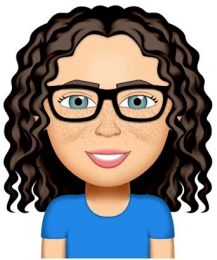


Level 2 Inference Workbook **ANSWERS**



**By Kathie Albertson
& Liz Sneddon**

Exercise 1:

- 1) Students would write their own description here.
E.g., Students aged between 13 and 18 years old, both genders, a mixture of ethnicities with the majority being _____. The population at school also includes staff, who are between the ages of 20 and around 70 years old, both genders, a mixture of ethnicities, etc. There are a lot more students than staff.
- 2) A census costs a lot of money and takes a long time to collect the data. A sample takes a lot less time and a lot less money.
- 3) The government has to make decisions about spending billions of taxpayer money each year. For example, they need to decide on what schools need to be built or expanded depending on the population growth in different areas, what funding to allocate to hospitals, roading, and many other initiatives.
- 4) B. Every person in the United States.
- 5) D. A selection of 3,294 people who bought the album.
- 6) B. All of the website visitors.
- 7) C. A selection of voters of different ages.

Exercise 2:

Suggestive words	Definitive words
<i>Maybe</i> <i>Suggest</i> <i>Likely</i> <i>May</i> <i>Might</i> <i>Can</i> <i>Tends</i> <i>Possible</i> <i>etc.</i>	<i>Prove</i> <i>Definitely</i> <i>Will</i> <i>Must</i> <i>Have to</i> <i>etc.</i>

Exercise 3:

- 1) Numeric Variables: Length, number of marbles, stretched length, weight.
Categorical Variables: Elastic type, did it hit obstacles.
- 2) Numeric Variables: Minutes, Stridelenlength
Categorical Variables: Gender, AgeGroup

Exercise 4:

- 1) It is important to distinguish between gender and sex because we want to have accurate and reliable data, and many people are not sure of the difference between these when questions are asked, so in order to get the best quality data, we need to be clear what information we want to collect and make it clear to the respondents what data is required.
- 2) Some of the issues when analysing and drawing conclusions for existing datasets are:
- When respondents have selected/recorded male/female, this data may not be very accurate or reliable.
 - Some respondents may not have answered this question as they do not wish to identify as either male or female (e.g., intersex, non-binary, etc.).
 - Some respondents may not have correctly answered this question as they may have selected an answer society expects rather than one they identify as.
 - Some respondents will be unsure about whether this is asking for gender or sex.
- These things lead to data that is not accurate and is not representative of the population. It is an approximation that will give some useful analysis or conclusions, but they will not be completely reliable and valid.

Exercise 5:

1)

Categorical variable	Method of transport to school
Two groups being compared	students who bus and students who walk to school
Numerical variable and units	travel time in minutes
Direction	Larger time for students who bus
Population definition	ALL high school students in NZ, for data from Census at School in 2015.

2) a)

Categorical variable	Gender
Numerical variable and units	Height (cm)
Median	No
Direction	Boys are taller than girls
Population definition	ALL 8-year-olds in NZ
Rewritten question	I wonder if the median height (cm) for 8-year-old boys is greater than the median height (cm) for 8-year-old girls, for ALL primary school students in NZ, for data from Census at School in 2015.

b)

Categorical variable	Gender
Numerical variable	Right foot length (cm)
Median	No
Direction	Males have longer right foot than females
Population definition	ALL 18-year-olds in NZ
Rewritten question	I wonder if the median right foot length (cm) is greater for male students than for female students for ALL 18-year-old high school students in NZ, for data from Census at School in 2015.

c)

Categorical variable	gender
Numerical variable	School bag weight (no units)
Median	No
Direction	missing
Population definition	missing
Rewritten question	I wonder if the median school bag weight (g) is greater for female students than for male students for ALL high school students in NZ, for data from Census at School in 2015.

d)

Categorical variable	gender
Numerical variable	Number of text messages sent per day
Median	No
Direction	missing
Population definition	missing
Rewritten question	I wonder if the median number of text messages sent per day for teenage girls is greater than the number of text messages sent per day by teenage boys for ALL 13–18-year-old high school students in Auckland, NZ, for data from Census at School in 2015.

3)

- I wonder if the median marathon time (minutes) for male athletes is faster than the median for marathon time (minutes) for female athletes, for ALL marathon runners in NZ, for data from (name source, not given here).
- I wonder if the median average stride length for a marathon (in cm) for male athletes is longer than the median average stride length for a marathon (in cm) for female (athletes, for ALL marathon runners in NZ, for data from (name source, not given here).
- I wonder if the median marathon time (minutes) for younger (under 40) athletes is faster than the median for marathon time (minutes) for older (over 40) athletes, for ALL marathon runners in NZ, for data from (name source, not given here).
- I wonder if the median average stride length for a marathon (in cm) for younger (under 40) athletes is longer than the median average stride length for a marathon (in cm) for older (over 40) athletes, for ALL marathon runners in NZ, for data from (name source, not given here).

4)

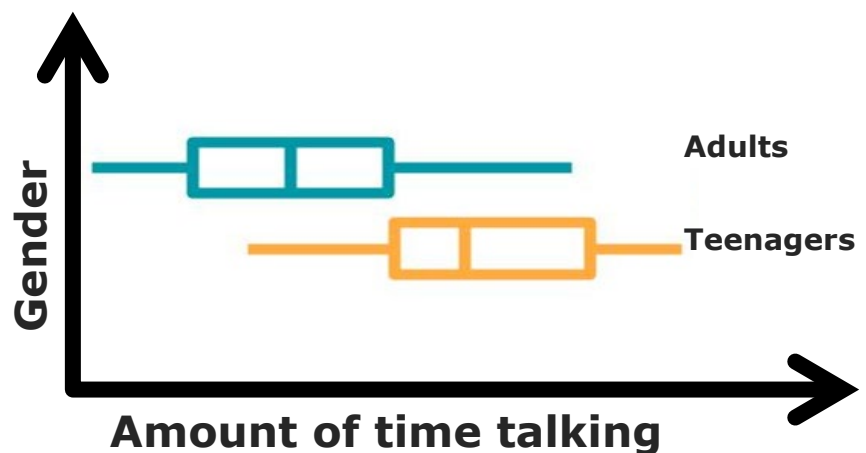
- I wonder if the median weights (kg) for New Zealand players are heavier than the median weights (kg) for South African players, for ALL (rugby players in NZ and SA for 2015/16 season), for data from <http://www.rugby-sidestep-central.com/>
- I wonder if the median weights (kg) for Forwards players is heavier than the median weights (kg) for Back players for ALL (rugby players in NZ and SA for 2015/16 season), for data from <http://www.rugby-sidestep-central.com/>
- I wonder if the median height (m) for New Zealand players is taller than the median height (m) for South African players, for ALL (rugby players in NZ and SA for 2015/16 season), for data from <http://www.rugby-sidestep-central.com/>
- I wonder if the median height (m) for Forwards players is taller than the median height (m) for Back players, for ALL (rugby players in NZ and SA for 2015/16 season), for data from <http://www.rugby-sidestep-central.com/>

