

Years
5&6

Tools for Teachers 2

Stephanie Alexander Kitchen Garden Foundation

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Growing Harvesting Preparing Sharing



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Pizza Party

Curriculum Links

Mathematics: Number and Algebra

- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103).
- Create simple financial plans (ACMNA106).

Mathematics: Statistics and Probability

- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118).

Preparing for the unit

This unit gets students involved in the planning of a class party in order to investigate fractions, money and budgeting, as well as data collection and comparison.

The unit starts with an open question, asking students to define the 'best' pizza option for a class party, comparing between home made and takeaway pizzas. This deliberately vague question means that the students first have to define what they think is 'best'. They might decide that their criteria include their favourite flavours, cost, nutritional value, the fun factor or novelty of making or buying pizzas. It's perfectly feasible to adapt this process to have students make comparisons on other criteria – Lesson 6 starts this process, but feel free to adapt the unit throughout.

Whatever the criteria your students focus on, the unit requires them to work in teams to design data collection sheets, collect and analyse data, make calculations involving fractions and compare costs.

If you would like to make the unit more challenging, you could give the class the challenge of creating a pizza party for more guests, or allowing each guest to choose two different pizza flavours rather than one.

Proformas at the end of the unit may be of use but are not required for the success of the unit. A maths rubric is attached at the end of the unit, alongside a resources list and the pizza recipe.

Garden and kitchen classes

Students may already have made pizzas in kitchen classes: if so, this personal experience will enhance the unit. They may express a desire to use their own garden produce in the pizzas that they decree are the 'best' – and this is a great opportunity to positively affirm their pride in beautiful, fresh, in-season ingredients that they grew themselves.



Pizza Preferences

Year level 5

Curriculum Links

Mathematics

- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103).
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118).

Resources

- paper, pens and pencils for each student

Location

The classroom

Duration:
45 minutes

Getting started

- Tell the class that they are going to plan a class pizza party. It could be for the end of term or any other celebration that's relevant to the timing of the unit.
- Introduce the challenge: In order to plan the best party, we need to investigate whether or not it is better to make the pizzas ourselves or to buy them for the party. Write down 'Make pizzas' on one side of the board and 'Buy pizzas' on the other side.
- Ask: 'What do you think we will need to consider? What makes one pizza 'better' than another?'
- 'Are there any questions we need to ask as we choose which pizza – home made or bought – is better?'

Tip

Focusing on the word 'better' makes the question deliberately unclear. That's because we want to draw out suggestions for several criteria by which we can compare home made to takeaway pizzas by collecting data (rather than restricting it specifically to cost or health at this stage – those factors can be introduced later).

- Students' responses might include:
 - Personal preference (Which ones do we like most, and are these bought or home made flavours?)
 - Taste (Which ones taste better?)
 - Cost (Which ones are more economical?)
 - Environmental considerations (Can we measure and compare the emissions between buying pizzas and making them ourselves? E.g. Do we need someone to drive a long way to get takeaway pizzas?)
 - The 'Fun Factor'! (Is it more fun to make our own?)

All of these are perfectly valid questions to explore by collecting and comparing data.

Getting into the maths thinking zone

- Try asking some maths, money and fractions questions to get the class thinking about fractions.
 - We made 24 muffins for the class so there would be one each, but we dropped six of them on the floor by mistake. Oops! How many are left and what proportion of a muffin does that mean each person gets? (Adjust these numbers depending on the size of your class and the difficulty level you want.)
 - To make this more open, more contextual for the class involved and allow for differentiation and more discussion the question could read: *We made a muffin for each member of the class and some of them fell on the floor. How many are left and how much of a muffin will each person get?*

- We've got 28 people for lunch. How many frittatas should we make? (Step back and let the class first discuss and work out for themselves that they need to decide how many slices each one will be cut into, before they can decide. This will help them with the investigation ahead.)

