Bar Graphs and Line Graphs

Lesson plan and teacher's notes · Grade 4 Mathematics · 2 periods of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Grade 4
Subject	Mathematics	**Enrolment**	Boys ___ Girls ___ Total ___
Time	80 minutes	**Topic**	Bar Graphs and Line Graphs

Learners collect data, organise it in a frequency table, present it on bar graphs and line graphs, read graphs to answer questions and, where computers exist, draw graphs with ICT tools. Two periods of 40 minutes.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Collect and organise data using a frequency table
2. Present data on a bar graph and a line graph
3. Interpret bar and line graphs
4. Use ICT tools to draw graphs where available

Prior knowledge

- Learners can count and add whole numbers
- Learners can use tally marks

Teaching and learning materials

- Sheets of paper with a blank frequency table
- Picture cards of animals (for example 5 elephants, 3 dogs, 4 cats, 6 chickens)
- Square grid paper and crayons
- Computers and a projector if available
- Manila paper and markers

References

Ministry of Education (CDC) Grade 4 Mathematics syllabus and module; 25Schools learners' note: Bar Graphs and Line Graphs.

Lesson development

Stage and time	Teacher activities	Learner activities
Period 1 Frequency table 20 min	Organise learners in groups. Give each group a task: record the people wearing black in school, the shoe sizes of teachers, or the number of classrooms. Each group makes a frequency table with the columns type, tally mark and frequency, and presents to the class. Ask why they arranged the data that way and which has the highest number.	Collect data and make a frequency table.
Period 1 Paint how many we are 20 min	Display animal picture cards. Learners pick a card of a wild or domesticated animal. On square grid paper, they write domesticated and wild animals along the x-axis and paint boxes upwards for the number counted. Join the tops with a line to form a line graph.	Paint bars and join points to make a line graph.
Period 2 Reading graphs 20 min	Show Bwalya's bar chart of vehicle colours. Ask how many were red, blue and black, the total, and the least colour. Then show Banji's line chart of favourite fruit and ask which was most liked, least liked and how many liked mango, orange and banana.	Read graphs and answer questions.
Period 2 ICT graphs 20 min	Where computers are available, put learners in manageable groups to draw line and bar graphs in Excel from a given table. Where there are none, learners redraw their graph on manila paper and present it.	Draw graphs in Excel or on manila paper.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

Frequency table

A frequency table has the columns type, tally mark and frequency. Learners use it to organise data and find the highest number.

Bar and line graphs

Bar graphs and line graphs show how things differ across groups. Use grid paper with the groups on the x-axis. Learners may also draw them in Excel.

Reading graphs

Find the group, then read the height of its bar or point. Add bars for a total, and find the shortest bar or lowest point for the least.

Questions to ask during the lesson

Question	Expected answer
The teacher shows a class survey of the animals at a village farm with chickens, goats and cows. (a) What do we use to count. (b) What do we call the total. (c) Where do we write it.	(a) Tally marks. (b) Frequency. (c) In the frequency column.
The teacher gives learners a bar chart of how many girls and boys are in the class today. (a) What does each bar show. (b) How do we find which is taller. (c) What is the total.	(a) The number in each group. (b) Compare the heights. (c) Add the two bars.
Banji draws a line chart for her friends at school showing favourite fruit and shows it to the class. (a) How do we find the most liked fruit. (b) How do we find the least liked. (c) Why is a title useful.	(a) The highest point. (b) The lowest point. (c) It tells what the graph shows.

Worked examples for the board

Making a frequency table

Step 1: Choose animals on picture cards. Step 2: Make one tally mark for each. Step 3: Count the marks and write the frequency. Step 4: Find the highest number.

Drawing a bar graph

Step 1: Write the groups along the x-axis. Step 2: Paint squares upwards for each count. Step 3: Add a title.

Board plan

Write the title Bar Graphs and Line Graphs. Draw a frequency table and one bar graph with the x-axis labelled.

Type	Tally mark	Frequency
Dog	III	3
Cat	IIII	4

The finished board

Mistakes to expect

Learners often think	Put it right
The frequency is the number of tally marks drawn, not the total.	Show that the frequency is the total counted from the tally marks.
Bars can be drawn with any width or starting point.	Show that bars start at the same line and use squares of equal size.

Differentiation

Learners who struggle

Give learners a ready frequency table with a few groups.

Learners who finish early

Ask learners to make their own survey question and present results on both graph types.

Hearing or visual impairment

Give learners large grids and tactile objects. Pair learners who find counting hard with a helper.

No projector, no printing

Use drawn grids in exercise books, stones or bottle tops for counting, and chalk on the floor.

If time is short

Keep the frequency table and reading graphs. Move the ICT activity to the next lesson.

Evaluation

Question or task	A correct answer shows
The teacher gives Mulenga a bar chart of vehicle colours that Bwalya made from the roadside near her house. (a) How many vehicles were red. (b) What is the total. (c) Which colour was the least.	Reads the bars correctly, adds for the total, and finds the shortest bar.
Chanda counts animals on picture cards for her group: 5 elephants, 3 dogs, 4 cats and 6 chickens. (a) Which has the highest number. (b) Which has the lowest. (c) How many animals in all.	(a) Chickens. (b) Dogs. (c) 18.

Homework

Njavwa asks 10 friends their favourite fruit and writes the results. (a) Make a frequency table with tally marks. (b) Draw a bar graph on grid paper. (c) Say which fruit is most liked.

Extra practice with answers

Question	Answer
1. A teacher in Lusaka asks Mulenga to count 5 elephants, 3 dogs, 4 cats and 6 chickens on cards for the class. (a) Which has the most. (b) Which has the least. (c) What is the total.	(a) Chickens. (b) Dogs. (c) 18.
2. Bwalya counted vehicles by the roadside near her house: red 4, blue 3, black 5. Her teacher asks questions about it. (a) How many were blue. (b) What is the total. (c) Which colour was the least.	(a) 3. (b) 12. (c) Blue.

3. Banji asked friends at school about fruit: mango 7, orange 4, banana 6. She draws a line chart for the class. (a) Which is most liked. (b) Which is least liked. (c) How many liked banana.	(a) Mango. (b) Orange. (c) 6.
4. Chanda wants to show the number of domesticated and wild animals on picture cards to her group on grid paper. (a) What goes on the x-axis. (b) How do we show the numbers. (c) How do we make it a line graph.	(a) The groups. (b) Paint boxes upwards. (c) Join the tops with a line.

Answers to the learners' check-yourself questions

1. What do we write in the three columns of a frequency table.
   The type, the tally marks and the frequency.
2. What is frequency.
   How many times something appears.
3. Which axis do we write the groups on.
   The x-axis.
4. How do we find which group has the highest number on a bar graph.
   Look for the tallest bar.
5. Bwalya sits by the roadside near her house and counts vehicles by colour for her class project. Her bar chart shows red 4, blue 3 and black 5. (a) How many were black. (b) What is the total number of vehicles. (c) Which colour was the least.
   (a) 5. (b) 12. (c) Blue.
6. Banji asks her friends at school about their favourite fruit and draws a line chart for the class. Mango has 7 votes, orange has 4 and banana has 6. (a) Which fruit was liked by most friends. (b) Which was least liked. (c) How many liked banana.
   (a) Mango. (b) Orange. (c) 6.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: