

FASHIONISTA – LESSON GUIDE

Introduction

Fashionista is an exercise in getting pupils to investigate the mathematics behind fashion trends. The software contains an introductory short film that shows the CEO and Store Manager of a London boutique discussing how to be successful in running a fashion business. His suggestions include: analysing age group buying patterns, recognising popular and less popular items and trying to find patterns that help with decisions on which stock to buy for the future success of the shop. Pupils then use Trendsetter to run simulations of buying patterns in a fictitious shop over an eight-week period. It represents this data pictorially, as well as through the use of charts and graphs. Once a configuration has been run, pupils (in groups or as a whole class), then use census population statistics work out how much stock they would need to buy in order to satisfy consumer demand in a particular region or area.

Pupils should be familiar with the ideas of variables and hypotheses testing before beginning work on this case study.

Using the case study

The software for Fashionista is divided into three parts:

- A short introductory film about what it is like to run a fashion store
- Trendsetter 1, a simulation that considers age range and fashion items
- Trendsetter 2, a simulation that considers age range, fashion items and price range

The introductory film should be viewed first to encourage class discussion on what is involved in working in fashion. In the film, the store owner and manager talk about the tasks involved in running a boutique, which include: analysing age group buying patterns; recognising popular and less popular items; trying to find patterns that help with decisions on which stock to buy in for the future success of the shop.

The film concludes with the buyer mentioning how he has been sent a handy program called Trendsetter which “....helps with this analysis” – and invites the pupils to have a look at it to see how it works...

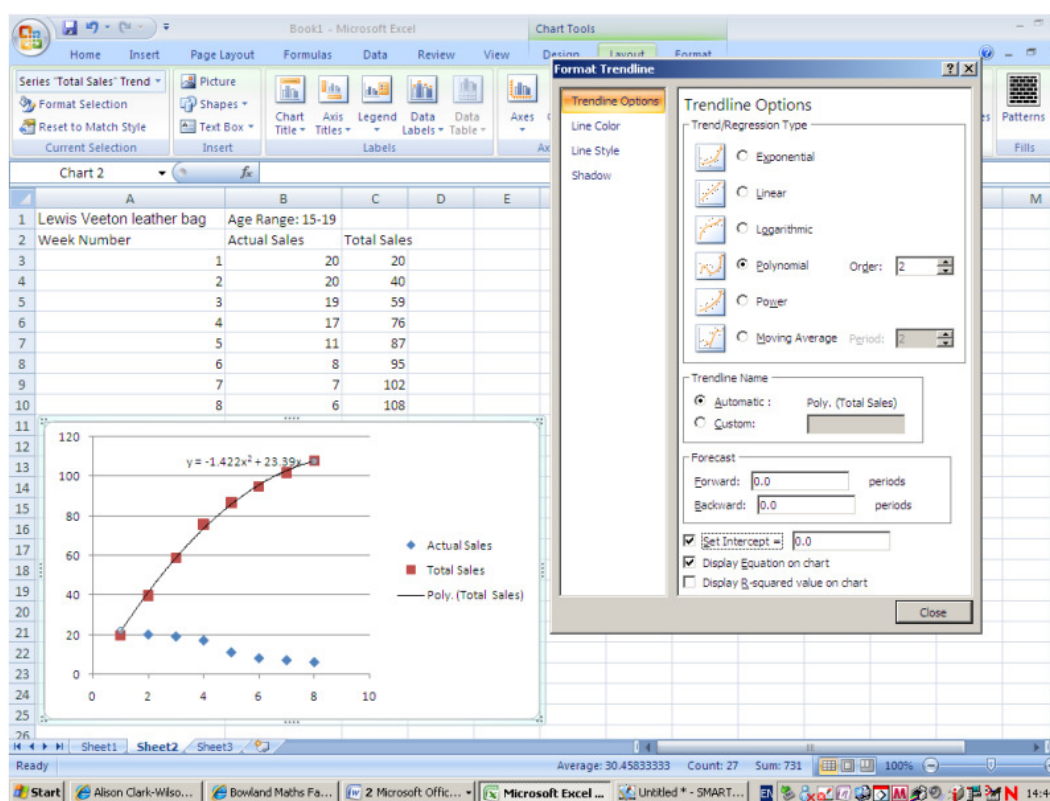
Trendsetter is an application in two parts that demonstrates the sales of a selection of fashion items over a period of eight weeks for a population sample of two hundred and twenty-five people of a selected age range.

