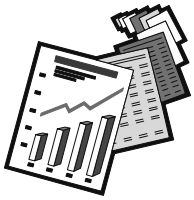


Exemplar 4：

Comparison of Stem-and-leaf Diagrams and Histograms

Objective： To compare the stem-and-leaf diagram and the histogram

Learning Unit： Construction and Interpretation of Simple Diagrams and Graphs

Key Stage： 3

Material Required： Graphs provided in the worksheet

Prerequisite Knowledge： Construction of stem-and-leaf diagrams and histograms

Description of the Activity：

1. The teacher distributes the worksheet to students.

2. Students use the data provided in Question 1 to draw a stem-and-leaf diagram.

3. Students use the same set of data to draw a histogram for Question 2.

4. After students completed Questions 1 and 2, the teacher asks students to discuss the similarities and differences of the stem-and-leaf diagram and the histogram on the information obtained by reading the diagrams. Students can discuss in groups.

5. The teacher invites some representatives of the groups to report the results of discussion to the class.

6. In summing up, the teacher asks students to suggest appropriate cases for using stem-and-leaf diagrams or histograms.

Worksheet: Comparison of Stem-and leaf Diagrams and Histograms

The marks of 40 students in a mathematics test are as follows:

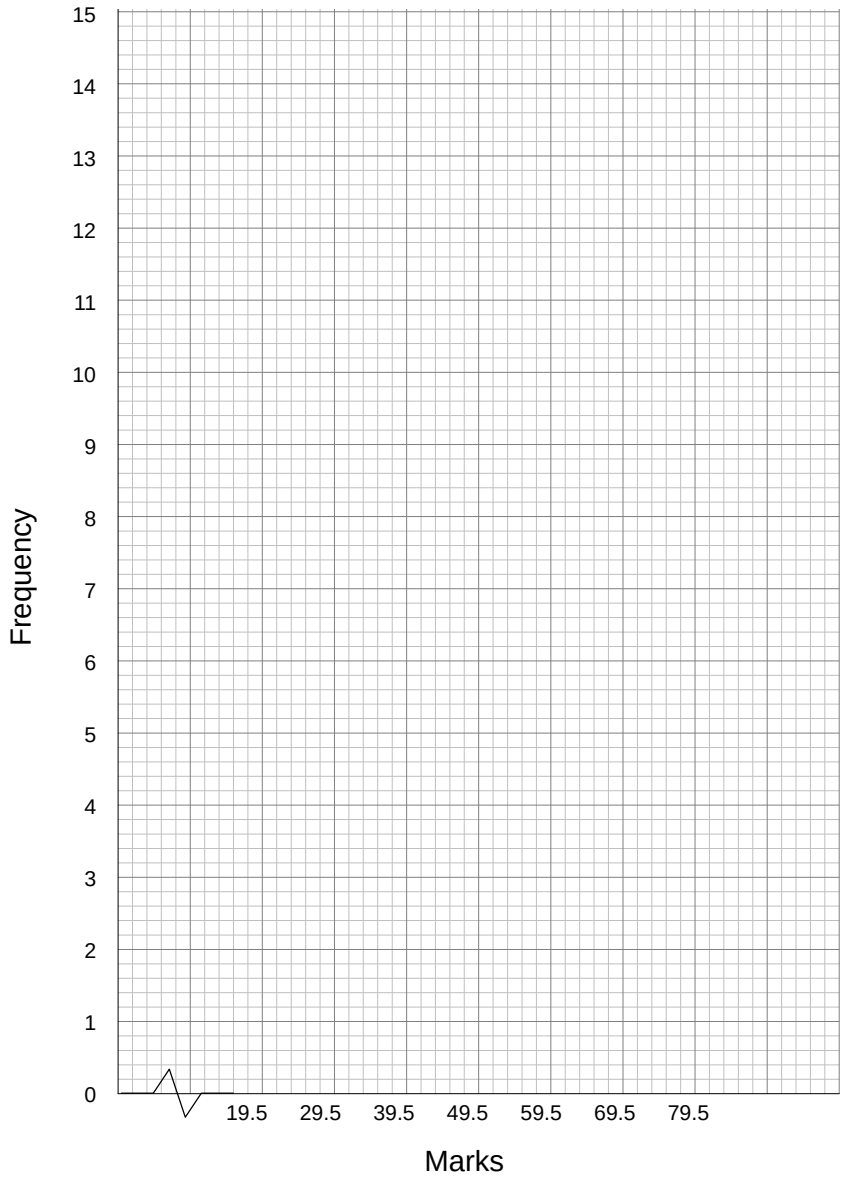
49	73	58	40	61	45	59	61
51	43	79	55	77	52	54	45
59	53	55	38	34	72	46	68
42	65	65	64	29	48	39	67
28	56	66	48	42	56	51	53

