Lesson plans for

PRIMARY
Mathematics

4
CLASS

3
TERM

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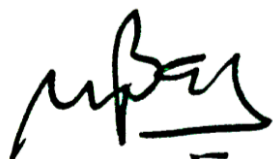
It is now time to build on this success. I am pleased to issue new lesson plans across all primary and JSS school grades in Language Arts and Mathematics. These plans give teachers the support they need to cover each element of the national curriculum. In total, we are producing 2,700 lesson plans –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

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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: Telling the Time to the Nearest Minute on an Analogue Clock	**Theme:** Measurement and Estimation Time	
Lesson Number: M-04-121	**Class/Level:** Primary 4	**Time:** 35 minutes

Learning Outcomes: By the end of the lesson, pupils will be able to: 1. Tell the time in hours and half hours using a 12-hour clock face. 2. Use appropriate language to tell the time.	**Teaching Aids** Analogue clock or a picture of a clock drawn on the board	**Preparation** 1. Gather 1 analogue (round) clock. If none are available, the lesson may be taught entirely with pictures. 2. Draw a large circle for the clock on the board.

Opening *(3 minutes)*

1. Ask pupils to think about the morning, afternoon and evening.
2. Tell pupils to think. Then, ask that they turn to a partner and tell them 1 thing they do in the morning.
3. **Ask:** What do you do in the morning? (Example answers: wake up; brush teeth; come to school)
4. Tell pupils to think. Then, to turn to a partner and tell them 1 thing they do in the afternoon.
5. **Ask:** What do you do in the afternoon? (Example answers: go home from school, homework)
6. Tell pupils to think. Then, to turn to a partner and tell them 1 thing they do in the evening.
7. **Ask:** What do you do in the evening? (Example answers: prepare the evening meal, eat, go to sleep)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn to tell time to the hour and half-hour on a clock.
2. Show pupils the round clock face (or the clock face drawn on the board).
3. **Say:** A clock tells us exactly what time it is in hours and minutes.
4. **Ask:** How many numbers do you see on the clock? Raise your hand to answer. (Answer: 12)
5. Say aloud with pupils the numbers on the clock face. Begin with '12'.
6. **Ask:** What else does the clock have? Raise your hand to answer. (Example answer: Black things that point at the numbers.)
7. **Say:** The things that point at the numbers are called clock hands. The short one is called the hour hand. The long one is called the minute hand.
8. **Say:** The short hand tells us the hour. We say the number the short hand is pointing to first. The long hand tells us the minutes. When the long hand is pointing to the '12', we say 'o'clock'.
9. Show pupils 9 o'clock with the analogue clock or the clock drawn on the board.
10. **Ask:** What number is the short hand pointing at? Raise your hand to answer. (Answer: 9)
11. **Ask:** What number is the long hand pointing to? Raise your hand to answer. (Answer: 12)
12. **Say:** As a class, please say '9 o'clock'.
13. Repeat steps 9 – 11 to show 6 o'clock, 3 o'clock, 7 o'clock, 12 o'clock and 8 o'clock. Have pupils say each time aloud as a class.
14. **Say:** Both hands move to show time move from 1 hour to the next.
15. Move the minute hand of the clock to point at the 6. Move the hour hand of the clock to half way between 8 and 9.

16. **Ask:** How far around the clock is the minute hand? Is it all the way around or halfway around? Raise your hand to answer. (Answer: It is halfway around.)
17. **Say:** When the minute hand is halfway around, the hour hand moves half way to the next hour.
18. **Ask:** What two numbers is the hour hand between? Raise your hand to answer. (Answer: 8 and 9)
19. **Say:** We read this time as 'half past 8'. As a class, please say 'half past 8.'
20. Repeat steps 14 -18 to show 'half past 2', 'half past 3', 'half past 7', 'half past 6' and 'half past 12'. Have pupils say each time aloud as a class.

Guided Practice *(10 minutes)*

1. **Say:** Now you are going to learn to draw a clock face.
2. Draw a large circle on the board. Tell pupils to draw a circle in their exercise books.
3. **Write** the number '12' at the top of the circle on the inside of the circle. Have pupils write the number 12 at the top of their circles.
4. **Write** the number '6' at the bottom of the circle on the inside of the circle. Have pupils write the number 6 at the bottom of their circles.
5. **Write** the numbers '3' and '9' in the correct spots on the circle. Have pupils do the same.
6. Fill in the rest of the numbers. Evenly space the numbers. Tell pupils to fill in the rest of their numbers. Remind them to evenly space the numbers.
7. **Ask:** How can we draw the clock hands to show 10 o'clock? Raise your hand to answer. (Answer: Draw the short hand to point to the 10. Draw the long hand to point to the 12).
8. **Draw** the clock hands to show 10 o'clock on the board. Have pupils do the same on their clock faces.
9. Have pupils draw a new clock face.
10. Ask pupils how to show 'half past 10.'
11. Erase the hands from the clock on the board. Draw new hands to show 'half past 10'.
12. Have pupils draw the hands on their clock faces to show 'half past 10'.
13. Use question and answer to guide pupils by drawing other times on their clocks as time allows.

Independent Practice *(10 minutes)*

1. Have pupils draw 5 clock faces. *(3 minutes)*
2. Ask pupils to draw the clock hands to show '4 o'clock'.
3. Draw hands on the clock on the board to show '4 o'clock'.
4. Have pupils say aloud as a class '4 o'clock'.
5. Have pupils check their work. Tell them to correct any mistakes.
6. Repeat steps 2 -5 with other times, such as 'half past 4', '11 o'clock', 'half past 11' and so on.

Closing *(2 minutes)*

1. Ask pupils to think about how clock time can help them. Then, ask them to tell a partner.
2. Choose 1 -2 pupils to share their ideas with the class. (Example answer: be on time for school)

Lesson Title: Telling the Time to the Nearest Minute on a Digital Clock	**Theme:** Measurement and Estimation Time	
Lesson Number: M-04-122	**Class/Level:** Primary 4	**Time:** 35 minutes

Learning Outcomes: By the end of the lesson, pupils will be able to: 1. Tell the time in quarters of an hour using a 12-hour clock face. 2. Use appropriate language to tell the time.	**Teaching Aids** Analogue Clock or a picture of a clock drawn on board.	**Preparation** Gather 1 analogue (round) clock. If none are available, the lesson may be taught entirely with pictures.

Opening *(3 minutes)*

1. Revise with pupils parts of a clock face and reading time to the hour.
2. Show pupils the round clock face or draw a clock on the board.
3. **Ask:** What is the long hand on the clock called? Raise your hand to answer. (Answer: the minute hand)
4. **Ask:** What is the short hand called? Raise your hand to answer. (Answer: the hour hand)
5. **Ask:** Where is the minute hand at 12 o'clock? Raise your hand to answer. (Answer: on the 12)
6. **Ask:** Where is the hour hand at 12 o'clock? Raise your hand to answer. (Answer: on the 12)
7. Set the clock hands to 12 o'clock (or draw them on the clock on the board).
8. Read the time aloud with pupils.
9. Repeat for each time on the hour in order, from 1 o'clock back to 12 o'clock as time allows.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn to tell time on a clock to a quarter hour. We will also learn to read times written as numbers.
2. **Say:** Raise your hand if you have seen the time on a cell phone.
3. **Write** on the board:

   12:00

4. **Say:** This is what '12 o'clock' look like on a cell phone.
5. Read the time aloud with pupils, '12 o'clock'.
6. Erase the 12. Write a '1'. Read the time aloud with pupils, '1 o'clock'.
7. Continue to write and read aloud each time on the hour in order.
8. **Write** on the board:

   12:30

9. **Say:** This is what 'Half past 12' look like on a cell phone. Another way to say 'half past 12' is '12:30'.
10. Read the time aloud with pupils as 'twelve thirty'.
11. Erase the 12. Write a '1'. Read the time aloud with pupils, 'one thirty.
12. Continue to write and read aloud each time on the half hour in order.
13. **Say:** Yesterday we told the time to the hour and half hour. Today we will tell the time to the quarter hour.
14. Show pupils the round clock face or the clock face drawn on the board.

15. **Say:** Both hands move to show time move from 1 hour to the next.
16. Move the minute hand of the clock to point at the 3. Move the hour hand of the clock to $\frac{1}{4}$ of the way between 1 and 2.

17. **Say:** The minute hand is on the 3. It is $\frac{1}{4}$ way around the clock. Another way to say 'one-fourth' is 'one-quarter'. When the minute hand points at the 3, we say it is 'quarter past'.
18. **Say:** This clock shows 'quarter past 1'.
19. Have pupils say the time aloud as a class.
20. Move the minute hand of the clock to point at the 9. Move the hour hand of the clock to $\frac{3}{4}$ of the way between 1 and 2.

21. **Say:** The minute hand is on the 9. It only needs to go $\frac{1}{4}$ more to get back to 12. When the minute hand points at the 9, we say it is 'quarter to'.
22. **Say:** This clock shows 'quarter to 2'.
23. Have pupils say the time aloud as a class.

Guided Practice *(10 minutes)*

1. Have pupils draw 5 clock faces.
2. **Ask:** How can we draw the clock hands to show 'quarter past 10'? Raise your hand to answer. (Answer: Draw the short hand to point a little past 10. Draw the long hand to point to the 3.)
3. Draw the clock hands to show 'a quarter past 10' on the board. Have pupils do the same.
4. **Ask:** How can we draw the clock hands to show 'a quarter to 11'? Raise your hand to answer. (Answer: Draw the short hand to point almost to 11. Draw the long hand to point to the 9.)
5. Erase the hands from the clock on the board. Draw new hands to show 'a quarter to 11'.
6. Have pupils do the same.
7. Use question and answer to guide pupils by drawing other times on their clocks.

Independent Practice *(10 minutes)*

1. Read the times written on the board with pupils.

a.	5:00	b.	5:30	c.	1:00	d.	1:30	e.	7:00	f.	6.45	g.	10:15

2. Tell pupils to work with a partner to draw clocks to show the times.
3. Have pupils to exchange their notebooks and check each others work while you read the answers aloud.

Closing *(2 minutes)*

3. **Say:** What two fractions do we use to represent time? Raise your hand to answer.
4. Invite 2 pupils to share. (Answer: quarter and half)

Lesson Title: Converting between 12 and 24 Hour Time	**Theme:** Measurement and Estimation Time
Lesson Number: M-04-123	**Class/Level:** Primary 4 — **Time:** 35 minutes

Learning Outcomes:	Teaching Aids	Preparation
By the end of this lesson, pupils will be able to: 1. Tell time to 5 minutes. 2. Know the number of minutes in an hour. 3. Use appropriate language to tell time.	Analogue clock or a picture of clock drawn on board that counts minutes in 5's.	1. Gather 1 analogue (round) clock. If none are available, the lesson may be taught entirely with pictures. 2. Draw a clock that shows how to count minutes in 5's on the board.

Opening *(3 minutes)*

1. Revise the reading time to the half hour with pupils.
2. Show pupils the round clock face or draw a clock on the board.
3. **Ask:** Where is the long hand or minute hand at 'half past 12'? Raise your hand to answer. (Answer: on the 6)
4. **Ask:** Where is the short hand or hour hand at 'half past 12'? Raise your hand to answer. (Answer: half way between the 12 and the 1)
5. Set the clock hands to 'half past 12' (or draw them on the clock on the board).
6. Read the time aloud with pupils.
7. Repeat for each time on the half-hour in order, from 'half past 1' to 'half past 11', as time allows.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how many minutes are in an hour by counting the minutes on a clock face in 5's.
2. Show pupils the round clock face or the clock face drawn on the board.
3. **Ask:** What is the short hand called? Raise your hand to answer. (Answer: the hour hand)
4. **Ask:** What does the short hand tell us? Raise your hand to answer. (Answer: the hour)
5. **Ask:** What is the long hand called? Raise your hand to answer. (Answer: the minute hand)
6. **Say:** The minute hand shows us how many minutes have passed since the beginning of the hour. The hour starts when the minute hand is on the 12. Every time the minute hand gets to a new number on the clock 5 minutes have passed.
7. Show pupils the clock drawn on the board.

8. Count around the clock in 5's, beginning and ending at the 12 on the clock face. Count '0,5,10… 55,60'.
9. **Say:** We just counted all the minutes on the clock face in 5's. How many minutes are on the clock face? Raise your hand to answer. (Answer: 60 minutes)
10. **Say:** The minute hand moves all the way around the clock face in an hour.

11. **Ask:** How many minutes does the minute hand move in an hour? Raise your hand to answer. (Answer: 60 minutes)
12. **Ask:** How many minutes in an hour? Raise your hand to answer. (Answer: 60 minutes in an hour)
13. Have pupils chant '60 minutes in an hour' 3 times.
14. **Ask:** What time does the clock show? Raise your hand to answer. (Answer: 1 o'clock)
15. **Say:** The clock shows 1 o'clock. It is 0 minutes past the hour.
16. Erase the minute hand on the clock. Draw the minute hand to show 1:05.
17. **Say:** The minute hand is pointing to 1. That means 5 minutes have passed. It is 5 minutes past 1.
18. **Write** on the board '1:05'.
19. **Say:** We write the time 'one dot dot zero five'. We say the time as '1 'oh' 5'. We say the zero as the letter 'o'.
20. Have pupils say the time aloud as a class.
21. Erase the minute hand on the clock. Draw the minute hand to show 1:10.
22. **Say:** The minute hand is pointing to 2. That means 10 minutes have passed. It is 10 minutes past 1.
23. **Write** on the board '1:10'.
24. Have pupils read the time and say it aloud as a class.

Guided Practice *(10 minutes)*

1. Have pupils draw 5 clock faces.
2. **Ask:** How can we draw the clock hands to show 1:15? Raise your hand to answer. (Answer: Draw the short hand to point a little past 1. Draw the long hand to point to the 3.)
3. Draw on the board the clock hands to show 1:15. Have pupils do the same.
4. **Say:** We can call this time 'a quarter past 1' or we can call it '1:15' (one fifteen). We call it 1:15 when we are counting minutes.
5. Have pupils say the time aloud both ways.
6. Use question and answer to guide pupils by drawing '2:15', '1:20', '1:30', '1:45' and '1:55'.
   a) Read '1:45' as both 'one forty-five and 'a quarter to 2' and '2:15' as two fifteen and 'a quarter past 2.'
   b) Discuss with pupils why there is no 1:60.

Independent Practice *(10 minutes)*

1. Read the times written on the board with pupils.

a.	5:25	**b.**	4:15	**c.**	3:15	**d.**	7:30	**e.**	8:40	**f.**	2:45

2. Tell pupils to work with a partner to draw clocks to show the times and to write the times using words.
3. Have pupils to exchange their notebooks and check each others' work while you read the answers aloud.

Closing *(2 minutes)*

5. **Ask:** What are the two ways to say 12:45? Raise your hand to answer. (Answer: 'quarter to one' and 'twelve forty-five')
6. **Ask:** Why can't you say 12:60? Raise your hand to answer. (Answer: Because once you get to 60, the clock changes to the next hour. It goes from 12:59 to 1:00.)

Lesson Title: Estimating and Measuring the Duration of an Event	**Theme:** Measurement and Estimation Time	
Lesson Number: M-04-124	**Class/Level:** Primary 4	**Time:** 35 minutes

Learning Outcomes: By the end of this lesson, pupils will be able to: 1. Tell time to the minute. 2. Use appropriate language to tell time.	**Teaching Aids** Analogue Clock or a picture of a clock drawn on the board that counts minutes in 5's and 1's.	**Preparation** 1. Gather 1 analogue (round) clock. If none are available, the lesson may be taught entirely with pictures. The picture of the clock needs to show the minutes. 2. Draw a clock that shows how to count minutes in 5's and 1's on the board.

Opening *(3 minutes)*

1. Revise with pupils reading time to the nearest 5 minutes.
2. Show pupils the round clock face or draw a clock on the board.
3. **Ask:** Where is the long hand at 4:05? Raise your hand to answer. (Answer: on the 1)
4. **Ask:** Where is the hour hand at 4:05? Raise your hand to answer. (Answer: at the 4)
5. Set the clock hands to 4:05 (or draw them on the clock on the board).
6. Read the time aloud with pupils.
7. Repeat for each time in order, from '4:05' up to '4:55' as time allows. Make note that the hour hand starts to move but much slower than the minute hand which has to go around the clock completely.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how to tell the time to the minute.

2. Show pupils the round clock face or the clock face drawn on the board.
3. **Ask:** What is the short hand called? Raise your hand to answer. (Answer: the hour hand)
4. **Ask:** What does the short hand tell us? Raise your hand to answer. (Answer: the hour)
5. **Ask:** What is the long hand called? Raise your hand to answer. (Answer: the minute hand)
6. **Say:** The minute hand shows us how many minutes have passed since the beginning of the hour.
7. **Ask:** How many minutes are in a hour? Raise your hand to answer. (Answer: 60 minutes in an hour)

8. **Say:** Yesterday, we learned how to count in 5 minutes around the clock.
9. Help pupils see that there are dots or lines between the numbers of the clock.
10. Explain that each dot or line stands for 1 minute.
11. Count the minutes around the clock in 1's from 1 to 60.

