise books.
   a. 112,927 (Answer: one hundred twelve thousand, nine hundred and twenty-seven)
   b. 107,829 (Answer: one hundred seven thousand, eight hundred and twenty-nine)
   c. 800,007 (Answer: eight hundred thousand and seven)
   d. 636,000 (Answer: six hundred thirty-six thousand)
   e. 38,700 (Answer: thirty-eight thousand, seven hundred)
   f. 228,016 (Answer: two hundred twenty-eight thousand and sixteen)
   g. 900,005 (Answer: nine hundred thousand and five)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. Tell pupils that they will continue this lesson tomorrow with numbers up to 10,000,000.
3. **Say**: Good job today pupils! You learned how to write out numbers using the written word.

Lesson Title: Reading and writing numbers up to 10,000,000	**Theme:** N & N Numbers and rounding up to 10,000,000	
Lesson Number: M-06-012	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to read and write numbers up to 10,000,000.	None	None

Opening *(3 minutes)*

1. **Say:** We have been working on reading and writing numbers and knowing how to best use large numbers. To do these things, we have become very familiar with place value and being able to identify how big a number is.
2. **Say:** Today we are going to continue writing numbers in words. We are going to focus on numbers up to the ten millions place. Let's review place value first.
3. **Write:** 'What place value is underlined 7 in each problem?'
   a. 57,879 (Answer: thousands)
   b. 470,804 (Answer: ten thousands)
   c. 607 (Answer: tens)
   d. 757,908 (Answer: hundred thousands)
   e. 4,876,208 (Answer: millions)

Introduction to the New Material *(10 minutes)*

1. Remind pupils that they have a list of words in their exercise books that can help them write the names of numbers correctly. Have pupils reference this when practicing if needed.
2. **Write** the number 75,098,164 on the board.
3. **Say:** This number is seventy-five million, ninety-eight thousand, one hundred and sixty-four. When we write this number in words, we write it exactly as it is said.
4. Have pupils raise their hands to volunteer to read the number. Call on 1 or 2 pupils to read the number. Help pupils who may be having trouble reading the number by correcting their errors.
5. **Write** the number in words next to the example number. You should write 'seventy-five million, ninety-eight thousand, one hundred and sixty-four' next to 75,098,164 on the board. Read the number in words to the pupils while pointing to the words as you read. Have pupils read along with you.
6. **Write** 99,756,183 on the board. Again, read the number out loud for pupils. Tell pupils to read along with you. Then, have pupils raise their hands, and call on 1 or 2 pupils to read the number out loud for the class. Assist pupils who may have difficulty reading the number.
7. **Write** 'ninety-nine million, seven hundred fifty-six thousand, one hundred eighty-three' on the board. Read the number again, pointing to the words on the board as you read the number.
8. Remind pupils again that when we write numbers in words, we write them exactly as we say the number.

Guided Practice *(10 minutes)*

1. **Write** 6 numbers on the board. Have pupils raise their hand to volunteer to read the numbers and then write them in words on the board. Call on one pupil per example. Assist or correct as necessary.
   a. 42,836,173 (Answer: forty-two million, eight hundred thirty-six thousand, one hundred and seventy-three)
   b. 72,293,273 (Answer: seventy-two million, two hundred ninety-three thousand, two hundred and seventy-three)
   c. 16,027,183 (Answer: sixteen million, twenty-seven thousand, one hundred and eighty-three)
   d. 92,000,187 (Answer: ninety-two million, one hundred and eighty-seven)
   e. 36,728,994 (Answer: thirty-six million, seven hundred twenty-eight thousand, nine hundred and ninety-four)
   f. 35,472,933 (Answer: thirty-five million, four hundred seventy-two thousand, nine hundred and thirty-three)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 7 numbers on the board. Ask pupils to write the numbers in words in their exercise books.
   a. 11,292,735 (Answer: eleven million, two hundred ninety-two thousand, seven hundred and thirty-five)
   b. 13,607,829 (Answer: thirteen million, six hundred seven thousand, eight hundred and twenty-nine)
   c. 80,000,007 (Answer: eighty million and seven)
   d. 63,156,000 (Answer: sixty-three million, one hundred fifty-six thousand)
   e. 38,700,294 (Answer: thirty-eight million, seven hundred thousand, two hundred and ninety-four)
   f. 1,228,016 (Answer: one million, two hundred twenty-eight thousand, and sixteen)
   g. 13, 900,005 (Answer: thirteen million, nine hundred thousand, and five)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. **Say**: Good job today pupils! You learned how to read and write very large numbers in words. You will next learn how to use rounding to estimate large numbers!

Lesson Title: Round numbers up to 100,000 to the nearest 10, 100, 1 000, and 10 000	**Theme:** N & N Numbers and rounding up to 10,000,000	
Lesson Number: M-06-013	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to round numbers up to 100,000 to the nearest 10, 100, 1,000, and 10,000.	None	None

Opening *(3 minutes)*

1. **Say:** We have been working on reading and writing numbers and knowing how to best use large numbers. To do these things, we have become very familiar with place value and being able to identify how big a number is. Today we are going to shift our focus from the exact numbers to an estimate of the number. Today we are going to learn about rounding.
2. **Say:** When we round numbers we decide what numbers are close enough to our given number. It helps us with estimation and being able to judge approximate quantities.
3. **Ask:** Can anyone think of a reason why we might want to estimate? Raise your hand to answer. (Example answers: To know if we have enough money to make our food purchase; to buy fabric for a new outfit; to purchase seeds for planting)
4. **Say:** Those are all great examples. Estimation is a very important skill, and we must learn how to do it properly.

Introduction to the New Material *(10 minutes)*

1. **Say:** There are a few rules that we must know before we can round. To start we need to think about rounding as figuring out what number ours is closest to. We will first think about rounding to the nearest Tens place.
2. Draw a number line on the board that goes from 10 to 20. Put tick marks for each whole number between. Then mark number 13 on the number line.
3. **Ask:** If we wanted to know what Ten the number 13 was closest to, would we say it was closer to 10 or to 20? Raise your hand to answer. (Answer: 10)
4. If they say it is closer to 20, show them that it is three marks to 10 but seven marks to 20. Tell pupils that when we round we are trying to answer this question without having to make a number line.
5. **Say:** Since we don't want to make a number line every time we round, there are some basic rules. First, we look at the digit to the right of the place we are rounding to. In the example of 13 rounding to the Tens place, we look at the 3. Since 3 is smaller than 5, we round down to 10. Rounding down means that we go to the smaller Tens number. If we were using the number 17, we would notice that the 7 is bigger than 5, so we would round up to 20. The challenge is what to do with a number like 15. Whenever our number is 5, we always round up. Let's try a few together.

6. **Write:** Round 456,789 to the nearest Hundred.
7. **Say:** We need to round to the Hundred so we look at the 7. Now look to the right of the seven and see what number is there.
8. **Ask:** What number is to the right of the 7? Raise your hand to answer. (Answer: The number is 8.)
9. **Say:** Yes, the number to the right of seven is 8. Because it is 5 or greater, we will round the 7 up to 8. We will replace all numbers to the right of the 8 with zeros since we are trying to round and estimate to clean or friendly numbers.
10. **Write:** Round 456,789 to the nearest hundred is 456,800.

Guided Practice *(10 minutes)*

1. **Write** the following numbers on the board with the place to round to. Show pupils where to look and which numbers determine whether you round up or down. Model the first three examples for pupils and then have pupils raise their hands to help you with the last three. Assist pupils if they are struggling. Remind pupils that, after rounding, every number between the rounded place and the end changes to a zero.
   a. 16; Tens place (Answer: 20)
   b. 743; Hundreds place (Answer: 700)
   c. 8,227; Thousands place (Answer: 8,000)
   d. 89,819; Ten Thousands place (Answer: 90,000)
   e. 5,550; Hundreds place (Answer: 5,600)
   f. 382,173; Ten Thousands place (Answer: 380,000)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 7 numbers on the board. Ask pupils to round the given numbers to the indicated place in their exercise books.
   a. 292,735; hundreds (Answer: 292,700)
   b. 607,829; ten thousands (Answer: 610,000)
   c. 800,007; tens (Answer: 800,010)
   d. 63,000; ten thousands (Answer: 60,000)
   e. 700,294; tens (Answer: 700,290)
   f. 28,016; hundreds (Answer: 28,000)
   g. 909,905; thousands (Answer: 910,000)
2. As pupils are working, walk around the room and assist them as needed.
3. After about 8 minutes, have pupils raise their hands and give their answers. Clarify any mistakes that pupils make. Take some time to explain the challenge in the last example. When we rounded to the thousands, we had to change the thousands place to a 10, which is not possible. Explain that if we have to round up a nine, the next bigger place value is affected as well.

Closing *(2 minutes)*

1. **Ask**: What happens to the right of the place value you round to? Raise your hand to answer. (Answer: They all become zeros.)
   Ask: What happens if the place value we are rounding is a 5? Raise your hand to answer. (Answer: We round up.)
2. Tell pupils that tomorrow they will continue practicing rounding with numbers up to the millions place.
3. **Say**: Good job rounding off large numbers using place value!

Lesson Title: Round numbers up to 1,000,000 to the nearest 10, 100, 1,000, 10,000, 100,000, and 1,000,000	**Theme:** N &N Numbers and rounding up to 10,000,000	
Lesson Number: M-06-014	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to round numbers up to 1,000,000 to the nearest 10, 100, 1000, 10000, and 100000.	None	None

Opening *(3 minutes)*

1. **Say:** Yesterday we began learning how to round. We learned how to round to the Tens, Hundreds, Thousands, and Ten Thousands place. Today we are going to use the same skills but to round even bigger numbers.
2. **Ask:** Can anyone tell me when we round down? Raise your hand to answer. (Answer: If the number to the right of the place we are rounding to is smaller than 5, we round down.)
3. **Ask:** Can anyone tell me when we round up? Raise your hand to answer. (Answer: If the number to the right of the place we are rounding to is equal to or bigger than 5, we round up.)
4. **Say:** Great responses. Today we are going to continue rounding numbers up to 1,000,000.

Introduction to the New Material *(10 minutes)*

1. **Ask:** Does anyone think that the process for rounding changes as the numbers get bigger? Or do you think the process is the same no matter how big the number? Raise your hand to answer. (Answer: The process does not change as the numbers get bigger.)
2. **Write** the number 8,103,726.
3. **Ask:** Who can tell me what the name of the place value is where the 8 is? Raise your hand to answer. (Answer: The millions place.)
4. **Say:** Today we are going to round numbers up to 1,000,000.
5. **Write** the number 8,295,173 on the board.
6. **Say:** We are going to use the number on the board to see what happens as we round to different places. We are going to start by rounding to the nearest Ten.
7. Show pupils how to round to the nearest Ten and give them the answer. (Answer: 8,295,170)
8. **Say:** We are going to continue rounding. We are now going to round this number to the nearest Hundred, Thousand, Ten Thousand, Hundred Thousand, and Million.
9. Continue rounding the example number to show pupils how the number changes if you round to different place values. The number, place and answers are below.
   a. 8,295,173; Hundred (Answer: 8,295,200)
   b. 8,295,173; Thousand (Answer: 8,295,000)
   c. 8,295,173; Ten Thousand (Answer: 8,300,000 – remind pupils that we rounded up a 9.)
   d. 8,295,173; Hundred Thousand (Answer: 8,300,000)

10. **Ask**: What do you notice about rounding to the **Ten** Thousand and the Hundred Thousand? (Raise your hand to answer. (Answer: You rounded to the same thing.)
11. **Say**: Yes, because the number in the Ten Thousands place was a 9, we had to round the Hundreds place up.

Guided Practice *(10 minutes)*

1. **Write** the following numbers on the board with the place to round to. Tell pupils to try them on their own in their exercise books first. Walk around the class and assist pupils if they are struggling. Once pupils are finished, have pupils raise their hand to give their answers. Assist pupils if they are not getting the correct answers when they raise their hands.
   a. 8,273,172; Tens place (Answer: 8,273,170)
   b. 745,939; Hundreds place (Answer: 745,900)
   c. 8,227,623; Thousands place (Answer: 8,228,000)
   d. 896,819; Ten Thousands place (Answer: 900,000)
   e. 8,999,990; Hundreds place (Answer: 9,000,000)
   f. 3,824,173; Ten Thousands place (Answer: 3,820,000)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 7 numbers on the board. Ask pupils to round the given numbers to the indicated place in their exercise books.
   a. 9,126,392; Hundreds (Answer: 9,126,400)
   b. 4,283,163; Ten Thousands (Answer: 4,280,000)
   c. 5,610,923; Thousands (Answer: 5,611,000)
   d. 3,291,387; Ten Thousands (Answer: 3,290,000)
   e. 7,549,732; Tens (Answer: 7,549,730)
   f. 6,287,016; Hundreds (Answer: 6,287,000)
   g. 5,183,273; Thousands (Answer: 5,183,000)
2. As pupils are working, walk around the room and assist pupils as needed.
3. After about 8 minutes, have pupils raise their hands and give their answers. Clarify any mistakes that pupils make.

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. **Ask**: What is the most important thing to remember about rounding numbers? Raise your hand to answer. (Example answers: you need to know place value; you need to understand when to round up and when to round down.
3. **Say**: Good job today pupils! You learned how to estimate numbers by rounding them off.

Lesson Title: Round numbers up to 10,000,000 to the nearest 10, 100, 1,000, 10,000, 100,000, and 1,000,000	**Theme:** N & N Numbers and rounding up to 10,000,000	
Lesson Number: M-06-015	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to round numbers up to 10,000,000 to the nearest 10, 100, 1000, 10 000, 100 000, and 1 000 000.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** Today we are going to finish up learning how to round. Today we are going to use the same skills but to round even bigger numbers. Today we will round numbers as large as Millions. First, let's review.
2. **Ask:** Can anyone tell me when we round down? Raise your hand to answer. (Answer: If the number to the right of the place we are rounding to is smaller than 5, we round down.)
3. Have pupils raise their hands to offer responses. Call on pupils until someone gives the correct answer. Praise the pupil once the correct answer is provided.
4. **Ask:** Can anyone tell me when we round up? Raise your hand to answer. (Answer: If the number to the right of the place we are rounding to is equal to or bigger than 5, we round up.)
5. Have pupils raise their hands to offer responses. Call on pupils until someone gives the correct answer. Praise the pupil once the correct answer is provided.
6. **Say:** Great responses. Today we are going to round numbers up to 10,000,000.

Introduction to the New Material *(10 minutes)*

1. **Ask:** Does anyone think that the process for rounding changes as the numbers get bigger? Or do you think the process is the same no matter how big the number? Raise your hand to answer. (Answer: As the numbers get bigger, the process does not change.)
2. **Write** the number 93,283,574.
3. **Ask:** Who can tell me what the name of the place value is where the 9 is? Raise your hand to answer. (Answer: The Ten millions place)
4. **Say:** Today we are going to round numbers up to the Ten Millions place.
5. Point to the number 93,283,574 written on the board.
6. **Say:** We are going to use the number on the board to see what happens as we round to different places. We are going to start by rounding to the nearest Ten.
7. Show pupils how to round to the nearest Ten and give them the answer. (Answer: 93,283,570)
8. **Say:** We are going to continue rounding. We are now going to round this number to the nearest Hundred, Thousand, Ten Thousand, Hundred Thousand, and Million.
9. Continue rounding the example number to show pupils how the number changes if you round to different place values. The number, place and answers are below.

a. 93,283,574; Hundred (Answer: 93,283,600)
b. 93,283,574; Thousand (Answer: 93,284,000)
c. 93,283,574; Ten Thousand (Answer: 93,280,000)
d. 93,283,574; Hundred Thousand (Answer: 93,300,000)
e. 93,283,574; Millions (Answer: 93,000,000)

Guided Practice *(10 minutes)*

1. **Write** the following numbers on the board with the place to round to. Tell pupils to try them on their own in their exercise books first. Walk around the class and assist pupils if they are struggling. Once pupils are finished, have pupils raise their hand to give their answers. Assist pupils if they are not getting the correct answers when they raise their hands.
   a. 73,263,750; Tens place (Answer: 73,263,750)
   b. 90,283,193; Hundreds place (Answer: 90,283,200)
   c. 99,183,276; Thousands place (Answer: 99,183,000)
   d. 43,827,364; Ten Thousands place (Answer: 43,830,000)
   e. 89,989,898; Hundred Thousands place (Answer: 90,000,000)
   f. 80,893,173; Millions place (Answer: 81,000,000)

Independent Practice *(10 minutes)*

1. Provide pupils with a list of 7 numbers on the board. Ask pupils to round the given numbers to the indicated place in their exercise books.
   a. 75,592,816; Hundreds (Answer: 75,592,800)
   b. 73,263,095; Ten Thousands (Answer: 73,260,000)
   c. 93,794,929; Thousands (Answer: 93,795,000)
   d. 19,837,558; Millions (Answer: 20,000,000)
   e. 83,273,762; Tens (Answer: 83,273,760)
   f. 44,283,916; Hundred Thousands (Answer: 44,300,000)
   g. 27,379,521; Thousands (Answer: 27,380,000)
2. As pupils are working, walk around the room and assist pupils as needed.
3. After about 8 minutes, have pupils raise their hands and give their answers. Clarify any mistakes that pupils make.

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. **Say**: Good job today pupils! You rounded off numbers to the nearest 10,000,000.

Lesson Title: Addition of numbers up to 1,000,000	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-016	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to add numbers up to 1,000,000.	None	None

Opening *(3 minutes)*

1. **Say:** Today, we are going to learn how to add numbers up to one million. First, though, we must review how to add multi-digit numbers. We must remember what to do when one of the place values adds up to larger than the place value or '10.' We will do a few sample problems, and then you will be able to practice on your own.

Introduction to the New Material *(10 minutes)*

1. **Write** the following problem on the board: $\begin{array}{rcc} & 1 & 3 \\ + & 2 & 8 \\ \hline \end{array}$
2. Show pupils how to solve this problem. Remind them that you will add the numbers in each place value from right to left, starting with the ones place. Tell pupils that you must carry any s to the next larger place value and add them there. In this example, 3+8 is 11, so our solution will look like this: $\begin{array}{rcc} & 1 & \\ & 1 & 3 \\ + & 2 & 8 \\ \hline & 4 & 1 \end{array}$
The 1 at the very top of the s place is the s place of 11 from 3+8 which we 'carried over.'
We then added it to the 1 + 2 +1 to get 4
3. **Say:** Now we are going to add two numbers up to the millions place.
4. **Write** the following on the board: $\begin{array}{rccccccc} & 2 & 5 & 3 & 6 & 1 & 7 & 8 \\ + & 4 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline \end{array}$
5. Show pupils how to solve the problem on the board, carrying over any extra place value and adding it in the next column to the left. The solution should be: $\begin{array}{rccccccc} & 1 & & 1 & & 1 & 1 & \\ & 2 & 5 & 3 & 6 & 1 & 7 & 8 \\ + & 4 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline & 7, & 2 & 6 & 5, & 9 & 6 & 1 \end{array}$
6. **Say:** I am now going to show you how to add three numbers up to the millions. The process is the same; we just need keep all our numbers in line.
7. **Write** the following on the board: $\begin{array}{rccccccc} & 2 & 3 & 4 & 5 & 1 & 6 & 8 \\ & 2 & 5 & 3 & 6 & 1 & 7 & 8 \\ + & 4 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline \end{array}$
8. Remind pupils that we are adding all the numbers from right to left. The solution should be:
$$\begin{array}{rccccccc} & 1 & 1 & 2 & 1 & 2 & 1 & \\ & 2 & 3 & 4 & 5 & 1 & 6 & 8 \\ & 2 & 5 & 3 & 6 & 1 & 7 & 8 \\ + & 4 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline & 9, & 6 & 1 & 1, & 1 & 2 & 9 \end{array}$$
While solving, tell pupils that when the columns add up to more than 20, we carry a 2 to represent 2 s.

Guided Practice *(10 minutes)*

1. **Ask:** What will we carry if the columns add up to 35? Raise your hand to answer. (Answer: We would carry a 3 to represent the three s.)
2. **Write** the following on the board: $\begin{array}{r} 6\ 3\ 3\ 4\ 7\ 3\ 4 \\ +\ 2\ 7\ 2\ 9\ 7\ 8\ 3 \\ \hline \end{array}$ Have pupils raise their hands, and call on a volunteer to solve the problem. Help the pupil if they have difficulty.

   (Answer: $\begin{array}{rrrrrrrr} & 1 & & & 1 & 1 & & \\ & 6 & 3 & 3 & 4 & 7 & 3 & 4 \\ + & 2 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline & 9, & 0 & 6 & 4, & 5 & 1 & 7 \end{array}$)
3. **Say:** We are now going to try another problem, but this time we are going to add three numbers. I will write the problem on the board, and I want you to try the problem in your exercise books first. Then I will call on a volunteer to put their answer on the board.
4. **Write** the following on the board: $\begin{array}{r} 2\ 3\ 2\ 5\ 3\ 6\ 8 \\ 2\ 5\ 3\ 6\ 1\ 7\ 8 \\ +\ 1\ 7\ 2\ 9\ 7\ 8\ 9 \\ \hline \end{array}$ While pupils are working in their exercise books, walk around and assist pupils who are struggling. After a few minutes, have pupils raise their hands to come to the board and give their solution.

   (Answer: $\begin{array}{rrrrrrrr} & 1 & & 2 & 1 & 2 & 2 & \\ & 2 & 3 & 2 & 5 & 3 & 6 & 8 \\ & 2 & 5 & 3 & 6 & 1 & 7 & 8 \\ + & 1 & 7 & 2 & 9 & 7 & 8 & 9 \\ \hline & 6, & 5 & 9 & 1, & 3 & 3 & 5 \end{array}$)

Independent Practice *(10 minutes)*

1. **Write** three problems on the board. Have pupils work on them independently in their exercise books. After about eight minutes, review the answers with pupils on the board.

   a. $\begin{array}{rrrrrrrr} & 4 & 3 & 6 & 8 & 5 & 4 & 7 \\ + & 3 & 8 & 7 & 9 & 2 & 7 & 3 \\ \hline \end{array}$ (Answer: $\begin{array}{rrrrrrrr} & 1 & 1 & 1 & & 1 & 1 & \\ & 4 & 3 & 6 & 8 & 5 & 4 & 7 \\ + & 3 & 8 & 7 & 9 & 2 & 7 & 3 \\ \hline & 8, & 2 & 4 & 7, & 8 & 2 & 0 \end{array}$)

   b. $\begin{array}{rrrrrrrr} & 2 & 9 & 7 & 8 & 7 & 8 & 9 \\ + & 4 & 3 & 7 & 4 & 3 & 3 & 6 \\ \hline \end{array}$ (Answer: $\begin{array}{rrrrrrrr} & 1 & 1 & 1 & 1 & 1 & 1 & \\ & 2 & 9 & 7 & 8 & 7 & 8 & 9 \\ + & 4 & 3 & 7 & 4 & 3 & 3 & 6 \\ \hline & 7, & 3 & 5 & 3, & 1 & 2 & 5 \end{array}$)

   c. $\begin{array}{rrrrrrrr} & 4 & 9 & 9 & 7 & 8 & 4 & 6 \\ & 1 & 9 & 7 & 4 & 4 & 5 & 6 \\ + & & 9 & 6 & 7 & 3 & 2 & 1 \\ \hline \end{array}$ (Answer: $\begin{array}{rrrrrrrr} & 2 & 2 & 1 & 1 & 1 & 1 & \\ & 4 & 9 & 9 & 7 & 8 & 4 & 6 \\ & 1 & 9 & 7 & 4 & 4 & 5 & 6 \\ + & & 9 & 6 & 7 & 3 & 2 & 1 \\ \hline & 7 & 9 & 3 & 9 & 6 & 2 & 3 \end{array}$)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about. Tell pupils that tomorrow they will be subtracting big numbers.
2. **Say**: Good job today pupils! You added very large numbers and learned how to carry over any extra place value and add it in the next column.