In Trendsetter 1, after choosing an age range and a fashion item, pupils then click “Set the trend!” to run the application. They then observe graphically how many people bought the item each week. At any point, the simulation can be paused or moved forward or backwards to a different week. Pupils can also view the data and a line graph that shows the sales up to any pause point, or let the simulation run to the end of the eight week period and then view the data and graph.

Trendsetter 2 works in exactly the same way, except that a price range can also be selected in addition to the age range and fashion item.

Practical aims of this task

1. Pupils test out different configurations of age group, fashion item (and price range), in order to collect data.
2. They compare these data sets to make conclusions about fashion trends: which age group likes which items, the effect of price on buying patterns, the rise and fall of trends and so on.
3. More able pupils can export the data to a spreadsheet application to model the trends algebraically or to make calculations related to their predictions.
Pupils working at Level 7 might use the 'Trendline' functionality within a spreadsheet application to obtain an algebraic model for one set of the data. For example, a quadratic model of the Week Number and Total Sales, with the intercept fixed to zero.



They might then substitute values to predict the Total Sales for a subsequent week, or use the shape of the graph to establish the maximum potential sales of the item. Pupils would be expected to recognise the limitations of this algebraic model within the Fashionista context.

4. Pupils work out how much stock to buy in order to satisfy future demand – in groups or as a whole class. This can be scaled up using census population statistics.

The mathematics within Fashionista

Fashionista provides opportunities for pupils to work on Key Concepts and Key Processes in the KS3 National Curriculum Programmes of Study; in addition it involves specific content within Handling data. The materials are most suited for pupils working between levels 4-6, although the nature of the interactive elements also allows a more exploratory approach for lower attaining or younger pupils.

Pupils use the software to explore the effects of varying values and look for patterns and trends. They will take account of feedback to support them to work logically towards results and conclusions.

The Key Concepts

Competence – Pupils apply suitable mathematics accurately within the classroom and communicate their mathematics effectively to each other by selecting the most appropriate mathematical tools and methods. This would include using the ICT within the resource.

Creativity – Pupils combine their own understanding, experiences, imagination and reasoning to arrive at new mathematical knowledge. They do this by applying their existing mathematical knowledge to pose their own questions, create solutions and develop convincing arguments in response to the unfamiliar problems provided by the Fashionista context.

Applications and implications of mathematics – The Fashionista case study puts mathematics in a worthwhile and engaging setting for pupils and supports them to understand that mathematics is used as a tool in a wide range of contexts.

Critical understanding – Pupils recognise the limitations and scope of their calculations or representation within the context of their own statistical enquiry.

The Key Processes

Representing – Pupils identify the mathematical aspects of Fashionista and choose between pictorial, tabular and graphical representations in order to select the mathematical information they will need and the methods and tools required to solve their own problems.

Analysing to make connections within mathematics – Pupils work with the dynamic images within the software to make a statistical hypothesis and to work logically towards results. By comparing their outcomes with those of other pupils, they should appreciate that there are a number of different techniques that can be used to analyse the situation.

Use appropriate mathematical procedures – Depending on the nature of the hypothesis that pupils make, they may need to manipulate numbers, to make accurate mathematical diagrams and graphs and to calculate accurately, using a calculator. All pupils should record their methods, solutions and conclusions and estimate, approximate and check their working

Interpreting and evaluating – All pupils should form convincing arguments based on their findings and consider the assumptions they make and the appropriateness and accuracy of results and conclusions. Pupil should relate their findings to the original context, identifying whether they support or refute conjectures. In discussing their work with other pupils, they should engage with someone else's mathematical reasoning and consider whether alternative strategies may have helped or been better.

Communicating and reflecting – Pupils communicate findings in a range of forms. They should engage in mathematical discussion about their results and so consider the effectiveness of alternative solutions.

The Range and Content in Fashionista

Number and Algebra

- Rules of arithmetic applied to calculations and manipulations with rational numbers, for example, making calculations to compare the different sales totals for different age groups or fashion items.
- Applications of ratio and proportion, for example, scaling up the predicted sales for a larger population.
- Accuracy and rounding, particularly when interpreting answers produced by calculator.