12. **Say:** We just counted all the minutes on the clock face in 1's. How many minutes on the clock face? Raise your hand to answer. (Answer: 60 minutes)
13. **Say:** The minute hand moves all the way around the clock face in an hour.
14. **Ask:** How many minutes does the minute hand move in an hour? Raise your hand to answer. (Answer: 60 minutes)
15. **Ask:** How many minutes in an hour? Raise your hand to answer. (Answer: 60 minutes in an hour)
16. **Ask:** What time does the clock show? Raise your hand to answer. (Answer: 1 o'clock)
17. **Say:** The clock shows 1 o'clock. It is 0 minutes past the hour.
18. Erase the minute hand on the clock. Draw it to show 1:03.
19. **Say:** The minute hand is pointing to the third dash between the 12 and the 1. That means 3 minutes have passed. It is 3 minutes past 1.
20. **Write** on the board '1:03'.
21. **Say:** We write the time 'one dot dot zero three'. We say the time as '1 'oh' 3'. We say the zero as the letter 'o'.
22. Have pupils say the time aloud as a class.
23. Erase the minute hand on the clock. Draw it to show 1:18.
24. Count the time in 5's to 1:15, '1:05, 1:10, 1:15'. Then count in 1's from 1:15 to 1:18, '1:16, 1:17, 1:18'. Have pupils listen.
25. Count the time in 5's to 1:15, '1:05, 1:10, 1:15'. Then count in 1's from 1:15 to 1:18, '1:16, 1:17, 1:18'. Have pupils count aloud with you.
26. **Write** '1:18' on the board.
27. Have pupils read the time and say it aloud as a class.

Guided Practice *(10 minutes)*

1. Have pupils draw 5 clock faces.
2. Use question and answer to guide pupils through drawing '1:23', '1:36', '1:11', '1:42' and '1:59'
3. Guide pupils to count in 5's and then count in 1's.

Independent Practice *(10 minutes)*

1. **Ask:** How long do you think 1 minute is?
4. **Say:** I want you to sit perfectly still while I time 1 minute.
5. Use a clock, watch or cell phone to time 1 minute.
6. Talk about how long 1 minute seems.
7. Ask pupils how many letters of the alphabet they estimate (guess) they can write in 1 minute.
8. Tell them to write their estimate at the top of a page and circle it.
9. Have pupils hold their pencils in the air.
10. **Say:** When I say 'Go!' you will write as many letters of the alphabet as you can in 1 minute.
11. Have pupils count the letters they wrote and compare it to their estimate.
12. Repeat steps 5 – 9 three times.
13. Discuss with pupils why their third estimate was better than their first estimate.

Closing *(2 minutes)*

1. Ask pupils to name other things they can do in 1 minute.

Lesson Title: Word Problems Involving Time	Theme: Measurement and Estimation Time	
Lesson Number: M-04-125	Class/Level: Primary 4	Time: 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to solve word problems about time involving seconds, minutes, hours, weeks, months, years (not conversion).		Teaching Aids Picture of a clock drawn on the board that counts minutes in 5's and 1's.		Preparation 1. Draw on the board a clock that shows how to count minutes in 5's and 1's. 2. Write the word problems on the board.

Opening *(3 minutes)*

1. Show 4:05 on the clock face.
2. **Say:** We are going to count in 5's from 4:05 to 4:15 to see how many minutes there are.
3. **Ask:** How many minutes between 4:05 and 4:10? Raise your hand to answer. (Answer: 5 minutes)
4. **Ask:** How many minutes between 4:10 and 4:15? Raise your hand to answer. (Answer: 5 minutes)
5. **Ask:** How many minutes in all? Raise your hand to answer. (Answer: 10 minutes)
6. Use steps 2 -5 to count in 5's from 4:05 to 4:25, from 4:45 to 5:00, and from 4:55 to 5:20 as time allows.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to solve word problems with time.
2. **Say:** First we are going to revise what we learned this week about telling time with a clock.
3. Use question and answer to revise with pupils;
   a) The parts of the clock face
   b) Telling time to the half hour, quarter hour and minute
   c) That there are 60 minutes in an hour
4. Read the word problems written on the board with pupils.

a.	Fatu started her chores at 6:45 in the morning. She finished at 7:00 in the morning. How much time has passed?
b.	Mohammed started reading at 3:40 in the afternoon. He stopped reading at 4:18 in the afternoon. How much time has passed?
c.	Some fourth graders started to play football at 12:50 in the afternoon. The game was over at 3:00 p.m. How much time had passed?

5. Show pupils the clock face drawn on the board.
6. **Ask:** How can we use the clock face to help us solve problem a.? Raise your hand to answer. (Answer: Count on the clock face in 5 minutes from 6:45 to 7:00.)
7. Count aloud as a class in 5's from 6:45 to 7:00.
8. **Ask:** How many minutes? Raise your hand to answer. (Answer 15 minutes)
9. Guide pupils to use the clock face to help us solve problem b.
   a) Count on the clock face with pupils in 5's from 3:40 to 4:15.
   b) Help pupils find that there are 35 minutes from 3:40 to 4:15.

    c) Count from 4:15 to 4:18.

    d) Guide pupils to understand and say there are 38 minutes in all.

10. Guide pupils to use the clock face to help us solve problem c.

    a) Count on the clock face with pupils in 5's from 12:50 to 1:00.

    b) Help pupils find there are 10 minutes from 12:50 to 1:00.

    c) Count on the clock face with pupils in hours from 1:00 to 3:00.

    d) Guide pupils to understand there are 2 hours and 10 minutes in all.

Guided Practice *(10 minutes)*

1. Read the word problems written on the board with pupils.

a.	Fatu started her chores at 7:15 in the morning. She finished at 8:00 in the morning. How much time has passed?
b.	Mohammed started reading at 1:40 in the afternoon. He stopped reading at 2:13 in the afternoon. How much time has passed?
c.	Some fourth graders started to play football at 2:35 in the afternoon. The game was over at 4:00 p.m. How much time had passed?
d.	Fatmata wants to teach her little sister to tell time. She draws clocks to show time. Draw clocks to show 2:00, 2:15, 2:30, 2:45 and 3:00.

2. Explain that they will solve problems a – c. in groups of 3.

3. Explain to pupils how the groups will work together.

    a) Have all 3 pupils in the group talk about the problem.

    b) Have all 3 pupils count the time.

    c) Have all 3 pupils agree on the same answer.

    d) Have each pupil write out the answer in his or her own exercise book.

4. Tell pupils to use the methods they just learned to solve the problems.

5. Go over the answers. (Answers: a. 15 minutes; b. 33 minutes; c. 2 hours 25 minutes)

Independent Practice *(10 minutes)*

1. Tell pupils to solve problem d. on their own.

2. Tell pupils to check their clocks with their group.

3. Choose pupils to come up and draw the clocks on the board.

Closing *(2 minutes)*

1. Revise with pupils the start and end times of school.

2. Help pupils find out how many hours each day they are in school.

3. **Say:** Good job today, pupils! You solved a number of word problems involving time!

Lesson Title: Multiplication of Whole Numbers up to 5 Digits by 10	**Theme:** Everyday Arithmetic (include Financial Literacy) Multiplication and Division	
Lesson Number: M-04-126	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to multiply whole numbers up to 5 digits by 10.		**Teaching Aids** None		**Preparation** Write the problems for the lesson on the board.

Opening *(3 minutes)*

1. Read aloud the pairs of multiplication problems written on the board.

3 x 1 = 3	42 x 1 =42	567 x 1 = 567
3 x 10 = 30	42 x 10 = 420	567 x 10 = 5670

2. **Ask:** What happens to the number when we multiply by 1? Point your thumb up if it stays the same. Point your thumb down if it is different. (Answer: It stays the same. Pupils should point their thumbs up.)

3. **Ask:** What happens to the number when we multiply by 10? Point your thumb up if it stays the same. Point your thumb down if it is different. (Answer: It is different. Pupils should point their thumbs down.)

4. **Ask:** What happens to the number multiplied by 10? Think. Then turn to a partner and tell them the pattern.

5. Choose 2-3 pupils to share their ideas with the class. (Example answer: The answer is the same as the number with a 0 on the end.)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how to multiply by 10 using place value.
2. **Say:** We said that when you multiply a number by 10, the answer has an extra 0 on the end. Now I want us to see how many place values the answer has.
3. **Write** on the board: 6 x 10 = 60
4. **Say:** There is 1 place value in 6. There are 2 place values in 60.
5. Tell pupils to raise 1 finger and say as a class, 'There is 1 place value in 6.'
6. Tell pupils to raise 2 fingers and say as a class, 'There are 2 place values in 60.'
7. **Write** on the board: 63 x 10 = 630
8. **Say:** There are 2 place values in 63. There are 3 place values in 630.
9. Tell pupils to raise 2 fingers and say as a class, 'There are 2 place values in 63.'
10. Tell pupils to raise 3 fingers and say as a class, 'There are 3 place values in 630.'
11. **Write** on the board: 635 x 10 = 6350
12. **Ask:** How many place values are in '635'? Please show me with your fingers. (Answer: There are 3 place values. Pupils should raise 3 fingers.)
13. **Ask:** How many place values are in '6350'? Please show me with your fingers. (Answer: There are 4 place values. Pupils should raise 4 fingers.)
14. **Ask:** What happens to the number of place values of a number when we multiply by 10? Think. Then turn to a partner and tell them what happens to the number of place values.

15. **Ask:** What happens to the number of place values? Raise your hand to answer. (Answer: The answer has 1 more place value than the number.)
16. Write on the board: 6357 x 10 =
17. **Ask:** How many place values are in '6357'? Please show me with your fingers. (Answer: There are 4 place values. Pupils should raise 4 fingers.)
18. **Say:** There are 4 place values in 6357. The answer will have 1 more place value than 6357.
19. **Ask:** How many place values will be in the answer? Please show me with your fingers. (Answer: There will be 5 place values in the answer. Pupils should raise 5 fingers.)
20. **Write** on the board: 6357 x 10 = ___ ___ ___ ___ ___
21. **Say:** I wrote 5 dashes to show the answer has 5 place values.

Guided Practice *(10 minutes)*

1. Read the problems on the board with pupils.

   a. 45 x 10 =   b. 451 x 10 =   c. 4517 x 10 =   d. 1938 x 10 =   e. 9999 x 10 =
2. **Say:** You are going to write dashes to show how many place values each answer will have.
3. **Say:** 42 has 2 place values. **Ask:** How many place values are in the answer? Raise your hand to answer. (Answer: 3 place values)
4. **Write** on the board: 45 x 10 = ___ ___ ___
5. **Say:** I wrote 3 dashes to show the answer has 3 place values.
6. Tell pupils to work with a partner to find the number of place values each answer has.
7. **Say:** Do not write numbers in the answers. Please only write dashes to show the number of place values.
8. Go over answers. (Answers: a. 3 place values; b. 4 place values; c. 5 place values; d. 5 place values e. 5 place values)

Independent Practice *(10 minutes)*

1. **Write** on the board '45 x 10 = 4 5 ___'.
2. **Ask:** What goes in the last place-value? Raise your hand to answer. (Answer: 0)
3. Revise with pupils that each answer will have 1 more place value than the number. It will end in a 0.
4. Tell pupils to solve problems a. – e.
5. Write the answers on the board.
6. Go over answers. (Answers: a. 450; b. 4510; c. 45,170; d. 19,380; e. 99,990)
7. Have pupils check that they have commas in the correct place for answers c.- e.

Closing *(2 minutes)*

1. **Write** on the board: ___ ___ ___ x 10 = 7190
2. Ask pupils to think about the problem. Then ask pupils to tell a partner what the missing number is.
3. Invite a pupil to come up and write the answer on the board. (Answer: 719)

Lesson Title: Multiplication of Decimals to 1 Decimal Place by 10	**Theme:** Everyday Arithmetic (include Financial Literacy) Multiplication and Division	
Lesson Number: M-04-127	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to multiply decimals to 1 decimal place by 10.		**Teaching Aids** None		**Preparation** Write the problems for the lesson on the board.

Opening *(3 minutes)*

1. Read aloud the pairs of multiplication problems written on the board.

2 x 10 =	62 x 10 =	627 x 10 =
8 x 10 =	68 x 10 =	687 x 10 =

2. Tell pupils to solve each pair of problems with a partner.
3. Choose 1 pupil to say the answers for each pair of problems. (Answers: 2 x 10 = 20, 8 x 10 = 80; 62 x 10 = 620, 68 x 10 = 680; 627 x 10 = 6270, 687 x 10 = 6870)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how to multiply decimal tenths by 10 using place value.
2. **Say:** Yesterday we learned that when you multiply a whole number by 10 the answer has 1 more place value. Today we are going to find out how the digits move.
3. **Write** on the board: 62 x 10 = __ __ __
4. **Ask:** What is the first digit in the answer, 6 or 2? Raise your hand to answer. (Answer: 6)
5. **Write** on the board: 62 x 10 = <u>6</u> __ __
6. **Say:** The '6' in '62' is in the tens place. The '6' in the answer is in the hundreds place. The '6' moves up 1 place value.
7. Have pupils move their hand from right to left to show the 6 moves up 1 place value.
8. Have pupils say, 'The 6 moves up 1 place value.'
9. **Ask:** What is the next digit in the answer? (Answer: 2)
10. **Write** on the board: 62 x 10 = <u>6 2</u> __
11. **Say:** The '2 in '62' is in the ones place. The '2' in the answer is in the tens place. The '2' moves up 1 place value.
12. Have pupils move their hand from right to left to show the '2' moves up 1 place value.
13. Have pupils say, 'The 2 moves up 1 place value.'
14. **Say:** We have moved up both digits in '62'. Our answer does not have a number in the ones place. We write a 0 in the ones place because the ones place cannot be empty.
15. **Write** on the board: 62 x 10 = <u>6 2 0</u>
16. **Write** on the board: 6.2 x 10 = ___
17. Read this aloud with pupils as 'six and two-tenths times 10'.
18. **Ask:** What place is the '6' in '6.2 in? Raise your hand to answer. (Answer: The '6' is in the ones place.)
19. **Say:** The 6 is in the ones place. When we multiply by 10, it moves up 1 place value. It moves up to the tens place.

20. **Write** on the board: 6.2 x 10 = <u>6</u> __
21. Have pupils move their hand from right to left to show the '6' moved up 1 place value.
22. Have pupils say, 'The 6 moved up 1 place value.'
23. **Say:** The '2' in 'six and two-tenths' is in the tenths place. When we multiply by 10, it moves up 1 place value. It moves up to the ones place.
24. **Write** on the board: 6.2 x 10 = <u>6</u> <u>2</u>
25. Have pupils move their hand from right to left to show the '2' moved up 1 place value.
26. Have pupils say, 'The 2 moved up 1 place value.'
27. **Say:** Our answer is '62'.
28. **Ask:** Does '62' have a digit in the ones place? Raise your hand to answer. (Answer: Yes. The '2' is in the ones place.)
29. **Say:** Our answer has a digit in the ones place, so we do not need to add a 0.
30. Repeat steps 16 – 28 with the number '4.5'.

Guided Practice *(10 minutes)*

1. Read with pupils the problems on the board.

   a. 0.6 x 10 =   b. 5.2 x 10 =   c. 1.7 x 10 =   d. 0.8 x 10 =   e. 8.1 x 10 =
   f. 0.4 x 10   g. 2.1 x 10   h. 93.4 x 10 =
2. Tell pupils to copy problem a. in their exercise books.
3. **Ask:** What happens to the '6' in 'six-tenths' when we multiply by 10? Show me by moving your hand and saying the answer together as a class. (Answer: Pupils should move their hands from right to left. They should say, 'The 6 moves up 1 place value.')
4. **Say:** The '6' in '6 tenths' moves up 1 place value. The next place value up is the ones place.
5. **Ask:** What place does the '6' in 6 tenths move up to? Raise your hand to answer. (Answer: The 6 moves up to the ones place.)
6. Guide pupils to write 0.6 x 10 = 6.
7. **Ask:** Is there a digit in the ones place? Raise your hand to answer. (Answer: Yes)
8. **Say:** When there is a digit in the ones place, we do not need to add a 0 to the answer.
9. Tell pupils to solve problems b. and c. with a partner.
10. Go over answers. (Answers: b. 52; c. 17)

Independent Practice *(10 minutes)*

1. Revise with pupils that when we multiply a number by 10, each digit moves up a place value.
2. Tell pupils to solve problems d. – h.
3. Tell pupils to check each problem with a partner.

Closing *(2 minutes)*

1. Go over the answers. (Answers: d. 8; e. 81; f. 4; g. 21; h. 934)
2. **Say:** Good job today, pupils! You multiplied a decimal place with a whole number.

