UNIT 11 *Data Collection and Presentation* Activities

Activities

ACTIVITY 11.1 *Class Database*

1. The table on Resource Sheet 11.1 has spaces for up to 35 entries. The first four columns have headings. Choose headings for the other columns and collect data from the members of your class

2. State which of your columns contains:

   (a) *quantitative* data,

   (b) *discrete quantitative* data,

   (c) *continuous quantitative* data.

3. Write down three interesting questions that could be answered using your database.

4. Write answers to your 3 questions.

1. Introducing coordinate axes, e.g. x in the E direction, and y in the N direction, as

RESOURCE SHEET 11.1 *Class Database*

Name	*Age*	*Height*	*Favourite Colour*				

ACTIVITY 11.2 *Car Park Survey*

Helen thinks that RED is the most common colour for cars. Her friend Ben does not agree. He thinks that WHITE is the most common colour. To find out who is right, Ben goes to a car park to collect some data.

The diagram on Resource Sheet 11.2 shows the colours of the cars in the car park.

1. Ben has started to fill in this tally chart:

COLOUR	*TALLY*	*FREQUENCY*
Silver	|||	
Green	|||	
Black	||	
Red	𝍸	
White	|||	
Blue	||||	
	TOTAL	

(a) Complete the tally chart.

(b) How many cars are there in total in the car park?

2. Draw a bar chart, a pictogram or a pie chart, to illustrate the data.

3. Who do you think is right, Helen or Ben?

RESOURCE SHEET 11.2 *Car Park Survey*

Ben's diagram showing colours of cars in the car park

SILVER ✓	*BLACK*	*RED*	*RED*
GREEN ✓	*BLUE*	*WHITE*	*BLUE*
BLACK ✓	*RED*	*GREEN*	*WHITE*
RED ✓	*PURPLE*	*WHITE*	*GREEN*
WHITE ✓	*BLACK*	*BLUE*	*RED*
RED ✓	*GREEN*	*BROWN*	
BLUE ✓	*BLACK*	*WHITE*	*BLUE*
BLUE ✓			←
WHITE ✓			→
RED ✓	*GREEN*	*PURPLE*	*SILVER*
GREEN ✓	*RED*	*WHITE*	*WHITE*
SILVER ✓	*BLUE*	*BLACK*	*RED*
BLACK ✓	*PURPLE*	*RED*	*GREEN*
BLUE ✓	*RED*	*WHITE*	*RED*
RED ✓	*SILVER*	*BLUE*	*BLUE*
GREEN ✓	*WHITE*	*RED*	*BLACK*
WHITE ✓	*BROWN*	*WHITE*	*RED*
RED ✓	*WHITE*	*BLACK*	*BLUE*
SILVER ✓	*RED*	*PURPLE*	
BLUE ✓	*BLUE*	*RED*	*WHITE*

ACTIVITY 11.3 *Stem and Leaf Plots*

There are many ways of representing data. For example, you are probably familiar with

histograms and *bar charts*

but there is another very simple way which quickly gives an overall view of the general characteristics of the data: this is called a

stem and leaf plot.

The following example illustrates how it works:

The marks gained out of 50 by 15 pupils in a Biology test are given below:

27	36	24	17	35	18	23	25
34	25	41	18	22	24	42	

We form a stem and leaf plot by recording the marks with the 'tens' as the *stem* and the 'units' as the *leaf*, as shown opposite.

Stem	*Leaf*
0	
1	7 8 8
2	7 4 3 5 5 2 4
3	6 5 4
4	1 2

The leaf part is then reordered to give a final plot, as shown, giving an impression of the spread of the numbers, and an indication of the average.

Stem	*Leaf*
0	
1	7 8 8
2	2 3 4 4 5 5 7
3	4 5 6
4	1 2

1. Form a *stem and leaf plot* for the following data:

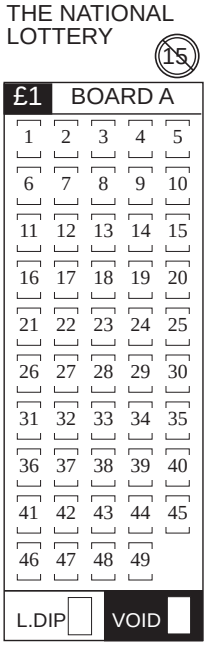
21	7	9	22	17	15	31	5	17	22	19	18	23
10	17	18	21	5	9	16	22	17	19	21	20	

2. The ages of drivers involved in fatal road accidents in England during one week are given below:

17	82	40	48	21	35	23	24	18	57	62	45
20	21	33	27	24	37	58	69	65	19	25	21
28	71	43	31	73	26	18	21	34	35	51	63
23	65	22	45	23	27	18	19	32	25	61	36

Illustrate these data using a stem and leaf plot.