Exploring the challenge

- Remind the class of the main question – you might write it on the board:
Is it better to make pizzas ourselves or to buy them for our class party?
- Ask the group: 'How many slices will there be in each pizza?'
- Agree on a number of slices per pizza (eight is a good number) and write it on the board.
- Tell them that we are going to allocate two slices per person for the party. Each person will get two slices of their favourite pizza flavour (e.g. 'Two pieces of ham and cheese for Samuel').
- As a whole class, discuss their favourite pizza toppings to get them started. After a couple of minutes, break the class into small groups of 3–4 students.

Creating data collection sheets

- Tell the class that each group is going to design a data collection sheet to find out what the class' favourite pizza flavours (topping combinations) are.
- If your students are unfamiliar with data collection, you might want to discuss examples of data collection sheets they have seen (sign-up forms, surveys etc).
- Let groups make mistakes in the design of their forms without commenting on them just yet. You'll discuss the data sheets later and it is more powerful if the groups themselves decide they want to change their data collection sheet and justify their decision (rather than you telling them why to change it).
- Provide enough time (perhaps 15–20 minutes) for groups to design their form. At the end of the time, ask each group to share their data collection sheet.
- Prompt groups to share not just the result but also their thoughts, any ideas they had that didn't work and why.
- Discussing each group's collection sheet provides positive emphasis that there are many valid ways of approaching the task and that dead ends are a useful part of thinking through a mathematical challenge. It also provides ideas to any groups who are struggling.
- After the discussion, give the groups more time to revise, recopy, or create on computers the second draft of their data collection sheet.

Extensions / Variations

- If you are making pizzas in a kitchen class, this would be a great time to stage a taste test of different flavours and to celebrate the many delicious pizza flavours the students can make themselves. This will help students to think of their favourite flavours.
- Some questioning prompts might include:
 - What other ways could you develop to record this data?
 - What other data could you look for?
 - What criteria have you used to define best?
 - Why have you decided on being the best?



Perfect Pizza Preferences

Year level 5

Curriculum Links

Mathematics

- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103).
- Create simple financial plans (ACMNA106).
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118).

Resources

- groups' draft data collection sheets from Lesson 1
- paper, pens and rulers for each student
- clipboards, one per group, would be useful

Location

The classroom

Duration:
45 minutes

Getting started

- Review what you did in the last lesson and gather the students back into their groups, giving each group a clipboard for data collecting (if available).

Collecting data – first trial

- Ask student groups to start collecting data from each other. This will be noisy, as each group is trying to collect data as well as being asked for their opinions as individuals. (You could pair off groups to start and ask members to 'trade' data to get started.)
- Let it run until you think each group has got at least a third of the class data.
- Gather them back to their original tables in their groups. Ask each group to add up the results they have got so far, based on their data (even though it's not complete). Their aim is to see how many whole pizzas they will need if they assume two pieces of their favourite pizza per student.
- Groups might draw pictures to represent the choices, number of slices and total number of pizzas this represents (a proforma for this is at the back of the unit).
- Get the groups to share their calculations, particularly any difficulties they had. Often, when students are new to data collecting, they end up with too many options – i.e. they can't make up any full pizzas at all from the wide range of favourites they have gathered.
- Discuss the problem that arises if groups specify part pizzas (you can't order part of a pizza from a takeaway shop, and you can't make $\frac{1}{8}$ th of a pizza on its own!)
- What are they going to do?

Share and revise

- Provide time for groups to revise and redesign their data collection sheets. Hopefully they will come to their own conclusion that they should provide a limited range of choices (like a restaurant menu), so that enough people select the same option and they can make up full pizzas.
- You might remind students that they are aiming for full pizzas, but agree on an acceptable level of extra pieces that they can add (e.g. if there are 26 students in a class, 2 slices each = 52 slices, which is 6.5 pizzas – so you would agree that each group can 'scatter' an extra four slices across their total order to make a total of 7 full pizzas). If you put it like this, groups will start to see that they need to offer and rank several options on their data collection sheets (this depends on the number of students in the class and whether or not the teacher is included!)
- Some groups will see that the partial data collection they have already done will guide them as they design a reasonable selection of options.
- Allow groups the opportunity to revise their data collection sheets again or make a new copy of their existing one if they are perfectly happy with it.