Lesson Title: Division of Whole Numbers up to 5 Digits by 10	**Theme:** Everyday Arithmetic (include Financial Literacy) Multiplication and Division	
Lesson Number: M-04-128	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to divide whole numbers up to 5 digits by 10.		**Teaching Aids** None		**Preparation** 1. Draw the circles for the Opening Problem. 2. Write the problems for Guided and Independent Practice on the board.

Opening *(3 minutes)*
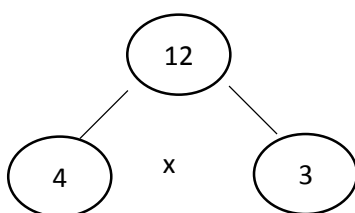
1. **Write** on the board:

2. Tell pupils to work with a partner to find the 2 multiplication and 2 division problems. *(1 minute)*
3. Invite a few pupils to tell you each multiplication and division problem.
    a) Write each problem on the board. (Answers: 3 x 4 = 12; 4 x 3 = 12; 12 ÷ 4 = 3; 12 ÷ 3 = 4)
    b) Revise the idea that multiplication and division are opposite operations.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how to divide by 10 using place value.
2. **Write** on the board: 60 ÷ 10 = 6
3. Read this aloud with the class.
4. **Say:** There are 2 place values in 60. There is 1 place value in 6. There is 1 less place value in the answer. The last '0' goes away to give us 1 less place value.
5. **Ask:** What happens to the number of place values in the answer when we divide by 10? Raise your hand to answer. (Answer: There is 1 less place value in the answer.)
6. **Ask:** What happens to the '0' at the end of '60' when we divide by 10? Raise your hand to answer. (Answer: It goes away.)
7. **Write** on the board: 6300 ÷ 10 = 630
8. **Ask:** How many place values are in '6300'? Please show me with your fingers. (Answer: There are 4 place values. Pupils should raise 4 fingers.)
9. **Ask:** How many place values are in '630'? Please show me with your fingers. (Answer: There are 3 place values. Pupils should raise 3 fingers.)
10. **Ask:** What happens to the number of place values in the answer when we divide by 10? (Answer: There is 1 less place value in the answer.)
11. **Ask:** What happens to the last '0' in '6300' when we divide by 10? (Answer: It goes away.)
12. **Say:** The last '0' in '6300' goes away to give us 1 less place value in the answer.
13. **Write** on the board: 4356 ÷ 10 =
14. **Say:** This problem is different because the last digit in 4356 is not a zero. But the rule still applies. There will be one less place value because when we divide by 10, we remove a place

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value from the answer. Instead, we will move the last digit into the tenths place and we will have a decimal place value.

15. **Ask:** How many place values are in '4356'? Please show me with your fingers. (Answer: There are 4 place values. Pupils should raise 4 fingers.)
16. **Say:** There are 4 place values in 4356. The answer will have 1 less place value when we divide by 10.
17. **Ask:** How many place values will be in the answer? Please show me with your fingers. (Answer: There will be 3 place values in the answer. Pupils should raise 3 fingers.)
18. **Write** on the board: 4356 ÷ 10 = __ __ __.__
19. **Ask:** What digit will go to the right of the decimal place? Raise your hand to answer. (Answer: 6)
20. **Say:** The six in the ones place will move to the right and become six tenths.
21. **Write:** 4356 ÷ 10 = 435.6
22. **Say:** As you can see, each digit decreases by 1 in place value.
23. **Write:** 215 ÷ 10 =
24. **Say:** Let's try another problem There are three place values and we will decrease each one by 1 when we divide by 10.
25. **Ask:** What is the place value for the '2?' Raise your hand to answer. (Answer: Hundreds)
26. **Ask:** What will the new place value for the '2' be? Raise your hand to answer. (Answer: Tens)
27. **Ask:** What is the place value for the 5? Raise your hand to answer. (Answer: Ones)
28. **Say:** Yes, the place value must go down by one. It will end up to the right of the new decimal place.
29. **Ask:** What place will the 5 be in? Raise your hand to answer. (Answer: tenths)
30. **Write:** 215 ÷ 10 = __ __ . __ = 21.5

Guided Practice *(10 minutes)*

1. Read the problems on the board with pupils.
    a.   400 ÷ 10 =   b.   2505 ÷ 10 =   c.   40,177 ÷ 10 =   d.   1080 ÷ 10 =   e.   99,095 ÷10 =
2. **Say:** You are going to write dashes to show how many place values each answer will have.
3. **Say:** 400 has 3 place values. **Ask:** How many place values are in the answer? Raise your hand to answer. (Answer: 2 place values)
4. **Ask:** How many dashes do you write for the place values in the answer? Raise your hand to answer. (Answer: 2 dashes)
5. Tell pupils to work with a partner to find the number of place values each answer has.
6. **Say:** Do not write numbers in the answers. Only write dashes to show the number of place values.
7. Go over answers. (Answers: a. 2 place values; b. 3 place values; c. 4 place values; d. 3 place values; e. 4 place values)

Independent Practice *(10 minutes)*

1. Write on the board: 455 ÷ 10 = 4 5.5
2. **Say:** I wrote the first 2 digits of 455 as the answer to the left of the decimal place. The second '5' in the number goes to the right of the decimal place.
3. Tell pupils to solve problems a. – e.
4. Go over answers. (Answers: a. 40; b. 250.5; c. 4017.7; d. 108; e. 9909.5)

Closing *(2 minutes)*

1. **Write** on the board: __ __ __ ÷ 10 = 7190
2. Ask pupils to tell a partner what the missing number is.
3. Ask a pupil to come up and write the missing number on the board. (Answer: 71,900)
4. **Say:** Good job today, pupils! You divided whole numbers by 10 and found how the place value shifted.

Lesson Title: Division of Decimals to 1 Decimal Place by 10	**Theme:** Everyday Arithmetic (include Financial Literacy) Multiplication and Division	
Lesson Number: M-04-129	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to divide decimals to 1 decimal place by 10.		**Teaching Aids** None		**Preparation** 1. Write the circles for the Opening on the board. 2. Write the problems for the Guided and Independent Practice on the board.
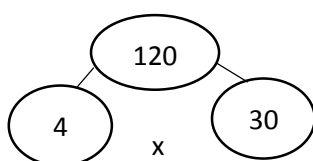
Opening *(3 minutes)*

1. **Write** on the board:

2. Tell pupils to work with a partner to find the 2 multiplication and 2 division problems. *(1 minute)*
3. Choose 1 pupil to tell you each multiplication and division problem.
   a) Write each problem on the board. (Answers: 30 x 4 = 120; 4 x 30 = 120; 120 ÷ 4 = 30; 120 ÷ 30 = 4)
   b) Revise the idea that multiplication and division are opposite operations.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn how to divide decimal tenths by 10 using place value.
2. **Say:** Yesterday we learned that when you divide a whole number by 10 the answer has 1 less place value. Today we are going to find out where the digits move.
3. **Write** on the board: 60 ÷ 10 = __
4. **Ask:** What is 60 ÷ 10? Show me with your fingers. (Answer: 6. Pupils should hold up 6 fingers.)
5. **Write** on the board: 60 ÷ 10 = 6
6. **Say:** The '6' in '60' is in the tens place. The '6' in the answer is in the ones place. The '6' moves down 1 place value.
7. Have pupils move their hand from left to right to show the 6 moves down 1 place value.
8. Have pupils say, 'The 6 moves down 1 place value.'
9. **Ask:** What happens when we divide by 10? Show me by moving your hand and saying the answer together as a class. Raise your hand to answer. (Answer: Pupils should move their hands from left to right. They should say, 'The 6 moves down 1 place value.')
10. **Write** on the board: 6 ÷ 10 =
11. Read this problem aloud with the class.
12. **Ask:** What happens when we divide by 10? Show me by moving your hand and saying the answer together as a class. (Answer: Pupils should move their hands from left to right. They should say, 'The 6 moves down 1 place value.')
13. **Say:** The '6' is in the ones place. I need to move it down to the tenths place to the right of the decimal point.
14. **Write** on the board: 6 ÷ 10 = __ . __

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15. **Say:** I need to write a decimal point so I can show '6 tenths'.
16. **Write** on the board: 6 ÷ 10 = 0.6
17. **Say:** The 6 is in the tenths place. There is no number in the ones place. We need a 0 in the ones place because the ones place cannot be empty.
18. Read this aloud with pupils as 'six divided by 10 equals six tenths'.
19. **Write** on the board 63 ÷ 10 =
20. Read the problem aloud with the class.
21. **Ask:** What happens to the '6' when we divide by 10? Show me by moving your hand and saying the answer together as a class. (Answer: Pupils should move their hands from left to right. They should say, 'The 6 moves down 1 place value.')
22. **Ask:** What happens to the '3' when we divide by 10? Show me by moving your hand and saying the answer together as a class. (Answer: Pupils should move their hands from left to right. They should say 'The 3 moves down 1 place value.')
23. **Say:** The '6' in 63 is in the tens place. I need to move it down to the ones place.
24. Write on the board: 6 ÷ 10 = 6
25. **Say:** The '3' in 63 is in the ones place.
26. **Ask:** What place value do we move the '3' to? (Answer: The tenths place)
27. **Say:** I need to write a decimal point so I can show '3 tenths'.
28. **Write** on the board: 6 ÷ 10 – 6.
29. **Ask:** Where does the '3' go? (Answer: The '3' goes after the decimal point.)
30. **Write** on the board: 63 ÷ 10 = 6.3
31. Read this aloud with pupils.

Guided Practice *(10 minutes)*

1. Read the problems on the board with pupils.
   a. 5 ÷ 10 = **b.** 35 ÷ 10 = **c.** 7 ÷ 10 = **d.** 71 ÷ 10 = **e.** 8 ÷ 10 = **f.** 48 ÷ 10 =
2. Tell pupils to copy problem a. in their exercise books.
3. **Ask:** What happens to the '5' when we divide by 10? Show me by moving your hand and saying the answer together as a class. (Answer: Pupils should move their hands from left to right. They should pupils say, 'The 5 moves down 1 place value.')
4. **Say:** The '5' moves down 1 place value. The next place value down is tenths.
5. **Ask:** What kind of point do we write to show tenths? Raise your hand to answer. (Answer: Decimal point)
6. Guide pupils to write: 5 ÷ 10 = __ . __ = 0.5
7. **Ask:** Is there a digit in the ones place? Raise your hand to answer. (Answer: Yes)
8. Use question and answer to guide pupils to solve problem b. (Answer: 3.5)

Independent Practice *(10 minutes)*

1. Tell pupils to solve problems c. – f.
2. Tell pupils to check each answer with a partner.

Closing *(2 minutes)*

1. Go over answers. (Answers: c. 0.7; d. 7.1; e. 4; g. 0.8; f. 4.8)
2. **Say:** Good job today, pupils! You divided whole numbers by 10 and determined their new place value.

Lesson Title: Mental Strategies for Multiplication and Division by 10	Theme: Everyday Arithmetic (include Financial Literacy) Multiplication and Division	
Lesson Number: M-04-130	Class/Level: Primary 4	Time: 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to use mental strategies to multiply and divide by 10.		Teaching Aids None		Preparation Write on the board the grid to play the game.

Opening *(3 minutes)*

1. Chant aloud as a class the multiplication facts with decimal tenths and 10. Say them as '1-tenth times 10 equals 1, 2-tenths times 10 equals 2, 3 tenths times 10 equal 3...' and so on, up to '9-tenths times 10 equals 9'.
2. Chant aloud as a class the division facts with 1-digit numbers and 10. Say them as '1 divided by 10 equals 1-tenth, 2 divide by 10 equals 2-tenths, 3 divided by 10 equal 3-tenths...' and so on, up to '9 divided by 10 equal 9-tenths'.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to practice multiplying and dividing by 10 with a game.
2. **Say:** We will use a number grid to play the game.
3. Show pupils the 3 x 3 grid on the board. Tell pupils to copy it into their exercise books.

400	0.5	6.2
5	Free	40
62	4	50

4. Give pupils 1 minute to copy the grid.
5. **Say:** This game is called 'Bingo'. Here are the rules:
   a) I say a multiplication or division problem.
   b) The class says the multiplication or division problem together aloud.
   c) Each pupil puts a tick mark on the answer on his or her grid.
   d) When you get 3 numbers in a straight line, you raise your hand and say 'Bingo!'.
6. **Say:** We will play the first game together.
7. **Say:** First, put a tick mark in the square that says 'Free'. We count the 'Free' square as part of '3 squares in a row'.
8. Show pupils how to write the tick mark.

400	0.5	6.2
5	Free✓	40
62	4	50

9. **Say** '0.4 x 10'.
10. Tell the class to say '0.4 x 10' together aloud.
11. **Ask:** What happens to the 4 when we multiply by 10? Raise your hand to answer. (Answer: It moves up a place value.)
12. **Ask:** What is 0.4 x 10? Raise your hand to answer. (Answer: 4)

13. Write a tick mark on the square with '4'. Tell pupils to write a tick mark in their square.
14. **Say** '5 ÷ 10'.
15. Tell the class to say '5 ÷ 10' together aloud.
16. **Ask:** What happens to the 5 when we divide by 10? Raise your hand to answer. (Answer: It moves down a place value.)
17. **Ask:** What is 5 ÷ 10? Raise your hand to answer. (Answer: 0.5)
18. Write a tick mark on the square with '0.5'. Tell pupils to write a tick mark in their square.
19. **Say:** We have 3 in a row. Raise your hand and say 'Bingo'!

400	0.5✓	6.2
5	Free✓	40
62	4✓	50

20. Explain that this line goes up and down, but you can also get 3 across to win.
21. Play 1 or 2 more games as a class, as time allows. Give different clues for each game. Example clues for each square are shown below.

Clues for Game		
40 x 10	5 ÷ 10	62 ÷ 10
0.5 x 10	Free✓	4 x 10
6.2 x 10	40 ÷ 10	5 x 10

Guided Practice *(10 minutes)*

1. **Write** on the board: '900, 90, 9, 0.9, 750, 75, 7.5, 7500, Free'.
2. Tell pupils to make a new 3 x 3 grid and write the numbers in it.
3. Tell pupils they may choose where in the grid to write each number and the word 'Free'. This will make each pupil's card different.
4. Play 1 – 3 games as a class, as time allows.
5. Keep track of clues you give. Example clues are shown below.
6. When pupils say 'Bingo!' say the answers to the clues, so pupils can check their cards.

Clues for Game		
90 x 10	900 ÷ 10	0.9 x 10
9 ÷ 10	Free✓	75 x 10
7.5 x 10	75 ÷ 10	750 x 10

Independent Practice *(10 minutes)*

1. Have pupils write a multiplication problem with 10 to make an answer '900, 90, 9, 750, 75, and 7500'.
2. Have pupils write a division problem to make an answer of '0.9' and '7.5'.
3. Have pupils check their answers with a partner.

Closing *(2 minutes)*

1. Go over answers. Invite a few pupils to share their answers. (Answers: 90 x 10 = 900, 9 x 10 = 90, 0.9 x 10 = 9; 75 x 10 = 750, 7.5 x 10 = 75, 750 x 10 = 7500; 9 ÷ 10 = 0.9, 75 ÷ 10 = 7.5)
2. **Say:** Good job today, pupils! You used Bingo as a strategy to create and solve simple multiplication and division problems by 10.

Lesson Title: Order of Operations	**Theme:** Everyday Arithmetic (Including Financial Literacy) – Problems with 4 Operations	
Lesson Number: M-04-131	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to use the order of operations in calculations.		**Teaching Aids** None		**Preparation** 1. Write on the board the order of operations. 2. Write on the board the problems for independent practice.