ACTIVITY 11.4 *National Lottery*



To play the National Lottery, you pay £1 to enter your choice of *six* different numbers from

1, 2, 3, . . . , 49

Each week, six numbers (plus a *bonus* number) are drawn randomly and you win a prize if you have three, four, five or six numbers the same.

The complete list of 6 winning numbers (plus *bonus* number) for the first 100 draws of the National Lottery is given on Resource Sheet 11.4.

Over a long period of time, if the numbers drawn are truly random, you would expect that each number will occur roughly the same number of times, i.e. will have the same frequency.

However, some commentators insist that certain numbers are luckier than others!

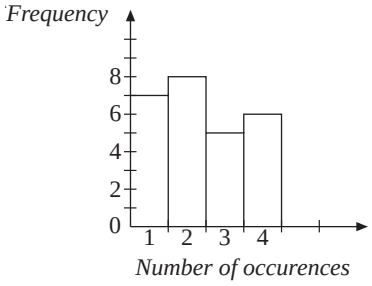
This activity will investigate their claim.

1. Over 49 consecutive weeks, how many times, on average, should each number be drawn, excluding the bonus number?

In practice, of course, some numbers will be drawn more often, and others less often.

2. (a) From Resource Sheet 11.4 choose any 49 consecutive draws and find the frequency of occurrence of each number.

   (b) Plot a bar chart to show the frequency of occurrences of the numbers. (For example, the bar chart opposite shows that 3 particular numbers each occurred 5 times.)



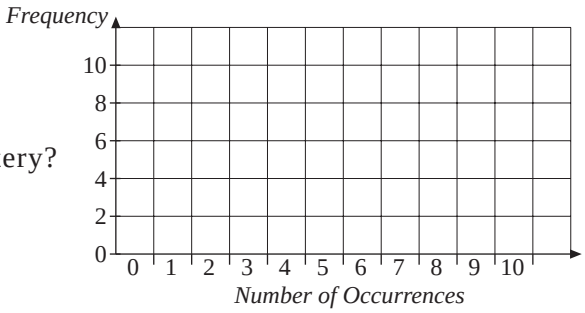
Extension

1. How many numbers had a frequency of

   0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

   in the first 100 draws of the National Lottery?

   Show the data in a bar chart.



2. Use the most recent data to analyse the frequency of each number since the National Lottery began. The data can be obtained from the CIMT website at

http://www.ex.ac.uk/cimt/res2/trolfl.pdf

RESOURCE SHEET 11.4 *National Lottery Data*

Draw	*Six winning numbers*						*Bonus*
1.	30	3	5	44	14	22	*10*
2	16	6	44	31	12	15	*37*
3.	21	11	17	30	29	40	*31*
4.	26	47	49	43	35	38	*28*
5.	13	3	38	5	14	9	*30*
6.	27	29	39	3	44	2	*6*
7.	17	44	36	32	9	42	*16*
8.	21	32	2	5	25	22	*46*
9.	23	38	17	7	32	42	*48*
10.	47	6	16	31	30	20	*4*
11.	31	16	25	43	4	26	*21*
12.	46	42	1	38	7	37	*20*
13.	48	38	15	29	18	35	*5*
14.	45	16	36	19	21	29	*43*
15.	18	33	8	31	5	10	*28*
16.	17	36	11	12	42	26	*13*
17.	2	22	13	46	29	27	*36*
18.	41	19	31	18	9	24	*21*
19.	4	49	41	44	42	17	*24*
20.	43	41	22	25	30	32	*29*
21.	42	17	22	24	47	14	*34*
22.	1	23	26	4	6	49	*8*
23.	33	36	8	20	38	18	*46*
24.	31	9	15	34	48	22	*23*
25.	35	14	48	17	43	5	*22*
26.	41	16	28	25	7	26	*19*
27.	46	15	17	28	6	32	*22*
28.	45	12	25	37	44	13	*9*
29.	31	1	29	40	21	32	*27*
30.	44	15	26	46	12	49	*14*
31.	48	30	40	27	38	33	*2*
32.	5	43	45	21	15	42	*20*
33.	25	7	8	5	48	44	*3*
34.	3	14	11	20	1	40	*45*
35.	1	4	43	20	31	41	*38*
36.	3	21	22	2	23	40	*24*
37.	41	34	49	28	46	45	*11*
38.	35	1	25	30	45	8	*15*
39.	25	33	28	47	11	34	*48*
40.	24	23	48	5	8	28	*19*
41.	21	41	18	38	16	27	*26*
42.	40	49	28	15	1	22	*44*
43.	12	22	41	2	20	45	*47*
44.	37	14	25	41	10	2	*5*
45.	10	34	24	19	5	46	*28*
46.	11	33	40	10	32	29	*16*
47.	28	37	10	30	36	22	*45*
48.	25	30	9	5	4	47	*17*
49.	17	19	2	21	6	47	*5*
50.	16	33	44	27	35	7	*5*

Draw	*Six winning numbers*						*Bonus*
51.	6	14	18	48	27	44	*1*
52.	23	28	48	10	7	30	*3*
53.	33	7	4	48	18	45	*1*
54.	46	42	28	16	30	23	*45*
55.	26	16	19	46	15	35	*7*
56.	5	26	29	12	11	33	*20*
57.	23	49	7	28	35	8	*10*
58.	40	47	6	49	34	11	*16*
59.	6	43	42	39	45	32	*36*
60.	4	13	2	3	42	44	*24*
61.	31	32	48	21	29	34	*25*
62.	23	37	33	30	25	5	*3*
63.	16	41	38	17	43	42	*28*
64.	2	32	44	22	9	26	*40*
65.	14	28	11	4	15	42	*6*
66.	18	14	16	22	4	15	*33*
67.	5	24	44	2	7	35	*30*
68.	41	11	9	24	45	12	*6*
69.	45	30	37	16	29	14	*7*
70.	19	38	48	12	28	2	*45*
71.	30	18	5	14	43	7	*28*
72.	37	12	49	27	26	28	*43*
73.	38	4	14	1	17	6	*9*
74.	38	47	23	44	49	40	*12*
75.	40	31	9	29	28	48	*23*
76.	18	11	31	48	6	4	*41*
77.	47	6	33	25	26	34	*49*
78.	7	48	12	10	22	34	*11*
79.	33	46	4	40	13	12	*41*
80.	8	26	42	20	34	43	*25*
81.	35	45	24	37	36	39	*20*
82.	32	15	17	11	25	46	*29*
83.	47	25	18	44	13	46	*34*
84.	4	7	11	17	3	40	*20*
85.	34	35	17	27	46	4	*7*
86.	44	47	45	43	26	13	*36*
87.	11	5	42	41	10	12	*2*
88.	14	44	6	25	34	20	*45*
89.	13	21	45	2	19	32	*9*
90.	26	28	36	31	13	17	*44*
91.	41	23	36	45	3	38	*44*
92.	28	42	33	39	44	2	*46*
93.	8	11	14	33	44	18	*34*
94.	27	3	5	47	14	44	*43*
95.	5	13	15	44	18	32	*41*
96.	10	9	38	48	11	2	*1*
97.	41	35	8	7	30	12	*47*
98.	19	26	23	39	36	31	*3*
99.	47	45	9	48	6	25	*14*
100.	25	15	45	16	39	30	*14*

ACTIVITIES 11.1 - 11.2 *Notes and Solutions*

Notes and solutions are given only where appropriate.

11.1 The activity should provide many opportunities for pupils to collect data and examine their databases. Pupils could enter their data into a spreadsheet.

11.2 1. (a)

COLOUR	*TALLY*	*FREQUENCY*
Silver	𝍸	5
Green	𝍸 |||	8
Black	𝍸 |||	8
Red	𝍸 𝍸 𝍸 |||	18
White	𝍸 𝍸 ||||	14
Blue	𝍸 𝍸 |||	13
Purple	||||	4
Brown	||	2
	TOTAL	72

(b) 72 cars

2. Pie chart angles:

Colour	*Angle*
Silver	25 °
Green	40 °
Black	40 °
Red	90 °
White	70 °
Blue	65 °
Purple	20 °
Brown	10 °

3. Based on this sample, Mary is right, but it should be noted that this is a very small sample.

ACTIVITIES 11.3 -11.6 *Notes and Solutions*

11.3 1.

Stem	*Leaf*										
0	5	5	7	9	9						
1	0	5	6	7	7	7	7	8	8	9	9
2	0	1	1	1	2	2	2	3			
3	1										

2.

Stem	*Leaf*															
0																
1	7	8	8	8	9	9										
2	0	1	1	1	1	2	3	3	3	4	4	5	5	6	7	7	8
3	1	2	3	4	5	5	6	7								
4	0	3	5	5	8											
5	1	7	8													
6	1	2	3	5	5	9										
7	1	3														
8	2															

11.4 1. 6 times