Handling data:

- The handling data cycle. It would be helpful to display this in the classroom to support the pupils to understand the process of developing a hypothesis and gathering the data in order to test it.
- Analysis of grouped and ungrouped data, including time series and lines of best fit. For example, lower attaining students might focus on analysing the data presented by the software in numeric and graphical form, whereas higher attaining pupils might calculate rolling averages of sales over time.
- Measures of central tendency and spread. For example, lower attaining pupils might look at the minimum and maximum weekly sales of an item in different weeks, while higher attaining pupils might calculate mean averages and explore how they vary for different items or age groups.

Organisation and pedagogy

The Fashionista case study supports 1-2 one hour lessons of classroom activity with the option for related homework. A mix of whole class and group work is involved.

Teachers might want to devote a single lesson to Trendsetter, exploring Trendsetter 1 and 2 from a largely mathematic-based perspective.

Alternatively, the activity can be split over two lessons, dealing with Trendsetter 1 and Trendsetter 2 in turn and the different issues raised by each. Another approach for two lessons might be to encourage pupils to think about and discuss some of the sociological issues associated with fashion trends (and perhaps other trends more generally). There are some potential discussion points later in this document.

In keeping with the ethos of the Bowland Maths approach, the role of the teacher is to set pupils realistic targets, to challenge them to think and reason for themselves and to manage discussions and plenary reporting sessions. Only as a last resort should techniques be demonstrated. Throughout, the goal is to develop pupils' ability to work and think independently.

In practice:

- Pupils working at National Curriculum Level 4 should be expected to interpret discrete data from graphs and tables generated by the software in order to decide which trends are more popular - and justify their conclusions using correct mathematical language.
- Pupils working at National Curriculum Level 5 should be expected to compare the data generated by several trends and use this data to justify or refute their hypothesis.
- Pupils working at National Curriculum Level 6 should be expected to explore the effect of price on their selected trends and to consider how trend lines might be used to predict future sales. This might include a consideration of the rolling averages. Pupils could input data into a spreadsheet software package to support the process of analysis.

Suggested sequence of events

It is *strongly recommended* that the lesson begins as a whole class activity, rather than pupils accessing Trendsetter on the computer by themselves. Otherwise, there is the danger that they will simply play with Trendsetter and exhaust all the buying configurations before embarking on any actual maths! A great advantage to limiting their access to the data is that it creates an element of anticipation and provides more purpose to the act of making a hypothesis and testing it later in the lesson.

1. Instigate a discussion on trends – how do they start, what influences them, how do they spread; move the discussion around to what information might need to be analysed in real life jobs. Talk about merchandisers and buyers in the fashion world and their need to predict what fashion items they think will be popular.

2. Ask pupils to think about the kind of analysis they might do – how they would gather the information, how they then might make predictions, based on past buying patterns and trends. Then open Trendsetter and click on the video player.

3. Whilst the pupils are watching the introductory video of the store owner and manager, ask them to note down key words or ideas that they think might be important to consider when trying to recognise trends. The film should prompt discussion.

4. Decide whether to use the (simpler) Trendsetter 1 or to move straight to Trendsetter 2.

5. When Trendsetter opens, some instructions will appear on how to use it. (You can access these instructions at any time by clicking on the Instructions button at the top of the screen.) When the instructions are closed, a graphical representation of a shop with a grid in the middle will appear, with a control area on the right-hand side and at the bottom of the screen. In Trendsetter 1, users select an age range and

fashion item from the bottom panel; in Trendsetter 2, they can also select a price range in addition.

7. Set up a trend, selecting an age range and fashion item (and price range for Trendsetter 2) and then click on “Set the trend!” to run Trendsetter in a demonstration to the class. A graphical representation will then appear in the grid, displaying the numbers of people that bought the fashion item from week to week.

8. While Trendsetter is running, you can ask the pupils what they see happening.

Trendsetter can be paused at any point before the end point of eight weeks; the data and graph can also be revealed at any time by clicking on “Data & graph”. This is an opportunity to ask the pupils what they saw, to check they understand the difference between the ‘actual sales’ and ‘total sales’ graphs, and to get them to describe how the trend spread and to think about why the trend rose (and possibly fell) as it did. They could also be asked to speculate on the resultant stock buying decisions that might be made in the real world.