Lesson Title: Subtraction of numbers up to 1,000,000	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-017	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to subtract numbers up to 1,000,000.	None	None

Opening *(3 minutes)*

1. **Say**: Let's review how to add two numbers and carry over any extra place value.
2. **Write**: $\begin{array}{rrr} & 2 & 3 \\ + & 1 & 8 \\ \hline \end{array}$
3. **Say:** Remember, the 3 + 8 gives us 11 so we put the 1 down and carry over the extra 1 to the s column.
4. **Write:** $\begin{array}{rrr} & 2 & 3 \\ + & 1 & 8 \\ \hline & 4 & 1 \end{array}$
5. **Say:** Today, we are going to learn how to subtract numbers up to one million. First, though, we must review how to subtract multi-digit numbers. We must remember what to do when one of the place values has a larger value subtracted from a smaller number. We will do a few sample problems, and then you will be able to practice on your own.

Introduction to the New Material *(10 minutes)*

1. **Write** the same problem on the board as a subtraction problem: $\begin{array}{rrr} & 2 & 3 \\ - & 1 & 8 \\ \hline \end{array}$
2. Show pupils how to solve this problem. Remind them that you will subtract the numbers in each place value from right to left, starting with the ones place. Tell pupils that you will have to borrow from the larger place value if they are subtracting a larger number from a smaller number. In this example, 3-8 does not work so well, so we must borrow 10 from our s place and add it to the three in our ones place. This allows us to subtract 8 from 13 rather than 8 from 3.
   The solution will look like this: $\begin{array}{rrr} & 1 & 13 \\ & \cancel{2} & \cancel{3} \\ - & 1 & 8 \\ \hline & 0 & 5 \end{array}$ The 1 at the very top of the s place is what is left over when we borrow 10 to change the 3 to 13. We subtract 1 – 1 in this column and the result is 0. So we can say that the answer is just 5.
3. **Say:** Now we are going to subtract two numbers up to the millions place.
4. **Write** the following on the board: $\begin{array}{rrrrrrrr} & 4 & 5 & 3 & 6 & 1 & 7 & 8 \\ - & 2 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline \end{array}$ Show pupils how to solve the problem on the board. The solution should be: $\begin{array}{rrrrrrrr} & 3 & 15 & 2 & 15 & 10 & 17 & \\ & \cancel{4} & \cancel{5} & \cancel{3} & \cancel{6} & \cancel{1} & \cancel{7} & 8 \\ - & 2 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline & 1, & 8 & 0 & 6, & 3 & 9 & 5 \end{array}$
5. As you solve the problem on the board, be sure to show pupils how you are borrowing when necessary to be able to subtract. Emphasize to pupils that you must subtract the bottom number

from the top number. This can be pupils' first instinct when the top number is smaller than the bottom.

Guided Practice *(10 minutes)*

1. **Ask:** What do we do when the top number is smaller than the bottom number? Raise your hand to answer. (Answer: We would borrow from the larger place value to make it possible to subtract.)
2. **Write** the following on the board. $\begin{array}{r} 6\;3\;3\;4\;7\;3\;4 \\ -\;\underline{2\;7\;2\;9\;7\;8\;3} \end{array}$ Have pupils raise their hands, and call on a volunteer to solve the problem. Help pupils if they have difficulty. (Answer: $\begin{array}{rccccccc} & 5 & 13 & & 13 & 16 & 13 & \\ & \cancel{6} & \cancel{3} & 3 & \cancel{4} & \cancel{7} & \cancel{3} & 4 \\ - & 2 & 7 & 2 & 9 & 7 & 8 & 3 \\ \hline & 3, & 0 & 1 & 4, & 9 & 5 & 1 \end{array}$)
3. **Say:** We are now going to try another problem. I will write the problem on the board, and I want you to try the problem in your exercise books first. Then I will call on a volunteer to put their answer on the board.
4. **Write** the following on the board: $\begin{array}{r} 2\;5\;3\;6\;1\;7\;8 \\ -\;\underline{1\;7\;2\;9\;7\;8\;9} \end{array}$ While pupils are working in their exercise books, walk around and assist pupils who are struggling. After a few minutes, have pupils raise their hands to come to the board and give their solution. (Answer: $\begin{array}{rccccccc} & 1 & 15 & 2 & 15 & 10 & 16 & 18 \\ & \cancel{2} & \cancel{5} & \cancel{3} & \cancel{6} & \cancel{1} & \cancel{7} & \cancel{8} \\ - & 1 & 7 & 2 & 9 & 7 & 8 & 9 \\ \hline & & 8 & 0 & 6, & 3 & 8 & 9 \end{array}$)

Independent Practice *(10 minutes)*

1. **Write** two problems on the board. Have pupils work on them independently in their exercise books. Walk around the room and assist pupils who are still struggling. After about eight minutes, review the answers with pupils on the board.

a. $\begin{array}{r} 4\;8\;6\;9\;5\;4\;7 \\ -\;\underline{3\;3\;7\;9\;2\;7\;3} \end{array}$ (Answer: $\begin{array}{rccccccc} & & 7 & 16 & & 4 & 14 & \\ & 4 & \cancel{8} & \cancel{6} & 9 & \cancel{5} & \cancel{4} & 7 \\ - & 3 & 3 & 7 & 9 & 2 & 7 & 3 \\ \hline & 1, & 4 & 9 & 0, & 2 & 7 & 4 \end{array}$)

b. $\begin{array}{r} 9\;2\;7\;3\;4\;5\;3 \\ -\;\underline{4\;6\;7\;7\;9\;8\;2} \end{array}$ (Answer: $\begin{array}{rccccccc} & 8 & 11 & 16 & 12 & 13 & 15 & \\ & \cancel{9} & \cancel{2} & \cancel{7} & \cancel{3} & \cancel{4} & \cancel{5} & 3 \\ - & 4 & 6 & 7 & 7 & 9 & 8 & 2 \\ \hline & 4, & 5 & 9 & 5, & 4 & 7 & 1 \end{array}$)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. Tell pupils that they will be multiplying three-digit numbers by two-digit numbers in the next class.
3. **Say**: Good job today pupils! Today you learned how to subtract very large numbers and borrow from an extra place value to the left in order to complete many problems.

Lesson Title: Multiplication of 3-Digit Numbers by 2-Digit Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-018	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to multiply 3-digit numbers by 2-digit numbers.	None	None

Opening *(3 minutes)*

1. **Say:** Today, we are going to learn how to multiply three-digit numbers by two-digit numbers. We will follow the same process of multiplication used for multiplying smaller numbers, but we need to keep track of all the places. First, let's review how to multiply three-digit numbers by one-digit numbers.
2. **Write** the following problem on the board: $\begin{array}{cccc} & 1 & 4 & 7 \\ \times & & & 6 \\ \hline \end{array}$ Work through the steps of the problem, explaining to pupils that we multiply from right to left, just like with addition and subtraction. If the product of the multiplication is larger than 10, we have to carry the Tens, just like in addition. The difference is that you multiply every digit in the top number by the bottom number.
3. **Say:** When you multiply 6 X 7, the result is 42. We write the 2 beneath the 7, and carry the 4. Then we multiply 6 X 4 and the result is 24; however, we must add the 4 that we carried to the 24. This would give us 28. We write the 8 beneath the 4 and carry the 2. We follow this process throughout the multiplication.
4. The solution should look like this: $\begin{array}{cccc} & 2 & 4 & \\ & 1 & 4 & 7 \\ \times & & & 6 \\ \hline & 8 & 8 & 2 \end{array}$

Introduction to the New Material *(10 minutes)*

1. **Write** the following problem on the board: $\begin{array}{cccc} & 1 & 2 & 3 \\ \times & & 4 & 8 \\ \hline \end{array}$
2. **Say:** We are going to start multiplying this the same way we did when we multiplied a three-digit number by a one-digit number. We will multiply every digit in 123 by 8, as we reviewed before. The difference in this problem occurs when we need to multiply by the 4. The 4 represents 40, so we have to be careful with how we line up our numbers. When we multiply by the 8, we line our answer up under the 8. However, when we multiply by the 4, we must line our answer up with the 4. We will write a zero in as a placeholder as shown in our solution.
3. First show pupils what the solution looks like when we first multiply by the 8. Write $\begin{array}{cccc} & 1 & 2 & \\ & 1 & 2 & 3 \\ \times & & 4 & 8 \\ \hline & 9 & 8 & 4 \end{array}$ on the board to show pupils the steps. Write this answer from the original one; you do not need to rewrite the original question. Be sure to show pupils that we did nothing different here.

4. Multiply by the 4 and show pupils that we line up our answer under the 4, put a zero in the ones place as a placeholder, and write the answer below the 984. Show this work as a continuation of the previous work: $\begin{array}{cccc} & & 1 & \\ & \cancel{1} & \cancel{2} & \\ & 1 & 2 & 3 \\ \times & & 4 & 8 \\ \hline & 9 & 8 & 4 \\ 4 & 9 & 2 & 0 \end{array}$
5. Explain to pupils that we have one more step after multiplying. We now have to add our answers together. Show pupils this final step on the board: $\begin{array}{cccc} & & 1 & \\ & \cancel{1} & \cancel{2} & \\ & 1 & 2 & 3 \\ \times & & 4 & 8 \\ \hline & 9 & 8 & 4 \\ 4 & 9 & 2 & 0 \\ \hline 5 & 9 & 0 & 4 \end{array}$ Remind pupils to add correctly, including by carrying Tens as needed.
6. **Say**: The result is 5904.

Guided Practice *(10 minutes)*

1. **Ask:** What do we do when we have to multiply by the Tens digit of our two-digit number? Raise your hand to answer. (Answer: We align our number under the Tens place and put in a zero as a place holder.)
2. **Write** the following problem on the board: $\begin{array}{ccc} 4 & 2 & 6 \\ \times & 4 & 3 \\ \hline \end{array}$
3. **Say:** I would like you to work with your partner to solve the problem in your exercise books. I will walk around and assist you if you need help.
4. Walk around the room as pupils work on the problem for five minutes.
5. Once the five minutes is up, solve the problem on the board for pupils. (Answer: $\begin{array}{ccccc} & & 1 & 2 & \\ & & & \cancel{1} & \\ & & 4 & 2 & 6 \\ & \times & & 4 & 3 \\ \hline & 1 & 2 & 7 & 8 \\ 1 & 7 & 0 & 4 & 0 \\ \hline 1 & 8, & 3 & 1 & 8 \end{array}$)
6. Show pupils that when you multiply the last number, they just write the tens next to it. Remind pupils that they must align their numbers to add them together for the final step.

Independent Practice *(10 minutes)*

1. **Write** two problems on the board. Have pupils work on them independently in their exercise books. Walk around the room and assist pupils who are still struggling. After about eight minutes, review the answers with pupils on the board.

a. $\begin{array}{ccc} 5 & 1 & 6 \\ \times & 6 & 9 \\ \hline \end{array}$ (Answer: $\begin{array}{ccccc} & & & 3 & \\ & & 1 & 5 & \\ & & 5 & 1 & 6 \\ & & \times & 6 & 9 \\ \hline & 4 & 6 & 4 & 4 \\ 3 & 0 & 9 & 6 & 0 \\ \hline 3 & 5, & 6 & 0 & 4 \end{array}$)

b. $\begin{array}{ccc} 3 & 8 & 2 \\ \times & 7 & 2 \\ \hline \end{array}$ (Answer: $\begin{array}{ccccc} & & 5 & 1 & \\ & & 1 & & \\ & & 3 & 8 & 2 \\ & & \times & 7 & 2 \\ \hline & & 7 & 6 & 4 \\ 2 & 6 & 7 & 4 & 0 \\ \hline 2 & 7, & 5 & 0 & 4 \end{array}$)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. Tell pupils that tomorrow they will be multiplying even larger numbers by two-digit numbers.
3. **Say**: Good job today pupils, you multiplied 3-digit numbers by 2-digit numbers by carefully lining them up!

Lesson Title: Multiplication of 4- and 7-Digit Numbers by 2-Digit Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-019	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Multiply 4- to 5-digit numbers by 2-digit numbers. 2. Multiply 6- to 7-digit numbers by 2-digit numbers.	None	None

Opening *(3 minutes)*

1. **Say:** We worked on multiplication of three-digit numbers with two-digit numbers yesterday. We learned what to look for and what to do with multiple digits being multiplied. Today, we are going to continue practicing how to multiply by two-digit numbers, but we will be multiplying two-digit numbers by numbers with more than three digits.
2. **Ask:** Who can tell me what we do when we have to multiply by the Tens digit of our two-digit number? Raise your hand to answer. (Answer: We have to align our product with the Tens digit and put a zero in as a place holder.)
3. Have pupils raise their hands to answer the question. Call on pupils until someone provides the correct answer.
4. **Write** the following problem on the board: $\begin{array}{rrr} 5 & 3 & 0 \\ \times & 7 & 2 \\ \hline \end{array}$
5. Ask for a volunteer to come to the board to solve the problem. Choose one pupil to solve the problem. (Answer: $\begin{array}{rrrrr} & & 2 & & \\ & & 5 & 3 & 0 \\ & \times & & 7 & 2 \\ \hline & 1 & 0 & 6 & 0 \\ 3 & 7 & 1 & 0 & 0 \\ \hline 3 & 8, & 1 & 6 & 0 \end{array}$) Make sure pupils know that when multiplying by 2, nothing was carried because none of the products until the last one was greater than 10.

Introduction to the New Material *(10 minutes)*

1. **Write** the following problem on the board: $\begin{array}{rrrr} 1 & 2 & 4 & 1 \\ \times & & 2 & 6 \\ \hline \end{array}$
2. **Say:** We are going to start multiplying this the same way we did when we multiplied a three-digit number by a two-digit number. We will multiply everything by the six first, and then everything by the two in the Tens place.
3. **Write** the solution on the board to show pupils that the process is the same as what was done yesterday. (Answer: $\begin{array}{rrrrr} & 1 & 2 & & \\ & 1 & 2 & 4 & 1 \\ & \times & & 2 & 6 \\ \hline & 7 & 4 & 4 & 6 \\ 2 & 4 & 8 & 2 & 0 \\ \hline 3 & 2 & 2 & 6 & 6 \end{array}$) Tell pupils what you are doing as you multiply. Remind pupils to carry any Tens, and remind pupils to put the zero in as a placeholder when they begin to multiply by the 2 in the Tens place.

4. **Say:** It is important to stay very organised and line up your numbers properly
5. **Write** another problem on the board: $\begin{array}{r} 6,298,476 \\ \times \qquad 83 \\ \hline \end{array}$ T ell pupils that this time you are multiplying a seven-digit number by a two-digit number.
6. Have pupils write the problem in their exercise books and have them copy the steps as you solve the problem on the board. Talk through your steps as you solve the problem on the board.

   (Answer: $\begin{array}{r} 6,298,476 \\ \times \qquad 83 \\ \hline 18895428 \\ 503878080 \\ \hline 522,773,508 \end{array}$) Write every step on the board, including when you have to carry during multiplication and addition.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** three problems on the board: $\begin{array}{r} 4,398,560 \\ \times \qquad 47 \\ \hline \end{array}$ $\begin{array}{r} 245,389 \\ \times \qquad 12 \\ \hline \end{array}$ $\begin{array}{r} 44,356 \\ \times \qquad 39 \\ \hline \end{array}$
3. **Say:** I would like you to solve these problems in your exercise books.
4. Walk around the room as pupils work on the problem for seven minutes with their partners.
5. Once the seven minutes is up, solve the problems on the board for pupils.
   (Answers: 206,732,320; 2,944,668; 1,729,884)
6. Show pupils that when they multiply the last number, they just write the Tens next to it. Remind pupils that they must align their numbers to add them together for the final step.

Independent Practice *(10 minutes)*

1. **Write** two problems on the board. Have pupils work on them independently in their exercise books. Walk around the room and assist pupils who are still struggling. After about eight minutes, have pupils check their work with a partner. Then write the answers on the board.
   a. $\begin{array}{r} 177,399 \\ \times \qquad 96 \\ \hline \end{array}$ (Answer: 17,030,304)

   b. $\begin{array}{r} 56,773 \\ \times \qquad 82 \\ \hline \end{array}$ (Answer: 4,655,386)

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about.
2. Tell pupils that they will be multiplying decimals in the next class.
3. **Say**: Good job today pupils! Today you learned how to multiply very large numbers with several digits by a 2-digit number.

Lesson Title: Multiplication of 1- and 2-Decimal Place Numbers by a one-Digit Number	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-020	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Multiply 1-decimal-place numbers by one-digit numbers. 2. Multiply 2-decimal-place numbers by 1-digit numbers.	None	None

Opening *(3 minutes)*

1. **Say:** We have been learning how to multiply multi-digit numbers. Today we are going to do the same thing; however, this time we will start multiplying numbers with decimals.
2. **Ask:** Who can tell me one important thing to remember when multiplying multi-digit numbers? Raise your hand to answer. (Example answers: We must put in placeholders when we multiply by the digit in the Tens place; we have to align answers with the place that we are multiplying by.)
3. **Say:** As you remember, the process is the same no matter how many digits are in the numbers we are multiplying together. Today, we are going to follow that same process with multiplying decimal numbers, but we must learn what to do with the decimal.

Introduction to the New Material *(10 minutes)*

1. **Say:** When we multiply by a decimal, we follow the same procedure as we did for multi-digit multiplication. We will start multiplying from the right and move to the left. We will then put in a placeholder and multiply by the second digit all the way through from right to left. Once we finish with the multiplication, we will add our numbers together to get our final answer. The only thing that is different is the decimal. When multiplying by a decimal, we must count how many decimal places there are in the original problem. The number of decimal places there are in the original problem must be the same number of decimal places in the final answer. This is the only thing that is different. Let's try a problem.
2. **Write** the following problem on the board: $\begin{array}{lcr} 1 & . & 4 \\ \times & & 7 \\ \hline \end{array}$
3. **Say:** Let's multiply this number as though the decimal isn't in the problem.
4. **Write** the solution on the board without the decimal place remembering to carry over the 2 above the 1 and adding it to 7 x 1 + 2 to get 9: $\begin{array}{lcr} 1 & . & 4 \\ \times & & 7 \\ \hline 9 & & 8 \end{array}$
5. **Say:** If the decimal was not in the problem, we would have multiplied 14 X 7 and the answer would have been 98. But we have one decimal place in the original problem so we must have one decimal place in the final answer. We must count from the rightmost digit in our answer one place and put our decimal.

6. **Write** in the decimal on the board so the problem now looks like this: $\begin{array}{r} 1.4 \\ \times \quad 7 \\ \hline 9.8 \end{array}$
7. **Write** another problem on the board: $\begin{array}{r} 3.56 \\ \times \quad 6 \\ \hline \end{array}$
8. **Say:** We will now multiply a number with two decimal places by a one-digit number. Again, we will multiply as though we do not have a decimal. Once we complete our multiplication, we will then count over two places from the right to add our decimal point in the correct place.
9. **Write** the solution to the problem on the board remembering to carry over and add like we did in multiplication: $\begin{array}{r} 3.56 \\ \times \quad 6 \\ \hline 21.36 \end{array}$

Guided Practice *(10 minutes)*

1. Put pupils in pairs. **Write** two problems on the board for pupils to practice with their partner. Have them write their solutions in their exercise books. Walk around the room and assist pupils who are struggling and answer any questions that may arise.
   a. $\begin{array}{r} 7.6 \\ \times \quad 8 \\ \hline \end{array}$ (Answer: 60.8)
   b. $\begin{array}{r} 15.49 \\ \times \quad 8 \\ \hline \end{array}$ (Answer: 123.92)
2. After about eight minutes, write your solution on the board so that pupils can check their work. Be sure to show pupils any numbers that were carried and added to the next product.

Independent Practice *(10 minutes)*

1. **Write** two problems on the board. Have pupils work on them independently in their exercise books for five minutes. Walk around the room and assist pupils who are still struggling. After about five minutes, have pupils check their work with a partner.
   a. $\begin{array}{r} 42.9 \\ \times \quad 4 \\ \hline \end{array}$ (Answer: 171.6)
   b. $\begin{array}{r} 23.85 \\ \times \quad 6 \\ \hline \end{array}$ (Answer: 143.10)
2. Once pupils have compared their work with a partner, have pupils raise their hands to volunteer to write their solutions on the board. Choose one pupil per problem to share their solution. Assist pupils at the board if they are struggling to get the correct solution.
3. Show pupils that the answer to the second problem could be written as 143.1 since we do not need to write the ending zeros on decimal numbers. Emphasise, though, that pupils must count the zero as one of the decimal places when writing in the decimal point.

Closing *(2 minutes)*

1. Conclude class by asking pupils if there are any parts of the lesson that they have questions about. Tell pupils that they will continue multiplying decimals in the next class.
2. **Say**: Good job today pupils! You multiplied numbers with 1 and 2 decimal places today to find solutions that also have decimal places!

Lesson Title: Multiplication of 3 to 4 Decimal Place Numbers by 2-Digit Numbers	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-021	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to: 1. Multiply 3 decimal place numbers by 2-digit numbers. 2. Multiply 4 decimal place numbers by 2-digit numbers.	None	None

Opening *(3 minutes)*

1. **Say:** We have been learning how to multiply multi-digit numbers, and we have begun multiplying decimals. Today we will continue working with both of those skills. We will learn how to multiply numbers with 3 or 4 decimals by 2-digit numbers. The process has not changed, but now we must count up to 3 or 4 decimal places once we finish multiplying and write them into.

Introduction to the New Material *(10 minutes)*

1. **Say:** Let's practise an example to see how the steps stay the same no matter how big the numbers and no matter how many decimal places there are.
2. **Write** the example on the board: $\begin{array}{r} 2.437 \\ \times \quad 58 \\ \hline \end{array}$
3. Multiply the numbers together as though there is no decimal and show pupils the work on the board. Then tell pupils that since there are 3 decimals in the original problem, we need to put 3 decimals in the answer. (Answer: 141.346)
4. **Say:** As you can see the process is the same as it has been the past few days with multiplication and with multiplying decimals. Let's try another.
5. **Write** the second example on the board: $\begin{array}{r} 6.7269 \\ \times \quad 73 \\ \hline \end{array}$
6. Multiply the numbers together as though there is no decimal and show pupils the work on the board. Then tell pupils that since there are 4 decimals in the original problem, we need to put 4 decimals in the answer. (Answer: 491.0637)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board for pupils to practise with their partners. Have them write their solutions in their exercise books. Walk around the room and assist pupils who are struggling and answer any questions that may arise.

a. $\begin{array}{r} 12.618 \\ \times \quad 37 \\ \hline \end{array}$ (Answer: 466.866)

b. $\begin{array}{r} 45.5482 \\ \times \quad 91 \\ \hline \end{array}$ (Answer: 4,144.8862)

3. After about 8 minutes, write your solution on the board so that pupils can check their work. Be sure to show pupils any numbers that were carried and added to the next product.