Opening *(3 minutes)*

1. **Ask:** What are 3 things you did this morning to get ready for school? Think. Then turn to a partner and tell 3 things.
2. **Ask:** Do you need to do all 3 things in order? Can you brush your teeth before you wake up? Think. Then turn to a partner and tell what things you need to do in order in the morning.
3. Invite 1 or 2 pupils to tell some things they need to do in order in the morning. (Example answers: wake up, then brush teeth; carry water, then wash face; do chores; them put on school uniform)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will learn the order for multiplying, dividing, adding and subtracting. Multiplying, dividing, adding and subtracting are called 'operations'. The operations must be done in a special order. If we do not, the answer will be different and it will not be correct.
2. **Say:** The order must always be followed! Let's look at a problem together to learn the order.
3. **Write** on the board: 3 + 2 x 8 ÷ 4 - 3
4. **Ask:** What are the 4 operations in this problem? Raise your hand to answer. (Answer: addition, multiplication, division and subtraction)
5. **Say:** We need to solve the problems in a specific order. Let's review the steps.
6. Read with pupils the order of operations for the 4 operations:
   a) Multiply or divide in order, from left to right.
   b) Add or subtract in order, from left to right.
7. **Say:** First we need to multiply and divide from left to right.
8. **Ask:** What multiplying or dividing is first? Raise your hand to answer. (Answer: 2 x 8)
9. **Ask:** What is 2 x 8? Raise your hand to answer. (Answer: 16)
10. **Write** on the board:

$$16$$
$$3 + \cancel{2 \times 8} \div 4 - 3$$
$$3 + 16 \div 4 - 3$$

11. **Say:** We solved 2 x 8, so I crossed it out. I wrote 16 to show the answer and rewrite it.
12. **Say:** Next we divide. We divide 16 ÷ 4.
13. **Ask:** What is 16 ÷ 4? Raise your hand to answer. (Answer: 4)

14. **Write** on the board:

$$\begin{array}{c} 4 \\ 3 + \cancel{16 \div 4} - 3 \\ 3 + 4 - 3 \end{array}$$

15. **Say:** I cross out each part of the problem as I do it and then rewrite it to show the next step.
16. **Ask:** What do we do after multiplying and dividing? Raise your hand to answer. (Answer: add and subtract from left to right)
17. **Say:** I see adding '3 plus' comes first in this problem before the subtraction from left to right. We add 3 + 4.
18. **Ask:** What is 3 + 4? Raise your hand to answer. (Answer: 7)
19. **Ask:** What is 7 − 3? Raise your hand to answer. (Answer: 4)
20. **Write** on the board:

    3 + 4 − 3 = 7 − 3 = 4

21. Repeat steps 2 − 20 to solve the equation 4 + 10 x 2 − 3. (Answer: 21)
22. Use question and answer to solve with pupils as a class the equation 1 + 9 x 2 ÷ 3 − 7. (Answer: 0)

Guided Practice *(10 minutes)*

1. **Write** on the board: 5, 1, 4, 2
2. **Ask:** How can we make these numbers equal 21? We can add, subtract, multiply or divide. We must use all 4 numbers.
3. Have pupils work with a partner for 2 minutes to try to make 21.
4. Choose a pupil to come up and write the answer on the board. (Answer: 5 x 4 + 2 − 1)
5. **Ask:** How can we make these numbers equal 3? We can add, subtract, multiply or divide. We must use all 4 numbers.
6. Have pupils work with a partner for 5 minutes to find a way to make 3.
7. If pupils finish early, tell them to find ways to make other problems with 5, 1, 4, 2.
8. Go over the answer to making 3. (Answer: 4 x 2 + 1 − 5)

Independent Practice *(10 minutes)*

1. Tell pupils to copy and solve problems a., b., c. and d.

a.	5 + 12 x 2 − 4	**b.**	5 + 12 ÷ 2 − 4	**c.**	5 + 12 x 2 ÷ 4	**d.**	5 + 12 ÷ 2 x 4

2. Tell pupils to check their answers with their partner.

Closing *(2 minutes)*

1. Go over the answers. (Answers: **a.** 25 **b.** 7 **c.** 11 **d.** 29)
2. **Ask:** Why is the order important? Raise your hand to answer. (Answer: If we don't follow the order, we get a different answer.)

Lesson Title: Word Problems Involving the 4 Operations and Money	**Theme:** Everyday Arithmetic (Including Financial Literacy) – Problems with 4 Operations	
Lesson Number: M-04-132	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to solve word problems involving order of operations and money.		**Teaching Aids** None		**Preparation** 1. Write on the board the order of operations. 2. Write on the board the word problems for the lesson.

Opening *(3 minutes)*

1. Review order of operations with pupils.
    a) Multiply or divide in order, from left to right.
    b) Add or subtract in order, from left to right.
2. **Write** on the board: 8, 2, 6, 1
3. **Ask:** How can we make these numbers equal 24? We can add, subtract, multiply or divide. We must use all 4 numbers.
4. Have pupils work with a partner to try to make 24. Invite one pupil to share the answer. (Example answer: 8 x 1 ÷ 2 x 6)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will solve word problems involving money and the order of operations. We need to multiply, add and subtract to solve the problems.
2. Read with pupils the word problems on the board:

a.	Oranges cost Le 500 each. Mangoes cost Le 1000 each. How much do 3 oranges and 1 mango cost?
b.	Pens cost Le 500 each. Pencils cost Le 200. How much does 1 pen and 4 pencils cost?
c.	Fatu earns Le 5000 each day. She works 2 days. She spends Le 2000. How much money does she have left?
d.	Ismail earns Le 5000 each day. He works 3 days. He spends Le 10,000. How much money does he have left?
e.	Oranges cost Le 500 each. Mangoes cost Le 1000 each. How much do 5 mangoes and 1 orange cost?
f.	Pens cost Le 500 each. Pencils cost Le 200. How much do 4 pens and 1 pencil cost?

3. Read problem a. again, aloud with the class.
4. **Say:** We need to do 2 operations in this problem. First, we find the cost of 3 oranges. Then, we find the cost of 3 oranges plus the cost of 1 mango.
5. **Ask:** How do we find the cost of 3 oranges? Raise your hand to answer. (Answer: 3 x 500)
6. **Ask:** What is 3 x 500? Raise your hand to answer. (Answer: 1500)
7. **Ask:** What is the cost of 3 oranges in leones? Raise your hand to answer. (Answer: Le 1500)
8. **Ask:** What is the cost of 1 mango? Raise your hand to answer. (Answer: Le 1000)
9. **Ask:** What is 1500 + 1000? Raise your hand to answer. (Answer: 2500)

10. **Ask:** What is the cost of 3 oranges and 1 mango in leones? Raise your hand to answer. (Answer: Le 2500)
11. **Say:** Now I will write a math problem to show how to solve the word problem.
12. **Write** on the board: 3 x 500 + 1000
13. **Say:** '3 x 500' tells the cost of 3 oranges. '+ 1000' tells us to add the cost of 1 mango.
14. Read problem b. again, aloud with the class.
15. **Ask:** How many operations do we do in this problem? Show me with your fingers. (Answer: We need to do 2 operations. Pupils hold up 2 fingers.)
16. **Ask:** What do we do first? Raise your hand to answer. (Answer: Find the cost of 4 pencils.)
17. **Ask:** How do we find the cost of 4 pencils? Raise your hand to answer. (Answer: 4 x 200)
18. Write on the board: 4 x 200
19. **Ask:** What do we do next? Raise your hand to answer. (Answer: Find the cost of 4 pencils plus the cost of 1 pen.)
20. **Ask:** What is the cost of 1 pen? Raise your hand to answer. (Answer: Le 500)
21. **Write** on the board: 4 x 200 + 500
22. Have pupils solve the problem.
23. Tell pupils to check their answer with a partner.
24. Use question and answer to solve the problem aloud with pupils. (Answer: 4 x 200 = 800; 800 +500 = 1300; they cost Le 1300.)

Guided Practice *(10 minutes)*

1. Read problems c. and d. aloud again with pupils.
2. Use question and answer to help pupils understand to multiply and subtract for problems c. and d.
3. Have pupils solve problems c. and d. with a partner.
4. Remind pupils to:
   a) Write the math problem with more than 1 'operation'.
   b) Solve the problem using the correct order of operations.
   c) Write the answer in leones.

Independent Practice *(10 minutes)*

1. Tell pupils to solve problems e. and f on their own.
2. Tell pupils to check their answers with their partner.

Closing *(2 minutes)*

1. Go over the answers. (Answers: **c.** 2 x 5000 = 10,000; 10,000 – 2000 = 8000; she has Le 8000. **d.** 3 x 5000 = 15,000; 15,000 – 10,000 = 5000; he has Le 5000. **e.** 5 x 1000 = 5000; 5000 + 500 = 5500; they cost Le 5500. **f.** 4 x 500 = 2000; 2000 + 500 = 2500; they cost Le 2500.)

Lesson Title: Word Problems Involving the 4 Operations and Money	Theme: Everyday Arithmetic (Including Financial Literacy) – Problems with 4 Operations		
Lesson Number: M-04-133	Class/Level: Primary 4	Time: 35 minutes	

	Learning Outcomes By the end of the lesson, pupils will be able to solve up to 3-step word problems involving the 4 operations and money.		Teaching Aids None		Preparation 1. Write on the board the order of operations. 2. Write on the board the word problems.

Opening *(3 minutes)*

1. Review order of operations with pupils.
   a) Multiply or divide in order, from left to right.
   b) Add or subtract in order, from left to right.
2. **Write** on the board: 5, 5, 4, 1
3. **Ask:** How can we make these numbers equal 24? We can add, subtract, multiply or divide. We must use all 4 numbers.
4. Have pupils work with a partner to try to make 24. Invite a pupil to write the answer on the board. (Example answer: 5 x 4 + 5 − 1)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will solve word problems. We need to multiply, add and subtract to solve the problems.
2. Read with pupils the word problems on the board:

a.	Oranges cost Le 500 each. Mangoes cost Le 1000 each. How much do 3 oranges and 2 mangoes cost?
b.	10 bananas cost Le 2000. How much do 2 bananas cost?
c.	Fatu earns Le 5000 each day. She works 2 days. Ismail earns Le 5000 each day. He works 3 days. How much more does Ismail earn than Fatu?
d.	3 pounds of rice Le 3000. How much does 4 pounds of rice cost?
e.	Oranges cost Le 500 each. Mangoes cost Le 1000 each. How much does 2 oranges and 5 mangoes cost?
f.	Pens cost Le 500 each. Pencils cost Le 200. How much do 4 pens and 3 pencil cost?

3. Read problem a. again, aloud with the class.
4. **Say:** We need to do 3 operations in this problem. First, we find the cost of 3 oranges. Next, we find the cost of 2 mangoes. Last, we find the cost 3 oranges plus the cost of 2 mangoes.
5. **Ask:** What do we do first? Raise your hand to answer. (Answer: Find the cost of 3 oranges.)
6. **Ask:** How do we find the cost of 3 oranges? Raise your hand to answer. (Answer: 3 x 500)
7. **Write** on the board: 3 x 500
8. **Ask:** What do we do next? Raise your hand to answer. (Answer: Find the cost of 2 mangoes.)
9. **Ask:** How do we find the cost of 2 mangoes? Raise your hand to answer. (Answer: 2 x 1000)
10. **Write** on the board: 3 x 500 + 2 x 1000

11. Have pupils solve the problem.
12. Tell pupils to check their answer with a partner.
13. Use question an answer to solve the problem aloud with pupils. (Answer: 3 x 500 = 1500; 2 x 1000 = 2000; 1500 + 2000 = 3500; they cost Le 3500.)
14. Read problem b. again, aloud with the class.
15. **Say:** This problem is different. We need to do 2 operations in this problem. First, we find the cost of 1 banana. Next, we find the cost of 2 bananas.
16. **Say:** We divide to find the cost of 1 banana**.**
17. **Ask:** What numbers do we divide? Raise your hand to answer. (Answer: 2000 ÷ 10)
18. **Write** on the board: 2000 ÷ 10
19. **Ask:** What do we do next? Raise your hand to answer. (Answer: Find the cost of 2 bananas.)
20. **Write** on the board: 2000 ÷ 10 x 2
21. **Say:** Remember we do multiplication and division from left to right. 2000 ÷ 10 comes first. We solve it first.
22. **Ask:** What is 2000 ÷ 10? Raise your hand to answer. (Answer: 200)
23. **Say:** 200 is the cost of 1 banana. We need the cost of 2 bananas. We multiply 200 x 2.
24. **Ask:** What is 200 x 2? Raise your hand to answer. (Answer: 400)
25. **Ask:** How much do 2 bananas cost? (Answer: Le 400)

Guided Practice *(10 minutes)*

1. Read problems c. and d. aloud again with pupils.
2. Use question and answer to help pupils understand to multiply and subtract for problem c.
3. Have pupils solve problems c. and d. with a partner.
4. Remind pupils to:
   a) Write the math problem with more than 1 operation.
   b) Solve the problem using the correct order of operations.
   c) Write the answer in leones.

Independent Practice *(10 minutes)*

1. Tell pupils to solve problems e. and f on their own.
2. Tell pupils to check their answers with their partner.

Closing *(2 minutes)*

1. Go over the answers. (Answers: **c.** 2 x 5000 = 10,000; 3 x 5000 = 15,000; 15,000 – 10,000 = 5000; he earns Le 5000 more. **d.** 3000 ÷ 3 = 1000; 1000 x 4 = 4000; it costs Le 4000. **e.** 2 x 500 = 1000; 5 x 1000 = 5,000; 5000 + 1000 = 6000; they cost Le 6000. **f.** 4 x 500 = 2000; 3 x 200 = 600; 2000 + 600 = 2600; they cost Le 2600.)

Lesson Title: Estimating Strategies to Check Answers for Reasonableness	Theme: Everyday Arithmetic (Including Financial Literacy) – Problems with 4 Operations	
Lesson Number: M-04-134	Class/Level: Primary 4	Time: 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to use estimation to check answers for reasonableness.		Teaching Aids None		Preparation Write on the board the problems for Guided and Independent Practice.

Opening *(3 minutes)*

1. **Write** on the board (without answers):

Number	Round to nearest 10	Round to nearest 100
376	380	400
336	330	300

2. As a class, round off each number to the nearest 10 and 100.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will estimate the answers to problems. Remember 'estimate' means a good guess. The estimate helps us know what number our answer is close to.
2. **Write** on the board:

    376 + 336 ≈ 600
    376 + 336 ≈ 700

3. Tell pupils this story: 2 pupils estimate the answer to 376 + 336. The first pupil says 376 + 336 is close to 600. The second pupil says 376 + 336 is close to 700.
4. **Ask:** What numbers do you think the first pupil used to estimate 600? Think. Then turn and tell a partner.
5. **Say:** I think the first pupil used 300 + 300. 376 and 336 both have 300s in them. 300 + 300 is 600. Point your thumb up if you agree.
6. **Ask:** What numbers do you think the second pupil used to estimate 700? Think. Then turn and tell a partner.
7. **Say:** I think the second pupil used 400 + 300. 376 rounds to 400 and 336 rounds to 300. 400 + 300 is 700. Point your thumb up if you agree.
8. **Say:** Now we will solve the problem. We will see which estimate is better.
9. **Write** on the board:

        1 1
        3 7 6
    +   3 3 6
        7 1 2

10. **Ask:** Which estimate was closer? Raise your hand to answer. (Answer: 400 + 300)
11. **Say:** 400 + 300 is a better estimate because 376 rounds off to 400. We round off and then estimate.
12. **Write** on the board: 462 – 159

13. Have pupils copy it into their exercise books.
14. **Ask:** What is 462 rounded to the nearest hundred? Raise your hand to answer. (Answer: 500)
15. **Write** on the board:

    462 – 159
    500

16. **Say:** Write 500 under 462.
17. **Ask:** What is 159 rounded to the nearest hundred? Raise your hand to answer. (Answer: 200)
18. **Write** on the board:

    462 – 159
    500 – 200

19. **Say:** Write 200 under 159.
20. **Ask:** What is 500 – 200? Raise your hand to answer. (Answer 300)
21. **Write** on the board:

    462 – 159
    500 – 200 = 300

22. **Say:** Write 200 under 159.
23. **Say:** Our estimate is 300. Our answer should be close to 300.
24. Solve with pupils:

```
     5  12
  4  6̶  2̶
– 1  5  9
  3  0  3
```

25. **Ask:** Is 303 close to 300? Raise your hand to answer. (Answer: Yes)

Guided Practice *(10 minutes)*

1. Read with pupils the directions.

Directions: Round off each number. Estimate.		
a. 620 + 185 Estimate: ____ + _____ = __	b. 578 + 125 Estimate: ____ + _____ = __	c. 433 – 309 Estimate: ____ + _____ = __
d. 618 – 296 Estimate: ____ + _____ = __	e. 776 – 119 Estimate: ____ + _____ = __	f. 46 x 12 Estimate: ____ + _____ = __

2. **Ask:** Will you round off 46 x 12 to the nearest 10 or the nearest 100? Raise your hand to answer. (Answer: nearest 10)
3. Have pupils complete the estimates for the problems.
4. Have pupils check their estimates with a partner.
5. Go over answers. (Answers: **a.** 600 + 200 = 800; **b.** 600 + 100 = 700; **c.** 400 – 300 = 100; **d.** 600 – 300 = 300; **e.** 800 – 100 = 700; **f.** 50 x 10 = 500)

Independent Practice *(10 minutes)*

1. Tell pupils to solve problems a., b., c., d., e. and f. on their own.
2. Tell pupils to check that their answers are close to their estimates.

Closing *(2 minutes)*

1. Ask pupils to name times when they might estimate in real life. (Example answers: shopping; cooking; the time it takes to get to the next town or village)
2. **Say:** Good job today, pupils! You used estimation to make a good guess about answers. You then checked if your estimate was accurate.

