



THE PRESIDENT'S
RECOVERY
PRIORITIES

Education

Ministry of
Education,
Science and
Technology

Lesson plans for
PRIMARY
Mathematics

5
CLASS

2
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.

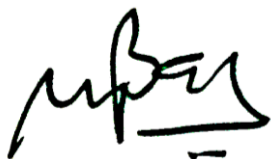
It is now time to build on this success. I am pleased to issue new lesson plans across all primary and JSS school grades in Language Arts and Mathematics. These plans give teachers the support they need to cover each element of the national curriculum. In total, we are producing 2,700 lesson plans – 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 pupils 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: Planning for Data Collection | Theme: Data Handling | |
| Lesson Number: M-05-61 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|---|
|  <p>Learning Outcomes By the end of the lesson pupils will be able to:</p> <ol style="list-style-type: none"> 1. Decide on questions to ask in a survey. 2. Devise a plan for data collection. |  <p>Teaching Aids None</p> |  <p>Preparation</p> <ol style="list-style-type: none"> 1. Define key vocabulary: survey, data, plan. (See below for definitions to key vocabulary.) 2. Draw or copy the sample survey on the board. |
|--|--|---|

Opening (3 minutes)

1. Write: 'Survey' on the board.
2. **Ask:** What do you think this word means? Raise your hand to answer.
(Example answers: a questionnaire, a set of questions for getting information or data from people, a form)
3. Write and **say:** How many siblings do you have? How many brothers and how many sisters?
1: _____ 2: _____ 3: _____ 4: _____ More than 4: _____
4. **Say:** I want to get information about the number of siblings you have so I will survey the room. Who has only one sibling? Two siblings? Three siblings? Four siblings? More than four siblings?
5. As pupils raise their hands, count them and write the tally on the line.
6. **Ask:** Why use surveys? Raise your hand to answer. (Example answers: to get information about a topic or person; to ask as many people as possible; to get opinions)
7. **Say:** This is a simple survey but helps to show how you ask questions and how you collect your data.
8. **Say:** Today you will learn how to create a survey and how to collect data.

Introduction to the New Material (5 minutes)

1. **Say:** Work in pairs to write down the kind of information you can collect from people.
(Example answers: number of siblings, favourite game, food they eat, age, hobbies)
2. Give pupils 2 minutes to write down their ideas and then invite them to share. Write some ideas on the board.
3. **Ask:** Have you collected information or data before? How? Raise your hand to answer.
(Example answers: asking questions, observing, reading)
4. **Say:** We collect data everyday when we ask questions and find answers to them. However, we are going to do a larger survey and find some information about the whole class so we can draw conclusions about the data later in the unit.
5. **Say:** You will collect information from your classmates about how they travel to school by designing a survey and taking time to gather your data.

Guided Practice (8 minutes)

1. **Say:** Here is an example of a survey.
2. Write:

Pupils' Favourite Subjects

- What is your gender? Male Female
 - How old are you?.....
 - What is your class?.....
 - What is your favourite subject?.....
 - Why do you like this subject?.....
 - How often do you learn this subject?.....
 - What work do you want to do in future?.....
3. **Say:** Complete the survey with your partner. Add two questions to the survey and explain why you added them.
 4. **Say:** Another word for 'survey' is 'questionnaire'. **Say** and then write 'questionnaire' in your books.

Independent Practice (14 minutes)

1. **Say:** Now you have taken a survey. Next you will make a survey to use for getting information from your peers.
2. **Say:** With your partner, write a survey. For the survey, make questions to collect data about how your fellow pupils travel to school each morning.
3. **Say:** Use at least 5 questions in your survey. Explain the reason to ask each question. A few possible questions could be: a) time it takes to get to school, b) the route they take to school, c) distance travelled to get to school, d) type of transportation they use or e) how many stops they make.
4. Give pupils 10 minutes to create their survey questions.
5. **Say:** Say your survey questions to each other.
6. **Say:** In the next lesson, you will test, or 'pilot', your survey questions with at least ten pupils. You will pilot your survey to check if your questions work well.
7. **Say:** Next lesson, be ready to answer survey questions yourself.

Closing (5 minutes)

1. **Ask:** Why is it important to collect this kind of data? Raise your hand to answer. (Example answers: to gather information, to learn about your fellow pupils, to learn about your community)
3. **Say:** You can record data using tally marks and tables. It will keep your data organised.
4. **Say** and write: Here is a way to record data. Use tally marks and a table.

| Survey Item | Tally | Total Number of Pupils |
|-------------|-------|------------------------|
| Male | ### / | 6 |
| Female | /// | 3 |
| Class 5 | ## | 5 |
| Class 6 | //// | 4 |




5. **Say:** You tally when you are counting the number of people who have that response. For example, when I counted the amount of pupils who had more than four siblings. It helps you gather your data quickly and efficiently.

6. **Ask:** How will you and your partner record your survey results? You should think about this while you create your questions.
7. **Say:** Good job today! You learned how to collect data and create a pilot survey.

Key word definitions:

- Survey: a set of questions for getting information or data from people
- Tally: a mark that you make that when you count your data as you collect it
- Questionnaire: another way to say survey, a set of questions on a form

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Making a Plan for Data Collection and Piloting | Theme: Data Handling | |
| Lesson Number: M-05-62 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to:</p> <ol style="list-style-type: none"> 1. Devise a plan for data collection. 2. Run a small pilot study. |  <p>Teaching Aids None</p> |  <p>Preparation None</p> |
|--|--|--|

Opening (3 minutes)

1. **Ask:** What are two reasons it is important to collect data? Write them down. Raise your hand to answer. (Possible answers: to gather information; to understand people)
2. **Ask:** What kind of data did we collect in the last lesson? Raise your hand to answer. (Possible answers: age; number of siblings; travel time to school; interests; hobbies)
3. **Ask:** How can we record the data we collect? Raise your hand to answer. (Possible answers: chart; table)
4. **Say:** Today you will run a small pilot study using the survey questions you created in the last lesson.

Introduction to the New Material (5 minutes)

1. Write: 'Pilot' on the board.
2. **Ask:** What does 'pilot' your survey mean? Talk with your partner. Raise your hand to answer. (Example answers: testing it, trying it)
3. **Ask:** Why pilot our survey? Raise your hand to answer. (Example answers: to see if people understand the questions; to see if it can help us collect the kind of data we wish to collect)
4. **Say:** Work with your partner to improve the questions on your survey. Will you add or take away questions? Will you change the words in the questions to make it easier to understand?
5. **Say:** Exchange your survey with another partnership's survey. Can you learn a way to improve your own survey from it?
6. Take 1 minute to discuss with your partner.
7. **Say:** Plan to pilot your survey. Think about which 5 pupils will you ask for your pilot and how will you ask them.

Guided Practice (8 minutes)

1. Allow pupils 1 minute to finalize their surveys and make any changes.
2. Walk around the room and provide some feedback to the groups about their questions. (Example answers: is that a good question; can you be more precise; what are you asking)
3. **Say:** Work in pairs to think of other questions from your peers to add or change.
4. **Say:** Write a short plan of how they you will pilot your survey. For example, who you will ask, how long you will take with each person, who will ask and who will record the data?

5. **Say:** Write the final version of your questionnaire.




Independent Practice (15 minutes)

1. **Say:** Make sure you know your survey duty. Who will ask the questions? Who will record the information?
2. **Ask** pupils to work with their partners to pilot their questionnaires with at least five pupils.
3. **Say:** Write the answers to your survey in a table. Remember the sample data table and tally chart from the previous lesson.
4. **Ask:** What challenges did you face in the pilot? Raise your hand to answer.
(Possible answers: it was loud; it was hard to find 5 pupils to ask, my questions needed to be shorter/better/more thorough)

Closing (4 minutes)

1. **Ask:** Invite one member of two groups tell the class how the group piloted their survey? What went well? What didn't go well? Answers will vary.
2. **Say:** Take 2 minutes to make changes to your survey with your partner.

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Putting the Data Collection Plan into Action | Theme: Data Handling | |
| Lesson Number: M-05-63 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to:</p> <ol style="list-style-type: none"> 1. Put a data collection plan into action. 2. Organise and work in a team as data collectors. |  <p>Teaching Aids None</p> |  <p>Preparation None</p> |
|--|--|--|

Opening (3 minutes)

1. **Ask:** What are ways to collect data? Raise your hand to answer.
(Example answers: asking questions, questionnaire, observation, interviewing)
2. **Say:** In your exercise books, list two reasons why you chose your method of collecting data when you ran your pilot in the last lesson.
(Example answers: tally, table, ask questions, fill out 10 forms)
3. **Say:** List two challenges you had when designing your survey for your pilot.
(Example answers: the answers were hard to think of, the questions were hard/easy, we needed more questions, the environment was loud or crowded)
4. **Say:** Today you will learn how to put your data plan into action and be data collectors.

Introduction to the New Material (5 minutes)

1. Write: 'Data collectors' on the board.
2. **Say:** Work with your partner to explain the word 'data collectors'.
(Answer: teams or partners who work together to make surveys, ask questions and gather information from these questions and surveys)
3. **Ask:** Why is it better to work together in collecting data? Raise your hand to answer.
4. (Example answers: for faster and easier completion, teamwork helps correct mistakes, you can ask more people and get better data)

Guided Practice (10 minutes)

1. **Say:** We will now join groups together to make them bigger. Each team is currently two people and we will join 2 groups together to form teams of 4.
2. Give pupils 2 minutes to pick another team to join.
3. **Say:** Choose 1 of the 2 surveys to use. Make any final changes to it. You might want to combine them with the best questions that gathered the most data.
4. Give pupils 6 minutes to write down at least seven questions that they want to ask from their surveys.
5. Walk around the room. Discuss answers with pupils and assist when groups need help.




Independent Practice (12 minutes)

1. **Ask:** How do you plan to collect your data now that you have a larger group of people to survey? Raise your hand to answer.
(Example answers: survey, observation, interview dates and times, making a form to collect)
2. Give pupils 5 minutes to finalise their surveys and practice asking and answering their finalised questions.
3. **Ask:** From whom will you collect the data? Choose at least 20 pupils from different classes.
4. Assign duties for this project based on the roles from your pilot. For example, those who will ask the questions, those who will record the responses, those who will organise the data, those who will start to analyse the data.
5. Groups should show you their finalised surveys and data collection plans before leaving the lesson.
6. Walk around the room. Discuss answers with pupils and assist when groups need help.

Closing (5 minutes)

1. **Ask:** Do you think there will be any problems in the data collection? Raise your hand to answer.
(Example answers: finding people to survey, recording data well, getting enough information)
2. **Say:** Take 3 minutes to start collecting data. You will complete this for homework and bring your collected data to the next lesson.
3. **Say:** Good job today pupils! You worked well with another group to create a data collection plan for your survey!

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Calculating the Mean of Data | Theme: Data Handling | |
| Lesson Number: M-05-64 | Class/Level: Class 5 | Time: 35 minutes |

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|---|--|---|------------------------------|---|--|
|  | Learning Outcomes By the end of the lesson, pupils will be able to calculate the mean of data. |  | Teaching Aids None |  | Preparation Define key vocabulary: mean, sum. (See below for definitions to key vocabulary.) |
|---|--|---|------------------------------|---|--|

Opening (3 minutes)

- Say:** Work individually to add the following numbers:
 - 2, 5, 3, 2 and 4 (Answer: 16)
 - 10, 2, 5, 6, and 2 (Answer: 35)
 - 5, 20, 3, 4, 6, 2, and 9 (Answer: 49)
- Say:** Work in pairs to write the ages of your brothers and sisters. Add their ages and keep this for the lesson later.
- Say:** Today you will learn how to calculate the mean of data.

Introduction to the New Material (5 minutes)

- Write 'mean' on the board.
- Say:** Mean is another name for the average of a data set. It is a number that helps you understand the central value of a number.
- Say:** To find the mean, add the numbers, then divide by how many numbers there are.
- Say:** Let's look at the sum of the ages you calculated in the opening.
- Write and **say:**

Sibling 1: 12 years old
 Sibling 2: 16 years old
 Sibling 3: 5 years old
 Add the ages together: $12 + 16 + 5 = 33$ years total
 Divide by the number of siblings: $33 \div 3 = 11$ years average
- Say:** You can find the mean of the data you have collected from your surveys you are taking using this calculation process.

Guided Practice (8 minutes)

- Write: Calculate the mean for the following data sets:
 - 2, 5, 3, 2 and 3 (Answer: $2 + 5 + 3 + 2 + 3 = 15$; $15 \div 5 = 3$)
 - 10, 2, 5, 6, and 2 (Answer: $10 + 2 + 5 + 6 + 2 = 25$; $25 \div 5 = 5$)
 - 5, 20, 3, 4, 6, 2, and 9 (Answer: $5 + 20 + 3 + 4 + 6 + 2 + 9 = 49$; $49 \div 7 = 7$)
 - 9, 0, 4, and 7 (Answer: $9 + 0 + 4 + 7 = 20$; $20 \div 4 = 5$)
- Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice (14 minutes)

- Write: Find the mean of the following data sets:
 - 7, 2, 6, 9 (Answer: $7 + 2 + 6 + 9 = 24 \div 4 = 6$)
 - 2, 5, 1, 4 (Answer: $2 + 5 + 1 + 4 = 12 \div 4 = 3$)
 - 7, 9, 4, 8 (Answer: $7 + 9 + 4 + 8 = 28 \div 4 = 7$)
 - 92 cm, 81 cm, 78 cm, 91 cm, 88 cm (Answer: $92 \text{ cm} + 81 \text{ cm} + 78 \text{ cm} + 91 \text{ cm} + 88 \text{ cm} = 430 \div 5 = 86 \text{ cm}$)
 - 89 in, 93 in, 85 in (Answer: $89 \text{ in} + 93 \text{ in} + 85 \text{ in} = 267 \text{ in} \div 3 = 89 \text{ in}$)
 - 76 g, 71 g, 66 g, 79 g (Answer: $76 \text{ g} + 71 \text{ g} + 66 \text{ g} + 79 \text{ g} = 292 \div 4 = 73 \text{ g}$)
- Have pupils to exchange their books and check their work while you read the answers aloud.




Closing (5 minutes)

- Invite pupils to the board to find the mean of the following data sets:
 - 9, 5, 8, 6 (Answer: $9 + 5 + 8 + 6 = 28 / 4 = 7$)
 - 49 min, 67 min, 64 min (Answer: $49 \text{ min} + 67 \text{ min} + 64 \text{ min} = 180 \text{ min} / 3 = 60 \text{ min}$)
 - 5 hr, 14 hr, 9 hr, 12 hr, 5 hr (Answer: $5 \text{ hr} + 14 \text{ hr} + 9 \text{ hr} + 12 \text{ hr} + 5 \text{ hr} = 45 \text{ hr} / 5 = 9 \text{ hr}$)
- Say:** Good job today pupils! You found the mean of several data sets and will do the same for your survey data in the next lesson.

Key vocabulary definitions:

- Mean: the average of a set of data, a number that helps you understand the central value of a data set.
- Sum: the answer to an addition problem.

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Writing a Statistical Report to the Minister with the Findings of the Survey | Theme: Data Handling | |
| Lesson Number: M-05-65 | Class/Level: Class 5 | Time: 35 minutes |

| | | | | | |
|---|--|---|--|---|---|
|  | <p>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.</p> |  | <p>Teaching Aids Worksheet describing the sections of the report (See below for worksheet.)</p> |  | <p>Preparation Write (or copy) the sections of the report and descriptions on the board.</p> |
|---|--|---|--|---|---|

Opening (5 minutes)

1. **Say:** In your groups, sort the data you collected about how and how long your fellow pupils take to get to school. Your numerical data needs to be sorted so you can make calculations.
2. **Say:** For example, you might have time it takes for pupils to get to school or distance travelled to get to school.
3. **Say:** In your groups, find the mean for each numerical data set you collected.
4. **Say and write:** Remember, the mean of your data is the average time or distance to get to school. Refer back to yesterday's lesson to find the formulae.
5. **Say:** Today you will learn how to write a statistical report with the data you collected.

Introduction to the New Material (5 minutes)

1. Write: 'report' on the board.
2. **Say:** What does this word mean? Talk with your partner.
(Example answer: a spoken or written account of something that one has seen, heard, done)
3. **Say:** For the next two lessons, you will write a report about your project to send to the Minister of Education. So you will need to work hard to make sure that the report is well written.
4. **Say:** Write the following in your notebooks, we will discuss the sections today.
 - Introduction
 - Methods
 - Results
 - Discussion
 - Conclusion

Guided Practice (8 minutes)

1. **Say** and write the following on the board and ask pupils to copy it into their exercise books.

Sections of a Report

- Introduction: Why are this question and the resulting data important?
- Methods: How exactly did you collect your data? How did collecting go?
- Results: What data did you collect, exactly? Include your data sets and the mean of each numerical data set.
- Discussion: What can we learn from the data?

Conclusion: How could we use what we have learned from the data?

2. **Say:** You will see more detailed descriptions to each section of the report on the board (or the copied worksheet).

Independent Practice (14 minutes)

1. **Say:** Work in your groups and plan what to write in each section of your group's report.
2. **Say:** Each pupil will write a part of the report. Write down each name and his or her part.
3. **Say:** Gather the information each of you will need to write your section of the report.

Closing (3 minutes)

1. **Say:** Each group say out loud the pupil who will write each part of your group's report.

NAME _____

DATE _____

WORKSHEET M-05-65: SECTIONS OF THE REPORT

Directions: Review and complete the following report with your groups based on the data you collected from your survey.

Introduction:

Make pupils aware that this section can have the following sub-sections

- The aims and objectives of the report
- Any challenges or limitations in the scope of the report
- The significance or importance of the study/report

Methods:

Make pupils aware that this section discusses the following:

- A description of the instrument used for collecting the data
- How the instrument was developed
- Explanations of the procedures followed
- Challenges encountered when developing the instrument(s)

Results

Make pupils aware that this section will include:

- A summary of the results of the investigation
- Use of any necessary diagrams, graphs or tables of gathered data

Discussions

Make pupils aware that this section will include:




- A discussion of the main ideas from the investigation
- An analysis of the results (what it means and tells us)

Conclusion

Make pupils aware that this section will include:

- The significance of the work done
- The main points raised in the report

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Devising a Plan for Writing a Report to the Minister with the Findings of the Survey | Theme: Data Handling | |
| Lesson Number: M-05-66 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|---|--|
|  <p>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.</p> |  <p>Teaching Aids Worksheet describing the sections of the report. (See below for worksheet.)</p> |  <p>Preparation None</p> |
|--|---|--|

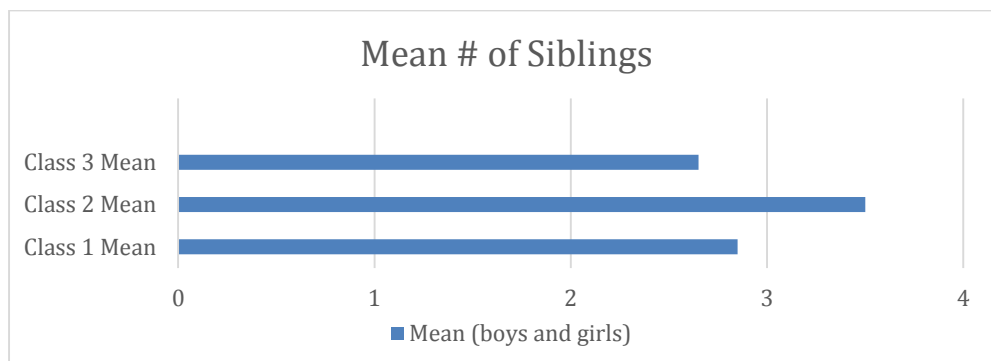
Opening (3 minutes)

1. **Say:** Make sure each group member knows what section of the report he or she will be writing. Take 1 minute to finalise this.
2. **Say:** Today you will work on the statistical report using your survey data for the Minister. Take out your data and the plan that you started in the previous class.

Introduction to the New Material (12 minutes)

1. **Say:** Remember, you need to include how you collected your data, why you chose your questions and the mean of your numerical data sets. You must be careful to write detailed conclusions about the data you gathered.
2. **Say:** You will also need to use different charts to represent your data. Let's look at a few examples.
3. Write the following on the board:
 - a. Data table
 - b. Tally Chart
 - c. Bar chart
4. **Say:** Your data tables are the tables where you collected your data as you surveyed people.
5. **Say:** Your tally charts are the charts you made that helped you count the total responses or the frequency of responses and record your data. The frequency is how many times something occurred.
6. **Say:** You will use these and a bar chart to represent the numerical information you gathered from your survey.

7. Write and draw: A bar chart is a visual that helps you represent your data. This is an example of a bar chart:



8. **Say:** This bar chart shows the means or averages for the number of siblings each Class 5 has.
9. **Say:** The bars are the means or averages of your numerical data sets such as 'time it takes pupils to travel to school' or 'distance travelled to get to school' or 'number of pupils who walk.' You will have a single bar across that represents the mean of each piece of data.
10. **Say:** You can also represent the bars vertically or up and down instead of across.

Guided Practice (10 minutes)

- Say** and write:
 - Finalise your data sets.
 - Finalise what bar graphs you will use to represent your data.
 - Complete your bar graphs in preparation for writing your report.
- Walk around the room. Discuss answers with groups and assist when pupils need help.

Independent Practice (8 minutes)

- Say:** Review the report format we discussed in the previous lesson.
- Say:** Finalise who will complete each section of the report and write your introductory sentence. We will review one example first.
- Say** and write:
 - The introduction: Why are these questions and the resulting data important?
 - For example: We conducted a survey to find out about how pupils get to school and how long it takes. It is important to know this information because...
- Say:** Talk in groups about what to include in the results, methods, discussion and conclusion sections.
- Walk around the room. Discuss answers with groups and assist when pupils need help.

Closing (2 minutes)

- Say:** Share your first line with your group and give each other feedback.
- Say:** Good job today pupils! You learnt how to take your mean data and represent it in a bar graph. This will be helpful when you write your reports for the next two lessons.

NAME _____

DATE _____

WORKSHEET M-05-65: SECTIONS OF THE REPORT

Directions: Review and complete the following report with your groups based on the data you collected from your survey.

Introduction:

Make pupils aware that this section can have the following sub-sections

- The aims and objectives of the report
- Any challenges or limitations in the scope of the report
- The significance or importance of the study/report

Methods:

Make pupils aware that this section discusses the following:

- A description of the instrument used for collecting the data
- How the instrument was developed
- Explanations of the procedures followed
- Challenges encountered when developing the instrument(s)

Results:

Make pupils aware that this section will include:

- A summary of the results of the investigation
- Use of any necessary diagrams, graphs or tables of gathered data

Discussions:

Make pupils aware that this section will include:




- A discussion of the main ideas from the investigation
- An analysis of the results (what it means and tells us)

Conclusion:

Make pupils aware that this section will include:

- The significance of the work done
- The main points raised in the report

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Writing the Report to the Minister with the Findings of the Survey | Theme: Data Handling | |
| Lesson Number: M-05-67 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|---|
|  <p>Learning Outcomes By the end of the lesson pupils will be able to:</p> <ol style="list-style-type: none"> 1. Write a statistical report. 2. Represent data using a bar chart. 3. Work out the mean and put it in context. |  <p>Teaching Aids None</p> |  <p>Preparation Draw the sample bar chart on the board.</p> |
|--|--|---|

Opening (5 minutes)

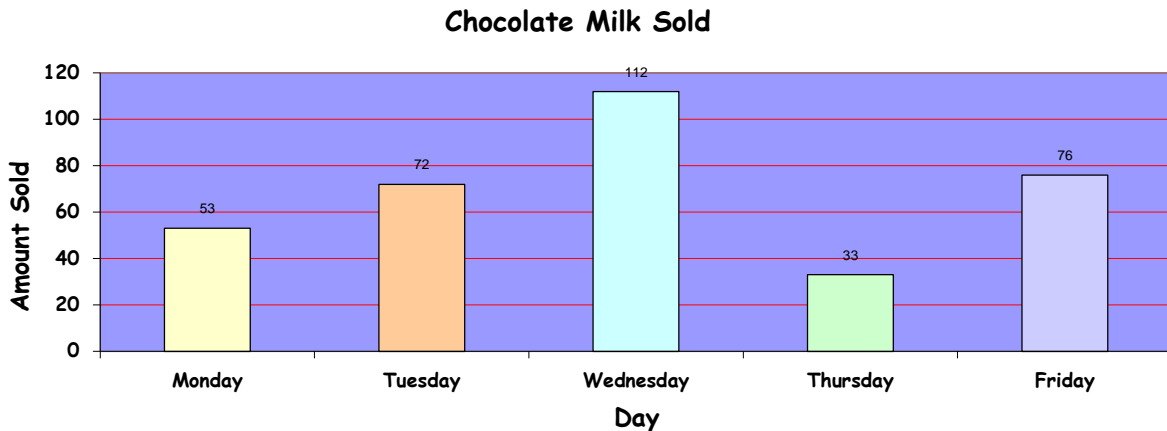
1. **Say:** In your groups, write down 2 kinds of charts that can show data.
(Example answers: data table, tally charts, bar graph)
2. **Ask:** Why use charts to show data? Raise your hand to answer. (Answer: Charts make data easier to understand.)
3. **Say:** Today and during the next lesson you will continue work on your report to the Minister about your findings.

Introduction to the New Material (5 minutes)

1. **Say:** You will continue working on your projects. You will learn to use charts to show your data.
2. **Ask:** What kind of chart will you use to show your data? Why?
(Example answers: tally chart and bar chart, they help show the total responses and the average of our data sets.)
3. **Say:** Today we will read another type of bar chart and then finalise your own charts.

Guided Practice (8 minutes)

1. **Say:** Talk with your partner about what you think a bar chart is. Talk for 1 minute to discuss.
2. **Say:** Remember, a bar chart uses bars (rectangles) to show numbers in total or by the average. Long bars show bigger numbers. Short bars show smaller numbers. The numbers on one side of the chart show exactly how big or small the data is. The other side of the chart tells what each bar means.
3. Draw the bar graph on the board. Ask pupils to use it to answer the questions below.



- Ask:** What does the bar chart show? Raise your hand to answer.
(Answer: number of chocolate milks sold Monday through Friday)
- Ask:** What is the total of chocolate milks sold? Raise your hand to answer.
(Answer: $53 + 72 + 112 + 33 + 76 = 346$ milks)
- Ask:** Which day had the highest sales? Raise your hand to answer. (Answer: Wednesday)
- Ask:** Which day had the lowest sales? Raise your hand to answer. (Answer: Thursday)




Independent Practice (14 minutes)

- Say:** Now you have seen 2 types of bar charts, data tables and tally charts. You have also completed the means or averages for your data set. It is time to finalise your data representations to include in your report.
- Say** and write: Complete the following with your group for your report:
 - Complete final copy of your data tables and tally charts for the report.
 - Check your calculations for the mean of your data. For example, average time the pupils take to get to school or average distance travelled to get to school.
 - Data representations for the data you collected in your survey. Include at least one tally chart and one bar chart.

Closing (3 minutes)

- Say:** In your groups, discuss what parts you still need to complete for your Report to the Minister and assign the homework to each group member.
- Say:** Remember, you need to complete the following sections as described in the last few lessons as well as the data representations:
 - Introduction
 - Methods
 - Results
 - Discussions
 - Conclusion
- Say:** Good job today! You are ready to finalise your reports in order to present to the Minister! We will go over the presentation plan and requirements in the next lesson.

| | | |
|---|-----------------------------|-------------------------|
| Lesson Title: Writing the Report to the Minister with the Findings of the Survey | Theme: Data Handling | |
| Lesson Number: M-05-68 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  <p>Learning Outcomes By the end of the lesson pupils will be able to:</p> <ol style="list-style-type: none"> 1. Write a statistical report. 2. Represent data using bar charts. 3. Work out the mean and put it in context. |  <p>Teaching Aids Rubric (See below for rubric on how to give feedback for the presentations.)</p> |  <p>Preparation Write the Report requirements on the board. (See below in the Introduction to the New Material.)</p> |
|---|--|--|

Opening (2 minutes)

1. **Ask:** What are the 5 components of your report? Raise your hand to answer. (Answer: Introduction, Methods, Results, Discussions and Conclusion)
2. **Ask:** What other information must you include in your report? Raise your hand to answer. (Example answers: data, mean, average, tally chart, data chart, bar chart)
3. **Say:** Today you will continue writing your report to the Minister with the Findings of your Survey. We will then review the guidelines for your presentations.

Introduction to the New Material (5 minutes)

1. **Say:** Today you will need to use your time well to finalise your reports with the parts we just reviewed. I will be giving you 20 minutes to finalise the report in class today.
2. Write and **say:** Remember that your report must include the following:
 - a. Introduction: The objective and the importance of the report
 - b. Methods: Description of the survey you created and the challenges you found.
 - c. Results: What you found, including the data mean, tables and graphs you created.
 - d. Discussions: An analysis of what our data tells us
 - e. Conclusions: The main points and importance of the survey.
3. **Say:** This is just a summary; you have written the details for each section earlier in the unit. Please refer to them to make sure you are being thorough.

Guided Practice (3 minutes)

1. **Ask:** Which groups are ready to finalise their reports? Show me by raising your hands.
2. Invite one group to share what their group has completed to help other groups see what they need to complete.
3. **Say:** Good job pupils! Now it is time to complete your Report to the Minister. I will be giving you time for independent practice to finish them.

Independent Practice (20 minutes)

1. **Say:** You will get 20 minutes now to finalise your reports to present in the next lesson. I will review how to present after your group work.
2. Walk around and assist groups as necessary. Answer any questions and review the parts of the reports as they need help.

Closing (5 minutes)

1. **Say:** Remember you will be presenting your reports to the class in the next 2 lessons.
2. Write and **say:** The guidelines for your presentation are:
 - a. You will present for 3 minutes.
 - b. Your presentation should include a brief look at:
 - What you asked in your survey and how you completed it.
 - What your data says about pupils traveling to school.
 - (Include mean and data representation.)
 - What conclusions you can make about the data.
 - c. You will get feedback or I will ask a question for 1 minute.
 - d. I will complete a rubric to give you feedback on your presentation and give it to your group.
3. **Ask:** Are there any questions?
4. Answer any questions pupils have.
5. **Say:** Good luck tomorrow for your presentations!

PRESENTATION FEEDBACK RUBRIC

Class _____

Group Number _____

Pupils _____

Did the pupils present the survey questions and data collection?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present the data with the mean and data representation?




0 (no) 1 2 3 4 5 (yes)

Did the pupils present their findings and conclusions?

0 (no) 1 2 3 4 5 (yes)

Feedback and/or Question:

| | | |
|--|-----------------------------|-------------------------|
| Lesson Title: Presenting a Statistical Report | Theme: Data Handling | |
| Lesson Number: M-05-69 | Class: Class 5 | Time: 35 minutes |

| | | |
|--|---|---|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to present a statistical report.</p> |  <p>Teaching Aids 1. Timer 2. Rubric for marking the presentations to give feedback. (See below for rubric to give feedback.)</p> |  <p>Preparation Print 10 copies of the rubric to write down feedback to give each group after they present.</p> |
|--|---|---|

Opening (3 minutes)

1. Ask pupils to be in their project work groups.
2. Ask the groups to use 3 minutes to rehearse their presentation.
3. **Say:** Today you will present your statistical report to the Minister.

Introduction to the New Material (2 minutes)

1. Remind pupils about the rules for the presentation that you reviewed in the last lesson.
2. **Say:** Each group has 3 minutes to present their statistical report and there will be 1 minute for follow-up questions or feedback from me.

