

LESSON PLAN



DLF Public School

THE LEARNING ACADEMY
Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic
IX	Mathematics	35 Mins	Statistics	☐ Graphical Representation of Data ☐ Histogram
Expected Learning Outcome: Learners will be able to 1) Interpret data from the given Histogram 2) draw the Histogram to depict the given data				
Expected skill development: 1) Representation skill while drawing Histogram 2) Procedural thinking 3) Communicating using mathematical terminology 4) Visual and spatial ability 5) Strategic thinking				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/ warm-up, Content, Think Line, Closure)

<u>Pedagogy</u>	<u>Content</u>
<u>(5 mins) Warm Up</u> <u>(Individual work)+ Black Board</u> What diagram is used to represent individual data? Thinkline How would you data involving continuous classes?	Bar Graph <u>Response by the learners:</u> To represent continuous class interval histogram is drawn. There are no gaps in between consecutive rectangles, the resultant graph appears like a solid figure. This is called a histogram. Here, areas of the rectangles are proportional to the corresponding frequencies. However, since the widths of the rectangles are all equal, the lengths of the rectangles are proportional to the frequencies. NOTE: If the first class interval is not starting from zero, we show it on the graph by marking a kink or a break on the axis.

(10 mins) Demonstration by Facilitator on Board

Facilitator will take Q5 of Ex 14.3 to reinforce the topic

5. The following table gives the life times of 400 neon lamps:

Life time (in hours)	Number of lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

- (i) Represent the given information with the help of a histogram.
(ii) How many lamps have a life time of more than 700 hours?

4. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	Number of leaves
118 - 126	3
127 - 135	5
136 - 144	9
145 - 153	12
154 - 162	5
163 - 171	4
172 - 180	2

- (i) Draw a histogram to represent the given data. [Hint: First make the class intervals continuous]
(ii) Is there any other suitable graphical representation for the same data?
(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?

In this case we will first change the distribution to continuous data.

Length(in mm)	No. of leaves
117.5-126.5	3
126.5-135.5	5
135.5-144.5	9
144.5-153.5	12
153.5-162.5	5
162.5-171.5	4
171.5-180.5	2

Now histogram will be drawn as in previous question.

Now, histogram will be drawn as in previous question.

(10 mins) In class Exercise:: Closure

Discussion of Q4 of Ex 14.3
Revisiting the concept done in the class.

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

4. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	Number of leaves
118 - 126	3
127 - 135	5
136 - 144	9
145 - 153	12
154 - 162	5
163 - 171	4
172 - 180	2

- (i) Draw a histogram to represent the given data. [Hint: First make the class intervals continuous]
- (ii) Is there any other suitable graphical representation for the same data?
- (iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?

- Evaluation/ Assessment:

Learners on the way	Advanced Learner Questioned based
Materialsneeded/ Resources:- NCERT Exemplar, NCERT, chalk, duster	
Common Misconceptions: - Difficulty in identifying the continuous and discontinuous data. - Difficulty in converting discontinuous interval into continuous interval	Addressing the misconceptions: By giving examples

- Home Assignments: Attempt Ex 14.3 Q6 and 7 in the notebook.

Teaching Methodology

- Questionnaire/ Assignment
- Discussion
- Demonstration

LESSONPLAN



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic
IX	Mathematics	35 + 35 Mins 2 Pds	Statistics	P6 and P7 Graphical representation of Frequency polygon

Expected Learning Outcome: Learners will be able to:
Draw the frequency polygon with the help of a histogram and without histogram.