Independent Practice *(10 minutes)*

1. **Write** 2 problems on the board. Have pupils work on them independently in their exercise books for 5 minutes. Walk around the room and assist pupils who are still struggling. After about 5 minutes, have pupils check their work with a partner.

   a. $\begin{array}{r} 16.545 \\ \times \quad 75 \\ \hline \end{array}$ (Answer: 1240.875)

   b. $\begin{array}{r} 4.6575 \\ \times \quad 68 \\ \hline \end{array}$ (Answer: 316.71 or 316.7100)

2. Once pupils have compared their work with a partner, have pupils raise their hands to volunteer to write their solutions on the board. Choose 1 pupil per problem to share their solution. Assist pupils at the board if they are struggling to get the correct solution.
3. Remind pupils that we need to be careful to count our decimal places correctly when we find our final answer. Show pupils that they can drop the last 2 zeros on their answer to the second example so their final answer may have 2 decimal places, but when they multiply they still have to count 4 decimal places as determined by the original problem so that their solution is correct.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. Tell pupils that they will continue multiplying decimals next class.
3. **Say**: Good job today pupils! You carefully solved many multiplication problems involving decimals!

Lesson Title: Multiplication of 1 Decimal Place Numbers by 1 Decimal Place Numbers	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-022	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to multiply 1 decimal place numbers by 1 decimal place numbers.	None	None

Opening *(3 minutes)*

1. **Say:** We have been multiplying whole numbers by decimals the past few days. Today we will begin to talk about how to multiply decimals by other decimals. We will start slowly and multiply 1 decimal place numbers by other 1 decimal place numbers. The steps continue to be the same for these multiplication processes, no matter whether we are multiplying whole numbers by whole numbers, decimals by decimals, or a mix of the 2 types of numbers. We will multiply by the place value on the right side and work our way left. We will multiply each digit of the top number by each digit of the bottom number and add all of the results.
2. **Ask:** What do we do at the end with a multiplication problem? Raise your hand to answer. (Answer: We add up the decimal places and we include them in the solution.)

Introduction to the New Material *(10 minutes)*

1. **Say:** Let's practise an example to see how the steps stay the same no matter how big the numbers and no matter how many decimal places there are.
2. **Write** the example on the board: $\begin{array}{r} 2.4 \\ \times\ 3.2 \\ \hline \end{array}$
3. Multiply the numbers together as though there is no decimal and show pupils the work on the board. You will multiply as though it is 24 X 32, which equals 768.
4. **Say:** Now that we have multiplied as though there are no decimals, we must count the total number of decimals in the original problem. As we can see, there are 2 decimals in 2.4 X 3.2, so there must be 2 decimals in our final answer. We will count from the right and our final answer is 7.68. Let's try another example.
5. **Write** the example on the board: $\begin{array}{r} 37.9 \\ \times\ 5.4 \\ \hline \end{array}$
6. **Say:** Again we multiply as though there are no decimals. When we multiply without decimals, it is as though we are multiplying 379 X 54. That answer is 20,466. Again, we must count the total number of decimal places in the original problem. That number is 2, so we count from the right side of our product 2 places and put our decimal. Our final answer is 204.66.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.

2. Write 2 problems on the board for pupils to practise with their partners. Have them write their solutions in their exercise books. Walk around the room and assist pupils who are struggling and answer any questions that may arise.
   a. $\begin{array}{r} 3.5 \\ \times\ 3.2 \\ \hline \end{array}$ (Answer: 11.2 or 11.20)
   b. $\begin{array}{r} 52.7 \\ \times\ 6.9 \\ \hline \end{array}$ (Answer: 363.63)
3. After about 8 minutes, write your solution on the board so that pupils can check their work. Be sure to show pupils any numbers that were carried and added to the next product. Mention that the first example can be written with 1 decimal place because the second decimal place is a zero, so we do not need to write it.

Independent Practice *(10 minutes)*

1. **Write** 2 problems on the board. Have pupils work on them independently in their exercise books for 5 minutes. Walk around the room and assist pupils who are still struggling. After about 5 minutes, have pupils check their work with a partner.
   a. $\begin{array}{r} 10.1 \\ \times\ 5.9 \\ \hline \end{array}$ (Answer: 59.59)
   b. $\begin{array}{r} 35.5 \\ \times\ 6.8 \\ \hline \end{array}$ (Answer: 241.4 or 241.40)
2. Once pupils have compared their work with a partner, have pupils raise their hands to volunteer to write their solutions on the board. Choose 1 pupil per problem to share their solution. Assist pupils at the board if they are struggling to get the correct solution.
3. Remind pupils that we need to be careful to count our decimal places correctly when we find our final answer. Show pupils that they can drop the last zero on their answer to the second example, so their final answer may have 1 decimal place, but when they multiply they still have to count 2 decimal places as determined by the original problem.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. Tell pupils that they will continue multiplying decimals next class.
3. **Say**: Good job today pupils! You multiplied two decimals together and found the solution by adding the decimal places.

Lesson Title: Multiplication of 2 Decimal Place Numbers by 1 Decimal Place Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-023	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to multiply 2 decimal place numbers by 1 decimal place numbers.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We have been multiplying whole numbers by decimals the past few days. Today we will continue talking about how to multiply decimals by other decimals. As we have learned, the steps continue to be the same for these multiplication processes, no matter whether we are multiplying whole numbers by whole numbers, decimals by decimals, or a mix of the 2 types of numbers. We will multiply by the place value on the right and work our way left. We will multiply each digit of the top number by each digit of the bottom number and add all the results.

Introduction to the New Material *(10 minutes)*

1. **Say:** Let's practise an example to see how the steps stay the same no matter how big the numbers and no matter how many decimal places there are.
2. **Write** the example on the board: $\begin{array}{r} 5.14 \\ \underline{\times\ 6.7} \end{array}$
3. Multiply the numbers together as though there is no decimal and show pupils the work on the board. You will multiply as though it is 514 X 67, which equals 34,438.
4. **Say:** Now that we have multiplied as though there are no decimals remembering to carry over and add any extra place values greater than '10' to the next column. Now we must count the total number of decimals in the original problem. As we can see, there are 3 decimals in 5.14 X 6.7, so there must be 3 decimals in our final answer. We will count from the right and our final answer is 34.438. Let's try another example.
5. **Write** the example on the board: $\begin{array}{r} 0.86 \\ \underline{\times\ 3.9} \end{array}$
6. **Say:** Again, we will multiply as though there are no decimals. When we multiply without decimals, it is as though we are multiplying 86 X 39. That answer is 3354. Again, we must count the total number of decimal places in the original problem. There are 3 decimals, so we count from the right side of our product 3 places and put our decimal. Our final answer is 3.354.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.

2. **Write** 2 problems on the board for pupils to practise with their partners. Have them write their solutions in their exercise books. Walk around the room and assist pupils who are struggling and answer any questions that may arise.
   a. $\begin{array}{r} 13.35 \\ \times\ 48.2 \\ \hline \end{array}$ (Answer: 643.47 or 643.470)
   b. $\begin{array}{r} 5.27 \\ \times\ 8.4 \\ \hline \end{array}$ (Answer: 44.268)
3. After about 8 minutes, write your solution on the board so that pupils can check their work. Be sure to show pupils any numbers that were carried and added to the next product. Mention that the first example can be written with 2 decimal places because the third decimal place is a zero, so we do not need to write it.

Independent Practice *(10 minutes)*

1. **Write** 2 problems on the board. Have pupils work on them independently in their exercise books for 5 minutes. Walk around the room and assist pupils who are still struggling. After about 5 minutes, have pupils check their work with a partner.
   a. $\begin{array}{r} 10.1 \\ \times\ 1.59 \\ \hline \end{array}$ (Answer: 16.059)
   b. $\begin{array}{r} 7.5 \\ \times\ 0.68 \\ \hline \end{array}$ (Answer: 5.1 or 5.100)
2. Once pupils have compared their work with a partner, have pupils raise their hands to volunteer to write their solutions on the board. Choose 1 pupil per problem to share their solution. Assist pupils at the board if they are struggling to get the correct solution.
3. Remind pupils that we need to be careful to count our decimal places correctly when we find our final answer. Show pupils that they can drop the last 2 zeros on their answer to the second example, so their final answer may have 1 decimal place, but when they multiply they still must count 3 decimal places as determined by the original problem.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. Tell pupils that they will continue multiplying decimals next class.
3. **Say**: Good job today pupils! You have continued solving multiplication problems with more decimal places.

Lesson Title: Multiplication of 3 Decimal Place Numbers by 2 Decimal Place Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-024	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to multiply 3 decimal place numbers by 2 decimal place numbers.	None	None

Opening *(3 minutes)*

1. **Say:** We have been multiplying whole numbers by decimals the past few days, but today will continue talking about how to multiply decimals by other decimals. As we have seen, the steps continue to be the same for these multiplication processes, no matter whether we are multiplying whole numbers by whole numbers, decimals by decimals, or a mix of the 2 types of numbers. We will multiply by the place value on the right and work our way left. We will multiply each digit of the top number by each digit of the bottom number and add all of the results.

Introduction to the New Material *(10 minutes)*

1. **Say:** Let's practise an example to see how the steps stay the same no matter how big the numbers and no matter how many decimal places there are.
2. **Write** the example on the board: $\begin{array}{r} 5.146 \\ \underline{\times\ 6.78} \end{array}$
3. Multiply the numbers together as though there is no decimal and show pupils the work on the board. You will multiply as though it is 5146 X 678, which equals 3,488,988.
4. **Say:** Now that we have multiplied as though there are no decimals, we must count the total number of decimals in the original problem. As we can see, there are 5 decimals in 5.146 X 6.78, so there must be 5 decimals in our final answer. We will count from the right and our final answer is 34.88988. Let's try another example.
5. **Write** the example on the board: $\begin{array}{r} 0.867 \\ \underline{\times\ 3.92} \end{array}$
6. **Say:** Again we will multiply as though there are no decimals. When we multiply without decimals, it is as though we are multiplying 867 X 392. That answer is 339,864. Again, we must count the total number of decimal places in the original problem. There are 5 decimals, so we count from the right side of our product 5 places and put our decimal. Our final answer is 3.39864.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.

2. **Write** 2 problems on the board for pupils to practise with their partners. Have them write their solutions in their exercise books. Walk around the room and assist pupils who are struggling and answer any questions that may arise.

   a. $\begin{array}{r} 1.635 \\ \times\ 4.52 \\ \hline \end{array}$ (Answer: 7.3902 or 7.39020)

   b. $\begin{array}{r} 6.271 \\ \times\ 3.47 \\ \hline \end{array}$ (Answer: 21.76037)

3. After about 8 minutes, write your solution on the board so that pupils can check their work. Be sure to show pupils any numbers that were carried and added to the next product. Mention that the first example can be written with 4 decimal places because the fifth decimal place is a zero, so we do not need to write it.

Independent Practice *(10 minutes)*

1. **Write** 2 problems on the board. Have pupils work on them independently in their exercise books for 5 minutes. Walk around the room and assist pupils who are still struggling. After about 5 minutes, have pupils check their work with a partner.

   a. $\begin{array}{r} 6.101 \\ \times\ 1.59 \\ \hline \end{array}$ (Answer: 9.70059)

   b. $\begin{array}{r} 4.705 \\ \times\ 9.32 \\ \hline \end{array}$ (Answer: 43.8506 or 43.85060)

2. Once pupils have compared their work with a partner, have pupils raise their hands to volunteer to write their solutions on the board. Choose 1 pupil per problem to share their solution. Assist pupils at the board if they are struggling to get the correct solution.
3. Remind pupils that we need to be careful to count our decimal places correctly when we find our final answer. Show pupils that they can drop the last zero on their answer to the second example, so their final answer may have 4 decimal places, but when they multiply they still have to count 5 decimal places as determined by the original problem.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. Tell pupils that they will begin dividing during the next class.
3. **Say**: Good job today pupils! You multiplied numbers with many decimal places to find the solution.

Lesson Title: Division of 3 and 4-Digit Numbers by 2-Digit Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-025	**Class/Level:** Primary 6	**Time:** 35 minutes

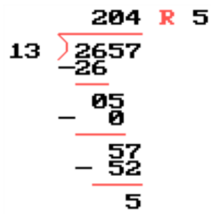
Learning Outcomes By the end of the lesson, pupils will be able to: 1. Divide 3 digit numbers by 2-digit numbers. 2. Divide 4 digit numbers by 2-digit numbers.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** So far we have discussed, learned and reviewed addition, subtraction, multiplication, rounding and types of numbers. We will now move on to long division. We will review what division means both mathematically and visually. We will learn what the different parts of the answer represent. Today and tomorrow we will be dividing 3, 4, 5 and 6 digit numbers by 2-digit numbers. Then we will use the skills learned today and tomorrow learn how to divide decimal numbers.
2. **Write** the following on the board: $7\overline{)91}$
3. Remind pupils of the process to solve the problem. (Answer: $\begin{array}{r} 13\ R\ 0 \\ 7\overline{)91} \\ -7 \\ \hline 21 \\ -21 \\ \hline 0 \end{array}$)
4. **Say:** First look at the 9 and ask how many groups of 7 can be taken out of 9. Write the 1 to represent 1 group of 7 above the 9. Then multiply 1 x 7 to get 7 and subtract from the 9. We are left with 2 in the Tens place and 1 in the ones place so bring the 1 down for a total of 21.
5. **Ask**: How many groups of 7 can be taken out of 21 now? Raise your hand to answer. (Answer: We can make 3 groups of 7)
6. Say: We write the 3 above the ones place. Since that covers all 21, the remainder equals zero. So 91 divided by 7 equals 13 exactly.

Introduction to the New Material *(10 minutes)*

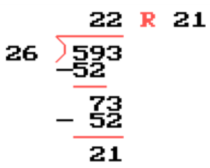
1. **Say:** Now we will learn how to use this same process to solve division of larger numbers.
2. **Write** the following on the board. $13\overline{)195}$
3. **Write** the solution on the board, explaining each step as you write. (Answer: $\begin{array}{r} 15\ R\ 0 \\ 13\overline{)195} \\ -13 \\ \hline 65 \\ -65 \\ \hline 0 \end{array}$)

4. **Say:** First we look at the 1 in 195 and see that we cannot make any groups of 13 if we only have 1. Then we look at the next digit, and we see that we have 19. We can make 1 group of 13 out of 19, so we write the 1 above the 9. We then multiply 1 x 13 to get 13 and subtract that group of 13 from the 19. We are left with 6. Bring down the 5 to make 65. We can make 5 groups of 13 from 65, so we write the 5 at the top. We subtract 65 from 65 to see that our remainder is zero. Therefore, 195 divided by 13 equals 15 remainder zero, or simply 15. Now let's try another problem to see what happens when we have a remainder.
5. **Write** the following on the board: $13\overline{)2657}$
6. Write the solution on the board, explaining each step as you write. (Answer: 

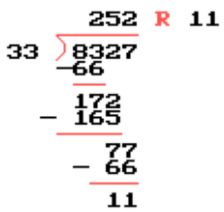
)
7. **Say:** First we look at the 2 in 2657 and see that we cannot make any groups of 13 if we only have 1. Then we look at the next digit, and we see that we have 26. We can make exactly 2 groups of 13 out of 26, so we write a 2 above the 6. We then subtract those groups of 13 from the 26. We are left with 0. Bring down the 5 to make 05. We can make no groups of 13 from 5, so we write zero above the 5. We bring down the 7 to make 57. We can make 4 groups of 13 out of 57, so we write the 4 on top. We then subtract 52, which represents the 4 groups of 13, from the 57. We are left with 5, which means that we have a remainder of 5. Therefore, 2,657 divided by 13 equals 204 R5. The remainder represents how many do not fit into a group of 13. The answer tells us that there are 204 groups of 13 and 5 left over.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

   a. $26\overline{)593}$ (Answer: 

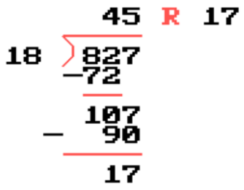
)

   b. $33\overline{)8327}$ (Answer: 

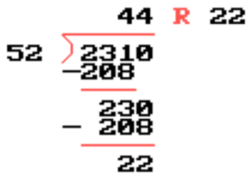
)

Independent Practice *(10 minutes)*

1. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books independently. Walk around the room and assist pupils who are having trouble. After about 8 minutes, have pupils share their work with a partner.

   a. $18\overline{)827}$ (Answer: 

)

   b. $52\overline{)2310}$ (Answer: 

)

Closing *(2 minutes)*

1. **Ask:** What does the answer to the last question mean? Raise your hand to answer. (Sample answer: We can make 44 groups of 52 out of 2310 with 22 left over.)
2. Ask pupils if they have any questions about the lesson.
3. Tell pupils that they will continue dividing next week.
4. **Say**: Good job today, you used long division to divide 3 and 4 digit numbers by a 2-digit number and learned about remainders.

Lesson Title: Division of 5 and 6-Digit Numbers by 2-Digit Numbers	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-026	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Divide 5-digit numbers by 2-digit numbers. 2. Divide 6-digit numbers by 2-digit numbers.	None	None

Opening *(3 minutes)*

1. **Say:** In our last class we learned how to divide 3 and 4-digit numbers by 2-digit numbers.
2. **Write** on the board: $17\overline{)\ 824}$ with $48R8$ above
3. **Ask:** What does the answer to this problem tell us? Raise your hand to answer. (Example answer: We can make 48 groups of 17 out of 824 with 8 left over.)
4. Have pupils raise their hands to volunteer to answer the question. Call on pupils until the correct answer is given.
5. **Say:** Today we will use the same process to divide even bigger numbers.

Introduction to the New Material *(10 minutes)*

1. **Say:** When we divide into even larger numbers, we follow the same process. We check each place to see how many groups we can make, and then subtract out the amount covered by the groups and continue until we are done. The remainder tells us how many do not fit in groups exactly. We will practise with 2 examples. Then you will do some on your own. We will finish up with a word problem today.
2. **Write** the following on the board: $13\overline{)19582}$
3. **Write** the solution on the board, explaining each step as you write.

   (Answer:
   ```
          1506 R 4
   13 ) 19582
       -13
         65
        -65
          08
         - 0
           82
          -78
            4
   ```
)
4. **Write** the following on the board: $54\overline{)729317}$
5. **Write** the solution on the board, explaining each step as you write.

```
        13505 R 47
54 ) 729317
    -54
     189
   - 162
      273
    - 270
        31
      -  0
        317
      - 270
         47
```

(Answer:)

6. **Ask:** Who can tell me what the solution of 13,505 R 47 means? (Sample answer: We can make 13,505 groups of 54 with 47 left over.)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partners. Walk around the room and assist pupils who are having trouble. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

a. $82\overline{)81635}$ (Answer:

```
        995 R 45
82 ) 81635
    -738
      783
    - 738
       455
     - 410
        45
```

)

b. $55\overline{)927355}$ (Answer:

```
        16861 R 0
55 ) 927355
    -55
     377
   - 330
      473
    - 440
       335
     - 330
         55
       - 55
          0
```

)

Independent Practice *(10 minutes)*

1. **Write** the following on the board: The headmasters of all local primary schools want to put pupils into groups for a joint school activity. There are 15,827 pupils in total at all the participating schools. Pupils need to be in groups of 55. How many groups will there be? How many pupils will not be in a group if there must be 55 pupils per group?
2. Pupils will work independently on the problem for 5 minutes. Then tell pupils to discuss the solution with their partner. Walk around the class and help as needed as pupils work.
3. After about 9 minutes, **Say:** 15,827 divided by 55 is 287 R 42. The headmasters would have 287 groups of 55. There would be 42 pupils not in a group.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. Tell pupils that they will continue dividing, but will be dividing decimals next.
3. **Say**: Good job today pupils, you divided large numbers today and determined if there is a remainder.

Lesson Title: Division of 1 Decimal Place Numbers by 1 Decimal Place Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-027	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to divide 1 decimal place numbers by 1 decimal place numbers.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We have been practising dividing numbers of all sizes over the past few classes. Over the next few days, we will practise dividing numbers with decimals. We will start with 1 decimal numbers and increase our decimal places. The process is mostly the same as we used in regular long division.
2. **Ask:** What number goes inside the division house? Raise your hand to answer.
(Answer: The number we are dividing into groups)
3. **Ask:** What number goes on the outside? Raise your hand to answer.
(Answer: The number we are dividing by or how much each group will have in it.)

Introduction to the New Material *(10 minutes)*

1. **Write** the following on the board: $0.3\overline{)4.8}$
2. **Say:** This problem follows almost the same process as the other long division we have done in the past. However, it is very difficult for us to think about dividing by a decimal. There is 1 step we must do before we can begin dividing. We need to make the number on the outside, known as the divisor, a non-decimal number. This means that we need to change 0.3 from a decimal to a non-decimal number. In order to do this we will move the decimal point to the right until there are no more numbers to the right of the decimal. We have to be careful, though, because if we change the divisor, we must change the dividend, the number inside the division problem. We move the decimal on the dividend the same number of places as we do the divisor.
3. **Ask:** How many places do we need to move the decimal on the divisor in the problem written on the board? Raise your hand to answer. (Answer: 1)
4. Have pupils raise their hands to offer their answer. Call on pupils until they provide the correct answer.
5. **Say:** Since we have to move the decimal point 1 place to the right in the divisor, we must do the same thing to the dividend. This changes what the problem looks like.
6. **Write** $3\overline{)48}$ on the board next to the original problem. Tell pupils that we will get the same answer dividing 48 by 3 as we do when dividing 4.8 by 0.3. Then show the solution on the board

to the problem. $\begin{array}{r} 16 \\ 3\overline{)48} \end{array}$ Explain each step of the division as you write it on the board. The final answer is 16.

7. **Say:** This tells us that 4.8 divided by 0.3 equals 16.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. Remind pupils to move the decimal to find the solution. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.
    a. $1.2\overline{)452.4}$ (Answer: 377)
    b. $5.5\overline{)984.5}$ (Answer: 179)

Independent Practice *(10 minutes)*

1. **Say:** We will now think about when dividing decimals is relevant outside our class.
2. **Write** the following on the board: In 23.6 days, Jeremiah walks 566.4 kilometres. How far does Jeremiah walk each day?
3. Pupils will work independently on the problem for 5 minutes in their exercise books. Then tell pupils to discuss with their partner about the solution. Walk around the class and help as needed as pupils are working.
4. After about 9 minutes, **Say:** To answer this question, we divide 566.4 by 23.6. To do that, we must remember to move our decimal points. We move the 23.6 one place to become 236 so we need to move the dividend one place to get 5664. Then we divide 5664 by 236 normally and we find out that Jeremiah walks 24 kilometres each day.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson. Answer any questions that the pupils may have.
2. **Say**: Good job today pupils, today you learned how to divide decimals.

Lesson Title: Division of 2 Decimal Place Numbers by 1 Decimal Place Numbers	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-028	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to divide 2 decimal place numbers by 1 decimal place numbers.	None	None

Opening *(3 minutes)*

1. **Say:** In our last class we learned how to divide 1 decimal numbers by 1 decimal numbers. We saw that the process is mostly the same as regular long division except we have to remember to move the decimal point to make the divisor a whole number. This change stays the same when we divide numbers with more than 1 decimal place.
2. **Ask:** How many decimal places do we move the number inside the division house or the dividend? Raise your hand to answer. (Answer: Start with the number on the outside and move the decimal places until you don't have any decimals left in the divisor. You then move the number on the inside the same amount of decimal places.)

