

STATISTICS

Specifying a problem, planning and collecting data

Pupils should learn to:	As outcomes, Year 7 pupils should, for example:
<p><b>Discuss a problem that can be addressed by statistical methods, and identify related questions to explore</b></p>	<p>Use, read and write, spelling correctly: <i>survey, questionnaire, experiment, data, statistics... grouped data, class interval... tally, table, frequency, data collection sheet... database...</i></p> <p><b>Given a problem that can be addressed by statistical methods, suggest possible answers</b>, in mathematics or other subjects. For example:</p> <ul style="list-style-type: none"> <li>● <i>Problem</i> What method of transport do pupils use to travel to school, and why? <i>Possible answers</i> Most pupils catch a bus because it's quicker. Few pupils cycle to school because of the busy roads. Pupils who walk to school have less distance to travel. A bus journey is quicker than walking the same distance. Some pupils must leave home before 7:30 a.m.</li> <li>● <i>Problem</i> Do different types of newspaper use words (or sentences) of different lengths? If so, why? <i>Possible answers</i> Tabloid newspapers use shorter words (or sentences) so that they are easier to read and so appeal to a wider audience. There is not likely to be much difference in the use of two- and three-letter words. There may be more difference in sentence length between newspapers of different types than in word length.</li> <li>● <i>Cross-curricular problem with geography</i> How will the population of a typical MEDC (more economically developed country) change over the next 50 years as compared with an LEDC (less economically developed country)? <i>Possible answers</i> The large number of younger people in the LEDC will lead to an explosion in the population in the future. The smaller number of younger people in the MEDC may lead to a population decline. Future changes may be difficult to predict because improvements in factors such as health care and nutrition, for example, are unknown.</li> </ul>

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**As outcomes, Year 8 pupils should, for example:**

Use vocabulary from previous year and extend to: *sample... primary source, secondary source, data log... two-way table... discrete, continuous...*

**Discuss a problem that can be solved by statistical methods; identify related questions to explore,** in mathematics or other subjects. For example:

- *Problem*  
 At what time during a football match is there most likely to be a goal?  
*Related questions*  
 Where could you find the necessary data?  
 Are there differences between football divisions?  
 When is the best time to buy a snack if you don't want to miss a goal or to queue at half-time?  
 What is the likelihood of missing a goal if you leave 10 minutes early?
- *Problem*  
 A neighbour tells you that the local bus service is not as good as it used to be.  
 How could you find out if this is true?  
*Related questions*  
 How can 'good' be defined? Frequency of service, cost of journey, time taken, factors relating to comfort, access...?  
 How does the frequency of the bus service vary throughout the day/week?
- *Problem*  
 How much TV do pupils and adults watch?  
*Related questions*  
 What factors affect TV viewing habits? Hours of work per week, hours of sleep per week, weekly travelling distance...?
- *Cross-curricular problem with geography*  
 How do modes of transport to an out-of-town shopping centre compare with those to a town centre?  
*Related questions*  
 Are there variations at different times of the day/week? If so, are they linked to variations in the number of visitors at each location?
- *Cross-curricular problem with science*  
 What are the factors affecting invertebrate communities in freshwater habitats?  
*Related questions*  
 What data could be collected?  
 What is the variation in light intensity at different depths of the water?
- *Cross-curricular problem with science*  
 Why do penguins huddle together to keep warm?  
*Related questions*  
 Can the process be modelled by comparing the cooling of a single warm test-tube with that of one surrounded by other similarly warm tubes?

**As outcomes, Year 9 pupils should, for example:**

Use vocabulary from previous years and extend to: *raw data... representative, bias... census...*

**Suggest a problem to explore using statistical methods, frame questions and raise conjectures,** in mathematics or other subjects. For example:

- *Cross-curricular problem with physical education*  
 How far can people jump from a standing start?  
 To what extent does a run-up help?  
 Does practice improve the distance?  
 Are Year 9 pupils able to jump or throw further than Year 7 pupils of the same height?  
*Conjectures*  
 Your height and the length of your run-up are likely to affect how far you can jump.  
 A moderate run-up is useful, but the effect will diminish after a certain point.
- *Cross-curricular problem with science*  
 What effect does engine size have on the acceleration of a car?  
*Conjecture*  
 In general more powerful engines produce the greatest acceleration.
- *Cross-curricular problem with science*  
 What factors affect the distribution of grass and non-grass plants on the school field?  
*Conjecture*  
 The direction that the field faces in relation to the school building will affect the distribution.
- *Cross-curricular problem with geography*  
*Are development indicators, such as GNP, and measures of development, such as educational attainment, telephones per 1000 people, energy consumption per capita, life expectancy... consistent with each other?*  
*Which are the most closely connected?*  
*Conjecture*  
*The measure of development that will show the greatest contrast between MEDCs (more economically developed countries) and LEDCs (less economically developed countries) is energy consumption per capita.*
- *Cross-curricular problem with PSHE*  
*How available are fairly-traded goods in local shops? What sort of organisations promote these goods and why?*  
*Conjecture*  
*People with experience of or links with LEDCs are more likely to be aware of and to buy fairly-traded goods.*