

Unit: Pizza Party

Lesson 3 of 5 Pizza Pricing

Activity Duration: **60 mins**

Principal partners



Computing at School

Concepts and approaches covered



Logic



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Overview

In this lesson pupils are introduced to data modelling as pupils work out the costs of their pizzas.

Note – in preparation for this lesson, combine pupils' choice of pizza toppings from each groups' spreadsheet from lesson 2 into a single spreadsheet (or better still ask a pupil to do this!). If you have changed the toppings pupils can choose from please update the information in slide 6 of the presentation. You also may want to change the information in slide 6 to reflect actual costs based on where you plan to buy the ingredients.

Learning objectives

- ✓ To predict what a change to a spreadsheet will do (formula or data changes)
- ✓ To apply and evaluate changes made
- ✓ To say what the spreadsheet modelling cycle is
- ✓ To say how data modelling can help with decision making

Computing concepts and approaches

- Pupils start to develop an understanding of **data modelling** as they use **logical reasoning** to predict and evaluate changes to the data and formula in spreadsheets

Resources

- ✓ **Lesson presentation**
- ✓ **Class Pizza Planning spreadsheet (created by combining groups' spreadsheets from lesson 2)**
- ✓ **Pizza costs maths worksheet (note – the data on this worksheet is replicated in the shopping list spreadsheet)**
- ✓ **Shopping List spreadsheet**
- ✓ **Extension worksheet – ‘the whole unit challenge’**

Introduction

- Display the completed spreadsheet from the previous lesson and ask pupils to share what they can recall about how it works. Can they recall what the terms ‘data collecting’, ‘data attribute’ and ‘data values’ mean?
- Ask pupils to think-pair-share how the spreadsheet can help them decide what quantity of each pizza topping they might need? They can look at the totals
- Start a ‘topping list’ on the board by writing up the number of people who want each topping, e.g. ham = 6, mushrooms = 13 etc.
- Ask pupils to think-pair-share what else you will need besides the toppings. Add these to a separate list. e.g. pizza bases (or flour, yeast etc if you want to make these), tomato sauce (again, decide if you will buy or make) etc.

Main activities

How much will it cost?

- Explain to pupils we will now work out how much the food on the list will cost and that a spreadsheet can help us calculate this; add that it might help to complete the calculation ourselves too, as it gives us something to check against and helps us think about what data attributes we will need. Can pupils recall what we mean by ‘data attributes’?
- Give out the ‘pizza costs’ maths worksheet and ask pupils to work in pairs or small groups to complete the calculations (**note** – at this stage the worksheet assumes there are 30 pupils in the class – we will be able to alter this in the spreadsheet)
- Discuss answers as a class. Ask pupils if they were going to use a spreadsheet to calculate the cost of the pizza, what data attributes they would need? E.g. Cost of ingredients, how many pizzas each ingredient will make

Spreadsheet guided exploration

- Explain that Barefoot has created a spreadsheet for pupils to enter their data into using the same data as the worksheet. Open the **shopping list spreadsheet**. Are the answers the same as pupils' workings? Are the data attributes the same?
- Lead a discussion to explore the spreadsheet as a class, covering the following areas:
 - The cells highlighted in blue are those where we input data (called raw data).
 - The data in the orange cells is the calculated data
- Can pupils explain how the division formula in column D calculates the quantity of the ingredient to buy? (slide 3) How does this relate to the calculation they performed?
- Can pupils explain how the multiplication formula in column E calculates the price of each ingredient? (slide 3) How does this relate to the calculation they performed?
- Can pupils explain how the spreadsheet calculates the total cost?
- Ask pupils to think-pair-share why using a spreadsheet could be more useful than working out calculations on paper? E.g. Demonstrate how quick it is to change a value in blue and have the new costs automatically update. Explain this is called **data modelling** (slides 4-5).