Introduction to the New Material *(10 minutes)*

1. **Write** the following on the board: $0.7\overline{)4.34}$
2. **Ask:** What is the first step that we must take in order to solve this problem? Raise your hand to answer. (Answer: We must move the decimal point in 0.7 to the right 1 place to become 7.)
3. Have pupils raise their hands to answer the question. Call on pupils until they give the right answer.
4. **Say**: Then we need to move the 4.34 one decimal place to get 43.4.
5. **Write** the updated problem on the board: $7\overline{)43.4}$
6. **Say:** Look at how the decimal point moved in the dividend. We moved the decimal point 1 place to the right, but the number in the dividend still has a decimal. This shifts what our answer looks like, but only slightly. Before we continue dividing, we will write the decimal point in our answer. To do this we write the decimal point directly above where it is in the divisor, but in the spot for the answer.
7. **Write** in the decimal point: $\begin{array}{r} \_\_.\_ \\ 7\overline{)43.4} \end{array}$ (Note: Do not write the underscores. They are only to align the decimal point when creating the lesson plans.)
8. **Say:** Now we divide normally while ignoring the decimal point in the dividend.
9. **Write** the detailed solution on the board, explaining each step as you write it. 7 goes into 43 six times so we write a 6 above the 3. We then multiply 6 x 7 which is 42 and write that below the 43 and subtract. The result is 1. Then we bring down the 4 and get 14. We then divide 14 by 7

and get 2. Put the 2 above the 4 and multiply. 2 x 7 gives us 14 so we put that below the 14 and subtract. The result is 0. We do not have any remainder. (Answer: 6.2)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. Remind pupils to move the decimal to find the solution and to write in the decimal for their answer before they start dividing. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.
   a. $1.5\overline{)95.55}$ (Answer: 63.7)
   b. $9.2\overline{)770.96}$ (Answer: 83.8)

Independent Practice *(10 minutes)*

1. **Say:** We will now think about when dividing decimals is relevant outside our class.
2. **Write** the following on the board: The taxi can hold 42.8 litres of gasoline. The taxi can go 564.96 kilometres on 1 tank. How many kilometres can the taxi go on 1 litre of gasoline?
   (Answer: 13.2 kilometres per litre)
3. Pupils will work independently on the problem for 5 minutes in their exercise books. Then tell pupils to discuss with their partner about the solution. Walk around the class and help as needed as pupils are working.
4. After about 9 minutes, **Say:** To answer this question, we divide 564.96 by 42.8. To do that, we must remember to move our decimal points. We will then divide 5649.6 by 428 to find out that the taxi can go 13.2 kilometres for each litre of gasoline.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson and answer them as necessary.
2. **Say**: Good job today pupils! You divided decimals by decimals using long division and solved a word problem.

Lesson Title: Division of 2 Decimal Place Numbers by 2 Decimal Place Numbers	Theme: Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-029	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to divide 2 decimal place numbers by 2 decimal place numbers.	None	None

Opening *(3 minutes)*

1. **Say:** In our last class we learned how to divide 1 decimal numbers by 2 decimal numbers. We are going to continue with this process with different types of decimal numbers that have 2 decimal places in the divisor.
2. **Say:** The process is the same and we will use long division.

Introduction to the New Material *(10 minutes)*

1. **Write** the following on the board: $0.26\overline{)74.36}$
2. **Ask:** What is the first step that we must take in order to solve this problem? Raise your hand to answer. (Answer: We must move the decimal point to the right 2 places.)
3. Have pupils raise their hands to answer the question. Call on pupils until they give the right answer. If pupils do not say that they need to move the decimal 2 places, help them by showing them that 0.26 has 2 decimal places and we need to get rid of all the decimal places before we can divide. Show them that we also need to move the decimal in the dividend or inside the division house by 2 decimal places also.
4. **Write** the updated problem on the board. $26\overline{)7436}$
5. **Say:** Now we can divide normally. The decimal point in this problem is after the 6, so we do not need to write it in.
6. Write the detailed solution on the board, explaining each step as you write it. Divide 74 by 26 to get 2. Write the 2 above the 4 and multiply. 2 x 26 is 52 so we put that below the 74 and subtract. 74 – 52 is 22. Bring down the 3 and get 223. Divide 223 by 26 to get 8. Put the 8 above the 3 and multiply to get 203 and subtract. 223 – 208 is 15. Bring down the 6 and get 156. Divide 156 by 26 to get 6. It goes in evenly so there will be no remainder. The result is 286. (Answer: 286)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partners. Walk around the room and assist pupils who are having trouble. Remind pupils to

move the decimal to find the solution and to write in the decimal for their answer before they start dividing. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

a. $1.52\overline{)568.48}$ (Answer: 374)

b. $0.92\overline{)207.92}$ (Answer: 226)

Independent Practice *(10 minutes)*

1. **Say:** I want you to work with a partner and come up with a word problem that might require us to divide 2 numbers, each with 2 decimal places. You can use any example that you want, but it must be realistic. It can be about farming, driving or running a race. I will walk around and see what you and your partner are creating and answer any questions that you may have.
2. Walk around the room and help pupils as needed.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson.
2. **Say**: Good job today pupils! You divided decimals by decimals using long division!

Lesson Title: Division of 3 Decimal Place Numbers by 2 Decimal Place Numbers	**Theme:** Everyday Arithmetic Operations with Numbers	
Lesson Number: M-06-030	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to divide 3 decimal place numbers by 2 decimal place numbers.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We will finish our work on dividing decimals by decimals today. Please take out your exercise books and open them to the word problem you and your partner created yesterday. To start class today, we will share our problems with other pupils to practise.
2. Have pairs of pupils switch exercise books so they can do the problem their peers created the day before.

Introduction to the New Material *(10 minutes)*

1. **Say:** Good work practising your decimal division. Today we will learn how to divide 3 decimal place numbers by 2 decimal place numbers.
2. **Write** the following on the board: $0.15\overline{)0.225}$
3. **Ask:** What is the first step that we must take in order to solve this problem? Raise your hand to answer. (Answer: We must move the decimal point to the right 2 places.)
4. Have pupils raise their hands to answer the question. Call on pupils until they give the right answer. If pupils do not say that they need to move the decimal 2 places, help them by showing them that 0.15 has 2 decimal places and we need to get rid of all the decimal places before we can divide. We then move the 0.225 by 2 decimal places and get 22.5
5. **Write** the updated problem on the board: $15\overline{)22.5}$
6. **Say:** Now we must write our decimal up in the answer so that we have it in the right spot in our answer.
7. **Write** the decimal point in the answer directly above where it is in the question.
8. **Say:** Now we divide normally until we get our final solution.
9. **Write** the detailed solution on the board, explaining each step as you write it. First you divide 22 by 15 and get 1. Write the 1 above the second 2. Then multiply 1 x 15 is 15. Write this below the 22 and subtract. 22 – 15 = 7. Bring down the 5 to get 75. Divide 75 by 15 to get 5. Write the 5 above the 5 to get 1.5. Remember the decimal place in the solution. (Answer: 1.5)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.

2. Write 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. Remind pupils to move the decimal to find the solution and to write in the decimal for their answer before they start dividing. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.
   a. $1.52\overline{)41.952}$ (Answer: 27.6)
   b. $0.92\overline{)37.812}$ (Answer: 41.1)

Independent Practise *(10 minutes)*

1. **Say:** We can check our work by multiplying our answer by the divisor. The result should be the dividend. It is a good way to make sure you are getting the right answer. If you are ever unsure of your work, you should do this.
2. **Write** 2 problems on the board. Have pupils do the problems in their exercise books.
   a. $0.43\overline{)1.075}$ (Answer: 2.5)
   b. $0.68\overline{)17.000}$ (Answer: 25)
3. Walk around the room and help pupils as needed. With 2 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. Ask pupils if they have any questions about the lesson. Answer any questions pupils have.
2. **Say**: Good job today pupils! You completed dividing 3 decimals by 2 decimals and found a result that often has a decimal place.

Lesson Title: Multiplication of Whole Numbers by 10	Theme: Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-031	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to multiply whole numbers by 10.	None	None

Opening *(3 minutes)*

1. **Say:** This year we have already talked about place value and multiplication. Today we will begin seeing what happens when we combine the 2 ideas.
2. **Write** $\begin{array}{r} 1\ 3 \\ \times\ 1\ 0 \\ \hline \end{array}$ on the board. Have pupils solve the problem in their exercise books. Then write the answer on the board, and remind pupils how to solve traditional multiplication problems. (Answer: $\begin{array}{r} 1\ 3 \\ \times\ 1\ 0 \\ \hline 0\ 0 \\ +\ 1\ 3\ 0 \\ \hline 1\ 3\ 0 \end{array}$)

Introduction to the New Material *(10 minutes)*

1. **Say:** Now we will see what is really happening when we multiply by 10.
2. **Ask:** Who can tell me how the 13 changed when we multiplied by 10? Raise your hand to answer. (Example answers: a zero was added to the end; the 13 moved over 1 place; it got bigger by 10)
3. Have pupils raise their hands to be called on to give possible answers. Call on 2 or 3 pupils.
4. **Say:** Very good. We added 1 zero to the end of 13 when we multiplied by 10, but the place value of our digits changed. In 13, we have 1 Ten and 3 Ones. In our answer, the 1 represents 100 and the 3 represents 30, or 3 Tens. The 0 at the end is in the Ones place.
5. **Ask:** Can anyone describe what is happening to the number 13 and the place value of the digits when we multiply by 10? Raise your hand to answer.
   (Answer: The digits move to 1 place value larger when we multiply by 10 and add 1 zero to the end.)
6. Have pupils raise their hands to be called on to give possible answers. Call on 1 or 2 pupils to give a response. If pupils do not know the answer, tell them the answer.
7. **Say:** We are going to try an example without doing the long multiplication first, and then we will check our answer using long multiplication.
8. **Write** $\begin{array}{r} 7\ 9 \\ \times\ 1\ 0 \\ \hline \end{array}$ on the board.

9. **Say:** Using the rule we just discussed, what is the answer to 79 X 10? We said that we move the digits of 79 to one larger and add a zero. That would tell us that our answer to 79 X 10 equals 790. Now let's solve the problem using traditional multiplication to see if we are correct.

10. **Write** the solution on the board:

$$\begin{array}{r} 7\ 9 \\ \times \quad 1\ 0 \\ \hline 0\ 0 \\ +\ 7\ 9\ 0 \\ \hline 7\ 9\ 0 \end{array}$$

11. **Say:** Yes, our response is correct. Let us keep using this rule as we practise some more. You can always check your work by doing the long multiplication.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. Remind pupils to use the rule introduced before and then check their work to see if they are correct. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

   a. $\begin{array}{r} 1\ 4\ 6 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 1460)

   b. $\begin{array}{r} 9\ 9 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 990)

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on our own.
2. Write 5 problems on the board. Have pupils do the problems in their exercise books.

   a. $\begin{array}{r} 4\ 6 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 460)

   b. $\begin{array}{r} 8\ 7\ 3 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 8730)

   c. $\begin{array}{r} 1\ 5\ 7\ 8 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 15,780)

   d. $\begin{array}{r} 2\ 4\ 3\ 0 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 24,300)

   e. $\begin{array}{r} 9\ 0\ 0\ 0 \\ \times \quad 1\ 0 \\ \hline \end{array}$ (Answer: 90,000)

3. Walk around the room and help pupils as needed. With 2 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we saw that when we multiply a number by 10, we can shift the digits 1 decimal place larger and add 1 zero to the end.
2. **Ask:** What do you think will happen when we multiply numbers by 100? Raise your hand to answer. (Answer: We shift the digits 2 decimal places larger and add 2 zeros.)
3. **Say:** We will find out the answer to this question tomorrow.

Lesson Title: Multiplication of Whole Numbers by 100	Theme: Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-032	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to multiply whole numbers by 100.	None	None

Opening *(3 minutes)*

1. **Say:** At the end of class yesterday, I asked you to think about what happens when we multiply a number by 100. You gave great responses. Today we will explore the idea to come up with a rule. We learned yesterday that when we multiply by 10 we move the digits to 1 place value larger and add 1 zero. To start today, we will multiply by 100 using standard multiplication to come up with a possible rule.
2. **Write** $\begin{array}{rrrr} & & 1 & 8 \\ ´ & 1 & 0 & 0 \\ \hline \end{array}$ on the board. Have pupils solve the problem in their exercise books.
3. Then write the answer on the board. (Answer: $\begin{array}{rrrrr} & & & 1 & 8 \\ ´ & & 1 & 0 & 0 \\ \hline & & & 0 & 0 \\ & & 0 & 0 & 0 \\ + & 1 & 8 & 0 & 0 \\ \hline & 1 & 8 & 0 & 0 \end{array}$)

Introduction to the New Material *(10 minutes)*

1. **Say:** Now we are going to see what is really happening when we multiply by 100.
2. **Ask:** Who can tell me how the 18 changed when we multiplied by 100? Let's think about what happened with place value. Raise your hand to answer.
   (Answers: The digits move to 2 place values larger and 2 zeros were added.)
3. **Say:** Very good. The number shifts 2 places larger and 2 zeros are added to the end, just like when we multiply by 10.
4. **Ask:** Can anyone see how we can tell how many places we must move our number? Raise your hand to answer. (Answer: by the number of zeros; ten has 1 zero and 100 has 2 zeros)
5. If pupils do not see that the number of zeros that are being multiplied determines how far the number shifts, tell them. Tell them that this is important because it makes multiplying by any power of 10 easy to do without having to write the long multiplication.
6. **Write** another example on the board: $\begin{array}{rrrr} & 9 & 0 & 2 \\ ´ & 1 & 0 & 0 \\ \hline \end{array}$ (Answer: 90,200)
7. Show pupils how the answer shifts the digits 2 places to the left to make the number bigger.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books with their partner. Walk around the room and assist pupils who are having trouble. Remind pupils to use the rule introduced before and check their answer by multiplying. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

a. $\begin{array}{r} 3\ 7\ 4\ 8 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 374,800)

b. $\begin{array}{r} 6\ 5\ 1\ 3 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 651,300)

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on your own.
2. Write 5 problems on the board. Have pupils do the problems in their exercise books.

a. $\begin{array}{r} 7\ 3\ 5 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 73,500)

b. $\begin{array}{r} 4\ 6\ 7 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 46,700)

c. $\begin{array}{r} 6\ 3\ 9 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 63,900)

d. $\begin{array}{r} 4\ 5\ 0\ 0 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 450,000)

e. $\begin{array}{r} 8\ 0\ 5\ 4 \\ \times\quad 1\ 0\ 0 \\ \hline \end{array}$ (Answer: 805,400)

3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** We have been multiplying by 10 and 100 the past 2 days. Tomorrow we will multiply by 1000.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Multiplication of Whole Numbers by 1000	**Theme:** Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-033	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to multiply whole numbers by 1000.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We have been figuring out rules to make multiplying by powers of 10 easier so that we do not have to always use the long multiplication to solve the problems. Today we will use the same reasoning we have used for multiplying by 10 and 100 to easily solve multiplication by 1000 problems.

Introduction to the New Material *(10 minutes)*

1. **Write** $\begin{array}{r} 4\ 7\ 8\ 9 \\ \times \quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ on the board.
2. **Say:** The rules we came up for multiplying by 10 and 100 show that when we multiply by 1,000 we shift the place value of the digits 3 places and add 3 zeros to the end. This is true.
3. **Write** the solution on the board: $\begin{array}{r} 4\ 7\ 8\ 9 \\ \times \quad 1\ 0\ 0\ 0 \\ \hline 4,\ 7\ 8\ 9,\ 0\ 0\ 0 \end{array}$
4. **Say:** The process is the same no matter what power of 10 we are working with. We shift the number that many place values to the left, when multiplying, and add zeros to the end. Let's try another one.
5. **Write** $\begin{array}{r} 5\ 6\ 3\ 2\ 7 \\ \times \quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ on the board.
6. **Say:** Since we have 3 decimal places in this problem, and we shift our number 3 places because we are multiplying by 1000, our solution looks different.
7. **Write** the solution on the board: $\begin{array}{r} 5\ 6\ 3\ 2\ 7 \\ \times \quad 1\ 0\ 0\ 0 \\ \hline 5\ 6,\ 3\ 2\ 7,\ 0\ 0\ 0 \end{array}$
8. **Say:** When we multiply numbers with decimals, the decimals use up some of the shifting. Be careful when you shift places and count carefully.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.

2. **Write** 2 problems on the board. Ask pupils to work on them in their exercise books. Walk around the room and assist pupils who are having trouble. Remind pupils to use the rule introduced before and check their result by multiplying. After about 8 minutes, call attention to the board and write the solutions on the board, explaining each step as you write.

   a. $\begin{array}{r} 4\ 4\ 3\ 2\ 9 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 44,329,000)

   b. $\begin{array}{r} 2\ 8\ 7\ 1\ 6 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 28,716,000)

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on your own.
2. **Write** 5 problems on the board. Have pupils do the problems in their exercise books.

   a. $\begin{array}{r} 1\ 6\ 0\ 0\ 8 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 16,008,000)

   b. $\begin{array}{r} 9\ 3\ 6\ 8 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 9,368,000)

   c. $\begin{array}{r} 1\ 7\ 5\ 4 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 1,754,000)

   d. $\begin{array}{r} 3\ 7\ 7 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 377,000)

   e. $\begin{array}{r} 7\ 2\ 2\ 2\ 5 \\ \times\quad 1\ 0\ 0\ 0 \\ \hline \end{array}$ (Answer: 72,225,000)

3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** We have been multiplying by 10, 100 and 1,000 the past 2 days. Tomorrow we will move on from multiplying by powers of 10 and start dividing by powers of 10.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Division of Whole Numbers by 10	**Theme:** Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-034	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to divide whole numbers by 10.	None	None

Opening *(3 minutes)*

1. **Say:** Just as we did for multiplication by powers of 10, we will be figuring out rules for when we divide by powers of 10. I want you to think quietly for 1 minute to see if you can come up with a rule for what happens when we divide by powers of 10.
2. Wait 1 minute while pupils think about a possible rule.
3. **Say:** Now take out your exercise books and write down the rule that you think will apply for when we divide by a power of 10. You will check at the end of class to see if your guess is correct.

Introduction to the New Material *(10 minutes)*

1. **Write** $10\overline{)760}$ on the board. Have pupils solve the problem using long division in their exercise books. After 1 minute, solve the problem on the board for pupils using long division. Show all steps. Divide 76 by 10 to get 7 and write the 7 above the 6. Multiply 7 x 10 to get 70 and put it under the 76 and subtract. The result is 6. Bring down the 0 to get 60. Divide 60 by 10 to get 6. Put the 6 above the 0 and the result is 76 because there is no remainder. (Answer: $\begin{array}{r}76\\10\overline{)760}\end{array}$)
2. **Say:** Now we will see what is really happening when we divide by 10.
3. **Ask:** Who can tell me how the 760 changed when we multiplied by 10? Raise your hand to answer. (Example answers: a zero was removed to the end; the 76 moved over 1 place; it got smaller)
4. **Say:** Very good. We moved the digits over 1 place value to the right and the end zero went away. Just like with multiplication, we have a rule that we can follow when dividing by 10. We can say that the digits shift to the left 1 place in order to make the number smaller by a power of 10, or 1 place value. The digits do not change.
5. **Write** $10\overline{)839}$ on the board.
6. **Say:** Using the rule we just discussed, what might the answer be to $839 \div 10$? We said that we move the digits of 839 to 1 smaller. That would tell us that our answer to $839 \div 10$equals 83.9 We had to be careful with this one because when we moved the digits to the smaller place value, the 9 moved into the tenths place. Remember, the tenths place is the first decimal place. You can think about this as moving the decimal point to the left 1 place.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board:
    a. $10\overline{)98{,}760}$ (Answer: 9,876)
    b. $10\overline{)4{,}875}$ (Answer: 487.5)
3. Show pupils where the decimal points would be in the dividend if we were to write them in – after the zero and after the 5 in each problem. The decimal point is to the right of the last digit. Show pupils that when we move the decimal point 1 spot to the left, we get the answer.
4. Have pupils check the answer using the rule by doing the long division. Pupils may need to be reminded that they must put their decimal point in when doing the long division. Walk around the room as pupils are working. Assist pupils if they are struggling to check their work.

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on your own.
2. **Write** 5 problems on the board. Have pupils do the problems in their exercise books.
    a. $10\overline{)42}$ (Answer: 4.2)
    b. $10\overline{)927}$ (Answer: 92.7)
    c. $10\overline{)820}$ (Answer: 82)
    d. $10\overline{)3}$ (Answer: 0.3)
    e. $10\overline{)8360}$ (Answer: 836)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we started dividing whole numbers by 10. We developed a rule that says that when we divide by 10 we move the decimal point to the left 1 space. Check your guess from the beginning of class to see if you got the rule correct. Good thinking if you were able to figure it out! Tomorrow we will divide whole numbers by 100.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Division of Whole Numbers by 100	**Theme:** Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-035	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to divide whole numbers by 100.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We learned yesterday that when we divide by 10, we move the decimal point to the left 1 place to make the dividend 1 place value smaller. To start today, we will divide by 100 using long division to see if the rule is the same for dividing by 100.
2. **Write** $100\overline{)895}$ on the board. Have pupils solve the problem in their exercise books. Remind pupils to put the decimal place in the dividend after the 5 so that their answer is correct. Tell pupils that they may have to put in some zeros after the decimal point to be able to divide correctly.
3. **Write** the solution on the board showing all the proper steps to get the answer. (Answer: 895 ÷100 = 8.95)

Introduction to the New Material *(10 minutes)*

1. **Say:** Now we will see what is really happening when we divide by 100.
2. **Ask:** Who can tell me how the 895 changed when we divided by 100? Let's think about what happened with place value. Raise your hand to answer. (Answers: The decimal point moved to the left 2 places so the number got smaller.)
3. **Say:** Very good. The decimal point shifts 2 places to the left. This is similar to what happens when we divide by 10.
4. **Ask:** Can anyone see how we can tell how many places we must move our decimal point? Raise your hand to answer. (Answer: by the number of zeros; 10 has 1 zero and 100 has 2 zeroes)
5. If pupils don't see that the number of zeros that are being multiplied determine how far the number shifts, tell them. Tell them that this is important because it makes dividing by any power of 10 easy to do without having to write the long multiplication.
6. **Write** another example on the board: $100\overline{)73}$ (Answer: 0.73)
7. Show pupils how the answer shifts the decimal point 2 places to the left to make the number smaller.
8. **Say:** In this problem we had to move the decimal point 2 places to the left like the previous example, but the decimal moved to the left of the 7. Be sure that you put a zero in so that it is clear that you have put in the decimal point. It helps us see that the decimal is there.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write 2 problems on the board.
    a. $100\overline{)4113}$ (Answer: 41.13)
    b. $100\overline{)8600}$ (Answer: 86 or 86.00)
3. Have pupils practise these problems on their own. Pupils may need to be reminded that they must put their decimal point in when doing the long division. Walk around the room as pupils are working. Assist pupils as needed.
4. After about 8 minutes, have pupils raise their hands to come to the board and write their answers. Call on 1 pupil per problem to write their answer on the board. Correct pupils if their answers are not correct and show how to get the correct answer.

