YEAR 7

FOOD CHARACTERISTICS

SPREADSHEET PROJECT

Objectives

This project is designed to introduce Year 7 to different ways of looking at the real-world, how to organise data into different categories, and how to summarize and analyse it using the Excel spreadsheet.

They were already studying Food, so we have decided to create an IT project based around the information they are already collecting.

The children will be split into teams of 4 to 8.

The "mission statement" for each team is as follows:

> **Design an Excel Spreadsheet to contain data on the characteristics of at least 20 different foods. Analyse your data to show how foods differ. Print out some graphs or charts representing your results. Write a brief explanation of why you chose to collect certain data, and what your charts show**.

The project will need to proceed in several stages:

1. Designing a spreadsheet to answer the questions
2. Collecting and entering the data
3. Using filtering, sorting, goal-seeking and graphics to display the results.
4. Writing up the results.

Hopefully, it would be possible to present the graphs and results on a display board in the class ?

1. Designing the spreadsheet

Explain the "mission statement".

Explain that a spreadsheet consists of rows and columns and we are going to use rows for each type of food which they have collected. What to use the colums for ? - The _characteristics_ of the food. Using a tin of beans as an example, we could decide to _categorise_ food the following ways...

- quantity (e.g. 350 gm)
- quantity of fat
- quantity of carbohydrates
- quantity of protein
- quantiity of vitamins
- whether it is a "branded" product (="1") or "own-brand" (="2")
- whether it is "organic" (="1") or not (="0")
- the price
- the type of packaging (1=wrapping, 2=package, 3=tin ?)
- brand image / marketing (0= plain packaging, 1 = highly branded bright packaging)
- country of origin (1= UK, 0 = overseas ??)
- best-before lifetime (e.g. 24 months, 30 months , 1 month)
- servings per packet ? no of servings expected from each purchase ?
- quantity I eat in a day ?

... each of these categories should be represented as a column in the spreadsheet.

Discuss the advantages of using numbers such as 1 or 0 to identify food types, since computers find it easier to work with numbers.

There are literally hundreds of different ways of categorising data. The first decision for each team is to _decide what categories of information to collect and input_ to the spreadsheet.

This will be based on what questions which they might like to ask. Discuss the sort of questions which could be asked once the data has been collected...

- Which foods have a greater quantity of fat ?
- What is the league table of foods with most fat / carbohydrate / protein ?
- What mixture of foods would give me 1,000 calories, & how much would it cost ?
- How much fat, carbohydrate, protein etc. Is there is an average day's diet, and how is is spread out ?
- Which foods have most vitamins ?
- If I substituted branded purchases for non-branded, how much would I save, if I want to get the same amount of nutrition ?
- Are "organic foods" cheaper than non-organic ?
- Are organic foods better ? (define "better" = more protein, carbohydrates etc. ?)
- Are bigger packages (e.g. "family packs") always better value than ordinary packages ?

- How much would an "ideal" meal cost ?
- How can I get the most amount of protein for £20.00 or less ?
- Which food is cheapest per 1,000 grammes ?

Some teams may like to keep a diary of all the things they eat in a day, and then produce a graph of each person's calory, fat, carbohydrate intake etc. (One way of organising this would be to have a column set to 1,2,3 or 4 for each the team members, or alternatively to have a different spreadsheet "tab" for each team member).

2. Collecting and entering the data

Use the "Red" option of Excel, which gives access to the Formatting Options, additional Toolbars, and Charting Wizard.

Don't forget - put time into planning what you are going to do, before entering data.

Make sure that your work has a title (including the name of your team), and properly labelled X & Y axis and descriptions.

Once the spreadsheet has been designed, entering the data should be a straightforward exercise. There are a number of hints and tips which could make this easier...

Excel has a number of toolbars available. The toolbars we require are **Standard** and **Formatting**. If you right-click on any toolbar, you can chose which toolbars to display. Alternatively, you can display the appropriate toolbars by chosing the Menu Option **View / Toolbars**

Use different fonts, and bold/italics etc.to highlight headings. To make some text fill across several columns of data, select the range, and then click on the "centre across columns" icon on the toolbar. Different coloured backgrounds and text colours can be used to present the data before printing it out.

Excel is capable of handling thousands of rows and columns of data. If you enter a lot of data, you may notice that the first row and/or column disappear as Excel scrolls to another cell. We can "freeze" these initial cells, so we can enter data on one part of a spreadsheet at the same time as reading the headings. Position the cursor just inside the area which you want to "Freeze" and chose the Menu Options **Window / Freeze Panes**

Remember that some columns may consist of money, others of quantities, so for neatness use formatting to display a range of cells with, say, a £- prefix and 2 decimal points.

Sometimes, columns are not wide enough to display the data which you have entered. If you position the cursor on the column headers, you will see a column width cursor, which enables you to change the width of each column to display the data better.

The real power of spreadsheets is in getting it to do most of the work, so set up additional columns with formulae in, such as a "total carbohydrate" column = carbohydrate column multipled by quantity column. Alternatively, a total cost column = price times quantity.

You can also set up a total row, which adds up the total from all the rows above. This can be done using the $\sum$ sum-formula.

3. Displaying the results

Firstly, there are a number of ways of organising data before you start graphing it..

Use _data sorting_ to sort the rows into a useful order. For example, sort by the amount of carbohydrates, before printing out a pie-chart of carbohydrate contents. Another example, sort data by brand-type, then create 2 charts, one of branded goods, the other of unbranded goods.

If data is organised in regular rows, and columns, you can make use of Excel's _Filtering_ options. This enables you to "hide" all the columns you are not interested in. For example, filter out all the "branded" goods, so you can build a chart of the non-branded ones. Then change the filtering back again.

For more advanced users, try out the _Goal Seek_ option in Excel. This enables you to vary a column (say the quantity to purchase), so that another column will reach a value (say the target amount to spend). This is very useful to answer questions such as "how much can I buy of these foods, to give me a good meal for £20.00 ?"

Ranges of data can be selected by highlighting the area with the mouse cursor, and keeping the mouse button down at the same time. If you need a _discontinuous_ range (such as when you want to include chart titles as well as totals), hold down the "Ctrl" key at the same time as you select the other part of the range.

The _charting wizard_ is used to "build" a chart or graph. Select a range of data you wish to display, then click on the wizard icon. Pick up the icon and place it over the cells which you want to display. Don't forget that charts should have correct titles, and the X and Y axis should be properly labelled.

4. Conclusions and Feedback

The "mission statement" is not only to produce graphs, but also to write a brief explanation of why they chose to the collect the data, and what they intended to present.

This is important, since any "real-world" project needs to have supporting information, not just graphs.

The following is brief outline of what could be included in the "final report".

A list of the team members (including a "team name", of course) and who did what, e.g. "team leader", "data collector", "designer", "data input", "graphics", "report writer".

What questions the team wanted to find out. (E.g. whether there is a difference between branded and non-branded foods).

Why different columns were chosen. (E.g. we wanted to analyse branded and non-branded foods, so we had a column set to "1" if the food was branded).

How the data was collected (e.g. magazines, shops, parents etc.).

What the data showed (e.g. own-brand foods have as much protein, carbohydrate and fat as branded foods, but cost 20% less ?)

A list of the graphs they have produced.

Features in Excel which were helpful (e.g. formulae columns mean we don't have to add up the amounts ourselves, using filters means we can show just the information we are interested in without having to delete the rest).

What they enjoyed most about the project.

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