TEACHER NOTES: HANDLING DATA

Students look at data collected by THORPE PARK, considering how best to collect, present and analyse the data, including consideration of bias and sample sizes. More able students go on to look at correlation between two data sets, and moving averages.

LEARNING OBJECTIVES (KS3)

Students should learn to:

- decide which data to collect and identify possible sources
- identify possible sources of bias and plan how to minimise it
- design suitable data collection sheets
- collect and organise data
- use suitable tables (including simple two-way tables)
- construct graphs to represent data (including line graphs and pie charts).

RESOURCES REQUIRED

- Ruler
- Pens and pencils
- Additional paper for notes and sketches
- Interactive whiteboard or projector to display material for class discussion
- Clipboards if students are to conduct survey on day of visit
- Compasses and protractors
- Calculators

EXTENSION ACTIVITIES (KS3)

- Worksheet 2 asks students to create a survey to assess a number of different aspects of THORPE PARK. Students should conduct their survey on the day of your visit.
- When you are back in the classroom, ask students to construct charts and graphs using the data they have collected on park.
- Ask students to analyse evidence / patterns in the graphs they have constructed using averages and ranges. You may like to ask them to present their findings back to the rest of the class.

LEARNING OBJECTIVES (KS4)

Students should learn to:

- identify possible sources of bias and plan how to minimise it
- decide how to collect data (including sample size)
- calculate moving averages of data and represent these in graph format
- construct graphs to represent data (including time series and scatter graphs)
- draw a line of best fit and calculate and plot the mean point within data sets and corresponding graphs.

EXTENSION ACTIVITIES (KS4)

Using the tabulated data below in which customers have ranked Colossus from 1 – 10*(1 = rubbish, 10 = brilliant), students first identify the modal class, then calculate and plot cumulative frequency and hence work out the median, upper and lower quartiles, and the inter-quartile range . By taking mid-points of the class intervals given, they may also estimate the mean.

Score	Frequency (f)
1 – 3	10
4 – 7	10
8 – 10	30
Total	50

*Not actual figures.

TEACHER NOTES: HANDLING DATA

ANSWERS (KEY STAGE 3)

Activity 1

A As well as needing to know how many people are visiting the attraction, THORPE PARK needs to gather customer opinion on the following, to ensure that high standards are maintained. Some of the information gathered also helps us understand who our target audience is so that we can promote the attraction better:

- Favourite rides
- Quality of food and drink / retail offering
- Cleanliness of park
- Customer service
- Overall customer enjoyment of day
- Intention to visit again
- Competitor attractions customer has visited
- Customer profile (i.e. age range / family or friends)
- How customers booked their tickets
- How they heard about THORPE PARK
- Whether queue length affected their experience

B Customer survey is the best way of gathering data on most areas of interest to the park including visitor experience / likes and dislikes. Numbers of visitors can be gauged through counting the number of tickets sold.

Activity 3*

A

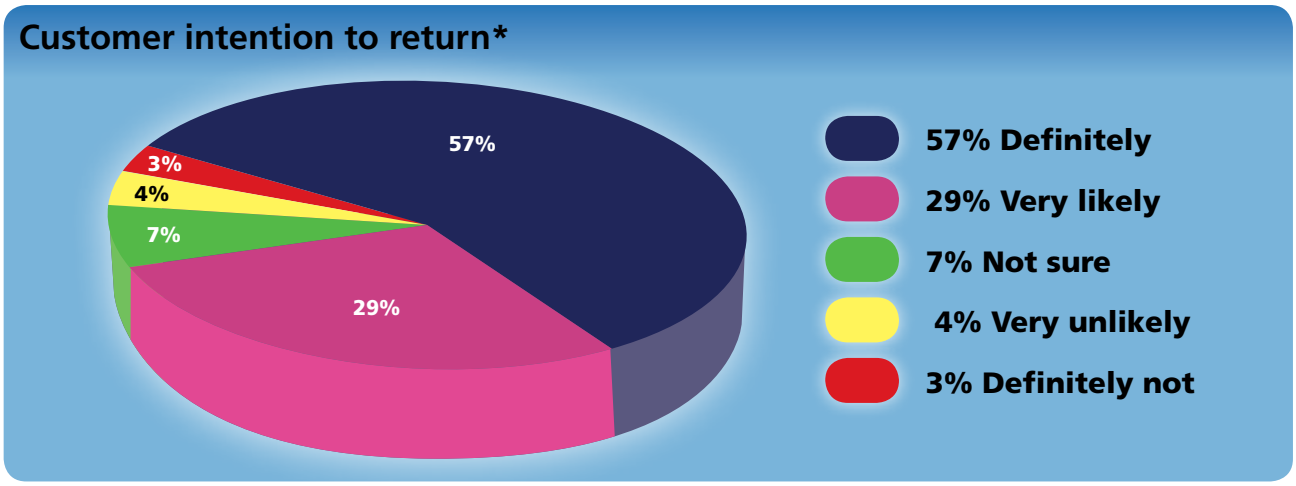
	2003	2004	2005	2006	2007	2008	Total
January	0	0	0	0	0	0	0
February	0	0	0	0	25,268	34,849	60,117
March	0	18,797	86,226	44,503	52,801	69,796	272,123
April	25,330	192,583	146,840	25,324	234,264	177,135	801,476
May	198,560	126,342	161,187	180,557	172,626	227,067	1,066,339
June	218,680	200,603	203,727	251,296	237,014	254,236	1,365,556
July	287,103	313,085	299,174	382,902	348,293	357,198	1,987,755
August	315,810	345,563	310,678	355,709	392,517	391,730	2,112,007
September	134,157	132,614	142,730	174,846	190,279	155,234	929,860
October	133,137	160,656	199,491	215,261	270,396	263,192	1,242,133
November	20,891	0	13,599	12,861	24,677	35,131	107,159
December	0	0	0	0	0	0	0
Total	1,333,668	1,490,243	1,563,652	1,643,259	1,948,135	1,965,568	9,944,525

