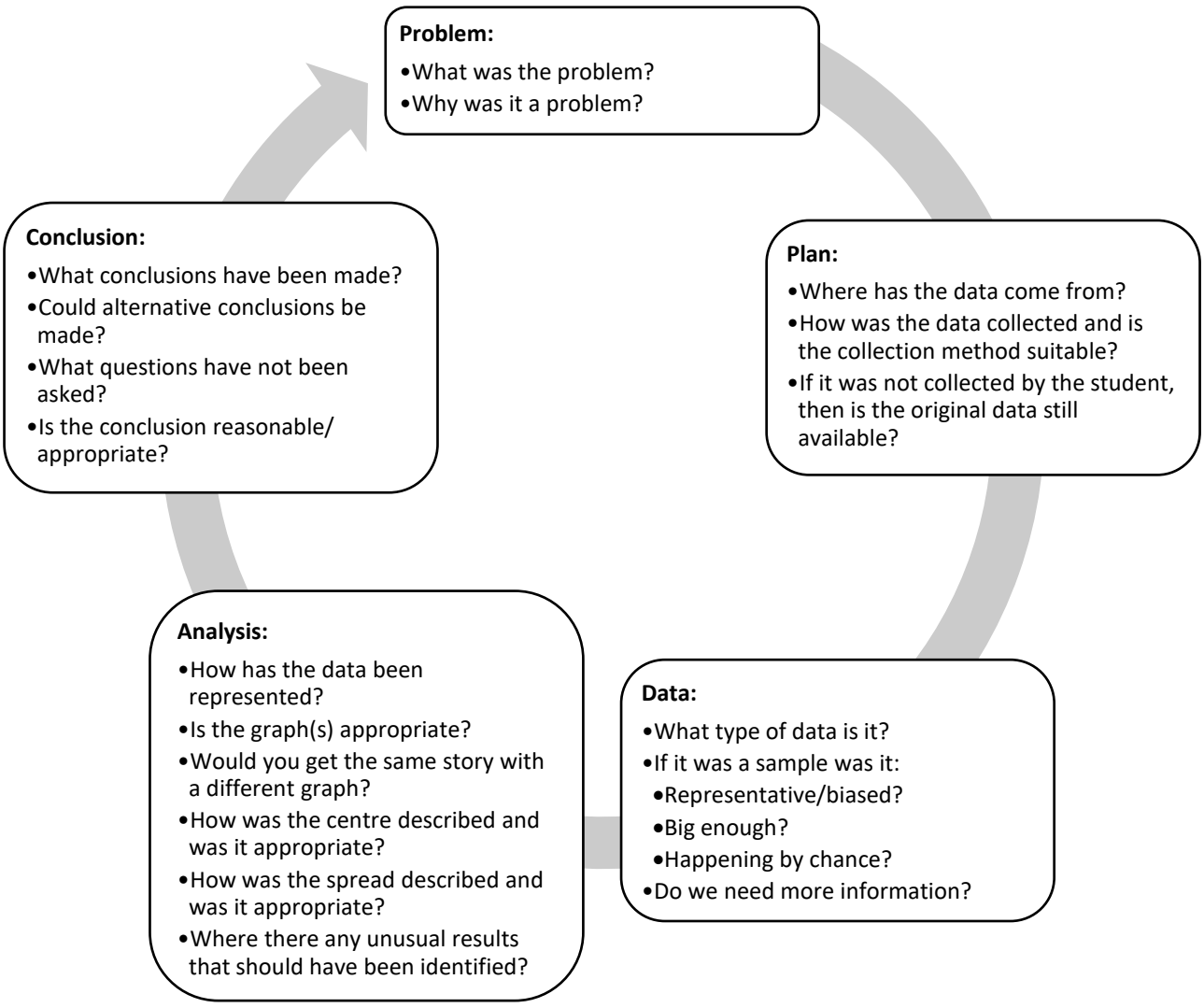
Interpreting Statistical and Chance Situations – Set 4 – Page 1

Ⓐ *Can **critique** other students statistical work and **evaluate** all components of the Statistical Enquiry Cycle within the student's work.*

Typically, students will need to ask the following questions about another student's work:



Using these questions students are aiming for improving other students work and the teacher would be asking: "What feedback could we give ……. to improve their investigation?"

