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### STATEMENT OF THE PROBLEM

*Plan a Pizza Day for all the students in Year 7/8*

*There are two requirements you must think about:*

- 1. You can only offer two types of pizza topping.*
  - 2. You have to make a profit from the pizzas you sell.*
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### PIZZA DAY – THE STORY

#### The Planning Stage

We posed the Problem to the students, and then asked them develop a plan for going about the Task. There were many different ideas about how the issue of pizza toppings should be addressed, and it was decided to send some students to the pizza shop for a list of the various toppings, sizes and prices. Other students decided to conduct a survey of Year 7/8 to find out which were the most popular pizza toppings. To guide this survey process, each student organised a list of toppings from the pizza shop research and we discussed how to make a tally of the Year 7/8 responses.

#### Doing the Task

Once the survey was carried out, we asked the children to represent the data using a pie graph and to identify the ‘top two’ toppings (see work sample 1). Having provided each child with a circle template with which to create their pie graph, it was interesting to watch how, while the majority understood the pie graph concept, some children divided their circle evenly into sections. One student who was originally Level 1 in the first round of the Project just drew all the toppings on the circle, regardless of amount. However, when he ended up with one half of a circle not coloured in, we questioned him regarding how that part of the pie graph represented ‘Hawaiian’ and he was able to recognise his mistake.

In the next part of the Task, the students were asked to survey Year 7/8 again, this time to find out how many slices each student could eat, and then turn these slices into whole pizzas. To carry out this part of the task, the students were split into groups – some groups investigated using a small pizza with 4 slices, others investigated using a large pizza with 8 slices, while others investigated using a family

### Authentic Task – Pizza Day

pizza with 10 slices. They then had to work out the cost of producing the required number of slices – this activity may be made more challenging by requiring the children to use the ‘top two toppings’ survey results when selecting their whole pizzas for costing.

We collated the results on a chart where the children observed that it was more economical to use family sized pizzas. Each group was then asked to decide on a price which they would charge for each pizza slice aiming to make an overall profit. This produced some interesting results, as some children initially chose a price that would not produce any profit – they just invented a price that they would be happy to pay. On the other hand, some children were politically opposed to making too much profit. In terms of the actual mathematics used, some students added a small amount to the cost of a whole pizza without regard to the cost of an individual slice, however, when questioned about how they would price one piece of pizza they knew that they would have to divide the whole pizza cost by the amount of slices. It was clear from their working of the Task that the students were working at different thinking levels. Some students used a calculator to perform the costing algorithm whilst others were able to use multiplicative thinking and others used an additive method (see rubric).

We later developed a Pizza Fraction component to the Task where we again provided the students with a circle template and asked them to divide it into 20. There was some discussion necessary as to how to do this, so we led the students through dividing the circle in half, then into quarters. Dividing those quarters into 5 pieces caused some problems, so we used paper folding to demonstrate this step.

We then asked the children to allocate the various toppings by fractions which they chose (eg. Hot Salami is  $\frac{4}{20}$ , Cheese is  $\frac{12}{20}$ ). An alternative way to carry out this activity would be to provide each child with a pre-prepared worksheet sheet giving instructions for which toppings to allocate to which fractions, eg. Andrew ordered a pizza with 20 slices. Draw his pizza.  $\frac{3}{5}$  (or  $\frac{12}{20}$ , depending upon the children’s level of understanding of fractions) of the slices have tomato. Half of the slices that have tomato also have capsicum, etc. This worksheet may also contain problems for the children to answer, eg. All the pieces have cheese except the ones that have tomato. How many slices have cheese, then? What fraction of the pizza is this? What fraction of the pizza has capsicum? Etc (see work sample 1).