Lesson Title: Inverse Operations to Check Answers for Reasonableness	**Theme:** Everyday Arithmetic (Including Financial Literacy) – Problems with 4 Operations	
Lesson Number: M-04-135	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to use inverse operations to check answers for reasonableness.		**Teaching Aids** None		**Preparation** 1. Write on the board the number circles. 2. Write on the board the problems for Guided and Independent Practice.

Opening *(3 minutes)*

1. **Write** on the board:

2. Have pupils turn to a partner and tell the 2 addition problems they can make with the numbers.
3. **Ask:** What are the 2 addition problems? Raise your hand to answer. (Answer: 8 + 2 = 10; 2 + 8 =10)
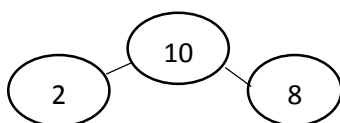4. Have pupils turn to a partner and tell the 2 subtraction problems they can make with the numbers.
5. **Ask:** What are the 2 subtraction problems? Raise your hand to answer. (Answer: 10 – 2 = 8; 10 – 8 =2)
6. **Ask:** Why can we make addition and subtraction problems with the same numbers? Raise your hand to answer. (Answer: Addition and subtraction are opposite of one another.)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will learn to check answers to subtraction problems with addition.
2. **Write** on the board:

```
    8   6   9
 −  2   5   4
    6   1   5
```

3. Tell pupils this story: A pupil in another class solved this problem. He is not sure if the answer is correct. He knows he can use addition to check the answer. He wants to know which numbers to add.
4. **Write** on the board:

5. **Say:** We check the   subtraction by writing an addition problem. The addition problem adds the answer to the bottom number.
6. Solve the addition problem with the class.

7. **Say:** Addition is the opposite of subtraction. The problems will have the same numbers if they are both correct.
8. **Ask:** Do the problems have the same numbers? Raise your hand to answer. (Answer: Yes)
9. **Ask:** Where is 615 in the subtraction problem? Raise your hand to answer. (Answer: at the bottom; the answer)
10. **Ask:** Where is 615 in the addition problem? Raise your hand to answer. (Answer: at the top)
11. **Ask:** Where is 869 in the subtraction problem? Raise your hand to answer. (Answer: at the top)
12. **Ask:** Where is 869 in the addition problem? Raise your hand to answer. (Answer: at the bottom; the answer)
13. **Say:** The numbers changed places because addition and subtraction are opposite.
14. **Write** on the board:

```
        12
    4  6  2̸
 −  1  5  9
    3  1  3
```

15. Tell pupils this story: Another pupil solved this problem. He wants to check it with addition. He is not sure what numbers to add can use addition to check the answer. He wants to know which numbers to add.
16. **Say:** Think. Then, turn to a partner and tell what numbers to add.
17. **Ask:** What numbers do we add? Raise your hand to answer. (Answer: 313 + 159)
18. **Ask:** What answer do we want the addition problem to have? Raise your hand to answer. (Answer: 462)
19. **Write** the addition problem on the board. Solve it with pupils.

```
        12              1
    4  6  2̸        3  1  3
 −  1  5  9      + 1  5  9
   (3  1  3)       4  7  2
```

20. **Say:** The addition problem does not have 462 as an answer. That means the subtraction problem is not correct. The pupil needs solve the subtraction problem again.

Guided Practice *(10 minutes)*

Directions: Solve each problem. Check your answer with addition.

a. 695	**b.** 573	**c.** 439	**d.** 6318	**e.** 776	**f.** 376
− 182	− 128	− 59	− 296	− 119	− 119

1. Read with pupils the directions.
2. Use question and answer to guide pupils to solve problem a.
3. Have pupils solve b. and c.
4. Have pupils check their problems with a partner.
5. Talk with pupils about how checking their own work helps make them successful in school.
6. **Ask:** Why do we not need to go over answers together? Raise your hand to answer. (Answer: We are checking our own work.)

Independent Practice *(10 minutes)*

1. Tell pupils to solve problems d., e. and f. on their own.

Closing *(2 minutes)*

1. **Ask:** How can checking your own work make you successful in and out of school? Raise your hand to answer. (Example answers: so you can be as accurate as possible; so you know your work is correct when you submit it; some jobs require precise calculations; you need to make exact change with money like at a supermarket)
2. **Say:** Good job today, you used inverse operations to check your work for accuracy.

Lesson Title: Equivalent Fractions	**Theme:** Everyday Arithmetic Fractions	
Lesson Number: M-04-136	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to calculate and identify equivalent fractions with denominators up to 12.		**Teaching Aids** None		**Preparation** 1. Draw on the board a rectangle that shows equivalent fourths and halves. 2. Write on the board the problems for guided and independent practice.

Opening *(3 minutes)*

1. Remind pupils that fractions equivalent to 1 have the same number on the top and on the bottom.
2. Tell pupils to work with a partner to name 3 fractions equivalent to 1.
3. Invite 1 -2 pupils to share fractions equal to 1 with the class. Write them on the board. (Example answers: $\frac{3}{3}$; $\frac{2}{2}$; $\frac{6}{6}$).
4. Review multiplication facts with 1.
5. **Ask:** What happens to a number when we multiply it by 1? Raise your hand to answer. (Answer: The number does not change.)

Introduction to the New Material *(10 minutes)*

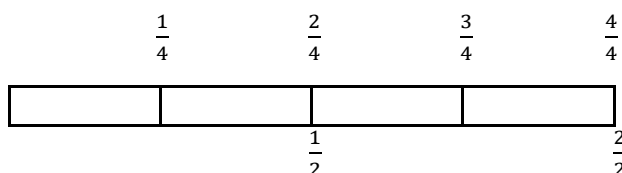1. **Say:** Today we are going to learn how to find equivalent fractions by multiplying with fractions equal to 1. Fractions of the same size are called 'equivalent fractions'.
2. **Say:** First we will revise equivalent fractions.
3. Show pupils the first rectangle drawn on the board.

4. **Ask:** How many fourths are as long as $\frac{1}{2}$? Raise your hand to answer. (Answer: $\frac{2}{4}$)
5. **Write** on the board ' $\frac{1}{2} = \frac{2}{4}$ '.
6. **Say:** We can multiply $\frac{1}{2}$ by a fraction equal to 1 to get $\frac{2}{4}$. We learned to do this when we added equivalent fractions.
7. **Write** on the board ' $\frac{1}{2} \times \frac{?}{?} = \frac{2}{4}$ '.
8. **Say:** We look at the denominators to see what fraction equal to 1 to use.
9. **Say:** The denominator of $\frac{1}{2}$ is 2. The denominator of $\frac{2}{4}$ is 4.
10. **Ask:** 2 times what number equals 4? Raise your hand to answer. (Answer: 2 x 2 = 4)
11. **Say:** 2 x 2 = 4, so we need to make a fraction equal to 1 with 2 as the top and bottom numbers.
12. **Ask:** What fraction equal to 1 can I multiply with to show $\frac{1}{2} = \frac{2}{4}$? Raise your hand to answer. (Answer: $\frac{2}{2}$)

13. **Write** on the board '$\frac{1}{2}$ x $\frac{2}{2}$ = $\frac{2}{4}$'. Read aloud with pupils.

14. **Say:** Remember, when we multiply with 1, the value of the number does not change. When we multiply with a fraction equal to 1, the size of the fraction does not change. $\frac{2}{4}$ is the same size as $\frac{1}{2}$.

15. **Ask:** What is 6 ÷ 1? Raise your hand to answer. (Answer: 6)

16. **Ask:** What happens to a number when we divide it by 1? Raise your hand to answer. (Answer: The number does not change.)

17. **Say:** We can multiply by a fraction equal to 1 to find equivalent fractions. We can also divide by a number equal to 1 to find equivalent fractions.

18. **Write** on the board '$\frac{2}{4}$ ÷ $\frac{?}{?}$ = $\frac{1}{2}$'.

19. **Ask:** What fraction equal to 1 can I divide with to show $\frac{2}{4}$ = $\frac{1}{2}$? Raise your hand to answer. (Answer: $\frac{2}{2}$)

20. **Write** on the board '$\frac{2}{4}$ ÷ $\frac{2}{2}$ = $\frac{1}{2}$'. Read aloud with pupils.

21. Repeat steps 7 – 16 with $\frac{2}{3}$ and $\frac{8}{12}$. (Answer: Multiply and divide with $\frac{4}{4}$. $\frac{2}{3}$ x $\frac{4}{4}$ = $\frac{8}{12}$)

Guided Practice *(10 minutes)*

1. Explain to pupils they will use multiplication to find the equivalent fractions.
2. Tell pupils it is important to organise the fractions.
3. **Ask:** How are the fractions in the matrix organised? (Example answers: Each column has fractions with the same denominator. Each column starts with a fraction that has a top number of '1'.)
4. Guide pupils to make the matrix, with headings, to organise the fractions in it.

Fractions equal to $\frac{1}{2}$	Fractions equal to thirds	Fractions equal to fourths	Fractions equal to fifths
$\frac{1}{2}$ x —— = $\frac{}{4}$	$\frac{1}{3}$ x —— = $\frac{}{6}$	$\frac{1}{4}$ x —— = $\frac{}{8}$	$\frac{1}{5}$ x —— = $\frac{}{10}$
$\frac{1}{2}$ x —— = $\frac{}{6}$	$\frac{1}{3}$ x —— = $\frac{}{9}$	$\frac{1}{4}$ x —— = $\frac{}{12}$	$\frac{2}{5}$ x —— = $\frac{}{10}$
$\frac{1}{2}$ x —— = $\frac{}{8}$	$\frac{1}{3}$ x —— = $\frac{}{12}$	$\frac{2}{4}$ x —— = $\frac{}{8}$	$\frac{3}{5}$ x —— = $\frac{}{10}$
$\frac{1}{2}$ x —— = $\frac{}{10}$	$\frac{2}{3}$ x —— = $\frac{}{6}$	$\frac{2}{4}$ x —— = $\frac{}{12}$	$\frac{4}{5}$ x —— = $\frac{}{10}$
$\frac{1}{2}$ x —— = $\frac{}{12}$	$\frac{2}{3}$ x —— = $\frac{}{9}$	$\frac{3}{4}$ x —— = $\frac{}{8}$	
	$\frac{2}{3}$ x —— = $\frac{}{12}$	$\frac{3}{4}$ x —— = $\frac{}{12}$	

Independent Practice *(10 minutes)*

1. Have pupils work with a partner to complete the problems in the matrix.
2. Go over answers by filling in the matrix on the board.
3. Have pupils check their work with the matrix on the board. Tell them to correct any mistakes.

Closing *(2 minutes)*

1. Continue to go over answers. (See below for answers.)
2. **Say:** Good job today, pupils! You learned how to find equivalent fractions.

Answers:

Fractions equal to $\frac{1}{2}$	Fractions equal to thirds	Fractions equal to fourths	Fractions equal to fifths
$\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$	$\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$	$\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$	$\frac{1}{5} \times \frac{2}{2} = \frac{2}{10}$
$\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$	$\frac{1}{3} \times \frac{3}{3} = \frac{3}{9}$	$\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$	$\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$
$\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$	$\frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$	$\frac{2}{4} \times \frac{2}{2} = \frac{4}{8}$	$\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$
$\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$	$\frac{2}{3} \times \frac{2}{2} = \frac{4}{6}$	$\frac{2}{4} \times \frac{3}{3} = \frac{6}{12}$	$\frac{4}{5} \times \frac{2}{2} = \frac{8}{10}$
$\frac{1}{2} \times \frac{6}{6} = \frac{6}{12}$	$\frac{2}{3} \times \frac{3}{3} = \frac{3}{9}$	$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$	
	$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$	$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$	

Lesson Title: Addition of Equivalent Fractions	Theme: Everyday Arithmetic Fractions	
Lesson Number: M-04-137	Class/Level: Primary 4	Time: 35 minutes

Learning Outcomes: By the end of the lesson, pupils will be able to calculate and identify equivalent fractions with denominators up to 12.	Teaching Aids None	Preparation 1. Draw on the board a rectangle that shows equivalent fourths and halves. 2. Write on the board the problems for guided and independent practice.

Opening *(3 minutes)*

1. Review fractions equivalent to 1. Remind pupils that fractions equivalent to 1 have the same number on the top and on the bottom.
2. Tell pupils to work with a partner to name as many fractions equivalent to 1 as they can in 1 minute.
3. Invite 1 -2 pupils to come to the board and write the fractions they thought of. (Example answers: $\frac{3}{3}$; $\frac{2}{2}$; $\frac{6}{6}$).

Introduction to the New Material *(10 minutes)*

1. **Say:** Yesterday we multiplied with a fraction equal to 1 to find equivalent fractions. Today we will use equivalent fractions to add. We did this once early in the year. It is time to review it.
2. **Ask:** Who remembers how to add using equivalent fractions? Point your thumb up if you remember how. Point your thumb to the side if you only remember a little. Point your thumb down if you do not remember at all. (Answers: Pupils should be encouraged to point their thumb in the way that shows if they remember. Teach the new material more slowly if most do not remember.)
3. **Write** on the board, ' $\frac{1}{3} + \frac{1}{12} = $ '.
4. **Say:** We are going to add $\frac{1}{3} + \frac{1}{12}$. They have different denominators. We cannot add fractions with different denominators. We need both fractions to have the same denominator to add.
5. Read aloud with pupils the 3 steps to add fractions that have different denominators.
   - Step 1: Decide what the new denominator is.
   - Step 2: Make equivalent fractions, so that both fractions have the same denominator.
   - Step 3: Add the top numbers of the fractions and keep the denominator the same.
6. **Ask:** What is Step 1? Raise your hand to answer. (Answer: Decide what the new denominator is.)
7. **Say:** The denominators are 3 and 12. I do not need to change both denominators because I know 3 x 4 = 12.
8. **Say:** I do not need to change $\frac{1}{12}$. It already has a denominator of 12.
9. **Ask:** Can I can make $\frac{1}{3}$ into an equivalent fraction with 12 as a denominator? Raise your hand to answer. (Answer: Yes)
10. **Say:** We have finished Step 1, 'Decide what the new denominator is'.
11. **Ask:** What is the new denominator? Raise your hand to answer. (Answer: 12)

12. **Ask:** What is Step 2? Raise your hand to answer. (Answer: Make equivalent fractions with the new denominator.)

13. **Write** on the board, '$\frac{1}{3} \times — = \frac{}{12}$'.

14. **Ask:** What fraction equal to 1 do we multiply with? Raise your hand to answer. (Answer: $\frac{4}{4}$)

15. **Write** on the board, '$\frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$'.

16. **Ask:** What is Step 3? Raise your hand to answer. (Answer: Add the top number of the fractions, keep the denominator the same.)

17. **Write** on the board:

$$\frac{1}{3} + \frac{1}{12} =$$

$$\downarrow \quad \downarrow$$

$$\frac{4}{12} + \frac{1}{12} = \frac{5}{12}$$

18. Read the solved addition problems aloud with pupils. Ensure they understand that both addition problems mean the same thing.

19. Repeat steps 3 – 19 with '$\frac{2}{3} + \frac{2}{9} =$'. (Answer: New denominator is 9: $\frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$, $\frac{6}{9} + \frac{2}{9} = \frac{8}{9}$.)

Guided Practice *(10 minutes)*

1. Read with pupils the problems written on the board.

   a. $\frac{3}{5} + \frac{3}{10} =$ b. $\frac{5}{8} + \frac{1}{4} =$ c. $\frac{1}{2} + \frac{1}{6} =$ d. $\frac{7}{12} + \frac{1}{3} =$ e. $\frac{5}{6} + \frac{1}{12} =$

   f. $\frac{3}{4} + \frac{1}{8} =$ g. $\frac{2}{3} + \frac{1}{6} =$ h. $\frac{4}{5} + \frac{1}{10} =$

2. Guide pupils to solve problem a. (Answer: a. New denominator is 10: $\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$, $\frac{6}{10} + \frac{3}{10} = \frac{9}{10}$; $\frac{3}{5} + \frac{3}{10} = \frac{9}{10}$.)

3. Have pupils work in groups of 2 or 3 to solve problems b. and c.

4. Remind pupils to:
   - Find the new denominator.
   - Make an equivalent fraction so that both fractions have the same denominator.
   - Add the top numbers of the fraction.

5. Go over the problems and answers with pupils. (Answers: b. New denominator is 8: $\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$, $\frac{5}{8} + \frac{2}{8} = \frac{7}{8}$, $\frac{5}{8} + \frac{1}{4} = \frac{7}{8}$; c. New denominator is 6: $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$, $\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$, $\frac{1}{2} + \frac{1}{6} = \frac{4}{6}$.)

Independent Practice *(10 minutes)*

1. Have pupils complete the problems d. – h. on their own.

Closing *(2 minutes)*

1. Go over answers. (Answers: d. $\frac{11}{12}$, e. $\frac{11}{12}$, f. $\frac{7}{8}$, g. $\frac{5}{6}$, h. $\frac{9}{10}$)

2. Have pupils check their work. Solve on the board problems pupils do not understand.

3. **Ask:** What do you notice about the answers to d and e? Raise your hand to answer. (Answer: They have the same answer.)
4. **Say:** Yes, the addition problem was different but the result was the same.
5. **Say:** Good job today, pupils! You used what you know about equivalent fractions to add fractions with unlike denominators.

Lesson Title: Subtraction of Equivalent Fractions	**Theme:** Everyday Arithmetic Fractions	
Lesson Number: M-04-138	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to subtract equivalent fractions with denominator up to 12.		**Teaching Aids** None		**Preparation** 1. Write on the board 3 steps to subtract with equivalent fractions. 2. Write on the board the problems for guided and independent practice.

Opening *(3 minutes)*

1. **Write** on the board: '__ + __ = 13; ___ - ___ = 1; __ x __ = 42'.
2. Tell pupils to work with a partner to find the same two numbers that make all 3 problems true. *(1 minute)*
3. Go over the answer. (Answers: 7 and 6: 7 + 6 = 13, 7 - 6 = 1, 7 x 6 = 42)

Introduction to the New Material *(10 minutes)*

1. **Say:** Yesterday we added using equivalent fractions. Today we will use equivalent fractions to subtract. We did this once early in the year. It is time to review it.
2. **Ask:** Who remembers how to subtract using equivalent fractions? Point your thumb up if you remember how. Point your thumb to the side if you only remember a little. Point your thumb down if you do not remember at all. (Answers: Pupils should be encouraged to point their thumb in the way that shows if they remember. Teach the new material more slowly if most do not remember.)
3. **Write** on the board, '$\frac{1}{4} - \frac{1}{12} = $ '.
4. **Say:** We are going to subtract $\frac{1}{12}$ from $\frac{1}{4}$. The fractions have different denominators. We cannot subtract fractions with different denominators. We need both fractions to have the same denominator to subtract.
5. Read aloud with pupils the 3 steps to subtract fractions that have different denominators.
    a) Step 1: Decide what the new denominator is.
    b) Step 2: Make equivalent fractions so that both fractions have the same denominator.
    c) Step 3: Subtract the top numbers of the fractions.
6. **Ask:** What is Step 1? Raise your hand to answer. (Answer: Decide what the new denominator is.)
7. **Say:** Look at the denominators of $\frac{1}{4}$ and $\frac{1}{12}$. Think about Step 1. Turn and tell a partner what the new denominator is.
8. **Ask:** What is the new denominator? Raise your hand to answer. (Answer: The new denominator is 12.)
9. **Ask:** Which fraction do we need to make into an equivalent fraction with a denominator of 12? Raise your hand to answer. (Answer: $\frac{1}{4}$)
10. **Write** on the board, '$\frac{1}{4}$ x — = $\frac{}{12}$ '.
11. **Ask:** What fraction equal to 1 do we multiply with? Raise your hand to answer. (Answer: $\frac{3}{3}$)

12. **Write** on the board, ' $\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$ '.

13. **Ask:** What is Step 3? Raise your hand to answer. (Answer: Subtract the top number of the fractions.)

14. **Write** on the board:

$$\frac{1}{4} - \frac{1}{12} =$$

$$\downarrow \qquad \downarrow$$

$$\frac{3}{12} - \frac{1}{12} = \frac{2}{12} \qquad \frac{1}{4} - \frac{1}{12} = \frac{2}{12}$$

15. Read the solved subtraction problems aloud with pupils. Ensure they understand that both subtraction problems mean the same thing.

16. Use question and answer to solve ' $\frac{2}{3} - \frac{2}{9} =$ ' with pupils. (Answer: New denominator is 9: $\frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$, $\frac{6}{9} - \frac{2}{9} = \frac{4}{9}$.)

Guided Practice *(10 minutes)*

1. Read with pupils the problems written on the board.

   a. $\frac{3}{5} - \frac{3}{10} =$ b. $\frac{5}{8} - \frac{1}{4} =$ c. $\frac{1}{2} - \frac{1}{6} =$ d. $\frac{7}{12} - \frac{1}{2} =$ e. $\frac{5}{6} - \frac{3}{12} =$

   f. $\frac{3}{4} - \frac{1}{8} =$ g. $\frac{5}{6} - \frac{2}{3} =$ h. $\frac{4}{5} - \frac{1}{10} =$

2. Have pupils work in groups of 2 or 3 to solve problems a. - c.

3. Remind pupils to:
   a) Find the new denominator.
   b) Make an equivalent fraction so that both fractions have the same denominator.
   c) Subtract the top numbers of the fraction.

4. Go over the problems and answers with pupils. (Answers: a. New denominator is 10: $\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$, $\frac{6}{10} - \frac{3}{10} = \frac{3}{10}$, $\frac{3}{5} - \frac{3}{10} = \frac{3}{10}$; b. New denominator is 8: $\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$, $\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$, $\frac{5}{8} - \frac{1}{4} = \frac{3}{8}$; c. New denominator is 6: $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$, $\frac{3}{6} - \frac{1}{6} = \frac{2}{6}$, $\frac{1}{2} - \frac{1}{6} = \frac{2}{6}$.)

Independent Practice *(10 minutes)*

1. Have pupils complete the problems d. – h. on their own.

Closing *(2 minutes)*

1. Go over answers. (Answers: d. $\frac{1}{12}$, e. $\frac{7}{12}$, f. $\frac{5}{8}$, g. $\frac{1}{6}$, h. $\frac{7}{10}$)
2. Have pupils check their work. Solve on the board problems pupils do not understand.
3. **Say:** Good job today, pupils! You subtracted fractions with different denominators by finding equivalent fractions.

Lesson Title: Multiplication of Equivalent Fractions	**Theme:** Everyday Arithmetic Fractions	
Lesson Number: M-04-139	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to multiply equivalent fractions with denominators up to 12.		**Teaching Aids** One soft biscuit or coconut cake (or a picture of these if none are available)		**Preparation** 1. Gather one soft biscuit or coconut cake. 2. Write on the board the problems for guided and independent practice.

Opening *(3 minutes)*

1. Show pupils 1 biscuit or coconut cake.
2. Then, tear or cut it in half.
3. **Ask:** How can 2 friends share $\frac{1}{2}$ of a cake? Remember, each friend gets the same amount of cake. Raise your hand to answer. (Answer: Tear or cut the $\frac{1}{2}$ cake into 2 equal pieces.)
4. Tear the half of the cake in half to show how big a piece of cake each friend gets.
5. Ask pupils to draw a picture to show how big a piece of cake each friend gets.
6. **Ask:** What fraction of the cake did each friend get? Raise your hand to answer. (Answer: $\frac{1}{4}$)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn to multiply equivalent fractions.
2. **Write** on the board 'What is $\frac{1}{2}$ of $\frac{1}{2}$?' Read it aloud with pupils.
3. **Say:** A few minutes ago, I asked how 2 friends can share $\frac{1}{2}$ cake. We said that we can cut the $\frac{1}{2}$ cake into 2 equal pieces. Each friend gets $\frac{1}{2}$ of $\frac{1}{2}$ cake. Each friend gets $\frac{1}{4}$ of the whole cake.
4. **Say:** Remember that 'of' means multiply. 'What is $\frac{1}{2}$ of $\frac{1}{2}$?' means 'What is $\frac{1}{2}$ x $\frac{1}{2}$?'
5. **Write** on the board,

$$\frac{1}{2} \text{ of } \frac{1}{2}$$
$$\downarrow$$
$$\frac{1}{2} \text{ x } \frac{1}{2}$$

6. **Write** on the board, ' $\frac{1}{2} \times \frac{1}{2} = \frac{1 \times 1}{2 \times 2}$ '.
7. **Say:** We multiply the top numbers when we multiply fractions. We also multiply the denominators.
8. **Say:** This is different from addition and subtraction because we will have a new denominator when we multiply.
9. **Ask:** What is 1 x 1? Raise your hand to answer. (Answer: 1)
10. **Ask:** What is 2 x 2? Raise your hand to answer. (Answer: 4)
11. **Write** on the board, ' $\frac{1}{2} \times \frac{1}{2} = \frac{1 \times 1}{2 \times 2} = \frac{1}{4}$ '.
12. **Say:** We said $\frac{1}{2}$ of $\frac{1}{2}$ is $\frac{1}{4}$. $\frac{1}{2} \times \frac{1}{2}$ is also $\frac{1}{4}$. $\frac{1}{2}$ of $\frac{1}{2}$ and $\frac{1}{2} \times \frac{1}{2}$ mean the same thing. They both equal $\frac{1}{4}$.

13. **Say:** Now I am going to do the same problem with a fraction equivalent to $\frac{1}{2}$ to see if I get the same answer. $\frac{2}{4}$ is equivalent to $\frac{1}{2}$. Let's see what $\frac{2}{4}$ of $\frac{1}{2}$ is.

14. **Write** on the board 'What is $\frac{2}{4}$ of $\frac{1}{2}$?' Read it aloud with pupils.

15. **Say:** First I am going to draw a picture to show this multiplication problem. I draw the $\frac{1}{2}$ first.

16. **Say:** Now I need to find out how much $\frac{2}{4}$ of $\frac{1}{2}$ is. I will make fourths in my half and shade 2 in.

17. **Say:** I shaded in $\frac{2}{4}$ of $\frac{1}{2}$. I need to find out what fraction of the whole rectangle that is.

18. **Ask:** Is the whole rectangle in equal pieces? Raise your hand to answer. (Answer: No)

19. **Ask:** How can I make the whole rectangle have equal pieces? Raise your hand to answer. (Answer: Make 4 pieces on the side that is not shaded).

20. **Say:** Now my rectangle is in equal pieces. There are 8 equal pieces in all. $\frac{2}{4}$ of $\frac{1}{2}$ is $\frac{2}{8}$.

21. **Ask:** How do we write $\frac{2}{4}$ of $\frac{1}{2}$ as a multiplication problem? Raise your hand to answer. (Answer: $\frac{2}{4} \times \frac{1}{2}$)

22. **Say:** $\frac{2}{4} \times \frac{1}{2} = \frac{2 \times 1}{4 \times 2} = \frac{2}{8}$.

23. **Say:** We said $\frac{1}{2}$ of $\frac{1}{2}$ is $\frac{1}{4}$. We said $\frac{2}{4}$ of $\frac{1}{2}$ is $\frac{2}{8}$. Is $\frac{2}{8}$ equivalent to $\frac{1}{4}$? Raise your hand to answer. (Answer: Yes.)

24. **Say:** When we multiply with equivalent fractions our answers are equivalent.

Guided Practice *(10 minutes)*

1. Show pupils the pairs of problems written on the board.
   a. $\frac{1}{2}$ x $\frac{1}{3}$ $\frac{2}{4}$ x $\frac{1}{3}$ b. $\frac{1}{2}$ x $\frac{2}{3}$ $\frac{2}{4}$ x $\frac{1}{3}$ c. $\frac{1}{3}$ x $\frac{1}{2}$ $\frac{2}{6}$ x $\frac{1}{2}$

2. Have pupils copy the first problem into their exercise book.

3. Guide pupils to solve it. (Answer: $\frac{1}{2} \times \frac{1}{3} = \frac{1 \times 1}{2 \times 3} = \frac{1}{6}$)

4. Have pupils copy the second problem into their exercise book.

5. **Say:** $\frac{2}{4}$ is equivalent to $\frac{1}{2}$. The answer to $\frac{2}{4}$ x $\frac{1}{3}$ should be equivalent to the answer to $\frac{1}{2}$ x $\frac{1}{3}$.

6. Have pupils solve $\frac{2}{4}$ x $\frac{1}{3}$. (Answer: $\frac{2}{4} \times \frac{1}{3} = \frac{2 \times 1}{4 \times 3} = \frac{2}{12}$)

7. Help pupils identify that $\frac{2}{12}$ and $\frac{1}{6}$ are equivalent fractions.

Independent Practice *(10 minutes)*

1. Have pupils complete the problems b. and c. with a partner.

Closing *(2 minutes)*

1. Go over answers with pupils. Help pupils identify equivalent fractions. (Answers: b. $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6}$, $\frac{2}{4} \times \frac{2}{3} = \frac{4}{12}$, c. $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$, $\frac{2}{6} \times \frac{1}{2} = \frac{2}{12}$)

Lesson Title: Multiplication of Fractions		**Theme:** Everyday Arithmetic Fractions	
Lesson Number: M-04-140		**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to multiply equivalent fractions with denominator up to 12.		**Teaching Aids** 1 soft biscuit or coconut cake (or a picture of these if none is available)		**Preparation** 1. Gather 1 soft biscuit or coconut cake. 2. Write on the board the problems for guided and independent practice.

Opening *(3 minutes)*

1. Show pupils 1 biscuit or coconut cake.
2. Then, tear or cut it in half.
3. **Ask:** How can 3 friends share $\frac{1}{2}$ of a cake? Each friend gets the same amount of cake. Raise your hand to answer. (Answer: Tear or cut the $\frac{1}{2}$ cake into 3 equal pieces.)
4. Tear the half of the cake into 3 pieces to show how big a piece of cake each friend gets.
5. **Ask:** Does each friend get more than $\frac{1}{2}$ or less than $\frac{1}{2}$? Raise your hand to answer. (Answer: Less)
6. **Ask:** Does each friend get a big piece or a small piece? Raise your hand to answer. (Answer: Small)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today we are going to learn to multiply fractions. We will look at the size of the answers.
2. **Write** on the board 'What is $\frac{1}{3}$ of $\frac{1}{2}$?' Read it aloud with pupils.
3. **Say:** A few minutes ago, I asked how 3 friends can share $\frac{1}{2}$ cake. We said that we can cut the $\frac{1}{2}$ cake into 3 equal pieces. Each friend gets $\frac{1}{3}$ of $\frac{1}{2}$ cake. Each friend gets $\frac{1}{6}$ of the whole cake.
4. **Say:** Remember that 'of' means multiply. 'What is $\frac{1}{3}$ of $\frac{1}{2}$?' means 'What is $\frac{1}{3}$ x $\frac{1}{2}$?'
5. **Write** on the board,

$$\frac{1}{3} \text{ of } \frac{1}{2}$$
$$\downarrow$$
$$\frac{1}{3} \text{ x } \frac{1}{2}$$

6. **Ask:** Do we multiply the top numbers when we multiply fractions? Raise 1 finger if we do multiply top numbers. Raise 2 fingers if we do not multiply top numbers. (Answer: We do multiply top numbers. Pupils raise 1 finger.)
7. **Ask:** Do we multiply the denominators when we multiply fractions? Raise 1 finger if we do multiply denominators. Raise 2 fingers if we do not multiply denominators. (Answer: We do multiply denominators. Pupils raise 1 finger.)
8. **Write** on the board, '$\frac{1}{3} \times \frac{1}{2} = \frac{1 \times 1}{3 \times 2} = $'.
9. Have pupils copy and solve the problem.
10. **Ask:** What is $\frac{1}{3} \times \frac{1}{2}$? Raise your hand to answer. (Answer: $\frac{1}{6}$)

11. **Say:** $\frac{1}{6}$ is smaller than $\frac{1}{3}$. $\frac{1}{6}$ is smaller than $\frac{1}{2}$. When we multiply fractions, the answer is smaller than the fractions we multiply. Remember each of the 3 friends only got a very small piece of cake.

12. Repeat steps 8 – 10 to have pupils multiply $\frac{1}{5}$ x $\frac{1}{2}$ and $\frac{3}{4}$ x $\frac{1}{2}$. (Answers: $\frac{1}{5} \times \frac{1}{2} = \frac{1 \times 1}{5 \times 2} = \frac{1}{10}$, $\frac{3}{4} \times \frac{1}{2} = \frac{3 \times 1}{4 \times 2} = \frac{3}{8}$)

13. Help pupils identify that the answer is a smaller fraction than the fractions being multiplied.

Guided Practice *(10 minutes)*

1. Use a game to have pupils practice fraction multiplication.
   a) Divide the class into Teams A and B.
   b) Team A sits in a group on one side of the classroom, Team B sits on the other side.
   c) Write a fraction multiplication problem on the board.
   d) Ask each team to work together to come up with the answer.
   e) Choose 1 pupil from each team to come to the board and write the answer. (Choose girls and boys).
   f) Give a point to each team for each correct answer.