The following methods need to be known:

- Table of Results
- Tally Chart
- Frequency Table
- Bar Chart – Both Single and Double
- Pictograms
- Pie Charts
- Strip Graphs
- Dot Plots
- Stem and Leaf – Including Back-to-Back
- Line Graphs
- Time Graphs
- Scatter Plots

Jake Wills, Olivia Walker-Wills and Vikki Clarke – 2021

INTERPRETING STATISTICAL AND CHANCE SITUATIONS – SET 4 – PAGE 2

Ⓐ *Can **critique** other students statistical work and **evaluate** all components of the Statistical Enquiry Cycle within the student's work.*

Example Statistical Investigation for Critiquing - Jake's Canteen Investigation Evaluations in Red

(note this report has been created to be bad to include a lot of critiquing opportunities!)

Jake does not like the school Canteen as it is very busy so the queues are too long, and they do not sell the food he likes as they are too healthy. 20 students is too few and his class is a biased sample

No clear problem stated, but can see why the investigation was done

He asks 20 students from his class the following questions:

1. How many times have you bought things from the school canteen this week?
   Would have been better to ask about queue times and when they went
2. How much have you spent at the canteen this week?
   Question not linked directly to the purpose
3. If you had a choice of to buy a pie or a sandwich for lunch which would you prefer?
   Assumes that "sandwich" is a healthy option

These are his results:

Student	Q1	Q2 ($)	Q3
1	7	8.00	Pie
2	0	0.00	Sandwich
3	5	10.30	Pie
4	2	2.50	Sandwich
5	3	14.00	Pie
6	5	21.00	Pie
7	6	20.00	Pie
8	1	1.50	Sandwich
9	4	18.70	Pie
10	20	65.00	Pie
11	3	7.80	Sandwich
12	5	11.75	Pie
13	6	19.30	Pie
14	7	14.00	Sandwich
15	0	0.00	Sandwich
16	3	13.50	Sandwich
17	2	12.00	Pie
18	0	0.00	Pie
19	4	6.50	Sandwich
20	3	4.50	Pie
Total	86	250.35	

Quest.3	Nos	%
Pie	12	60
Sandwich	8	40

Calculations:

The mean amount spent at the canteen per ~~week~~ visit = $ $\frac{250.35}{86}$ = *$2.90*

Number of visits to the canteen in order is

0 0 0 1 2 2 3 3 3 3 4 4 5 5 5 6 6 7 7 20

median

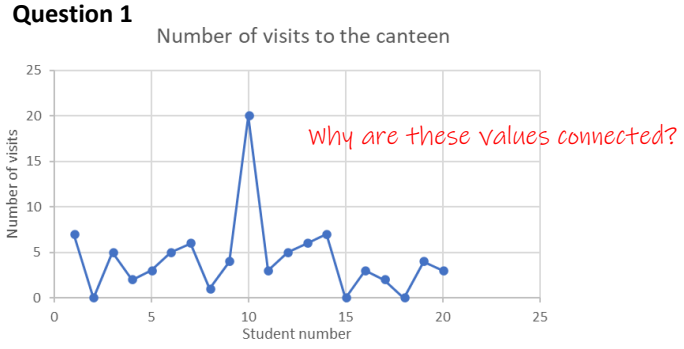
So the ~~mean~~ number of visits to the canteen in a week = 3.5

mean

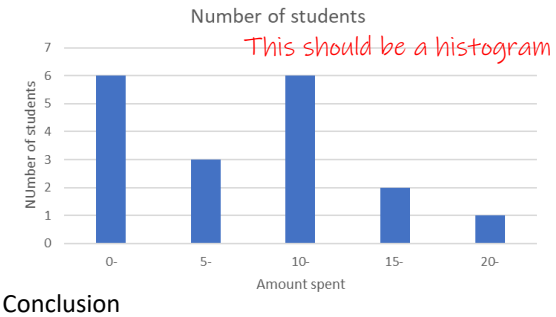
The ~~average~~ number of visits to the canteen in a week = $\frac{86}{20}$ = *4.3*

Is this correct for a weekly visit, or is it a monthly total?

