

Most Popular Letter

Task Description

Students explore the frequency of letters in the English language.

In pairs, students select 100 words in a text and record how many times each letter appears in a frequency table. A graph is created to present and summarise the data. In discussion, connections are made between the usefulness of the knowing the frequency of letters to playing games such as Hangman and Scrabble.

Length of Task

Approximately 100 minutes, including playing 'Hangman' and discussion time.

Materials

- Samples of various texts e.g., newspapers, poetry, novels, comics, magazines, own writing, picture story books, etc.

Using the Activity

Introductory game to focus the investigation

'Hangman':

The teacher selects a secret word and draws a line to represent each letter on the board. Students guess a letter that might be in the word. If the letter is part of the word, the letter is written on the line on the board. If the letter is not in the word, one part of the drawing of the hangman is completed. Play continues until either all the letters of the secret word are known or the hangman is drawn. The aim to guess the word before the Hangman is formed.

See picture for example of a Hangman game in progress.

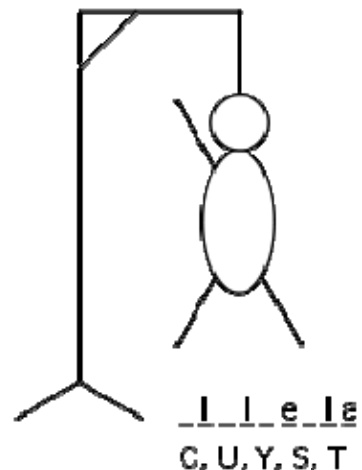


Figure 1. 'Hangman' in progress.

Source: Wikipedia.com Accessed January 22 2009.

Main Activity

Teacher promotes discussion about the letters selected during the game of Hangman.

Discussion questions: Why did you select particular letters? What is the most popular vowel? consonant? Which letters appear most often in words? Which letters are the least popular in words? What is your prediction? Would the frequency of letters change depending on the text, e.g. a comic versus a novel? Teacher records on board the students' predictions.

Students test their predictions. In pairs, children select the first 100 words of a text for letter analysis. Students use different types of texts: newspapers, magazine, comic, own writing, picture story-books, novels, etc. They record the number of times each letter

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appears in a frequency table. The methods for analysing and recording data are determined by the students.

Students record their information from the frequency tables onto a graph. Students decide the type of graph to use for presentation of the data. The most typical choice is a bar graph.

Students share their results with the class. Compare the results of the different types of texts: Are there any similarities and differences between the types of texts we used? What conclusions can we draw? So when you're playing Hangman, which letters would you choose first?

Conclude with a game of Hangman. Ask - How did the letter frequency investigation assist you in playing this game? For what other games might this knowledge be valuable? (Scrabble, Wheel of Fortune, crosswords).

Key Mathematical Concepts

- Data collection, presentation, analysis, and interpretation.
- Developing and testing conjectures.

Prerequisite Knowledge

- Understanding the elements of a graph.
- How to transfer data from a frequency table to a graph.

Dimension	Standard
Measurement, Chance and Data	Students use a column or bar graph to display the results of an experiment (for example, the frequencies of possible categories).
Measurement, Chance and Data	Students organise and present grouped and ungrouped data using displays such as simple frequency tables.
Working mathematically	Students develop and test conjectures.

Assessment

To be working at level 4, students should be able to:

- Investigate and analyse conjectures through the use of a frequency table;
- Convert data from a frequency table to a graph; and,
- Appropriately label a graph.

Extension Suggestions

For students who would benefit from additional challenges:

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- Use the excel software program to record frequency tables and create graphs.
- Explore the frequency of words used in written and spoke English. Explore the frequency of letters that start and end a word.
- Collate all results into one larger frequency table to investigate differences that may occur between individual and whole class results.

Teacher Advice and Feedback

Possibly reduce the number of words analysed to 50 or 70 as teachers found that 100 words can take a long time to review. This lesson may take over two sessions to complete. Tally marks using the five-bar gate system might assist students with counting. The tallying process can vary in length of time for pairs, so maybe give a time limit so that all students have the opportunity to draw together their results during the discussion.

Teachers were pleased that all students were able to work on this investigation independently of teacher prompting.

Teachers and observers witnessed that students were engaged and on-task during the investigation.

The teachers were satisfied that students made the commonsense choice of a bar graph to present the data.