9. Interesting debate can also be generated about how Trendsetter displays the trend spreading in clusters, just as fashions in the real world tend to grow among groups of people. Pupils might consider how fashion trends can grow ‘geographically’ due to the influences of friends or particular social groups. You can stop the simulation at points to see this growth pattern at work.

10. In groups, pupils can then run their own trend selections on their PCs, view the data and graphs generated and make stock decisions. It is important that they only have a few minutes to explore one or two trends before stopping them and asking them to make a hypothesis based on what they have found so far. If they have too much time exploring Trendsetter at this stage, it is possible for them to explore all the possible combinations and so reduce the incentive to make and test their own hypothesis.

11. Ask pupils to share their hypotheses with the rest of the class: for example:

- ‘Skinny jeans will be more popular with younger people.’
- ‘A rise in price will not affect the buying patterns of older customers.’
- ‘The cheaper the price, the more straw hats 10-14 year olds will buy.’

12. There are several ways in which the activity can be developed, depending on the level of ability of the pupils and the progress that they have made with the activity.

Some pupils could focus on communicating the data that they collected in order to test their hypothesis: for example, combining several sets of data onto one graph to show comparisons and presenting conclusions back to the whole class.

Pupils can use Trendsetter 2 to explore how the different price ranges affect the buying patterns for their chosen fashion item.

Pupils could also be given the resource ‘Predicting Trends – How Many to Buy’, which sets up an ‘Apprentice style’ task in which pupils use local or regional data from the 2001 census population statistics, to work in groups or as a whole class, in order to calculate how much stock they would need to

buy in order to satisfy consumer demand. It is recommended that pupils are provided with a print out of the page of data for your town or region.

Questions to prompt thinking

- How did the trend sales rise (and/or) fall?
- How could this information be represented in a table/graph? (to be asked before revealing the data and graph in Trendsetter)
- What does the table/graph reveal?
- How could this information be used to help make stock-buying decisions?
- How did price affect the take-up of the trend?
- At what price do you think the item became too expensive?
- Did age make a difference?
- Did different age groups react in different ways? Why is this?
- How might the pricing of an item affect your stock decisions?

Questions about fashion trends

As noted above, interesting debate can also be generated by drawing attention to how Trendsetter displays trends spreading in clusters: to what extent does this mirror the way that fashions are adopted in real life? Why do trends rise and fall?

You can use this to stimulate debate on the sociological dimension that underlies fashion trends. Here are some questions for discussion:

1. How do fashions typically undergo a number of stages in their life-cycle?

Suggestions:

- Rise -> Peak -> Decline -> Revival?
- What might be the causes behind each of these phases?

2. What are the key factors contributing to fashion trends?

Suggestions:

- Price
- Availability
- Affordability
- Key influencers/trendsetters/role models

3. What are the main drivers of fashion trends?

Suggestions:

- Film
- Music
- Other media
- Fashion shows
- The High Street

4. Who/what are the key opinion formers?

Suggestions:

- Magazines
- Films
- Music

- Fashion designers
- Marketing/Advertisements
- Friends/peer group

5. Who decides what's fashionable and why?

- From the top down: is it dictated by the manufacturers for commercial reasons?
- Are new styles constantly introduced and old ones decreed unfashionable because they make more money when people are encouraged to buy new clothes often?
- From the bottom up: are styles created 'on the street' by young people themselves or minority groups
- Or is it a mixture of the two?

6. Why do fashions become unfashionable?

- People become bored of them
- Better ones come along
- They become 'too' popular – and are no longer exclusive to an elite of trendsetters
- They are adopted by people the opinion-formers consider 'untrendy'

Homework suggestions

If Fashionista is divided into two lessons, it makes sense to break up the use of each Trendsetter into each lesson. If this approach is used, possible homework prior to using Trendsetter 2 is:

- Conduct a survey amongst friends and family on how much they would pay for a selected item of your choice
- Look at the current prices for some items of your choice in shops or online – and think about who might buy them; can you work out from the price whom they are aimed at?