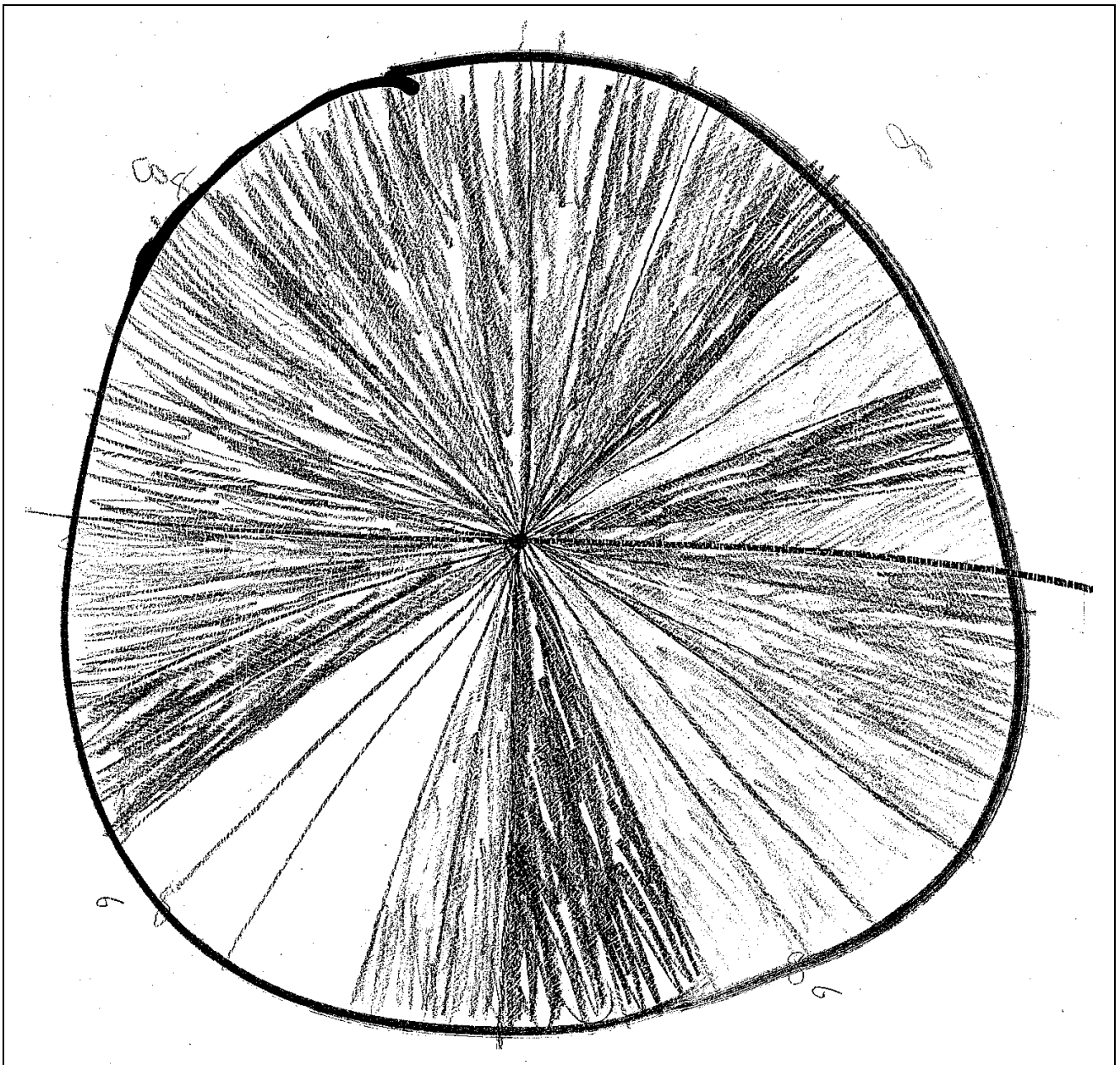
#### After the Task

Organising an actual Pizza Day for the children would be a great conclusion to the task, even if the students’ actual survey results are not used to choose the toppings, they will be able to see how their mathematical work has practical application in everyday life.

# A U T H E N T I C T A S K

Authentic Task – Pizza Day

**Work Sample 1: Pie Graph**



## Authentic Task – Pizza Day

**RUBRIC FOR 'ORGANISE A PIZZA DAY' AUTHENTIC TASK**

	<b>3</b>	<b>2</b>	<b>1</b>
<b>Collecting data</b>	Collects data using a tally and can make a statement or hypothesis based on that data	Collects data using a tally	Haphazard collection of data
<b>Representing data</b>	Shows data accurately as fractional parts of a pie graph in proportional sections of the circle and graph is colour coded with key and heading	Shows data accurately as fractional parts of a pie graph but graph not labelled and no key or heading	Shows data in a pie graph but data not represented as functional sections of the circle
<b>Working out how many pizzas to buy and the total cost</b>	Able to turn surveyed number of slices into whole pizzas using small, large and family and able to use multiplication correctly to find the total cost	Uses addition to find out total cost of pizzas and able to turn surveyed number of slices into whole pizzas using a calculator	Guesses the amount of pizzas needed
<b>Working out profit</b>	Uses formal division to find the cost of one slice and able to add a margin to that cost to make a profit	Understands that division is needed to find out the cost of one pizza slice but had to use a calculator	Guesses what a reasonable price would be, based on how much they would pay for a piece of pizza