Topical Applications of Mathematics

Popular Baby Names TEACHER INFORMATION

Key Stage 3 or 4

Target Mainstream Y7/8 (and as a possible Y5/6 activity)

MEP references Year 7A, Unit 11 GCSE Unit 8

Teaching notes This is a straightforward resource that illustrates the concepts and strategies for interpreting data. It also brings into play the issue of pupils collecting data and combining data together.

The topic will be of interest to pupils as it is dealing with issues in their lives. There is no one explanation for the change of popularity of names. This illustrates one of the fundamental issues in applying mathematics, namely that the mathematics being used is quite straight-forward but the interpretation of the results in the real world is much more complex. You might like to work with your English Department when using this resource as the staff might have more suggestions for some of the interpretation questions.

Solutions and Notes for material in the Pupil Text

Activity 1

(a) The obvious conclusion us that over a 30-year period, there is little consistency between the data. No boy's or girl's name comes top more than once although John does appear three times (1904, 1934 and 1964). Most names only appear once.

(b) This is very subjective, but the popularity of Harry might be due to Prince Harry (born in 1984). Could Thomas be influenced by the enduring popularity of 'Thomas the Tank Engine' and Ruby by the popular character of that name in 'Eastenders'? Pupils will have their own ideas!

Activity 2

(a) Over a 5-year period there are trends that cannot be seen over a 30-year period. Some names remain very popular; for example, for girls, EMILY ranked

2, 1, 1, 2, 5

showing great consistency. For boys, Jack is ranked top in every year, while JOSHUA ranks

2, 2, 2, 2, 3

and THOMAS

3, 3, 3, 3, 2

There are though, other names that show great movement; for example, GRACE ranks

19, 13, 11, 7, 2

whilst MATTHEW has decreased in popularity over the 5 years with rankings

12, 12, 12, 14, 18

(b) There are many possible ways of illustrating this data. The most obvious is by using graphs of the type shown on Data Sheets 4 and 5 but there are numerous other ways. For example, you could work out the average rank and the range for each name. The problem here though is that, if a name does not appear in the top 20, it could be ranked

anywhere – maybe at number 21 or perhaps at 101, etc. More data is available at the website

http://www.babycentre.co.uk/pregnancy/naming/popularbabynames/?_requestid=10802699

Activity 3

(a) Pupils will choose different names to plot. They can check one another's line graphs or compare their graphs with classmates who have chosen the same name.

Class discussion will lead to the answers to points A - D.

(b) One explanation for this sudden popularity of RUBY could be that it corresponds to a popular character in BBC1's 'Eastenders'. Interestingly, the character is no longer in the series so it will be interesting to see if there is a decrease in the ranking of RUBY in 2007. However, if you look at the websites

http://www.babyplanners.co.uk/namebrain_100.php

and

http://www.babyplanners.co.uk/namebrain_300.php

you will see that RUBY was a popular name from 1904 until 1934. It began a revival in about 1998, re-entering the top 20 only in recent years. Perhaps parents are now going back to their great-grandparents to source names for their children.

Activity 4

You might need to provide this data for your pupils.

Activity 5

It is important that all pupils contribute to this data. Perhaps you could ask pupils to discuss this at home and bring their lists of names to the lesson. You, as the teacher, will have the task of bringing all the data together. You could use a spreadsheet or computer program: you might decide not to use IT and to either sort it yourself or provide copies of the full data set for each pupil to analyse for homework.

Activity 6

Using the rank of 21 when a name is not in the top 20, the full list of data, in alphabetical order is given in Data Sheets 6 and 7.

Activity 7

This question is much more subjective than the previous one. We do not have any precise definition for *similar* data sets. A numerical approach is possible, looking at the differences in rank position but this is problematic as it is not clear what a non-appearance means. Use this activity to discuss the possible ways forward but be open in concluding that there is no precise and accurate method. This could provide an introduction to Spearman's Rank Correlation Coefficient, but this works only if the names are the same in each data set, with the positions changing.

Extensions

(a) The data is of interest in that some names have popularity in both countries whereas others are seen only on one or other side of the Atlantic.

(b) Street numbering in English towns was introduced by Act of Parliament in 1765. Many properties have a name as well as, or instead of, a number.

House naming is an old British custom which began with the gentry naming their halls, manors and castles, but the custom gradually spread to the masses and normal folk began naming their homes too.

Many people choose their house names to reflect their lifestyle, the origin of the building or its location. You can find data from the Halifax House Names Survey on the top 50 house names in 2003, 1998 and 1998 at

http://www.hbosplc.com/media/pressreleases/articles/halifax/2003-10-02-00.asp

and at several other websites.