Guided Practice (2 minutes)

1. **Say:** Finalise who will present each section of the project and get ready to present.

Independent Practice (25 minutes)

1. Groups 1 – 8 will present today. Call each group up and ask them to begin. Use a timer to make sure they do not take longer than 3 minutes to present. Write your feedback using the rubric below.

Closing (3 minutes)

1. **Say:** Good job today pupils! You completed the presentation of your report to the Minister with your findings about how your peers travel to school.

PRESENTATION FEEDBACK RUBRIC

Class _____

Group Number _____

Pupils _____

Did the pupils present the survey questions and data collection?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present the data with the mean and data representation?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present their findings and conclusions?

0 (no) 1 2 3 4 5 (yes)

Feedback and/or Question:

PRESENTATION FEEDBACK RUBRIC

Class _____

Group Number _____

Pupils _____

Did the pupils present the survey questions and data collection?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present the data with the mean and data representation?




0 (no) 1 2 3 4 5 (yes)

Did the pupils present their findings and conclusions?

0 (no) 1 2 3 4 5 (yes)

Feedback and/or Question:

| | | |
|--|-----------------------------|-------------------------|
| Lesson Title: Presenting a Statistical Report | Theme: Data Handling | |
| Lesson Number: M-05-70 | Class: Class 5 | Time: 35 minutes |

| | | |
|--|---|---|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to present a statistical report.</p> |  <p>Teaching Aids 1. Timer 2. Rubric for marking the presentations to give feedback. (See below for rubric to give feedback.)</p> |  <p>Preparation Print 10 copies of the rubric to write down feedback to give each group after they present.</p> |
|--|---|---|

Opening (3 minutes)

1. Ask pupils to be in their project work groups.
2. Ask the groups who have not presented to use 3 minutes to rehearse their presentation.
3. **Say:** Today you will present your statistical report to the Minister.

Introduction to the New Material (2 minutes)

1. Remind pupils about the rules for the presentation that you reviewed in the last lesson.
2. **Say:** Each group has 3 minutes to present their statistical report and there will be 1 minute for follow-up questions or feedback from me.

Guided Practice (2 minutes)

1. **Say:** Finalise who will present each section of the project and get ready to present.

Independent Practice (25 minutes)

1. Groups 9-16 will present today. Call each group up and ask them to begin. Use a timer to make sure they do not take longer than 3 minutes to present. Write your feedback using the rubric below.

Closing (3 minutes)

1. **Say:** Good job today pupils! You completed the presentation of your report to the Minister with your findings about how your peers travel to school.

PRESENTATION FEEDBACK RUBRIC

Class _____

Group Number _____

Pupils _____

Did the pupils present the survey questions and data collection?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present the data with the mean and data representation?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present their findings and conclusions?

0 (no) 1 2 3 4 5 (yes)

Feedback and/or Question:

PRESENTATION FEEDBACK RUBRIC

Class _____

Group Number _____

Pupils _____

Did the pupils present the survey questions and data collection?

0 (no) 1 2 3 4 5 (yes)

Did the pupils present the data with the mean and data representation?




0 (no) 1 2 3 4 5 (yes)

Did the pupils present their findings and conclusions?

0 (no) 1 2 3 4 5 (yes)

Feedback and/or Question:

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Addition of Numbers Involving 3 or More Terms Up to 100,000 | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-071 | Class/Level: 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to add numbers involving 3 or more terms. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write: $2534 + 2351 =$
2. **Ask:** Will someone come to the board to add these numbers? Raise your hand to volunteer. (Answer: 4885)
3. **Say:** Today you will learn how to add numbers involving 3 or more terms up to 100,000.

Introduction to the New Material (7 minutes)

1. Write and **say:** Use the vertical method to find the sum of the three terms.

$$\begin{array}{r}
 45,210 \\
 23,015 \\
 + \underline{21,762} \\
 \hline
 \end{array}$$

2. **Say:** Find the sum. This addition does not involve renaming. (Answer: 89,987)
3. Remind pupils how to complete a sum with renaming. The numbers that carry over and how to add this to the next column.
4. Write:

$$\begin{array}{r}
 111 \\
 32,932 \\
 16,321 \\
 + \underline{45,281} \\
 \hline
 \end{array}$$

4. **Say:** Find the sum. This addition involves renaming. (Answer: 94,534)
5. **Say** and write the answer: Remember, we start in the column to the right and add $2 + 1 + 1$, which is 4. The next column gives us $3 + 2 + 8$, which is 13. So we put the 3 down and carry over the extra 1 into the next place value. We continue moving to the left in this manner. Let's complete it together.
6. Complete the problem and have pupils write their answers.

Guided Practice (10 minutes)

1. **Say:** Work in pairs.
2. Write:
 - a. $23,145$
 1634

$$\begin{array}{r} + \quad 2110 \\ \hline \end{array}$$

b. $\begin{array}{r} 83,234 \\ 14,363 \\ + \quad 2156 \\ \hline \end{array}$

3. **Say:** Find the sums of the figures above. (Answers: a. 26,889; b. 99,753)
4. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice (10 minutes)

1. **Say:** Work individually to solve the problems below.
2. Write and **ask:** What is the sum? (Answer: 93,491)

a. $\begin{array}{r} 83,534 \\ 5631 \\ + \quad 4326 \\ \hline \end{array}$

3. Write and **ask:** What is the sum? (Answer: 45,977)

a. $\begin{array}{r} 31,034 \\ 10,812 \\ + \quad 4131 \\ \hline \end{array}$

4. Write and **ask:** What is the sum? (Answer: 86,530)

a. $\begin{array}{r} 51,750 \\ 30,359 \\ + \quad 4421 \\ \hline \end{array}$

5. Have pupils to exchange their books and check their work while you read the answers aloud.




Closing (5 minutes)

1. Write and **say:** Let's look at this problem and answer a few questions: (Answer: 96,377)

a. $\begin{array}{r} 81,434 \\ 10,812 \\ + \quad 4131 \\ \hline \end{array}$

2. **Ask** while you point to the problem: Where do you start when finding sums of large numbers? Raise your hand to answer.
(Answer: You start at the column to the right and add the numbers in that column.)
3. **Ask:** Which direction do you move when adding sums in vertical form? Raise your hand to answer. (Answer: You move to the left.)
4. **Ask:** What do you do when you add and the number is greater than 10 or the place value? Raise your hand to answer. (Answer: Keep the Ones value and carry over the Tens value.)
5. **Say:** Good job today pupils! You learnt how to add three or more terms together.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Subtraction of Numbers Involving 3 or More Terms Up to 100,000 | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-072 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to subtract numbers involving 3 or more terms. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

1. Write: If Abass owes Mo Le 234 and he pays Le 231. How much does he still owe him?
2. **Say:** We will subtract to find the amount of money he still owes Mo.
3. **Say:** Subtract Le 231 from Le 234. (Answer: Le 234 – Le 231 = Le 3)
4. **Say:** This is a basic word problem involving only 2 terms. We will look at problems that have more than 2 terms today.
5. **Say:** Today you will learn how to subtract numbers involving 3 or more terms.

Introduction to the New Material (7 minutes)

1. Write: Abass gets paid and has Le 657. He has to pay one bill for Le 87 and he has to pay Mo the remaining Le 3. How much does he still have left over for the week?
2. **Say:** We will subtract to find the amount of money he has left for the week.
3. **Say:** First, subtract Le 87 from Le 657.

4. Write and **say:** Let's put it in vertical form to subtract:

$$\begin{array}{r}
 515 \quad \leftarrow \text{Borrow from the place to the left} \\
 657 \\
 \underline{-87} \\
 570
 \end{array}$$

5. **Say:** Now we must subtract the amount Abass still owes Mo.
6. Write and **say:** Let's set this up again in vertical form to subtract:

$$\begin{array}{r}
 610 \quad \leftarrow \text{Borrow from the place to the left} \\
 570 \\
 \underline{-3} \\
 567
 \end{array}$$

7. **Say:** Abass has Le 567 left for the week after he pays back Mo and his bill.
8. **Say:** Let's try another problem together. We will subtract the problem in 2 steps.
9. Write: $14,891 - 460 - 59$
10. Write:

$$\begin{array}{r}
 14,891 \\
 \underline{-460} \\
 14,431 \\
 12 \\
 3211 \\
 14,431
 \end{array}$$

$$\begin{array}{r} - 59 \\ 14,372 \end{array}$$

Guided Practice (10 minutes)

1. **Say:** Work in pairs to solve the following problems. Remember to set them up vertically first.
2. Write:
 - a. $5650 - 5045 - 35$ (Answer: 570)
 - b. $47,669 - 34,668 - 5345$ (Answer: 7656)
3. Walk around the room. Discuss answers with pupils and assist when pupils need help.




Independent Practice (10 minutes)

1. **Say:** Solve the problems below individually. Remember to set them up vertically first.
2. Write:
 - a. $89,606 - 45,707 - 5981$ (Answer: 37,918)
 - b. $100,000 - 54,500 - 6500$ (Answer: 39,000)
 - c. $97,888 - 54,999 - 3777$ (Answer: 39,112)
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing (5 minutes)

1. **Ask:** Can you solve the problems in one step if they have more than 2 terms? Raise your hand to answer. (Answer: No, you must solve it in two steps. The first difference and then the second difference.)
2. **Ask:** What does borrowing mean? Raise your hand to answer. (Answer: When you don't have a large enough number to subtract, you borrow place value from the column to the left.)
3. **Say:** Good job today pupils! You learnt how to subtract numbers involving 3 or more terms.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Multiplication of Whole Numbers Up to 100,000 | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-073 | Class/Level: Class 5 | Time: 35 minutes |

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|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to multiply whole numbers up to 100,000. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (2 minutes)

- Say:** Multiply 5 by 6 (Answer: 30)
- Say:** Multiply 7 by 8 (Answer: 56)
- Write: 145×10
- Say:** Read the numbers out loud.
- Say:** The lesson of the day involves multiplication of whole numbers.

Introduction to the New Material (10 minutes)

- Say:** Today you will learn how to multiply large whole numbers using the vertical method. There is a step-by-step method that I will review with you using the following example.
- Write:
 - 3145
 $\times 62$
- Say:** Multiply 2 by 5. That is 10. Write down the 0 under the 2.
- Say:** Carry the 1 over to the next column because it is an extra '10' so we add it to the next place value.
- Say:** Multiply 2 by 4. That is 8. Add the 1 we carried over to get 9. Write 9 under the 6.
- Say:** Multiply 2 by 1. That is 2. Write it under the 1.
- Say:** Multiply 2 by 3. That is 6. Write it under the 3.
- Say:** We must move one place value to the left now because we are multiplying the 6 which is in the tens place. So we don't put anything under the 2 anymore.
- Say:** Multiply 6 by 5. That answer is 30. Write the 0 under the 6.
- Say:** Carry the 3 over to the next column because it is an extra '30' so we add it to the next place value.
- Say:** Multiply 6 by 4. That is 24. Add the 3 to get 27. Write the 7 under the 1.
- Say:** Carry the 2 over
- Say:** Multiply 6 by 1. That is 6. Add the 2 to get 8. Write the 8 under the 3.
- Say:** Multiply 6 by 3. That is 18. Write this in front of the other terms.

$$\begin{array}{r}
 3145 \\
 \times 62 \\
 \hline
 6290 \\
 + 18870 \\
 \hline
 \end{array}$$

194990

15. **Say:** Finally, we add the two rows to find the final answer of 194,990.

Guided Practice (10 minutes)

1. **Say** and write: Work in pairs to find the following products.
(Remember to write them vertically to solve.)
 - a. 1634×65 (Answer: 106,210)
 - b. 345×350 (Answer: 120,750)
 - c. 4705×47 (Answer: 221,135)
2. Walk around the room. Discuss answers with pupils and assist when pupils need help.
3. Invite a pupil to write the answer on the board. Have pupils check their work against the work on the board.




Independent Practice (10 minutes)

1. **Say** and write: Work individually to find the following products. (Remember to write them vertically to solve.)
 - a. 2682×144 (Answer: 386,208)
 - b. 1567×21 (Answer: 32,907)
 - c. 980×460 (Answer: 450,800)
2. **Say:** Remember to write them vertically to solve.
3. Have pupils to exchange their books and check their work while you read the answer aloud.

Closing (3 minutes)

1. **Say:** It is important to remember to line up your numbers according to place value and keep it orderly.
2. **Ask:** What else do you need to remember? Raise your hand to answer. (Example answers: line up numbers; carry over extra place value and add to the next product; add all the numbers at the end)
3. **Say:** Good job today pupils! You learnt how to find products of two numbers using the vertical method.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Division of Whole Numbers Up to 100,000 | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-074 | Class/Level: Class 5 | Time: 35 minutes |

| | | | | | |
|---|--|---|------------------------------|---|--|
|  | Learning Outcomes By the end of the lesson, pupils will be able to divide whole numbers up to 100,000. |  | Teaching Aids None |  | Preparation Write the definitions of key vocabulary on the board. (See below for definitions.) |
|---|--|---|------------------------------|---|--|

Opening (2 minutes)

- Write 'dividend' on the board.
- Ask:** What does this word mean? Raise your hand to answer. (Answer: a number being divided by another number)
- Write 'divisor' on the board.
- Ask:** What does this word mean? Raise your hand to answer. (Answer: a number by which a dividend is divided)
- Write 'quotient' on the board.
- Ask:** What does 'quotient' mean? Raise your hand to answer. (Answer: the answer in a division problem)
- Say:** Today you will learn how to divide whole numbers up to 100,000.

Introduction to the New Material (10 minutes)

- Say:** When you see a division problem like $2901 \div 3$, in order to use long division, we must set it up using a division house. We put the dividend inside and the divisor outside.
- Write and **say** the following as you solve the problem using division.

a. 967

$$\begin{array}{r}
 3 \overline{)2901} \\
 \underline{-27} \\
 20 \\
 \underline{-18} \\
 21 \\
 \underline{-21} \\
 0
 \end{array}$$

← 3 can't go into 2, so move to '29'. 3 goes into 29 nine times so put the 9 up and multiply to get 27. Subtract.
 ← Bring down the 0
 ← 3 goes into 20 six times, so put 6 up and multiply to get 18. Subtract.
 ← Bring down the 1
 ← 3 goes into 21 seven times, so put 7 up and multiply to get 21. Subtract.
 ← When you get 0 at the end and there is no more to bring down, you are done.

- Say:** You have just divided 2901 by 3 and you got a result of 967. That means that 3 goes into or divides 2901 into 967 equal groups.
- Write and **say** the following as you solve the problem using division.

$$\begin{array}{r}
 10,858 \\
 5 \overline{)54,290} \\
 \underline{-5} \\
 04 \\
 \underline{-0} \\
 42
 \end{array}$$

← 5 goes into 5 one time, so put a 1 up and multiply to get 5. Subtract.
 ← Subtract.
 ← Bring down the 4
 ← 5 can't go into 4, so put 0 up and multiply to get 0. Subtract.
 ← Bring down the 2

-40 ←5 goes into 42 eight times, so put 8 up and multiply to get 40. Subtract
 29 ←Bring down the 9
 -25 ←5 goes into 29 five times, so put 5 up and multiply to get 25. Subtract.
 40 ←Bring down the 0
 -40 ←5 goes into 40 eight times, so put 8 up and multiply to get 40. Subtract.
 0 ←When you get 0 at the end and there is no more to bring down, you are done.

6. **Say:** You have just divided 54,290 by 5 and you got a result of 10,858. That means that 5 goes into or divides 54,290 into 10,858 equal groups.

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. Write and **say:** Solve the following quotients with your partners. Remember to line them up properly like we did in the introduction.
 - a. Divide 57,160 by 8. (Answer: 7145)
 - b. Divide 37,107 by 7 (Answer: 5301)
3. Walk around the room. Discuss answers with pupils and assist when pupils need help.
 - a. Invite a pupil to write his or her answer on the board.
 - b. Discuss the solution with pupils and instruct pupils to check their solutions as others write them on the board.

Independent Practice (10 minutes)

1. Write and **say:** Solve the following quotients individually. Remember to line them up properly like we did in the introduction.
 - a. Divide 5410 by 5. (Answer: 1082)
 - b. Divide 46,512 by 9. (Answer: 5168)
 - c. Divide 247,996 by 7. (Answer: 35,428)
2. Have pupils to exchange their books and check their work while you read the answers aloud.




Closing (3 minutes)

1. **Say:** There are many steps to remember to solve division problems using long division.
2. **Say:** It can get confusing, this is why it is best to show you using examples that you can follow and then copy the process.
3. **Say and write:** Let's list the steps here.
 - a. Write the division problem using a division house.
 - b. Put the dividend inside and the divisor outside.
 - c. Slowly start to divide the dividend by the divisor starting with the first term.
 - d. Place this answer above the house, multiply the answer and divisor and place below.
 - e. Subtract and then bring down the next term.
 - f. Repeat.

Key vocabulary definitions:

- Dividend: the number being divided by another number
- Divisor: the number you divide by
- Quotient: the answer to a division problem

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Multi-Step Word Problems Involving the 4 Operations up to 100,000 | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-075 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to solve word problems involving the four operations. |  Teaching Aids None |  Preparation Write the word problems from the lesson on the board. |
|---|--|---|

Opening (3 minutes)

- Write: Abass was given Le 28,000 as pocket money for the first day of school. He got Le 44,300 the next day of school. How much does he have altogether?
- Say:** The word problem says altogether so we must add the two amounts of money together to find the total.
- Write: $28,000 + 44,300 =$ (Answer: Le 72,300)
- Say:** Addition is one of four operations of mathematics. The others are subtraction, division and multiplication.
- Say:** Today you will learn how to solve word problems involving all four of the operations.

Introduction to the New Material (10 minutes)

- Write: Johnson's mother gave Le 80,000 to him and his three sisters to share equally. His father gave them another Le 80,000 to share. Now how much does each sibling receive?
- Say:** This problem requires two steps and two different operations. First we need to add the two amounts they received together. Then we will divide them by the number of siblings there are.
- Write:

$$(80,000 + 80,000) \div 4 \quad \leftarrow \text{Set up the mathematical expression.}$$

$$(160,000) \div 4 \quad \leftarrow \text{Add first because it is in parenthesis.}$$

$$160,000 \div 4 = 40,000 \quad \leftarrow \text{Solve}$$

- Say:** Each sibling will get Le 40,000.
- Write: Clinton bought a pair of shoes from his friend and made a payment of Le 145,000. He also decided to purchase a pack of DVDs from him for a cost of Le 47,650. If the cost of the shoes is Le 167,000; how much does Clinton owe his friend?
- Say** and write: First subtract the payment from the cost of the shoes.

$$\begin{array}{r} 167,000 \\ -145,000 \\ \hline \end{array} \quad (\text{Answer: Le } 22,000)$$

- Say** and write: Now we add the cost of the DVDs to see how much Clinton owes his friend.

$$\begin{array}{r} 22,000 \\ + 47,650 \\ \hline \end{array} \quad (\text{Answer: Le } 69,650)$$

Guided Practice (8 minutes)

- Put pupils in pairs.

2. Write:
 - a. David and Moses worked for 5 days and were paid Le 10,000 each for each day. They used half their money to buy meat. How much money did they use to buy the meat? (Answer: $(10,000 \times 5) \times 2 = 100,000 \div 2 = \text{Le } 50,000$)
 - b. Sarah and Mary do chores around the house so that they can buy admission to the movies. The admission to the theatre costs Le 1000 for both of them. Mary does 4 chores and Sarah does 3 chores and their parents pay them Le 500 for each chore. Will they have enough money to go to the movies? How much money will they have left for snacks? (Answer: $(4 + 3) \times 500 - (1000) = 7 \times 500 = 3,500 - 1,000 = 2,500$. Yes, they will have enough to go to the movie theatre. They will have Le 2,500 left for snacks.)
3. Walk around the room. Discuss answers with pupils and assist when pupils need help.




Independent Practice (8 minutes)

1. Tell pupils to solve the following problems.
2. Write **the following problems on the board:**
 - a. The teachers have 230 biscuits in the staff room over a term. Mrs. Stevens eats 41 of them. Mr. Lee eats 56. Mrs. Good will not say how many she has eaten, but there are 81 biscuits left. How many did Mrs. Good eat? (Answer: $230 - 41 - 56 - 81 = 52$ biscuits)
 - b. James was given Le 2000 for his birthday. He already had twice the amount he was given. He went into town and bought a game for Le 1500. How much does he have left? (Answer: $2000 + 4000 - 1500 = 6000 - 1500 = \text{Le } 4500$)
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing (6 minutes)

1. **Say:** It is important to read the problems thoroughly and determine which operations you will need to use. Also, which step you should complete first.
2. **Ask:** Create your own multi-step word problem with the following directions.
 - a. You must have two operations.
 - b. You must solve your word problem.
3. Invite two pupils to share their problems for the class to solve.
4. **Say:** Good job today! You have now solved multi-step word problems involving all 4 operations.

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|--|-----------------------------------|-------------------------|
| Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest Ten | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-076 | Class/Level: Class 5 | Time: 35 minutes |

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|--|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers to the nearest Ten. |  Teaching Aids None |  Preparation Write the story problems for the lesson on the board. |
|--|--|---|

Opening (4 minutes)

1. Write 'estimate' on the board.
2. **Ask:** What does estimate mean? Raise your hand to answer.
(Example answers: Approximate, gauge, guess)
3. **Ask:** What do we use estimates for? Raise your hand to answer.
(Example answers: to describe a number or quantity, to guess an answer to a math question, to talk about time)
4. **Say:** In mathematics, and in life, we use estimates in different ways to help us talk about numbers easily. Sometimes it helps us talk about big numbers or really small numbers. We often round off numbers to a specific place value. This is a type of estimating.
5. **Say:** Today you will learn how to round whole numbers to the nearest Ten.

Introduction to the New Material (10 minutes)

1. **Ask:** Who remembers what we do when we round a number to the nearest 10?
2. **Answer:** To round a number to the nearest 10, the number in the Ones place must be zero. If the digit in the Ones place is less than 5, you round down and replace the digit in the Ones place with 0. If the digit in the Ones place is 5 or more, you round up and add one to the Tens digit.
3. Write on the board: 765,482. How do we round this number to the nearest 10s place?
4. **Ask:** Read the number seven hundred and sixty-five thousand, four hundred and eighty-two.
5. **Say:** Since the Ones number, the last number, is less than 5, we replace it with zero. So we have 765,480.
6. Write on the board: What is 935,427 rounded to the nearest 10s place?
7. **Ask** pupils to read the number written on the board: Nine hundred and thirty-five thousand four hundred and twenty-five.
8. **Ask:** Which digit is in the One's place? Raise your hand to answer. (Answer: 7)
9. **Say:** To round 935,427 to the nearest 10, we first consider the number in the Ones place. Since the digit in the Ones place is 7, which is more than 5, we round up. This means we write 0 in place of 7 and add 1 to the 2 to make it 3.
10. **Ask:** What then is the rounded number of 935,427? Raise your hand to answer.
(Answer: 935,430)

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.

2. Write on the board:
 1. Round the following numbers to the nearest Tens place.
 - a. 543,984 (Answer: 543,980)
 - b. 328,905 (Answer: 328,910)
 - c. 89,655 (Answer: 89,660)
 2. What is the total of these numbers? (Answer: 962,550)
6. While pupils are working in their exercise books, walk around to check their work and assist those who are struggling.
7. After a few minutes, have pupils raise their hands to explain their choice of answers. Have pupils check their work while the answers are being explained.




Independent Practice (8 minutes)

1. Write on the board: Round the following numbers to the nearest 10:
 - a. 456,396 (Answer: 456,400)
 - b. 983,456 (Answer: 983,460)
 - c. 989,976 (Answer: 989,980)
2. Write on the board: Solve the following word problem by rounding to the nearest 10:
 - a. You need to measure the total area in your apartment. The rooms are 63 square metres, 57 square metres and 78 square metres. What is the total area of the rooms rounded to the nearest 10? (Answer: $60 + 60 + 80 = 200$ square metres in total)
3. Have pupils work on them independently in their exercise books. After a few minutes, ask pupils to raise their hands, and call on three to write their answers on the board.
4. Have pupils exchange their books with their partner and check their work.

Closing (3 minutes)

1. **Ask:** When rounding to the nearest Ten, what digit should be in the Ones place? Raise your hand to answer. (Answer: 0)
2. **Ask:** What do you do to the number in the Tens place if the number in the Ones place is 5 or above? (Answer: You add 1 to the number in the Tens place.)

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest Hundred | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-077 | Class/Level: Class 5 | Time: 35 minutes |

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|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers to the nearest Hundred. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

1. Write '2476' on the board.
2. **Ask:** What is the estimate to the nearest ten? Raise your hand to answer. (Answer: 2480)
3. **Say:** Our last lesson took us to a country where the smallest denomination is Le10. Today, we are going to another country where the smallest denomination is Le100.
4. **Say:** Today you will learn how to round to the nearest Hundred.

Introduction to the New Material (10 minutes)

1. **Say:** When you round to a number to the nearest Hundred, the numbers in the Tens and Ones places must become zero.
2. **Say:** If the digit in the tens place is less than 5, you round down. You keep the digit in the hundreds place and then replace the digits in the Tens and Ones places with 0s.
3. Write on the board: How much will you pay for Le546,734 worth of confectionaries if the smallest denomination in the country is Le100?
4. Underline the 6 to show which place value we are rounding to.
5. **Say:** Since the number in the tens place, 3, is less than 5, you round it down and replace the 3 and 4 with 0s and keep the 7 as is. So you will get Le 546,700.
6. **Say:** If the digit in the tens place is 5 or more, you round up and add one to the Hundreds digit, and the Tens and Ones places become 0s.
7. Write on the board: How much will you pay if your electricity bill is Le 143,567 and the smallest denominator is Le100?
8. Underline the 5 to show which place value we are rounding to.
9. **Say:** The digit in the tens place is more than 5 so we will take the 5 in the Hundreds place and round it up to 6 and change the Tens and Ones to zeros.
10. **Ask:** Which hundred is Le 483,567 closer to, Le 483,500 or Le 483,600?
11. **Say:** Let's find out.
12. **Ask:** Which digit is in the Tens place? (Answer: 6)
13. **Say:** To round Le 483,567 to the nearest 100, we first consider the number in the Tens place.
14. Underline 6 (483567).
15. **Say:** Since the digit in the Tens place is 6, which is greater than 5, we round up. This means we add 1 to the 5 and write 0 in place of 6 and 7, and 483,567 rounded to the nearest 100s place is 483,600. So we will pay Le483,600 for the electricity.

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board:
 - a. Round 562,348 to the nearest 100. (Answer: 562,300)
 - b. Round 864,634 to the nearest 100. (Answer: 864,600)
 - c. Round 78,899 to the nearest 100. (Answer: 78,900)
 - d. Round 1111 to the nearest 100. (Answer: 1100)
3. While pupils are working in their exercise books, walk around to check their work and assist those who are struggling.
4. After a few minutes, have pupils raise their hands to explain their answers while the other pupils check their own work.




Independent Practice (8 minutes)

1. Have pupils work individually on the following problems.
2. Write on the board: Round the following numbers to the nearest 100:
 - a. 628,534 (Answer: 628,500)
 - b. 321,425 (Answer: 321,400)
 - c. 989,457 (Answer: 989,500)
 - d. 67,894 (Answer: 67,900)
3. Write on the board: What is the total of 24,589 and 63,389 round to the nearest 100? (Answer: 88,000)
4. While pupils are working in their exercise books, go around, check their answers and make necessary corrections.
5. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing (4 minutes)

1. **Ask:** When rounding to the nearest hundred, what numbers are in the Tens and ones places? Raise your hand to answer. (Answer: 0)
2. **Ask:** What do you do to the number in the hundreds place if the number in the Ones place is 5 or above? Raise your hand to answer. (Answer: You add 1 to it.)
3. **Say:** Good job today pupils! Today you learnt how to round numbers to the nearest 100.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest Thousand | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-078 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers to the nearest Thousand. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write '546,783' on the board.
2. **Ask:** What is the estimate to the nearest Hundred? Raise your hand to answer.
(Answer: 546,800)
3. **Ask:** What do you replace the Ones and Tens places with? Raise your hand to answer.
(Answer: zeros)
4. **Say:** Today's lesson will round whole numbers to the nearest Thousand.

Introduction to the New Material (10 minutes)

1. **Say:** To round a number to the nearest Thousand, the numbers in the Hundreds, Tens and Ones places must be replaced with zero.
2. **Say:** If the digit in the Hundreds place is less than 5, you round down and replace the digits in the Hundreds, Tens and Ones places with 0s.
3. Write on the board: 'Round 957,446 to the nearest 1,000.'
4. **Say:** Since the number in the Hundreds place, 4, is less than 5, you round it down and replace the 4, 8 and 6 with 0s. So you will get 957,000.
5. **Say:** If the digit in the Hundreds place is 5 or more, you round up and add One to the Thousands digit, and the Hundreds, Tens and Ones places become 0s.
6. Write on the board: 'Round 534,867 to the nearest 1000.'
7. **Ask:** Which Thousand is 534,867 closer to, 534,000 or 535,000?
8. **Say:** Let's find out.
9. **Ask:** Which digit is in the Hundreds place? Raise your hand to answer. (Answer: 8)
10. **Say:** To round 534,867 to the nearest Thousand, we first consider the number in the Hundreds place.
11. Underline 8 (534,867).
12. **Say:** Since the digit in the Hundreds place is 8, which is greater than 5, we round up. This means we add 1 to the 4 and write 0 in place of 8, 6 and 7, and 534,867 rounded to the nearest Thousand is 535,000.

Guided Practice (10 minutes)

1. **Ask** pupils to work in pairs.
2. Write on the board: Round the following numbers to the nearest 1000.
 - a. 348,245 (Answer: 348,000)

- b. 887,965 (Answer: 888,000)
 - c. 87,987 (Answer: 88,000)
 - d. 198,453 (answer: 199,000)
3. While pupils are working in their exercise books, walk around the room to check their work and assist those who are struggling.
 4. After a few minutes, have pupils raise their hands to explain their choice of answers.




Independent Practice (8 minutes)

1. Ask pupils to work individually on the following problems.
2. Write on the board and **say**: Round the following numbers to the nearest 1,000
 - a. 35,264 (Answer: 35,000)
 - b. 45,678 (Answer: 46,000)
 - c. 100,567 (Answer: 101,000)
 - d. 199,609 (Answer: 200,000)
3. While pupils are working in their exercise books, walk around the room to check their work and assist those who are struggling.
4. After a few minutes, have pupils raise their hands to come to the board and give their solution.

Closing (4 minutes)

1. **Ask**: When rounding to the nearest Thousand, what numbers are in the Hundreds, Tens and Ones places? Raise your hand to answer. (Answer: 0)
2. **Ask**: What do you do to the number in the Thousands place if the number in the Hundreds place is 5 or above? Raise your hand to answer. (Answer: You add 1 to it.)
3. **Say**: Good job today pupils! Today you learnt how to round whole numbers up to 100,000.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest Ten Thousand | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-079 | Class/Level: Class 5 | Time: 35 minutes |

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|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers to the nearest Ten Thousand. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write '463,672' on the board.
2. **Ask:** What is the estimate to the nearest Thousand? Raise your hand to answer.
(Answer: 464,000)
3. **Say:** Today's lesson will round whole numbers to the nearest 10,000.

Introduction to the New Material (10 minutes)

1. **Say:** To round a number to the nearest 10,000, the numbers in the Thousands, Hundreds, Tens and Ones places must all be zero.
2. **Say:** If the digit in the Thousands place is less than 5, you round down and replace the digits in the Thousands, Hundreds, Tens and Ones places with 0s.
3. Write on the board: Round 523,467 to the nearest 10,000.
4. **Say:** Since the number in the Thousands place, 3, is less than 5, you round it down and replace the 3, 4, 6 and 7 with 0s. So you will get 520,000
5. **Say:** If the digit in the Thousands place is 5 or more, you round up and add One to the Ten Thousands digit, and the Thousands, Hundreds, Tens and Ones places become 0s.
6. Write on the board: Round 729,654 to the nearest 10,000.
7. **Ask:** Which Ten Thousands is 729,654 closer to, 720,000 or 730,000?
8. **Say:** Let's find out
9. **Ask:** Which digit is in the Thousands place? (Answer: 9)
10. **Say:** To round 729,654 to the nearest 10,000, we first consider the number in the Thousands place.
11. Underline 9 (729,654).
12. **Say:** Since the digit in the Thousands place is 9, which is greater than 5, we round up. This means we add 1 to the 2 and write 0 in place of 9, 6, 5 and 4, and so 729,654 rounded to the nearest 10,000s is 730,000.

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board: Round 654,327 and 247,583 to the nearest 10,000.
3. While pupils are working in their exercise books, walk around the room to check their work and assist those who are struggling.

4. After a few minutes, have pupils raise their hands to explain their answers. Tell other pupils to check their work as the others explain. (Answers: 650,000 and 250,000)




Independent Practice (8 minutes)

1. Write on the board: Round the following numbers to the nearest 10,000:
 - a. 785,234 (Answer: 790,000)
 - b. 621,878 (Answer: 620,000)
 - c. 133,547 (Answer: 130,000)
2. Write on the board: What is the total of 67,802 and 188,946 rounded to the nearest 10,000? (Answer: 70,000 + 190,000 = 260,000).
3. While pupils are working in their exercise books, go around, check their answers and make necessary corrections.
4. After a few minutes, have pupils raise their hands to come to the board and give their solution.

Closing (4 minutes)

1. **Ask:** When rounding to the nearest Ten Thousand, what numbers are in the Thousands, Hundreds, Tens and Ones places? Raise your hand to answer. (Answer: 0)
2. **Ask:** What do you do to the number in the Ten Thousands place if the number in the Thousands place is 5 or above? Raise your hand to answer. (Answer: You add 1 to it.)
3. **Say:** Good job pupils! Today you learnt to round numbers to the nearest 10,000.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest Hundred Thousand | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-080 | Class/Level: Class 5 | Time: 35 minutes |

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|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers to the nearest Hundred Thousand. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write '765,438' on the board.
2. **Say:** Expand the number using place value.
3. Write: $765,438 = 700,000 + 60,000 + 5,000 + 400 + 30 + 8$
4. **Say:** We can see the place value expanded and it makes it easier to round the numbers to specific place value this way! You can use this method if you like to help solve rounding off problems.
5. **Ask:** What is the estimate to the nearest 10,000? Raise your hand to answer. (Answer: 770,000)
6. **Say:** Today's lesson will round whole numbers to the nearest 100,000.

Introduction to the New Material (10 minutes)

1. **Say:** To round a number to the nearest 100,000, the numbers in the Ten Thousands, Thousands, Hundreds, Tens and Ones places must all be zero.
2. **Say:** If the digit in the Ten Thousands place is less than 5, you round down and replace the digits in the Ten Thousands, Thousands, Hundreds, Tens and ones places with 0s.
3. Write on the board: 'Round 718,439 to the nearest 100,000.'
4. **Say:** Since the number in the Ten Thousands place, 1, is less than 5, you round it down and replace the 1, 8, 4, 3 and 9 with 0s. So you will get 700,000.
5. **Say:** If the digit in the Ten Thousands place is 5 or more, you round up and add One to the Hundred Thousands digit, and the Ten Thousands, Thousands, Hundreds, Tens and ones places become 0s.
6. Write on the board: 'Round 452,688 to the nearest 100,000.'
7. **Ask:** Which Hundred Thousands is 452,688 closer to, 400,000 or 500,000?
8. **Say:** Let's find out.
9. **Ask:** Which digit is in the Ten Thousands place? Raise your hand to answer. (Answer: 5)
10. **Say:** To round 452,688 to the nearest 100,000, we first consider the number in the Ten Thousands place.
11. Underline 5 (452,688).
12. **Say:** Since the digit in the Ten Thousands place is 5, which is considered greater than 5, we round up. This means we add 1 to the 4 and write 0 in place of the rest of the numbers, and so 452,688 rounded to the nearest 100,000 is 500,000.

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board: 'Round 634,126 and 253,976 to the nearest 100,000.'
3. While pupils are working in their exercise books, go around to check their answers and assist where necessary.
4. After a few minutes, have pupils raise their hands to come to the board and give their solution. (Answers: 600,000; 300,000)




Independent Practice (8 minutes)

1. Write on the board: Round the following numbers to the nearest 100,000: 821,236, 268,921, 124,547
2. While pupils are working in their exercise books, go around, check their answers and make necessary corrections.
3. After a few minutes, have pupils raise their hands to come to the board and give their solution. (Answers: 800,000, 300,000, 100,000)
4. Tell pupils to check their work while the other pupils write their solutions on the board.

Closing (4 minutes)

1. **Ask:** When rounding to the nearest 100,000, what numbers are in the Ten Thousands, Thousands, Hundreds, Tens and ones places? Raise your hand to answer. (Answer: 0)
2. **Ask:** What do you do to the number in the Hundred Thousands place if the number in the Ten Thousands place is 5 or above? Raise your hand to answer. (Answer: You add 1 to it.)
3. **Say:** Good job today pupils! You learnt how to round large numbers to the nearest Hundred Thousand.

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|--|--|-------------------------|
| Lesson Title: Relations of Sets of Numbers Involving Addition | Theme: Relations of Sets of Numbers | |
| Lesson Number: M-05-081 | Class/Level: Class 5 | Time: 35 minutes |

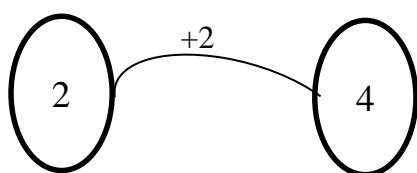
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|--|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to identify and describe the relation of sets of numbers involving addition. |  Teaching Aids None |  Preparation Draw the diagrams in the Introduction to the New Material on the board. |
|--|--|---|

Opening (2 minutes)

1. Write 'relation' on the board
2. **Ask:** What do you think this word means? Raise your hand to answer.
(Example answers: Connection, similarities)
3. **Say:** When given two or more sets of numbers, we can find the similarities or connections between different sets of numbers provided.
4. **Say:** In mathematics, relations between numbers can take different forms. Today's lesson will be about the relation of sets of numbers involving addition.

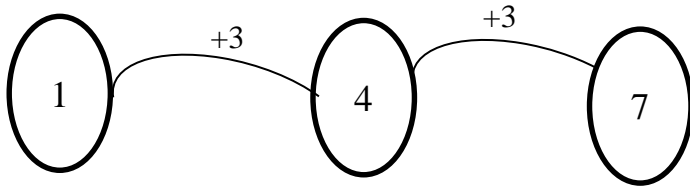
Introduction to the New Material (13 minutes)

1. **Say:** Any given set of numbers either has a relation or doesn't have a relation.
2. **Say:** We are going to look at some numbers to determine whether they are related or not by addition.
3. Write on the board: '2 and 4'.
4. **Ask:** Are these numbers related by addition? And if they are, what is the relation between them?
Raise your hand to answer.
5. Call on several pupils who volunteer and listen to all the answers provided by the pupils.
6. **Say:** There is a relation between the two numbers, because if you add 2 to 2, you'll get 4. So it can be said that the relation between 2 and 4 is the addition of 2



7. Write: 1, 4, 7
8. **Ask:** What is the relation between these three numbers?
9. **Say:** First let us consider the first two numbers, 1 and 4. What is their relationship?
10. **Say:** It can be seen that 3 can be added to 1 to make 4
11. **Say:** Now, let us consider 4 and 7
12. **Ask:** What is their relationship?
13. **Say:** 3 has been added to 4, making it 7. Therefore, the relationship between 4 and 7 is the addition of 3.

14. **Say:** Therefore, it can be concluded that the relationship between 1, 4 and 7 is the addition of 3 as shown below:



15. Write on the board: A= 1, 2, 3; B= 3, 5, 7; C= 4, 7, 9
16. **Ask:** Which sets (A, B or C) contain numbers that are related?
17. **Say:** Let us work through each set.
18. **Ask:** In Set A, what number will you add to 1 to give you 2?
19. **Say:** The answer is 1. So let us add throughout Set A: '1+1=2, 2+1=3', therefore, it can be agreed that the numbers are related by the addition of 1.
20. **Ask:** In set B, what number will you add to 3 to give you 5? Raise your hand to answer.
21. **Say:** The answer is 2. So let us add 2 throughout Set B: '3+2=5, 5+2=7', therefore, it can be agreed that the numbers in Set B are related by the addition of 2.
22. **Ask:** In Set C, what number will you add to 4 to give you 7?
23. **Say:** The answer is 3. So let us add 3 throughout Set C: '4+3=7, 7+3=10', therefore, it can be agreed that the numbers in Set C (4, 7, 9) are not related.
24. **Say:** The examples we just worked out show that while some sets of numbers are related by addition (A and B), others are also not related by addition (C).

Guided Practice (10 minutes)

1. Ask pupils to mention three numbers between and including 1 and 40. Accept all groups mentioned and write them on the board. Randomly pick out three sets mentioned by the pupils.
Examples:
 - a. A= 10, 20, 30
 - b. B= 4, 7, 8
 - c. C= 13, 16, 19
2. **Say:** Group these sets of numbers into those that are related by addition and those unrelated by addition.
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. **Ask:** Why are the numbers in Sets A and C related? Raise your hand to answer. (Answer: Because Set A's numbers are related by the addition of 10 and Set C's numbers are related by the addition of 3.)
5. **Ask:** Why are the numbers in Set B not related? Raise your hand to answer. (Answer: Because 3 was added to 4 to make 7, but when 3 is added to 7, we get 10, not 8, therefore making the set of numbers unrelated by addition.)

Independent Practice (8 minutes)




1. Write on the board: Find the relation by addition between the following sets of numbers:

- a. $A = 4, 9, 14$ (Answer: Addition of 5)
 - b. $B = 2, 5, 8$ (Answer: Addition of 3)
 - c. $C = 45, 50, 61$ (Answer: There is no relation by addition.)
- 2. Ask pupils to write their answers in their exercise books and work individually.
 - 3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing (2 minutes)

- 1. **Ask:** Are the following sets related or unrelated by addition?
 - a. $1, 10, 19$ (Answer: Related)
 - b. $3, 4, 6$ (Answer: Unrelated)

| | | |
|---|--|-------------------------|
| Lesson Title: Relations of Sets of Numbers Involving Subtraction | Theme: Relations of Sets of Numbers | |
| Lesson Number: M-05-082 | Class/Level: Class 5 | Time: 35 minutes |

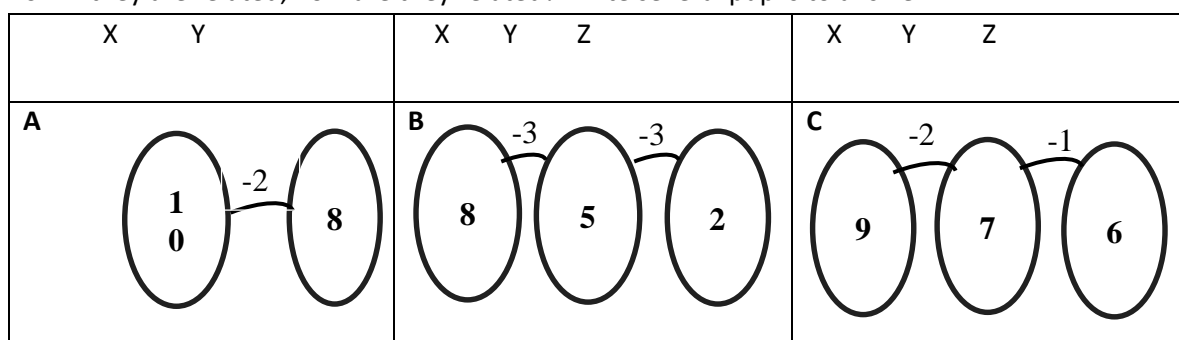
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|---|---|---|------------------------------|---|--|
|  | Learning Outcomes By the end of the lesson, pupils will be able to identify and describe the relation of sets of numbers involving subtraction. |  | Teaching Aids None |  | Preparation Draw the diagram in the Introduction to the New Material on the board. |
|---|---|---|------------------------------|---|--|

Opening (2 minutes)

1. Write 'relation' on the board.
2. **Ask:** What does this word mean? Raise your hand to answer.
(Example answers: Connection, similarities)
3. **Say:** When given two or more sets of numbers, we can find the similarities or connections between different sets of numbers provided.
4. **Say:** In mathematics, relations between numbers can take different forms. Today's lesson will touch on the relation of sets of numbers involving subtraction.

Introduction to the New Material (13 minutes)

1. **Say:** Any given set of numbers either has a relation or doesn't have a relation.
2. **Say:** We are going to look at some numbers to determine whether they are related or not by subtraction.
3. Draw the diagram below on the board without the answers.
4. **Say:** Consider the diagram below and determine whether the numbers in each set are related or not by subtraction.
5. **Ask:** If they are related, how are they related? Invite several pupils to answer.



6. Listen to all the answers provided by the pupils
7. **Say:** There is a relation between the numbers in Set A; the relation between 10 and 8 is the subtraction of 2.
8. **Say:** Considering Set 'B', it can be agreed that there is a relation between the set of numbers. (The relation between '8 and 5' and '5 and 2' is the subtraction of 3, as shown in the diagram)
9. **Say:** It can be seen from Set C that the numbers are **not** related by subtraction.

10. **Say:** The examples we just worked out show that while some sets of numbers are related by subtraction (A and B), others are also not related by subtraction (C).

Guided Practice (10 minutes)

1. Ask pupils to mention three numbers between and including 1 and 10. Invite pupils to share their three numbers. Accept all groups mentioned and write them on the board. Randomly pick out three sets mentioned by the pupils. Examples:
 - a. A= 30, 20, 10
 - b. B= 8, 7, 4
 - c. C= 9, 6, 3
2. **Say:** Group these sets of numbers into those that are related by subtraction and those unrelated by subtraction.
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. **Ask:** Why are the numbers in Sets A and C related? Raise your hand to answer. (Answer: Because Set A's numbers are related by the subtraction of 10, and Set C's numbers are related by the subtraction of 3.)
5. **Ask:** Why are the numbers in Set B not related? Raise your hand to answer. (Answer: Because 1 was subtracted from 8 to give us 7, but when 1 is subtracted from 7, it gives us 6, not 4, therefore making the set of numbers unrelated by subtraction.)




Independent Practice (8 minutes)

1. Write on the board: 'Find the relation by subtraction between the following numbers:'
 - a. A = 14, 9, 4 (Answer: Subtraction of 5)
 - b. B = 8, 5, 1 (Answer: There is no relation by subtraction.)
 - c. C = 23, 20, 17 (Answer: Subtraction of 3)
2. Ask pupils to write their answers in their exercise books and work individually.
3. Have pupils exchange their books and check their work while you read the answers aloud.

Closing (2 minutes)

1. **Ask:** Are the following sets related or unrelated by subtraction? Raise your hand to answer.
 - a. 15, 10, 5 (Answer: Related)
 - b. 6, 4, 3 (Answer: Unrelated)
2. **Ask:** How do you know? Raise your hand to answer. (Example answers: because you can't subtract the same number; because there is no pattern)

| | | |
|--|--|-------------------------|
| Lesson Title: Relations of Sets of Numbers Involving Multiplication | Theme: Relations of Sets of Numbers | |
| Lesson Number: M-05-083 | Class/Level: Class 5 | Time: 35 minutes |

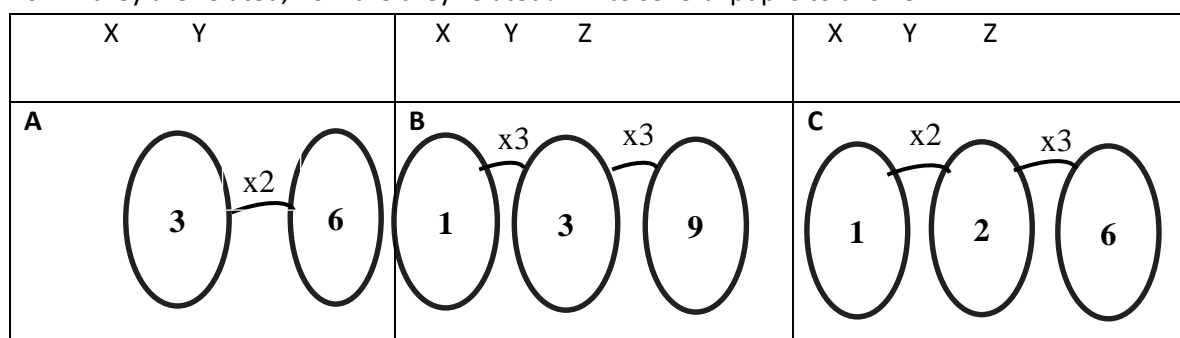
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|  | Learning Outcomes By the end of the lesson, pupils will be able to identify and describe the relation of sets of numbers involving multiplication. |  | Teaching Aids None |  | Preparation Draw the diagram in the Introduction to the New Material on the board. |
|---|--|---|------------------------------|---|--|

Opening (2 minutes)

1. Write 'relation' on the board.
2. **Ask:** What does this word mean? Raise your hand to answer.
(Example answers: Connection, similarities)
3. **Say:** When given two or more sets of numbers, we can find the similarities or connections between the different sets of numbers provided.
4. **Say:** In mathematics, relations between numbers can take different forms. Today's lesson will touch on the relation of sets of numbers involving multiplication.

Introduction to the New Material (13 minutes)

1. **Say:** Any given set of numbers either has a relation or doesn't have a relation.
2. **Say:** We are going to look at some numbers to determine whether they are related or not by multiplication.
3. **Say:** Study the diagram below and determine whether the numbers in each set are related or not by multiplication.
4. **Ask:** If they are related, how are they related? Invite several pupils to answer.



5. Listen to all the answers provided by the pupils
6. **Say:** There is a relation between the numbers in Set A: 3 was multiplied by 2 to arrive at 6.
7. **Say:** Considering Set B, it can be agreed that there is a relation between the set of numbers. (The relation between '1 and 3' and '3 and 9' is the multiplication by 3, as shown in the diagram.)
8. **Say:** It can be seen from Set C that the numbers are **not** related by multiplication, as different multipliers were needed to arrive at the subsequent numbers.
9. **Say:** The examples we just worked out show that while some sets of numbers are related by multiplication (A and B), others are also not related by multiplication (C).

Guided Practice (10 minutes)

1. Ask pupils to mention three numbers between and including 1 and 20. Accept all groups mentioned and write them on the board. Randomly pick out three sets mentioned by the pupils.
Example:
 - a. $A = 1, 4, 16$
 - b. $B = 1, 3, 6$
 - c. $C = 3, 6, 12$
2. **Say:** Group these sets of numbers into those that are related by multiplication and those unrelated by multiplication.
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. **Ask:** Why are the numbers in Sets A and C related? Raise your hand to answer. (Answer: Because set A's numbers are related by multiplying through with 4, and Set C's numbers are related by multiplying through with 2.)
5. **Ask:** Why are the numbers in Set B not related? Raise your hand to answer. (Answer: Because 1 was multiplied by 3 to give us 3, but when 3 is multiplied by 3, it gives us 9, not 6, therefore making the set of numbers unrelated by multiplication.)




Independent Practice (8 minutes)

1. Write on the board: Find the relation between the following numbers:
 - a. $A = 4, 8, 16$ (Answer: Multiplication by 2)
 - b. $B = 2, 10, 50$ (Answer: Multiplication by 5)
 - c. $C = 4, 12, 24$ (Answer: No relation by multiplication)
2. Ask pupils to write their answers in their exercise books and work individually.
3. Have pupils exchange their books and check their work while you read the answers aloud.

Closing (2 minutes)

1. **Ask:** Are the following sets related or unrelated by multiplication?
 - a. 1, 4, 16 (Answer: Related)
 - b. 3, 6, 8 (Answer: Unrelated)
2. **Ask:** How do you know the set of numbers in b are unrelated by multiplication? Raise your hand to answer. (Example answer: there is no common number to multiply 3 to get 6 and 6 to get 8, you multiply $3 \times 2 = 6$ but $6 \times 2 = 12$ not 8)
3. **Say:** Good job today pupils! You learnt how to find the relation between a set of numbers by multiplication!

| | | |
|--|--|-------------------------|
| Lesson Title: Relations of Sets of Numbers Involving Division | Theme: Relations of Sets of Numbers | |
| Lesson Number: M-05-084 | Class: Class 5 | Time: 35 minutes |

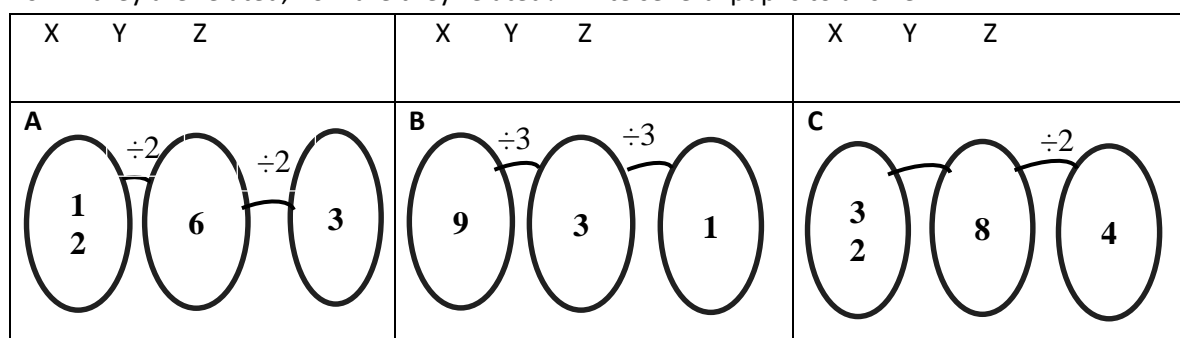
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|  Learning Outcomes By the end of the lesson pupils, will be able to identify and describe the relation of sets of numbers involving division. |  Teaching Aids None |  Preparation Draw the diagram in the Introduction to the New Material on the board. |
|--|--|--|

Opening (2 minutes)

1. Write 'relation' on the board.
2. **Ask:** What does this word mean? Raise your hand to answer.
(Possible answers: Connection, similarities)
3. **Say:** When given two or more sets of numbers, we can find the similarities or connections between the different sets of numbers provided.
4. **Say:** In mathematics, relations between numbers can take different forms. Today's lesson will touch on the relation of sets of numbers involving division.

Introduction to the New Material (13 minutes)

1. **Say:** Any given set of numbers either has a relation or doesn't have a relation.
2. **Say:** We are going to look at some numbers to determine whether they are related or not by division.
3. **Say:** Study the diagram below and determine whether the numbers in each set are related or not by division.
4. **Ask:** If they are related, how are they related? Invite several pupils to answer.



5. Listen to all the answers provided by the pupils.
6. **Say:** There is a relation between the numbers in Set A: the relation between 12, 6 and 3 in each subsequent number is the result of the prior number divided by 2.
7. **Say:** Considering Set B, it can be agreed that there is a relation between the set of numbers. The relation between 9, 3 and 1 is that each number is divided by 3 to arrive at the subsequent number, as shown in the diagram.
8. **Say:** It can be seen from Set C that the numbers are **not** related by division. Each subsequent number is not the result of dividing the prior number by a particular number. For example, 32

was divided by 4 to get 8. So for the set of numbers to be related, 8 would also need to be divided by 4, which would give us 2 and not 4, as shown in the diagram.)

9. **Say:** The examples we just worked out show that while some sets of numbers are related by division (A and B), others are also not related by division (C).

Guided Practice (10 minutes)

1. Ask pupils to mention three numbers between and including 1 and 30. Accept all groups mentioned and write them on the board. Randomly pick out three sets mentioned by the pupils.
Example:
 - a. A= 20, 10, 5
 - b. B= 6, 3, 1
 - c. C= 25, 5, 1
2. **Say:** Group these sets of numbers into those that are related by division and those unrelated by division. (The sets of numbers in A and C are related, those in B are unrelated.)
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. **Ask:** Why are the numbers in Sets A and C related? Raise your hand to answer. (Answer: With Set A, dividing the prior number by 2 results in the following number, and with Set C, dividing the prior number by 5 results in the following number.)
5. **Ask:** Why are the numbers in Set B not related? Raise your hand to answer. (Answer: Because 6 is divided by 2 to give us 3 and 1 is not a result of dividing 3 by 2, thereby making the set of numbers unrelated by division.)




Independent Practice (8 minutes)

1. Write: Find the relation between the following numbers:
 - a. A= 16, 8, 4 (Answer: Division by 2)
 - b. B= 50, 10, 2 (Answer: Division by 5)
 - c. C = 16, 8, 2 (Answer: No relation by division)
2. Ask pupils to write their answers in their books and work individually.
3. Have pupils exchange their books and check their work while you read the answers aloud.

Closing (2 minutes)

1. **Ask:** Are the following sets related or unrelated by division?
 - a. 16, 4, 1 (Answer: Related)
 - b. 24, 6, 1 (Answer: Unrelated)
2. **Ask:** How do you know the set of numbers in b are unrelated by division? Raise your hand to answer. (Example answer: there is no common number to divide 24 to get 6 and 6 to get 1, you divide 24 by 4 = 6 but 6 divided by 4 is not 1)
3. **Say:** Good job today pupils! You learnt how to find the relation between a set of numbers by division!

| | | |
|--|--|-------------------------|
| Lesson Title: Relations of Sets of Numbers Involving the 4 Operations | Theme: Relations of Sets of Numbers | |
| Lesson Number: M-05-085 | Class/Level: Class 5 | Time: 35 minutes |

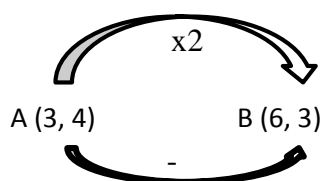
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|  <p>Learning Outcomes By the end of the lesson, pupils will be able to identify and write a set of ordered pairs that obey a given rule or relation involving the four operations.</p> |  <p>Teaching Aids None</p> |  <p>Preparation Draw the diagram from the Introduction to the New Material on the Board.</p> |
|--|--|--|

Opening (2 minutes)

1. Write 'relation' on the board.
2. **Ask:** What does this word mean? Raise your hand to answer.
(Example answers: Connection, similarities)
3. **Say:** When given two or more sets of numbers, we can find the similarities or connections between the different sets of numbers provided.
4. **Say:** In mathematics, relations between numbers can take different forms. Today's lesson will touch on the relation of sets of ordered pairs that obey a given rule involving the four operations (addition, subtraction, multiplication, division).

Introduction to the New Material (13 minutes)

1. **Say:** In this lesson, we will be making use of ordered pairs of numbers. Ordered pairs fall within set rules and are written in this form (x, y).
2. Draw the example below on the board:



3. **Say:** The first number, the x value, of the first pair of numbers, A, should always relate to the first number, or x value, of the second pair of numbers, B. **Say:** In the example above, 3 is related to 6 by multiplying 3 by 2.
4. **Say:** Also the second number, the y value, of the first pair of numbers, A, should always relate to the second number, or y value, of the second pair of numbers, B. **Say:** In the example above, 4 is related to 3 by subtracting 1 from 4.
5. Write on the board: A (4, 6) and B (6, 2)
6. **Say:** Consider these new sets of ordered pairs of numbers: A (4, 6) and B (6, 2)
7. **Ask:** What rule do these pairs of numbers obey? Point to the x values of Set A and B (4 and 6) and **ask:** Can anyone tell us what the relation between these two numbers is? Raise your hand to answer. (Example answers: 2 was added to 4 to arrive at 6, therefore, the relation is the addition of 2)

8. Point to the **y** values of Set A and B (6 and 2), and **ask**: Can anyone tell us what the relation between these two numbers is? Raise your hand to answer. (Answer: There are two example answers: 6 can be divided by 3 to give us 2, and also 4 can be subtracted from 6 to give us 2. Therefore, the relation of the y values can either be dividing by 3 or subtracting by 4.)
9. **Say**: Let us make 2 ordered pairs of numbers between and including 1 and 10. (Allow pupils to give their choices and then choose (2, 7) and (3, 5).)
10. Write on the board: (2, 7) and (3, 5).
11. **Ask**: Who can give the relation between these ordered pairs? Raise your hand to answer. (Answer: $x = +1, y = -2$.)
12. **Say**: With the x values, 1 was added to 2 to arrive at 3 ($2 + 1 = 3$). With the y values, 2 was subtracted from 7 to arrive at 5 ($7 - 2 = 5$).
13. **Say**: The relation between the ordered pairs (2, 7) and (3, 5) is $x = +1, y = -2$

Guided Practice (11 minutes)

1. Put pupils in pairs.
2. Write and **say**: Find the rule for the following ordered pairs of numbers:
 - a. A= (1, 4) and (4, 12)
 - b. B= (5, 9) and (4, 3)
3. While pupils are working in their exercise books, walk around the room to check their work and assist those who are struggling. Leave pupils to work on their own for several minutes, and then **say**: Please look forward and let us all solve it on the board.
4. **Say**: Let us start with the x values of A. Here, 1 was multiplied by 4 to arrive at 4, so the rule for x is 'multiplied by 4'.
5. **Say**: Still on A, with the y values, 4 was multiplied by 3 to arrive at 12, and also 8 can be added to 4 to arrive at 12. So the rule for that pair is either 'add 8' or 'multiply by 3'.
6. **Say**: With the x values of Set B, 1 was subtracted from 5 to arrive at 4, so the rule for x is 'subtract 1'.
7. **Say**: In relation to the y value of Set B, 9 can be divided by 3 to arrive at 3, or 6 can be subtracted from 9 to arrive at 3. So the rule for y is 'divide by 3' or 'subtract 6'.

Independent Practice (7 minutes)




1. **Say**: Using any numbers from and including 1 to 5, write a set of ordered pairs using the rule $x = +4, y = \div 2$. (Example answers: (1, 4) and (5, 2); (1, 2) and (5, 1))
2. **Ask**: What is the rule for the following ordered pairs: (3, 5) (5, 10)? Raise your hand to answer. (Answer: $x = +2, y = x \times 2$ or $+5$)
3. Have pupils to exchange their exercise books and check their work as you read the answers aloud.

Closing (2 minutes)

1. **Say**: We looked at how to identify and write ordered pairs that follow a rule involving the four operations.

2. **Say:** We also found out that some ordered pairs can follow more than one rule.
3. **Say:** Ordered pairs are written in the form (x, y) .
4. **Say:** The x values can have a different rule from the y values.
5. **Say:** Good job today pupils! You learnt how to write rules for sets of ordered pairs.

| | | |
|---|--|-------------------------|
| Lesson Title: Estimating Temperatures in Celsius | Theme: Measurement and Estimation | |
| Lesson Number: M-05-087 | Class/Level: Class 5 | Time: 35 minutes |

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|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will estimate temperature in Celsius. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

1. Write: What is temperature? Raise your hand to answer. (Answer: how cold or hot something is)
2. **Ask:** How do you usually measure temperature? Raise your hand to answer. (Answer: thermometer)
3. **Ask:** Can you think of any units of temperature? Raise your hand to answer. (Answer: degrees Celsius, Fahrenheit or Kelvin)
4. **Say:** Today's lesson will be about estimating temperatures in degrees Celsius.