Task: complete the costings

- Model, or ask a pupil to demonstrate, how to add additional ingredients to the list on the spreadsheet. Slide 6 contains toppings data which can be used for this. **Note** – you may have updated this if you are using different toppings or have accurate prices from where you plan to buy the ingredients. Is the overall total now correct? If not, how can we amend the formula? Slides 7 to 11 can be used to support as required.
- Give pupils time to open their own version of the original shopping list spreadsheet. Remind pupils of the question 'Can you find the total cost of the ingredients for the pizzas? Encourage pupils to add data attributes and values for the remaining toppings so they get an accurate prediction of cost.
- Print or leave displayed slide 6 for pupils to use as data during this activity. They will also have the list of how many people want each topping written up during the introduction to the lesson.

Plenary

- Invite a selection of pupils to share what they have achieved. Have they created an accurate spreadsheet including all the ingredients? What is the total cost? Does everyone agree? Yes, no – why?
- Note – the following discussion with pupils about the steps in the data modelling cycle relates to the data modelling process on slide 12 and in the unit overview.

Show pupils the data modelling cycle on slide 12 and ask pupils to identify:

1. What was the question they answered? (What is the total cost of all the ingredients to make the pizzas?)
 2. What data attributes did Barefoot provide? (Ingredient/topping, Price per bag, Number of pizzas 1 bag)
 3. What data values pupils added? (E.g. Ham and £1.20)
 4. What formula pupils used? (=SUM(), Multiplication, Division)
 5. What was the calculated data?
- **The ‘whole units problem’** – ask pupils if anyone can identify an issue with our spreadsheet? Pupils may have already noticed that when the spreadsheet calculates the number of jars/bags of a topping it calculates it as a decimal if it doesn’t happen to be a whole number. Lead a discussion to explain this is like going into the supermarket, opening the mushrooms and taking a handful as that’s all we need! What ideas do pupils have to improve this? The extension challenge aims to fix this!

Differentiation

Support:

- An additional adult may need to support pupils who are not confident with the maths required in this lesson
- Less confident pupils may also benefit from working with more confident pupils in pairs or small groups
- Some pupils may be given the class version of the shopping list and asked to make minor changes

Stretch & challenge:

- There is a flaw in the spreadsheet used in this lesson as it calculates decimals of the quantity required and the cost i.e. it might work out you need 3.5 boxes of mushrooms (which obviously you can’t buy). Can pupils think of a solution to this within the spreadsheet? (See challenge worksheet)

Assessment suggestions

Teacher observation:

- Are pupils able to add toppings, prices and the formula to complete the calculations?
- Do pupils predict what each change will achieve before they apply it and then evaluate the change?
- Can pupils explain the benefits of spreadsheet modelling?

Formal assessment of maths and spreadsheets work

- Are pupils able to complete the calculations for the pizza costs correctly?
- Can pupils add ingredients' information to the spreadsheet and the formula to calculate their costs?
- Can pupils amend the total price formula accurately?

Examples of questions to assess understanding:

- What do you predict will happen?
- Why was it /was it not what you expected?
- What formula and functions have you used and why?
- What problems did you encounter and how did you fix them?
- Why is spreadsheet modelling helpful?

Extension ideas

- Consider introducing additional requirements and maths challenges e.g. setting a budget: how can the spreadsheet help the class to stay within the budget? What changes could be made (cheaper ingredients, making them go further etc)
- You could widen the task to include what else you might need for a pizza party e.g. drinks, crisps, napkins, balloons etc.
- Consider what jobs and careers might use spreadsheets and other forms of data modelling?
- As a homework, find out who in your family and friends used spreadsheets at home or at work
- Find out how spreadsheets are used in school

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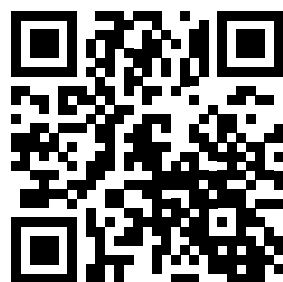


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