The Halifax list gives the following, in decreasing order of popularity as:

	2003	**1998**	**1988**
1.	The Cottage	The Cottage	The Bungalow
2.	Rose Cottage	The Bungalow	The Cottage
3.	The Bungalow	Rose Cottage	Rose Cottage
4.	The Coach House	The Lodge	The School House
5.	Orchard House	The Coach House	The White House
6.	The Lodge	The School House	Hillcrest
7.	Woodlands	The White House	The Lodge
8.	The Old School House	Woodlands	Woodlands
9.	Ivy Cottage	Hill Crest	The Coach House
10.	The Willows	The Gables	Hillside

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Popular Baby Names SAMPLE LESSON PLAN

Activity		*Notes*
Before lesson (previous homework)	Set the first part of Activity 5, "Write down the names of 20 children born in 2002 – 2006", as homework for each member of the class and ensure that the data is available before this lesson.	T: Teacher P: Pupil
1	**Popular names for BOYS and GIRLS** T: What do you think are the most popular names for GIRLS / BOYS born this year? *Ps make suggestions.* T: Do you know of any babies who have been given very unusual names? Do you know why the parents chose these names? T: Can you think of reasons why some names are more popular than others? T: Where could we find the exact data for names? *(Internet)* T: There is a wealth of data available. Here we have the data for 2006 and also for 1904, 1934, 1964 and 1994. T: For the next 5 minutes, discuss with your partner what you see as the main features of this data. *After 5 minutes:* T: What have you noticed? Ps: Names change; not many occur more than once. T: Which name occurs 3 times? Ps: John (1904, 1934, 1964) T: Why does the popularity of names change? Ps: Fashion, celebrities, Royal Family, etc. *12 mins*	Interactive start to lesson to get Ps to think about names and whether some are more popular than others; if so, why? Teacher could bring in newspaper 'Births' announcements and discuss names with Ps. All births are registered: the data is available from the Office for National Statistics (via the internet). T gives each pair of Ps a copy of Data Sheet 1. Ps work in pairs; T monitors but helps only if asked. T chooses (volunteer?) Ps to answer the following questions. T praises Ps who contribute sensible ideas and encourages reluctant Ps to offer suggestions.
2 *(continued)*	**Trends in popularity, 2002 - 2006** T: Do you think that there will be as many changes in a 5-year period as you have seen in the data we have looked at so far? *(Maybe not so many, but some names will change)*	This activity is to illustrate the fact that there are big changes over periods of 20 or 30 years, but fewer over a 5-year period. This leads on to finding ways of analysing the trends.

Activity		*Notes*
2 *(continued*	T: Here are lists of the top 20 names for girls and for boys for the years from 2002 until 2006. Work with your partner to find any important trends in this data. You have 5 minutes to do this!	Each pair of Ps is given a copy of Data Sheets 2 and 3. Some could work on data for GIRLS, others on BOYS.
	After 5 minutes: T: Who would like to make a statement about the data? *(Hopefully Ps will contribute and discussion will follow, with many Ps joining in)*	T should monitor the discussion but allow it to develop without intervening, unless help is needed.
	T: Looking at the GIRLS data, what can you say about CHLOE, ELLIE and GRACE ? *(Going down in popularity; consistently high rapid increase, respectively)*	T chooses Ps (or asks for volunteers) to answer the questions. Praise when due.
	T: Does the data for BOYS show the same rate of variation of names? *(No, the top names do not vary very much)*	
	T: How could we quantify or illustrate the changes that have taken place over these 5 years? *(Ps provide ideas)*	Listen carefully to any ideas before steering Ps towards a graphical approach, as started on Data Sheets 4 and 5.
	T: One way is to plot these positions over time on a graph. The points for 3 of the names have been plotted on Data Sheets 4 and 5. Using different colours for each one, plot the points on Data Sheet 4 for CHARLOTTE, KATIE and LUCY On Data Sheet 5, plot the points for BENJAMIN, ETHAN and LEWIS	Give out copies of Data Sheets 4 and 5. T monitors, helps and praises Ps, ensuring that they are all fully on task.
	T: Who would like to come and plot the points on the OHP (IWB)?	Volunteer P works at front of class. Other Ps check their graphs.
	T: Is it easy to spot trends in the popularity of names? How can we quantify results? *(Find the average position of each name over the 5 years)*	Get Ps to suggest method. Could discuss using the *median* of the numbers but the *average* does make most sense.
	T: Yes; finding the average position will help. As an example we'll look at CHLOE. The positions for each of the five years are 1, 3, 5, 5 and 7. What is the average position? Who can complete this at the board?	
	P: Average position $= \frac{1+3+5+5+7}{5}$ $= \frac{21}{5}$ $= 4.2$	Get Ps to work out the formula first before writing out the calculation. Ensure equals signs are lined up!
	T: Will this work for all the data? Can you think of cases where there might be a problem?	

Activity *(continued)*		***Notes***
	P: What happens if a name is not included in the top 20 in one or more years? T: How can we cope with this? P: Use 21 as an estimate for the position. T: Why is this not accurate? P: The position of the name in these years could be any number ≤ 21. T: It is, though, the best we can do unless we look up the full set of data. T: In pairs, work out the top 5 using this method. You have 5 minutes. *mins*	Discuss ways of overcoming this. Internet access will allow the problem to be solved but using 21 is sufficient here are we are not looking for precise answers. Paired work, monitored by T with encouragement where necessary and praise when deserved. Agree final list of top 5 names ready for Activity 3.
3	**Comparing with class data** T: How can we compare our class data with this national result? *(Ps give their ideas; T chooses method or lets Ps try out their own methods)* *mins*	The class data needs to be collated to provide one set of data. This can be done now as a separate exercise, or worked on earlier. Again, there is a chance for discussion over the method to use for the comparison. There is not one 'correct' method. Not all the data points are comparable. Review and summarise results with the class.
4	**Homework** Consider similar problems. For example: 1. Analyse baby names popular in the USA. 2. Analyse data for popular house names.	