Statistics: 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**	Statistics: Bar Graphs and Line Graphs

Learners collect data in a school survey, organise it in a frequency table with tally marks, present it on bar graphs and line graphs on square grid paper, read the graphs, and see how computers can plot them. Two periods of 40 minutes.

Specific outcomes

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

1. Collect and organise data in a frequency table
2. Present data on a bar graph and a line graph
3. Interpret a bar graph and a line graph

Prior knowledge

- Learners can count and add whole numbers
- Learners know a table has rows and columns

Teaching and learning materials

- Sheets with a blank frequency table
- Picture cards of animals
- Square grid paper and crayons
- Chalk and board
- Computer and projector if available

References

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

Lesson development

Stage and time	Teacher activities	Learner activities
Period 1 **Present** **10 min**	Introduce the key terms: statistics, data, bar graph, line graph. Say that bar charts and line graphs show how things differ across groups, for example the number of girls and boys in class. Teach how to make tally marks.	Learn the key terms and practise tally marks.
Period 1 **Practice** **20 min**	School survey. Groups record the number of people wearing black, shoe sizes of teachers, classrooms in the school, or boys and girls in Grade 4. Groups present the raw data, then fill a blank frequency table with item, tally marks and frequency. With picture cards of animals, each group makes a frequency table and answers why they arranged the data that way and which animal has the highest number.	Collect data and complete a frequency table.
Period 1 **Closure** **10 min**	Groups present their findings. Ask which item has the highest frequency.	Present and answer.
Period 2 **Practice** **20 min**	On square grid paper, learners draw a bar for each animal with the categories on the x-axis. For the line graph, groups find how many learners wear each shoe size, mark points with shoe size on the horizontal axis and number of learners on the vertical axis, and join the points with straight lines. Learners find the highest and lowest points.	Draw a bar graph and a line graph.
Period 2 **Produce** **10 min**	Give learners graphs to read, such as vehicle colours seen on the roadside or temperatures on three days. Ask which is highest and lowest and what the total is.	Read and answer questions about graphs.
Period 2 **Closure** **10 min**	If a computer is available, demonstrate plotting a bar chart and line graph. Check that learners can present data in different forms correctly.	Present a graph to the class.

Teacher's content notes

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

Key terms

Statistics, data, bar graph and line graph.

Frequency table

A frequency table has three columns: the item, the tally marks and the frequency. Learners must be taught how to make tally marks.

Graphs

Bar graphs and line graphs show how things differ across groups. A line graph is made by marking points on square grid paper and joining them with straight lines. Learners check which point is highest and which is lowest.

Questions to ask during the lesson

Question	Expected answer
The teacher gives each group picture cards showing 5 elephants, 3 dogs, 4 cats and 6 chickens and asks them to make a frequency table. (a) Which animal has the highest frequency. (b) How many dogs. (c) What are the three columns.	(a) Chickens. (b) 3. (c) Type of animal, tally mark and frequency.
The teacher asks a group to find out how many learners wear each shoe size and then to mark the points on grid paper and join them. (a) What is on the horizontal axis. (b) What is on the vertical axis. (c) What is the result called.	(a) Shoe size. (b) Number of learners. (c) A line graph.
The teacher shows a bar chart Bwalya made of vehicle colours passing her house on the road. (a) How do we find the colour seen most. (b) How do we find the colour seen least. (c) How can we find the total vehicles.	(a) The tallest bar. (b) The shortest bar. (c) Add all the bars.

Worked examples for the board

Making a frequency table

Step 1: Count each item. Step 2: Make tally marks for each count. Step 3: Write the number in the frequency column. Step 4: Find the highest number.

Making a line graph

Step 1: Draw the axes on the grid. Step 2: Mark a point for each count. Step 3: Join the points with straight lines. Step 4: Find the highest and lowest points.

Board plan

Write the title Statistics. Draw a frequency table with three columns, then a small bar graph beside it.

Item	Tally marks	Frequency
Pencils	||||	4
Pens	||||		6
Erasers	|||	3

The finished board

Mistakes to expect

Learners often think	Put it right
A line graph is a drawing of a line.	Show that a line graph is made by marking a point for each count and joining the points.
A longer table row means a higher number.	Teach learners to read the frequency column, not the length of the tally marks.

