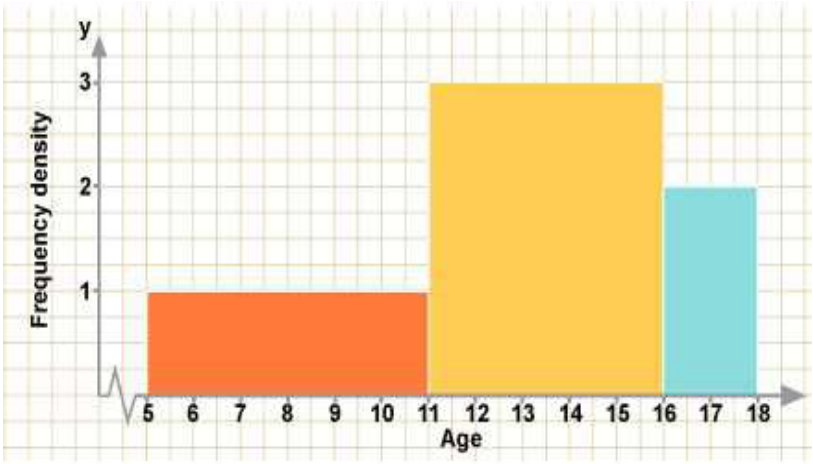
HISTOGRAM



The histogram shows the number of children in each age group on a school bus. There are no children under 5 years and no children over 17 years. There are 6 children aged between 5 and 10 years.

Explain why the **class boundaries** are 5, 11, 16 and 18.

Ages of children on the bus	Frequency	Frequency density
5 – 10	6	1
11-15		
16-17		
>17	0	

Complete the frequency table.

How many children are there on the bus altogether?

Remember that in a **histogram** the **area** of the bar represents the frequency and the label on the vertical axis should be '**frequency density**. It is incorrect to label the vertical axis 'frequency'.

HELP

You might work with a partner or in a small group as it helps to talk about this sort of question, and to explain the ideas to each other.

It is important to understand what the words mean.

On the horizontal scale, marked **Age,** the **age groups** (also called **classes)** are : 5 - 10, 11 - 16 and 17- 18. The **area** of the bar in a **histogram** represents the frequency and the **height** is the **frequency density.**

So for the children aged 5 – 10 the **frequency density** (the **height** of the bar**)** is 1 child per year and the **frequency** (the **area** of the bar) is 6 × 1 = 6 children in that age group.

NEXT

In your class most of the learners will be the same age so the histogram for ages will not be very interesting. How would you plan a project to collect data, and draw a histogram, for the ages of all the children in the class together with the ages of all their brothers and sisters? What ages would you expect to have on the horizontal axis?

NOTES FOR TEACHERS

SOLUTION

Ages of children on the bus	Frequency	Frequency density
5 - 10	6	1
11 - 15	15	3
16 - 17	4	2
> 17	0	0

The class width for the 11 to 15 group is 5 years and the frequency density is 3 so the frequency is 5 x 3 = 15.

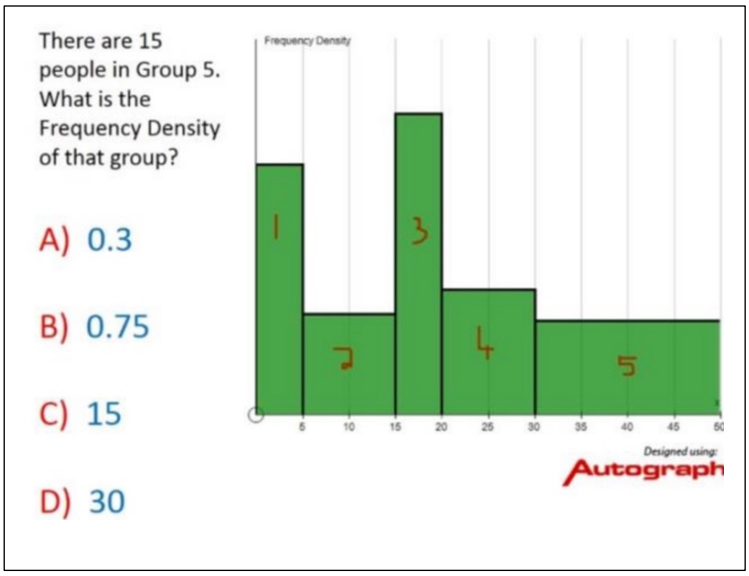
The class width for the 16 to 17 group is 2 years and the frequency density is 2 so the frequency is 2 x 2 = 4.

The total number on the bus is 6 + 15 + 4 = 25

DIAGNOSTIC ASSESSMENT This should take about 5–10 minutes.

Write the question on the board, say to the class:
"Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D".

1. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer. DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
2. It is important for learners to explain the reasons for their answers. Putting thoughts into words leads better understanding and improves their communication skills.
3. Do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.



4. Ask the class to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.
5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

The correct answer is: B
Group 5 represents ages 30 to 50, that is a class width of 20 years so 15 people in 25 years gives a frequency density of 15/20 = 0.75 people per year.

Why do this activity?

This problem provides a histogram for learners to interpret. It can be used to introduce the idea of a histogram or as a quick revision example.

Learning objectives

In doing this activity students will have an opportunity to develop a better understanding of how graphs and charts are used to represent data.

Generic competences

In doing this activity students will have an opportunity to:

1. develop the skill of interpreting and creating visual images to represent concepts and situations;
2. analyse, and interpret information.

Suggestions for teaching

You might like to use the 'Best Representation' activity first and follow on with this one. https://aiminghigh.aimssec.ac.za/years-7-10-best-representation/

This is a simple problem that learners can be given without introduction by the teacher as the definition of histogram and the fact that the areas of the bars represent the frequencies are written into the question.

Learners (perhaps working in pairs) could be asked to present their findings.

Key questions

- Can you read the ages at the edges of the bars in the graphs (the class boundaries)?
- Why do you think that the class boundary is 11 between the 5 to 10 years group and the 11 to 15 years group instead of perhaps 10.5?
- What are the frequency densities (read them from the graph)?
- How can you use the areas to find the frequencies from the histogram?

Follow up

For a further challenge and to work on statistics relating to the big issues in today's world:
SA Demographics https://aiminghigh.aimssec.ac.za/grades-9-12-sa-demographics/
A Richer World https://aiminghigh.aimssec.ac.za/years-9-12-a-richer-world/ Drinking Water https://aiminghigh.aimssec.ac.za/years-6-10-drinking-water/
Land and Sea Statistics
https://aiminghigh.aimssec.ac.za/years-10-12-land-and-sea-statistics/