B i) August ii) 2008 iii) 2003

*These figures are not accurate and are for demonstration purposes only.
They do however correctly reflect monthly variations.

TEACHER NOTES: HANDLING DATA

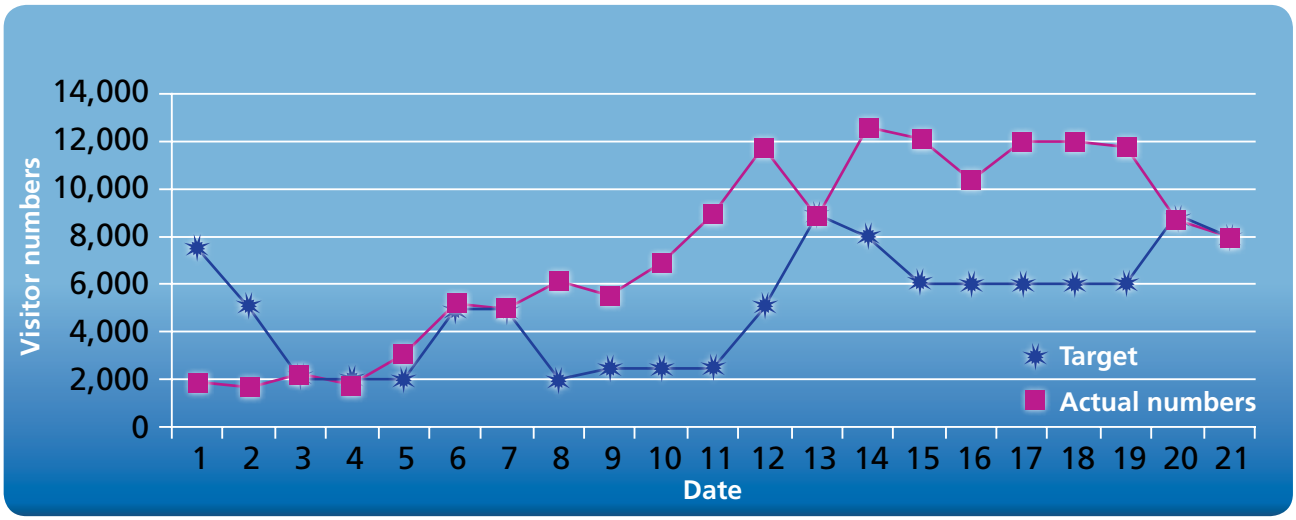
Activity 4



*Figures taken from customer exit survey. These figures are not accurate and are for demonstration purposes only.

Activity 5**

Students may need guidance on the appropriate scales to use.



**Figures taken from customer exit survey. These figures are not accurate and are for demonstration purposes only. They do however reflect correct monthly variations.

ANSWERS (KEY STAGE 4)

Activity 1

A. This is biased, because people who ride Stealth are probably all fans of big thrill rides, which will mean that they are likely to answer the question similarly. Also there are height restrictions to Stealth which means that all respondents are likely to be over a certain age.