Expected skill development:

- Representation skill while drawing frequency polygon.
- Procedural thinking.
- Communicating using mathematical terminology.
- Visual and spatial ability
- Strategic thinking.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/ warm-up, Content, Think Line, Closure)

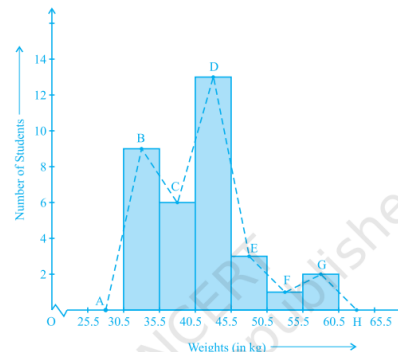
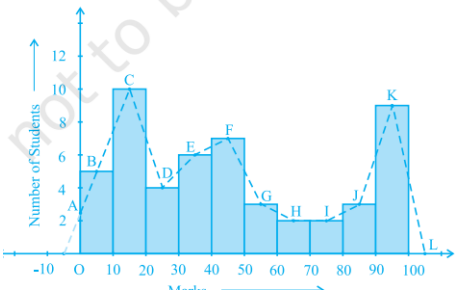
<u>Pedagogy</u>	<u>Content</u>
<u>(10 mins) Warm up</u> Facilitator will ask the Question Q-In what other ways can you represent data? Thinkline: Why is this so? And how do we complete the polygon when there is no class preceding the first class?	After getting mixed response from learners, facilitator will introduce another visual way of representing quantitative data and its frequencies. This is a polygon called Frequency Polygon. Consider the histogram we made yesterday. We will join the mid-points of the upper sides of the adjacent rectangles of this histogram by means of line segment. Facilitator will further continue, although there exists no class preceding the lowest class and no class succeeding the highest class, addition of the two class intervals with zero frequency enables us to make the area of the frequency polygon the same as the area of the histogram.  Example 8 : Consider the marks, out of 100, obtained by 51 students of a class in test, given in Table 14.9.

Table 14.9

Marks	Number of students
0 - 10	5
10 - 20	10
20 - 30	4
30 - 40	6
40 - 50	7
50 - 60	3
60 - 70	2
70 - 80	2
80 - 90	3
90 - 100	9
Total	51



Thinkline:

Can you draw Frequency Polygon without Histogram?

To **find** the class marks of a class interval, we find the sum of the upper limit and the lower limit of a class and divide it by 2. Thus, Class mark = $\frac{1}{2}$ (upper limit + lower limit)

Note: frequency polygons are used when the data is continuous and very large. It is very useful for comparing two different sets of data of the same nature, for example – comparing the performance of two different sections of the same class.

(50 mins) Demonstration by Facilitator on Board

Facilitator will take Q6 of Ex 14.3 to reinforce the topic on black board and explain the steps of constructions of frequency polygon.

6. The following table gives the distribution of students of two sections according to the marks obtained by them:

Section A		Section B	
Marks	Frequency	Marks	Frequency
0 - 10	3	0 - 10	5
10 - 20	9	10 - 20	19
20 - 30	17	20 - 30	15
30 - 40	12	30 - 40	10
40 - 50	9	40 - 50	1

Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the two polygons compare the performance of the two sections.

(10 mins) In class Exercise: Closure

Facilitator will revise the formula of finding class marks and class size and steps for finding frequency polygon.

8. A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1 - 2	5
2 - 3	3
3 - 5	6
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	4

Draw a histogram to represent the data above.

--	--

Proposed Questions(must include the questions asked in the classroom and the ones given as class-work in the notebook)

8. A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1 - 2	5
2 - 3	3
3 - 5	6
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	4

Draw a histogram to represent the data above.

Evaluation/ Assessment: Teacher will assess the children randomly and also through student teacher interaction.

Learners on the way

3. Given below are the seats won by different political parties in the polling outcome of a state assembly elections:

Political Party	A	B	C	D	E	F
Seats Won	75	55	37	29	10	37

(i) Draw a bar graph to represent the polling results.
 (ii) Which political party won the maximum number of seats?

Advanced Learner

8. A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1 - 2	5
2 - 3	3
3 - 5	6
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	4

Draw a histogram to represent the data above.

Materials needed/ Resources:- Chalk, Duster NCERT Exemplar, NCERT Text Book

Common Misconceptions:
Identification of preceding the lowest class and succeeding the highest class.