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on your own.
2. **Write** 5 problems on the board. Have pupils do the problems in their exercise books.
    a. $100\overline{)999}$ (Answer: 9.99)
    b. $100\overline{)18273}$ (Answer: 182.73)
    c. $100\overline{)5370}$ (Answer: 53.7)
    d. $100\overline{)6}$ (Answer: 0.06)
    e. $100\overline{)65300}$ (Answer: 653)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we started dividing whole numbers by 100. We developed a rule that says that when we divide by 100 we move the decimal point to the left 2 places. We will expand this rule next class to apply it to division by 1000.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Division of Whole Numbers by 1000	Theme: Everyday Arithmetic Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-036	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to divide whole numbers by 1000.	None	None

Opening *(3 minutes)*

1. **Say:** We have been finding rules to make dividing by powers of 10 easier so that we do not always have to use long division to solve problems. Today we will use the same reasoning we have been using for dividing by 10 and 100 to easily find the answers to division by 1000 problems.
2. **Ask:** What do you think will happen when we divide a number by 1000?
3. **Say:** Write down what you think will happen in your exercise books and see if you are correct at the end of the lesson.

Introduction to the New Material *(10 minutes)*

1. **Write** $1000\overline{)73942}$ on the board.
2. **Say:** The rules we came up with for dividing by 10 and 100 tell us that when we divide by 1000 we shift the decimal point in the dividend 3 places to the left. This is true.
3. **Write** the solution on the board: $\begin{array}{r} 73.942 \\ 1000\overline{)73942} \end{array}$
4. **Say:** The process is the same no matter what power of 10 we are dividing by. We need to see how many zeros are in our power of 10 and move the decimal point that many places. Let’s try another one.
5. **Write** $1000\overline{)840003}$ on the board.
6. **Say:** We have to move the decimal point 3 places to the left when we divide 840,003 by 1000. When we do that, the answer becomes 840.003.
7. **Write** the answer on the board: $\begin{array}{r} 840.003 \\ 1000\overline{)840003} \end{array}$

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 problems on the board.
   a. $1000\overline{)4113}$ (Answer: 4.113)
   b. $1000\overline{)93000}$ (Answer: 93 or 93.000)

3. Have pupils practise these problems on their own. Pupils may need to be reminded that they must put their decimal point in when doing the long division. Walk around the room as pupils are working. Assist pupils as needed.
4. After about 8 minutes, have pupils raise their hands to come to the board and write their answers. Call on 1 pupil per problem to write their answer on the board. Correct pupils if their answers are incorrect and show how to get the correct answer.

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise on your own.
2. **Write** 5 problems on the board. Have pupils do the problems in their exercise books.
   a. $1000\overline{)7863}$ (Answer: 7.863)
   b. $1000\overline{)18423}$ (Answer: 18.423)
   c. $1000\overline{)83100}$ (Answer: 83.1 or 83.100)
   d. $1000\overline{)29}$ (Answer: 0.029)
   e. $1000\overline{)49000}$ (Answer: 49 or 49.000)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write the solutions on the board. Call on 1 pupil for each problem to write the solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we increased our knowledge about dividing by powers of 10 to include division by 1000. The general rule that we came up with was that when dividing by a power of 10 we move the decimal point to the left the same number of places as there are zeros in our power of 10. If we are dividing by 10, we move the decimal point 1 place to the left; if dividing by 100, we move the decimal point 2 places to the left; and if dividing by 1000, we move the decimal point 3 places to the left. You can use this rule for division by any power of 10.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Word Problems Involving the 4 Operations	**Theme:** Everyday Arithmetic; Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-037	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to solve simple word problems involving the 4 operations.	None	Write the word problems for the lesson on the board.

Opening *(3 minutes)*

1. **Say:** Over the past 7 weeks we have been focusing on the 4 main operations: addition, subtraction, multiplication and division. Our work has mostly been procedural, meaning that we have been solving problems with little application. Today we are going to shift to application and focus on word problems. Word problems help us see how we can use the skills that we have mastered to answer questions about our everyday life. Knowing how and why math is used in our everyday lives makes it interesting. It shows us the importance of understanding the mathematical concepts we are learning.

Introduction to the New Material *(10 minutes)*

1. **Say:** We know that the 4 operations are important to solve problems. Today you will use each of the 4 operations to solve problems. We must read each problem carefully in order to figure out which operation is needed to solve the problem.
2. **Write** a word problem on the board: There are 28 boys and 13 girls in the class. How many pupils are there in all? (Answer: 41 pupils)
3. Then read the problem to pupils and explain the problem if they are confused.
4. **Say:** When we think about what this problem is asking us, we know that we need to add the number of boys and the number of girls together to get our solution of 41 pupils. Sometimes it is easier to draw pictures to represent what is going on to help us find the solution. Let's try another one.
5. **Write** another word problem on the board: A trader is selling the last of his vegetables. He has 45 vegetables at his stand. He has 6 cabbages, 23 tomatoes and some onions. How many onions does he have left to sell? (Answer: 16 onions)
6. Read the word problem with the pupils and explain the problem if they are confused.
7. **Say:** When we think about this problem we see that we have to subtract the cabbages and the tomatoes from the total amount of vegetables. We can say that 45 minus 6 is 39. Then 39 minus 23 is 16. So we know that there are 16 onions remaining. If we don't see that we have to subtract, we could always draw a picture to represent the situation. For our class picture, we will use the letter 'c' to represent cabbages, the letter 't' to represent tomatoes and the letter 'o' to represent onions. We can list out all the cabbages and tomatoes on the board.

8. Write 6 ‘c’s on the board, and 23 ‘t’s on the board to represent the cabbages and tomatoes. Then draw ‘o’s until you have a total of 45 vegetables on represented on the board. Explain what you are doing as you draw the visual representation on the board.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 more word problems on the board. Read them as you write them. Have pupils copy each word problem in their exercise books.
    a. The local school has 252 pupils and 6 classes. If there are an equal number of pupils per class, how many are in each class? (Answer: 42 pupils in each class)
    b. 7 taxis arrive in town at the same time. If each taxi has 18 people in it, how many people arrived in town? (Answer: 126 people)
3. **Say:** Write these problems in your exercise books. Then take 6 minutes to solve them with your partner. I will walk around the room to help as needed. Then we will review the solutions together.
4. As pupils work on the problems, walk around the room and assist as needed. After 6 minutes is up, show pupils how to solve each problem.

Independent Practice *(10 minutes)*

1. **Say:** Now you are going to solve some more problems on your own. You will be given 7 minutes to solve 3 word problems individually. When you are finished, you may check your solutions with a partner.
    a. 5600 pupils from 70 schools attended a rally. How many pupils did each school send if they all sent the same number? (Answer: 80 pupils from each school)
    b. Each classroom has 24 desks. How many desks are there in 15 classrooms? (Answer: 360 desks)
    c. There are 173 men, 298 women and 264 children at the market. How many people are at the market? How many more women than men are at the market? (Answer: 735 people at the market; 125 more women than men at the market)
2. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we started solving word problems using all 4 operations. We will continue working on word problems tomorrow.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: More Word Problems Involving the 4 Operations	**Theme:** Everyday Arithmetic; Multiplication and Division by 10, 100, 1000	
Lesson Number: M-06-038	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to solve more complex word problems involving the 4 operations.	None	Write the word problems for the lesson on the board.

Opening *(3 minutes)*

1. **Say:** Yesterday we began learning how to read and interpret simple word problems using all 4 operations. Today we are going to continue with that skill, but we will be working with more complex word problems. Our word problems today may require use of more than 1 operation to answer the question.

Introduction to the New Material *(10 minutes)*

1. **Write** a word problem on the board: In a school, there are 528 pupils. If 0.25 of them are in classes 1 and 2, how many pupils are in the other classes?
   (Answer: 396 pupils are in the other classes.)
2. **Say:** When we think about what this problem is asking us, we realise that we first must find out how many pupils are in classes 1 and 2. To find that answer, we multiply 0.25 by 528. We see that there are 132 pupils in classes 1 and 2. Then we must subtract 132 from the total number of pupils to find that there are 396 pupils in the other classes.
3. Write the mathematical solution on the board as you explain the process. Pupils will be able to help you with the multiplication of decimals and the subtraction, if needed.
4. **Say:** Now we will try another word problem. Remember, we may need to use more than 1 step to solve the problem.
5. **Write** the second word problem on the board: Bintu and Musa are driving from Bo City to Freetown. Bintu falls asleep while Musa is driving. When she wakes up, Musa tells her that they have travelled 100 km. Bintu knows that the whole drive is 340 km. How much further do they need to drive before they arrive in Freetown? If they are travelling at 80 km/hour, how much longer will they be driving? (Answer: 240 km further; Bintu and Musa will drive for 3 more hours)
6. **Say:** This problem has 2 questions and requires 2 steps to answer both questions. The first question is a simple subtraction problem. We subtract 340 minutes 100 to find that they have 240 km further to drive. The second question asks how much longer they have to drive in terms of time. We are given a rate of 80 km per hour, and we have our total distance of 240 km. To solve this problem, we must divide the total distance by the rate to see that they will be driving for 3 more hours.
7. Write the mathematical solution on the board as you explain the process so pupils can see how the math relates to the language of the word problem.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 2 more word problems on the board. Read them as you write them. Have pupils copy each word problem in their exercise books.
    a. Your school is starting a school garden to help feed pupils lunch. If 1 kg of bean seed yields 32 kg of beans, how many kilograms of beans will be harvested if the school plants 15 kg of bean seed? If the school cooks 5 kg of beans each day from the harvest, how many days will they be able to feed pupils from this harvest?
    (Answer: 480 kg of beans harvested; pupils can be fed for 96 days)
    b. You count the number of pieces of clothing that you wash with a new bar of soap. You see that it the bar of soap lasts for 525 pieces of clothing. If you cut the bar of soap into 5 pieces to make it easier to work with, how many pieces of clothing can you wash with the smaller piece of soap? (Answer: 105 pieces of clothing can be washed.)
3. **Say:** Write these problems in your exercise books. Then take 6 minutes to solve them with your partner. I will walk around the room to help as needed. Then we will review the solutions together.
4. As pupils work on the problems, walk around the room and assist as needed. After 6 minutes is up, show pupils how to solve each problem. The first problem requires pupils to first multiply 32 by 15. Then they must divide that answer by 5 for the second response. The second problem is easier because it just requires pupils to divide 525 by 5.

Independent Practice *(10 minutes)*

1. **Say:** Now you are going to solve some more problems on your own. You will be given 7 minutes to solve 3 word problems individually. When you are finished, you may check your solutions with a partner.
    a. A football stadium has 13,507 seats. If 4,312 people came from Freetown, 3,672 came from Bo, 3,812 came from Port Loko and 2,715 people came from the Western Area, how many people came to the match? Were there enough seats for everyone? If not, how many people did not have a seat? (Answer: 14,511 people came to the match; not everyone had a seat; 1,004 people did not have a seat)
    b. If 6 busses came from Makeni and 7 busses came from Port Loko to Freetown for a concert, how many people arrived by bus for the concert if each bus carried 52 people? There were 875 tickets available for the concert, was everyone able to go to the concert? If not, how many people did not get tickets? If so, how many tickets were left over? (Answer: 676 people came via bus; yes, everyone was able to get a ticket; there were 199 tickets remaining)
2. Walk around the room and help pupils as needed. With 3 minutes left, have pupils raise their hands to volunteer to write their solutions on the board. Call on 1 pupil for each problem to write their solution. Assist pupils as needed at the board.

Closing *(2 minutes)*

1. **Say:** Today we started solving word problems using all 4 operations. We will continue working on word problems tomorrow.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Place Value of Decimal Numbers up to Thousandths	**Theme:** Everyday Arithmetic Multiplying and Dividing by 10, 100, 1000	
Lesson Number: M-06-039	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Identify place value columns of decimal numbers. 2. Show place value of decimal numbers.	None	Draw the decimal place value matrix on the board.

Opening *(3 minutes)*

1. **Say:** At the beginning of the year we learned the names of place values for whole numbers. We learned how to read and write those numbers. Then we applied the 4 operations to decimals, but we never learned what the place values of decimals were. Remember that each place value has a special name. These names are important to remember so that we can accurately read and understand that quantities that we are working with. Today we are finally going to learn how to read and interpret decimal numbers after working with them for a few weeks.

Introduction to the New Material *(10 minutes)*

1. **Say:** Just as each digit had a place value in whole numbers, the same is true when we are working with decimals. Decimal place values have similar names with a different pronunciation. They follow the same pattern as whole number place values, but they end with the suffix '-ths'. I will demonstrate this with the number 0.942
2. Draw the following table on the board.

Units or Ones	Decimal Point	tenths	hundredths	thousandths
0	.	9	4	2

3. **Say:** The names of the decimal places look like the names of the place values of larger numbers, but the endings are slightly different. We have 'tenths', 'hundredths' and 'thousandths', which all end in '-ths'. The ending '-ths' tells us that we have numbers that represent part of a whole number. Remember that decimals tell us parts of things.
4. Add another row and write number 0.738 in it.

5. **Say:** We can show the place value of this number by identifying where each digit is. We have 7 tenths, 3 hundredths, and 8 thousandths. These place value names help us read our numbers too. We would read this decimal as 'seven hundred thirty-eight thousandths'. As you can see, we read the decimal part as though it was a whole number, and use the final decimal place value name to tell us how big or how small the number is.
6. **Write** 0.021 on the board.
7. **Say:** This number has zero tenths, 2 hundredths, and 1 thousandth. We would read this number as 'twenty-one thousandths' because the last digit is in the thousandths place and that tells us how small the decimal is.

Guided Practice *(10 minutes)*

1. **Write** 5 numbers on the board:
    a. 0.628 (tenths)
    b. 0.006 (thousandths)
    c. 0.967 (tenths)
    d. 0.621 (tenths)
    e. 0.067 (hundredths)
2. **Say:** Copy these 5 numbers into your exercise books. We will identify where the 6 is in each of the numbers.
3. Go through each number and help pupils find the 6. Then show them which place value the 4 has in each number. Remind pupils that the decimal place values have the '-ths' at the end of their name and they must include the '-ths' in order to correctly identify the place value of decimals.

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise what you have learned. I am going to write different place values on the board. I want you to copy those place values into your exercise books and come up with your own number that has a 1 in that place value. Once finished, you will share your numbers with your partner.
2. **Write** 6 place value names on the board for pupils to work with. (Answers will vary)
    a. tenths (Example answer: 0.1)
    b. hundredths (Example answer: 0.01)
    c. thousandths (Example answer: 0.001)
    d. tenths (Example answer: 0.123)
    e. thousandths (Example answer: 0. 0123
    f. hundredths (Example answer: 0.00123)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their self-created numbers with their partners. Have them discuss if they think the numbers are correct. Remind pupils that they must have a 1 in each of the place values listed. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement.

Closing *(2 minutes)*

1. **Say:** Today we learned to identify the place value names and locations for decimal numbers. This is important because it helps us read our numbers correctly and identify how small our decimals really are. Tomorrow we will combine the place value names of decimals with whole numbers to be able to completely understand the size of our numbers.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Place Value of Whole and Decimal Numbers up to Thousandths	**Theme:** Everyday Arithmetic Multiplying and Dividing by 10, 100, 1000	
Lesson Number: M-06-040	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Identify place value columns of whole and decimal numbers. 2. Show place value of both.	None	Draw the place value matrix on the board.

Opening *(3 minutes)*

1. **Say:** At the beginning of the year we learned the names of place values for whole numbers. We learned how to read and write those numbers. Then we applied the 4 operations to decimals, but we never learned what the place values of decimals were. Let's review the place values for numbers up to Ten Millions.
2. **Write** the number 83,172,695 on the board. Then review with pupils what each digit in the number represents for place value. (Answer: 8: ten millions; 3:millions; 1: hundred thousands; 7: ten thousands; 2: thousands; 6: hundreds; 9: tens; 5: ones)

Introduction to the New Material *(10 minutes)*

1. **Say:** Just as each digit had a place value in whole numbers, the same is true when we are working with decimals. Decimal place values have similar, but different names. They follow the same pattern as whole number place values, but they end with the suffix '-ths'. I will demonstrate this with the number 6,814.678.
2. **Draw** the following table on the board.

Thousands	Hundreds	Tens	Units or Ones	Decimal Point	tenths	hundredths	thousandths
6	8	1	4	.	6	7	8

3. **Say:** As you can see by the table, our decimals start with tenths and the names seem to get bigger the same way they do for whole numbers. We move from left to right in decimals from tenths to hundredths to thousandths. We would read the number on the board as: six thousand, eight hundred fourteen and six hundred seventy-eight thousandths. We use the last decimal place to read the number.
4. **Write** the number 413.076 on the board.

5. **Say:** We can show the place value of this number by identifying where each digit is. We have 4 hundreds, 1 ten, 3 ones or units, 0 tenths, 7 hundredths and 6 thousandths.

Guided Practice *(10 minutes)*

1. **Write** 5 numbers on the board.
   a. 732.84 (hundredths)
   b. 49.008 (tens)
   c. 16.402 (tenths)
   d. 30.004 (thousandths)
   e. 4,017.83 (thousands)
2. **Say:** Copy these 5 numbers into your exercise books. We will then identify where the 4 is in each of the numbers.
3. Go through each number and help pupils find the 4. Then show them which place value the 4 has in each number. Remind pupils that the decimal place values have the '-ths' at the end of their name.

Independent Practice *(10 minutes)*

1. **Say:** Now you will practise what you have learned. I am going to write different place values on the board. I want you to copy those place values into your exercise books and come up with your own number that has a 7 in that place value. Once finished, you will share your numbers with your partner.
2. Write 7 place value names on the board for pupils to work with. (Answers will vary.)
   a. Ones (Example answer: 17)
   b. Thousands (Example answer: 7,654)
   c. hundredths (Example answer: 0.17)
   d. Tens (Example answer: 71)
   e. thousandths (Example answer: 0.567)
   f. tenths (Example answer: 1.7)
   g. Hundreds (Example answer: 718)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their self-created numbers with their partners. Have them discuss if they think the numbers are correct. Remind pupils that they must have a 7 in each of the place values listed. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement.

Closing *(2 minutes)*

1. **Say:** Today we combined place value names and locations for both whole and decimal numbers. This is the most complete way to identify numbers because we frequently have whole and decimal numbers working together to represent real life situations.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Identifying and Adding Even and Odd Numbers	**Theme:** Numbers and Numeration Classification of Numbers	
Lesson Number: M-06-041	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Identify even and odd numbers. 2. Add even and odd numbers.	None	None

Opening *(3 minutes)*

1. **Say:** There are many different ways to identify numbers. So far this year we have identified numbers as whole and decimal, and we have applied the 4 operations to these types of numbers. Today we are going to start thinking about different types of numbers. We will learn about even and odd numbers. We will learn how to identify even and odd and what happens when we add them together. As with most things in math, different types of numbers give us different patterns. We can use the patterns to help us solve problems and to evaluate whether our answers are correct or not.

Introduction to the New Material *(10 minutes)*

1. **Say:** The easiest way to distinguish between even and odd numbers is by the digit in the ones place. If a number has a 2, 4, 6, 8 or 0 in the ones place, it is considered even. Another way to define an even number is to say that it is evenly divisible by 2. In other words, if we can divide a number by 2 without a remainder, it is even. Odd numbers are any numbers that are not even. The easy way to identify odd numbers is that they have a 1, 3, 5, 7 or 9 in the ones place.
2. **Write** the number 81,372 on the board.
3. **Say:** Since this number ends in a 2, we know that it is even.
4. **Write** the number 73,169 on the board.
5. **Say:** Since this number ends in a 9, we know that it is odd. That is all there is to identifying even and odd numbers. We look at the number in the ones place and that tells us whether it is even or odd. The next thing we need to explore is what happens when we add numbers together.
6. **Write** the following 3 examples on the board.
    a. 16 + 22 (Answer: 16 + 22 = 48; even + even = even)
    b. 7 + 41 (Answer: 7 + 41 = 48; odd + odd = even)
    c. 18 + 13 (Answer: 18 + 13 = 31; even + odd = odd)
7. **Say:** In each of these examples let’s identify 2 things. Let’s say whether we are adding even and even, odd and odd, or even and odd numbers. Then we need to see what the answer to each of these examples is and whether it is even or odd.
8. Walk pupils through each of these examples.
9. **Say:** From these 3 examples we are beginning to see a pattern, but we are going to explore further before we decide on a final rule for even and odd numbers.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Write** 6 examples on the board. Tell pupils to work in their exercise books to find the answer to the examples. Then, pupils will determine if they are adding even or odd numbers and whether the sum is even or odd. Have them write their solution the same way that the earlier examples were written. Give pupils 5 minutes to work on this with a partner.
    a. 24 + 73 (Answer: 24 + 73 = 97; even + odd = odd)
    b. 72 + 46 (Answer: 72 + 46 = 118; even + even = even)
    c. 63 + 15 (Answer: 63 + 15 = 78; odd + odd = even)
    d. 17 + 85 (Answer: 17 + 85 = 102; odd + odd = even)
    e. 45 + 26 (Answer: 45 + 26 = 71; odd + even = odd)
    f. 18 + 4 (Answer: 18 + 4 = 22; even + even = even)
3. When 5 minutes is up, go through the solutions with pupils to make sure they have the correct answers in their exercise books.
4. **Say:** Now that we have lots of examples to look at, we can see a pattern developing. When we add numbers of the same type, even plus even or odd plus odd, our answer is always even. The only time our sum is odd is when we add different types of numbers. When we add even numbers with odd numbers, the solution is odd. This is an important pattern for us to know to be able to know whether our solution is correct.

Independent Practice *(10 minutes)*

1. **Say:** Now that we have identified a pattern for adding even and odd numbers, we are going to use that pattern to determine whether our sums will be even or odd. You do not need to solve these addition problems. Copy the 8 examples that I am going to write on the board in your exercise books. I want you to think about the numbers and then write down whether the sum would be even or odd.
2. **Write** 8 examples on the board:
    a. 27 + 35 (Answer: even)
    b. 17 + 98 (Answer: odd)
    c. 65 + 46 (Answer: odd)
    d. 34 + 88 (Answer: even)
    e. 27 + 12 (Answer: odd)
    f. 19 + 63 (Answer: even)
    g. 77 + 25 (Answer: even)
    h. 90 + 78 (Answer: even)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their responses with their partners. Have them discuss if they think the numbers are correct. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement.
4. Write the solutions on the board so pupils know whether they were correct.

Closing *(2 minutes)*

1. **Say:** Today we learned about even and odd numbers. We learned how to identify even and numbers and what happens when we add even and odd numbers.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Prime and Composite Numbers	Theme: Numbers and Numeration Classification of Numbers	
Lesson Number: M-06-042	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Identify prime and composite numbers. 2. Differentiate between prime and composite numbers.	None	None

Opening *(3 minutes)*

1. **Say:** Yesterday we learned that we could classify numbers as even and odd. We learned that even numbers could be defined as being divisible by 2. Today we will learn a new way to classify numbers. We will learn about prime and composite numbers. It is important to know before we get started that prime and composite numbers are defined by what numbers can divide into them. Knowing even and odd numbers helps in recognising prime and composite numbers.
2. **Write** the number '6' on the board.
3. **Say:** We know that 6 is even because it can be divided by 2. It can also be divided by another number. 2 x 3 = 6 so it can also be divided by 3. This will be helpful when we discuss prime and composite numbers.

Introduction to the New Material *(10 minutes)*

1. **Say:** Since we are going to define prime and composite numbers by what they are divisible by, we need to first determine how they are different. Composite numbers are numbers that are divisible by more than 2 numbers. Prime numbers are divisible by exactly 2 numbers, 1 and itself. Let's see what this looks like. **Write** the numbers 2, 3, 4, 5 and 6 on the board spaced out.
2. **Ask:** What numbers divide evenly into 2? Raise your hand to answer. (Answer: 1 and 2)
3. Repeat this for 3 (Answer: 1 and 3), 4 (Answer: 1, 2 and 4), 5 (Answer: 1 and 5) and 6 (Answer 1, 2, 3 and 6). **Write** all the answers on the board under their respective numbers
4. **Say:** Each of these numbers has a different amount of numbers that divide into them evenly. Because the numbers 2, 3 and 5 have only 2 numbers evenly divisible into them, they are considered prime numbers. The numbers 4 and 6 have more than 2 numbers that divide into them evenly, and are therefore considered composite. This is the difference between the numbers. We need to understand which numbers are prime and composite for future math concepts like reducing fractions, finding the greatest common factor, and factoring polynomials. We will not be doing these things this year, but we must become comfortable with these ideas. It is also important to notice that even numbers that we discussed yesterday are all divisible by 2. This means that all even numbers are composite, except for the number 2. 2 is the **only** even prime number. This does not mean, however, that all odd numbers are prime. For odd numbers,

we need to see if we can find numbers that multiply to give us the odd number or factors. If we have more than 2, then the number is composite.

Guided Practice *(10 minutes)*

1. **Write** 6 numbers on the board. Have pupils copy the numbers into their exercise books.
    a. 24 (Answer: 1, 2, 3, 4, 6, 8, 12, 24; composite)
    b. 23 (Answer: 1, 23; prime)
    c. 63 (Answer: 1, 3, 7, 9, 21, 63; composite)
    d. 17 (Answer: 1, 17; prime)
    e. 45 (Answer: 1, 3, 5, 9, 15, 45; composite)
    f. 108 (Answer: 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108; composite)
2. With pupils, write a list of as many numbers that you can that divide into the given number. List the numbers next to the given number. Remember that you just need a third number that is evenly divisible into it for the number to be considered composite. You do not need to list every factor. Then write whether the number is prime or composite. Have pupils help with this process so they can start thinking about the composition of numbers.

Independent Practice *(10 minutes)*

1. **Say:** Now that we have practised identifying prime and composite numbers together, you are going to try doing this on your own. For each example that I write on the board, please list as many numbers as you can that go into the number and then tell whether it is prime or composite.
2. **Write** 8 examples on the board:
    a. 9 (Answer: 1, 3, 9; composite)
    b. 13 (Answer: 1, 13; prime)
    c. 82 (Answer: 1, 2, 41, 82; composite)
    d. 31 (Answer: 1, 31; prime)
    e. 39 (Answer: 1, 3, 13, 39; composite)
    f. 51 (Answer: 1, 3, 17, 51; composite)
    g. 81 (Answer: 1, 3, 9, 27, 81; composite)
    h. 113 (Answer: 1, 113; composite)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their responses with their partners. Have them discuss if they think the numbers are correct. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement.
4. Write the solutions on the board so pupils know whether they were correct.

Closing *(2 minutes)*

1. **Say:** Today we learned about prime and composite numbers. We are going to use this as we move forward tomorrow. Tomorrow we will work with factors and multiples.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Factors and Multiples	**Theme:** Numbers and Numeration Classification of Numbers	
Lesson Number: M-06-043	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Show differences between factors and multiples. 2. Write factors and multiples of numbers from 1 to 12.	None	Draw the multiplication table from 1 through 12 on the board.

Opening *(3 minutes)*

1. **Say:** Yesterday we learned about prime and composite numbers. We found some of the numbers that divide into bigger numbers, but we did not go over what those numbers were called or how to find them very easily. Today we will talk about factors and multiples and learn the difference between those types of numbers.

Introduction to the New Material *(10 minutes)*

1. **Say:** The numbers we listed yesterday to determine whether numbers were prime or composite were factors. Factors are numbers that divide evenly into a bigger number. We have started thinking about factors without realising what they were called. All even numbers are multiples of 2 because 2 is a factor of them. This is easier to demonstrate visually.
2. List the numbers 1 through 12 on the board vertically and horizontally. (See below)
3. **Say:** We are now going to write the multiples of each of these numbers on the board. In order to find multiples, we will multiply each number by 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. The products are our multiples. Copy this table in your exercise book so you have it to reference for all future lessons.
4. **Write** the multiples of 1 through 12 on the board. The list should look like this.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	65	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

5. **Say:** This table will help us find factors. If I wanted to find the factors of 24, I would look for 24 on the table. The column and row headers tell us the factors of 24.
6. Scroll up and over to show the factors at the top of each column and row.
7. **Say**: The factors of 24, as shown on the table are 1, 2, 3, 4, 6, 8, 12 and 24. You know that 1 and the number are always factors, so they do not need to be on the table. Each number that is not in the leftmost column or topmost row is a composite number. Factors of a number are always smaller than or equal to the number and multiples are always bigger than or equal to the number.
8. **Now show them the difference between factor and multiple**. Let's look at 24 further.
9. **Write**: Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24
10. **Say**: We can see that 24 has the factors listed on the board. Each of the factors is a multiple of 24 because they can be multiplied by another number to get to 24. If we look across a row or down a column we can see all the factors of a number.
11. **Write**: Multiples of 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 and so on.
12. **Say**: 2 x 1 = 2, 2 x 2 = 4, 2 x 3 = 6. We find multiples by multiplying. We find factors by dividing.
13. **Say**: 24 is a multiple of 24 but 2 is not a multiple of 24. Multiples of 24 are 24 x 1 = 24, 24 x 2 = 48, 24 x 3 = 36 and so on. They numbers get bigger.
14. **Write**: List all the multiples of up to 12. Use the table to help you.
    (Answer: Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48)
15. **Say**: As you can see, 24 is a multiple of 4 but it is not a factor.

Guided Practice

1. **Say:** We have already written all the multiples of numbers from 1 to 12 in the table, so now we are going to practise writing the factors of numbers 1 to 6. In your exercise books, please record the factors of each number from 1 to 6 as we find them together. We will decide if the numbers are prime or composite.
2. **Ask:** Using the definition of prime and composite, what does that tell us about the number 1?
    a. 1 (Answer: neither prime nor composite)
    b. 2 (Answer: 1, 2; prime)
    c. 3 (Answer: 1, 3; prime)
    d. 4 (Answer: 1, 2, 4; composite)
    e. 5 (Answer: 1, 5; prime)
    f. 6 (Answer: 1, 2, 3, 6; composite)
3. **Ask**: Is 5 a factor of 24? Raise your hand to answer.
    (Answer: No, we cannot multiply 5 by a number to get 24.
4. **Ask**: Is 24 a multiple of 6? Raise your hand to answer.
    (Answer: Yes, 6 x 4 = 24 so 24 is a multiple of 6.)
5. With pupils, write a list of the factors of the numbers 1 through 6. Then write whether the number is prime or composite. Have pupils help with this process so they can start thinking about the composition of numbers. Pupils will finish this list independently up through 12.

Independent Practice *(10 minutes)*

1. **Say:** Now that we have practised finding the factors of numbers 1 through 6 and have identified whether they are prime or composite, continue your list. In your exercise books, please write the factors of numbers 7 through 12 and tell whether they are prime or composite.
    a. 7 (Answer: 1, 7; prime)
    b. 8 (Answer: 1, 2, 4, 8; composite)
    c. 9 (Answer: 1, 3, 9; composite)
    d. 10 (Answer: 1, 2, 5, 10; composite)
    e. 11 (Answer: 1, 11; prime)
    f. 12 (Answer: 1, 2, 3, 4, 6, 12; composite)
2. **Ask**: Is 12 a factor of 24? Raise your hand to answer. (Answer: Yes, 24 divided by 2 is 12)
3. **Ask**: Is 12 a multiple of 24? Raise your hand to answer. (Answer: No, it is a factor but not a multiple. The multiples of 24 are 24, 36, 48, 60 and so on, they get bigger)
4. **Ask**: Is 24 a multiple of 12? Raise your hand to answer.
   (Answer: Yes, 12 x 2 is 24 so 24 is a multiple of 12)
5. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their responses with their partners. Have them discuss if they think the numbers are correct. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement. Write the solutions on the board so pupils know whether they were correct.

Closing *(2 minutes)*

1. **Say:** Today we learned about the factors and multiples of numbers. We will use this as we move forward tomorrow. Tomorrow we will combine what we have determined about prime and composite numbers with what we learned today to find prime factors.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Prime Factors	**Theme:** Numbers and Numeration Classification of Numbers	
Lesson Number: M-06-044	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to identify factors that are prime from a list of factors.	None	List of the first 10 prime numbers on the board.

Opening *(3 minutes)*

1. **Say:** We have been working on different types of numbers and how numbers relate to one another. Yesterday we spent time learning what factors were and identifying the multiples of numbers 1 through 12. Two days ago we learned about prime and composite numbers and how to identify them. Today we are going to combine many of these ideas to learn how to identify prime factors. Prime factors are important because they help us with decomposition of numbers. Being able to identify prime factors aides in our ability to reduce fractions and factor polynomials. These are skills that build on what you are learning now. It is important to remember the first 10 prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29. These help us if we need to identify prime factors.
2. **Write** the list of the first 10 prime numbers on the board so pupils can copy them into their exercise books for reference.

Introduction to the New Material *(10 minutes)*

1. **Say:** Yesterday we spent time learning about factors and multiples and what they were. We even identified which numbers were prime and composite. We will now combine these skills to look at lists of factors and determine which factors are prime.
2. **Write** the following on the board for pupils to copy in their exercise books:
   a. Factors of 16: 1, 2, 4, 8, 16 (Answer: 2)
   b. Factors of 27: 1, 3, 9, 27 (Answer: 3)
   c. Factors of 34: 1, 2, 17, 34 (Answer: 2, 17)
   d. Factors of 19: 1, 19 (Answer: 19)
3. **Say:** We are going to identify which of these factors are prime by circling it in our list. Let’s look at the list of factors of 16. We know that 1 is neither prime nor composite, so we cannot say that 1 is prime. We know that 2 is prime, so we can circle it. The numbers 4, 8 and 16 are all even so they are not prime. The only prime factor of 16 is 2, so we will only circle the number 2 in our list. Now let’s look at the list of factors of 27. We never circle 1, but we will circle 3 because it is prime. 9 and 27 are not prime, so 3 is the only prime factor of 27. In looking at the factors of 34, we will circle 2 and 17, but not 34 because 34 is composite. The prime factors of 34 are 2 and 17. Our last example is a prime number, so it only has 2 factors. We will circle 19, though, because it is a prime factor of itself. Again, learning the first 10 prime numbers will help you identify prime factors.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Say:** You are now going to practise this in your exercise books with your partner. You will have 7 minutes to find the prime factors of 5 numbers. We will then review the answers on the board.
3. **Write** the following on the board for pupils to copy.
    a. Factors of 28: 1, 2, 4, 7, 14, 28 (Answer: 2, 7)
    b. Factors of 29: 1, 29 (Answer: 29)
    c. Factors of 25: 1, 5, 25 (Answer: 5)
    d. Factors of 32: 1, 2, 4, 8, 16, 32 (Answer: 2)
    e. Factors 42: 1, 2, 3, 6, 7, 14, 21, 41 (Answer: 2, 3, 7)
4. While pupils are working, walk around the room and assist pupils if they are having difficulty. After 7 minutes, review the answers with pupils and answer any questions that they ask.

Independent Practice *(10 minutes)*

1. **Say:** Now you are going to practise the skill again independently.
2. **Write** the following on the board for pupils to copy and practise:
    a. Factors of 210: 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 35, 42, 70, 105, 210 (Answer: 2, 3, 5, 7)
    b. Factors of 14: 1, 2, 7, 14 (Answer: 2, 7)
    c. Factors of 72: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72 (Answer: 2, 3)
    d. Factors of 51: 1, 3, 17, 51 (Answer: 3, 17)
    e. Factors of 23: 1, 23, (Answer: 23)
    f. Factors of 99: 1, 3, 9, 11, 33, 99 (Answer: 3, 11)
3. Walk around the room and help pupils as needed. With 3 minutes left, have pupils share their responses with their partners. Have them discuss if they think the numbers are correct. Have pupils resolve any differences in opinion. Help partners if they cannot come to an agreement. Write the solutions on the board so pupils know whether they were correct.

Closing *(2 minutes)*

1. **Say:** Today we identified prime factors from a list of factors. Remember that being able to find the prime factors of a number will help you with more advanced math in the future.
2. **Ask:** Does anyone have any question about what we are learning?
3. Answer any questions that pupils have.

Lesson Title: Common Factors and Common Multiples	**Theme:** Numbers and Numeration Classification of Numbers	
Lesson Number: M-06-045	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. List factors that are common from a set of factors. 2. List multiples that are common from a list of multiples.	None	Write the word problems from the guided practice and independent practice on the board.

Opening *(3 minutes)*

1. **Say:** Sometimes we want to know what factors and multiples 2 numbers have in common. It helps us figure out how to group numbers and how to figure out how many groups of things we may need to buy. As we work through this concept today, we will understand why this idea is important.

Introduction to the New Material *(10 minutes)*

1. **Write** the following lists on the board.
    a. Factors of 36: 1, 2, 3, 4, 6, 9, 12, 18, 36 AND Factors of 48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 (Answer: 1, 2, 3, 4, 6, 12)
    b. Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27 AND Multiples of 4: 4, 8, 12, 16, 20, 24, 28 (Answer: 12, 24)
2. **Say:** Today we will look at lists of factors and multiples to see which values are the same when we compare lists. If we looked at the factors of 36 and the factors of 48 on the board and we wanted to see which were common factors, we would find all numbers on both lists. In this example, we can see that the common factors of 36 and 48 are 1, 2, 3, 4, 6 and 12.
3. **Say:** We can do the same thing when we are trying to find common multiples. In the lists of multiples of 3 and 4, we see the common multiples are 12 and 24. There are more common multiples but we stopped our lists there. Mathematically we need to understand these ideas for when we work with fractions. We will use common factors to reduce factors and we will use common multiples to find common denominators later this year. Right now we are just identifying these common properties from lists without applying them mathematically.

Guided Practice *(10 minutes)*

1. **Write** the following word problem on the board: You have harvested 40 tomatoes and 30 ears of maize that you want to sell together. You want to sell the maize and tomatoes in groups so that each group has the same number of tomatoes and ears of maize. You know that you can put

tomatoes in 1, 2, 4, 5, 8, 10, 20 or 40 groups. You also know that you can put maize in 1, 2, 3, 5, 6, 10, 15, or 30 groups. What is the most number of groups you can make so that you have an equal number of groups of tomatoes and maize?

2. **Say:** The problem on the board has us thinking about our harvest to make the same number of groups of tomatoes and maize. Here we will look for the common factors of 30 and 40. We see that we can make 2, 4, 5, or 10 groups of both tomatoes and maize.
3. Circle the common factors for pupils on the board so they see that they are common factors.
4. **Say:** The question is asking for the most number of groups that we can make, so the answer to the problem would be that we would make 10 groups of tomatoes and maize. This means that you would sell 10 groups of 4 tomatoes (because 10 x 4 = 40 total tomatoes) and 10 groups of 3 ears of maize (because 10 x 3 = 30 total ears of maize) from your harvest.
5. **Write** another problem on the board for pupils to think about: You and your friend each like to run. You run for 3 minutes before you need to stop and your friend runs for 5 minutes before he needs to stop. If you and your friend run for this amount of time, how long would you both have to run for you to run the same amount of time?
6. **Say:** You know that if you run 3 minutes at a time, you would run 3, 6, 9, 12, 15, 18 or 21 minutes over different attempts. Your friend, who can run for 5 minutes at a time, would run 5, 10, 15 or 20 minutes at a time. Looking at the lists of possible times, we see that 15 is the common multiple of 3 and 5. This means that you and your friend would run for 15 minutes before you ran for the same amount of time.

Independent Practice *(10 minutes)*

1. **Say:** Now you will solve two word problems on your own.
2. **Write** the following 2 problems on the board for pupils to try.
    a. You have 2 jerrycans to collect water. 1 is 25 litres and the other is only 15 litres. Your little sister is going to help you collect water with the small jerry can. How many times would you each need to carry the jerry cans home if you both bring the same amount of water back home to pour into the water tank? The multiples of 25 are 25, 50, 75, and 100. The multiples of 15 are 15, 30, 45, 60, 75 and 90. (Answer: 75 litres of water each; You would carry the large jerry can home 3 times to fill 75 litres and your sister would carry the small jerry can home 5 times to fill 75 litres.)
    b. You have made 18 chapati and 12 bowls of chicken soup. You want to invite friends over to eat, but you need to know how many friends you can invite over so that everyone has the same amount of food. You know the factors of 18 are 1, 2, 3, 6, 9 and 18 and the factors of 12 are 1, 2, 3, 4, 6, and 12. What is the most number of friends you can have to share the meal? (Answer: You can feed 6 people evenly because 6 is the common factor.)
3. When pupils are finished, they will share their solutions with their partners. When time is up, share the answers with pupils so they know whether their work is correct.

Closing *(2 minutes)*

1. **Say:** Today we used common factors and common multiples to solve word problems. We are seeing how the classification of numbers is important because it helps us solve everyday problems.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Increasing Numbers with a Common Difference	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-046	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence by adding the common difference. 2. Describe a rule for the sequence.	None	Draw the tables from the lessons on the board.

Opening *(3 minutes)*

1. **Say:** We can find patterns everywhere. We see them in fabric and in plants to name two common places. Our fingerprints are patterns too. There are patterns in math as well. Today we will begin looking at different types of patterns in math. We will start with 1 type called an arithmetic sequence. Over the next 2 weeks we will learn about different types of mathematical patterns. We will find the pattern and extend it. We will write rules that describe how the pattern is changing.

Introduction to the New Material *(10 minutes)*

1. **Write** 1, 3, 5, 7, 9, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote. Draw 1 dot under the number 1, 3 dots under the number 3, and so on.
2. **Say:** This is an example of a mathematical pattern. In math, patterns like this are called sequences. This example is increasing by 2 to get to the next term. The name we give to the number that we add to each term to get the next term is the common difference. This means that we add the same or common number to each term to get the next term.
3. **Ask:** What are the next 2 terms in the sequence? Raise your hand to answer. (Answer: 11, 13)
4. **Say:** Since we are adding 2 to each term to get the next number the sixth term would be 11 and the seventh term would be 13. All we did to get the next terms was add 9 + 2 = 11 and then we did 11 + 2 = 13. To model this sequence algebraically with a rule, we would try to figure out how things were changing. Using a table helps us visualise what we need to do.
5. Fill out the table below with pupils. You will tell them that you are guessing that the rule is 2n to start which means 2 times n. You fill out the term value in the first row. You then write in what 2n equals. (n is your top row.) You then calculate how much the difference is by solving $x_n - 2n$.

n:	1	2	3	4	5
Terms (x_n):	1	3	5	7	9
2n:	2	4	6	8	10
Wrong by:	-1	-1	-1	-1	-1

6. **Say:** Since we see that guessing that the rule is 2n is off by -1 for each term, we can say that the rule is $x_n = 2n - 1$. You do not always have to make a table if you see the rule immediately, but it helps make it clearer.

Guided Practice *(10 minutes)*

1. **Write** 4, 7, 10, 13, ___, ___ on the board.
2. **Say:** This example is changing by +3 each time. Our common difference is +3. Since our common difference is 3, we know our next 2 terms are 16 and 19. Now let's try to create the rule for this example. First we will make a table. **Draw** the table on the board.

n:	1	2	3	4
Terms (x_n):	4	7	10	13
3n:				
Wrong by:				

(Answer:

n:	1	2	3	4
Terms (x_n):	4	7	10	13
3n:	3	6	9	12
Wrong by:	1	1	1	1

)

3. **Say:** We will try 3n as our guess for the rule on this sequence because our common difference is 3.
4. Have the pupils help you fill in the table. Then have the pupils help you find $x_n - 2n$. Fill out the table together.
5. **Say:** The table shows us that our rule for this sequence is $x_n = 3n + 1$ since the common difference was 3 and we were wrong by a positive 1.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 13, 20, 27, 34, ___, ____. Remember to make a table and draw a visual representation to help you.
2. **Write** the sequence 13, 20, 27, 34, ___, ___ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 41, 48. The rule for the sequence is $x_n = 7n + 6$.)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. **Ask:** Can anyone come to the board and draw a picture that could represent this sequence?
5. Have pupils raise their hands and choose 1 pupil to come draw a picture that represents the sequence. (Answer: Pictures can be of anything, as long as it represents the sequence 13, 20, 27, 34, 41, 48. They could use symbols or trees or any other drawing of their choice.)

Closing *(2 minutes)*

1. **Say:** Today we learned about sequences with a common difference. Tomorrow we will work with sequences that do not have common differences.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Increasing Number Patterns Without a Common Difference	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-047	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence by adding different numbers. 2. Describe a rule for the sequence.	None	Draw the tables from the lesson on the board.

Opening *(3 minutes)*

1. **Say:** Yesterday we started looking at sequences. We learned how to find the next 2 terms in a sequence, and we learned how to find the rule that describes the sequence when we have a common difference. We practised drawing visual representations for sequences as well. Today we will look at sequences again, but this time we won't have a common difference. We will still be adding numbers. However, the sequences will not be increasing by the same amount. This will make it slightly more difficult to find our next 2 terms and to write a rule, but not impossible.