Exercise 6:

1)

Hypothesis:

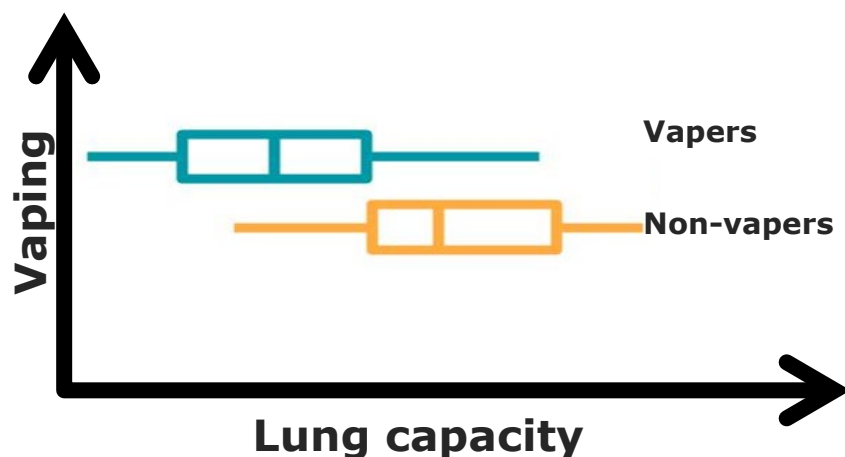
I expect that teenagers tend to spend more time talking each day than adults, because teenagers tend to have more free time to text and call their friends as adults tend to spend a lot of hours working or looking after the family.



2)

Hypothesis:

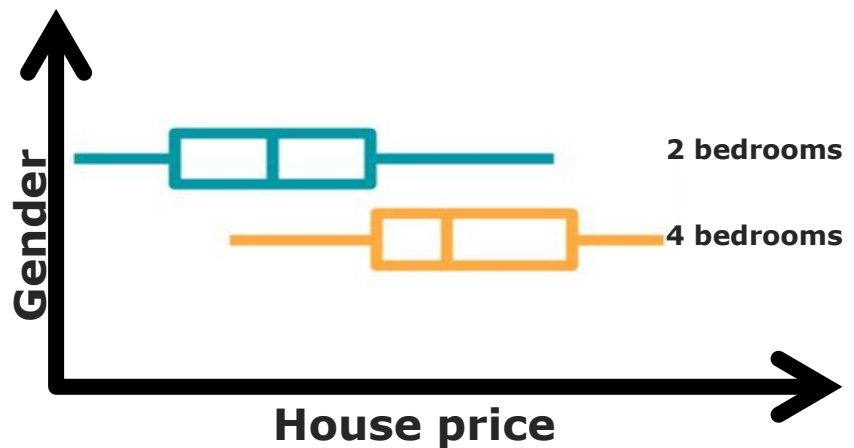
I expect that teenagers who vape are likely to have smaller lung capacities than teenagers who don't vape as vaping affects the health of a person's lungs, due to the chemicals in vapes.



3)

Hypothesis:

I expect that 4-bedroom homes will tend to have a higher price than 2-bedroom homes as they are likely to be larger as well as having more bedrooms, which is likely to increase the price as larger floor areas of houses means that it will have cost more to build, and therefore will be expected to sell for higher prices.



Exercise 7:

Each student will have a different sample.

Exercise 8:

1)

	Sampling method	Random or biased
a)	Systematic	Random
b)	Self-selected	Biased
c)	Convenience	Biased
d)	Stratified	Random
e)	Cluster	Random
f)	Simple random	random

2) You could have a copy of the class roll and roll until you get a number higher than 2. Let's call the random number n . Put a tick beside every n th student. If you go through the class list and need more students for your sample, skip the students already chosen, and start again from the beginning of the roll choosing n th students.

(There are many other possible answers, but they must involve randomly generating a way of selecting)

3) Split the class group into male and female students. Within each gender group, toss the coin for each student. Heads means they are "in", tails mean they are "out" of the sample. If too few in the sample, go back to the "out" students and re-toss the coin, similarly if too many are in the sample, re-toss for the "in" group and some will be re-allocated too "out".