1. Draw a stem-and-leaf diagram for the above data.

Stem ( )	Leaf ( )

2. Draw a histogram for the marks of the 40 students.

Marks	Class boundary	Frequency
20 - 29		
30 - 39		
40 - 49		
50 - 59		
60 - 69		
70 - 79		



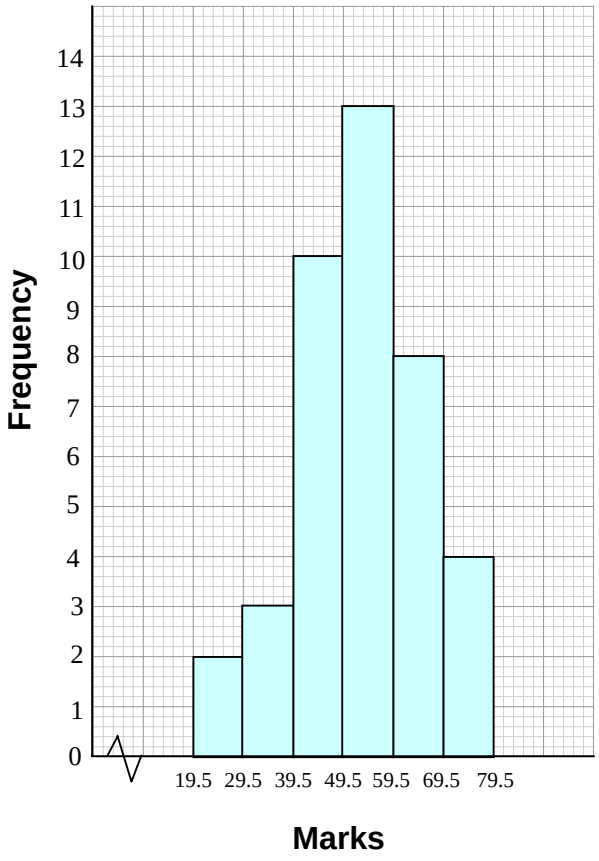
3. Compare the similarities and differences of the stem-and-leaf diagram and the histogram on the information obtained by reading the diagrams. Write down your comments.

Notes for Teachers

1. Suggested answer to Question 1.

Stem (10 marks)	Leaf (1 mark)
2	8 9
3	4 8 9
4	0 2 2 3 5 5 6 8 8 9
5	1 1 2 3 3 4 5 5 6 6 8 9 9
6	1 1 4 5 5 6 7 8
7	2 3 7 9

2. Suggested answer to Question 2.



3. Suggested answer for Question 3.
   - It is easier to construct a stem-and-leaf diagram than a histogram.
   - The distribution of the data can be easily seen from both diagrams.
   - The frequency of each group of data is proportional to the length of each bar on a histogram or the leaf on a stem-and-leaf diagram.
   - The original data can be reconstructed from a stem-and-leaf diagram but not from a histogram.
   - Although both the histogram and the stem-and-leaf diagram can show the frequency distribution, more information can be read from the stem-and-leaf diagram than from the histogram, including the original data, the exact value of the median and the inter-quartile range, etc.
   - A stem-and-leaf diagram can indicate individual values and is appropriate for a small set of data. A histogram is more suitable for a larger data set and its class widths can be adjusted easily.

4. If students have difficulties in the discussion, the teacher can provide them with some guiding questions, e.g.
   - Which diagram is easier to draw?
   - Can you tell each datum from the diagram?
   - What kinds of information, e.g. mode, median, inter-quartile range, etc. could be obtained from the diagram?
   - Taking into consideration the size of the data set, how would you choose an appropriate diagram to represent the data set?

5. Students can use a few more sets of data related to their own experience for consolidating the concept.

6. In Point 6 of the Description of the Activity, the teacher can provide different cases for students to choose if they have difficulties in suggesting the cases.

7. Instead of using the graph paper provided in the worksheet, students can use the statistical software – *Winstats* to draw the stem-and-leaf diagram and the histogram. *Winstats* is a freeware and can be downloaded from *http://math.exeter.edu/rparris/*. However, care must be exercised by the teacher not to shift the focus of the activity from “comparison” to “using the software to construct diagrams”.