

## Making Muffins

### Purpose:

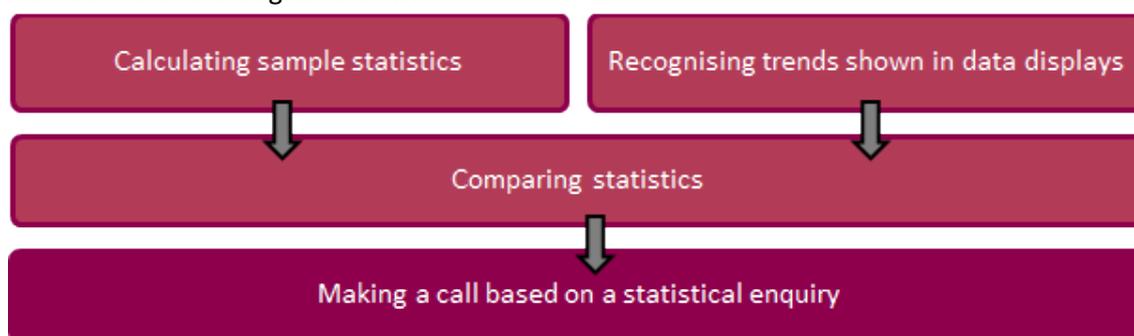
The purpose of this activity is to engage students in applying the skills of a statistical enquiry to make a business decision.

### Achievement Objectives:

S4-1: Plan and conduct investigations using the statistical enquiry cycle: determining appropriate variables and data collection methods; gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends; comparing distributions visually; communicating findings, using appropriate displays.

### Description of mathematics:

The background knowledge and skills that need to be established before and/or during this activity are outlined in the diagram below:



#### Calculating sample statistics

Find the mean and the range of the following:

32 33 45 46 48

#### Recognising trends shown in data displays

Josie earns her pocket money by helping out with housework. Her earnings over the past nine weeks are shown in the table below. Comment on any trends that are shown in the data.

Hours	3.5	2.8	2.9	2.5	2.4	2.0	2.0	2.1	1.5
Pay (\$)	17.50	14.00	14.50	12.50	12.00	10.00	10.00	10.50	7.50

#### Comparing statistics

In a year 7 class, heights range from 145 cm to 168 cm, with a median of 151 cm. The year 8 class in the next room has a range of heights from 143 cm to 174 cm with a median of 153 cm. Which year group has the greatest range of heights?

#### Making a call based on a statistical enquiry

In a year 7 class, heights range from 145 cm to 168 cm, with a median of 151 cm. The year 8 class in the next room has a range of heights from 143 cm to 174 cm with a median of 153 cm. Use this information to say whether you can make the call as to whether year 8 students in this school tend to be taller than year 7 students? (...and do they tend to be taller?)

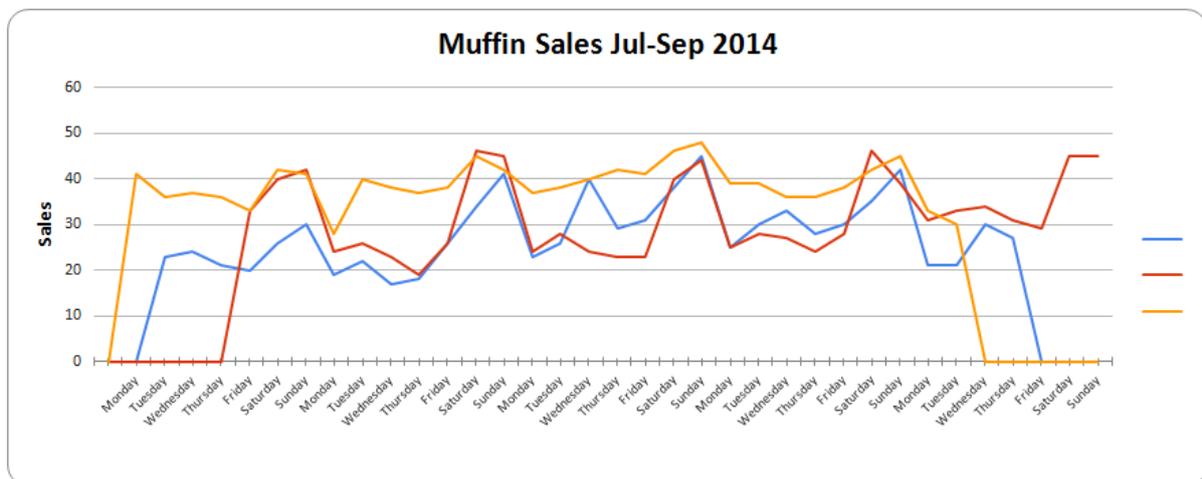
This activity may be carried out with step by step guidance, or by allowing the student to follow their own method of solution. The approach should be chosen in sympathy with students' skills and depth of understanding.

**Activity:**

A roadside 'coffee cart' offers drinks and muffins for sale.

To make a healthy profit, they need to make just enough muffins to nearly sell out by the end of the day.

Use the sales figures for the past three months to suggest how many muffins they should make for a typical day.



Muffin Sales Jul-Sep 2014			
	July	August	September
Monday			41
Tuesday	23		36
Wednesday	24		37
Thursday	21		36
Friday	20	33	33
Saturday	26	40	42
Sunday	30	42	41
Monday	19	24	28
Tuesday	22	26	40
Wednesday	17	23	38
Thursday	18	19	37
Friday	26	26	38
Saturday	34	46	45
Sunday	41	45	42
Monday	23	24	37
Tuesday	26	28	38
Wednesday	40	24	40
Thursday	29	23	42
Friday	31	23	41
Saturday	38	40	46
Sunday	45	44	48
Monday	25	25	39
Tuesday	30	28	39
Wednesday	33	27	36
Thursday	28	24	36
Friday	30	28	38
Saturday	35	46	42
Sunday	42	39	45
Monday	21	31	33
Tuesday	21	33	30
Wednesday	30	34	
Thursday	27	31	
Friday		29	
Saturday		45	
Sunday		45	
Mean Monthly	28	32	39

## The procedural approach

The student is able to form a summary of relevant statistics and to use these to make an appropriate recommendation.

Prompts from the teacher could be:

1. Consider how the data is grouped: by month and by weekday/weekend (type of day).  
Choose one of these categories in which to compare the data.
2. Find the maximum daily sales, by your chosen category.
3. Find the minimum daily sales, by your chosen category.
4. Find the range of daily sales, by your chosen category.
5. You may like to display the statistics you have found in a table or a graph.
6. What trend(s) can you see in the statistics you have listed?
7. Use these statistics and trends to make a recommendation for the number of muffins (in dozens) that should be baked for sale.

Range of Sales by Month

July	Max 45	Min 17	Range 28
August	Max 46	Min 19	Range 27
September	Max 48	Min 28	Range 20

\*Range is getting smaller  
so if we make the max  
number of muffins we  
are getting more likely to  
sell them.

Weekends are peaks on the graphs July and August but by September it is evening out to being about the same (smaller range).

\*\* I'd say make 48

## The conceptual approach

The student is able to form a summary of relevant statistics, to comment on any trends in the data and to use these to make an appropriate recommendation.

Prompts from the teacher could be:

1. Consider how the data is grouped: by month and by weekday/weekend (type of day).  
Choose one of these categories in which to compare the data.
2. Find, calculate and list all the relevant statistics.
3. You may like to display the statistics you have found in a table or a graph.
4. What trend(s) can you see in the statistics you have listed?
5. Use these statistics and trends to make a recommendation for the number of muffins (in dozens) that should be baked for sale.