Potential Student Difficulties

Teachers found that the methods for recording the letter frequency will range in efficiency. However, resist the temptation to demonstrate to the students how to create a frequency table at the beginning of the lesson. Allow students time to discover their own methods for collating data. To assist those who are finding this part of the investigation difficult, ask students to share their methods after 5 – 10 minutes of data collection.

Solution

The most popular letter in the English language is 'e'. The letter frequency of all letters in the English language is: e t a o i n s r h l d c u m f p g w y b v k x j q z

Reference: <http://www.letterfrequency.org/> Accessed January 22nd 2009.

Sources

Lilburn, P. & Rawson, P. (1993). *Talking maths: encouraging children to explore ideas*. Melbourne: Oxford University Press .

<http://www.letterfrequency.org/>

<http://www.wikipedia.com>

Acknowledgements

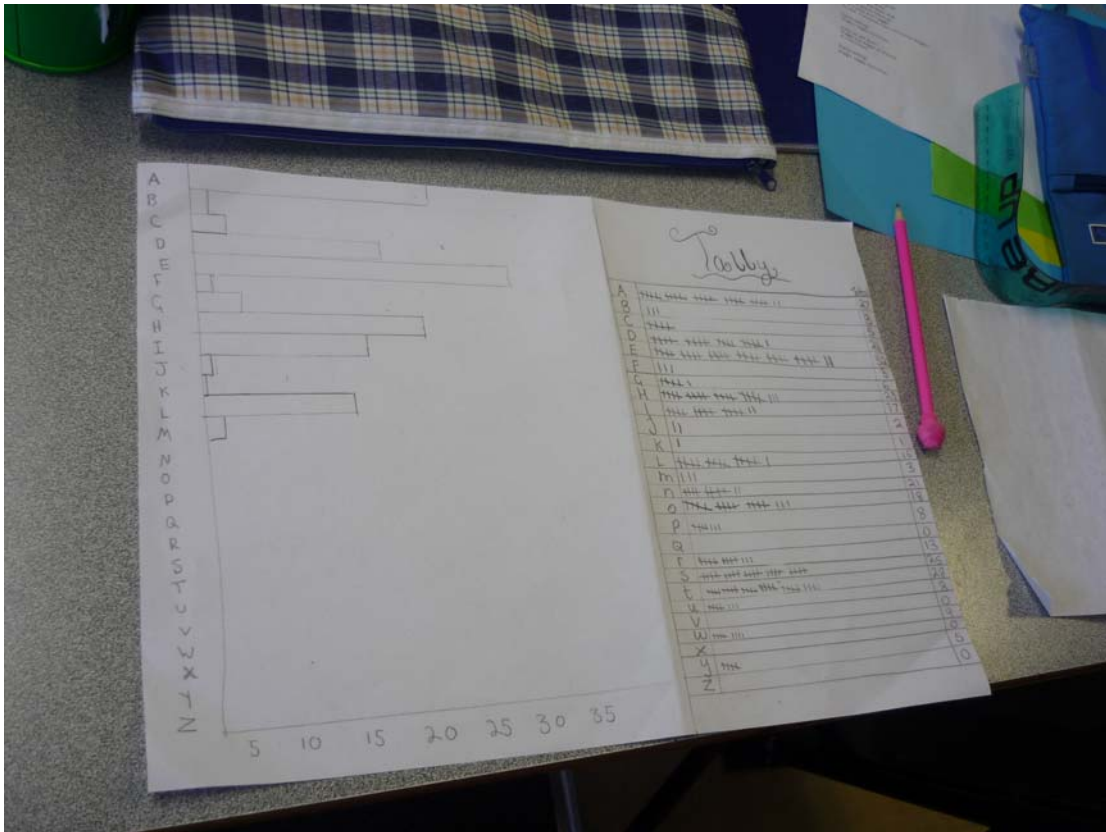
Thank you to the teachers and students from Timbarra Primary School for providing valuable feedback on the use of this activity.

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Student Work Samples

Example 1:

These students have created a frequency table that could efficiently record the data. Tally marks are summaries numerically. These students are converting the information from the frequency table accurately to a bar graph.



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Student work samples

Example 2:

Whilst accurate, the students did not demonstrate a sophisticated tallying technique. The accompanying graph shows the students' understanding of adjusting the scale appropriately to suit the data.