B. This is not biased. The sample size is good and represents the cross section of customers.

C. This is biased, because the queues for rides are likely to be quite long on the busiest day of the year and this will affect customer enjoyment.

D. This is biased, because it is a leading question. It suggests that you are not normal if you do not think the food and drink options are good value.

TEACHER NOTES: HANDLING DATA

Activity 2

A The larger the sample the better. 10 to 20% would be a reasonable response. There is not a definitive answer here, but the activity will yield some interesting class discussion.

B Several samples throughout the year including some taken at peak and at low season are likely to yield the most representative results.

Activity 3

Students might like to break this out in detail, but they should evidence understanding that sample strata needs to reflect the different age groups that customers fall into (e.g. for every hundred people surveyed, your sample would need to contain about twice as many 18 – 24 year olds as 25 – 34 year olds).

Activity 4

A 1,300,000 (approximately)

B 1,900,000 (approximately)

Activity 5

Year	Quarter	Number of people in 000s	Four point moving average
2003	Spring	224	
	Summer	821	333.25
	Autumn	288	361.75
	Winter	0	371.25
2004	Spring	338	459
	Summer	859	459
	Autumn	639	473
	Winter	0	424.25
2005	Spring	394	353.5
	Summer	664	353.5
	Autumn	356	317.5
	Winter	0	399
2006	Spring	250	410.75
	Summer	990	410.75
	Autumn	403	463.25
	Winter	0	460.25
2007	Spring	460	480.75
	Summer	978	
	Autumn	485	
	Winter	0	

TEACHER NOTES: HANDLING DATA

Activity 6

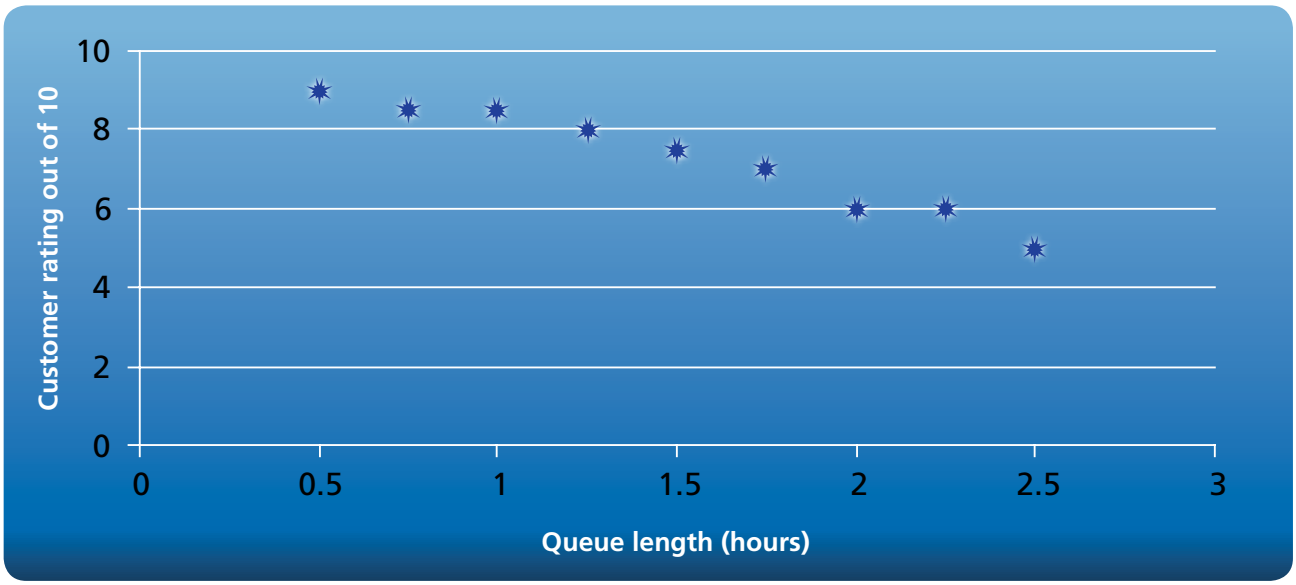
A Stealth = 68 ÷ 11 = 6.18 / SAW – The Ride = 69 ÷ 11 = 6.27

B There are many correct answers here.

C Yes there is a positive correlation. Both Stealth and SAW – The Ride are thrill rides and it is likely that most people who liked one ride will also like the other one.

Activity 7

A



B Mean rating = 65.5 ÷ 9 = 7.28

C There are many correct answers here.

D Yes there is a negative correlation. The longer the queue time, the less people enjoy their day.