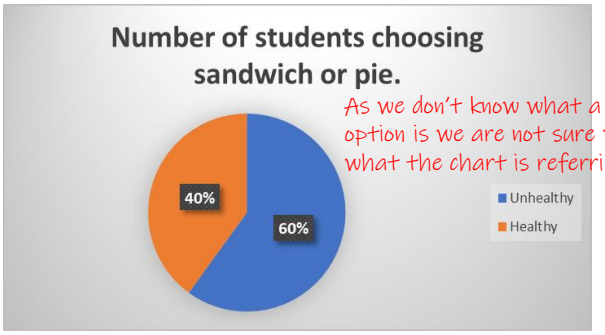
Question 1



Question 2



Question 3



Conclusion

From the above I can see that students would prefer to have unhealthy options in the canteen as 60% preferred to have a pie. If unhealthier options were increased, then the average amount spent in the canteen per week would increase and the average amount of times that people visited would increase and so the canteen would get more profit. No link between preference to pie (unhealthy option) and increase to money spent and times visited canteen

Jake Wills, Olivia Walker-Wills and Vikki Clarke – 2021

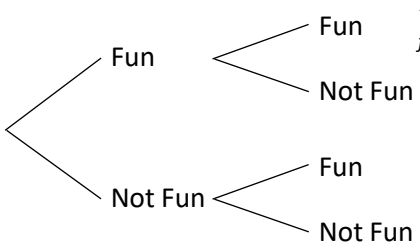
INTERPRETING STATISTICAL AND CHANCE SITUATIONS – SET 4 – PAGE 3

*Can **critique** other student's ideas on chance and evaluate chance situations using experiments and simple models.*

Example Investigation for Critiquing
(note this report has been created to be bad to include a lot of critiquing opportunities!)

After school Jake has a choice of doing homework, chores, play with friends or watch TV. He has time to do two activities and he considers playing with friends and watching TV as fun activities. Jake wants to see how many school evenings he could expect to do two fun activities in a school term of 10 weeks (50 school days)

Jake thinks that he would expect to have a quarter of the time doing two fun activities and draws the following diagram to explain his reasoning.



I have called the activities "Fun" and "Not Fun" and have put the fun activities together and the not fun activities together. This shows that one line out of four have two "Fun" and so the chance of having two fun activities is ¼ and a quarter of 50 is 12.5 so I would expect to have 12 – 13 days of two fun activities.

Is he correct?

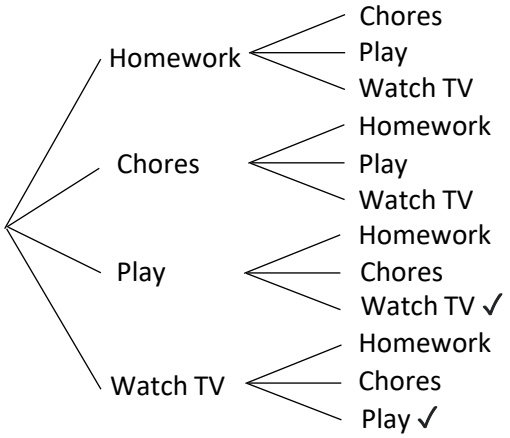
Olivia thinks that this is not correct and creates this experiment. She puts four coloured discs in the bag. Each disc represents an activity.

Red = Homework
Green = Chores
Yellow = Play with friends
Blue = Watch TV

She notes down her results and then puts the discs back and repeats this activity 50 times. Her results are shown to the right.

Colour of discs	Tally	Frequency
RED + GREEN	𝍸|	7
BLUE + GREEN	𝍸𝍸|	11
RED + BLUE	𝍸||	8
BLUE + YELLOW	𝍸|	7
RED + YELLOW	𝍸|||	9
GREEN + YELLOW	𝍸|||	8
	Total	50

These results are lower than what Jake would expect with his reasoning and so Olivia redraws his diagram without putting the activities together.



Reasoning We can see that there are only two lines out of twelve that give Jake 2 fun activities and so he should expect 8-9 evenings where he does two fun activities as $\frac{2}{12} \times 50 = 8.3333$

This is similar to Olivia's results she has gathered but she says that she would expect some variation between the predictions and the experiment especially as she only did the experiment 50 times.

Jake Wills, Olivia Walker-Wills and Vikki Clarke – 2021