Addressing the misconceptions:
By giving different examples.

Home Assignment: Attempt Q 7 of Ex 14.3 of NCERT Text Book Class 9 in the Note Book



Class	Subject	Time slot	Lesson	Topic
IX	Mathematics	35 Mins	Statistics	P8 Graphical representation Histogram with unequal width

Expected Learning Outcome: Learners will be able to

- Identify the situation where adjusted frequency needs to be calculated.
- Draw the histogram

Expected skill development:

- Representation skill while drawing histogram and frequency polygon
- Numeracy and calculation skills while finding adjusted frequency.
- Procedural thinking
- Visual and spatial ability
- Strategic thinking.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/ warm-up, Content, Think Line, Closure)

<u>Pedagogy</u>	<u>Content</u>																		
<u>(5 mins) Warm Up</u> Facilitator will discuss the question done on the previous day Q – What is the advantage of showing the data graphically? Facilitator will consider the situation where the class size were unequal and ask the students to plot the histogram. Do you think it correctly represent the data? Why?	<table border="1"> <thead> <tr> <th>Marks</th><th>Number of students</th></tr> </thead> <tbody> <tr> <td>0 - 20</td><td>7</td></tr> <tr> <td>20 - 30</td><td>10</td></tr> <tr> <td>30 - 40</td><td>10</td></tr> <tr> <td>40 - 50</td><td>20</td></tr> <tr> <td>50 - 60</td><td>20</td></tr> <tr> <td>60 - 70</td><td>15</td></tr> <tr> <td>70 - above</td><td>8</td></tr> <tr> <td>Total</td><td>90</td></tr> </tbody> </table> Mixed responses by the learners.	Marks	Number of students	0 - 20	7	20 - 30	10	30 - 40	10	40 - 50	20	50 - 60	20	60 - 70	15	70 - above	8	Total	90
Marks	Number of students																		
0 - 20	7																		
20 - 30	10																		
30 - 40	10																		
40 - 50	20																		
50 - 60	20																		
60 - 70	15																		
70 - above	8																		
Total	90																		

<u>(30 mins) Demonstration by Facilitator on Board</u> Facilitator will take Q 8 of Ex – 14.3 on Black board to reinforce the topic.	No, the areas of the rectangles are always proportional to the frequencies in a histogram. Earlier this problem did not arise, because the widths of all the rectangles were equal. But, here since the widths of rectangles are varying, the histogram above does not give correct picture. So, we need to make certain modifications in the lengths of the rectangles so that the areas are again proportional to the frequencies. The steps to be followed are as given below 1. Select the class interval with the minimum class size. 2. The lengths of the rectangles are then modified to be proportionate to the class – size 10. Since, we have calculated these lengths for an interval of 10 marks in each case, we may call these lengths as “proportion of learners per 10 marks interval.” So, we can now make the correct histogram with the varying width where the areas of rectangles are proportional to the frequencies. This method is known as method of ADJUSTING FREQUENCY Note: Adjusted Frequency = (Minimum class size/ class size) X Frequency A random survey of the number of children of various age groups playing in a park was found as follows: <table><thead><tr><th>Age (in years)</th><th>Number of children</th></tr></thead><tbody><tr><td>1 - 2</td><td>5</td></tr><tr><td>2 - 3</td><td>3</td></tr><tr><td>3 - 5</td><td>6</td></tr><tr><td>5 - 7</td><td>12</td></tr><tr><td>7 - 10</td><td>9</td></tr><tr><td>10 - 15</td><td>10</td></tr><tr><td>15 - 17</td><td>4</td></tr></tbody></table> Draw a histogram to represent the data above.	Age (in years)	Number of children	1 - 2	5	2 - 3	3	3 - 5	6	5 - 7	12	7 - 10	9	10 - 15	10	15 - 17	4
Age (in years)	Number of children																
1 - 2	5																
2 - 3	3																
3 - 5	6																
5 - 7	12																
7 - 10	9																
10 - 15	10																
15 - 17	4																
<u>(10 mins) In class Exercise:: Closure</u> Learners will revisit the steps of making Histogram with varying frequencies	Learners will find the Adjusted frequency and write them in Tabular form.																