Introduction to the New Material (10 minutes)

1. **Say:** The freezing point of water is 0°C . Its boiling point is 100°C . Body temperature is 37°C .
2. **Ask:** Estimate the temperature of a cup of tea. Is it 0°C , 37°C or 80°C ? (Answer: 80°C)
3. **Ask:** Why is it not 0°C ? Raise your hand to answer. (Answer: It would be like ice.)
4. **Ask:** Why is it not 37°C ? Raise your hand to answer. (Answer: Water does not boil at that temperature.)
5. **Ask:** Estimate the temperature of a child with malaria. Is it 30°C , 40°C , or 12°C ?
6. **Ask:** If the child is sick, will his body be hot or cold? Raise your hand to answer. (Answer: hot)
7. **Ask:** So what will be the temperature of the body? Raise your hand to answer. (Answer: 40°C)
8. **Say:** 30°C and 12°C are not right because they are below normal body temperature of 37°C .

Guided Practice (10 minutes)

1. Write and **say:** Work in pairs to estimate the following temperature:
 - a. Water in a fridge for 30 minutes: 5°C , 30°C , 40°C ? (Answer: 5°C)
 - b. A cup of tea that has sat for 30 minutes: 10°C , 30°C , 60°C ? (Answer: 60°C)
2. Ask pupils to explain the answer they chose using a complete sentence.
3. Invite pupils to share why they think they chose the correct answer.
4. Discuss the solution with pupils.

Independent Practice (10 minutes)




1. **Say:** I love drinking hot Milo before bed. My brother prefers a cold chocolate drink.
2. **Ask:** What should the temperatures be of the Milo and the chocolate drink for someone who likes it cold and for someone who likes it hot. Explain your reasoning.

3. **Ask:** What temperature do you like your beverages and why? Raise your hand to answer.
(Example answers: Hot: 80 – 100 °C, Warm 50 – 60 °C, Cool: 5 - 20 °C)
4. Invite pupils to write their answers on the board.
5. Walk around and check the pupils' work. Make corrections where necessary.

Closing (2 minutes)

1. Invite pupils to come to the board and explain his or her answer.
(Answer: Cold: 5-10 °C and Hot: 80- 100 °C)
2. **Say:** Good job today pupils! Now we can estimate temperatures when there is no thermometer.

| | | |
|--|--|-------------------------|
| Lesson Title: Measurement and Comparison of Temperatures in Celsius | Theme: Measurement and Estimation | |
| Lesson Number: M-05-087 | Class: Class 5 | Time: 35 minutes |

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|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to measure and compare temperatures in Celsius. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write: What is temperature? Raise your hand to answer. (Answer: how cold or hot something is)
2. **Ask:** How do you usually measure temperature? Raise your hand to answer.
(Answer: thermometer)
3. **Ask:** Can you think of any units of temperature? Raise your hand to answer.
(Answer: degrees Celsius, Fahrenheit or Kelvin)
4. **Say:** Today's lesson will be about measuring and comparing temperatures in degrees Celsius.

Introduction to the New Material (10 minutes)

1. **Say:** 32^oF is equal to 0^oC. This is the freezing point for water. There is a formula that we use to convert degrees from Celsius to Fahrenheit, which is used in other parts of the world.
2. **Say:** To change Fahrenheit to Celsius we use the formula $C = \frac{5}{9} \times (F - 32)$
3. Write: If F = 32^oF, find C.
4. **Say:** Use the formula to find C, Celsius. We first plug in the degrees in Fahrenheit and then start calculating.

Say: We subtract 32 – 32 which gives us 0. Then we multiply $\frac{5}{9} \times 0$ which gives us 0.

9

a. $C = \frac{5}{9} \times (32 - 32)$

9

$C = \frac{5}{9} \times 0$

9

$C = 0^{\circ}\text{C}$

5. Say: Now you can see that 32^oF = 0^oC
6. Write: The temperature of a room is 68^oF. Use the formula to find the temperature in Celsius.

a. $C = \frac{5}{9} \times (F - 32)$

9

$C = \frac{5}{9} \times (68 - 32)$

9

$C = \frac{5}{9} \times 36$

9

$C = 20^{\circ}\text{C}$

Guided Practice (10 minutes)

1. **Say:** Work in pairs to solve the following:
2. Write: Water boils at 212° F. At what temperature does it boil in Celsius?
3. Go round, check work and assist when necessary.
4. Invite a pupil to write the answer on the board.
5. Discuss the solution with pupils.




Independent Practice (10 minutes)

1. Write: The average surface temperature of Earth is 57° F. Find the temperature in Celsius.
2. Ask pupils to write their answers on the board.
3. Walk around and check the pupils' work. Assist when necessary.

Closing (2 minutes)

1. Invite a pupil to come to the board to show his or her work.
2. **Say:** Any temperature can be converted to Celsius using this formula. Good job today pupils!

| | | |
|---|--|-------------------------|
| Lesson Title: Words Problems Involving Degrees Celsius | Theme: Measurement and Estimation | |
| Lesson Number: M-05-088 | Class: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to solve word problems involving calculations in degrees Celsius.</p> |  <p>Teaching Aids None</p> |  <p>Preparation Write the word problems for the lesson on the board.</p> |
|---|--|--|

Opening (3 minutes)

1. **Ask:** What is normal body temperature? Raise your hand to answer. (Answer: 37°C)
2. **Ask:** At what temperature does water freeze? Raise your hand to answer. (Answer: 0°C)
3. **Ask:** At what temperature does water boil? Raise your hand to answer. (Answer: 100°C)
4. **Say:** Today's lesson is solving word problems involving calculations in degrees Celsius.

Introduction to the New Material (10 minutes)

1. **Say:** Now that you know about some normal temperatures in Celsius for boiling, freezing and body temperatures; we will take that understanding and use it to solve problems involving calculations with temperature in Celsius.
2. Write the following on the board:
 - a. A nurse measured a mother's temperature to be 37°C and her son's 39°C . What is the total temperature of mother and son? (Answer: $37^{\circ}\text{C} + 39^{\circ}\text{C} = 76^{\circ}\text{C}$)
 - b. Who is at normal body temperature and who is not? By how much? Raise your hand to answer. (Answer: The mother is at normal temperature and the son is above normal. $39 - 37 = 2^{\circ}\text{C}$)
3. **Say:** You know that 37°C is normal body temperature. So we can determine that the mother has a normal temperature and her son's is higher and above normal. We can measure this by subtracting the mother's temperature from the son's temperature.
4. Write: $39 - 37 = 2^{\circ}\text{C}$
5. **Say:** Let's look at another example and use what we know to solve the problem involving Celsius.
6. Write: The temperature of the core of the earth is 100 times the temperature of the mantle of the earth.
7. **Ask:** What operation do we already know we will use and why? Raise your hand to answer. (Answer: multiplication; because it says times and that means multiplication)
8. Write and say: What is the temperature of the core if the mantle is 60°C ?
9. **Say:** We will write a mathematical expression as follows:
10. Write $60^{\circ}\text{C} \times 100 = 6000^{\circ}\text{C}$
11. **Ask:** How does this compare to the boiling point of water, which is 100°C ? Raise your hand to answer. (Answer: The temperature is 60 times as hot as boiling water.)

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. **Say** and write: Solve the following problems involving Celsius temperatures.
 - a. The temperature in Freetown is 29°C . At the same time in Pretoria, South Africa, the temperature is 10°C . What is the temperature difference between the two countries and which city is colder? (Answer: $29^{\circ}\text{C} - 10^{\circ}\text{C} = 19^{\circ}\text{C}$ difference, Pretoria is colder.)
 - b. If the temperature of Soweto in South Africa is two times as much as the temperature in Pretoria, what is the temperature in Celsius? (Answer: $10^{\circ}\text{C} \times 2 = 20^{\circ}\text{C}$)
 - c. What is the difference in temperature between Freetown and Soweto? ($29^{\circ}\text{C} - 20^{\circ}\text{C} = 9^{\circ}\text{C}$)
4. Invite a pupil to write the answer on the board.
5. Discuss the solution with pupils.




Independent Practice (10 minutes)

1. Write:
 - a. The temperature during the rainy season is 15°C , and it is 34°C during the dry season. What is the difference in temperature between these two seasons? (Answer: $34^{\circ}\text{C} - 15^{\circ}\text{C} = 19^{\circ}\text{C}$)
 - b. If the mildest season is a temperature that is 10°C less than double the temperature in the rainy season, what is the temperature of this mild season?
(Answer: First double the temperature of the rainy season. $15^{\circ}\text{C} \times 2 = 30^{\circ}\text{C}$. Then subtract 10°C from this. $30^{\circ}\text{C} - 10^{\circ}\text{C} = 20^{\circ}\text{C}$)
2. Invite pupils to write their answers on the board.
3. Check work and make necessary corrections.

Closing (2 minutes)

1. **Say:** Any given temperature can be measured in Celsius and we can solve word problems to help us understand the temperature in Celsius.
2. **Say:** Good job today pupils! You solved many story problems involving temperatures in Celsius.

| | | |
|---|------------------------------------|-------------------------|
| Lesson Title: Time Intervals in Months, Weeks and Days | Theme: Temperature and Time | |
| Lesson Number: M-05-089 | Class/Level: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to find the number of months, weeks and days between two events. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

- Ask:** How many hours are in a day? Raise your hand to answer. (Answer: 24 hours)
- Ask:** How many days are in a week? Raise your hand to answer. (Answer: 7 days)
- Ask:** How many weeks are in a month? Raise your hand to answer. (Answer: 4 weeks)
- Ask:** How many months are in a year? Raise your hand to answer. (Answer: 12 months)
- Say:** Today's lesson is to learn how to find the number of months, weeks and days between two events.

Introduction to the New Material (10 minutes)

- Say:** It is important to understand how to convert or change between months, weeks and days so we can understand how much time has passed. It also helps us calculate the time between two events. Let's practice first changing between months, weeks and days.
- Ask:** If I have 7 days, how many weeks is this? Raise your hand to answer. (Answer: 1 week)
- Ask:** If I have 14 days, how many weeks is this? Raise your hand to answer. (Answer: 2 weeks)
- Say:** So we can divide by 7 to find how many weeks in the total days.
- Ask:** How many months are there in 90 days? Raise your hand to answer. (Answer: 3 months because 90 divided by 30 is 3 months)
- Say:** Sometimes it is not so neat without a remainder. So we must try some calculations where there are remainder days or weeks.
- Ask:** How many weeks are in 72 days? How many additional days? Raise your hand to answer. (Answer: 10 weeks and 2 days)
- Say:** Add 13 weeks to 9 weeks. How many months is that? How many weeks left over?
- Say:** $13 + 9 = 22$ weeks. Then divide 22 by 4. The answer is 5 with a remainder of 2.
- Say:** 5 is the number of months and 2 is the number of weeks. So 22 weeks = 5 months and 2 weeks.

Guided Practice (10 minutes)

- Say:** Work in pairs to solve the following:
- Write:
 - Add 7 weeks to 4 weeks. How many months is the total? How many weeks left over? (Answer: 2 months and 3 weeks)
 - How many days total?

(Answer: 2 months = 60 days, 3 weeks = 21 days. Add $60 + 21 = 81$ days)

3. Tell a pupil to come and write the answer on the board.
4. Discuss the solution with pupils.




Independent Practice (10 minutes)

1. Write:
 - a. The premier league match was played today. If the next home game match up is after 45 days, how many months, weeks and days will that be? (Answer: 1 month, 2 weeks and 1 day)
 - b. There are 30 away games, spaced apart by 5-day intervals each. How many months long is the season? (Answer: 30×5 days = 150 days total. 150 divided by 30 = 5 month long season)
2. Walk around and check the pupils' work. Make any corrections necessary.
3. Invite pupils to come to the board and write their answers. Have the other pupils check their work as the others write on the board.

Closing (2 minutes)

1. **Say:** It is important that you know how to multiply and divide by 7 and 30 in order to solve problems involving intervals of time.
2. **Ask:** What is $180 \div 30$? Raise your hand to answer. (Answer: 6)
3. **Ask:** What is $63 \div 7$? Raise your hand to answer. (Answer: 9)
4. **Say:** Good job today pupils! You can now tell the amount of time between events.

| | | |
|--|------------------------------------|-------------------------|
| Lesson Title: Word Problems Involving Time Between 2 Events | Theme: Temperature and Time | |
| Lesson Number: M-05-090 | Class: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to solve word problems involving naming the time between two events. |  Teaching Aids None |  Preparation Write the story problems for the lesson on the board. |
|--|--|---|

Opening (3 minutes)

- Say:** To find the number of weeks when you have the days, divide the number of days by 7.
- Say:** To find the number of months when you have weeks, divide the number of weeks by 4.
- Say:** To find the number of days when you have weeks, multiply the number of weeks by 7.
- Say:** To find the number of weeks when you have months, multiply the number of months by 4.
- Ask:** If there are 21 days, how many weeks is that? Raise your hand to answer. (Answer: 3 weeks)
- Say:** Today's lesson is to solve word problems involving naming the time between 2 events.

Introduction to the New Material (10 minutes)

- Ask:** How many weeks in 3 months?
- Say:** First we need to find how many weeks are in a month. There are 4 weeks in a month on average, so we multiply 3 months by 4 weeks each to get 12 weeks' total.
- Say:** It takes 1 week and 4 days for a pupil to weed a piece of land. How many days did he use? We must first find how many days in the week, which is 7. Then we add it to the extra days, which is 4. So we get $7 + 4 = 11$ days total.
- Ask:** Schools opened on 1st September and went on break on 15th October. How many months, weeks and days did pupils spend in school?
- Say:** Add September's 30 days to October's 15 days to get 45 days. The 30 days gives 1 month. Then there are 15 days left in October. Let's see how many groups of 7 there are in 15. This gives us 2 weeks and 1 day left over.
- Say:** So, the answer is 1 month, 2 weeks and 1 day.
- Ask:** If a plane leaves Freetown on 28th October and stops in multiple cities before arriving in the USA on 2nd November, how many days does it take?
- Say:** There are 31 days in October so it takes 3 days in this month. If it arrives on 2nd of November, there are 2 days in November. $3 \text{ days} + 2 \text{ days} = 5 \text{ days total}$.

Guided Practice (10 minutes)

- Say:** Work in pairs to solve the following:
- Write:

- a. Mr. Johnson planted maize on May 1st and harvested it in August 15th. How long in months, weeks and days did he cultivate the crops? (Answer: 3 months, 2 weeks, 1 day; or you can say 14 weeks and 1 day; or you can say 99 days)
3. Go round and help pupils with the calculations.
4. Invite a pupil to come and write the answer on the board.
5. Discuss the solution with pupils.




Independent Practice (10 minutes)

1. Write:
 - a. A mother gets pregnant on January 1st and gives birth on September 8th. How long in months, weeks and days was she pregnant before giving birth?
(Answer: 9 months, 1 week and 1 day)
 - b. Convert 88 days into weeks and remaining days. (Answer: 12 weeks and 4 days)
 - c. Convert 88 days into months and remaining weeks and days. (3 months and 4 days)
 - d. The shorter school year would mean 39 weeks and 1 day of school. A longer school year would mean 300 days of school. How many days' difference is this? How many weeks difference is this?
(Answer: First find the number of days in the shorter school year:
 $39 \times 7 + 1 = 273 + 1 = 274$. Then subtract $300 - 274 = 26$ days. Divide 26 by 7 = 3 weeks and 5 days.)
2. Invite pupils to write their answers on the board. Tell other pupils to check their work as pupils explain their answers at the board.

Closing (2 minutes)

1. Invite a pupil to come to the board and show his or her work and explain.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Good job today pupils! You solved a number of story problems involving time between events.

| | | |
|---|--------------------------------------|-------------------------|
| Lesson Title: Counting Up to 1,000,000 Forwards and Backwards From Any Number in Multiples of 100 and 1000 | Theme: Numbers and Numeration | |
| Lesson Number: M-05-91 | Class/Level: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to count numbers to 1,000,000 forwards and backwards from any number in multiples of 100 and 1000. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (5 minutes)

- Say:** Let us all count by 10s from 100 to 200. (Answer: 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200)
- Say:** Let us all count by 1000 from 5000 to 15,000. (Answer: 5000, 6000, 7000, 8000, 9000, 10,000, 11,000, 12,000, 13,000, 14,000, 15,000)
- Say:** Let us count down by 50s from 1000 to 800. (Answer: 1000, 950, 900, 850, 800)
- Say:** Today you will learn how to count numbers forwards and backwards in multiples of 100 and 1000.

Introduction to the New Material (12 minutes)

- Say:** We are now going to count by bigger numbers up to one million.
- Say:** Write count by 2,000s from 500,000 to 510,000 in your exercise books.
- Ask:** If we are counting by 2000s, which place value will change each time? Raise your hand to answer. (Answer: The Thousands place)
- Say:** Who can come to the board to underline the Thousands place?
- Call on a pupil to underline the Thousands place. (Answer: 500,000).
- Say:** Now let us count up by 2,000s from 500,000 to 510,000.
- Ask:** What will be the first number? Raise your hand to answer. (Answer: 500,000)
- Ask:** What will be the second number? Raise your hand to answer. (Answer: 502,000)
- Ask:** Why? Raise your hand to answer.
(Answer: Because the number increases by 2000 each time, so 500,000 plus 2000 is 502,000.)
- Say:** Now let's continue together.
- Write on the board '500,000, 502,000, 504,000, 506,000, 508,000, 510,000' with Thousands place underlined.
- Ask:** What do you notice, how do the numbers change? Raise your hand to answer.
(Answer: The number in the 1000s place increases by 2 each time.)
- Say:** Let us try another example.
- Write on the board: Count down by 500 from 256,800 to 253,800
- Say:** Write the number in your exercise books.
- Ask:** We are counting down by 500, so which place value will be changing? Raise your hand to answer. (Answer: Hundreds place)

17. **Say:** Underline the hundreds place value then. (Answer: 256,800)
18. **Say:** Now let us count down by 500. What will be the first number? (Answer: 256,300)
19. **Say:** Let's start again. (Answer: 256,800, 256,300, 255,800, 255,300, 254,800, 254,300, 253,800)

Guided Practice (8 minutes)

1. **Say:** Now try these with your partner in your exercise books.
2. Write on the board: Complete the following:
 - a. Write: Count forwards by 400s from 898,000 to 900,000.
(Answer: 898,000, 898,400, 898,800, 899,200, 899,600, 900,000)
 - b. Write: Count backwards by 7,000 from 777,777 to 749,777
(Answer: 777,777, 770,777, 763,777, 756,777, 749,777)
 - c. Write: Count backwards by 9,000 from 898,989 to 862,989
(Answer: 898,989, 889,989, 880,989, 871,989, 862,989)
3. Ask any pupil to show how they got their answer on the board.
4. Ask pupils to compare their answers to those on the board.




Independent Practice (9 minutes)

1. Ask pupils to answer the following questions on their own
2. Write on the board:
 - a) Count up by 6000 from 906,363 to 924,363
(Answer: 906,363; 912,363; 918,363; 924,363)
 - b) Count down by 800 from 564,820 to 561,620
(Answers: 564,020; 563,220; 562,420; 561,620)
3. Write on the board: 'Complete the following:'
 - a) Write: 1,000,000, _____, 994,000, 991,000, _____, 985,000
(Answers: 997,000, 988,000)
 - b) Write: 545,454, 540,454, _____, 530,454, _____, _____
(Answers: 535,454; 525,454; 520,454)
4. Go round, check their answers and assist if necessary.
5. Have pupils to exchange their books and mark their work while you read the answers aloud.

Closing (3 minutes)

1. **Say:** Take your slates.
2. **Say:** If you find the rule, write it down and raise your slate for me to see.
3. Write on the board: Find the rule of the following:
 - a) 10,000, 15,000, 20,000, 25,000, 30,000 (Rule: Start at 10,000 and add 5,000.)
 - b) 345,000, 344,700, 344,400, 344,100, 343,800 (Rule: Start at 345,000 and subtract 300.)
4. **Say:** Good job today pupils! You learnt how to count forwards and backwards by large intervals.

| | | |
|---|--------------------------------------|-------------------------|
| Lesson Title: Counting Up to 1,000,000 Forwards and Backwards From Any Number in Multiples of 10,000 and 100,000 | Theme: Numbers and numeration | |
| Lesson Number: M-05-092 | Class/Level: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to count to 1,000,000 forwards and backwards from any number in multiples of 10,000 and 100,000. |  Teaching Aids None |  Preparation None |
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Opening (5 minutes)

- Say:** In our last lesson, we were counting forward and counting backward in multiples of 100 and 1,000. Let us see if we can remember how to do that.
- Say:** Let us all count up by 500 from 10,000 to 15,000.
(Answer: 10,000, 10,500, 11,000, 11,500, 12,000, 12,500, 13,000, 13,500, 14,000, 14,500, 15,000)
- Say:** Let us all count by 1,000 from 5,000 to 15,000.
(Answer: 5,000, 6,000, 7,000, 8,000, 9,000, 10,000, 11,000, 12,000, 13,000, 14,000, 15,000)
- Say:** Today you will learn how to count numbers forwards and backwards in multiples of 10,000 and 100,000.

Introduction to the New Material (12 minutes)

- Write on the board: We are now going to count by bigger numbers up to one million.
- Say:** Write 'Count by 50,000s from 500,000 to 800,000' in your exercise books.
- Ask:** If we are counting by 50,000, which place value will change each time? Raise your hand to answer. (Answer: The Ten Thousands place)
- Say:** Who can come to the board to underline the Ten Thousands place?
- Call on a pupil to underline the Ten Thousands place. (Answer: 500,000)
- Say:** Now let us count up by 50,000s from 500,000 to 800,000.
- Ask:** What will be the first number? Raise your hand to answer. (Answer: 500,000)
- Ask:** What will be the second number? Raise your hand to answer. (Answer: 550,000)
- Ask:** Why? Raise your hand to answer. (Answer: Because the number increases by 50,000 each time, and so 500,000 plus 50,000 is 550,000.)
- Say:** Now let's continue together.
- Write on the board: 500,000, 550,000, 600,000, 650,000, 700,000, 750,000, 800,000
- Ask:** What do you notice, how do the numbers change? Raise your hand to answer.
(The number in the 10,000s place increases by 5 each time)
- Say:** Let us try another example.
- Write on the board: Count down by 100,000 from 459,924 to 159,924
- Say:** Write the numbers in your exercise books.
- Ask:** We are counting down by 100,000, so which place value will be changing? Raise your hand to answer. (Answer: Hundred Thousands place)

17. **Say:** Underline the Hundred Thousands place value then. (Answer: 459,924)
18. **Say:** Now let us count down by 100,000. What will be the first number? Raise your hand to answer. (Answer: 459,924)
19. **Say:** Let's start again. (Answer: 459,924, 359,924, 259,924, 159,924)

Guided Practice (8 minutes)

1. **Say:** Now try these with your partner in your exercise books.
2. Write on the board: 'Complete the following:'
 - a. Write: Count forwards by 200,000 from 100,000 to 900,000
(Answer: 100,000; 300,000; 500,000; 700,000; 900,000)
 - b. Write: Count backwards by 20,000 from 489,566 to 409,566
(Answer: 489,566; 469,566; 449,566; 429,566; 409,566)
 - c. Write: Count backwards by 200,000 from 998,990 to 198,990
(Answer: 998,990; 798,990; 598,990; 398,990; 198,990)
3. Ask any pupil from any pair to show how they got their answer on the board.
4. Ask pupils to compare their answers while the others write on the board.




Independent Practice (9 minutes)

1. **Say:** Now answer the following in your exercise books.
2. Write on the board:
 - a. Count up by 40,000 from 238,994 to 358,994
(Answer: 238,994; 278,994; 318,994; 358,994)
 - b. Count down by 800 from 564 820 to 561 620
(Answers: 564,020; 563,220; 562,420; 561,620)
3. Write on the board: Complete the following:
 - a. Write: _____, 437475, 637475, _____
(Answers: 237,475; 837,475)
 - b. Write: 787878, _____, 707878, 667878, _____, _____
(Answers: 747,878; 627,878; 587,878)
4. Go around, check pupils' answers and assist if necessary.
5. Have pupils exchange their exercise books and mark their work as you read the answers aloud.

Closing (3 minutes)

1. **Say:** Take your slates.
2. **Say:** If you find the rule, write it down and raise your slate for me to see.
3. Write on the board: Find the rule of the following:
 - a. Write: 888,888, 788,888, 688,888, 588,888 (Rule: Start at 888,888 and subtract 100,000.)
 - b. Write: 345,855, 375,855, 405,855, 435,855 (Rule: Start at 345,855 and add 30,000.)
4. **Say:** Good job today pupils! You learned how to count forwards and backwards by large intervals.

| | | |
|--|--------------------------------------|-------------------------|
| Lesson Title: Reading and Writing Numbers Up to 1 Million | Theme: Numbers and Numeration | |
| Lesson Number: M-05-093 | Class/Level: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to read and write numbers up to 1 million. |  Teaching Aids None |  Preparation Take 10 sheets of paper. On each paper write one of the following: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. |
|--|--|--|

Opening (3 minutes)

1. **Say:** Read the following numbers aloud:
 - a. 48,200 (Answer: Forty-eight thousand, two hundred)
 - b. 59,902 (Answer: Fifty-nine thousand, nine hundred and two)
 - c. 22,222 (Answer: Twenty-two thousand, two hundred and twenty-two)
2. **Say:** Today you will be able to read and write numbers up to 1 million.

Introduction to the New Material (10 minutes)

1. Invite any 6 pupils to volunteer.
2. **Say to the first:** Give me any number between 1 and 9.
3. **Say to the each of the five:** Give me any number between 0 and 9.
4. Write the numbers on the board to make a 6-digit number. (Example answer: 574,909)
5. **Ask:** Who can read this number?
6. Invite 2 different pupils to read the number. (Answer: Five hundred and seventy-four thousand, nine hundred and nine)
7. Ask all the pupils to say the number together.
8. Then write the number in words on the board. (Answer: Five hundred and seventy-four thousand, nine hundred and nine)
9. Choose another set of 6 pupils.
10. **Say to the first:** Give me any number between 1 and 9.
11. **Say to the each of the five:** Give me any number between 0 and 9.
12. Write the numbers on the board to make a 6-digit number. (Example answer: 357,899)
13. **Ask:** Who can read this number?
14. Invite 2 different pupils to read the number. (Answer: Three hundred and fifty-seven thousand, eight hundred and ninety-nine)
15. **Ask** pupils to write the number 'three hundred and fifty-seven thousand, eight hundred and ninety-nine' in figures. Raise your hand to answer. (Answer: 357,899)
16. Read the number to pupils again: Three Hundred and fifty-seven Thousand, eight Hundred and ninety-nine.

Guided Practice (10 minutes)

1. Put pupils in pairs to do the following in their exercise books.
2. Write on the board: Write the following number names in figures:

- a. One hundred and seventeen thousand, five hundred and six. (Answer: 117,506)
 - b. Five hundred and one thousand, five hundred and one. (Answer: 501,501)
 - c. Two hundred thousand, and two. (Answer: 200,002)
3. Write on the board: Write the following numbers in words:
 - a. 101,00 (Answer: One hundred and one thousand, one hundred)
 - b. 593,000 (Answer: Five hundred and ninety-three thousand)
 - c. 201,020 (Answer: Two hundred and one thousand, and twenty)
 4. Walk around the room, check pupils' work, discuss with them and assist where necessary.
 5. As you walk around, invite 6 different pairs to write their answers on the board.




Independent Practice (8 minutes)

1. Ask pupils to do the following in their exercise books:
2. Write the following in words:
 - a. 870,009 (Answer: Eight hundred and seventy thousand and nine)
 - b. 252,344 (Answer: Two hundred and fifty two thousand, three hundred and forty-four)
 - c. 675,091 (Answer: Six hundred and seventy five thousand and ninety-one)
3. Write the following in figures:
 - a. One million (Answer: 1,000,000)
 - b. Five hundred and fifty thousand and five (Answer: 550,005)
 - c. Nine hundred and seventy seven thousand, one hundred and seventy (Answer: 977,170)
4. Walk around the class and check on pupils.
5. Ask pupils to write their answers on the board and ask the others to pay attention.
6. Have pupils exchange their books and check their work while you read the answers aloud.

Closing (4 minutes)

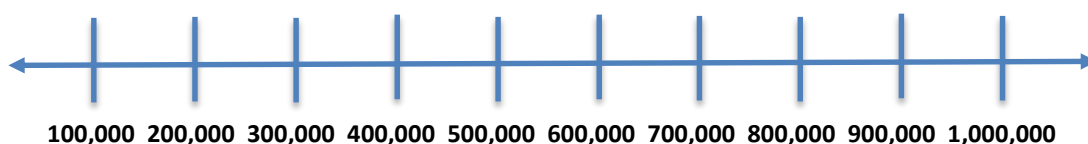
1. Play the following game with the pupils:
2. Take the 10 sheets of paper and mix them up.
 - a) Select any six pupils (three boys and three girls).
 - b) Ask each pupil to choose any of the sheets.
 - c) Let the pupil hold the sheet so other pupils can see.
 - d) Arrange the pupils in any order.
 - e) **Ask:** What number do you see?
 - f) Ask pupils to write down the number in both figure and word form.
 - g) If there is time, have pupils change their positions to change the number, and replay the game.

| | | |
|---|--------------------------------------|-------------------------|
| Lesson Title: Compare, Order and Locate Numbers on a Number Line | Theme: Numbers and Numeration | |
| Lesson Number: M-05-094 | Class/Level: Class 5 | Time: 35 minutes |

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|  Learning Outcomes By the end of the lesson, pupils will be able to compare, order and locate numbers on a number line up to 100,000. |  Teaching Aids None |  Preparation Draw number lines from the lesson on the board. |
|--|--|---|

Opening (5 minutes)

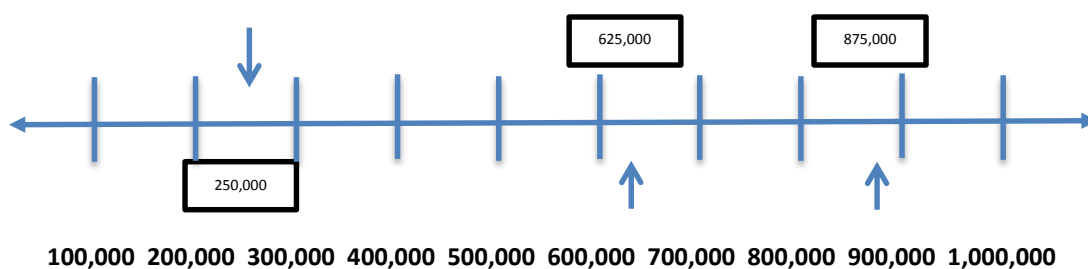
1. Select a few pupils to come to the board.
2. Draw straight lines on the board and divide them into equal portions.
3. **Say:** Let us place the following numbers on the number line: 100,000, 200,000, 300,000, 400,000, 500,000, 600,000, 700,000, 800,000, 900,000, and 1,000,000.



4. **Say:** Today you will learn how to compare, order and locate numbers on the number line.

Introduction to the New Material (10 minutes)

1. Use the number lines drawn on the board for this section.
2. Write on the board: 'Place the following numbers on the number line: 250,000, 625,000, 875,000'.



3. For 250,000, do the following:
4. **Ask:** Where would we place 250,000? Raise your hand to answer.
(Answer: Between 200,000 and 300,000)
5. **Ask:** Would it be closer to 200,000 or 300,000? Raise your hand to answer.
(Answer: In the middle)
6. **Ask:** Why? Raise your hand to answer.
(Answer: Because 250,000 is exactly half of the distance between 200,000 and 300,000.)
7. For 625,000, do the following:
8. **Ask:** Where would we place 625,000? Raise your hand to answer.
(Answer: Between 600,000 and 700,000)
9. **Ask:** Would it be closer to 600,000 or 700,000? Raise your hand to answer.

(Answer: Closer to 600,000)

10. **Ask:** Why? Raise your hand to answer.

(Answer: Because 625,000 is less than 650,000, which is halfway between 600,000 and 700,000.)

11. For 875,000, do the following:

12. **Ask:** Where would we place 875,000? Raise your hand to answer.

(Answer: Between 800,000 and 900,000)

13. **Ask:** Would it be closer to 800,000 or 900,000? Raise your hand to answer.

14. (Answer: Closer to 900,000)

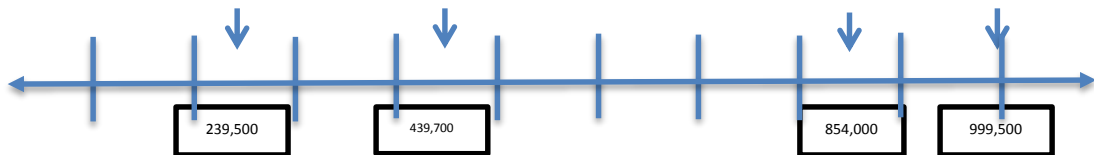
15. **Ask:** Why? Raise your hand to answer. (Answer: Because 875,000 is more than 850,000, which is halfway between 800,000 and 900,000.)

Guided Practice (5 minutes)

1. Ask pupils to work with a partner to do the following:

a) **Say:** Draw and label a number line in intervals of 100,000 from 100,000 to 1,000,000.

b) **Say:** Place the numbers below on a number line: 854,000, 439,700, 239,500, 999,500.



100,000 200,000 300,000 400,000 500,000 600,000 700,000 800,000 900,000 1,000,000

c) **Write:** Use the number line to write the numbers in order from least to the greatest.

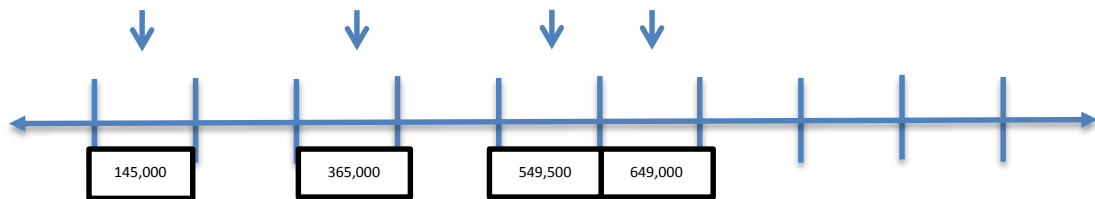
(Answer: 239,500, 439,700, 854,000, 999,500)

2. Visit each group, check on their work, discuss with them and assist where necessary.
3. Ask a member from any group to come to the board and copy their answer on the board.

Independent Practice (10 minutes)

1. **Say:** Now try this in your exercise books:

a) Place the following numbers on a number line: 365,000, 145,000, 649,000, 549,500.



100,000 200,000 300,000 400,000 500,000 600,000 700,000 800,000 900,000 1,000,000

b) Write on the board: 'Use the number line to write these numbers in order from least to the greatest.' (Answer: 145,000, 365,000, 549,500, 649,000)




c) Write: Place the numbers below on a number line: 725,000, 425,500, 245,000, 999,500.

2. Ask pupils to solve them independently in their exercise books.
3. Go round and check pupils' work, mark and do necessary corrections.

Closing (5 minutes)

1. Call those who got the answers correct to come to the board and show how they did it.

| | | |
|--|--------------------------------------|-------------------------|
| Lesson Title: Round Whole Numbers Up to 1 Million to the Nearest 10, 100 and 100,000 (Revision) | Theme: Numbers and Numeration | |
| Lesson Number: M-05-095 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to round whole numbers up to 1 million to the nearest 10, 100, and 100,000. |  Teaching Aids None |  Preparation Draw the tables from the guided practice and independent practice on the board (without the answers). |
|---|--|---|

Opening (4 minutes)

- Write on the board: Round 24,955 to the nearest 10. Raise your hand to answer. (Answer: 24,960)
- Write: Round 24,955 to the nearest 1000. Raise your hand to answer. (Answer: 25,000)
- Ask:** What happens to the ones digit when we round a number to the nearest 10? Raise your hand to answer. (Answer: It becomes 0)
- Ask:** What happens when you round to the nearest 100? Raise your hand to answer. (Answer: The digits in the Tens and ones place all become 0)
- Say:** Today you will learn how to round numbers up to 1 million to the nearest 10, 100 and 100,000 place value.

Introduction to the New Material (8 minutes)

- Write on the board: Round 338,576 to the nearest 100.
- Invite a pupil to read the number. (Answer: Three hundred and thirty-eight thousand, five hundred and seventy-six)
- Say:** Now we will round 338,576 to the nearest 100.
- Ask:** Which Hundreds is 338,576 between? Raise your hand to answer. (Answer: 338,500 and 338,600)
- Say:** Underline the digit in the Hundreds place. (Answer: 338,576)
- Say:** Since the digit in the Hundreds place is 5, we round up. This means we replace the Tens and Ones digits with 0 and add one to the digit in the Hundreds place. So 338,576 rounded to the nearest 100 is 338,600.
- Say:** Now let's round 338,576 to the nearest 10.
- Ask:** Which digit is in the Tens place? Raise your hand to answer. (Answer: 7)
- Say:** To round 338,576 to the nearest 10, we first consider the digit in the ones place.
- Underline 6. (338,576).
- Say:** Since the digit in the ones place is 6, which is greater than 5, we round up. This means we replace the ones digit with 0 and add one to the digit in the Tens place, 7. So 338,576 rounded to the nearest 10 is 338,580.
- Say:** Now let us round 338,576 to the nearest 100,000.
- Ask:** What digit is in the Hundred Thousands place? Raise your hand to answer. (Answer: 3)

14. **Say:** Since the digit in the Hundred Thousands place is 3, which is less than 5, we round down. This means we replace the Ten Thousands, Thousands, Hundreds, Tens and Ones digits with 0 and keep the same digit in the Hundred Thousands place. So 338,576 rounded to the nearest 100,000 is 300,000.

Guided Practice (10 minutes)

- Put pupils in pairs.
- Ask each pair to round the numbers in the first column of the following table to the nearest 10, 100, 1000, and 100,000.

| Number | Nearest 10 | Nearest 100 | Nearest 1000 | Nearest 100,000 |
|----------------|------------|-------------|--------------|-----------------|
| 549,088 | 549,090 | 549,100 | 549,000 | 500,000 |
| 982,289 | 982,290 | 982,300 | 982,000 | 1,000,000 |
| 712,009 | 712,010 | 712,000 | 712,000 | 700,000 |
| 507,089 | 507,090 | 507,100 | 507,000 | 500,000 |
| 228,014 | 228,010 | 228,000 | 228,000 | 200,000 |

- Walk around the room, discuss with pupils and assist where necessary.

Independent Practice (8 minutes)

- Say:** Now try these in your exercise books individually
- Write on the board: Round these numbers to the nearest 10, 100, 1000, and 100,000: 200,004, 540,859, 304,050, 894,827. (Answer: See table below.)




| Number | Nearest 10 | Nearest 100 | Nearest 1000 | Nearest 10,000 | Nearest 100,000 |
|----------------|------------|-------------|--------------|----------------|-----------------|
| 200,004 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| 540,859 | 540,860 | 540,900 | 541,000 | 540,000 | 500,000 |
| 304,050 | 304,050 | 304,100 | 304,000 | 300,000 | 300,000 |
| 894,827 | 894,830 | 894,900 | 895,000 | 900,000 | 900,000 |

- Have pupils to exchange their books and check their work as you read the answers aloud.

Closing (3 minutes)

- Invite 2 pupils to explain how they rounded 304,050 and 894,827.

| | | |
|--|--|-------------------------|
| Lesson Title: Properties of Prime Numbers | Theme: Numbers and Numeration: Prime Numbers | |
| Lesson Number: M-05-096 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to identify properties of prime numbers. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (2 minutes)

- Write on the board: Find the factors of the following numbers: 12, 15, 11
 - 12 (Answer: 1, 2, 3, 4, 6, 12)
 - 15 (Answer: 1, 3, 5, 15)
 - 11 (Answer: 1, 11)
- Say:** Today, we will be learning about the properties of prime numbers less than 100.

Introduction to the New Material (8 minutes)

- Write 'Prime numbers' on the board.
- Ask:** What is a prime number? Raise your hand if you think you know the answer.
- Pupils may not be familiar with the term, but take about three definitions/descriptions from pupils who think they know.
- Say:** Write the definition of prime numbers in your notebooks.
- Say** and write: A prime number is a natural number that has exactly 2 factors, itself and 1 (Underline exactly)
- Say:** Say the definition together.
- Say:** A natural number is a counting number, such as 1, 2, 3, 4, and so on, and does not include 0, negative numbers, or fractions.
- Say:** Now, when we said 'exactly' a minute ago, that means the factors have to be only 2, not less than or more than 2.
- Say:** Now let's find some prime numbers.
- Write '1' on the board.
- Say:** One is a natural number. Let us find the factors of 1. One only has a factor of 1, and not exactly 2 as the definition states, so 1 is not a prime number.
- Say:** Now 2. Two has factors of 1 and 2, which is exactly 2 factors, so 2 is a prime number. It is important to note that 2 is a special prime number, because it is the only even prime number.
- Say:** Now see if 3 is a prime number.
- Ask:** What are the factors of 3? Raise your hand to answer. (Answer: 1 and 3)
- Say:** Since there are exactly 2 factors, 1 and 3, we can say that 3 is a prime number.
- Say:** Let's try another number.
- Write '9' on the board.
- Ask:** What are the factors of 9? Raise your hand to answer. (Answer: 1, 3, 9)
- Ask:** How many factors does 9 have? Raise your hand to answer. (Answer: 3)
- Ask:** Is 9 a prime number? Raise your hand to answer. (Answer: No)

21. **Ask:** Why? Raise your hand to answer. (Because it has 3, and not exactly 2, factors)

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. **Say:** Work with your partner to find all the prime numbers between 10 and 20.
(Answer: See table below.)

| Number | Factors | Prime? | Number | Factors | Prime? |
|--------|-------------------|--------|--------|--------------------|--------|
| 11 | 1, 11 | YES | 16 | 1, 2, 4, 8, 16 | NO |
| 12 | 1, 2, 3, 4, 6, 12 | NO | 17 | 1, 17 | YES |
| 13 | 1, 13 | YES | 18 | 1, 2, 3, 6, 9, 18 | NO |
| 14 | 1, 2, 7, 14 | NO | 19 | 1, 19 | YES |
| 15 | 1, 3, 5, 15 | NO | 20 | 1, 2, 4, 5, 10, 20 | NO |

3. Walk around the room, discuss with pupils and assist where necessary.
4. Invite a few groups share their answers on the board.




Independent Practice (8 minutes)

1. Ask pupils to do the following in their exercise books.
2. Write on the board: Find which of the following numbers are prime numbers: 22, 43, 99, 73, 55, 61 (Answers: 43, 73, 61)
3. Write on the board: Find one more prime number up to 100 that we haven't discussed today.

Closing (3 minutes)

1. **Ask:** What is a prime number? Raise your hand to answer.
(Answer: A prime number is a natural number that has exactly two factors, itself and 1)
2. **Ask:** How do you know any number is prime? Raise your hand to answer.
(Answer: When the number has exactly 2 factors, 1 and the number itself.)
3. **Say:** Good job today pupils! You learnt how to identify prime numbers up to 100.

| | | |
|--------------------------------|--------------------------------------|-------------------------|
| Lesson Title: Factors | Theme: Numbers and Numeration | |
| Lesson Number: M-05-097 | Class/Level: Class 5 | Time: 35 minutes |

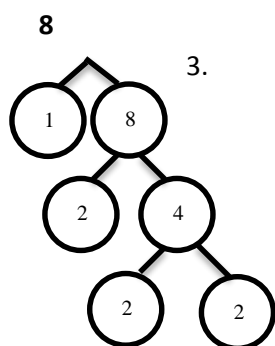
| | | |
|---|--|---|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to find factors of numbers up to 100.</p> |  <p>Teaching Aids None</p> |  <p>Preparation Draw the factor trees from the lesson on the board (without answers).</p> |
|---|--|---|

Opening (5 minutes)

1. Review multiplication tables from 6 to 12
2. **Say:** Today you will learn how to find factors of numbers up to 100.

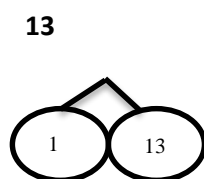
Introduction to the New Material (8 minutes)

1. **Ask:** Find the factors of 8
2. **Say:** We will use a factor tree to show the factors:



Say: To find the factors of 8, we can use a factor tree. First, we know that 1 is a factor. One times 8 gives 8 (write '1' and '8' on the board). We also know that 8 can be expressed as 2 times 4 (write '2' and '4') and 4 can be written as 2 times 2 (write '2' and '2').

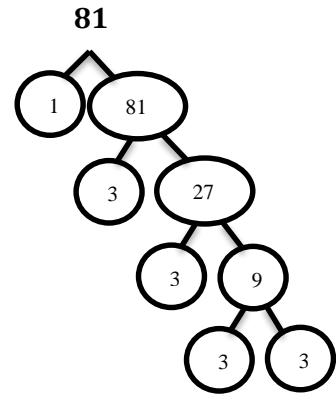
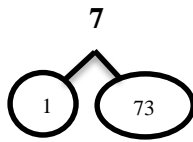
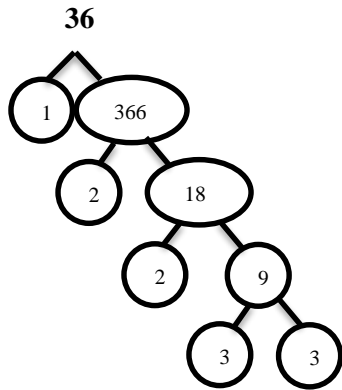
4. **Say:** Use the factor tree to find the factors of 13.
5. Write '13' on the board.



6. **Say:** To find the factors of 13, we can use the factor tree. First, we know that 1 is a factor. One times 13 gives 13. (Write '1' and '13' on the board.)
7. **Ask:** What 2 natural numbers can we multiply to get 13? Raise your hand to answer. (Answer: none)
8. **Say:** So the factors of 13 are only 1 and 13. This is exactly two factors, so what can we say about 13? (Answer: It is a prime number.)

Guided Practice (10 minutes)

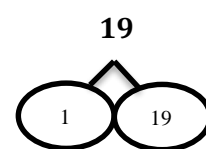
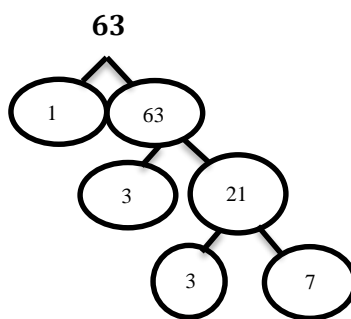
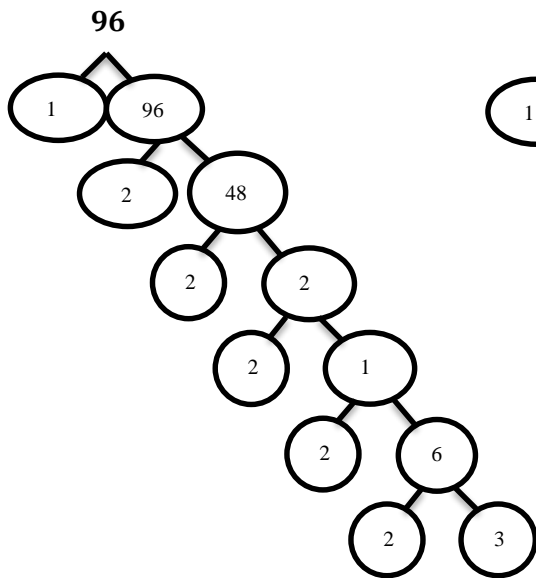
1. Put pupils in pairs.
2. **Say:** Use the factor tree to find the factors of the numbers I'm writing on the board.
3. Write on the board: 36, 73, 81



- Say:** Convince your partner that you have found all the possible factors.
- Walk around the room, discuss with pupils and assist where necessary.

Independent Practice (8 minutes)

- Say:** Use the factor tree to find the factors of the following:
- Write on the board: 96, 63, 19






- Call on pupils to draw their factor trees on the board and have the other pupils check their work against the answers on the board.

Closing (3 minutes)

1. **Ask:** Why are some factor trees so big and some so small? Raise your hand to answer. (Answer: When the number has many factors, the tree is bigger.)
2. **Say:** Look at all the factor trees. What do you notice? Raise your hand to answer. (Answer: Each number has at least two factors: 1 and the number itself.)
3. **Say:** Good job today pupils! Today you learnt how to use a factor tree to find all the factors of a number.

| | | |
|------------------------------------|--------------------------------------|-------------------------|
| Lesson Title: Prime Factors | Theme: Numbers and Numeration | |
| Lesson Number: M-05-098 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to identify properties of prime factors. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (5 minutes)

- Say:** In our last class, we talked about the size of factor trees.
- Ask:** What did we say about big factor trees? Raise your hand to answer.
(Answer: If the factor tree is big, then the number has many factors.)
- Ask:** What about small factor trees? Raise your hand to answer.
(Answer: The number has few factors.)
- Ask:** What about numbers that have exactly two factors? Raise your hand to answer.
(Answer: Those numbers are prime numbers.)
- Say:** Give me an example of a prime number.
- Invite about 4 pupils to answer.
(Example answers: 2, 3, 5, 7, 11, 13, 17)
- Say:** Today's lesson will be looking at prime factors and their properties.

Introduction to the New Material (8 minutes)

- Ask:** What are the factors of 8? Raise your hand to answer. (Answers: 1 and 8, 2 and 4)
- Say:** Now let's find the prime factors of 8. To find the prime factors of 8, we want to find all the prime numbers that, when multiplied together, give the original number.
- Say:** We know that the factors of 8 are 1, 2, 4, and 8. The numbers 4 and 8 are not prime numbers so let's see how to find the prime factors of 8.
- Write:** We know that $8 = 2 \times 4$, but 4 is not a prime number, but we can break it down further into 2×2 and they are both prime numbers. So we can say that $8 = 2 \times 2 \times 2$. Since 2 is a prime number, the prime factorisation of $8 = 2 \times 2 \times 2$
- Say:** Let's find the prime factors of 36. We know that:

$$36 = 2 \times 18$$

$$36 = 2 \times 2 \times 9$$

$$36 = 2 \times 2 \times 3 \times 3$$

- Say:** The prime factorisation of 36 is $2 \times 2 \times 3 \times 3$

Guided Practice (10 minutes)

- Put pupils in pairs.
- Say:** Do the following in your exercise books.

3. Write on the board: 'Find the prime factors of the following numbers: a. 40, b. 84, c. 99, d. 29, e. 60, f. 100'. (Answers: See below.)

| | | |
|---|---|--|
| a) $40 = 2 \times 20$ $= 2 \times 2 \times 10$ $= 2 \times 2 \times 2 \times 5$ | b) $84 = 2 \times 42$ $= 2 \times 2 \times 21$ $= 2 \times 2 \times 3 \times 7$ | c) $99 = 3 \times 33$ $= 3 \times 3 \times 11$ |
| d) $29 = 1 \times 29$ | e) $60 = 2 \times 30$ $= 2 \times 2 \times 15$ $= 2 \times 2 \times 3 \times 5$ | f) $100 = 2 \times 50$ $= 2 \times 2 \times 25$ $= 2 \times 2 \times 5 \times 5$ |

4. Walk around the room, discuss with pupils and assist where necessary.

Independent Practice (8 minutes)

- Say:** Do the following in your exercise books.
- Write on the board: Find the prime factors of the following numbers: a. 48, b. 18, c. 93, d. 59, e. 64, f. 97. (Answers: See below.)

| | | |
|--|--|-----------------------|
| a) $48 = 2 \times 24$ $= 2 \times 2 \times 12$ $= 2 \times 2 \times 2 \times 6$ $= 2 \times 2 \times 2 \times 2 \times 3$ | b) $18 = 2 \times 9$ $= 2 \times 3 \times 3$ | c) $93 = 3 \times 31$ |
| d) $59 = 1 \times 59$ | e) $64 = 2 \times 32$ $= 2 \times 2 \times 16$ $= 2 \times 2 \times 2 \times 8$ $= 2 \times 2 \times 2 \times 2 \times 4$ $= 2 \times 2 \times 2 \times 2 \times 2 \times 2$ | f) $97 = 1 \times 97$ |

3. Ask pupils to exchange their books and mark their work while you read the answers aloud.

Closing (5 minutes)

- Say:** Look at all the prime factors. What do you notice? Raise your hand to answer.
- Say:** Talk to the person next to you to list the things you notice about prime factors. (Example answers: each of the factors is prime, 1 is not a prime factor, some of the prime factors can be multiplied more than once)
- Say:** Good job today pupils! You learned how to find the prime factorisation of for numbers.

| | | |
|--|--|-------------------------|
| Lesson Title: Composite Numbers | Theme: Numbers and Numeration: Prime Numbers | |
| Lesson Number: M-05-099 | Class/Level: Class 5 | Time: 35 minutes |

| | | | | | |
|---|--|---|------------------------------|---|---|
|  | Learning Outcomes By the end of the lesson, pupils will be able to identify composite numbers. |  | Teaching Aids None |  | Preparation Draw the table for the independent practice on the board. |
|---|--|---|------------------------------|---|---|

Opening (5 minutes)

- Say:** In our last class, we talked about the size of prime factors and how to find all the prime factors of any given number.
- Say:** Find the factors of 24. Raise your hand to answer. (Answer: 1, 2, 3, 4, 6, 8, 12, 24)
- Say:** Find the prime factors of 24
 $24 = 2 \times 12$
 $= 2 \times 2 \times 6$
 $= 2 \times 2 \times 2 \times 3$
 The prime factors of 24 are $2 \times 2 \times 2 \times 3$
- Say:** We talked about factors that are prime. Today's class is about factors that are not prime. They are called composite numbers.

Introduction to the New Material (8 minutes)

- Say:** Composite numbers are numbers that can be evenly divided by numbers other than one and itself. That is, counting numbers that are not prime.
- Say:** Let's find out which of the following numbers are composite numbers:
 a. 7, b. 26, c. 51, d. 97
- Say:** To find a composite number, first find the factors of the number. If the number has more factors other than itself and 1, then the number is a composite number.

| | | | |
|--|---|---|---|
| $7 = 1 \times 7$ 7 has factors of 1 and 7, so 7 is prime and not composite. | $26 = 1 \times 26$ $= 2 \times 13$ 26 has factors of 2 and 13 other than 1 and 26, so 26 is a composite number. | $51 = 1 \times 51$ $= 3 \times 17$ 51 has factors of 3 and 17 other than 1 and 51, so 51 is a composite number. | $97 = 1 \times 97$ 97 has factors of 1 and 97, which makes 97 prime and therefore not composite. |
|--|---|---|---|

Guided Practice (10 minutes)

- Put pupils in pairs.

2. Write on the board: Find the composite numbers under 10

| NUMBER | FACTORS | COMPOSITE? |
|--------|-------------|------------|
| 1 | 1 | NO |
| 2 | 1, 2 | NO |
| 3 | 1, 3 | NO |
| 4 | 1, 2, 4 | YES |
| 5 | 1, 5 | NO |
| 6 | 1, 2, 3, 6 | YES |
| 7 | 1, 7 | NO |
| 8 | 1, 2, 4, 8 | YES |
| 9 | 1, 3, 9 | YES |
| 10 | 1, 2, 5, 10 | YES |

3. Walk around the room, discuss with pupils and assist where necessary.

Independent Practice (8 minutes)

1. **Say:** Do the following in your exercise books individually.
2. Write on the board: Complete the following table. Draw the following table on the board:

| NUMBERS | FACTORS | COMPOSITE? |
|---------|---------|------------|
| 21 | | |
| 17 | | |
| 48 | | |
| 76 | | |
| 50 | | |
| 37 | | |
| 88 | | |

Answers below:




| NUMBERS | FACTORS | COMPOSITE? |
|---------|----------------------------|------------|
| 21 | 1, 3, 7, 21 | YES |
| 17 | 1, 17 | NO |
| 48 | 1, 2, 3, 6, 8, 16, 24, 48 | YES |
| 76 | 1, 2, 4, 19, 38, 76 | YES |
| 50 | 1, 2, 5, 10, 25, 50 | YES |
| 37 | 1, 37 | NO |
| 88 | 1, 2, 4, 8, 11, 22, 44, 88 | YES |

3. Call on pupils to write their answers on the board.
4. Ask pupils to exchange their books and mark their work while you read the answers aloud.

Closing (5 minutes)

1. **Ask:** What is the difference between a prime number and a composite number? Raise your hand to answer.
(Answer: A prime number has exactly two factors, and a composite number has at least 3 factors.)
2. **Ask:** True or false:
 - a. Every even number is a composite number (Answer: False, 2 is a prime number.)
 - b. Every odd number is a prime number.
(Answer: False, 9 and 15 are all odd numbers that are not prime.)
3. **Say:** Good job today. You can now identify composite and prime numbers by their properties.

| | | |
|---|--|-------------------------|
| Lesson Title: Prime Numbers Up to 20 | Theme: Numbers and Numeration: Prime Numbers | |
| Lesson Number: M-05-100 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to identify all prime numbers up to 20. |  Teaching Aids None |  Preparation Draw the tables on the board for the guided practice and independent practice. |
|---|--|--|

Opening (4 minutes)

- Say:** We have talked about prime numbers in the past few lessons.
- Ask:** What is a prime number? Raise your hand to answer.
(Answer: A prime number is a natural number that has exactly 2 factors, itself and 1). Write the definition on the board and underline exactly.
- Ask:** If a number has 3 factors, can that number be called a prime number? Raise your hand to answer. (Answer: No, a prime number must have exactly 2 factors, the number itself and 1.)
- Say:** Today you will identify all prime numbers up to 20 and classify them based on their properties.

Introduction to the New Material (8 minutes)

- Say:** Let us find the prime numbers less than 5.
- Say:** We can use a table to help us keep track of what we are doing. We will find the factors of the number and if there are exactly two, we can say that the number is prime.
- Say:** We will start from 1.
- Ask:** Is 1 a prime number? Raise your hand to answer. (Answer: No)
- Ask:** Why? Raise your hand to answer.
(Answer: Because 1 has only 1 factor, so it is not exactly 2 factors.)
- Ask:** What about 2? Raise your hand to answer.
(Answer: 2 is a prime number because it has exactly 2 factors, 1 and 2.)
- Say:** Let us try 3. What are the factors of 3? Raise your hand to answer.
(Answer: The factors are 1 and 3, which are exactly 2, so 3 is a prime number.)
- Say:** We can try 4.
- Ask:** What are the factors of 4? Raise your hand to answer.
(Answer: The factors of 4 are 1, 2, and 4.)
- Ask:** Is 4 prime? Raise your hand to answer.
(Answer: No, there are more than exactly 2 factors.)

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. Write on the board: Classify all numbers under 10. Draw the following table.

| NUMBER | FACTORS | PRIME? |
|--------|---------|--------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

Answer: See below:

| NUMBER | FACTORS | PRIME? |
|--------|-------------|--------|
| 1 | 1 | NO |
| 2 | 1, 2 | YES |
| 3 | 1, 3 | YES |
| 4 | 1, 2, 4 | NO |
| 5 | 1, 5 | YES |
| 6 | 1, 2, 3, 6 | NO |
| 7 | 1, 7 | YES |
| 8 | 1, 2, 4, 8 | NO |
| 9 | 1, 3, 9 | NO |
| 10 | 1, 2, 5, 10 | NO |

3. Walk around the room, discuss with pupils and assist where necessary.

Independent Practice (8 minutes)

1. **Say:** Do the following in your exercise books.
2. Write on the board: Complete the following table to classify numbers up to 20.

| NUMBERS | FACTORS | PRIME? |
|----------------|----------------|---------------|
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |

Answers below:




| NUMBERS | FACTORS | PRIME? |
|----------------|--------------------|---------------|
| 11 | 1, 11 | YES |
| 12 | 1, 2, 3, 4, 6, 12 | NO |
| 13 | 1, 13 | YES |
| 14 | 1, 2, 7, 14 | NO |
| 15 | 1, 3, 5, 15 | NO |
| 16 | 1, 2, 4, 8, 16 | NO |
| 17 | 1, 17 | YES |
| 18 | 1, 2, 3, 6, 9 | NO |
| 19 | 1, 19 | YES |
| 20 | 1, 2, 4, 5, 10, 20 | NO |

3. Call on pupils to write their answers on the board.
4. Ask pupils to exchange their books and mark their work while you read the answer aloud.

Closing (5 minutes)

1. **Ask:** Is every odd number a prime number? Raise your hand to answer. (Answer: No)
2. **Ask:** Can you name an odd number that is not prime? Raise your hand to answer. (Example answers: 9, 15, 21)
3. **Say:** Good job today pupils! You can now identify all numbers up to 20 as prime or composite and list their factors.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Mental Strategies Using 4 Operations | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-101 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use strategies for mental calculations using four operations. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

- Say:** Complete the following.
- Write the problems on the board:
 - $23 + 53 = 76$
 - $120 - 30 = 90$
 - $14 * 10 = 140$
 - $69 \div 3 = 23$
- Ask:** How did you arrive at your answers?
- Write down some of the strategies used by pupils.
- Say:** Today you will learn how to use mental strategies to calculate using all operations.

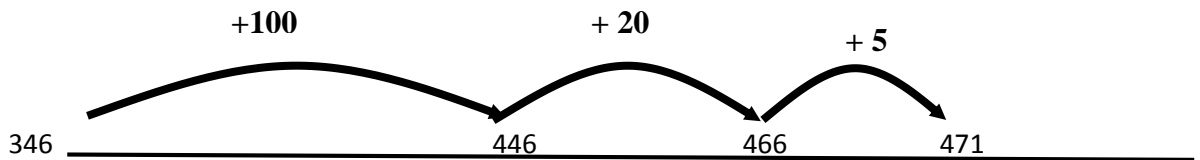
Introduction to the New Material (5 minutes)

- Say:** There are different mental strategies that you can use to solve problems like the examples above.
- Say:** For addition, we will look at the 'adding-on' and 'compensation' methods or strategies.
- Say:** For subtraction, we will look at 'partial subtraction' and 'compensation' methods.
- Say:** For multiplication, we will look at the 'grid' method.
- Say:** For division, we will look at the 'decomposing method'.

Guided Practice (20 minutes)

- Say:** Solve the following using the adding-on and the compensation methods.
- Write the problems on the board: $346 + 125$, 268 to 390.
- Explain the answer using the adding-on method.
- Say:** For the 'adding-on' method, one addend is kept intact, while the other addend is decomposed into friendlier numbers. Therefore, we can keep 346 constant and decompose 125 as $100 + 20 + 5$.
- Draw the following graphic on the board.

6. Explain the answer using the compensation strategy:



7. **Say:** the compensation strategy involves adding more than is needed, and then taking away the extra at the end.
8. **Say:** We can use the compensation method by adding $268 + 400$, and then subtracting the extra 10 (the difference between 390 and 400)

$$\begin{aligned} &= 400 + 268 = 668 \\ &= 668 - 10 = 658 \end{aligned}$$

9. **Say:** Solve the following using the adding-on and partial-subtraction methods.
10. Write the problems on the board: $568 - 254$, $856 - 325$
11. Explain the answer using the adding-on strategy:
12. **Say:** This strategy involves starting with the smaller quantity and adding on numbers until the larger quantity is reached.
13. Work out the problem on the board, as follows:

$$\begin{aligned} 568 - 254 &= 254 + 100 \\ &= 354 + 100 \\ &= 454 + 100 \\ &= 554 + 14 \\ &= 568 + 0 \\ &= 100 + 100 + 100 + 14 = 314 \end{aligned}$$

Therefore, $568 - 254 = 314$

14. Explain the answer using the partial-subtraction strategy:
15. **Say:** With a partial-subtraction strategy, the number being subtracted is decomposed into parts, and each part is subtracted separately.
16. Work out the problem on the board, as follows:

$$\begin{aligned} &325 \text{ can be decomposed as } 300+20+5: \\ &856 - 300 = 556 \\ &556 - 20 = 536 \\ &536 - 5 = 531 \end{aligned}$$

Therefore, $856 - 325 = 531$

17. **Say:** Perform the following operations using multiplication and the grid method.
18. Write the problems on the board: $14 * 33$, $20 * 45$
19. Explain the answer using the multiplication and grid method.
20. **Say:** Using the grid method, we will decompose the numbers into friendlier numbers. For example, $14 = 10 + 4$ and $33 = 30 + 3$.

| | | | |
|------------|------------------------|-------------|------------------------|
| | 30 + | 3 (=33) | |
| 10+ | 300 (that is, 10 * 30) | 30 = 10 * 3 | 330 + |
| 4 (=14) | 120 (that is, 4 * 30) | 12 = 4 * 3 | 132 = 462 |

21. **Say:** Perform the following operations using division with the decomposing method.
22. Write the problems on the board: $69 \div 3$, $384 \div 4$
23. Explain the answer using division.
24. **Say:** 69 can be decomposed to $60 + 9$. $(60 \div 3) = 20$ and $(9 \div 3) = 3$. Therefore $69 \div 3 = 20 + 3 = 23$.
25. **Say:** $384 \div 4$ can be written as $(400 - 16) \div 4$. $(400 \div 4) - (16 \div 4) = 100 - 4$. Therefore, $384 \div 4 = 96$




Independent Practice (4 minutes)

1. **Say:** Solve the following problems and indicate which of the above methods you used:
 - a) $23 + 53 =$ (Answer: $23 + 50 = 73 + 3 = 76$, using the add-on strategy)
 - b) $120 - 30 = 90$ (Answer: $120 - (20 + 10) = 120 - 20 = 100 - 10 = 90$, using the decomposing method)
 - c) $14 \times 10 = 140$ (Answer: $(10 + 4) \times 10 = (10 \times 10) + (4 \times 10) = 100 + 40 = 140$, using the decomposing method)
 - d) $69 \div 3 = 23$ (Answer: $(60 + 9) \div 3 = (60 \div 3) + (9 \div 3) = 20 + 3 = 23$, using the decomposing method)
2. Write the problems on the board.

Closing (3 minutes)

1. Invite pupils to say which methods they used in solving the questions above.
2. **Say:** Good job today pupils! You used many mental strategies to help you solve problems using the 4 operations.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Mental Strategies Using the 4 Operations | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-102 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use formal written strategies for addition up to 1 million. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (5 minutes)

1. **Say:** Perform the following tasks:

| | |
|---|---|
| $\begin{array}{r} 31,055 \\ + 2128 \\ \hline \end{array}$ | $\begin{array}{r} 23,481 \\ + 1362 \\ \hline \end{array}$ |
|---|---|

2. Write the problems on the board. (Answers: a) 28,928, b) 24,843)
3. **Ask:** How did you arrive at your answers? Raise your hand to answer.
4. Write down some of the strategies used by pupils.
5. **Say:** Today you will learn how to use formal written strategies to solve addition problems.

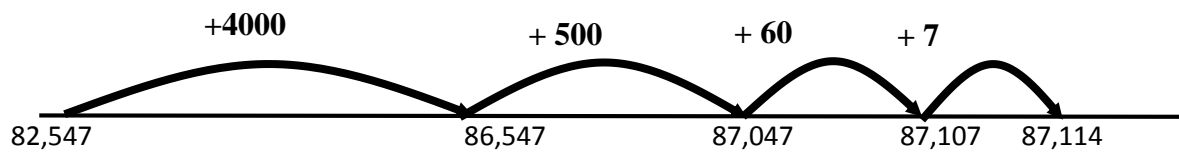
Introduction to the New Material (5 minutes)

1. **Say:** We will be using the adding-on and compensation methods or strategies to solve problems.
2. **Say:** Write the following in your books:
 - a) Adding-on Method: In this method, one addend is kept intact, while the other addend is decomposed into friendlier numbers.
 - b) Compensation Strategy: A compensation strategy involves adding more than is needed, and then taking away the extra at the end.

Guided Practice (10 minutes)

1. **Say** and write: Solve the following problems using the adding-on or compensation method:
 - a) $82,547 + 4567$
 - b) $50,848 + 4856$.
2. **Say:** Write how you approached the problem. Raise your hand to answer.
3. **Say:** Keeping 82,547 constant and decomposing $4567 = 4000 + 500 + 60 + 7$ we will use the adding-on strategy to solve this addition problem.

4. Draw the following number line on the board and explain.



5. **Say:** We can use the compensation method by adding 50,848 and 4,900, and then subtracting the extra 44 (the difference between 4,900 and 4,856).

6. Write:

$$50,848 + 4,900 = 55,748$$

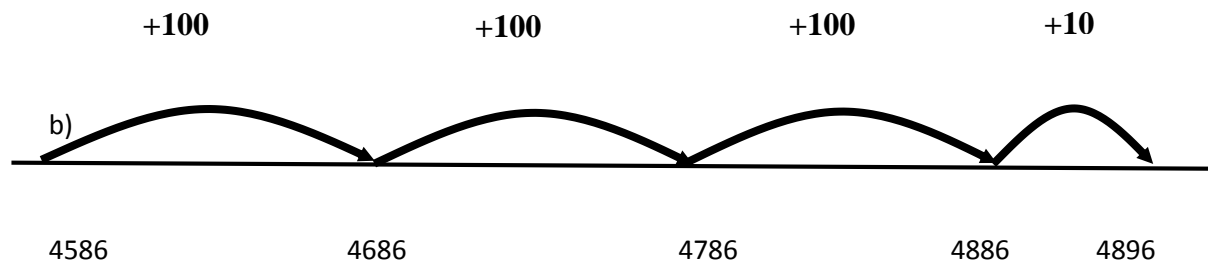
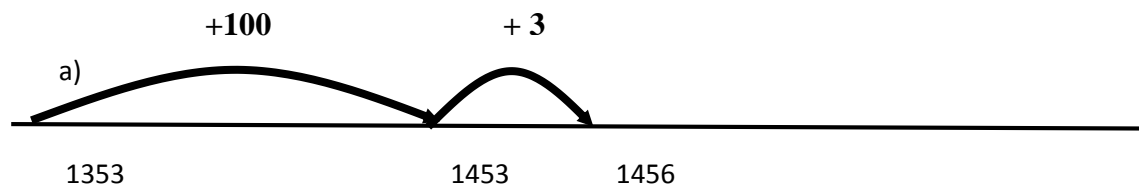
$$55,748 - 44 = 55,704$$

Independent Practice (11 minutes)

1. **Say and write:** Use the adding-on approach to find the answer to the following problems:

- a) $1353 + 103$, b) $4586 + 310$.

Answers



2. **Say and write:** Use the compensation method to find the answer to the following problems, and explain how you did it: a) $1455 + 895$, b) $3456 + 173$.

Answers

- a) Add 1,455 to 900 and take away 5 from the final result.

$$(1,455 + 900 = 2,355; 2,355 - 5 = 2,350)$$




- b) Add 3,456 to 200 and take away 27 from the final result.

$$(3456 + 200 = 3656, 3656 - 20 = 3636, 3636 - 7 = 3629)$$

Closing (4 minutes)

1. Invite pupils to use either the adding-on or the compensation method to solve the following problems:
2. Write:
 - a. $4563 + 312$ (Answer: 4875)
 - b. $6782 + 434$ (Answer: 7216)
3. Invite 2 pupils to share what strategy and how they answered the problems.
4. **Say:** Good job today! You used 2 different written strategies to add numbers.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Formal Written Strategies for Subtraction Up to 1 Million | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-103 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use formal written strategies for subtraction up to 1 million. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (5 minutes)

- Write $120 - 30 = ?$ and $145 - 15 = ?$ on the board. **Say:** Perform the tasks I've just written on the board.
- Say:** Explain how you arrived at your answers. (Answers: $120 - 30 = 90$, $145 - 15 = 130$)
- Say:** Today you will learn how to use formal written strategies to subtract large numbers.

Introduction to the New Material (5 minutes)

- Say:** We will be using the adding-on and partial-subtraction methods or strategies to solve problems.
- Say:** Write the following in your exercise books:
 Adding-on strategy: This strategy involves starting with the smaller quantity and adding on numbers until the larger quantity is reached.
 Partial-subtraction strategy: With a partial-subtraction strategy, the number being subtracted is decomposed into parts, and each part is subtracted separately.

Guided Practice (10 minutes)

- Say:** Solve the following using the adding-on or the partial-subtraction method:
 a) $1346 - 103$
 b) $3456 - 235$
- Say:** Write how you approached the problem.

Answer to a) Using Adding-on Strategy

$$\begin{aligned}
 1,346 - 103 &= 103 + 1000 \\
 &= 1103 + 100 \\
 &= 1203 + 100 \\
 &= 1303 + 43 = 1346 \\
 \text{So: } 1000 + 100 + 100 + 43 &= 1243
 \end{aligned}$$

Therefore, $1346 - 103 = 1243$

Answer to a) Using Partial-Subtraction Strategy

$$\begin{aligned}
 1,346 - 103 &\text{ (103 can be decomposed into } 100 + 3) \\
 1,346 - 100 &= 1246 \\
 1,246 - 3 &= 1243
 \end{aligned}$$

Independent Practice (12 minutes)

1. **Say** and write: Use the adding-on approach to find the value of the following:
 - a) $1296 - 245$
 - b) $3456 - 120$
2. **Say**: Write how you approached the problem.

Answer to a) Using Adding-on Strategy:

$$\begin{aligned}1,296 - 245 &= 245 + 1000 \\ &= 1245 + 45 \\ &= 1290 + 6 = 1,296\end{aligned}$$

Therefore, $1296 - 245 = 1000 + 45 + 6 = 1051$.

Answer to b) Using Adding-on Strategy

$$\begin{aligned}3,456 - 120 &= 120 + 3,000 \\ &= 3120 + 100 \\ &= 3220 + 100 \\ &= 3320 + 100 \\ &= 3420 + 30 \\ &= 3450 + 6 = 3456\end{aligned}$$

Therefore, $3456 - 120 = 3000 + 300 + 30 + 6 = 3336$

3. **Say** and write: Use the partial-subtraction method to find the value of the following:
 - a) $1455 - 895$
 - b) $3456 - 182$
4. **Say**: Write how you approached the problem.

Answer

- a) $1455 - 895$ (895 can be decomposed as $400 + 400 + 40 + 50 + 5$)

$$\begin{aligned}1455 - 400 &= 1055 \\ 1055 - 400 &= 655 - 40 \\ 615 - 5 &= 610 \\ 610 - 50 &= 560\end{aligned}$$




- b) $3,456 - 182$ (182 can be decomposed as $100 + 40 + 40 + 2$)

$$\begin{aligned}3456 - 100 &= 3356 \\ 3356 - 40 &= 3316 \\ 3316 - 40 &= 3276 \\ 3276 - 2 &= 3274\end{aligned}$$

Closing (3 minutes)

1. **Say:** Who can describe one of the methods we used to subtract large numbers today? Raise your hand to answer. (Expected answers: adding on strategy: you start with the smaller quantity and add on numbers until the larger quantity is reached; partial subtraction strategy: the number being subtracted is decomposed into parts, and each part is subtracted separately in multiple steps)
2. **Say:** Good job today pupils! You used two different strategies to subtract large numbers.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Formal Written Strategies for Addition and Subtraction | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-104 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use formal written strategies for addition and subtraction. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (5 minutes)

- Say:** Write the following numbers in expanded form: 4653, 2145, 54,342, 120,456, 38044.

Answers:

- $4,653 = 4000 + 600 + 50 + 3$
- $2145 = 2000 + 100 + 40 + 5$
- $54,342 = 50,000 + 4000 + 300 + 40 + 2$
- $120,456 = 100,000 + 20,000 + 400 + 50 + 6$
- $38,044 = 30,000 + 8000 + 40 + 4$

- Say:** Explain how you arrived at your answers. Raise your hand to answer.
- Allow a few pupils to respond explaining how they solved the problems.
- Say:** Today you will learn how to use formal strategies for addition and subtraction.

Introduction to the New Material (5 minutes)

- Say:** Formal written strategies can be used to perform addition and subtraction.
- Say:** We need to remember that when we write addition and subtraction problems in vertical form to solve, we sometimes need to carry over (in addition) or borrow (in subtraction) when you need to rename. Let's review this.
- Write the following on the board: a) $787 + 642$, b) $874 - 523$, c) $932 - 457$
- Say:** Some of these problems require renaming so we will rewrite them in vertical form and review this.

- Say:** The above expressions could be written in their vertical format as:

| | | |
|-------------|------------|------------|
| a) 787 | b) 874 | c) 932 |
| $+ 642$ | $- 523$ | $- 457$ |
| <u>1429</u> | <u>351</u> | <u>475</u> |

- Say:** Let's look at a). You start with the ones, and the vertically so $7 + 2$ is 9. Then you move to the Tens column. Here $8 + 4$ is 12 so we put the 2 down under the 4 and carry over the extra place value to the next column to add. Then we move to the hundreds column, $7 + 6 + 1$ that we carried over is 14. Thus, the answer is 1429.
- Say:** Let's look at b). You start in the ones column and move left to subtract. $4 - 3$ is 1. We don't need to borrow. Let's move to the tens column. $7 - 2$ is 5 so we put that answer down and move the hundreds column. Again, we don't need to borrow because the number on top is bigger than the one under it. $8 - 5$ is 3. Thus, the answer is 351.

8. **Say:** Lastly, let's look at c). Here we will have to borrow place value from the column to the left. We cannot subtract 7 from 2 so we borrow Ten and make it 12. The 3 in the Tens column becomes a 2. Now subtract $12 - 7$ and get 5. Move to the Tens column, and we must borrow again because we cannot subtract 5 from 2. So the 2 becomes 12 and the 9 becomes an 8. Now subtract $12 - 5$ and get 7. Lastly, subtract $8 - 4$ and get 4. Thus, the answer is 475.
9. **Say:** You will now practice this vertical method today.

Guided Practice (8 minutes)

1. **Say:** write the vertical format of the following problems and solve them:
- a) $12,836 + 7288$
 b) $30,243 + 4323$
 c) $86,383 - 1254$

Answer:

| | | |
|--|--|--|
| $\begin{array}{r} 12,836 \\ + 7288 \\ \hline 20,124 \end{array}$ | $\begin{array}{r} 30,243 \\ + 4323 \\ \hline 34,566 \end{array}$ | $\begin{array}{r} 86,383 \\ - 1254 \\ \hline 85,129 \end{array}$ |
|--|--|--|

Independent Practice (14 minutes)

1. **Say:** Write the vertical format of the following expressions and solve them.
- a. $78,654 + 6125$
 b. $54,696 + 51,792$
 c. $82,433 + 925,540$
2. **Say:** Write the vertical format of the following expressions and solve them.
- a. $89,478 - 52,424$
 b. $90,535 - 40,517$




Answer:

| | | |
|--|--|---|
| $\begin{array}{r} 1a) 78,654 \\ + 6125 \\ \hline 84,779 \end{array}$ | $\begin{array}{r} b) 54,696 \\ + 51,792 \\ \hline 106,458 \end{array}$ | $\begin{array}{r} c) 82,433 \\ + 925,540 \\ \hline 1,007,973 \end{array}$ |
| $\begin{array}{r} 2a) 89,478 \\ - 52,424 \\ \hline 37,054 \end{array}$ | $\begin{array}{r} b) 90,535 \\ - 40,517 \\ \hline 50,018 \end{array}$ | |

Closing (3 minutes)

1. **Ask:** What do you need to remember when using the vertical method when adding and subtracting? Raise your hand to answer.
 (Answer: You need to borrow or carry over when adding and subtracting numbers that require renaming.)
2. **Say:** Good job pupils. Today you learnt how to use formal written strategies to add and subtract numbers.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Mental Strategies for Addition and Subtraction | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-105 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to:</p> <ol style="list-style-type: none"> 1. Use strategies for solving addition and subtraction problems mentally, 2. Solve mentally multi-step word problems involving addition and subtraction. |  <p>Teaching Aids None</p> |  <p>Preparation Write the word problems for the lesson on the board.</p> |
|---|--|--|

Opening (5 minutes)

1. Write the following problems on the board: a) $58,745 + 23,45$ b) $12,345 + 30,034$
c. $45,679 - 23,453$
2. **Say:** Write the problems on the board in their vertical format:

Answer:

| | | |
|-------------|-------------|-------------|
| a) $58,745$ | b) $12,345$ | c) $45,679$ |
| $+ 23,455$ | $+ 30,034$ | $+ 23,453$ |

3. **Say:** Today you will learn a number of mental strategies to solve word problems instead of using the formal vertical method.

Introduction to the New Material (5 minutes)

1. **Say:** The mental strategies you have learned can be used to solve real-life problems.
2. **Say:** In previous lessons, we used a number of strategies to solve addition and subtraction problems. We used the add-on strategy and decomposition and add on strategy. These were used most frequently. We will now use these strategies but first we must set up a mathematical expression from the word problems we will look at today.
3. **Say:** Write mathematical expressions for each of the following word statements:
 - a. A school has 357 girls and 456 boys. How many pupils are in the school?
(Answer: $357 + 456$)
 - b. A football stadium had a capacity of 2890, and after a renovation, a total of 655 chairs were removed. What is the new capacity of the stadium?
(Answer: $2890 - 655$)
4. **Say:** Now we will use the different methods to solve the problems you created. Let's start with a).
5. Write: $357 + 456$
Expand $456 = 400 + 50 + 6$
Now add each part to the first number as follows:
 $357 + 400 = 757 + 50 = 807 + 6 = 813$
6. **Say:** Now we will use the decomposition method to look at how to solve the subtraction problem in b).
7. Write: $2890 - 655$

Expand $650 = 600 + 50 + 5$

Now subtract each part to the first number as follows:

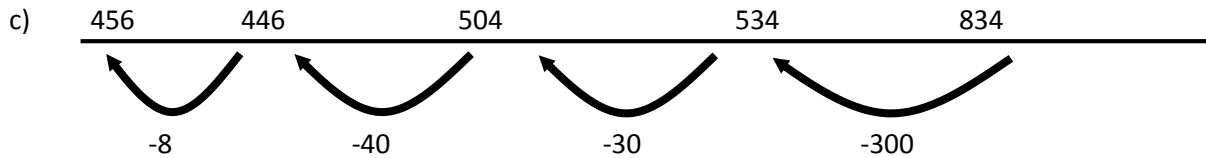
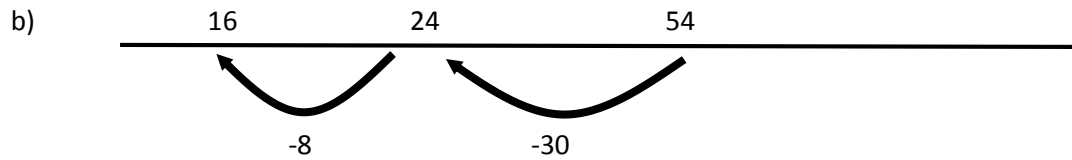
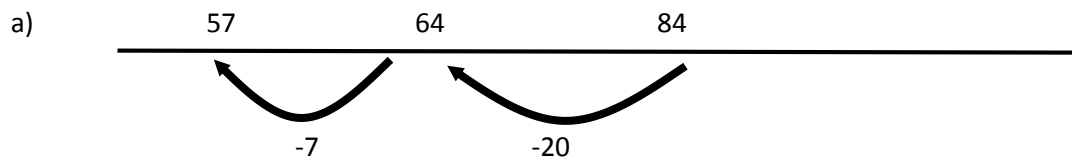
$$2890 - 600 = 2290 - 50 = 2240 - 5 = 2235$$

Guided Practice (10 minutes)

1. **Say:** work out the following problems:

- a) I cut 27cm off a ribbon measuring 84cm. How much is left?
- b) There are 54 children in a school music show, and 38 turn up late. How many are on time?
- c) The library has 834 books, and 378 are out on loan. How many books are left on the shelves?

Answer:






Independent Practice (10 minutes)

- 1. **Say:** Work out the following problems:
- 2. Write the questions below on the board:
 - a) The populations of the three largest towns in a county were 346,754, 124,534 and 52,971. What was the total population of these three cities? (Answer: 524,259)
 - b) A man paid 25,000 for a pair of shoes, 15,000 for a shirt and 10,000 for a wrist watch. How much did he pay all together? (Answer: 50,000)
 - c) Mother gave the cashier 25,000 for food items she bought and received 6,500 as change. How much did she spend? (Answer: 18,500)
 - d) I went to a shop and spent 10,000 on a story book, 7000 on a box of coloured pencils and 8,000 on ten pens. How much did I spend all together? (Answer: 25,000)

Closing (3 minutes)

- 1. **Ask:** What is the best method to use to solve the following problems:
 - a) A woman spent 23,000 on food and 25,000 on clothes during a month. How much did she spend all together? (Answer: add on strategy)
 - b) There are 37,000 books in a library. If 1,300 of these books have been borrowed, how many books are left in the library? (Answer: decomposition strategy)
- 2. **Say:** Good job today pupils! You solved word problems using the new strategies you just learned for addition and subtraction.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Formal Written Strategies for Multiplication Up to 4 Digits by 2 Digits | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-106 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use formal written strategies for multiplication up to four digits by two digits. |  Teaching Aids None |  Preparation None |
|--|--|--|

Opening (3 minutes)

1. Write on the board: Multiply 25×3
2. **Ask:** What is the value of 25 times 3? Raise your hand to answer. (Answer: 75)
3. **Say:** Today's lesson will use formal written strategies for multiplication up to 4 digits.

Introduction to the New Material (10 minutes)

1. Write on the board: Multiply 42×23
2. **Say:** Use formal written strategy to multiply 42 times 23

Answer: 42

$$\begin{array}{r}
 x 23 \\
 126 \\
 +840 \\
 \hline
 966
 \end{array}$$

3. **Say:** We start to solve by multiplying 3 by 2 which gives 6 so we write that below. We then multiply 3 by 4 which gives us 12. Multiplying 3 by 42 thus gives us 126.
4. **Say:** Write the answer under the 23.
5. **Say:** Next we place 0 under the 6 because we are moving to the 2 of 23 to multiply and this is in the tens place so there is no ones place here.
6. **Say:** Then we multiply 2 by 2, which gives us 4, and we write that below the 2. Then we multiply 2 by 4 and get 8, which results in 840.
7. **Say:** Finally, we add the 126 to the 840 to give the final answer of 966.
8. **Say:** These are the basic steps for this problem. Let's try another one so you can remember it.
9. Write on the board: Multiply 251 by 32
10. **Say:** Let's put it in vertical form to multiply formally.
11. Write:

$$\begin{array}{r}
 251 \\
 x 32 \\
 502 \\
 +7530 \\
 \hline
 8032
 \end{array}$$

- Say:** We start by multiplying the 2 by 251 like we did before. 2 by 1 is 2 so you write that below the 2. Then you multiply 2 by 5 which gives 10. Write the 0 below the 3 and carry the one over. Then we multiply 2 by 2 to get 4 and add the 1 we carried over to get 5. Multiplying 251 x 2 gives us 502.
- Say:** Then we move to the 3 and do the same thing. We leave a zero in the ones place and begin. 3 by 1 is 3 so write that below and move to the next number. 3 by 5 is 15 so write the 5 below and carry the 1 over. Lastly, we multiply 3 by 2 to get 6 but then we add the 1 and get 7. The result is 7530. Lastly, we add 502 + 7530 to get 8032.

Guided Practice (10 minutes)

- Put pupils in pairs.
- Say:** Multiply the following using the formal method. Remember to put the numbers in vertical form.
- Write: 'Multiply:'
 - 1342×45 (Answer: 60,390)
 - 8523×24 (Answer: 204,552)
- Walk around the room, check pupils' work and assist where necessary.




Independent Practice (8 minutes)

- Say:** Copy the problems in your notebook and work on them individually.
- Write: Multiply:
 - 452×51 (Answer: 23,052)
 - 4120×93 (Answer: 383,160)
- Go around, check pupils' answers and make necessary corrections.
- Have pupils to exchange their notebooks and check their work while you read the answers aloud.

Closing (4 minutes)

- Ask some of the pupils to write their answers on the board.
- Say:** Good job today pupils! You used the formal method to multiply 4 digit by 2 digit numbers.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Formal Written Strategies for Division Up to 4 Digits by 2 Digits | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-107 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use formal written strategies for division up to 4 digits by 2 digits. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write on the board: $100 \div 4$
2. **Ask:** What is the value of 100 divided by 4? Raise your hand to answer. (Answer: 25)
3. **Say:** Today's lesson will use formal written strategies for division up to 4 digits.

Introduction to the New Material (10 minutes)

1. Write on the board: $468 \div 12$
2. **Say:** We will use a formal written strategy to divide these two numbers using long division.

Answer: $\underline{\quad 39}$

$$\begin{array}{r}
 12 \overline{)468} \\
 \underline{-36} \\
 108 \\
 \underline{-108} \\
 0
 \end{array}$$

3. **Say:** We start by seeing how many times 12 goes into 47 which is 3 times. We then multiply 3 x 12 which gives us 36. Write this below 47 and subtract to get 1. Then we bring down the 8.
4. **Say:** Now we repeat this process for 108. How many times does 12 go into 108? Raise your hand to answer? (Answer: 9)
5. **Say:** Good, put the 9 above and multiply 9 x 12 to get 108 and put it below 108 and subtract. The result is 0 so we are done. The answer to $468 \div 12$ is 39.

4. Write on the board: $2424 \div 14$

Answer: $\underline{\quad 173}$

$$\begin{array}{r}
 14 \overline{)2424} \\
 \underline{-14} \\
 102 \\
 \underline{-98} \\
 44 \\
 \underline{-42} \\
 2
 \end{array}$$

5. **Say:** Divide 24 by 14 to get 1. Multiply 1 x 14 to get 14, write it below the 24 and subtract. You get 10. Bring down the 2 and see how many times 12 goes into 102. This is when knowing your times tables is very helpful.

6. **Say:** 14 goes into 102, 7 times. Write this above and multiply 7 by 14 to get 98. Write this below the 102 and subtract to get 4 and then bring down the final 4. Now we see how many times 14 goes into 44. The result is 3. Multiply 3 x 14 and get 42 and write it below the 44 and subtract. The result is 2, which become a remainder. The answer to $2,424 \div 14$ is 173 R2.

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. Write on the board: Divide the following using long division:
 - a) $1425 \div 15$ (Answer: 95)
 - b) $4214 \div 22$ (Answer: 191 R13)
3. Walk around the room, check pupils' work and assist where necessary.




Independent Practice (8 minutes)

1. **Say:** Copy the following problems in your notebooks and work on them individually.)
2. Write on the board: Divide the following using long division:
 - a) $6,446 \div 11$ (Answer: 586)
 - b) $4,120 \div 12$ (Answer: 343 R4)
3. Go around, check pupils' answers and make necessary corrections.
4. Have pupils to exchange notebooks and check each other's work as you read the answers aloud.

Closing (4 minutes)

1. Ask some of the pupils to write their answers on the board.
2. **Say:** Good job today pupils. You learnt how to divide 4-digit by 2-digit numbers using the formal method of long division.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Estimating in Multiplication Problems Up to 1 Million | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-108 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to estimate answers involving multiplication up to 1 million. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write on the board: Multiply 45 by 20
2. **Ask:** What is the value of 45 times 20? Raise your hand to answer. (Answer: 900)
3. **Say:** Today's lesson will estimate answers involving multiplication up to 1 million.

Introduction to the New Material (10 minutes)

1. Write on the board: Estimate 895×548 to the nearest 10
2. **Say:** Round 895 to the nearest 10. Raise your hand to answer. (Answer: 900)
3. **Say:** Round 548 to the nearest 10. Raise your hand to answer. (Answer: 550)
4. **Say:** Now let's multiply 900 by 550 by expanding.
5. Write: $(900 \times 500) + (900 \times 50) = 450,000 + 45,000 = 495,000$. (Answer: 495,000)
6. Write on the board: Estimate $3,456 \times 244$ to the nearest 100
7. **Say:** Round 3456 to the nearest 100. Raise your hand to answer. (Answer: 3500)
8. **Say:** Round 244 to the nearest 100. Raise your hand to answer. (Answer: 200)
9. **Say:** Now let's multiply 3500 by 200 by expanding.
10. Write: $(3000 \times 200) + (500 \times 200) = 600,000 + 100,000 = 700,000$ (Answer: 700,000)
11. Write on the board: Estimate 2543×456 to the nearest 100
12. **Say:** Round 2543 to the nearest 100. Raise your hand to answer. (Answer: 2500)
13. **Say:** Round 456 to the nearest 100. Raise your hand to answer. (Answer: 500)
14. **Say:** Now let's multiply 2500 by 500 by expanding.
15. Write: $(2000 \times 500) + (500 \times 500) = 1,000,000 + 250,000 = 1,250,000$. (Answer: 1,250,000)

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board: 'Estimate 1469×62 and 4214×25 to the nearest 10'. (Answers: $1470 \times 60 = (1000 \times 60) + (400 \times 60) + (70 \times 60) = 60,000 + 24,000 + 4200 = 88,200$, $4210 \times 30 = (4000 \times 30) + (200 \times 30) + (10 \times 30) = 120,000 + 6000 + 300 = 126,300$)
3. Walk around the room, check pupils' work and assist where necessary.

Independent Practice (8 minutes)




1. Tell pupils to copy the problems in their notebooks and work individually to solve them.

2. Write on the board: Estimate 4256×711 and 2144×532 to the nearest 100. (Answers: $4300 \times 700 = (4000 \times 700) + (300 \times 700) = 2,800,000 + 210,000 = 3,010,000$, $(2000 \times 500) + (100 \times 500) = 1,000,000 + 50,000 = 1,050,000$)
3. Go around, check pupils' answers and make necessary corrections.
4. Have pupils to exchange their notebooks and check each other's work while you read the answers aloud.

Closing (4 minutes)

1. Ask some of the pupils to write their answers on the board while others check their work with what is on the board.
2. **Ask:** What do you do first when you estimate and then multiply? Raise your hand to answer. (Answer: You round the numbers to the indicated place value.)
3. **Say:** Good job today pupils! You learnt how to estimate the value of large products by rounding off.

| | | |
|--|-----------------------------------|-------------------------|
| Lesson Title: Estimating in Division Problems Up to 1 Million | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-109 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to estimate answers involving division up to 1 million. |  Teaching Aids None |  Preparation None |
|---|--|--|

Opening (3 minutes)

1. Write on the board: Divide 100 by 20
2. **Ask:** What is the value of 100 divided by 20? Raise your hand to answer. (Answer: 5)
3. **Say:** Today's lesson will estimate answers involving division up to 1 million.

Introduction to the New Material (10 minutes)

1. Write on the board: Estimate $7152 \div 253$ to the nearest 100
2. **Say:** Round 7152 to the nearest 100. Raise your hand to answer. (Answer: 7,200)
3. **Say:** Round 253 to the nearest 100. (Answer: 300)
4. **Say:** Now let's divide 7200 by 300 by breaking it into friendly parts.
5. Write: $7200 = (6000 + 1200) \div 300 = (6,000 \div 300) + (1200 \div 300) = 20 + 4 = 24$. (Answer: 24)
6. Write on the board: 'Estimate $92,444 \div 889$ to the nearest 1000'.
7. **Say:** Round 92,444 to the nearest 1000. Raise your hand to answer. (Answer: 92,000)
8. **Say:** Round 889 to the nearest 1000. Raise your hand to answer. (Answer: 1000)
9. **Say:** Now let's divide 92,000 by 1000 by breaking it into friendly parts.
10. Write: $92,000 = (90,000 \div 1000) + (2000 \div 1000) = 90 + 2 = 92$. (Answer: 92)

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board: Estimate $1869 \div 62$ and $4,774 \div 845$ to the nearest 100
(Answers: $1900 \div 100 = (1000 \div 100) + (900 \div 100) = 10 + 9 = 19$, $4800 \div 800 = (4000 \div 800) + (800 \div 800) = 5 + 1 = 6$)
3. Walk around the room, check pupils' work and assist where necessary.




Independent Practice (8 minutes)

1. Tell pupils to copy the problems in their notebooks and work individually to solve them.
2. Write on the board: 'Estimate $9543 \div 1970$ and $7,144 \div 1120$ to the nearest 1000
(Answers: $10,000 \div 2000 = 5$, $7000 \div 1,000 = 7$)
3. Go around, check pupils' answers and make necessary corrections.
4. Have pupils to exchange their notebooks and check each other's work while you read the answers aloud.

Closing (4 minutes)

1. Ask some of the pupils to write their answers on the board and have other pupils check their work against the work on the board.
2. **Ask:** What is the first step to solving division problems with estimation? Raise your hand to answer. (Answer: You round of the numbers to the indicated place value first)
3. **Say:** Good job today pupils! You used estimation to divide large numbers.

| | | |
|---|-----------------------------------|-------------------------|
| Lesson Title: Multi-Step Word Problems with Money Using the 4 Operations | Theme: Everyday Arithmetic | |
| Lesson Number: M-05-110 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to use the 4 operations to solve multi-step problems with money. |  Teaching Aids None |  Preparation Write the word problems for the lesson on the board. |
|--|--|--|

Opening (3 minutes)

1. **Ask:** How much is a litre of vegetable oil? (Example answers: Le1500, Le2000)
2. **Say:** There are many problems you will need to solve with the cost of items.
3. **Say:** Today's lesson will use the four operations to solve multi-step problems with money.

Introduction to the New Material (10 minutes)

1. Write on the board: Johnson bought a litre of vegetable oil for Le2000 and chilli for Le500 from a supermarket. How much did he pay for the ingredients?
2. **Say:** Add the cost of the vegetable oil to the cost of the chilli. Raise your hand to answer. (Answer: Le2500).
3. Write on the board: Mr. Abass bought a mobile phone top-up for Le8000, and a bar of soap for Le2000. He also paid poda poda Le 1000 from his house to school and back.
4. **Ask:** If he took Le15,000 to school, how much did he spend all together? How much did he have on him after the payments?
5. **Say:** Add all the money spent together.
6. Write: $8000 + 2000 + (1000 \times 2) = 8000 + 2000 + 2000 = \text{Le } 12,000$. (Answer: Le12,000)
7. **Say:** He spent Le12,000.
8. **Say:** We then need to subtract the amount he spent from the amount he took to school which was Le 15,000.
9. Write: $15,000 - 12,000 = 3000$ (Answer: Le15,000 - Le12,000)
10. **Say:** He had Le3000 left after the payments.

Guided Practice (10 minutes)

1. Ask pupils to work in pairs.
2. Write on the board: Clinton, Hillary, Henry and James bought 17 oranges to share. If an orange costs Le500, how much did they spend all together? How many oranges will each get and how many will be left over if they each get an even amount of oranges?
3. **Say:** To start to solve this, we multiply the 17 by the 500. To find how much they spent on the oranges in total. (Answer: $500 \times 15 = (500 \times 10) + (500 \times 7) = 5000 + 3500 = \text{Le}8500$)
4. **Say:** Then we divide the 17 oranges by the 4 pupils. (Answer: $17 \div 4 = 4$ oranges each with 1 remaining.)
5. Walk around the room, check pupils' work and assist where necessary.




Independent Practice (8 minutes)

1. Write on the board: 'Moses bought a pound of rice for Le1000 and eggs for Le1000. If he paid Le7000, how much will he receive as change?' (Answer: $1000 + 1000 = 2000$, $7,000 - 2,000 =$ Le5000 change)
2. Go around, check pupils' answers and make necessary corrections.

Closing (4 minutes)

1. Ask some of the pupils to write their answers on the board.
2. **Say:** Good job today pupils! You solved word problems involving money.

| | | |
|--|---|-------------------------|
| Lesson Title: Draw and Identify Properties of Squares, Including Angles and Lines of Symmetry | Theme: Geometry Squares and Rectangles | |
| Lesson Number: M-05-111 | Class/Level: Class 5 | Time: 35 minutes |

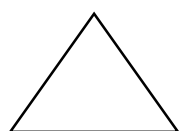
| | | |
|--|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to draw and identify properties of a square. |  Teaching Aids None |  Preparation Draw the shapes from the lesson of the board. |
|--|--|---|

Opening (5 minutes)

- Say:** Write down the shapes of objects that you know. Raise your hand to answer.
(Example answers: circle, rectangle, triangle, square, prism, pentagon, cone, cylinder)
- Ask:** What is the shape of your exercise book? Raise your hand to answer.
(Example answers: rectangle, square)
- Ask:** Why do you say the shape of your book is a rectangle or a square? Raise your hand to answer.
(Example answers: rectangle because it has 4 sides with unequal adjacent sides, square because it has four equal sides)
- Say:** Today you will learn how to identify and draw properties of a square.

Introduction to the New Material (12 minutes)

- Display cardboard shapes of a triangle, rectangle, square and pentagon at the front of the class.
- Say:** Copy the shapes I just set up in your exercise books, and write down the names beneath them.



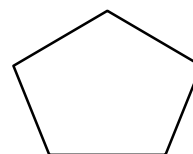
Triangle



Rectangle



Square



Pentagon

- Say:** Let's write down 2 properties of each of the shapes.

Triangle

- Has 3 sides.
- Has 3 angles.

Rectangle

- Has 4 sides.
- Has 4 equal angles.

Square

- Has 4 equal sides.
- Has 4 equal angles.

Pentagon

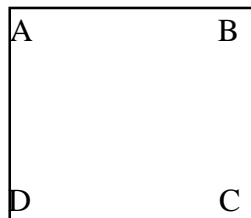
- a) Has 5 sides.
- b) Has 5 angles.
4. **Say:** Both the rectangle and the square have 4 sides and 4 angles. But there is 1 difference; can someone see the difference on the pictures of the shapes? Raise your hand to answer.
(Example answer: the sides of the rectangle are different, the square has 4 equal sides but the rectangle does not)
5. **Say:** Good, the square has 4 equal sides. If one side is 15 centimetres, then all the sides measure 15 centimetres.
6. **Ask:** What is the value of the angles in the square? Raise your hand to answer.
(Answer: 90° each)
7. **Ask:** Why is each of the angles equal to 90° ? Raise your hand to answer.
(Answer: The lines meet at right angles.)
8. **Say:** Write the following in your exercise books:

Properties of a Square:

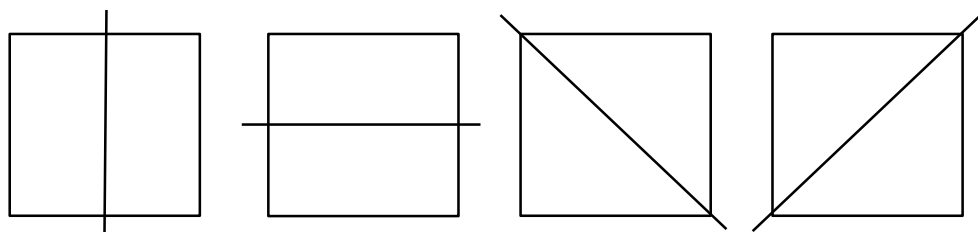
- a) Four equal sides
- b) Four right angles
- c) Opposite sides parallel and equal
- d) Four lines of symmetry

Guided Practice (10 minutes)

1. **Say:** Form pairs.
2. **Say:** Use your ruler to draw a square 5 cm long on each side.



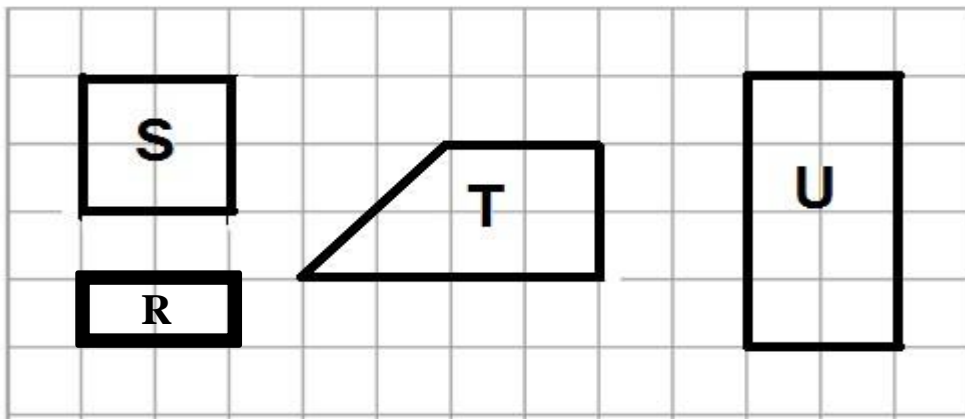
3. **Say:** Use your protractor to measure the value of the angles A, B, C, and D.
(Answer: $A = 90^\circ$, $B = 90^\circ$, $C = 90^\circ$, $D = 90^\circ$)
4. Write 'line of symmetry' on the board.
5. **Say:** Write 'line of symmetry' in your exercise books and say it aloud.
6. Write on the board: Line of symmetry is a line where you could fold the image and have both halves match exactly.
7. **Say:** Write the meaning of line of symmetry in your exercise books.
8. **Say:** We want to find the number of lines of symmetry of a square using the shape we have drawn.



9. **Say:** There are 4 different ways that we can divide a square into 2 equal parts.
10. **Ask** pupils to write: A square has 4 lines of symmetry.

Independent Practice (5 minutes)

1. Write: Study the figures below. Compare them with the table to show the properties each figure has.






| Property | Figure | | | |
|------------------------------|--------|---|---|---|
| | R | S | T | U |
| It has 4 sides. | ✓ | ✓ | ✓ | ✓ |
| All sides are equal. | X | ✓ | X | X |
| Opposite sides are equal. | ✓ | ✓ | X | ✓ |
| All angles are right angles. | ✓ | ✓ | X | ✓ |

Closing (2 minutes)

1. **Ask:** Do all the shapes have the same characteristics? Raise your hand to answer. (Answer: No)
2. **Ask:** Which of the shapes is a square? Raise your hand to answer. (Answer: Shape S)
3. **Ask:** Based on your table of properties, which 2 shapes are the same type and what is the shape? Raise your hand to answer. (Answer: Shape R and Shape U are both rectangles.)
4. **Say:** Good job today pupils! You identified the properties of shapes and can identify them, in particular the square.

| | | |
|---|---|-------------------------|
| Lesson Title: Draw and Identify Properties of Rectangles, Including Angles and Lines of Symmetry | Theme: Geometry Squares and Rectangles | |
| Lesson Number: M-05-112 | Class/Level: Class 5 | Time: 35 minutes |

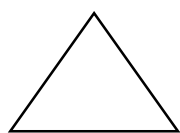
| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to draw and identify properties of a rectangle. |  Teaching Aids None |  Preparation Draw the shapes for the lesson on the board. Copy or draw the schematic from the independent practice. |
|---|--|--|

Opening (5 minutes)

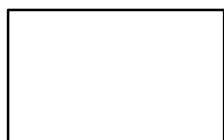
- Say:** Write down the shapes of objects that you know. Raise your hand to answer. (Example answers: circle, rectangle, triangle, square, prism, pentagon, cone, cylinder)
- Ask:** What is the shape of your exercise book? Raise your hand to answer. (Example answers: rectangle, square)
- Ask:** Why do you say the shape of your book is a rectangle or a square? Raise your hand to answer. (Answer: Rectangle because it has four sides with unequal adjacent sides. Square because it has 4 equal sides.)
- Say:** Today you will learn how to draw and identify the properties of a rectangle.

Introduction to the New Material (12 minutes)

- Draw the shapes of a triangle, rectangle, square and pentagon as below.
- Say:** Copy the shapes I just set up in your exercise books, and write down their names beneath them.



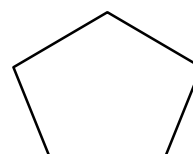
Triangle



Rectangle



Square



Pentagon

- Say:** Write down two properties of each of the shapes above.

Triangle

- Has 3 sides.
- Has 3 angles.

Rectangle

- Has 4 sides.
- Has 4 equal angles.

Square

- Has 4 equal sides.
- Has 4 equal angles.

Pentagon

- Has 5 sides.
- Has 5 angles.

- Ask:** What is the value of the angles in the rectangle? Raise your hand to answer. (Answer: 90° each)

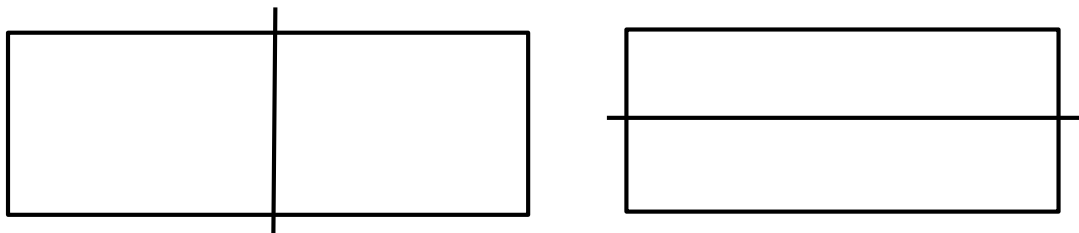
5. **Ask:** Why is each of the angles equal to 90° ? Raise your hand to answer. (Answer: The lines meet at right angles.)
6. **Say:** Yes, the rectangle and square both have four 90° angles. However, there are many differences between the 2 shapes.
7. **Say:** They also have lines of symmetry and some of their sides are equal but not all of their sides. Let's look at the properties in detail by drawing and measuring some rectangles.
8. Write on the board:
Properties of a Rectangle
 - a) Four right angles
 - b) Opposite sides parallel and equal
 - c) Two lines of symmetry
9. **Say:** Write what I've just written on the board in your exercise books.

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. **Say:** Use your ruler to draw a rectangle with sides 10cm by 5cm



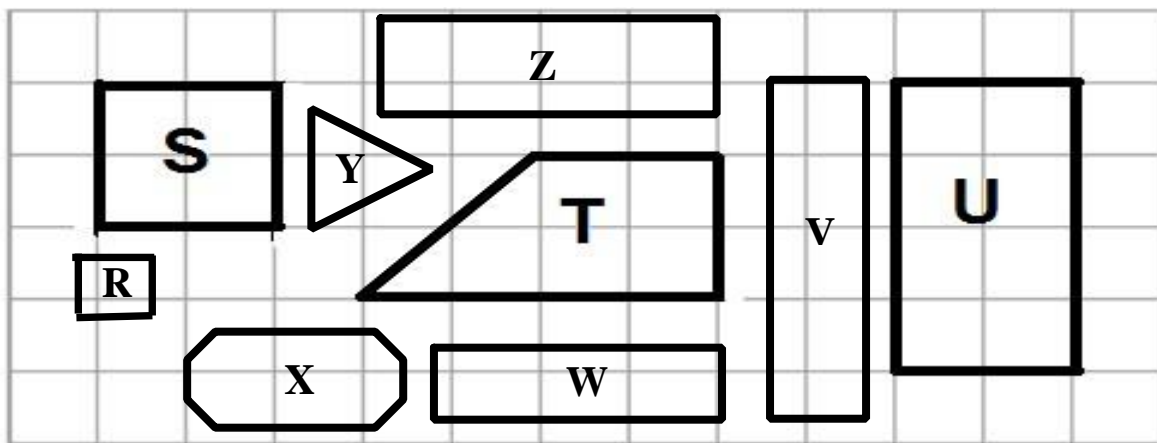
3. **Say:** Use your protractor to measure the value of the angles A, B, C and D. (Answer: $A = 90^\circ$, $B = 90^\circ$, $C = 90^\circ$, $D = 90^\circ$)
4. Write 'line of symmetry' on the board.
5. **Say:** Write 'line of symmetry' in your books and say it aloud.
6. Write on the board: Line of symmetry is a line where you can fold the image and have both halves match exactly.
7. **Say:** Write the meaning of line of symmetry in your exercise books.
8. **Say:** We want to find the number of lines of symmetry of a rectangle using the shape we have drawn.



9. **Say:** There are 2 different ways that we can divide a rectangle into 2 equal parts.
10. Write on the board: A rectangle has two lines of symmetry.
11. **Say:** Now let's look at their sides. In a square, all four sides are equal. But in a rectangle, the opposite sides are equal in measure. So the long sides, or the length, have the same measure and the shorter sides, or the width, have the same measure.

Independent Practice (5 minutes)

1. Display the following schematic at the front of the class. Then write on the board: Study the figures. Complete the table to show the properties of each figure.






| Property | Figure | | | | | | | | |
|------------------------------|--------|---|---|---|---|---|---|----|---|
| | R | S | T | U | V | W | X | Y | Z |
| It has 4 sides. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | X | X | ✓ |
| All sides are equal. | ✓ | ✓ | X | X | X | X | X | ✓ | X |
| Opposite sides are equal. | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | -- | ✓ |
| All angles are right angles. | ✓ | ✓ | X | ✓ | ✓ | ✓ | X | X | ✓ |

Closing (2 minutes)

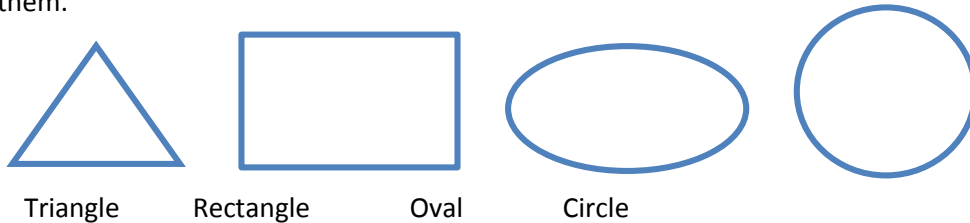
1. **Ask:** Do all the shapes have the same characteristics? Raise your hand to answer. (Answer: No)
2. **Ask:** Which of the shapes are rectangles? Raise your hand to answer.
(Answer: Shapes U, V, W, and Z)
3. **Ask:** Why does shape Y have dashes (--) in the row for opposite sides? Raise your hand to answer. (Answer: Because the shape does not have sides that are directly opposite each other.)
4. **Say:** Good job today pupils! You identified the properties of rectangles and compared them to the properties of squares and other shapes.

| | | |
|--|---|-------------------------|
| Lesson Title: Draw and Identify the Parts of a Circle | Theme: Geometry Squares and Rectangles | |
| Lesson Number: M-05-113 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|---|--|---|
|  Learning Outcomes By the end of the lesson, pupils will be able to draw and identify parts of a circle. |  Teaching Aids None |  Preparation Draw or copy the shapes from the lesson on the board. |
|---|--|---|

Opening (5 minutes)

- Say:** Write down the shapes of objects that you know.
(Example answers: circle, rectangle, triangle, square, prism, pentagon, cone, cylinder)
- Display the shapes of a triangle, rectangle, oval and circle on the board at the front of the class.
- Say:** Copy the shapes I just set up in your exercise books, and write down their names beneath them.



- Say:** Write down the names of 2 objects that have the shape of a circle.
- Say:** Today you will learn about circles and how to identify parts of a circle.

Introduction to the New Material (15 minutes)

- Say:** Draw a circle in your exercise books.



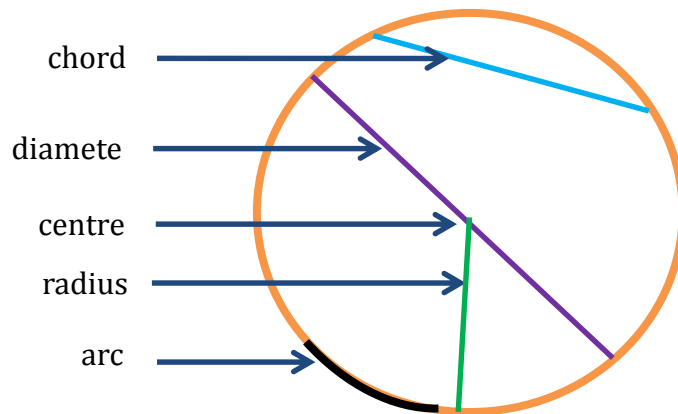
Figure A Figure B Figure C Figure D Figure E Figure F
 (circumference) (centre) (radius) (diameter) (chord) (arc)

- Say:** The distance around a circle is called the **circumference** of a circle, as shown in Figure A.
- Say:** Write what I just said in your exercise books: 'The distance around a circle is called the **circumference** of a circle.'
- Say:** Figure B shows the **centre** of the circle. Now write that in your exercise books.
- Say:** The line drawn from the centre to the circumference is called the radius.
- Say:** Figure C shows the **radius** of a circle. Copy that into your exercise books.
- Say:** The line drawn from one circumference through the centre to another circumference is called the diameter.
- Say:** Figure D shows the **diameter** of a circle. Write that in your exercise books.
- Say:** A line that connects one point on the edge of the circle with another point on the circle is called a chord.
- Say:** Figure E shows the **chord** of a circle. Write that in your exercise books.

- Say:** A part of the circumference of the circle is called an arc.
- Say:** Figure F represents an **arc** of a circle. Write that in your exercise books.

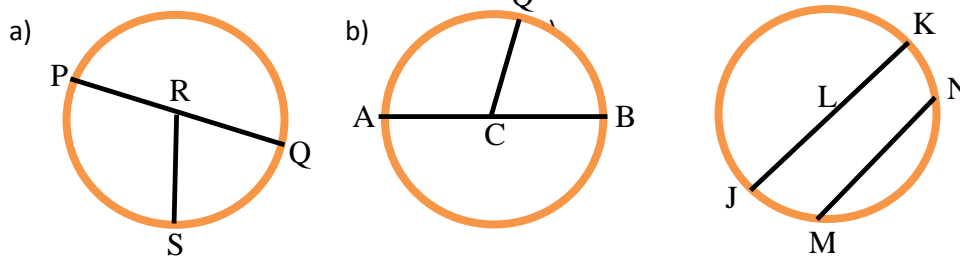
Guided Practice (5 minutes)

- Put pupils in pairs.
- Say:** Draw a circle and label its parts.
- Go around and guide pupils.



Independent Practice (6 minutes)

- Draw the following figures on the board:






- Say:** Identify the parts of the three circles I've just drawn.
 (Answers: a) Diameter: PQ and Radius: RS, PR and RQ; b) Diameter: AB and Radius: AC, CB and CQ; c) Diameter: JK Radius: JL and LK and Chord: MN)

Closing (4 minutes)

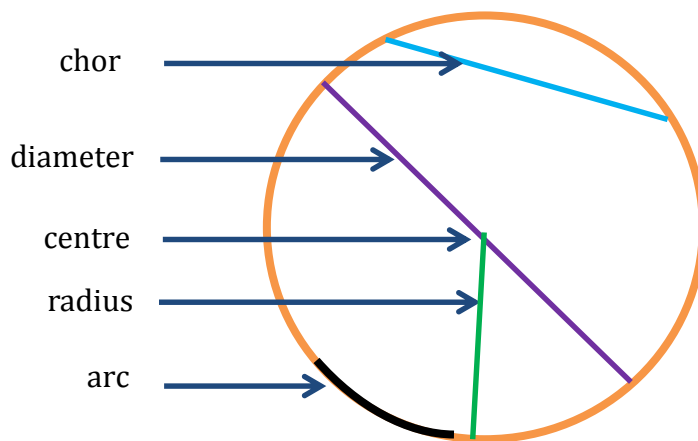
- Say** and write: Complete the following statements.
 - Half as long as the diameter is called the _____.
 - The distance around a circle is called the _____.
 - A line segment connecting any two points on a circle is called a _____.
 - Twice as long as the radius is the _____.
 - The perimeter of a circle is also called the _____.
- Invite pupils to answer. (Answers: a) Radius b) Circumference c) Chord d) Diameter e) Circumference)

| | | |
|--|---|-------------------------|
| Lesson Title: Radius and Diameter of a Circle | Theme: Geometry Squares and Rectangles | |
| Lesson Number: M-05-114 | Class/Level: Class 5 | Time: 35 minutes |

| | | |
|--|---|--|
|  <p>Learning Outcomes By the end of the lesson, pupils will be able to solve problems involving the radius and diameter of a circle.</p> |  <p>Teaching Aids Ruler</p> |  <p>Preparation Draw or copy the shapes and tables in the lesson on the board.</p> |
|--|---|--|

Opening (5 minutes)

1. **Say:** Copy this circle and label the parts.



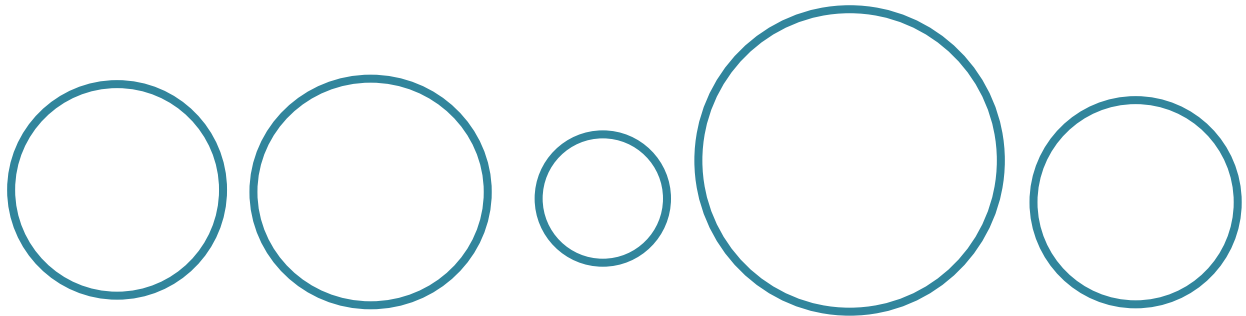
2. **Say:** Yesterday you learned about the parts of a circle and today you will solve problems that involve the radius and diameter of circles.

Introduction to the New Material (5 minutes)

1. **Ask:** What is the relationship of the radius and the diameter of a circle? If we look at the shape you drew in the opening, we can see that the diameter goes directly across the circle in the middle and the radius is half of this. We can look at it in two different ways.
2. **Say** and write on the board: Twice the radius is equal to the diameter, or half the diameter is equal to the radius.
3. **Ask** pupils to say this aloud and write it in their exercise books.
4. **Ask:** If I have a circle with diameter of 15 cm, what is the radius? Raise your hand to answer. (Answer: 7.5 cm)
5. **Ask:** If I have a circle with radius 11 ft, what is the diameter? Raise your hand to answer. (Answer: 22 ft)

Guided Practice (10 minutes)

1. **Say:** Use your ruler to measure the diameter and radius of the following circles and record your results.



Circle A

Circle B

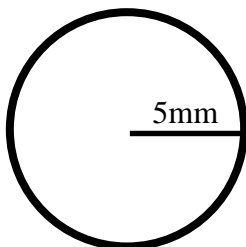
Circle C

Circle D

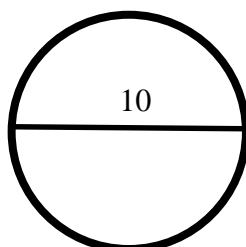
Circle E

Independent Practice (10 minutes)

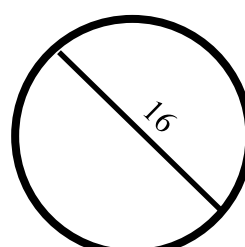
1. **Say:** Solve the following questions:
 - a) The diameter of your bicycle wheel is 34 inches. What is the radius? (Answer: 17cm)
 - b) The radius of a circle is 5 inches. What is the diameter? (Answer: 10 inches)
 - c) The diameter of a circular rug is 5 feet. What is the radius? (Answer: 2.5 feet)
2. **Ask:** What are the radius and diameter of each circle?



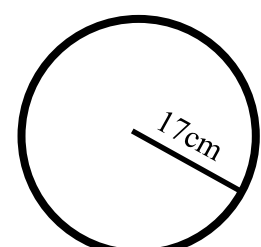
a)



b)



c)



d)

Answers:

- a) radius = 5mm and diameter = 10mm
- b) radius = 5 cm and diameter = 10cm
- c) radius = 8km and diameter = 16km
- d) radius = 17cm and diameter = 34cm

Closing (5 minutes)




1. Draw the table below on the board.
2. Call pupils to come to the board and complete the table:

| Radius | Diameter |
|---------------|-----------------|
| 24 cm | |
| | 120 cm |
| | 78 cm |
| 64 cm | |
| 105 cm | |

Answer:

| Radius | Diameter |
|---------------|-----------------|
| 24 cm | 48 cm |
| 60 cm | 120 cm |
| 39 cm | 78 cm |
| 64 cm | 128 cm |
| 105 cm | 210 cm |

| | | |
|--|---|-------------------------|
| Lesson Title: Compare and Contrast Properties of Different Shapes | Theme: Geometry Squares and Rectangles | |
| Lesson Number: M-05-115 | Class/Level: Class 5 | Time: 35 minutes |

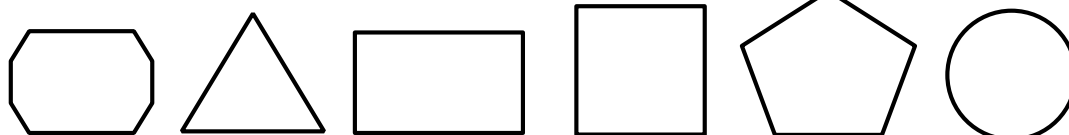
| | | |
|---|--|--|
|  Learning Outcomes By the end of the lesson, pupils will be able to compare and contrast properties of different shapes. |  Teaching Aids None |  Preparation Draw or copy the shapes and tables in the lesson on the board. |
|---|--|--|

Opening (5 minutes)

- Say:** Write down the names of 5 shapes you know.
(Example answers: circle, rectangle, triangle, square, prism, pentagon, cone, cylinder)
- Say:** Sit in groups of two.
- Say:** Draw the shapes of the objects you have written down.
- Say:** Now that you have learned about many shapes, today you will compare and contrast the properties of different shapes.