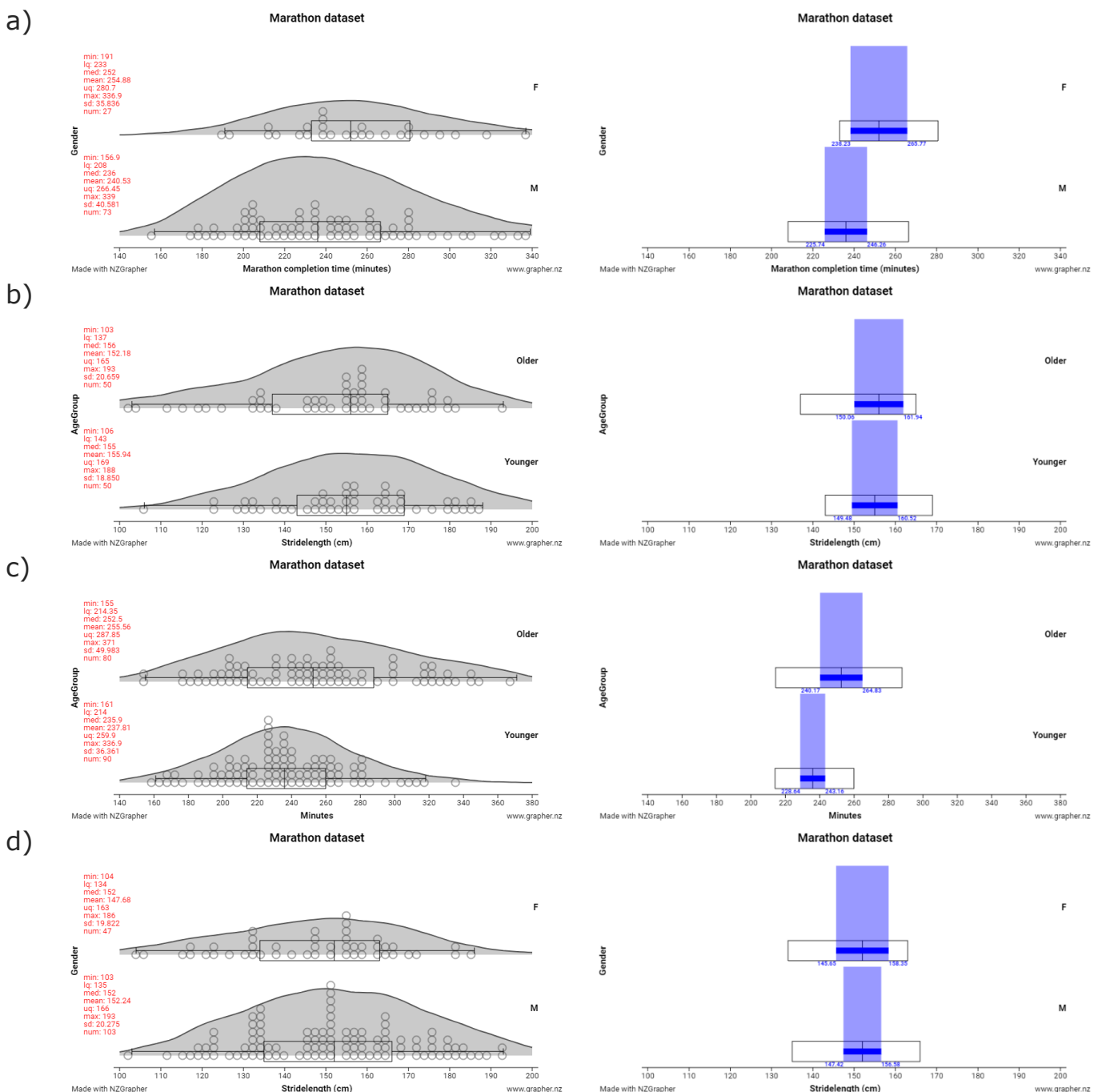
Exercise 9:

- 1) a) Smaller sample sizes take a **shorter** time to collect data but are **less** precise.
b) Larger sample sizes take a **longer** time to collect data and are **more** precise.
- 2) No they should be in a similar ratio to the proportion of each gender at the school. They don't have to be exactly the same.

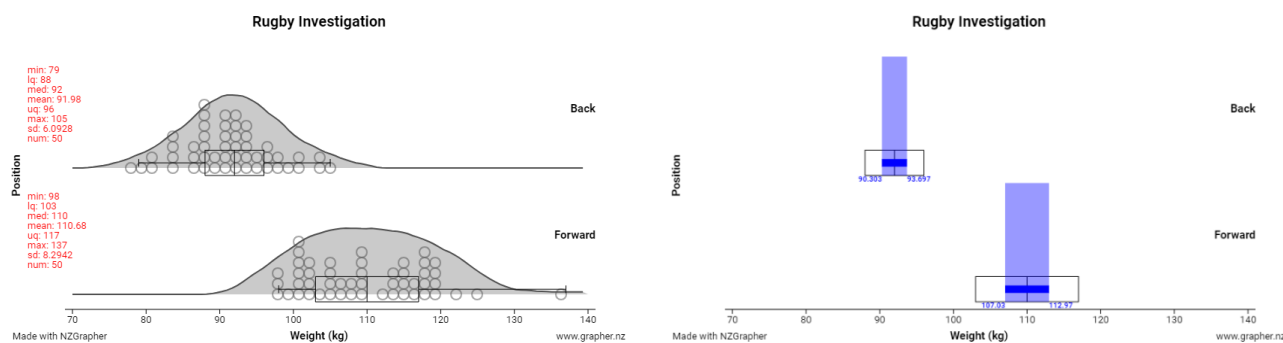
Exercise 10:

Graphs will vary depending on the sampling method and random selection of data. Here are some examples.

1)



- 2) Students need to select 2 variables, so their descriptions and graphs will differ slightly to this example.
- a) I will go to the "Sample and more" menu and select the first option "Sample". I then will select the variable "Position" and enter a sample size of 50 for both the forwards and the backs, giving a stratified sample of 50 of each categorical variable.
- b)



Exercise 11:

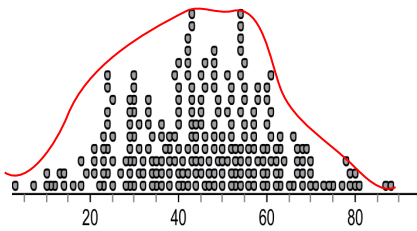
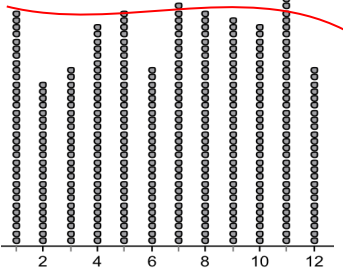
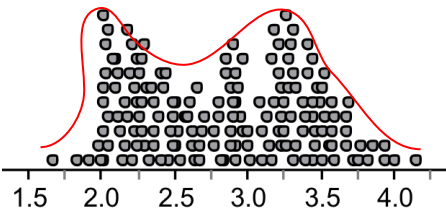
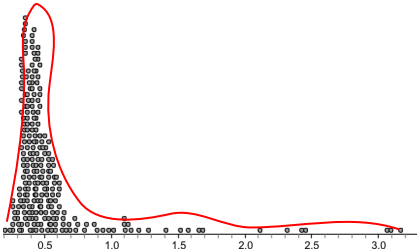
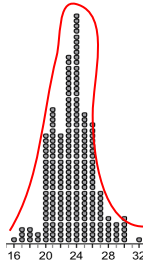
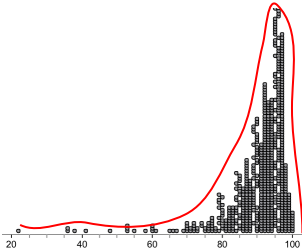
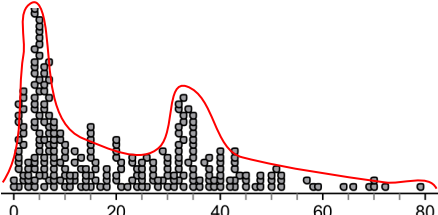
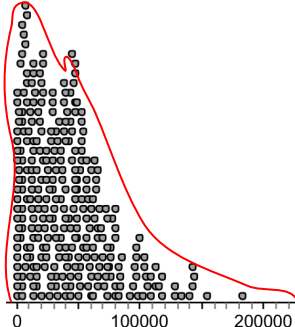
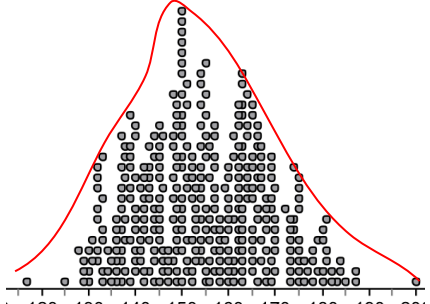
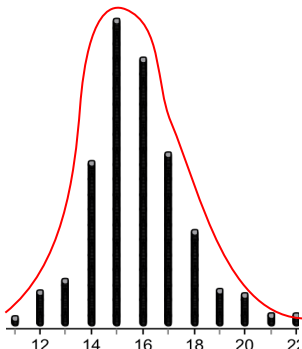
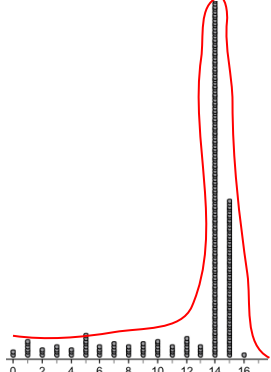
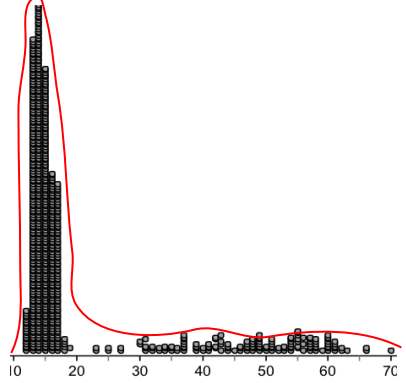
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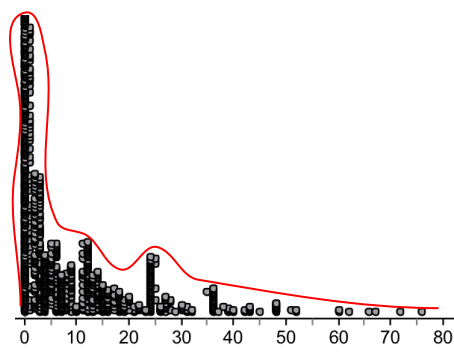
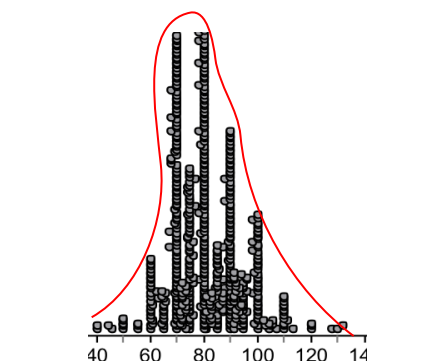
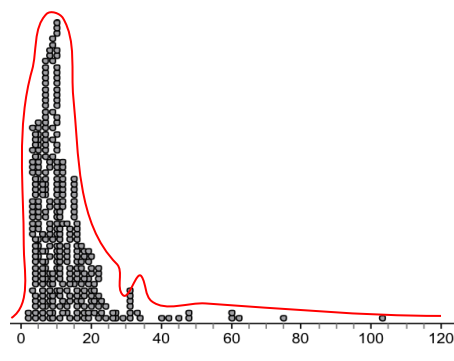
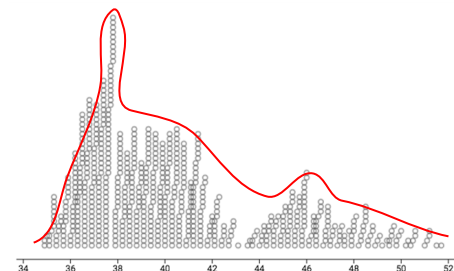
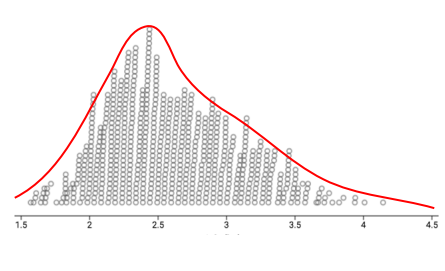
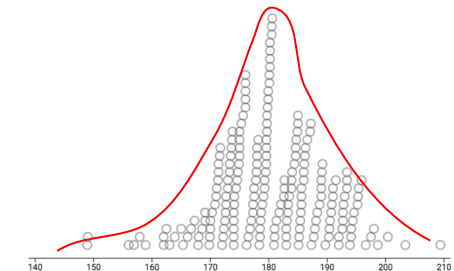
Ordered data	2, 3, 4, 4, 6, 8, 9
Minimum	2
Maximum	9
Median	4
Mean	5.14 (2.d.p.)
LQ	3
UQ	8
IQR	$8 - 3 = 5$

2)

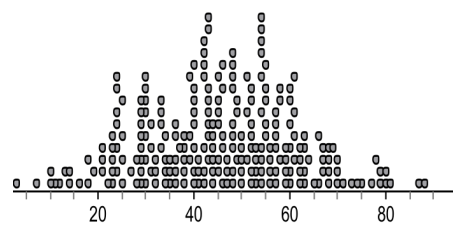
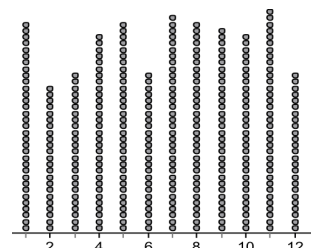
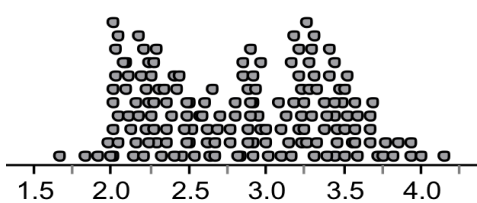
Ordered data	1.5, 2.0, 2.2, 2.9, 3.3, 3.5, 4.2, 4.4, 4.4, 4.7, 6.7
Minimum	1.5
Maximum	6.7
Median	3.5
Mean	3.618 (3.d.p.)
LQ	2.2
UQ	4.4
IQR	$= 4.4 - 2.2 = 2.2$

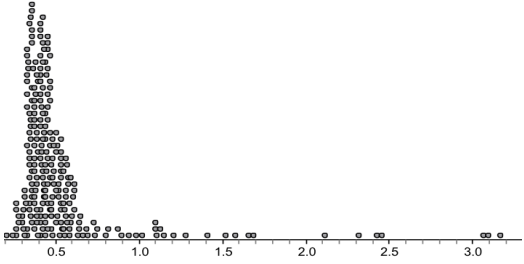
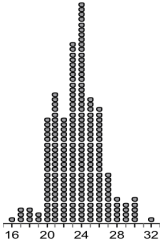
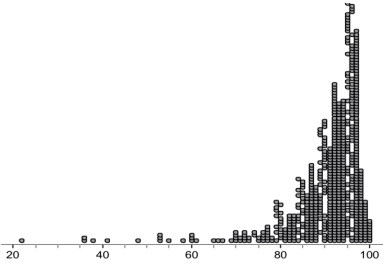
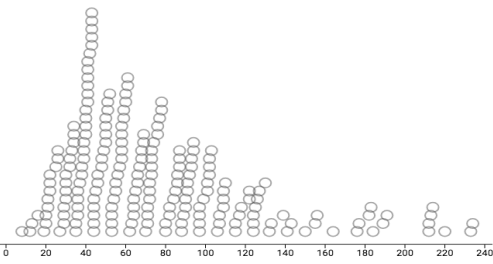
Exercise 12:

1. 	2. 	3. 
Normal (bell-shaped curve)	Uniform	Bimodal
4. 	5. 	6. 
right skew	Normal (bell-shaped curve)	left skew
7. 	8. 	9. 
Bimodal, right skew	right skew	Normal (bell-shaped curve)
10. 	11. 	12. 
Normal (bell-shaped curve)	left skew	right skew,

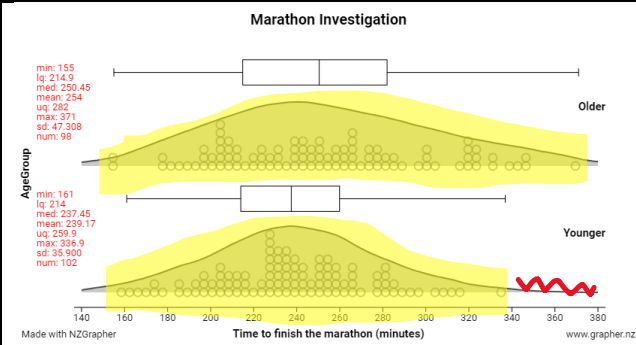
13. 	14. 	15. 
right skew	Normal (bell-shaped curve)	right skew
16. 	17. 	18. 
right skew, bimodal	slight right skew	slight left skew

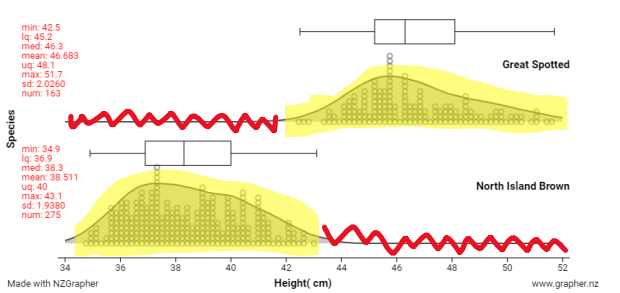
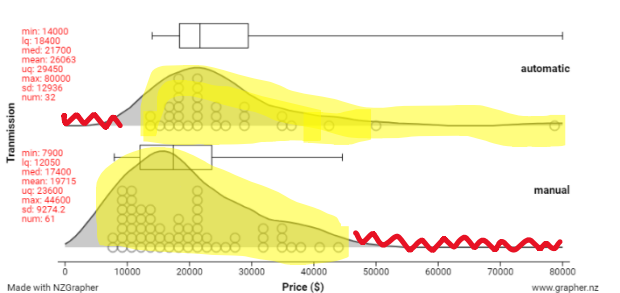
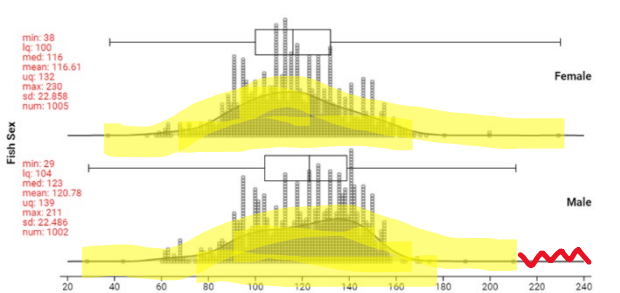
Exercise 13:

	Symmetric: No Number of peaks: 1 Bell shaped curve: Yes Tails: N/A
	Symmetric: Yes Number of peaks: 0 Bell shaped curve: No Tails: N/A
	Symmetric: No Number of peaks: 2 Bell shaped curve: No Tails: N/A

	Symmetric: No Number of peaks: 1 Bell shaped curve: No Tails: Right hand tail longer
	Symmetric: Yes Number of peaks: 1 Bell shaped curve: Yes Tails: N/A
	Symmetric: No Number of peaks: 1 Bell shaped curve: No Tails: Left hand tail longer
	Symmetric: No Number of peaks: 1 Bell shaped curve: No Tails: Right hand tail longer

Exercise 14:

a)  Older min: 155 lq: 214.9 med: 250.45 mean: 254 uq: 282 max: 371 sd: 47.908 num: 98 Younger min: 161 lq: 214 med: 237.45 mean: 239.17 uq: 259.9 max: 336.9 sd: 35.900 num: 102 Made with NZGrapher Time to finish the marathon (minutes) www.grapher.nz	The time to complete a marathon for older competitors has a right skewed shape, with the marathon times being unimodal, asymmetrical with a longer tail on the right-hand side. The time to complete a marathon for younger competitors is approximately Normal because the marathon times are unimodal and symmetrical with a bell-shaped curve.
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b)	Kiwi Investigation  Species Great Spotted North Island Brown Height (cm) Made with NZGrapher www.grapher.nz min: 42.5 lq: 45.2 med: 46.3 mean: 46.683 uq: 48.1 max: 51.7 sd: 2.0260 num: 163 min: 34.9 lq: 36.9 med: 38.3 mean: 38.511 uq: 40 max: 43.1 sd: 1.9380 num: 275	The shape of the heights of Great Spotted kiwis is a right skewed shape because it is unimodal, asymmetrical, with a longer tail on the right-hand side. The shape of the heights of North Island Brown kiwis is also right skewed, with a unimodal, asymmetrical shape with the heights more spread out on the right-hand side.
c)	Car Investigation  Transmission automatic manual Price (\$) Made with NZGrapher www.grapher.nz min: 14000 lq: 18400 med: 21700 mean: 22063 uq: 29450 max: 80000 sd: 12936 num: 32 min: 7000 lq: 12050 med: 17400 mean: 19715 uq: 23600 max: 44600 sd: 9274.2 num: 61	The shape of prices of automatic cars is right skewed because the prices are more spread out on the right-hand side, and there is one peak and asymmetrical. The shape of prices of manual cars is also right skewed because the prices are unimodal, asymmetrical and have a longer tail on the right-hand side.
d)	Shark Investigation  Fish Sex Female Male Total Length (cm) Made with NZGrapher www.grapher.nz min: 98 lq: 100 med: 116 mean: 116.61 uq: 132 max: 228 sd: 22.858 num: 1005 min: 29 lq: 104 med: 123 mean: 120.78 uq: 139 max: 211 sd: 22.486 num: 1002	The shape of lengths of female sharks is slightly right skewed as the lengths are unimodal, asymmetrical and the lengths are more spread out on the right-hand side. The shape of lengths of male sharks is roughly Normal, because the lengths are roughly symmetrical, unimodal and the tails are similar lengths.

Exercise 15:

1)	Median marathon time for Older runners	250.45
	Median marathon time for Younger runners	237.45
	Which group has a longer median time?	older
	Difference in median times	13 minutes

In the sample, the median marathon time for older runners (250.45 minutes) is longer than the median marathon time for younger runners (237.45 minutes) by 13 minutes. Older runners may take longer to finish because they are more likely to be carrying injuries as the body takes longer to heal as you get older. In addition, younger people may be faster runners as their muscles are stronger and the fibres in the muscles are much stronger.

2)	Median height for Great Spotted kiwis	46.3 cm
	Median height for North Island Brown kiwis	38.3 cm
	Which group has a larger median height?	Great Spotted
	Difference in median height	8 cm

In the sample, the median height of Great Spotted kiwis (46.3 cm) is taller than the median height of North Island Brown kiwis (38.3 cm), by 8 cm. Great spotted kiwis may be taller because of the environment that they live in and their genetics.

- 3) The median price of an automatic car in our sample is \$21,700 which is more expensive than the median price of a manual car, \$17,400 by \$4300. Automatic cars may have a higher price as the gears are more complicated and therefore more costly than manual cars.
- 4) The median length of female sharks (116 cm) is shorter than the median length of male sharks (123 cm) by 7 cm. It may be that male sharks are longer as they are likely to have the role of protecting the female and baby sharks and being bigger is an evolutionary advantage of this.

Exercise 16:

1)	IQR for older runners	$= 282 - 214.9 = 67.1$ minutes
	IQR for younger runners	$= 259.9 - 214 = 45.9$ minutes
	Compare spread	☐ Older runners' times spread a little wider

The spread of the middle 50% of the times for older people to run a marathon is a bit more spread out than the middle 50% of times that younger people take to run a marathon, for my sample.

2)

IQR for Great Spotted kiwis	$48.1 - 45.2 = 2.9 \text{ cm}$
IQR for North Island Brown kiwis	$40 - 36.9 = 3.1 \text{ cm}$
Compare spread	☐ About the same

In the sample, the spread of the middle 50% of heights for Great Spotted kiwis is similar to the spread of heights for North Island Brown kiwis.

3) IQR (automatic) = $29450 - 18400 = \$11,550$

IQR (manual) = $23600 - 12050 = \$11,500$

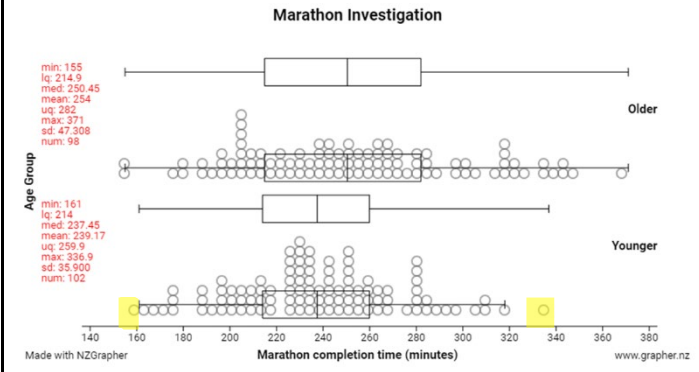
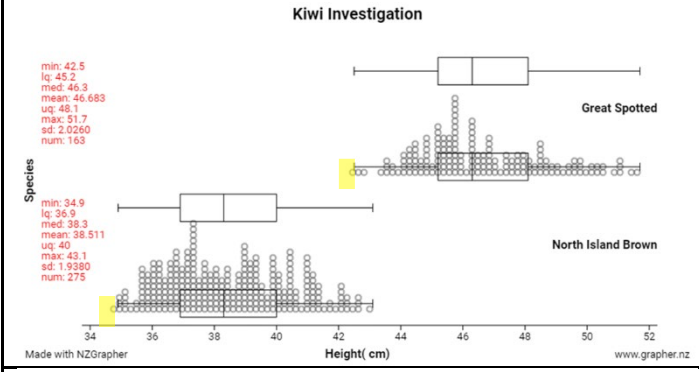
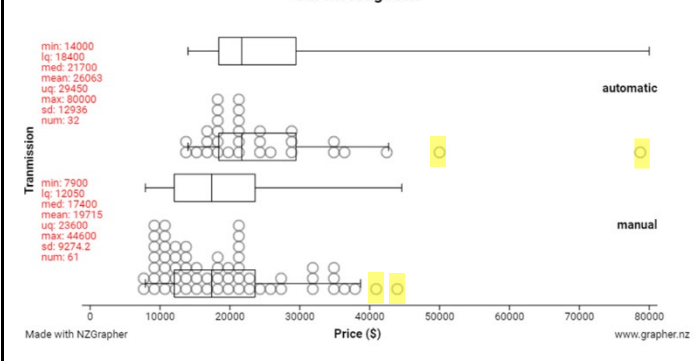
The spread of the middle 50% of the prices of automatic cars is similar to the spread of prices of manual cars, for my sample.

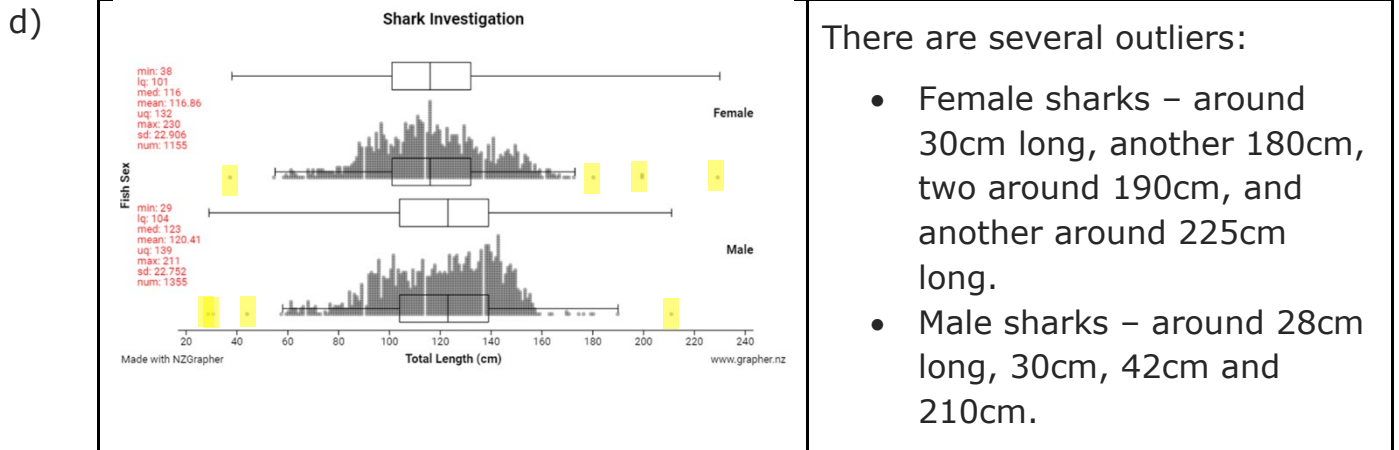
4) IQR (Female) = $132 - 101 = 31 \text{ cm}$

IQR (Male) = $139 - 104 = 35 \text{ cm}$

The spread of the middle 50% of lengths of female sharks is similar to the middle 50% of lengths of male sharks, for my sample.

Exercise 17:

a)	 Marathon Investigation Age Group Older Younger Marathon completion time (minutes) Made with NZGrapher	There are two outliers in the younger marathon runners, one is a person who completed it in a short time of 160 minutes, and the second is a runner who took around 335 minutes to complete the marathon – longer than expected.
b)	 Kiwi Investigation Species Great Spotted North Island Brown Height (cm) Made with NZGrapher	There is one outlier of a great spotted kiwi shorter than expected at around 42 cm tall. There is a second outlier with a North Island Brown kiwi who is shorter than expected at around 34.5 cm.
c)	 Car Investigation Transmission automatic manual Price (\$) Made with NZGrapher	There are several outliers: - Two automatic cars, one that sold for around \$80,000, the other around \$50,000, - Two manual cars, one sold for around \$40,000 and the second around \$45,000.

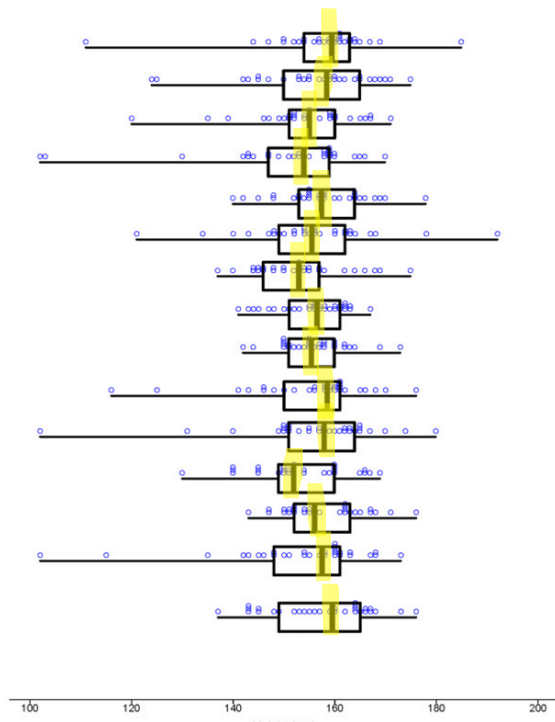


Exercise 18:

- a) In my sample I notice:
- The shape of travel time for both students who go to school on the bus and those who walk, is skewed to the right, as the travel times are unimodal, asymmetrical and a longer tail on the right-hand side.
 - The median travel time for students who travel by bus (30 minutes) is longer than the median travel time for students who walk to school (12 minutes) by 18 minutes. It is possible that students who walk to school live close by and therefore their travel time is shorter, while students who catch the bus live further away and therefore have a longer travel time.
 - The spread of the middle 50% of travel times for students who come to school on the bus ($IQR = 40 - 17 = 23$ minutes) is nearly twice the spread of the middle 50% of travel times for students who walk to school ($IQR = 20 - 5 = 15$ minutes).
 - There are 5 students who travels by bus who are outlier, there are four who only take around 3 minutes and one who takes 90 minutes to travel to school. There are 5 students who walk to school who are outliers, there are three who take around 45 minutes to walk to school, one who takes around 50 minutes and another who takes around 70 minutes to walk to school.
- b) In my sample I notice:
- The shape of ages of students who don't have a device is approximately normal as the ages are unimodal, symmetric and a bell shaped curve. The shape of ages of students who do have a device is left-skewed as the ages are unimodal, asymmetric and has a longer tail on the left-hand side.
 - The median age of students who don't have a device is 11 years old, which is 2 years younger than the median age of students who do have a device (13 years old). It is likely students get a device when they get to high school so that may be the reason that students with a device tend to be older than those without a device.
 - The spread of the middle 50% of ages of students with a device ($IQR = 15 - 12 = 3$ years) is similar to the spread of the middle 50% of ages of students without a device ($IQR = 13 - 10 = 3$ years).
 - There are no outliers in the dataset.

Exercise 19:

a)



- b) No, each sample will have different people selected at random.
- c) Every sample contains slightly different combinations of members of the original population, so has slightly differing median, mean etc.
- d) The medians vary between around 150cm and 160cm.
- e) The sample medians are quite close to the population median. None of them is a long way away. Some are slightly higher, some slightly lower, but none is more than about 5cm away from the population median.

Exercise 20:

The larger the sample size, the less variation in the median. The sample medians are much closer to the population median if we have a large sample size.

Exercise 21:

- 1) The median marathon time for older athletes is likely to be between 240 and 261 minutes, for ALL marathon runners in NZ.
The median marathon time for younger athletes is likely to be between 231 and 244 minutes, for ALL marathon runners in NZ.
- 2) The median height for Great Spotted Kiwis in NZ is likely to be between 46.0 and 46.6 cm, for ALL kiwis in NZ.
The median height for North Island Brown Kiwis in NZ is likely to be between 38.0 and 38.6 cm, for ALL kiwis in NZ.
- 3) The median cost for automatic cars is likely to be between \$18,770 and \$24,630 for ALL cars sold in America in 1993.
The median cost for manual cars is likely to be between \$15,182 and \$19,618 for ALL cars sold in America in 1993.
- 4) The median length of female sharks for older athletes is likely to be between 114.6cm and 117.4cm, for ALL sharks on the MPI database in NZ.
The median length of male sharks for older athletes is likely to be between 121.6cm and 124.4cm, for ALL sharks on the MPI database in NZ.

Exercise 22:

Sample size, n	Margin of error $1.5 \times \frac{1}{\sqrt{n}}$	Confidence Interval, (Limit 1, Limit 2)	Width of CI, Limit 2 - Limit 1
10	$1.5 \times \frac{1}{\sqrt{10}} =$	[9.5257, 10.4743]	0.9847
100	$1.5 \times \frac{1}{\sqrt{100}} =$	[9.85, 10.15]	0.3
1000	$1.5 \times \frac{1}{\sqrt{1000}} =$	[9.9526, 10.0474]	0.0949
10,000	$1.5 \times \frac{1}{\sqrt{10,000}} =$	[9.985, 10.015]	0.03
100,000	$1.5 \times \frac{1}{\sqrt{100,000}} =$	[9.9953, 10.0047]	0.0095

- a) it gets smaller
- b) width depends on size of Confidence interval, and width decreases as sample size increases

Exercise 23:

1)	Do the confidence intervals overlap?	Yes
	Can you make the call?	No

I do **NOT** have enough evidence that the median time it takes older people to complete a marathon is longer than the median time it takes younger people to complete a marathon, for all marathon runners in NZ.

2)	Do the confidence intervals overlap?	No
	Can you make the call?	Yes

I do have enough evidence that the median height for Great Spotted kiwis is taller than the median height for North Island Brown kiwis, for **ALL** kiwi birds from around NZ.

2)	Do the confidence intervals overlap?	No
	Can you make the call?	Yes

I do have enough evidence that the median height for males is taller than the median weight for female for ALL adults in NZ.

3)	Do the confidence intervals overlap?	Yes
	Can you make the call?	No

I don't have enough evidence that the median cost of automatic cars tends to be more than the median cost of manual cars, for ALL cars sold in America in 1993.

4)	Do the confidence intervals overlap?	No
	Can you make the call?	Yes

I do have enough evidence that the median length of female sharks tends to be shorter than the median length of male sharks, for ALL sharks on the MPI database in NZ.

Exercise 24:

If I took another sample the medians, UQ and LQ, would all be slightly different, as we would have different individuals in our samples. I would expect the medians to be similar, because the sample would still be coming from the same population. In this case, because the medians sometimes overlapped in the animation, I do not expect I could conclude that back in the population there is a difference in the medians for boys and girls.

Exercise 25:

1) Interpreting the confidence intervals.

I estimate that the median travel time for ALL High School students in NZ who travel by bus, is likely to be between 27 and 33 minutes.

I estimate that the median travel time for ALL High School students in NZ who walk to school, is likely to be between 10 and 14 minutes.

Answering the investigation question.

The confidence intervals do NOT overlap, which means that I can make the call. I have enough evidence that the median travel time of students who bus is likely to be greater than the median travel time of students who walk, for ALL High School students in NZ.

Sampling variability.

If I took another sample, I would get different travel times, as I would be collecting data from different students. I would expect though that the median travel time of students to be similar to the values I found in my sample. I also expect that my conclusion, that the median travel time of bus students is longer than the median travel time of students who walk for ALL students at High schools in NZ, to remain the same.

2) Interpreting the confidence intervals.

I estimate that the median age of students who don't have a device for ALL High school students in NZ, is likely to be between 11 and 12.1 years old.

I estimate that the median age of students who do have a device for ALL High school students in NZ, is likely to be between 13.7 and 14.3 years old.

Answering the investigation question.

The confidence intervals do NOT overlap, which means that I can make the call. I have enough evidence that the median age for students who do have a device is older than students who don't have a device for ALL High school students' schools in NZ

Sampling variability.

If I took another sample, I would get different ages, as I would be collecting data from different students. I would expect though that the median age of students at High schools in NZ is likely to be similar to the values I found in my sample. I also expect that my conclusion, that the median age of students who have devices is older than the median age of students who don't have devices for ALL students at High schools in NZ, to remain the same.

Exercise 26:

- 1) Other factors may include communication preferences, such as whether teenagers and adults prefer to chat on the phone or via online games etc. I suspect that teenagers are more likely to talk when they are gaming online through a desktop or laptop computer, whereas adults are more likely to do a facetime or audio phone call on their phones.

What type of plan teenagers have is likely to affect how much time they spend on their phone. If it is a prepay phone that they pay for themselves, they may be more likely to text rather than phone as it is cheaper. However, if they are on a monthly plan with unlimited calling time, they are more likely to spend more time on phone calls.

- 2) One factor that may affect the lung capacity of teenagers are things such as overall health, and in particular if they have any respiratory problems such as asthma. Teenagers whose health is not as good, or who have respiratory problems are likely to have smaller lung capacities than those teenagers who are healthy or don't have respiratory problems.

Another factor that may affect the lung capacity of teenagers is whether they were born a male or female, as males typically have larger lung capacities as their lungs are larger than females (females have smaller lungs as their reproductive organs take up more space in the body).

A third factor may be age or whether the teenager has gone through puberty yet. I expect that a teenager who is small or has not yet had a growth spurt is likely to have smaller lungs than a teenager who is older or has been through their puberty growth spurt.

- 3) There are a lot of factors that may affect the price of a house, other than the number of bedrooms. For example, the size of the land, the floor area of the house, whether it has a garage or not, the number of bathrooms, what the house is made of (e.g., brick, wood, etc.).

For example, a house with only a small piece of land is likely to cost less than a house with a larger piece of land. Typically, the more land you have, the bigger the house that can be built on that land is, therefore costing more to build and selling for a higher price.