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1 - 2	5
2 - 3	3
3 - 5	6
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	4

Draw a histogram to represent the data above.

Evaluation/ Assessment: Teacher will assess the children randomly and also through student teacher interaction.

Learners on the way	Advanced Learner
Hand holding while calculating adjusted frequencies.	They will be helping peer in making the histogram.

Materials needed/ Resources:- Chalk, Duster NCERT Exemplar, NCERT Text Book

Common Misconceptions:	Addressing the misconceptions:
Difficulty in identifying the data where adjusted frequency needs to be calculated	By telling them to calculate the class width of the class interval.

Home Assignment: Attempt Q 9 of Ex – 14.3 of NCERT Text Book Class 9 in note book.



Class	Subject	Time slot	Lesson	Topic P9
IX	Mathematics	35 Mins	Statistics	• Measures of Central Tendency • Median • Mode • Ex 14.4
<u>Expected Learning Outcome:</u> Learners will be able to • know the use of Measures of Central Tendency – Median and Mode in daily life.				
<u>Expected skill development:</u> • Numeracy and calculation skills while finding median and mode • Procedural thinking • Communicating using mathematical terminology • Strategic thinking and Creative thinking • Analytical Thinking and Problem Solving				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/ warm-up, Content, Think Line, Closure)

<u>Pedagogy</u>	<u>Content</u>
<u>(5 mins) Warm Up</u> <u>(Individual work)+ Black Board</u> Thinkline: What do you understand by the term 'Median' and 'Mode'?	<u>Response by the learners:</u> The median is that value of the given number of observations, which divides it into exactly two parts. So, when the data is arranged in ascending (or descending) order the median of ungrouped data is calculated as follows: (i) When the number of observations (n) is odd, the median is the value of the $(n+1)/2^{\text{th}}$ term. (ii) When the number of observations (n) is even, the median is the mean of the $[n/2 + (n/2 + 1)]/2^{\text{th}}$ term The mode is that value of the observation which occurs most frequently, i.e., an observation with the maximum frequency is called the mode

(20 mins) Demonstration by Facilitator on Board

Facilitator will take questions of Ex14.4 to reinforce the topic

1. The following number of goals were scored by a team in a series of 10 matches:
2, 3, 4, 5, 0, 1, 3, 3, 4, 3
Find the mean, median and mode of these scores.
2. In a mathematics test given to 15 students, the following marks (out of 100) are recorded:
41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60
Find the mean, median and mode of this data.
3. The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x .
29, 32, 48, 50, x , $x+2$, 72, 78, 84, 95

(10 mins) In class Exercise:: Closure

Thinkline:

Give one example of a situation in which

(i) the mean is an appropriate measure of central tendency.

(ii) the mean is not an appropriate measure of central tendency but the median is an appropriate measure of central tendency.

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

2. In a mathematics test given to 15 students, the following marks (out of 100) are recorded:
41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60
Find the mean, median and mode of this data.
3. The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x .
29, 32, 48, 50, x , $x+2$, 72, 78, 84, 95

Evaluation/ Assessment: Teacher will assess the children randomly and also through student teacher interaction.

Learners on the way

Find the mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

Advanced Learner

Give one example of a situation in which

(i) the mean is an appropriate measure of central tendency.

(ii) the mean is not an appropriate measure of central tendency but the median is an appropriate measure of central tendency.

Materials needed/ Resources:- Chalk, Duster NCERT Exemplar, NCERT Text Book

Common Misconceptions: Differentiate with mean, median and mode as the most appropriate measure of central tendency in different situations	Addressing the misconceptions: By taking various examples and peer help.
---	--

Home Assignment: Complete Ex – 14.4 of NCERT Text Book Class 9 in Note Book.