Introduction to the New Material *(10 minutes)*

1. **Write** 1, 3, 6, 10, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote. Draw 1 dot under the number 1, 3 dots under the number 3, and so on. It may help to draw these so they form a triangle.
2. **Ask:** How are these numbers increasing? Raise your hand to answer. (Answer: They are increasing by 2 and then 3 and then 4.)
3. **Say:** We can use this pattern to see that the next 2 terms are 15 and 21. We can see this nicely with the triangles that we are drawing out of dots to show how many are in each term. To draw our triangles we are just adding 1 more row on the bottom of our triangle with the increase. But how do we find out the rule if it is not consistent? We have to think very carefully about how numbers are changing. We know that we are adding 2 to term 1 to find term 2. We add 3 to term 2 to find term 3. We could say that we are adding n-1 to find x_n. Mathematically we would write $x_n = (n-1) + x_{n-1}$. Let's show this in a table to explain.
4. Draw the table on the board. We can see from the table that this works, we just have to be careful with how we find the pattern. We need to look closely at how the numbers are changing.

n:	1	2	3	4
Terms (x_n):	1	3	6	10
N	1	2	3	4
x_{n-1}		1	3	6
(n-1)+ x_{n-1}	1	3	6	10

Guided Practice *(10 minutes)*

1. **Write** 0, 1, 1, 2, 3, 5, 8, ___, ___ on the board.
2. **Say:** This example is changing in a different way. Let's put this in a table to help us visualize it.
3. **Draw** the table on the board.

n:	1	2	3	4	5	6	7
Terms (x_n):	0	1	1	2	3	5	8
Change:			0	1	1	2	3

4. **Say:** The table helps us see that we may not be able to write a rule from the differences. We can see that term 3 is the sum of term 1 and term 2. That term 4 is the sum of term 2 and term 3. That term 5 is the sum of term 3 and term 4. We can write a rule for that. Try writing a rule that tells us that the term is the sum of the previous 2 terms.
5. Have the pupils write a rule that represents how this sequence is changing. Walk around the room to see how pupils are doing. When pupils are finished, write the rule on the board. (Answer: $x_n = x_{n-2} + x_{n-1}$)
6. **Say:** Sometimes you have to look outside of what the difference is in order to find rule. It also helps to draw a picture.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 6, 8, 12, 18, 26, ___, ___. Don't forget to make a table to help you.
2. **Write** the sequence 6, 8, 12, 18, 26, ___, ___ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 36, 48. The rule for the sequence is $x_n = x_{n-1} + 2(n-1)$.)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. **Ask:** Can anyone come to the board and draw a picture that could represent this sequence?
5. **Say:** Remember, you can use dots or dashes for your picture to keep it simple.
6. Have pupils raise their hands and choose 1 pupil to come draw a picture that represents the sequence. (Answer: Pictures can be of anything, if it represents the sequence 6, 8, 12, 18, 26, 36, 48. They could use symbols or trees or any other drawing of their choice. The visual representation should show the increase of multiples of 2.)

Closing *(2 minutes)*

1. **Say:** Today we talked about increasing sequences without common differences. Tomorrow we will learn about decreasing sequences with a common difference.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Decreasing Number Patterns with a Common Difference	Theme: Algebra Number Patterns	
Lesson Number: M-06-048	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence by subtracting a common difference. 2. Describe a rule for the sequence.	None	Draw the tables from the lesson on the board.

Opening *(3 minutes)*

1. **Say:** As things grow, their patterns increase. But things also decrease, and we can create mathematical sequences to represent things that decrease. Today we will start with decreasing patterns that have a common difference, so we can use tables to find our rules more easily than if we did not have a common difference. The difference between today's lesson and the lesson 2 classes ago is that our common difference will be negative rather than positive.

Introduction to the New Material *(10 minutes)*

1. **Write** 26, 21, 16, 11, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers decreasing? (Answer: They are decreasing by 5 each time.)
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is increasing. Pupils should notice that the numbers decrease by subtracting 5 from each term.
4. **Say:** We can use this pattern to see that the next 2 terms are 6 and 1. We can see this nicely with the visual representation we drew along with our numbers. Now we need to find the rule for this sequence. We will do this the same way we did with an increasing sequence with a common difference. Remember, our common difference here is -5.
5. **Draw** the table on the board. **Say:** We can see from the table that this works, we just have to be careful with how we find the pattern.
6. Show pupils how you found the numbers as you put them in the table.

n:	1	2	3	4
Terms (x_n):	26	21	16	11
-5n	-5	-10	-15	-20
Wrong by:	31	31	31	31

7. **Say:** We can write our rule as $x_n = -5n + 31$ or as $x_n = 31 - 5n$. It might be easier to solve the second equation, but the first equation is in the same form as our equations from our increasing sequences with a common denominator.

Guided Practice *(10 minutes)*

1. **Write** 107, 91, 75, 59 ___, ___ on the board.
2. **Say:** This example is changing by -16 each time. Our common difference is -16. Since our common difference is -16, we know our next 2 terms are 43 and 27. Now let's try to create the rule for this example. First we will make a table.
3. **Draw** the table on the board:

n:	1	2	3	4
Terms (x_n):	107	91	75	59
-16n				
Wrong by:				

(Answer: See table below)

n:	1	2	3	4
Terms: (x_n):	107	91	75	59
-16n	-16	-32	-48	-64
Wrong by:	123	123	123	123

4. **Say:** We will try -16n as our guess rule on this sequence because our common difference is -16.
5. Have pupils help you fill in the table. Then have the pupils help you find $x_n - 16n$. Fill out the table together.
6. **Say:** The table shows us that our rule for this sequence is $x_n = -16n + 123$ since the common difference was -16 and we were wrong by 123.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 94, 82, 70, 58, ___, ____. Don't forget to make a table and draw a visual representation to help you.
2. **Write** the sequence 94, 82, 70, 58, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 46, 34. The rule for the sequence is $x_n = -12n + 106$)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. **Ask:** Can anyone come to the board and draw a picture that could represent this sequence?
5. Have pupils raise their hands and choose 1 pupil to come draw a picture that represents the sequence.
   (Answer: Pictures can be of anything, if it represents the sequence 94, 82, 70, 58, 46, 34. They could use symbols or trees or any other drawing of their choice.)

Closing *(2 minutes)*

1. **Say:** Today we talked about decreasing sequences with common differences. Tomorrow we will learn about decreasing sequences without a common difference.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Decreasing Number Patterns Without a Common Difference	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-049	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence by subtracting different numbers. 2. Describe a rule for the sequence.	None	None

Opening *(3 minutes)*

1. **Say:** We are continuing our work with sequences today by finding the next 2 terms and rules for decreasing number patterns that do not have a common difference. Let's remember that a common difference is the number that we add or subtract consistently from 1 term to get the next term. The amount that we add or subtract does not change from term to term. Mathematically these types of sequences represent any type of linear equation anything with a constant rate of change. We can model these types of sequences with real life applications when we learn about functions and linear equations. However, today we need to learn how to find the rule for decreasing sequences that do not change by a constant or common amount.

Introduction to the New Material *(10 minutes)*

1. **Write** 36, 35, 33, 30, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers decreasing?
   (Answer: They are decreasing by 1, then 2, then 3, and so on. They are increasing by n-1)
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is decreasing. Pupils should notice that the numbers decrease by 1 more number each to get the next term.
4. **Say:** We can use this pattern to see that the next 2 terms are 26 and 21. We can see this nicely with the visual representation we drew along with our numbers. Now we need to find the rule for this sequence. Let's first think about what is happening with our numbers and represent the changes using n. To get from term 1 to term 2, we subtract 1, or (n-1). We can use this idea to write our rule. We can write our rule as
5. **Write** the rule on the board: $x_n = x_{n-1} - (n - 1)$
6. **Say:** Remember that n is the number of the term that we are looking for. If we were to solve for the fifth term, the equation would look like this:
7. **Write** the rule with the appropriate values on the board: $x_5 = x_4 - (5 - 1)$
   $x_5 = 30 - 4 = 26$

8. **Say:** This is what we figured out to be the value of our fifth term, so our rule works.

Guided Practice *(10 minutes)*

1. **Write** 59, 56, 50, 41, ___, ___ on the board.
2. **Say:** This example is decreasing by 3, then 6, then 9. We can use this to say that the next term would be 29 and the next term 14. We subtracted 12 and then 15 to get the next 2 terms because we were decreasing by multiples of 3. Try to use the first example today to write the rule for this sequence. (Answer: $x_n = x_{n-1} - 3(n-1)$)
3. Walk around the room and assist pupils as they are trying to find the rule if they need help. After about 7 minutes, call attention to the board and write the rule on the board. Show pupils that the rule works for finding the 6th term: $$x_6 = x_5 - 3(6-1)$$ $$x_6 = 29 - 3(5) = 29 - 15 = 14$$
4. **Say:** We use the -3 in front of the (n-1) to make the multiples of 3 since we saw that n-1 gave us the multiples of 1 in the last example.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 53, 52, 49, 44, ___, ____. Don't forget to draw a visual representation to help you.
2. **Write** the sequence 53, 52, 49, 44, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 37, 28. The rule for the sequence is $x_n = x_{n-1} - (2(n-1) - 1)$.)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them what the rule is and how they can check their work and prove that it works for the sixth term. $$x_6 = x_5 - (2*(6-1) - 1)$$ $$x_6 = 37 - (2*5 - 1) = 37 - 9 = 28$$

Closing *(2 minutes)*

1. **Say:** Today we talked about decreasing sequences without common differences. These are a little more difficult, but by using a visual representation and trying to figure out how the numbers are changing, it is possible to come up with rules to describe the patterns. Tomorrow we will explore patterns that increase through multiplication.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Multiplication in Number Patterns with a Common Ratio	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-050	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence by multiplying with a common number. 2. Describe a rule for the sequence.	None	None

Opening *(3 minutes)*

1. **Say:** We are continuing our work with sequences today by finding the next 2 terms and rules for sequences that increase through multiplication. The common difference is how much a sequence increases or decreases through addition and subtraction when that amount is held constant from term to term. We have something similar with multiplication. When the amount that a sequence increases through multiplication is constant, we call that amount the common ratio. To solve these sequences, we first must find the common ratio. We will then find the next 2 terms and the rule that describes the sequence.

Introduction to the New Material *(10 minutes)*

1. **Write** 1, 2, 4, 8, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers increasing?
   (Answer: They are increasing by multiplying each term by 2.)
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is decreasing. Pupils should notice that the numbers increase by multiplying by 2 to get the next term.
4. **Say:** We can use this pattern to see that the next 2 terms are 16 and 32. We can see this nicely with the visual representation we drew along with our numbers. Now we need to find the rule for this sequence. Let's first think about what is happening with our numbers and represent the changes using n. To get from term 1 to term 2, we multiply by 2. We can use this idea to write our rule. We can write our rule as
5. **Write** the rule on the board. $x_n = 2 * x_{n-1}$
6. **Say:** This equation forces us to know the term before it. But what if we wanted to write a rule where we could find the term we wanted from the first term. Well how many times we have to multiply by 2 to get the missing term. We multiply by 2 time (n-1) times to get the unknown term. Our new rule can be written this way.
7. **Write** the new rule on the board. $x_n = x_1 \times 2^{n-1} = 1 \times 2^{n-1}$
8. **Say:** We can show that this second rule works by finding the 6th term.

9. **Write** the solved equation on the board to prove the rule to pupils. $x_6 = 1 \times 2^{6-1} = 1 \times 2^5 = 1 \times 32 = 32$

Guided Practice *(10 minutes)*

1. **Write** 6, 12, 24, 48, ___, ___ on the board.
2. **Say:** This example is increasing by multiplying each term by 2. We can use this to say that the next 2 terms are 96 and 192. Try to use the first example today to write the rule for this sequence. (Answer: $x_n = x_1 \times 2^{n-1} = 6 \times 2^{n-1}$)
3. Walk around the room and assist pupils as they are trying to find the rule if they need help. After about 7 minutes, call attention to the board and write the rule on the board. Show pupils that the rule works for finding the 6th term. $x_6 = x_1 \times 2^{6-1} = 6 \times 2^5 = 6 \times 32 = 196$
4. **Say:** We use the 6 as the first number because it was our first term. We then multiply it by our common ratio raised to the (n-1) power.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 2, 6, 18, 54, ___, ____. Don't forget to draw a visual representation to help you.
2. **Write** the sequence 2, 6, 18, 54, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 162, 586. The rule for the sequence is $x_n = x_1 \times 3^{n-1} = 2 \times 3^{n-1}$.)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them what the rule is and how they can check their work and prove that it works for the 6th term. $x_6 = 2 \times 3^{6-1} = 2 \times 3^5 = 2 \times 243 = 586$

Closing *(2 minutes)*

1. **Say:** Today we talked about increasing sequences with common ratios. There is a general format to writing the rules for these, as we discussed in class today. Next class, we will continue our work with sequences but with multiplication without a common ratio.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Multiplication in Number Patterns Without a Common Ratio	Theme: Algebra Number Patterns	
Lesson Number: M-06-051	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to: 1. Complete a sequence using multiplication by different multiples. 2. Describe a rule for the sequence.	None	None

Opening *(3 minutes)*

1. **Say:** We are continuing our work with sequences today by finding the next 2 terms and rules for sequences that increase through multiplication. Today, however, our sequences will not have a common ratio. Instead, we will have to find the pattern that we multiply by and write the changes in terms of n.

Introduction to the New Material *(10 minutes)*

1. **Write** 1, 2, 6, 24, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers increasing? (Answer: They are increasing by multiplying each previous term by n. So to get the second term, we multiply the first time by 2. To get the third term, we multiply the second term by 3, and so on.)
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is decreasing. Pupils should notice that the numbers increase by multiplying by varying numbers.
4. **Say:** We can use this pattern to see that the next 2 terms are 120 and 720. Now we need to find the rule for this sequence. Let's first think about what is happening with our numbers and represent the changes using n. Since we are multiplying by varying numbers, it is easier to write our rule to relate to the term before it. Our rule can be written as: $x_n = x_{n-1} \times n = nx_{n-1}$
5. **Write** the rule on the board: $x_n = x_{n-1} \times n = nx_{n-1}$
6. **Say:** This equation forces us to know the term before it. In order to write this rule to determine any term, we must know how to use the factorial equation, which we are not familiar with yet. We can only write this recursively, or when knowing the term before. We can show that this second rule works by finding the sixth term.
7. **Write** the solved equation on the board to prove the rule to pupils: $x_6 = 120 \times 6 = 720$

Guided Practice *(10 minutes)*

1. **Write** 2, 4, 16, 256, ___ on the board.
2. **Say:** This example is increasing by multiplying each term by itself to get the next term. We can use this to say that the next term is 65,536. Try to figure out what the rule is for this sequence.
3. Walk around the room and assist pupils as they are trying to find the rule if they need help. (Answer: $x_n = x_{n-1}^2$)
4. After about 7 minutes, call attention to the board and write the rule on the board.
5. **Say:** This rule needs the previous term to do it. The rule without having the prior term requires us to look at is more difficult. This rule can be written as: $x_n = 2^{2^{n-1}}$
6. **Write** the new rule on the board: $x_n = 2^{2^{n-1}}$
7. **Say:** You can figure this rule out by looking at what it gets multiplied by. It gets multiplied by 2, then 4, then 16, then 256, etc. Written as powers of 2, the sequence can be written as 2^1, 2^2, 2^4, 2^8 and 2^{16}. Written this way, we can write a rule for the exponents in terms of powers of 2. This is a very complicated sequence, but it is possible to write a rule that describes the sequence.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 2, 4, 12, 48, ___, _____ Remember to draw a visual representation to help you if needed.
2. **Write** the sequence 2, 4, 12, 48, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 240, 1440. The rule for the sequence is $x_n = x_{n-1} \times n = nx_{n-1}$)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them what the rule is and remind them that is okay to have to rely on the previous term to write the rules for such complicated sequences.

Closing *(2 minutes)*

1. **Say:** Today we talked about increasing sequences without common ratios. We found that these are very difficult to write rules for and that we need to write the recursively. Recursive means that we write our rule so that the nth term relies on the (n-1) term.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Division in Number Patterns with a Common Factor	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-052	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Complete a sequence using division by a common factor. 2. Describe a rule for the sequence.	None	None

Opening *(3 minutes)*

1. **Say:** We are continuing our work with sequences today by finding the next 2 terms and rules for sequences that change through division with a common factor. These problems are similar to the sequences that change through multiplication with a common ration, except they are getting smaller though division.

Introduction to the New Material *(10 minutes)*

1. **Write** 256, 128, 64, 32, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers decreasing?
   (Answer: They are decreasing by dividing each term by 2.)
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is decreasing. Pupils should notice that the numbers decrease by dividing by 2.
4. **Say:** We can use this pattern to see that the next 2 terms are 16 and 8. Now we need to find the rule for this sequence. Let's first think about what is happening with our numbers and represent the changes using n. Since we are diving by the same number, we can write our equation in terms of our first term. Our rule can be written as:
5. **Write** the rule on the board: $x_n = x_1 , 2^{n-1} = \frac{x_1}{2^{n-1}} = \frac{256}{2^{n-1}}$
6. **Say:** We can use this rule to find any term. We can show that this second rule works by finding the sixth term.
7. **Write** the solved equation on the board to prove the rule to pupils: $x_6 = \frac{256}{2^{6-1}} = \frac{256}{2^5} = \frac{256}{32} = 8$

Guided Practice *(10 minutes)*

1. **Write** 81, 27, 9, 3, ___, ___ on the board.
2. **Say:** This example is decreasing by dividing each term by 3 to get the next term. We can find the next 2 terms using this information. The next 2 terms are 1 and 1/3. Try to figure out what the rule is for this sequence.

3. Walk around the room and assist pupils as they are trying to find the rule if they need help. (Answer: $x_n = x_1 \div 3^{n-1} = \frac{x_1}{3^{n-1}} = \frac{81}{3^{n-1}}$)
4. Walk around the room and assist pupils as they are trying to find the rule if they need help. After about 7 minutes, call attention to the board and write the rule on the board. Show pupils that the rule works for finding the sixth term: $x_6 = x_1 \div 3^{6-1} = \frac{x_1}{3^{6-1}} = \frac{81}{3^5} = \frac{81}{243} = \frac{1}{3}$
5. **Say:** We use the 81 as the number in our numerator because it was our first term. We then divide it by our common ratio raised to the (n-1) power.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 56, 28, 14, 7, ___, ____. Remember to draw a visual representation to help you if needed.
2. **Write** the sequence 56, 28, 14, 7, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are $\frac{7}{2}$ *or* 3.5, $\frac{7}{4}$ *or* 1.75. The rule for the sequence is $x_n = x_1 \div 2^{n-1} = \frac{x_1}{2^{n-1}} = \frac{56}{2^{n-1}}$)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them what the rule is and remind them that when we have a common factor we can use the same format for figuring out the rule.

Closing *(2 minutes)*

1. **Say:** Today we talked about sequences that changed using division of a common factor. We learned that the rule for sequences of this type is the first time divided by the common factor raised to the (n-1) power.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Division in Number Patterns Without a Common Factor	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-053	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to: 1. Complete a sequence using division by different factors. 2. Describe a rule for the sequence.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** We are continuing our work with sequences today by finding the next 2 terms and rules for sequences that change through division with different factors. These sequences will be a little more difficult to see the patterns and to write the rule.

Introduction to the New Material *(10 minutes)*

1. **Write** 24, 24, 12, 4, ___, ___ on the board. Under each number, draw dots that correspond with the number you wrote.
2. **Ask:** How are these numbers decreasing?
   (Answer: They are decreasing by dividing each term by (n-1))
3. Have pupils raise their hands to give their answers. Call on 1 or 2 pupils to describe how the sequence is decreasing. Pupils should notice that the numbers decrease by dividing by different numbers that happen to equal (n-1).
4. **Say:** We can use this pattern to see that the next 2 terms are 1 and $\frac{1}{5}$ Now we need to find the rule for this sequence. Let's first think about what is happening with our numbers and represent the changes using n. Since we are diving by (n-1), we can write our equation in terms of the previous term. Our rule can be written as:
5. **Write** the rule on the board: $x_n = x_{n-1} \div (n-1) = \frac{x_{n-1}}{(n-1)}$
6. **Say:** We would need to use factorials to write this rule in terms of the first equation. We can check this rule to find our sixth term since we know our fifth term is 1.
7. **Write** the solved equation on the board to prove the rule to pupils: $x_6 = \frac{x_5}{(6-1)} = \frac{1}{5}$

Guided Practice *(10 minutes)*

1. **Write** 56, 14, $\frac{7}{3}$, $\frac{7}{24}$, ___, ___ on the board.

2. **Say:** This example is decreasing by dividing each term by 2n to get the next term. We can find the next 2 terms using this information. The next 2 terms are $\frac{7}{240}$ and $\frac{7}{2880}$ Try to figure out what the rule is for this sequence.
3. Walk around the room and assist pupils as they are trying to find the rule if they need help. (Answer: $x_n = x_{n-1} \div (2n) = \frac{x_{n-1}}{2n}$)
4. Walk around the room and assist pupils as they are trying to find the rule if they need help. After about 7 minutes, call attention to the board and write the rule on the board. Show pupils that the rule works for finding the fifth term: $x_5 = x_4 \div (2n) = \frac{x_4}{2n} = \frac{\frac{7}{24}}{2 \times 5} = \frac{\frac{7}{24}}{10} = \frac{7}{240}$
5. **Say:** We write this recursively, meaning relating to the previous term, because we would need higher level math in order to write this any other way.

Independent Practice *(10 minutes)*

1. **Say:** Now try to find the next 2 terms and the rule for this sequence. 9720, 1620, 180, 15, ___, ____. Remember to draw a visual representation to help you if needed.
2. **Write** the sequence 9720, 1620, 180, 15, ___, ____ on the board for pupils to copy into their exercise books. (Answer: The next 2 terms are 1, $\frac{1}{18}$ The rule for the sequence is $x_n = x_{n-1} \div (3n) = \frac{x_{n-1}}{3n}$)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they came up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them what the rule is and remind them that we have to write this rule recursively.

Closing *(2 minutes)*

1. **Say:** Today we talked about sequences that changed using division of different factors. We learned that the rule for sequences of this type is best written using recursion. This means that we write our rules referencing back to the previous term.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Writing Sequences with Multiples of 2 and 3	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-054	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to: 1. Write a sequence with multiples of 2 and 3. 2. Describe a rule for the sequence.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. **Say:** Today we will continue working with sequences, but today you are going to write sequences of your own. We are going to focus on multiples of 2 and 3.
2. **Ask:** Who can come to the board and write the first 12 multiples of 2 and the first 12 multiples of 3? (Answer: Multiples of 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24; Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36)
3. Have pupils raise their hands to volunteer to come to the board to write the multiples. Have 1 pupil write the multiples of 2 and another write the multiples of 3.
4. **Say:** We will be using these multiples in order to write our own sequences today.

Introduction to the New Material *(10 minutes)*

1. **Say:** To write a sequence we need to think about the problem. We have almost looked at some problems like this, but today we are going to use word problems to write our sequences.
2. Write the following on the board: You are making baskets to sell at the market. Each day you can make 2 baskets. You have 10 days to make baskets before market day. You already have 7 baskets finished. How many baskets will you be able to sell at the market? Write a sequence and rule that models the scenario.
3. Read the problem to the class as pupils copy the word problem in their exercise books.
4. **Say:** First we need to read the question and see how many baskets we start with. We start with 7 which is our first term.
5. Write 7 on the board as the first term. Continue writing the next terms on the board as you explain the problem.
6. **Say:** Then we need to see how many baskets we add to that 7 each day. The problem says that you can make 2 baskets a day, so the next day you would have 9 baskets. The day after that there would be 11 baskets, and the fourth day there would be 13.
7. The board should have the sequence 7, 9, 11, 13 on it.
8. **Say:** Now that we have a sequence, we can see that we have modelled the problem with the sequence. We know that the common difference is 2 and our first term is 7. The question asks us what the tenth term is. To find that we have to write the rule that describes the sequence. Remember that when we write rules that describe a sequence with a common difference we

must know our first term and our common difference. We know both of these things, so we can now write our rule on the board.

9. **Write** the rule on the board: $x_n = 2n + 7$
10. **Say:** We will use this rule to find the tenth term when n=10

$$x_{10} = 2 \times 10 + 7$$

11. **Write** the solution on the board: $x_{10} = 20 + 7$

$$x_{10} = 27$$

12. **Say:** We can see that you will have 27 baskets to sell at the market in 10 days.