Example problems for game					
(Write on the board one at a time without answers)					
$\frac{2}{3}$ x $\frac{1}{5}$ =	$\frac{3}{4}$ x $\frac{1}{5}$ =	$\frac{5}{6}$ x $\frac{1}{2}$ =	$\frac{3}{5}$ x $\frac{1}{2}$ =	$\frac{5}{8}$ x $\frac{1}{3}$ =	$\frac{7}{9}$ x $\frac{1}{2}$ =
(Answer: $\frac{2}{15}$)	(Answer: $\frac{3}{20}$)	(Answer: $\frac{5}{12}$)	(Answer: $\frac{3}{10}$)	(Answer: $\frac{5}{24}$)	(Answer: $\frac{7}{18}$)

Independent Practice *(10 minutes)*

1. Have pupils copy and solve problems a. – f.
   a. $\frac{2}{5}$ x $\frac{1}{3}$ b. $\frac{3}{8}$ x $\frac{3}{5}$ c. $\frac{1}{2}$ x $\frac{1}{7}$ d. $\frac{1}{6}$ x $\frac{1}{3}$ e. $\frac{1}{9}$ x $\frac{1}{5}$ f. $\frac{3}{11}$ x $\frac{1}{5}$

2. Have pupils check their answers with a partner.

Closing *(2 minutes)*

1. Go over answers. (Answers: a. $\frac{2}{15}$, b. $\frac{9}{40}$, c. $\frac{1}{14}$, d. $\frac{1}{18}$, e. $\frac{1}{45}$, f. $\frac{3}{55}$)
2. Answer any questions pupils have.
3. **Say:** Good job today, pupils! You learned how to multiply fractions.

Lesson Title: Making up a Plan for Data Collection	**Theme:** Statistics and Probability: Data Handling: Continuous Data	
Lesson Number: M-04-141	**Class/Level:** Primary 4	**Time:** 35 minutes

Learning Outcomes: By the end of the lesson, pupils will be able to: 1. Decide on questions to ask in a survey. 2. Devise a plan for data collection for continuous data.	**Teaching Aids** None	**Preparation** 1. Write on the board questions for the Opening. 2. Draw on the board a 2-column matrix.

Opening *(3 minutes)*

1. Read with pupils the questions on the board.
   a) What is your favourite colour?
   b) How old are you?
   c) What is your favourite food?
   d) How many sisters do you have?
2. Tell pupils to turn to a partner and tell the answers to the questions.

Introduction to the New Material *(10 minutes)*

1. **Say:** We are going to be working on a big project over the next few weeks. We will ask questions to get information. We will organise the information. We will make a special presentation with the information. You will also plan how to collect and organise the answers to the questions.
2. Read with pupils the heading on the matrix.

Questions that are answered with numbers	Questions that are not answered with numbers

3. **Say:** There are different kinds of questions. Some questions have numbers as answers. Some questions have words as answers. They do not have numbers in their answers.
4. **Say:** The first question you answered today was 'What is your favourite colour?'
5. Choose a few pupils to say their favourite colours.
6. **Ask:** Do the answers have numbers in them? Raise your hand to answer. (Answer: No)
7. **Write** 'What is your favourite colour?' in the matrix under the heading 'Questions that are not answered with numbers'.
8. **Say:** The second question you answered today was 'How old are you?'
9. Choose a few pupils to say their age.
10. **Ask:** Do the answers have numbers in them? Raise your hand to answer. (Answer: Yes)
11. **Write** 'How old are you?' in the matrix under the heading 'Questions that are answered with numbers'.
12. Repeat steps 4 – 11 with the last 2 questions.

13. Revise the matrix with pupils by reading aloud the questions under each heading.

Questions that are answered with numbers	Questions that are not answered with numbers
How old are you? How many sisters do you have?	What is your favourite colour? What is your favourite food?

14. **Say:** We will use a question that has a number as an answer for our project.
15. **Say:** We are going to pretend that we are making a presentation to the Ministry of Sports. The Ministry wants information about how good Grade 4 pupils are at sports. We are going to find out by marching or by doing jumping jacks.
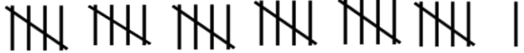16. Read with pupils the 2 questions on the board.

How many jumping jacks can you do in 1 minute?	How many steps can you march in place in 1 minute?

17. **Say:** We will decide on the question through voting. Each person gets 1 vote.
18. **Say:** I will keep track of who votes by calling your name and making tally marks. When I call your name, answer. Say 'jumping jacks' or 'march'.
19. Call the roll and have pupils vote. Example:

How many jumping jacks can you do in 1 minute?	How many steps can you march in place in 1 minute?

20. Count the tallies in 5's and 1's with pupils. The question with the most votes wins.

Guided Practise *(10 minutes)*

1. Have pupils work in their groups to plan how they will collect the information about the question. (Note to teacher: Pupils may decide on either question. The marching question is used only as an example in the lesson plan.)
2. Tell pupils their plan must include:
   a) How will they time 1 minute?
   b) How will they count the number of steps each person marches?
   c) How will they write down the steps for each person?
   d) How can they keep track of which person's steps have been counted?
3. Revise the rules for pupils to work together in groups. (Example answers: Work together nicely. Listen to one another. Help one another. Everybody helps do the work.)
4. Tell pupils there are different jobs in the group. Each day they need to decide who is doing what job.
5. Have groups begin to devise and write their plan.

Independent Practise *(10 minutes)*

1. Have pupils work in their groups to devise and write the plan.

Closing *(2 minutes)*

1. Choose 1 - 2 reporters to share their group's plan with the class.

Lesson Title: Making up a Plan for Data Collection	Theme: Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-142	Class/Level: Primary 4	Time: 35 minutes

	Learning Outcomes: By the end of the lesson, pupils will be able to: 1. Devise a plan for data collection. 2. Run a small statistical pilot study.		Teaching Aids None		Preparation Draw the sample data collection table on the board.

Note to teacher: This lesson plan uses the question about marching as an example. Either question may be used.

Opening *(3 minutes)*

1. Ask 1-2 reporters to share their groups' plan, if they did not share on Day 1.

Introduction to the New Material *(10 minutes)*

1. **Say:** Yesterday we voted. We decided to answer the question about how many steps you can march in 1 minute. You made plans in your groups about how to get that information. Today, you are going to try your plan.
2. **Say:** First you needed to decide how to time 1 minute. I am going to teach you how to count to 1 minute, as we do not have enough clocks for everyone.
3. **Ask:** How many seconds are in a minute? Raise your hand to answer. (Answer: 60)
4. **Say:** We need to count to 60 in a special way to make sure we are counting 1 minute. We need to say a word in between each number so we can count in seconds.
5. Teach pupils to count at a steady pace by saying '1 elephant, 2 elephants, 3 elephants'… and so on to '60 elephants'. If a clock is available, time the count to 1 minute.
6. **Say:** Your group needs to count 1 minute. Your group needs to count steps. How will you count both things in a way that you will not get the numbers mixed up? Talk in your groups about how you can count both things.
7. Give pupils time to talk in their groups. (2 minutes)
8. Invite pupils to share ideas with the class. (Example answers: The person counting time stands away from the person counting steps. Both people count quietly.)
9. Show pupils the sample data collection table.
10. **Say:** I am going to teach you a new word. The word is 'data.' When we answer a question with numbers, the numbers are called 'data'. Data means the numbers we use to answer the question.
11. Have pupils say 'data is the numbers' 3 times.
12. **Say:** I am going to show you 1 plan to collect the data.

Number of steps in 1 minute		
Name	Tally	Count

13. Have 5 pupils come to the front of the class.
    a) 1 pupil marches
    b) 1 pupil counts off 1 minute
    c) 1 pupil counts off the steps
    d) 1 pupil writes the tally marks
    e) 1 person counts the tallies and write the number
14. Show pupils how to fill in the data table for 1 pupil.
15. Have a second pupil march.
16. Use question and answer to have pupils help fill in the data for the second pupil.
17. Tell pupils they are going to test out their own plans in their groups.

Guided Practice *(10 minutes)*

1. Have pupils work in their groups to make a data table.
2. Remind pupils the data table must have:
    a) A title
    b) A column for pupil names
    c) A column for tallies
    d) A column for numbers
3. Review the rules for pupils to work together in groups. (Example answers: Work together nicely. Listen to one another. Help one another. Everybody helps do the work.)
4. Tell pupils that there are different jobs in the group. Each day they need to decide who is doing what job.
5. Tell pupils that today each pupil must do each job one time.
    a) Each pupil marches 1 time. They write their own name in the data table.
    b) 1 pupil counts off 1 minute.
    c) 1 pupil counts off the steps.
    d) 1 pupil writes the tally marks.
    e) 1 person counts the tallies and write the number.

Independent Practice *(10 minutes)*

1. Have pupils stop marching.
2. Tell pupils to talk about any changes they need to make to their plan.
3. Say: For example, you might need to have a different person count the minute or count the steps. You might need to have them stand farther apart or not make any sound while they count.

Closing *(2 minutes)*

1. Choose 1 - 2 pupils to talk about what changes their group is making to their plan.

Lesson Title: Putting the Data Collection Plan into Action	**Theme:** Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-143	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes: By the end of this lesson, pupils will be able to: 1. Put a data collection plan into action. 2. Organise and work in a team as data collectors.		**Teaching Aids** None		**Preparation** Gather for each group of 5 pupils 1 piece of A4 paper, or have pupils carefully rip 1 page out of 1 exercise book for their group.

Note to teacher: This lesson plan uses the question about marching as an example. Either question may be used.

Opening *(3 minutes)*

1. Ask 1-2 groups to share the data they collected in their small groups about the number of steps.

Introduction to the New Material *(10 minutes)*

1. **Say:** Each small group has collected data about the number of steps you each marched in one minute. Today we need to devise a way for groups to share data with one another.
2. **Say:** Each group needs 20 pieces of data to make their presentation to the Ministry.
3. **Ask:** How many pieces of data does each group have? Raise your hand to answer. (Answer: 5)
4. **Ask:** How many groups will need to share data so everyone has 20 pieces of data? Raise your hand to answer. (Answer: 4 groups will need to share.)
5. **Ask:** What do you need to write the data from other groups? Raise your hand to answer. (Answer: A data table)
6. **Ask:** Do you need to do the marching and counting again? Raise your hand to answer. (Answer: No)
7. **Ask:** What ideas do you have for ways you can share data with other groups? Talk with your group about ideas.
8. Give pupils 2 -3 minutes to talk in their groups about ways to share data.
9. Choose pupils to share their ideas.
10. As a class, decide on 1 way to share data. (Example answer: The 4 groups sit near one another. Each group passes their data table to the next group. The next group copies it. Pupils keep passing and copying data tables until all 4 groups have all 4 data tables.)

Guided Practice *(10 minutes)*

1. Have pupils work in their groups to make 3 more data tables.
2. Assign 4 groups to work together.
3. Review the rules for pupils to work together in groups. (Example answers: Work together nicely. Listen to one another. Help one another. Everybody helps do the work.)
4. Tell pupils that there are different jobs in the group. Each day they need to decide who is doing what job.

5. Tell pupils that today, pupils will work together to copy the data tables.
   a) All pupils are writers. They take turns writing the names, tallies and numbers from the other groups' data tables.
   b) All pupils are checkers. They check to ensure the names and numbers are copied correctly.
   c) 1 pupil is the passer. He or she passes the data table to the next group.

Independent Practice *(10 minutes)*

1. Pupils continue to pass and copy data tables.

Closing *(2 minutes)*

1. Have groups working together check to ensure they all have the same data.

Lesson Title: Devising a Plan for Writing a Report to the Minister with the Survey Findings	Theme: Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-144	Class/Level: Primary 4	Time: 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to plan for writing a statistical report, including how to represent the data using a histogram.		Teaching Aids None		Preparation 1. Write on the board the 4 example data tables. 2. Write on the board the two-column matrix. 3. Draw on the board the histogram.

Opening *(3 minutes)*

1. Show pupils the example data tables.

Steps in 1 minute	
Name	Count
Fatu	81
Foday	84
Maria	80
Omar	81
Kossi	81

Steps in 1 minute	
Name	Count
Mohammed	82
Hassan	81
Lucy	84
Aminata	83
Marie	80

Steps in 1 minute	
Name	Count
Ishmael	86
Fatmata	81
Joseph	83
Favour	83
Ibrahim	81

Steps in 1 minute	
Name	Count
Yabu	80
Kumba	79
Sahr	82
Abimbola	83
Isatu	85

2. **Say:** These tables show the number of steps pupils in another class marched. Look at all the numbers.
3. **Ask:** What is the smallest number on all 4 data tables? Raise your hand to answer. (Answer: 79)
4. **Ask:** What is the largest number on all 4 data tables? Raise your hand to answer. (Answer: 85)
5. **Ask:** How many pupils are there in all? Raise your hand to answer. (Answer: 20)
6. **Ask:** How many pupils marched 81 steps in 1 minute? Raise your hand to answer. (Answer: 7)
7. **Ask:** How many pupils marched 82 steps in 1 minute? Raise your hand to answer. (Answer: 2)
8. **Ask:** How many pupils marched 80 steps in 1 minute? Raise your hand to answer. (Answer: 1)

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will start to create a report with your data. You will organise the number of steps from all 4 data tables. You will put all the data in 1 new table.
2. Show pupils the 2-column matrix.

Steps in 1 minute	How many people

3. **Say:** This is called a 'frequency table'. It tells how many people marched each number of steps.
4. **Say:** We are going to put our numbers into 'intervals to make a 'frequency table'. We will make the intervals with 2 numbers of steps at a time.
5. **Say:** I write the smallest 2 numbers of steps first. The smallest number is 79.
6. **Ask:** What is the next biggest number of steps? Raise your hand to answer. (Answer: 80)

7. **Ask:** How many pupils marched 79 steps? Raise your hand to answer. (Answer: 1)
8. **Ask:** How many pupils marched 80 steps? Raise your hand to answer. (Answer: 3)
9. **Write** in the table:

Steps in 1 minute	How many people
79 -80	4

10. **Say:** Now I write the next 2 biggest numbers of steps. I count how many pupils walked those numbers of steps.
11. Continue to use question and answer to complete the frequency table.

Steps in 1 minute	How many people
79 -80	4
81 -82	8
83-84	6
85-86	2

12. Show pupils how to make a histogram from the frequency table.
    a) Write the number of steps along the bottom of the histogram.
    b) Write 'Number of Steps'.
    c) Write the number of pupils going up the left side of the histogram.
    d) Write 'Number of Pupils'.
    e) Draw rectangles to show how many pupils.
    f) The rectangles must touch one another.
    g) Write 'Steps Pupils March in 1 Minute' as the title.
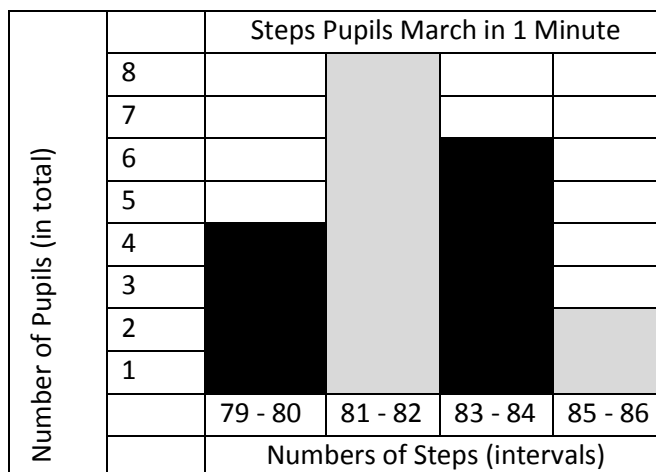
13. Leave the histogram and frequency table on the board for pupil to look at during Guided and Independent Practice.

Guided Practice *(10 minutes)*

1. Have pupils work in their groups to make a frequency table with their own data tables from Lesson 143.

Independent Practice *(10 minutes)*

1. Have pupils work in their groups to make a histogram with their data.

Closing *(2 minutes)*

1. Choose pupils to share 1 interesting thing about their data.

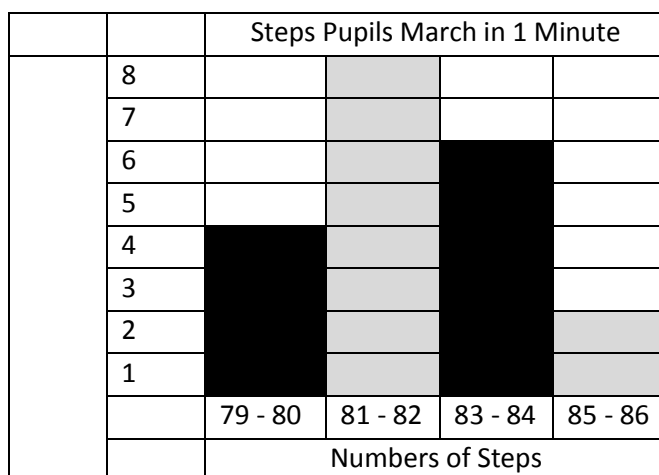| **Lesson Title:** Devising a Plan for Writing a Report to the Minister with the Survey Findings	**Theme:** Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-145	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to plan for writing a statistical report, including how to represent the data.		**Teaching Aids** None		**Preparation** 1. Write on the board the histogram from Lesson 144. 2. Write on the board the 4 questions.

Opening *(3 minutes)*

1. Choose pupils to share 1 interesting thing about their data.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will decide what goes into the report for your data. Remember, the report is for the Ministry, so it must have all the important information.
2. **Say:** The Ministry wants to know how well fourth graders will do with sports. Pupils who can march a lot may do well with sports.
3. Show pupils the histogram on the board.

		Steps Pupils March in 1 Minute			
	8				
	7				
	6			■	
	5			■	
	4	■		■	
	3	■		■	
	2	■		■	▨
	1	■		■	▨
		79 - 80	81 - 82	83 - 84	85 - 86
		Numbers of Steps			

4. **Ask:** How do you find the numbers of steps with the most people on the histogram? Raise your hand to answer. (Answer: The tallest bar is the most people.)
5. **Ask:** How do you find the numbers of steps with the least people? Raise your hand to answer. (Answer: The shortest bar is the least people.)
6. **Say:** Each report to the Ministry needs to have a very neatly drawn histogram. It also needs to tell the Ministry important information from the histogram.
7. Read with pupils the 4 questions written on the board:
    a) What is the smallest number of steps? Raise your hand to answer. (Answer: 79)
    b) What is the largest number of steps? Raise your hand to answer. (Answer: 86)
    c) What is the difference between the largest number of steps and the smallest number of steps? Raise your hand to answer. (Answer: 85 − 79 = 6; the difference is 6 steps.)

d) Which numbers of steps has the most people? Raise your hand to answer. (Answer: 81-82 steps)

8. Use the example histogram to help pupils answer the questions.
9. **Say:** The answers to these questions tell some of the important information in the histogram.
10. **Ask:** What other important information can you find in the histogram? Raise your hand to answer. (Example answers: 4 people marched less than 81 steps; 8 people marched 81 or 82 steps; most people marched less than 81 steps.)

Guided Practice *(10 minutes)*

1. Tell pupils to work in their groups to plan the information they will include in their report to the Ministry.
2. Tell pupils that their report must have:
   a) Their histogram;
   b) The answers to the 4 questions on the board; and
   c) Other important information from the histogram.
3. Tell pupils to work in their groups to write the answers to the 4 questions about their data.
4. Tell pupils to decide with their group what other important information they want to put in their report.

Independent Practice *(10 minutes)*

1. Have pupils continue to work on the tasks from Guided Practice.
2. Ask pupils to share with the class what important data their group decided to include.

Closing *(2 minutes)*

1. Ask pupils to bring in a large piece of cardboard from a box for their group. Tell pupils their group will use the cardboard to make a poster for their report.

Lesson Title: Writing the Report to the Minister with the Survey Findings	**Theme:** Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-146	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to: 1. Write a statistical report. Represent data using bar charts. 2. Work out the median and put it in context.		**Teaching Aids** Report Poster		**Preparation** 1. Make a poster on cardboard or a poster sheet to show pupils an example report. 2. Gather crayons, coloured pencils or markers for each group, if possible.

Opening *(3 minutes)*

1. Show pupils the example report.
2. Ask pupils to talk in their groups about what information they see in the report.

Report for the Ministry

Names:

Question: How many steps can pupils march in 1 minute?

We counted the steps for 20 fourth grade pupils.

		Steps Pupils March in 1 Minute			
	8				
	7				
	6				
	5				
	4				
	3				
	2				
	1				
		79 - 80	81 - 82	83 - 84	85 - 86
		Numbers of Steps			

We found:

The least steps is 79.

The most steps is 85.

The difference between least steps and most steps is 6 steps.

The middle number of steps pupils marched: _____

Other important information:

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will start to write your report. You will make a poster on cardboard.
2. Guide pupils to use the example report to name the parts of the report.
3. List on the board the parts of the report as the pupils name them:

a) Names of group members
b) Title
c) Question
d) Number of fourth graders
e) Histogram
f) Least steps
g) Most steps
h) Difference in steps
i) The middle number of steps pupils marched.
j) Other important information

4. **Say:** The report is missing the middle number of steps. We will find that together.
5. **Ask:** How many pupils in all? Raise your hand to answer. (Answer: 20 pupils)
6. **Ask:** What number is half of 20? Raise your hand to answer. (Answer: 10)
7. **Say:** There are 3 steps to find the middle number of steps with 20 pupils:

   a) Find the rectangle with the tenth pupil.
   b) Find the rectangle with the eleventh number.
   c) Find the middle number of steps between them.
8. **Say:** 4 pupils marched between 79 and 80 steps. 8 pupils marched between 81 and 82 steps. 4 + 8 = 12.
9. **Ask:** What rectangle has the tenth and eleventh pupil? Raise your hand to answer. (Answer: 81 - 82)
10. **Write** on the board: 81 __ 82
11. **Ask:** What is the middle number between 81 and 82? Raise your hand to answer. (Answer: $81\frac{1}{2}$ or 81.5)
12. **Write** on the example poster: The middle number of steps pupils marched: 81.5

Guided Practice *(10 minutes)*

1. Review with pupils what information they need to put in their reports.
2. Answer any questions pupils have.
3. Remind pupils to make their reports neat and attractive. (Give them crayons and markers if these are available.)
4. Remind pupils that each person in the group must help with the report. Talk about helping one another and taking turns writing and drawing.
5. Give pupils time to begin their reports.

Independent Practice *(10 minutes)*

1. Have pupils continue to write their reports.

Closing *(2 minutes)*

1. Collect the posters and supplies to keep them safe.

Lesson Title: Writing the Report to the Minister with the Survey Findings	**Theme:** Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-147	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to: 1. Write a statistical report. 2. Represent data using bar charts. 3. Work out the median and put it in context.		**Teaching Aids** Example report poster		**Preparation** Gather crayons, coloured pencils or markers for each group, if possible.

Opening *(3 minutes)*

1. Hand back the posters to groups of pupils.
2. Ask pupils about any questions they have about how to complete the report.

Report for the Ministry

Question: How many steps can pupils march in 1 minute?

We counted the steps for 20 fourth grade pupils.

Names:

		Steps Pupils March in 1 Minute			
	8				
	7				
	6				
	5				
	4				
	3				
	2				
	1				
		79 - 80	81 - 82	83 - 84	85 - 86
		Numbers of Steps			

We found:

The least steps is 79.

The most steps is 85.

The difference between least steps and most steps is 6 steps.

The middle number of steps pupils marched: 81.5

Other important information:

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will finish your reports on your posters. Tomorrow, you will present your reports. We will pretend the class is the Ministry.
2. Review the parts of the report with pupils:
   a) Names of group members
   b) Title
   c) Question

d) Number of fourth graders

e) Histogram

f) Least steps

g) Most steps

h) Difference in steps

i) The middle number of steps pupils marched.

j) Other important information

3. Ask pupils to check their report for all the parts.

4. Review with pupils how to find the middle number of steps with 20 pupils on a histogram.

5. **Say:** There are 3 steps to find the middle number of steps with 20 pupils:

a) Find the rectangle with the tenth pupil.

b) Find the rectangle with the eleventh number.

c) Find the middle number of steps between them.

6. **Say:** 4 pupils marched between 79 and 80 steps. 8 pupils marched between 81 and 82 steps. 4 + 8 = 12.

7. **Ask:** What rectangle has the tenth and eleventh pupil? Raise your hand to answer. (Answer: 81 - 82)

8. **Write** on the board: 81 __ 82

9. **Ask:** What is the middle number between 81 and 82? Raise your hand to answer. (Answer: $81\frac{1}{2}$ or 81.5)

Guided Practice *(10 minutes)*

1. Remind pupils that their group decided what other important information to put in the report in Lesson 145. Tell pupils to include this information in their report.

2. Remind pupils to make their reports neat and attractive. (Give them crayons and markers if these are available.)

3. Tell pupils to finish their reports in their groups.

Independent Practice *(10 minutes)*

1. Some pupils may still need to finish their reports.

2. Once they are finished, have groups decide on 3 pieces of information they want to present to the class from their report.

3. Read with pupils the rules for presenting tomorrow:

a) Stand and show your poster to the class.

b) Each group member says his or her own name.

c) 2 pupils from the group hold the poster up.

d) 3 pupils from the group give the report. Each pupil tells 1 sentence about an important or interesting thing from the report. Talk loud enough for the class to hear.

e) Both girls and boys must give the report.

f) The class listens nicely. The class claps at the ends of each report.

Closing *(2 minutes)*

1. Collect the posters and supplies to keep them safe.

Lesson Title: Presenting a Statistical Report	**Theme:** Statistics and Probability	
	Data Handling: Continuous Data	
Lesson Number: M-04-148	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes		**Teaching Aids**		**Preparation**
	By the end of the lesson, pupils will be able to present a statistical report.		Rules for presenting		1. Decide which groups will present first. 2. List on the board the rules for presenting. 3. Ensure there is space for pupils to stand to present.

Opening *(3 minutes)*

1. Hand back the posters to groups of pupils.
2. Ask pupils to check their report to make sure it is complete.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will present your reports on your posters. We will pretend the class is the Ministry.
2. **Say:** You will not present your whole report. Your group will decide on 3 interesting or important things to present from your report.
3. Read with pupils the rules for presenting:
   a) Stand and show your poster to the class.
   b) Each group member says his or her own name.
   c) 2 pupils from the group hold the poster up.
   d) 3 pupils from the group give the report. Each pupil tells 1 sentence about an important or interesting thing from the report. Talk loud enough for the class to hear.
   e) Both girls and boys must give the report.
   f) The class listens nicely. The class claps at the ends of each report.
4. **Say:** Your group can decide what 3 things you want to present. Each group may have different things they present. You may only say 1 sentence about each thing. Each group will only have 2 or 3 minutes to present.
5. Ask if pupils have any questions.
6. Give pupils time to practise presenting their report.

Guided Practice *(10 minutes)*

1. Remind pupils to listen quietly to others.
2. Tell pupils to clap at the end of each group presenting.
3. Choose 6 or 7 groups to present their reports. Give each group about 2 or 3 minutes to present. The 6 presentations will take the rest of the lesson time.
4. Call on each group to present in turn.

Independent Practice *(10 minutes)*

1. Pupils continue to present reports.

Closing *(2 minutes)*

1. Collect the posters and supplies to keep them safe.

Lesson Title: Presenting a Statistical Report	**Theme:** Statistics and Probability Data Handling: Continuous Data	
Lesson Number: M-04-149	**Class/Level:** Primary 4	**Time:** 35 minutes

	Learning Outcomes By the end of the lesson, pupils will be able to present a statistical report.		**Teaching Aids** None		**Preparation** 1. Decide which groups will present first. 2. List on the board the rules for presenting. 3. Ensure there is space for pupils to stand to present.

Opening *(3 minutes)*

1. Hand back the posters to groups of pupils.

Introduction to the New Material *(10 minutes)*

1. **Say:** Today you will present your reports on your posters.
2. Review with pupils the rules for presenting:
   a) Stand and show your poster to the class.
   b) Each group member says his or her own name.
   c) 2 pupils from the group hold the poster up.
   d) 3 pupils from the group give the report. Each pupil tells 1 sentence about an important or interesting thing from the report. Talk loud enough for the class to hear.
   e) Both girls and boys must give the report.
   f) The class listens nicely. The class claps at the ends of each report.
3. Call on the rest of the groups in the class to present in turn. Give each group about 2 – 3 minutes to present.

Guided Practice *(Answer: 10 minutes)*

1. Pupils continue to present reports.

Independent Practice *(10 minutes)*

1. Pupils continue to present reports.

Closing *(2 minutes)*

1. Collect the posters. Hang them around the room.

Lesson Title: Word Problems Involving Statistics	**Theme:** Statistics and Probability
	Data Handling: Continuous Data
Lesson Number: M-04-150	**Class/Level:** Primary 4 **Time:** 35 minutes

	Learning Outcomes		**Teaching Aids**		**Preparation**
	By the end of the lesson, pupils will be able to solve 2-step word problems involving statistics.		None		1. Write on the board the word problems. 2. Draw on the board the bar graph.

Opening *(3 minutes)*

1. Show pupils the bar graph.
2. Tell them to tell a partner what information the bar graph shows.
3. **Ask:** What do the bottom numbers show? Raise your hand to answer. (Answer: the number of sisters)
4. **Ask:** What do the numbers going up the side show? Raise your hand to answer. (Answer: how many pupils have each number of sisters)
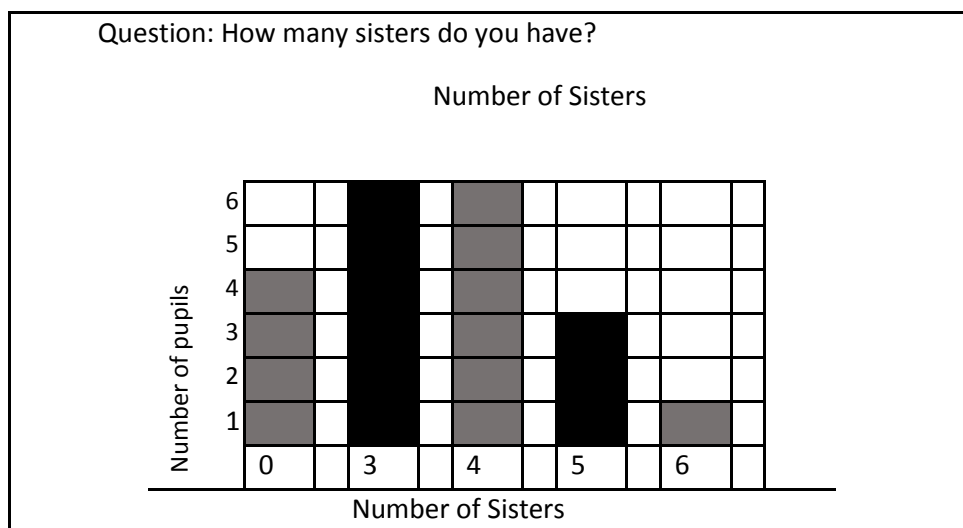
Introduction to the New Material *(10 minutes)*

1. **Say:** Today we will learn to use a bar graph to solve word problems.
2. **Say:** A group of pupils made this graph. The graph shows how many sisters each pupil has. You will use this information to solve some word problems.
3. Read with pupils the word problems on the board.
   a) How many pupils does the graph show in all?
      Answer: The graph shows_____
   b) How many pupils do not have sisters?
      Answer: _____ pupils do not have sisters.
   c) How many pupils have 3 sisters? How many sisters do they have in all?
      Answer: _____ pupils have 3 sisters. They have _____ sisters in all.
   d) How many pupils have 4 sisters? How many sisters do they have in all?

e) How many pupils have 5 sisters? How many sisters do they have in all?

f) How many pupils have 6 sisters? How many sisters do they have in all?

g) How many sisters does the graph show in all?

4. For each question:
   a) First, have pupils think.
   b) Then, have pupils turn and tell a partner the answer.
   c) Last, choose 1 or 2 pupils to share their ideas with the class.

5. **Ask:** How do we find how many pupils the graph shows in all? Raise your hand to answer. (Answer: Count how tall each bar is. Add the bars together.)

6. **Ask:** How do we find how many pupils do not have sisters? Raise your hand to answer. (Answer: Count the number of pupils in the 0 bar.)

7. **Ask:** How do we find how many pupils have 3 sisters? Raise your hand to answer. (Answer: Count the number of pupils in the 3 bar.)

8. **Ask:** How do we find how many sisters those pupils have in all? Raise your hand to answer. (Answer: Multiply the number of pupils by 3.)

9. **Ask:** How do we find how many pupils have 4 sisters? Raise your hand to answer. (Answer: Count the number of pupils in the 4 bar.)

10. **Ask:** How do we find how many sisters those pupils have in all? Raise your hand to answer. (Answer: Multiply the number of pupils by 4.)

11. **Ask:** How do we find how many sisters the graph shows in all? Raise your hand to answer. (Answer: Add the numbers of sisters together.)

Guided Practice *(10 minutes)*

1. Have pupils solve problems a., b. and c. in their exercise books.
2. Tell pupils to copy and complete the sentences to answer each question.
3. Go over answers. Show how to use the graph to get each answer. (Answers: **a.** The graph shows 20 pupils in all. **b.** 4 pupils do not have sisters. **c.** 6 pupils have 3 sisters. 6 x 3 = 18. They have 18 sisters in all.)

Independent Practice *(10 minutes)*

1. Have pupils solve problems d., e., f. and g. Remind pupils to answer the questions in sentences.
2. Go over answers. (Answers: **d.** 6 pupils have 4 sisters; 6 x 4 = 24; they have 24 sisters in all. **e.** 3 pupils have 5 sisters; 3 x 5= 15; they have 15 sisters in all. **f.** 1 pupil has 6 sisters; the pupil has 6 sisters in all. **g.** 18 + 24 + 15 + 6 = 63; the pupils have 63 sisters in all.)

Closing *(2 minutes)*

1. Continue to go over answers.
2. **Say:** Good job today, pupils! You used a bar graph to solve one and two step word problems.

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