Introduction to the New Material (12 minutes)

- Draw the following shapes on the board as below.
- Say:** Copy the shapes I just set up into your exercise books, and write down their names beneath them.



Octagon Triangle Rectangle Square Pentagon Circle

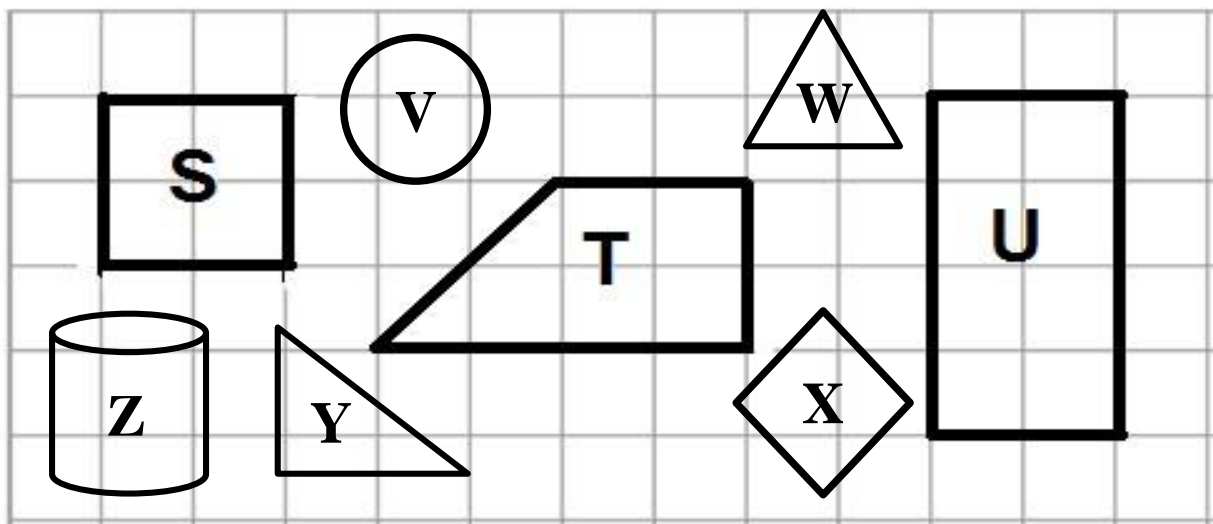
- Say:** Sit in groups of 2. Now choose any 3 of the shapes above and write down 3 properties of each of them.

| | |
|---|---|
| Octagon a) Has 8 sides b) Has 8 angles c) Each of the 8 angles is 135° | Triangle a) Has 3 sides b) Has 3 angles c) The interior angles add up to 180° |
| Rectangle a) Has 4 sides b) Has 4 equal angles c) The interior angles add up to 360° | Square a) Has 4 equal sides b) Has 4 equal angles c) The interior angles add up to 360° |
| Pentagon a) Has 5 sides b) Has 5 angles c) The interior angles add up to 540° | Circle a) The diameter of a circle is the longest chord b) Circles that have equal radii are equal c) Equal circles have equal circumferences |

4. Ask pupils for their responses and write them on the board.
5. **Say:** Write the above properties in your exercise books.
6. **Ask:** What do rectangles and squares have in common? Raise your hand to answer.
(Answer: they both have 4 90-degree angles they both have 4 sides.)
7. **Ask:** Which has more sides: a) octagon or triangle b) pentagon or octagon c) circle or triangle.
Raise your hand to answer.
(Answer: a) octagon; b) octagon; c) triangle, a circle doesn't have any sides)

Guided Practice (10 minutes)

1. Put pupils in pairs.
2. **Say:** Write down the names of the following shapes and complete the table below.



Answer:

| Property | Figure | | | | | | | |
|---------------------------------------|---------------|------------------|------------------|---------------|-----------------|----------------|--------------------------------|-----------------|
| | S (square) | T (trapezoid) | U (rectangle) | V (circle) | W (triangle) | X (diamond) | Y (right-angle triangle) | Z (cylinder) |
| Has 4 sides. | ✓ | ✓ | ✓ | ✓ | ✓ | X | X | X |
| All sides are equal. | ✓ | X | X | X | X | X | ✓ | X |
| Opposite sides are equal. | ✓ | X | ✓ | X | X | ✓ | ✓ | ✓ |
| All angles are right angles. | ✓ | X | ✓ | ✓ | ✓ | X | X | X |
| Has a circumference. | X | X | X | ✓ | X | X | X | ✓ |
| Made up of 2 circles and a rectangle. | X | X | X | X | X | X | X | ✓ |
| Has 3 sides. | X | X | X | X | ✓ | X | ✓ | X |




Independent Practice (5 minutes)

1. Write on the board: Provide the correct answers for the following questions:
 - a) What is a quadrilateral with 4 angles that are 90° and 4 sides of equal length? (Answer: square)
 - b) An octagon is a shape with how many sides? (Answer: 8 sides)
 - c) I have 4 sides. I have 2 pairs of equal sides. All my angles are equal and I have 2 pairs of parallel sides. Who am I? (Answer: rectangle)
 - d) I have more sides than a rectangle but less sides than an octagon. Who am I? (Answer: pentagon)

Closing (3 minutes)

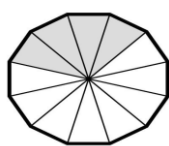
1. **Say:** Write 2 similarities between a cylinder and a circle.
2. **Say:** Good job today pupils! You can now compare and contrast a number or different shapes.

| | | |
|--|---|-------------------------|
| Lesson Title: Like Fractions with Denominators Up to 12 | Theme: Numbers and Numeration: Everyday Arithmetic | |
| Lesson Number: M-05-116 | Class/Level: Class 5 | Time: 35 minutes |

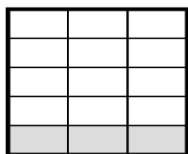
| | | | | | |
|---|---|---|------------------------------|---|---|
|  | Learning Outcomes By the end of the lesson, pupils will be able to identify, read, write and model like fractions with denominators up to 12. |  | Teaching Aids None |  | Preparation Draw the fraction models and tables from the lesson on the board. |
|---|---|---|------------------------------|---|---|

Opening (3 minutes)

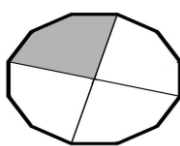
- Ask:** What part of the total is shaded in the following figures?



4 out of 12 ($\frac{4}{12}$)



$\frac{3}{15}$



$\frac{1}{4}$

- Say:** A fraction is part of a whole. The whole shape is seen above and the fraction is what part of the whole is shaded.
- Say:** Today you will learn how to identify, read, write and model fractions with denominators up to 12.

Introduction to the New Material (5 minutes)

- Say:** A fraction has 2 parts: the numerator and the denominator.
- Repeat:** A fraction has 2 parts: the numerator and the denominator.
- Then ask pupils to say out loud: 'A fraction has two parts, the numerator and the denominator'.
- Say:** Write 'numerator' and 'denominator' into your exercise books.
- Write $\frac{2}{5}$ on the board. Then **say:** The number on the top is called the numerator, and the number on the bottom is called the denominator.
- Say:** The numerator shows the part of the whole in question.
- Say:** The denominator shows the whole of the object in question.
- Say:** Write the meaning of the denominator and numerator in your exercise books.
- Say:** In the fraction $\frac{5}{8}$ what is the numerator? Raise your hand to answer. (Answer: 5)
- Say:** In the fraction $\frac{1}{7}$ what is the denominator? Raise your hand to answer. (Answer: 7)

Guided Practice (10 minutes)

- Put pupils in pairs.
- Say:** We are going to play a game, and the winner gets a present.
- Say:** Form 10 words from the word 'independence' and indicate the fraction of the total letters used by completing the table below. Remember, independence has 12 letters total.
- Say:** For example, the word 'pen' can be found in the word independence. Pen has 3 letters. So the fraction I used was $\frac{3}{12}$.

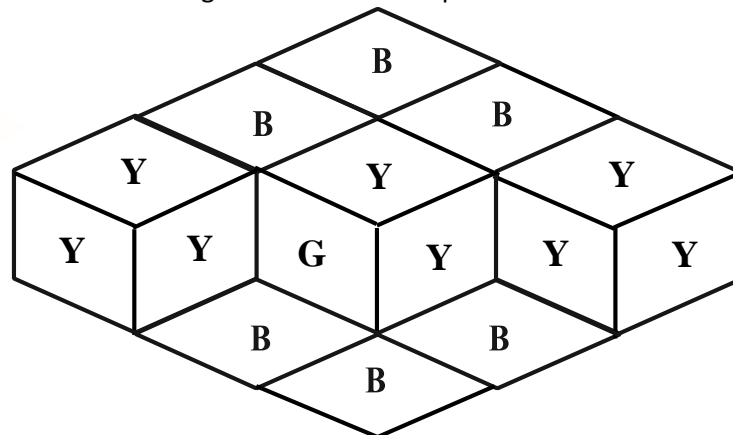
5. **Say:** The more letters you use to form the word the more marks you get.

| Word | Number of Letters Used | Fraction |
|---------|------------------------|----------|
| Depend | 6 | 6/12 |
| Nice | 4 | 4/12 |
| Indeed | 6 | 6/12 |
| Needed | 6 | 6/12 |
| Pennine | 7 | 7/12 |

(Example answers: in, pi, pin, pen, ped, pie, pic, ice, nip, end, din, dip, inn, nice, cede, ceded, need, niece, pinned, pine, needed, indeed, decide, dinned, depend, piece, pieced, denied, deep, deepen, deepened, dependence)

Independent Practice (10 minutes)

1. Write on the board: In the figure below, B is blue, Y is yellow, G is green. Count the total number of sides visible and then use the figure to answer the questions below.



- What fraction of the whole figure does one green block cover? (Answer: 1/15)
- What fraction do the yellow blocks cover? (Answer: 8/15)
- What fraction of the whole figure do the blue blocks cover? (Answer: 6/15)
- What fraction of the whole figure do the yellow and blue blocks cover? (Answer: 14/15)




Closing (4 minutes)

1. Invite pupils to the board to draw and shade the following fractions:

- 1/12
- 7/10
- 6/11
- 7/12

2. **Say:** Good job today pupils. You learnt how identify, read, write and model like fractions with denominators up to 12.

| | | |
|---|---|-------------------------|
| Lesson Title: Compare and Order Like Fractions | Theme: Numbers and Numeration: Everyday Arithmetic | |
| Lesson Number: M-05-117 | Class/Level: Class 5 | Time: 35 minutes |

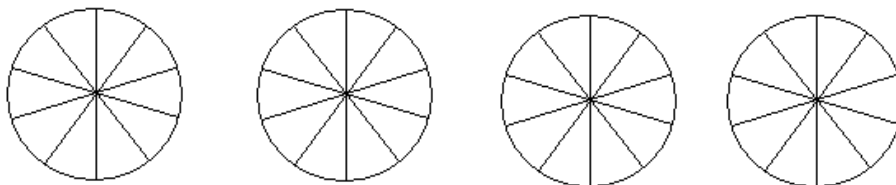
| | | | | | |
|---|--|---|------------------------------|---|---|
|  | Learning Outcomes By the end of the lesson, pupils will be able to compare, order and model like fractions with denominators up to 12. |  | Teaching Aids None |  | Preparation Draw the fraction models and shapes from the lesson on the board. |
|---|--|---|------------------------------|---|---|

Opening (5 minutes)

- Say:** Form groups of 3.
- Say:** Write down 3 fractions with the same denominator. (Possible answers: $\frac{2}{5}$ $\frac{4}{5}$ $\frac{3}{5}$ $\frac{1}{5}$)
- Say:** Represent your fractions on a diagram. For example, draw a circle and split it up into the number of your denominator and then shade the part or the numerator.
- Say:** Today you will learn how to compare, order and model like fractions with denominators up to 12.

Introduction to the New Material (5 minutes)

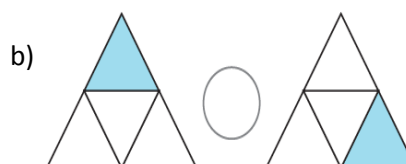
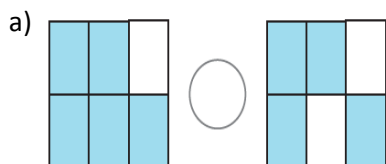
- Say:** Form groups of 3.
- Say:** Shade the following fractions on the figures below: $\frac{1}{10}$ $\frac{3}{10}$ $\frac{2}{10}$ $\frac{5}{10}$

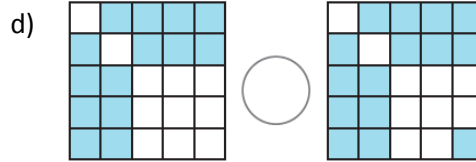
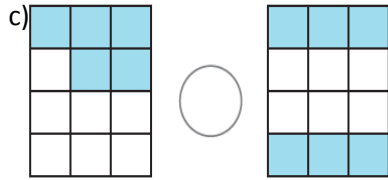


- Ask:** Which of the fractions is the biggest? Raise your hand to answer. (Answer: 5/10)
- Say:** When the denominators of the fractions are the same, the numerators are used to determine the size of the fraction.
- Say:** The bigger the numerator the bigger the fraction.
- Say:** Write in your books: The bigger the numerator the bigger the fraction when the numerators are the same.

Guided Practice (10 minutes)

- Put pupils in pairs.
- Say:** Compare the shaded fractions in the shapes by using $>$, $<$ or $=$





(Answer: a) > b) = c) < d) <)

3. Walk around the room, check pupils' work and assist where necessary.

Independent Practice (10 minutes)

1. **Say:** Write the following problems in your notebook and solve them individually.
2. **Say:** Compare the following fractions by using >, < or =

a) $\frac{11}{12}$ $\frac{10}{12}$ b) $\frac{11}{14}$ $\frac{3}{14}$ c) $\frac{1}{6}$ $\frac{5}{6}$

d) $\frac{7}{10}$ $\frac{8}{10}$ e) $\frac{1}{8}$ $\frac{3}{8}$ f) $\frac{7}{15}$ $\frac{11}{15}$

(Answer: a) > b) > c) < d) < e) < f) <)

3. Go around, check pupils' answers and make necessary corrections.
4. Have pupils to exchange their notebooks and check their work while you read the answers aloud.




Closing (5 minutes)

1. Call pupils to the board to order the following fractions from the smallest to the highest:

a) $\frac{1}{12}$ $\frac{7}{12}$ $\frac{3}{12}$ $\frac{4}{12}$ (Answer: $\frac{1}{12}$ $\frac{3}{12}$ $\frac{4}{12}$ $\frac{7}{12}$)

b) $\frac{7}{9}$ $\frac{6}{9}$ $\frac{2}{9}$ $\frac{9}{9}$ (Answer: $\frac{2}{9}$ $\frac{6}{9}$ $\frac{7}{9}$ $\frac{9}{9}$)

| | | |
|---|---|-------------------------|
| Lesson Title: Addition and Subtraction of Like Fractions | Theme: Numbers and Numeration: Everyday Arithmetic | |
| Lesson Number: M-05-118 | Class/Level: Class 5 | Time: 35 minutes |

| | | | | | |
|---|--|---|------------------------------|---|----------------------------|
|  | Learning Outcomes By the end of the lesson, pupils will be able to add and subtract like fractions with denominators up to 12. |  | Teaching Aids None |  | Preparation None |
|---|--|---|------------------------------|---|----------------------------|

Opening (5 minutes)

1. **Say:** Order the following fractions from the smallest to the greatest: $\frac{2}{12}$ $\frac{4}{12}$ $\frac{3}{12}$ $\frac{1}{12}$

(Answer: $\frac{1}{12}$ $\frac{2}{12}$ $\frac{3}{12}$ $\frac{4}{12}$)

2. **Say:** Order the following fractions from the greatest to the smallest.

a) $\frac{2}{5}$ $\frac{4}{5}$ $\frac{3}{5}$ $\frac{1}{5}$ (Answer: $\frac{4}{5}$ $\frac{3}{5}$ $\frac{2}{5}$ $\frac{1}{5}$)

b) $\frac{2}{9}$ $\frac{6}{9}$ $\frac{8}{9}$ $\frac{1}{9}$ (Answers: $\frac{8}{9}$ $\frac{6}{9}$ $\frac{2}{9}$ $\frac{1}{9}$)

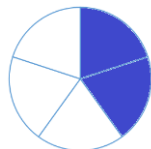
3. **Say:** Today you will learn how to add and fractions like these that have the same denominator.

Introduction to the New Material (5 minutes)

1. **Say:** Shade $\frac{1}{5}$ of this shape:



2. **Say:** Shade $\frac{2}{5}$ of this shape:



3. **Ask:** How many parts of the second shape are shaded all together? Raise your hand to answer.

(Answer: 2 parts)

4. **Ask:** How many parts of the first shape are shaded all together? Raise your hand to answer.

(Answer: 1 part)

5. **Say:** We can compare the two fractions because they have the same denominator.

6. Write:

$$\frac{1}{5} < \frac{2}{5} \text{ or } \frac{2}{5} > \frac{1}{5}$$

7. **Say:** When we add or subtract two or more fractions with the same denominators, we add or subtract the numerators and keep the denominator constant.

8. **Say:** We can add and subtract these fractions by adding or subtracting their numerators because they have the same denominator. Let's see two examples using the fractions above because they both have a denominator of 5.

9. Write:

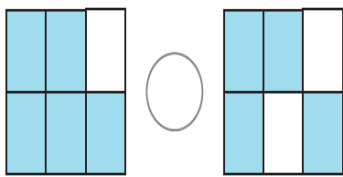
a. $\frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$

b. $\frac{2}{5} - \frac{1}{5} = \frac{2-1}{5} = \frac{1}{5}$

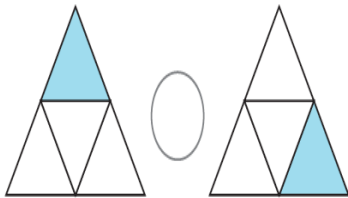
Guided Practice (10 minutes)

1. **Say:** Work out the following problems by comparing them first and then performing the indicated operation.

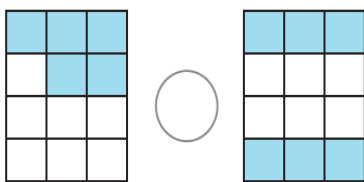
a) Compare and subtract



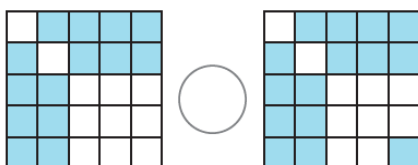
b) Compare and add



c) Compare and add



d) Compare and add



(Answer: a) $>$, $\frac{5}{6} - \frac{4}{6} = \frac{1}{6}$ b) $=$, $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ c) $<$, $\frac{5}{12} + \frac{6}{12} = \frac{11}{12}$ d) $<$, $\frac{14}{25} + \frac{15}{25} = \frac{29}{25}$)

Independent Practice (10 minutes)

1. **Say:** Work out the following problems:

a) $\frac{3}{7} + \frac{2}{7}$ b) $\frac{4}{9} + \frac{1}{9}$ c) $\frac{1}{8} + \frac{3}{8}$ d) $\frac{9}{12} - \frac{6}{12}$ e) $\frac{7}{11} - \frac{6}{11}$ f) $\frac{9}{12} + \frac{6}{12} - \frac{3}{12}$

(Answer: a) $\frac{5}{7}$ b) $\frac{5}{9}$ c) $\frac{4}{8}$ d) $\frac{3}{12}$ e) $\frac{1}{11}$ f) $\frac{12}{12}$)




Closing (5 minutes)

1. Call pupils to the board to work out the following

a) $\frac{1}{12} + \frac{7}{12} - \frac{3}{12}$ b) $\frac{2}{10} - \frac{1}{10} + \frac{3}{10}$

(Answer: a) $\frac{5}{12}$ b) $\frac{4}{10}$)

| | | |
|---|---|-------------------------|
| Lesson Title: Equivalent Fractions | Theme: Numbers and Numeration: Everyday Arithmetic | |
| Lesson Number: M-05-119 | Class/Level: Class 5 | Time: 35 minutes |

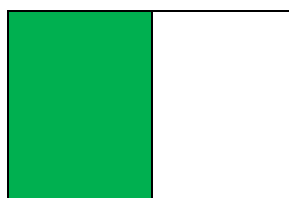
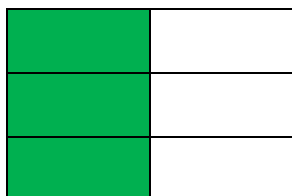
| | | | | | |
|---|--|---|------------------------------|---|---|
|  | Learning Outcomes By the end of the lesson, pupils will be able to identify and compare equivalent fractions with denominators up to 12. |  | Teaching Aids None |  | Preparation Draw or copy the shapes and table from the lesson on the board. |
|---|--|---|------------------------------|---|---|

Opening (3 minutes)

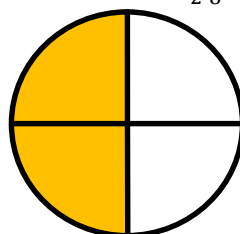
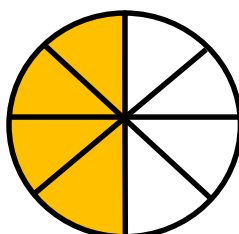
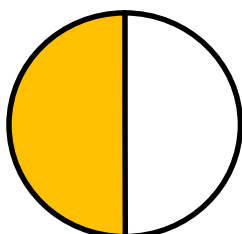
- Say:** Order the following fractions from the smallest to the biggest: $\frac{2}{12}$ $\frac{4}{12}$ $\frac{3}{12}$ $\frac{1}{12}$
 (Answer: $\frac{1}{12}$ $\frac{2}{12}$ $\frac{3}{12}$ $\frac{4}{12}$)
- Say:** Which of the following fractions are the same? $\frac{1}{12}$ $\frac{4}{12}$ $\frac{4}{11}$ $\frac{1}{12}$
 (Answer: $\frac{1}{12} = \frac{1}{12}$)
- Say:** Today you will learn how to identify and compare equivalent fractions with denominators up to 12.

Introduction to the New Material (10 minutes)

- Say:** Draw any shape of your choice and divide it into six different parts.
- Say:** Shade $\frac{3}{6}$ of the shape.
- Say:** Draw any shape of your choice, divide it into two parts and shade half of it.



- Ask:** Which of the above portions is bigger? Raise your hand to answer.
 (Answer: They are the same.)
- Say:** Write down the fractions representing the above shapes. (Answer: $\frac{3}{6}$ and $\frac{1}{2}$)
- Say:** These fractions are called equivalent fractions.
- Say:** Equivalent fractions are fractions that look different but show exactly the same amount.
- Ask** pupils to draw three different shapes and shade the fractions $\frac{1}{2}$ $\frac{4}{8}$ or $\frac{2}{4}$



9. **Say:** Would you rather have $\frac{1}{2}, \frac{4}{8}$ or $\frac{2}{4}$ of an orange? (Answer: They are equivalent.)
10. **Say:** We can determine if two fractions are equivalent by drawing a shape with shaded parts or using a simple calculation.
11. Write: $\frac{1}{2} = \frac{4}{8}$ and $\frac{4}{8} = \frac{2}{4}$
12. **Say:** Now we will cross multiply and set the two products equal.
13. Write:
 $1 \times 8 = 4 \times 2$ $4 \times 4 = 2 \times 8$
 $8 = 8$ $16 = 16$
14. **Say:** The 2 sides are equal so we know that the two fractions are equivalent.

Guided Practice (10 minutes)

1. **Say:** Work out the following problems by indicating which of the fractions are equivalent.

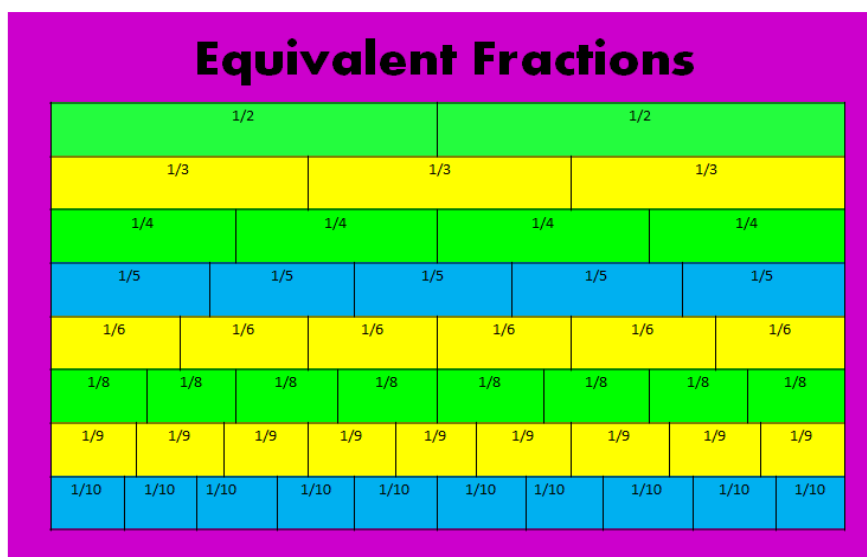
a) $\frac{3}{6}, \frac{2}{6}, \frac{1}{3}$ and $\frac{1}{2}$ b) $\frac{2}{12}, \frac{1}{6}, \frac{2}{6}, \frac{4}{12}$ c) $\frac{1}{4}, \frac{1}{3}, \frac{3}{12}, \frac{4}{12}$ d) $\frac{4}{8}, \frac{2}{6}, \frac{1}{2}, \frac{1}{3}$

(Answers: a) $\frac{3}{6}$ and $\frac{1}{2}$ are equivalent; $\frac{2}{6}$ and $\frac{1}{3}$ are equivalent b) $\frac{2}{12}$ and $\frac{1}{6}$ are equivalent; $\frac{2}{6}$ and $\frac{4}{12}$ are equivalent c) $\frac{4}{12}$ and $\frac{1}{3}$ are equivalent; $\frac{1}{4}$ and $\frac{3}{12}$ are equivalent d) $\frac{4}{8}$ and $\frac{1}{2}$ are equivalent; $\frac{2}{6}$ and $\frac{1}{3}$ are equivalent)

Independent Practice (10 minutes)

1. **Say:** Use the table below to write down all the equivalent fractions of the following fractions:

a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{5}{10}$






(Answers: a) $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$ b) $\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$ c) $\frac{1}{4} = \frac{2}{8}$ d) $\frac{5}{10} = \frac{4}{8} = \frac{3}{6} = \frac{1}{2}$

Closing (2 minutes)

1. Call pupils to the board to write down 2 equivalent fractions.

| | | |
|---|---|-------------------------|
| Lesson Title: Addition and Subtraction of Equivalent Fractions | Theme: Numbers and Numeration: Everyday Arithmetic | |
| Lesson Number: M-05-120 | Class/Level: Class 5 | Time: 35 minutes |

| | | | | | |
|---|--|---|------------------------------|---|----------------------------|
|  | Learning Outcomes By the end of the lesson, pupils will be able to add and subtract equivalent fractions with denominators up to 12. |  | Teaching Aids None |  | Preparation None |
|---|--|---|------------------------------|---|----------------------------|

Opening (5 minutes)

1. Write and **say:** Solve the following addition and subtraction problems:

a) $\frac{5}{11} - \frac{4}{11}$ (Answer: $\frac{1}{11}$)

b) $\frac{1}{8} + \frac{3}{8}$ (Answer: $\frac{4}{8}$)

c) $\frac{5}{12} + \frac{6}{12}$ (Answer: $\frac{11}{12}$)

d) $\frac{6}{8} + \frac{3}{8} - \frac{2}{8}$ (Answer: $\frac{7}{8}$)

2. **Say:** Today you will learn how to add and subtract equivalent fractions with denominators up to 12.

Introduction to the New Material (10 minutes)

1. **Say:** Form groups of two.

2. **Say:** Just as we added and subtracted fractions with a similar denominator, we can also add and subtract equivalent fractions.

3. **Say:** Before we add or subtract any two or more equivalent fractions, we have to make sure the denominators are equal.

4. **Say:** Make the denominators of the following fractions equal:

a. $\frac{1}{2}$ and $\frac{2}{6}$ b) $\frac{1}{5}$ and $\frac{1}{10}$ c) $\frac{1}{2}$ and $\frac{2}{12}$

5. **Say** and write:

a) Change the denominator of the first fraction from 2 to 6.

$$\frac{1}{2} = \frac{\quad}{6}$$

Since $\frac{1}{2} = \frac{3}{6}$ therefore, the answer is $\frac{3}{6}$ and $\frac{2}{6}$

b) Change the denominator of the first fraction from 5 to 10.

$$\frac{1}{5} = \frac{\quad}{10}$$

Since $\frac{1}{5} = \frac{2}{10}$ therefore, the answer is $\frac{2}{10}$ and $\frac{1}{10}$

c) Change the denominator of the first fraction from 2 to 6

$$\frac{1}{2} = \frac{\quad}{12}$$

Since $\frac{1}{2} = \frac{6}{12}$ therefore, the answer is $\frac{6}{12}$ and $\frac{2}{12}$

6. **Say:** Now you can add or subtract the fractions because they have the same denominator. You can only add and subtract fractions if they have the same denominator. Remember, you add the numerators and keep the denominator the same.

7. Write:

a. $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

b. $\frac{2}{10} - \frac{1}{10} = \frac{1}{10}$

c. $\frac{6}{12} - \frac{2}{12} = \frac{4}{12}$

Guided Practice (10 minutes)

1. Put pupils in pairs.

2. **Say:** work out the following problems

a) $\frac{3}{6} - \frac{1}{2}$ b) $\frac{2}{6} + \frac{1}{3}$ c) $\frac{2}{12} + \frac{1}{6}$ d) $\frac{1}{4} + \frac{3}{12}$

(Answers:

a. $\frac{3}{6} - \frac{1}{2} = \frac{3}{6} - \frac{3}{6} = 0$

b. $\frac{2}{6} + \frac{1}{3} = \frac{4}{6}$

c. $\frac{2}{12} + \frac{1}{6} = \frac{2}{12} + \frac{2}{12} = \frac{4}{12}$

d. $\frac{1}{4} + \frac{3}{12} = \frac{3}{12} + \frac{3}{12} = \frac{6}{12}$)

3. Walk around the room, check pupils' work and assist where necessary.

Independent Practice (10 minutes)

1. **Say:** work out the following problems.

a) $\frac{1}{3} + \frac{4}{12}$ b) $\frac{1}{4} + \frac{2}{8}$ c) $\frac{1}{5} + \frac{2}{10}$ d) $\frac{1}{3} + \frac{3}{9}$

(Answers: a) $\frac{8}{12}$ b) $\frac{4}{8}$ c) $\frac{4}{10}$ d) $\frac{6}{9}$)

2. Have pupils to exchange their notebooks and check their work while you read the answers aloud.

Closing (2 minutes)

1. **Ask:** What's the first step to adding and subtracting equivalent fractions? Raise your hand to answer. (Answer: Make the denominators the same.)

2. **Say:** Good job today pupils! You learned how to add and subtract fractions with like denominators.

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