Guided Practice *(10 minutes)*

1. **Say:** Let's try another problem with some help from you.
2. **Write** the following on the board for pupils to copy: You are fencing in your garden. You have already fenced in 5 metres. You can put up 3 metres of fencing each day. How much fencing will be completed in 14 days? If you need to put up 50 metres of fencing to completely close in your garden, will the garden be fenced in after 14 days? Write the first 4 terms of the sequence and create a rule that describes the sequence. (Answers: 5, 8, 11, 14; $x_n = 3n + 5$; $x_{14} = 3 \times 14 + 5 = 42 + 5 = 47$; you can fence in 47 metres in 14 days; no, the garden will not be completely closed in after 14 days.)
3. Have pupils provide the information for both the sequence and the rule by raising their hands and being called upon. Pupils should identify the first 4 terms of the sequence, the common difference and the first term. Pupils can assist in creating the rule and by solving for the number of metres completed in 14 days. They will tell you that there is not enough fencing. Help pupils if they are struggling by providing guidance in solving the problem.

Independent Practice *(10 minutes)*

1. **Say:** Now you are going to solve a word problem on your own.
2. **Write** the problem on the board for pupils to copy into their exercise books. You have 32 eggs and you use 3 eggs everyday while preparing meals. How many eggs will you have left at the end of the week? Write the first 4 terms of the sequence and create a rule that describes the sequence to help you answer the question.
   (Answer: 32, 29, 26, 23; $x_n = -3n + 32$; $x_7 = -3 \times 7 + 32 = -21 + 32 = 11$; at the end of the week, there will be 11 eggs remaining.)
3. Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they come up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solution on the board.
4. After pupils have put their solutions on the board, show them the solution. Explain that the common difference is -3 because the numbers are reducing.

Closing *(2 minutes)*

1. **Say:** Today we applied what we know about sequences to word problems using multiples of 2 and 3. Tomorrow we will do the same thing, but with multiples of 4 and 5.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Writing Sequences with Multiples of 4 and 5	**Theme:** Algebra Number Patterns	
Lesson Number: M-06-055	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Write a sequence with multiples of 4 and 5. 2. Describe a rule for the sequence.	None	None

Opening *(3 minutes)*

1. **Say:** Today we will continue modelling word problems with sequences just as we did yesterday. But rather than focusing on multiples of 2 or 3, we will focus on multiples of 4 and 5.
2. **Ask:** Who can come to the board and write the first 12 multiples of 4 and the first 12 multiples of 5? (Answer: Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48; Multiples of 5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60)
3. Have pupils raise their hands to volunteer to come to the board to write the multiples. Have 1 pupil write multiples of 4 and another write multiples of 5.
4. **Say:** We will be using these multiples to write our own sequences today.

Introduction to the New Material *(10 minutes)*

1. **Say:** Just as we did yesterday, we will think about word problems to create sequences.
2. **Write** the following on the board: You have 30 math problems to finish. You have already completed 6 problems and you complete 4 problems each minute. How many problems are finished after 5 minutes? Will the problem be finished in 5 minutes? Write the first 4 terms of the sequence and write a rule that describes the sequence.
3. Read the problem to the class as pupils copy the word problem in their exercise books.
4. **Say:** First we need to read the question and see how many problems are finished before we start. We start with 6.
5. **Write** 6 on the board as the first term. Continue writing the next terms on the board as you explain the problem.
6. **Say:** Then we need to see how many problems we solve each minute. The problem says that you can solve 4 problems each minute, so after 1 minute you will have 10 problems solved. After 1 more minute you will have solved 14 problems, and so on.
7. The board should have the sequence 6, 10, 14, 18 written on it.
8. **Say:** Now that we have a sequence, we can see that we have modelled the problem with the sequence. We know that the common difference is 4 and our first term is 6. The question asks us what the fifth term is. To find that we have to write the rule that describes the sequence. Remember that when we write rules that describe a sequence with a common difference we

must know our first term and our common difference. We know both of these things, so we can now write our rule on the board.

9. **Write** the rule on the board: $x_n = 4n + 6$
10. **Say:** We will use this rule to find the fifth term when n=5
11. **Write** the solution on the board: $x_5 = 4 \times 5 + 6 = 20 + 6 = 26$
12. **Say:** We can see that 26 problems will be solved in 5 minutes and that the assignment will not be finished in 5 minutes.

Guided Practice *(10 minutes)*

1. **Say:** Let's try another problem with some help from you.
2. **Write** the following on the board for pupils to copy: The water tank at the school holds 500 L of water. Each morning, pupils use 5 L of water to wash their hands. If it does not rain and no water is added to the tank, how much water is left in the tank after 45 days? After 75 days? Write a sequence that models the amount of water in the tank for the first 4 days. Create a rule that will help you answer the question. (Answer: 500 L, 495 L, 490 L, 485 L; $x_n = -5n + 500$;

   $x_{45} = -5 \times 45 + 500 = -225 + 500 = 375L$; after 45 days, there will be 375 L of water left in the tank;

   $x_{75} = -5 \times 75 + 500 = -375 + 500 = 125L$; after 75 days, there will be 125 L of water left in the tank.)
3. Have pupils provide the information for both the sequence and the rule by raising their hands and being called upon. Pupils should identify the first 4 terms of the sequence, the common difference and the first term. Pupils can assist in creating the rule and by solving for how much water is left after 45 days and 75 days. Help pupils if they are struggling by providing guidance in solving the problem.

Independent Practice *(10 minutes)*

1. **Say:** Now you will solve a word problem on your own.
2. **Write** the problem on the board for pupils to copy into their exercise books: At the market, there is a pile of 300 oranges. Each customer buys 4 oranges. During the day 72 customers come to buy oranges. How many oranges are left at the end of the day? Write the first 4 terms of the sequence and create a rule that describes the sequence to help you answer the question. (Answer: 300, 296, 292, 288; $x_n = -4n + 300$; $x_{72} = -4 \times 72 + 300 = -288 + 300 = 12$; at the end of the day, there are 12 oranges remaining.) Have pupils work on the example for 6 minutes. Walk around and help them if they are struggling. Once 6 minutes is up, have pupils share their solutions with their partner to see if they come up with the same rule. Once partners have shared, have pupils volunteer to put their solution on the board. Have 1 or 2 volunteers write their solutions on the board.
3. After pupils have put their solutions on the board, show them the solution.

Closing *(2 minutes)*

1. **Say:** Today we applied what we know about sequences to word problems using multiples of 4 and 5. Next week we will begin a new unit on measurement.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Measuring Lengths of Objects in Feet and Inches	**Theme:** Measurement and Estimation; Length	
Lesson Number: M-06-056	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to measure different lengths in the classroom in feet and inches.	Rulers for inches and feet. (Copy the ruler for groups if rulers are unavailable.)	1. Gather rulers or make copies of a ruler with inches and feet. 2. Draw the table on the board for the introduction to new material.

Opening *(3 minutes)*

1. **Say:** Today we are going to measure things in the classroom. We will measure in inches and feet. We will work in groups to figure out how big things are in the classroom.

Introduction to the New Material *(10 minutes)*

1. Show pupils the ruler and indicate which marks are inches and which are feet.
2. **Say:** As you can see, feet are bigger than inches. We can use inches to measure smaller lengths and feet to measure larger lengths. When we measure, though, we must make sure we measure from the 0 mark on the ruler.
3. The zero mark may not be labelled as zero, but rulers don't always go to the end. This is something you must determine with the rulers you have. Pick up a piece of chalk.
4. **Say:** If we wanted to measure this piece of chalk, we would measure the chalk in inches because it is a smaller length.
5. Show pupils how to measure the chalk using the ruler. Walk around the room to show pupils how you are measuring the chalk in inches.
6. **Say:** We measure in feet the same way that we do in inches. Sometimes, though, the length we are measuring is longer than 1 foot. When this happens, we must be careful to mark the end of 1 foot and move the ruler. We move the ruler to the mark and measure again. This is sometimes difficult, but we must do our best.
7. **Say:** Let's measure the height of the window using feet.
8. Show pupils how to measure the height of the window using feet and carefully moving the ruler to measure distances larger than 1 foot. Divide pupils into groups. The number of groups is determined by how many rulers you have. If you have 5 rulers, divide pupils into 5 groups.

Guided Practice *(10 minutes)*

1. **Say:** In your groups, I want you to decide on 3 things in the classroom you would measure in inches and 3 things in the classroom you would measure in feet. In each of your exercise books, I want you to make a table to record your measurements.
2. Draw the table on the board for pupils to copy:

Item	Measurement in Inches	Measurement in Feet
1.		
2.		
3.		
4.		
5.		
6.		

3. **Say:** Write the items your group wishes to measure in the Item column of your table. Then as a group, measure the items you wrote. Remember, you should measure 3 items in inches and 3 items in feet. Write your measurements in the appropriate column based on your unit of measurement.
4. Groups will then go around the classroom and measure the items and record their answers.

Independent Practice *(10 minutes)*

1. Once groups have finished measuring, have groups return to their seats.
2. **Say:** In your groups, please decide who will share what you measured.
3. Allow groups to decide on a person to share their results. This should take only 1 minute. Once groups have chosen their reporter, have each reporter come to the front of the room with their notes.
4. Have groups share their measurements. Reporters should state the name of the item and the measurement with units (inches or feet). If any measurements seem like they are not close, help them measure again to ensure correct values.

Closing *(2 minutes)*

1. **Say:** All the groups did a good job at measuring and recording their data today. We will use this information tomorrow. Tomorrow we will convert between inches and feet using the values you recorded in your groups.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Conversion of Lengths from Inches to Feet and Feet to Inches	**Theme:** Measurement and Estimation; Length	
Lesson Number: M-06-057	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Convert from inches to feet. 2. Convert from feet to inches.	None	None

Opening *(3 minutes)*

1. **Say:** We are going to continue with our lesson from yesterday. We are going to get back in our groups from yesterday and learn how to convert between feet and inches. This means that we are going to see how many inches there are in the things we measured in feet and vice versa. We can convert by multiplying and dividing.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to explore how to change units. We know by looking at our rulers that 1 foot equals 12 inches. That fact is what we call our conversion factor. Without using more complicated procedures like fraction multiplication, we can still convert between units. The general rule is that when we convert from feet to inches, we multiply our number by 12. When we convert from inches to feet, we divide by 12. Another way to think about this if we are going from a bigger unit to a smaller unit, we multiply. If we are converting from a smaller unit to a bigger unit, we divide.
2. **Write** the rule on the board for pupils to copy in their exercise books:
    a. Feet to inches → multiply by 12
    b. Inches to feet → divide by 12
3. **Say:** Copy this information into your exercise books to help you with today's exercise. If I measured a piece of chalk to be 2 inches long, I would say that it was $2 \div 12=\frac{1}{6}$ feet long. Sometimes our conversions will give us fractions. That is okay.
4. **Say:** If we have 4 feet of material and we need to find how many inches this is, we will multiply.
5. **Write:** 4 x 12 = 48 inches of material is the same as 12 feet.

Guided Practice *(10 minutes)*

1. **Write** on the board: Convert the following inches to feet or feet to inches by multiplying or dividing:
    a. 3 feet = ____ inches(Answer: 36 inches)
    b. 4.5 feet = ____ inches (Answer: 54 inches)
    c. 60 inches = ___ feet(Answer: 5 feet)
    d. 90 inches = ___ feet(Answer: 7.5 feet)

2. **Say:** Now you will get back into your groups from yesterday and convert the lengths you measured in feet and inches

Independent Practice *(10 minutes)*

1. **Say:** Please get in your groups from yesterday and make sure you bring your notes with your measurements. We are going to work with those numbers today to convert between units. Work with your group to convert all your measurements from yesterday to the other unit. If you measured something in inches, convert it to feet. If you measured something in feet, convert it to inches. Some conversions might be in fractions or decimals and it's ok. Check your work to see if it makes sense.
2. Walk around the room to see if groups need help. If groups struggle, remind them of the rules for conversion posted on the board and written in their exercise books.
3. Once groups have finished converting, call attention to the front of the room.
4. **Say:** In your groups, please decide who will share what you converted. Please choose a different reporter than the person who spoke for your groups yesterday.
5. Allow groups to decide on a person to share their results. This should take only 1 minute. Once groups have chosen their reporter, have each reporter come to the front of the room with their notes.
6. Have groups share their conversions. Pupils should say what the original measurement was and what the converted measurement is and include units (inches or feet) in their report. If any conversions seem like they are not correct, help them convert again to ensure correct values.

Closing *(2 minutes)*

1. **Say:** All of the groups did a good job at converting their data and recording it today. Tomorrow we will continue measuring, but we will be using different units. Instead of working with inches and feet, we will be working with millimetres and centimetres.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Measuring Lengths of Objects in Millimetres and Centimetres	Theme: Measurement and Estimation; Length	
Lesson Number: M-06-058	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	Teaching Aids	Preparation
By the end of the lesson, pupils will be able to measure different lengths in the classroom in millimetres and centimetres.	Rulers with millimetres and centimetres.	1. Gather rulers or make copies of a ruler with centimetres and millimetres. 2. Draw the table on the board for the introduction to new material.

Opening *(3 minutes)*

1. **Say:** Today we are going to measure things in the classroom again. We will work in groups again. This time we will measure in millimetres and centimetres rather than in inches and feet. Remember that there are different systems of measurement. Inches and feet are part of the imperial system of measurement. Millimetres and centimetres are part of the metric system. For the rest of the week we are going to focus on the metric system. We will measure items using the metric system and learn how to convert between different units within the metric system.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to use rulers to measure in millimetres and centimetres.
2. Hold up a ruler and show pupils the millimetre and centimetre marks on the ruler.
3. **Say:** Remember that when we measure using a ruler we need to be careful to start at zero, which may not be at the very end of the ruler. Since millimetres are very small measurements, it is even more important that we make sure we start our measurements right at the zero on our ruler. Today we are going to get back in our groups and measure the same items that we measured 2 classes ago. The things we measured in inches, we are going to measure in millimetres. The things we measured in feet we are going to measure in centimetres. Remember to be very careful if what you are measuring is longer than the ruler.
4. **Draw** a table on the board for pupils to copy into their exercise books.

Item Measured	Millimetres	Centimetres
1.		
2.		
3.		
4.		
5.		
6.		

5. **Say:** Use this table to record your measurements. Remember to put your measurements in the correct columns by unit of measurement.

Guided Practice *(10 minutes)*

1. Have pupils get into their groups and give each group a ruler with millimetres and centimetres on it.
2. **Say:** Now work with your group to measure the same items you measured in inches and feet. Remember that the items you measured in inches will be measured in millimetres today and the items you measured in feet will be measured in centimetres today. Record your measurements in your table and in the column that corresponds with the correct unit of measurement, either millimetres or centimetres.

Independent Practice *(10 minutes)*

1. Once groups have finished measuring, have groups return to their seats.
2. **Say:** In your groups, please decide who will share what you converted. Please choose a different reporter than the person who spoke for your groups the past 2 days.
3. Allow groups to decide on a person to share their results. This should take only 1 minute. Once groups have chosen their reporter, have each reporter come to the front of the room with their notes.
4. Have groups share their measurements. Pupils should name the item and tell the unit of measurement (millimetres or centimetres) in their report. If any measurements seem like they are not correct, help them measure again to ensure correct values.

Closing *(2 minutes)*

1. **Say:** All of the groups did a good job at measuring different items in millimetres and centimetres. You are also becoming experts in recording and reporting data. Tomorrow we will continue working with these measurements, so please do not lose your work.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title:		
Lesson Title: Conversion of Lengths from Centimetres to Millimetres and Millimetres to Centimetres	**Theme:** Measurement and Estimation; Length	
Lesson Number: M-06-059	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Convert from millimetres to centimetres. 2. Convert from centimetres to millimetres.	None	None

Opening *(3 minutes)*

1. **Say:** We are going to continue with our lesson from yesterday. We will get back in our groups from yesterday and learn how to convert between feet and inches. This means that we are going to see how many millimetres there are in the things we measured in centimetres and vice versa.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to explore how to change units. We know by looking at our rulers that 1 centimetre equals 10 millimetres. That fact is our conversion factor for today's activity. Without using more complicated procedures like fraction multiplication, we can still convert between units. The general rule is that when we convert from millimetres to centimetres, we divide our number by 10. When we convert from centimetres to millimetres, we multiply by 10. Another way to think about this if we are going from a bigger unit to a smaller unit, we multiply. If we are converting from a smaller unit to a bigger unit, we divide.
2. Write the rule on the board for pupils to copy in their exercise books.
    a. Centimetres to millimetres → multiply by 10
    b. Millimetres to centimetres → divide by 10
3. **Say:** Copy this information into your exercise books to help you with today's exercise.
4. Give pupils a minute to copy the conversion factor into their exercise books.
5. **Say:** If I measured a piece of chalk to be 6 centimetres long, I would say that it was $6 \times 10 = 60$ millimetres long. Since our conversion factors have us multiplying and dividing by 10, it is easy for us to find our answers. We can easily give our conversions in decimals if the measurement converts that way. We do not need to write anything in fractions. We will use the skills we learned to multiply and divide by 10.
6. **Say:** If a notebook measures 300 millimetres long, how many centimetres is it? Let's look at this calculation together.
7. **Write:** 300 millimetres ÷ 10 = 30 centimetres

Guided Practice *(10 minutes)*

1. **Write** on the board: Convert the following centimetres to millimetres or millimetres to centimetres by multiplying or dividing:
    a. 35 millimetres = ____ centimetres (Answer: 3.5 centimetres)
    b. 4.5 centimetres = ____ millimetres (Answer: 45 millimetres)
    c. 650 millimetres = ___ centimetres (Answer: 65 centimetres)
    d. 90 centimetres = ___ millimetres (Answer: 900 millimetres)
2. **Say:** Now you will get back into your groups from yesterday and convert the lengths you measured in centimetres and millimetres.

Independent Practice *(10 minutes)*

1. **Say:** Please get in your groups from yesterday and make sure you bring your notes with your measurements. We are going to work with those numbers today to convert between units. Work with your group to convert all your measurements from yesterday to the other unit. If you measured something in millimetres, convert it to centimetres. If you measured something in centimetres, convert it to millimetres. You might get fractions or decimals and it's ok. Check your work to see if it makes sense.
2. Walk around the room to see if groups need help. If groups struggle, remind them of the rules for conversion posted on the board and written in their exercise books.
3. Once groups have finished converting, call attention to the front of the room.
4. **Say:** In your groups, please decide who will share what you converted. Please choose a different reporter than the person who spoke for your groups yesterday.
5. Allow groups to decide on a person to share their results. This should take only 1 minute. Once groups have chosen their reporter, have each reporter come to the front of the room with their notes.
6. Have groups share their conversions. Pupils should say what the original measurement was and what the converted measurement is and include units (millimetres or centimetres) in their report. If any conversions seem like they are not correct, help them convert again to ensure correct values.

Closing *(2 minutes)*

1. **Say:** Every group did a good job converting between millimetres and centimetres. Tomorrow we will convert more measurements. These measurements will be for much larger distances.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

Lesson Title: Conversion of Lengths from Metres to Kilometres and from Kilometres to Metres	**Theme:** Measurement and Estimation; Length	
Lesson Number: M-06-060	**Class/Level:** Primary 6	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to: 1. Convert from metres to kilometres. 2. Convert from kilometres to metres.	None	None

Opening *(3 minutes)*

1. **Say:** We are finishing up measurement and conversions today. We have looked at inches and feet and have converted between them, as well as millimetres and centimetres and their conversions. Today we are going to explore much larger distances, such as metres and kilometres. These measurements are much more closely related to sizes of houses and distances walked to school or to the market.

Introduction to the New Material *(10 minutes)*

1. **Say:** The first thing we need to know is how metres and kilometres are related. 1 metre is about the length of a desk or the width of a doorway. A kilometre is much further. A kilometre is about how far you would walk in about 10 minutes. Kilometres and metres are related, though, and we can easily convert between those measurements. 1 kilometre is equal to 1000 metres. That is our conversion factor. In order to convert between kilometres and metres, we have to know the rules to follow. To convert from kilometres to metres, we multiply by 1000. To convert from metres to kilometres, we divide by 1000.
2. Write the rule on the board for pupils to copy in their exercise books.
    a. Kilometres to metres → multiply by 1000
    b. Metres to kilometres → divide by 1000
3. **Say:** Copy this information into your exercise books to help you with today's exercise.
4. Give pupils a minute to copy the conversion factor into their exercise books.
5. **Say:** Since we are just multiplying and dividing by powers of 10, we will use the rules we already learned to make this multiplication and division easier.
6. **Write** the following word problem on the board: Sorie and Abu are running a race. They are told the race is 10 kilometres in length. How many metres do they have to run?
   (Answer: 10,000 metres)
7. Read the problem to pupils after you write it on the board.
8. **Say:** The problem gives us the distance of the race as 10 kilometres, but the question is asking for the distance in metres. We are being asked to convert from kilometres to metres. We know that we have to multiply by 1000 to convert from kilometres to metres. If we convert properly, we know that 10 multiplied by 1000 equals 10,000.
9. **Write** the solution on the board: $10 \times 1000 = 10,000$

10. **Say:** Sorie and Abu each run 10,000 metres in the race.

Guided Practice *(10 minutes)*

1. **Write** the following word problem on the board for pupils to copy in their exercise books: When measuring the distance around his plot of land, Mr Tommy figures out that he needs 600 metres of fencing. When he goes to the shop, they ask him how much fencing he needs in kilometres. Convert his measurement to kilometres so that Mr Tommy knows how much fencing he needs. (Answer: 0.6 kilometres of fencing)
2. Read the problem to pupils.
3. **Say:** This problem is asking us to convert from metres to kilometres. Try using the rule we figured out earlier to convert the measurement for Mr. Tommy. Work on it by yourself. I will walk around the room to assist if you are having difficulty.
4. Walk around the room while pupils are working on the problem. Give pupils about 5 minutes to solve the problem. Once pupils are done, have pupils raise their hands to volunteer to put their work on the board. Call on 3 pupils to write their solution on the board. Help pupils if they do not get the correct solution.
5. **Say:** Since we are converting from metres to kilometres, we must divide by 1000. 600 divided by 1,000 equals 0.6 kilometres.

Independent Practice *(10 minutes)*

1. **Say:** Now you will try 2 more problems on your own.
2. **Write** the next problems on the board for pupils to copy in their exercise books
    a. A lorry travels 197,460 metres per day. The driver needs to know how many kilometres he drives per day. Convert the distance to kilometres to help the driver.
    (Answer: 197.46 kilometres per day)
    b. Your cow gets away and is found 5 kilometres down the road. Your father asks you how many metres the cow travelled. Convert the distance to metres to help your father.
    (Answer: The cow travelled 5,000 metres down the road.)
3. Have pupils work on the problem independently. Walk around the room and assist pupils if they need help. Once pupils have solved both problems, they will check their responses with their partners. With 2 minutes left, have pupils raise their hands to come to the board to show their responses to the 2 word problems. Help pupils if they need help in explaining their work.

Closing *(2 minutes)*

1. **Say:** We are done working with conversions at this point in time. We will use these measurements later in the year to do some geometry, but for now we just need to remember how to convert between different units. We are now at the end of Term 1 and you will be having examinations in 2 weeks. We will move on to revisions next week.
2. **Ask:** Does anyone have any question about what we have been learning?
3. Answer any questions that pupils have.

FUNDED BY

IN PARTNERSHIP WITH