Complete the data collection

- Start the data collection again from the beginning. Let the groups collect data until they have surveyed everyone in the class.



Creating Comparisons

Year level 5

Curriculum Links

Mathematics

- Create simple financial plans (ACMNA106).
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118).

Resources

- groups' data collection sheets from Lesson 1
- flyers, menus, advertisements and takeaway menus for local pizza shops, or web addresses for local pizza outlets
- paper, pens and rulers for each student
- calculators
- a pizza dough recipe (a recipe is provided at the end of the unit)
- pizza pans or stones that your school uses in the kitchen (if they can't be borrowed, measure their diameter. You could even make cardboard circle templates so that students can visualise the size and the division into eight equal pieces.)

Location

The classroom

Duration:
60–90 minutes

Getting started

- Ask each group to nominate a speaker to call out the main pizza flavour options on their data collection sheet.
- Write all the options on the whiteboard or somewhere where the whole class can see them.

Creating comparisons

- Discuss that you need to be able to make comparisons between home made pizzas and store-bought pizzas, so the class needs to agree on one size of pizza in order to compare. (Realistically, it's easiest to estimate a size similar to the pizza trays or stones your school uses, so that when students actually make pizzas, all their calculations and comparisons are still applicable. Many pizza websites don't specify beyond 'small, medium or large' – so just make an estimate and run with it!)
- Write down the chosen size on the board.
- When you have the list of favourite pizzas in front of the class, you may see that some are clearly home made recipes (based on students' experience in kitchen classes). Others might be commercial flavours such as 'Hawaiian' or 'Margherita'.
- As a class, discuss and define each one (e.g. Hawaiian = ham, pineapple and cheese) so that students can compare like for like.

Explore commercial options

- Give each group a selection of pizza menus, flyers and other advertising. Computers may be used to search for online menus from takeaway pizza shops (make sure they are in Australian dollars). There are many websites with takeaway pizza menus, from all over Australia – try a search for 'takeaway pizza menus' or pre-load some of the links at the back of this unit.
- Students gather data about the commercial options:
 - Can they find commercial options that are similar or the same as some of the home made flavours that we nominated on the class list?
 - What does 'our' size of pizza cost?

Calculate costs – commercial pizzas

- Using their data collection sheet as a guide to the favourite pizzas of the class, students make a list for collecting prices.
- Next to their preference they list the closest possible commercial option (which might be the same thing).
- Then they record the price of this pizza, making sure that their data relates to the size the class agreed upon at the beginning of the lesson.
- Remind them that they might need to look at options such as 'Choose your own topping' and calculate the cost of added ingredients (such as base pizza \$10, plus three toppings at \$2 each) to create a commercial equivalent of a home made favourite.

- It's possible that some of the home made options just aren't available commercially (e.g. potato, rosemary and rocket). Let students mark these favourites as they wish and tell them that they can make decisions about these ones later (such as giving them extra points in their final ranking because they are unique, fancy favourites!)
- Each groups' grid might look something like this:

Our favourite pizzas	Takeaway options	Price for large pizza
Margherita: Tomato, mozzarella and oregano	Margherita: Tomato, mozzarella and oregano	\$11
Tomato, mozzarella, ham and mushroom	Quattro stagioni: tomato, mozzarella, ham and mushroom	\$15
Pumpkin, feta and sage	Pumpkin, feta and basil	\$17
Potato, rosemary and rocket	Not available	Not available
Tomato, mushroom, ham and artichoke hearts	Capriciosa: Tomato, mushroom, ham and artichoke hearts	\$18
Tomato, spinach and egg	Florentine: Tomato, spinach and egg	\$15
Tomato, mozzarella and mushroom	Tomato, mozzarella and mushroom	\$15

- Students may decide that a commercial option is close enough to one of their favourite options that they can be compared (e.g. the third entry in the table above, where the group discussed that sage and basil are both herbs, therefore they can be compared fairly in this instance).

SAMPLE