Differentiation

Learners who struggle

Use small counts, such as 3 or 4 items, and mark each tally with a learner before moving to the grid.

Learners who finish early

Ask learners to collect a new data set at home and draw both graphs.

Hearing or visual impairment

Pair learners who find drawing hard with a helper. Provide raised or large-print grids for learners with visual difficulty.

No projector, no printing

Use drawn grids on the board or in exercise books, and use stones or bottle tops to count.

If time is short

Keep the frequency table and the bar graph. Move the line graph and computer demonstration to the next lesson.

Evaluation

Question or task	A correct answer shows
During a classroom check at Kapiri Mposhi Primary School, learners counted 4 pencils, 6 pens, 4 pencils, 2 sharpeners, 6 pens and 3 erasers in their pencil cases. The teacher asks Bupe to make a frequency table. (a) Name the three columns. (b) Which item has the highest frequency. (c) How many erasers.	(a) Item, tally marks and frequency. (b) Pens. (c) 3.
Learners recorded club members: 7 in the Environmental Club, 4 in the Chess Club, 9 in the Health Club and 5 in the Art Club. The teacher asks Mwamba to make a bar graph. (a) Which club has the most members. (b) Which has the fewest. (c) How many in total.	(a) Health Club. (b) Chess Club. (c) 25.

Homework

Njavwa counts the vehicles passing her house for an hour: 5 cars, 8 motorbikes, 2 trucks and 3 buses. She wants to show her class what she found. (a) Make a frequency table with item, tally marks and frequency. (b) Which has the highest frequency. (c) What kind of graph can she draw.

Extra practice with answers

Question	Answer
1. Learners recorded temperatures at midday over three days: Day 1 22 degrees Celsius, Day 2 26 degrees Celsius and Day 3 24 degrees Celsius. The teacher asks Mulenga to plot a line graph. (a) What does the x-axis show. (b) What does the y-axis show. (c) Which day is highest.	(a) The day. (b) The temperature. (c) Day 2.
2. A dairy farmer in Luangwa recorded the litres of milk collected on five days. Chanda must read his line graph and answer questions for the class. (a) How do we find the highest day. (b) How do we find the lowest day. (c) How do we find how many more litres on one day than another.	(a) Find the highest point. (b) Find the lowest point. (c) Subtract the two values.
3. In a club survey, 7 learners are in the Environmental Club, 4 in the Chess Club, 9 in the Health Club and 5 in the Art Club. Bupe is asked to make a frequency table. (a) How many in the Chess Club. (b) Which has the highest frequency. (c) How many learners in all.	(a) 4. (b) Health Club. (c) 25.
4. Mwamba counted the classrooms and teachers at his school: 8 classrooms and 12 teachers. His teacher asks him to show this in a bar graph. (a) Which bar is taller. (b) What is the difference. (c) What are the two categories.	(a) Teachers. (b) 4. (c) Classrooms and teachers.

Answers to the learners' check-yourself questions

1. What are the three columns of a frequency table.
   The item, the tally marks and the frequency.
2. What do we do to make a line graph after marking the points.
   Join the points with straight lines.
3. What does the tallest bar show.
   The highest number.
4. What is data.
   Information we collect.
5. During a classroom check at Kapiri Mposhi Primary School, learners counted 4 pencils, 6 pens, 2 sharpeners and 3 erasers in their pencil cases. The teacher asks them to make a frequency table. (a) What are the three column names. (b) Which item has the highest frequency. (c) How many pens are there.
   (a) Item, tally marks and frequency. (b) Pens. (c) 6.
6. Learners at Feira school measured the temperature at midday on three days: Day 1 was 22 degrees Celsius, Day 2 was 26 degrees Celsius and Day 3 was 24 degrees Celsius. They plotted a line graph. (a) What goes on the x-axis. (b) What goes on the y-axis. (c) Which day is the highest point.
   (a) The day. (b) The temperature in degrees Celsius. (c) Day 2.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: