

Census at School 2019/20 – Activity Pack Questions

Section 1 – Statistical Investigations

► Section 1: Activity 1

The CensusAtSchools 2019/20 questionnaire consists of 17 questions.

Read through each of the questions.

In your opinion what are the creators of the study trying to find out?

Formulate a question that could be added to the survey and give reasons for its inclusion.

► Section 1: Activity 2

Many of the questions of the questionnaire are designed to gain insight into the thoughts of young people on climate change.

Carry out a survey of another class in your school that focuses on this aspect of the study.

The survey should help you find out more about the opinions of the school regarding climate change and issues regarding the environment.

Do you think the opinions of other students in the school is the same or different that those in other parts of the world?

Do you think the views of students in the schools is different from that of their parents or grandparents?

► Section 1: Activity 3

The CensusAtSchools 2019/20 questionnaire consists of 17 questions.

Discuss possible methods for the distribution and collection of questionnaires to students in Ireland?

List some of the advantages and disadvantages of each.

► Section 1: Activity 4

Discuss possible methods for the distribution and collection of CensusAtSchools questionnaires to students in Ireland?

List some of the advantages and disadvantages of each.

Type	Advantages	Disadvantages
Online Form (Method Used for the CensusAtSchools 2019/20)		
Mail		
Telephone		
Face to Face		
Email		

► Section 1: Activity 5

We want to survey a random sample of 50 students in our school.

Complete the table to suggest a suitable strategy you could use for each of the following sampling types.

Sample Type	Method
Simple Random Sample	
Stratified Random Sample	
Systematic Random Sample	
Cluster Sample	

► **Section 1: Exam Question 1 – JCHL 2015 Q3 (c)**

Eithne is considering sending her survey by email.

State **one advantage** and **one disadvantage** of using email to collect data.

► **Section 1: Exam Question 2 – JCHL 2015 Q3 (b)**

Eithne is going to send her survey to some of the post-primary schools in Ireland.

Describe how Eithne could select a **Simple Random Sample** from all the post-primary schools in Ireland.

► **Section 1: Exam Question 3 – JCHL 2017 Q6 (d)**

Clara is worried that the students in her school are not a representative sample of all of the students in Ireland.

Explain why it is important to have a **representative** sample when doing statistical research.

► **Section 1: Exam Question 4 – JCHL 2014 Q5 (b)**

Clara is worried that the students in her school are not a representative sample of all of the students in Ireland.

Explain why it is important to have a **representative** sample when doing statistical research.

Margaret wants to examine if people prefer to do their weekly shopping in *Tesco*, *Dunnes Stores*, *SuperValu*, or *Lidl*. She stands outside her local *Lidl* shop for one day, and asks everyone as they leave the shop where they prefer to do their weekly shopping.

Give one reason why Margaret's data may be biased.

► **Section 1: Exam Question 5 – JCHL 2014S Q5 (iv)**

John is conducting a survey on computer usage by students at his school. His questionnaire asks "Approximately how long do you spend on social networking sites each week?".

He plans to carry out his survey by asking the question to twenty first-year boys on the Monday after the mid-term break.

Give two reasons why the results from John's question might not be as representative as those in the histogram.

Section 2 – Types of Data

► Section 2: Activity 1

Some of the questions in the CensusAtSchool 2019/2020 Questionnaire are shown in the table below.

Put a tick (✓) in the correct box to show what type of data each question would return.

	Numerical Continuous	Numerical Discrete	Categorical Nominal	Categorical Ordinal
1. Are you: <input type="checkbox"/> Female <input type="checkbox"/> Male				
2 (a). Please state your present age in completed years.				
5. What is your height in cm (without shoes)?				
10 (a). How concerned are you about climate change? Not at all Somewhat Very Much <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				
13. How many gold, silver and bronze medals do you think Ireland will win at the Olympic games in Tokyo 2020?				

► Section 2: Activity 2

Reread each of the questions in the CensusAtSchools 2019/20 Questionnaire.

What type of data is generated by each of the questions?

Are there any questions where it is hard to decide what type of data it is?

If so, how could we alter the question to make it easier to ascertain the data type.

► Section 2: Activity 3

Questions 13 through 15 in the CensusAtSchool 2019/2020 Questionnaire concern a popular upcoming event, the 2020 Tokyo Olympics.

Complete the table below by formulating one question you could ask about the 2020 Tokyo Olympics that would generate each type of data.

Type of Data	Question
Numerical Continuous	
Numerical Discrete	
Categorical Ordinal	
Categorical Nominal	

► Section 2: Exam Question 1 – JCHL 2015 Q3 (a)

Eithne is going to survey post-primary Geography teachers in Ireland.

Some of the questions in the survey are shown in the table below.

Put a tick (✓) in the correct box to show what type of data each question would give.

Question	Numerical Continuous	Numerical Discrete	Categorical Nominal	Categorical Ordinal
How many Geography classes do you teach each week?				
How much do you like teaching Geography? A lot A little Not at all <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				
What subjects (other than Geography) do you teach?				

► **Section 2: Exam Question 2 – JCHL 2014 Q5 (a)**

Students in a class are investigating spending in their local area. They carry out a different survey, and display the results.

John is investigating whether people pay for their weekly shopping with Credit Card, Debit Card, Cash, or Cheque.

When people tell him which one of these they usually use he writes it in a table. His results are shown below.

Credit Card	Debit Card	Debit Card	Cash	Debit Card
Credit Card	Cash	Cash	Credit Card	Debit Card
Debit Card	Debit Card	Cheque	Cash	Cash
Cash	Cash	Debit Card	Cash	Credit Card

What type of data has John collected? Put a tick (✓) in the correct box below.

Numerical
Continuous

☐

Numerical
Discrete

☐

Categorical
Nominal

☐

Categorical
Ordinal

☐

► Section 2: Exam Question 3 – JCHL 2017 Q6 (c)

Complete the table below to show one question in each case that Clara could ask that would generate each type of data. Each question should be about eating or exercise.

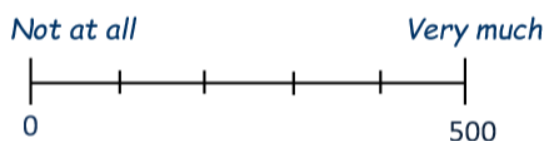
One is already filled in.

Type of Data	Question
Numerical continuous	
Numerical discrete	
Categorical ordinal	How healthy is your diet? Tick one box. Very healthy Fairly healthy Not very healthy Very unhealthy <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Categorical nominal	

► Section 2: Activity 4

Question 10 (a) of the 2019/2020 CensusAtSchools Questionnaire asks us how concerned we are about climate change. The strength of our concern can be ascertained by a position on a scale.

10. a) How concerned are you about climate change?



Discuss whether this question contains Numerical or Categorical data?

Can the data gathered be both numerical and categorical?

Section 3 – Measures of Central Tendency

► Section 3: Activity 1

Reread each of the questions in the CensusAtSchools 2019/20 Questionnaire.

For each of the questions decide whether the mean, median and mode can be found from a sample of results?

For those where the mean, median or mode cannot be found, give reasons as to why not.

► Section 3: Activity 2

Some of the questions in the CensusAtSchool 2019/2020 Questionnaire are shown in the table below.

Discuss the most appropriate measure of central tendency in each case.

Question	Appropriate Measure of Central Tendency	Reason
3. In what county do you live?		
5 (i). What is your height in cm (without shoes)?		
6. In all low-income countries across the world, what percentage of girls finish primary school? <input type="checkbox"/> 20 percent <input type="checkbox"/> 40 percent <input type="checkbox"/> 60 percent		
13. How many gold, silver and bronze medals do you think Ireland will win at the Olympic games in Tokyo 2020?		
16 (b). What was the most popular colour of car licensed in Ireland in 2018?		

► **Section 3: Exam Question 1 – JCHL 2014 Q5 (a)**

Students in a class are investigating spending in their local area. They carry out a different survey, and display the results.

John is investigating whether people pay for their weekly shopping with Credit Card, Debit Card, Cash, or Cheque.

When people tell him which one of these they usually use he writes it in a table. His results are shown below.

Credit Card	Debit Card	Debit Card	Cash	Debit Card
Credit Card	Cash	Cash	Credit Card	Debit Card
Debit Card	Debit Card	Cheque	Cash	Cash
Cash	Cash	Debit Card	Cash	Credit Card

(ii) Fill in the frequency table below.

Method of Payment	Credit Card	Debit Card	Cash	Cheque
Frequency				

(iii) What is the mode of John's data?

(iv) John says that he cannot find the mean of his data. Explain why this is the case.

► **Section 3: Activity 3**

The list below shows the heights (in cm) of the group of 24 2nd year students in our CensusAtSchool 2019/2020 Questionnaire.

154, 154, 155, 156, 156, 158, 159, 159, 160, 160, 163, 163

163, 164, 164, 168, 168, 169, 169, 171, 174, 176, 179, 188

Use the data to calculate the:

- (i) Mean height of students in the class
- (ii) Mode height of students in the class
- (iii) Median height of students in the class

► **Section 3: Exam Question 2 – JCHL 2018 Q6 (a)**

16 girls and 14 boys went on a school tour to Barcelona.

The weight of each student's bag (in kg) is shown in the tables below.

Girls			
5.8	6.3	6.9	7.6
7.8	8.0	8.1	8.7
9.1	9.4	9.5	9.6
9.8	9.8	9.8	11.3

Boys			
5.9	6.8	7.4	8.5
8.6	8.7	8.8	9.2
9.4	9.5	9.5	9.7
9.7	10.5		

The mean weight of the girls' bags was 8.6 kg, correct to one decimal place.

Work out the **mean weight** of the **boys'** bags, correct to one decimal place.

► **Section 3: Exam Question 3 – JCHL 2011 Q5**

The table below shows the distances travelled by seven paper airplanes after they were thrown.

Airplane	A	B	C	D	E	F	G
Distance (cm)	188	200	250	30	380	330	302

- (a) Find the median of the data.
- (b) Find the mean of the data.
- (c) Airplane D is thrown again and the distance it travels is measured and recorded in place of the original measurement. The median of the data remains unchanged and the mean is now equal to the median. How far did airplane D travel the second time?
- (d) What is the minimum distance that airplane D would need to have travelled in order for the median to have changed?

► **Section 3: Activity 4**

The table below shows the results of Q13 on the CensusAtSchool 2019/20 Questionnaire regarding the number of Gold medals students think Ireland will win at the Tokyo 2020 Olympics.

Use the table below to calculate the:

- (i) mean, (ii) mode and (iii) median number of Gold medals Ireland will win in the opinion of the students in the survey.

Number of Golds	0	1	2
Number of Students	3	13	8

13. How many gold, silver and bronze medals do you think Ireland will win at the Olympic games in Tokyo 2020?

Medal	Ireland won in 2012	Ireland won in 2016	Ireland will win in 2020
Gold	1	0	
Silver	1	2	
Bronze	4	0	

► Section 3: Activity 5

The table below displays the heights of 24 2nd Year students according to the results of Q5 of the CensusAtSchools 2019/20 questionnaire.

Height	150 - 155	155 - 160	160 - 165	165 - 170	170 - 175	175 - 180	180 - 185	185 - 190
Number of Students	2	6	7	4	2	2	0	1

Discuss possible methods of estimating the mean height of the students using only the grouped frequency table and then use this method to estimate that mean height.

Is the method involved a more or less accurate way of finding the mean than using all 24 values from the raw data.

Compare your answer to the mean calculated in Section 3: Activity 3.

In what interval do the modes and medians lie?

► Section 3: Exam Question 4 – JCHL 2018 Q6

The table below shows the amount of money that the 30 students spent at the airport.

Amount of money (€)	0 – 5	5 – 10	10 – 20	20 – 30	30 – 50	50 – 100	100 – 150
Number of students	5	4	7	8	3	1	2

[Note: 5 – 10 means €5 or more but less than €10, etc.]

(e) Use mid-interval values to estimate the mean amount of money spent.

Give your answer in euro, correct to the nearest cent.

(f) Use the values in the table to estimate the **median** amount of money spent, as accurately as you can. **Justify** your answer.

Remember that there were 30 students in total.

► **Section 3: Exam Question 5 – JCHL 2013 Q6**

The salaries, in €, of the different employees working in a call centre are listed below.

22 000 16 500 38 000 26 500 15 000 21 000 15 500 46 000
42 000 9500 32 000 27 000 33 000 36 000 24 000 37 000
65 000 37 000 24 500 23 500 28 000 52 000 33 000 25 000
23 000 16 500 35 000 25 000 33 000 20 000 19 500 16 000

(a) Use this data to complete the grouped frequency table below.

Salary (€1000)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of Employees							

[Note: 10 – 20 means €10 000 or more but less than €20 000, etc.]

(b) Using mid-interval values find the mean salary of the employees.

- (c)
- (i) Outline another method which could have been used to calculate the mean salary.
 - (ii) Which method is more accurate? Explain your answer.

Section 4 – Measures of Spread

► Section 4: Activity 1

Reread each of the questions in the CensusAtSchools 2019/20 Questionnaire.

For each of the questions decide whether the range can be found from a sample of results?

For those where the range cannot be found, give reasons as to why not.

► Section 4: Activity 2

The table below shows the maximum and minimum values of some of the answers of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.

Work out the **range** of the data in each case.

Question	Minimum	Maximum	Range
Please state your present age in completed years.	13	15	
What is your height (to the nearest cm)?	154 cm	188 cm	
What is the span of your hand (to the nearest tenth of a cm)?	14.3 cm	21.9 cm	
What is your vertical reach (to the nearest cm)?	189	229	
What is your length of right foot (to the nearest tenth of a cm)?	19.1	28.5	
What is your circumference of right wrist (to the nearest cm)?	15.1	21.5	
How many bronze medals do you think Ireland will win at the Olympic games in Tokyo 2020?	6	1	

► Section 4: Activity 3

The list below shows the lengths of right foot (in cm) of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.

19.8, 19.1, 20.5, 20.3, 23.8, 23.9, 23.0, 23.5, 23.0, 26.1, 24.2, 24.2

23.5, 26.9, 21.2, 28.5, 22.2, 22.1, 26.1, 21.3, 19.9, 25.4, 26.2, 21.3

Work out the **range** of the data.

► Section 4: Exam Question 1 – JCHL 2018 Q5A (i)

The list below shows the time (in minutes) taken by 12 students to solve a maths problem.

3, 5, 6, 7, 9, 9, 10, 12, 13, 14, 14, 15

Work out the **range** of the data.

► Section 4: Activity 4

The list below shows the vertical reach (in cm) of the group of 14 female second year students in our CensusAtSchool 2019/2020 Questionnaire. The data has already been ranked from lowest to highest.

189, 194, 194, 196, 197, 197, 200, 205, 206, 208, 209, 218, 224

Use the data to calculate the:

- (a) Find the median vertical reach of female students in the class?
- (b) Find the lower quartile.
- (c) Find the upper quartile and hence the interquartile range.

► Section 4: Exam Question 2 – JCHL 2018 Q5A (ii)

The list below shows the time (in minutes) taken by 12 students to solve a maths problem.

3, 5, 6, 7, 9, 9, 10, 12, 13, 14, 14, 15

Work out the **inter-quartile range** of the data.

Section 4B – Standard Deviation

► Section 4B: Activity 1

The lists below show the length of the circumference of right wrist for a group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire. The data is split by gender.

Female

20.2, 15.1, 21.5, 19.1, 17.5, 16.3, 15.5, 19.2, 18.2, 15.7, 18.1, 15.1, 16.6, 15.5

Male

18.9, 16.4, 16.5, 21.2, 16.0, 17.1, 20.2, 19.0, 16.3, 18.5

Calculate the mean (μ) and standard deviations (σ) for each group and comment on which group has a greater spread of right wrist lengths.

► Section 4B: Exam Question 1 – LCOL 2018 Q7 (e)

Find the standard deviation of the **rainfall data**, in mm, correct to 1 decimal place.

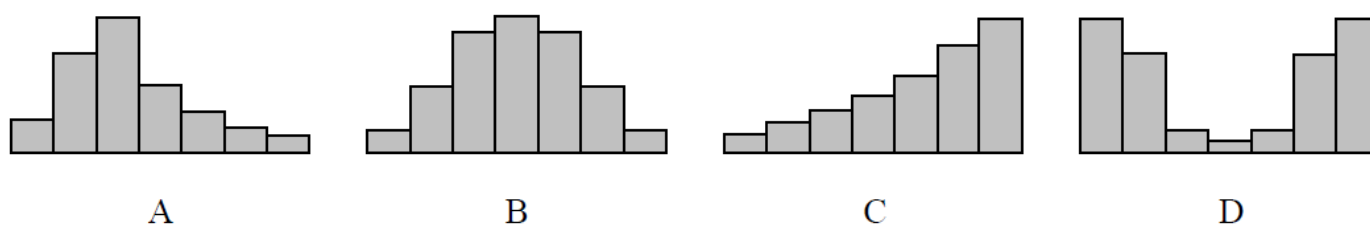
Total rainfall and total sunshine at Valentia in June										
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Rainfall (mm)	72	133	155	101	94	47	149	134	94	84
Total Sunshine (hours)	169	124	180	173	173	239	159	168	228	205

(Source: Met Éireann)

► Section 4B: Exam Question 2 – LCHL 2012 S Q2 (b)

The shapes of the histograms of four different sets of data are shown below.

Assume that the four histograms are drawn on the same scale.



State which of them has the largest standard deviation, and justify your answer.

Section 5 – Graphing Data

Section 5A – Types of Graph

► Section 5A: Activity 1

In Statistics we can use charts and graphs to summarise a set of data in a visual way?

Why would we want to do this?

Make a list of charts and graphs you are familiar with?

Are some of the charts and graphs better for summarising particular data types than others?

► Section 5A: Activity 2

Place an ✓ in the table below to indicate where a particular chart type is suitable for different data types.

Type of Data	Line Plot	Bar Chart	Frequency Table	Grouped Frequency Table	Histogram	Pie Chart	Stem and Leaf Diagram
Categorical							
Numerical Discrete							
Numerical Continuous							

Section 5B – Line Plots

► Section 5B: Activity 1

The list below shows the number of bronze medals students a group of 24 2nd year students think Ireland will win at the Tokyo Olympics 2020, according to the results of our CensusAtSchool 2019/2020 Questionnaire.

4, 3, 3, 1, 3, 4, 3, 4, 2, 2, 5, 3, 2, 2, 3, 1, 3, 3, 3, 4, 3, 4, 6, 2

Illustrate the data on a line plot and then answer the following questions.

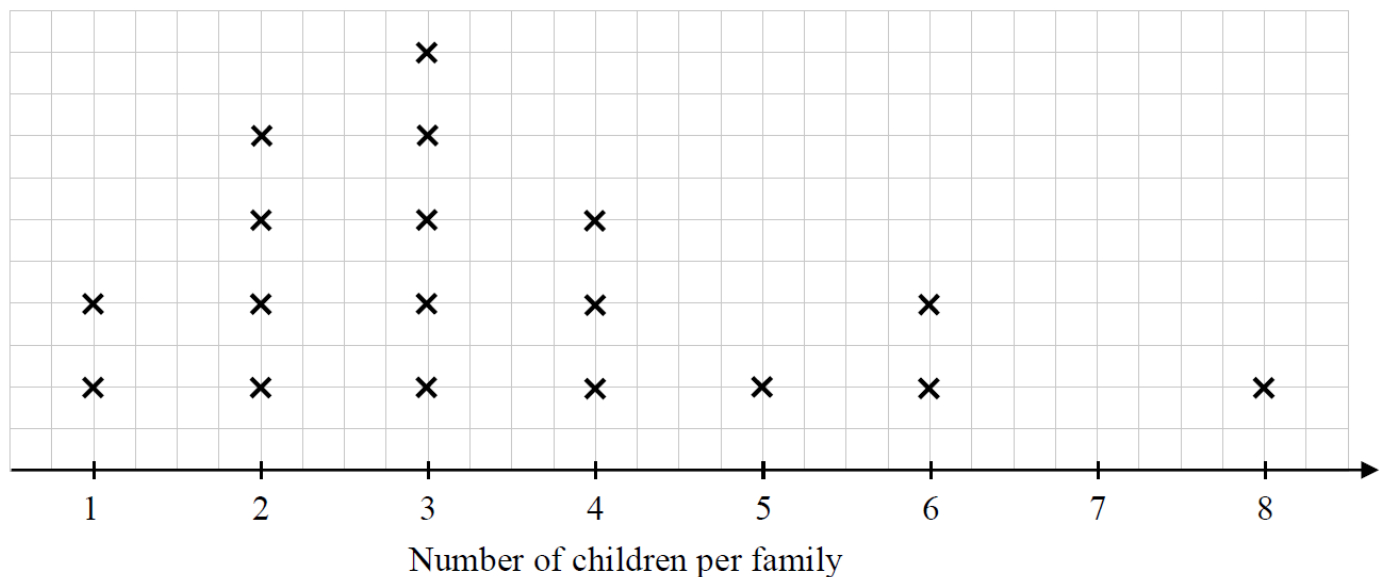
How many students predicted that Ireland would win 4 bronze medals?

What was the modal number of bronze medals?

What is the median number of bronze medals?

► Section 5B: Exam Question 1 – LCFL 2015 Q6

In a survey, 18 students were asked how many children are in their family. The results are shown in the line plot below.



(a) What is the mode of the data?

(b)

(i) Find the total number of children in the 18 families.

(ii) Find the mean number of children per family, correct to one decimal place.

(c) Which of the two numbers, the mode or the mean, do you think is the best single number to describe this data? Give a reason for your answer.

Section 5C – Bar Charts

► Section 5C: Activity 1

The table below summarises the results of the answer to Q16 (a) of a group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.

16. a) What was the most popular car make licensed in Ireland in 2018?

Car Make	Audi	Hyundai	VW	Ford	Toyota	Land Rover	Opel
Number of Students	1	7	4	1	9	1	1

Display this information on a bar chart.

► **Section 5C: Exam Question 1 – JCFL 2019 Q9**

Gerry carried out a survey on the hair colour of the 12 students in his class.

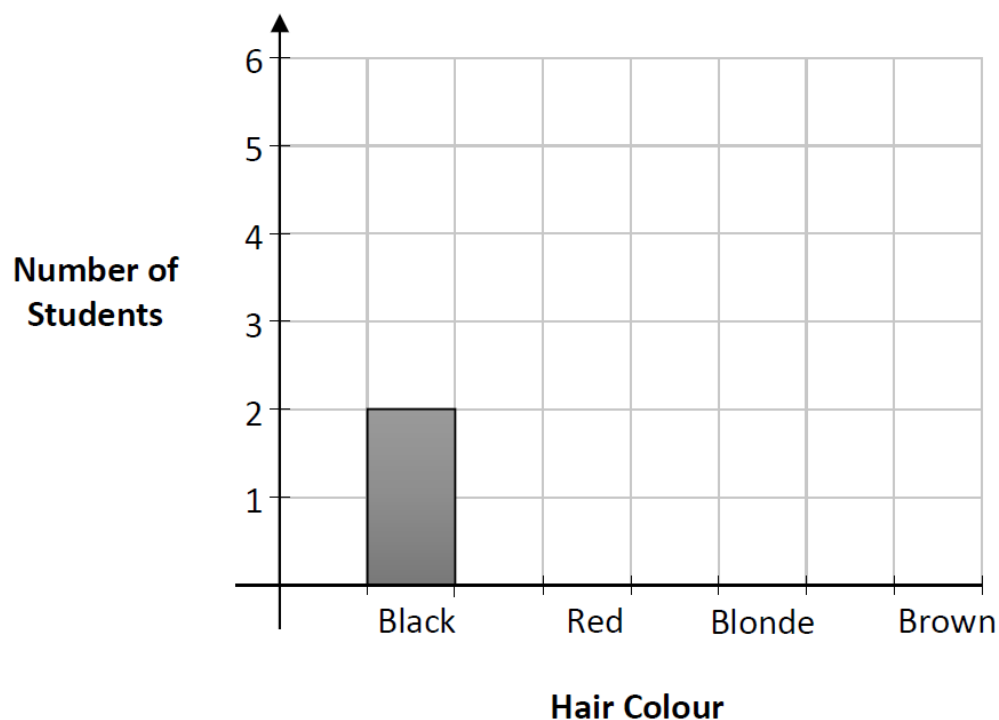
The colour of each person's hair is shown in this table:

Black	Red	Blonde	Brown
Brown	Blonde	Brown	Brown
Black	Brown	Blonde	Red

(a) Complete the following table by writing in the number of students with each hair colour.

Hair Colour	Black	Red	Blonde	Brown
Number of Students	2			

(b) Complete the bar chart on the axes below to show this information.



(c) What was the **modal** [most common] hair colour?

Eoghan was one of the 12 students surveyed.

(d) What is the **probability** that he has **black** hair?

(e) What **percentage** of the students surveyed had **blonde** hair?

► Section 5C: Activity 2

The tables summarises the answers of 24 second year students for Q16 (b) of the 2019/2020 CensusAt School Questionnaire.

Display the data **graphically** in a way that allows you to compare the data for the male and females in the class.

	Car Colour				
	Black	Grey/ Silver	White	Navy	Red
Male	6	2	2	0	0
Female	7	4	1	1	1

► **Section 5C: Exam Question 2 – JCHL 2016 Q3 (f)**

Table 2 shows the percentage of female members of parliament in each of the current 28 EU countries in 2005 and 2015.

Display the data **graphically** in a way that allows you to compare the data for the two years.

Label your graph(s) clearly. Show any calculations that you make.

You may use the data from **Table 1** or **Table 2**.

Table 2						
% of female members of parliament		0 – 9	10 – 19	20 – 29	30 – 39	40 – 49
Number of countries	2005	2	10	8	7	1
	2015	0	7	10	8	3

Table 1	
% of female members of parliament	
2005	2015
9	10
9	13
11	13
12	14
12	16
12	18
13	19
13	20
16	20
17	23
17	23
19	24
20	24
20	26
21	26
21	28
22	29
22	31
22	31
23	31
33	36
34	37
35	37
36	37
37	39
37	41
38	42
45	44

► **Section 5C: Exam Question 3 – JCHL 2014S Q6**

Three groups of 10 students in a third-year class were investigating how the number of jelly beans in a bag varies for three different brands of jelly beans.

Each student counted the number of jelly beans in a bag of brand A or B or C. Their results are recorded in the tables below.

Group 1 (Brand A)

23	25	25	26	26
32	32	33	34	35

Group 2 (Brand B)

17	22	22	24	24
29	29	29	29	29

Group 3 (Brand C)

25	25	25	26	26
29	29	30	30	31

- (i) Display the data in a way that allows you to describe and compare the data for each brand.
- (ii) If you were to buy a bag of jelly beans which brand would you buy? Give a reason for your answer based on the data provided in the tables. In your explanation you should refer to the **mean** number of jelly beans per bag, and the **range** or **spread** of the number of jelly beans per bag for each brand.

Section 5D – Histograms

► Section 5D: Activity 1

The table below shows the hand span (in cm) of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.

Height	14 – 16	16 – 18	18 – 20	20 – 22
Number of Students	3	4	6	11

[Note: 14 – 16 means 14 cm or more but less than 16 cm, etc.]

Draw a **histogram** to represent this data. Label each axis clearly.

Describe in your own words the shape of the distribution.

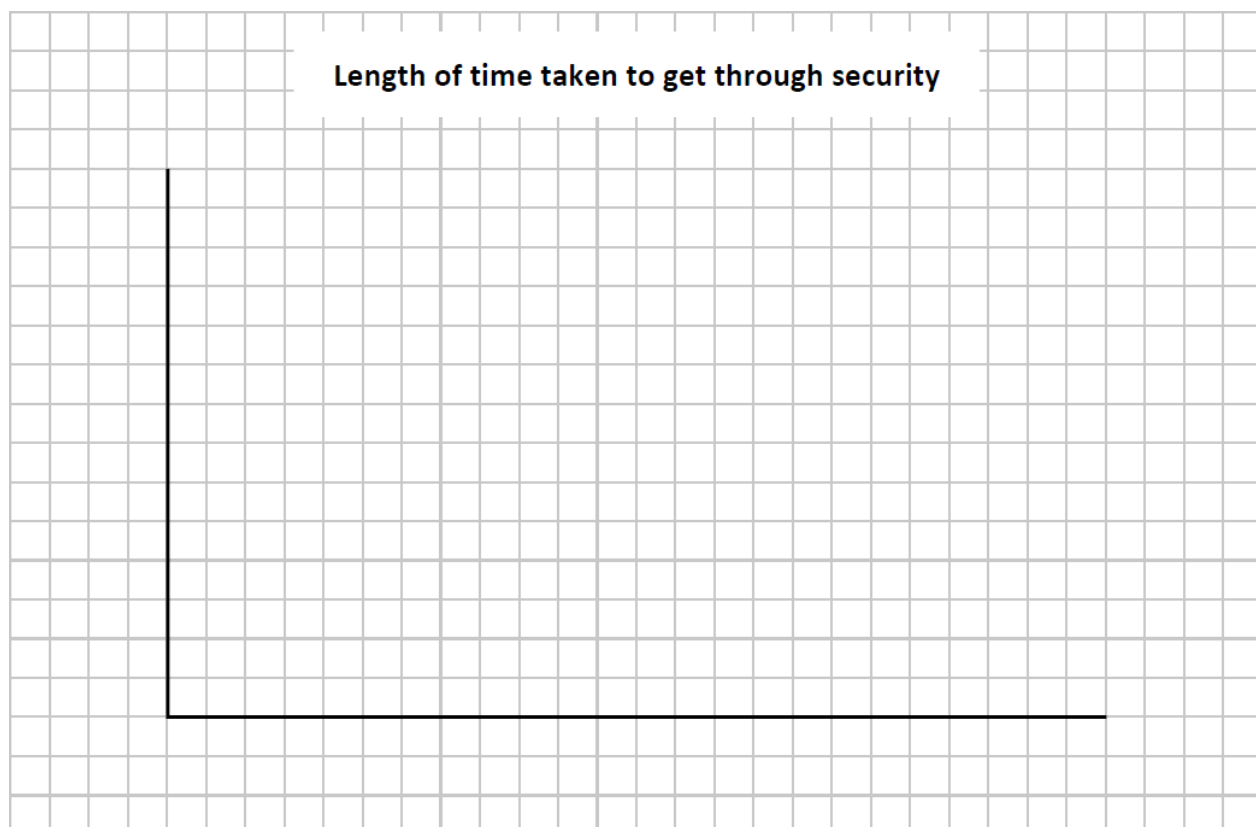
► Section 5D: Exam Question 1 – JCHL 2018 Q6 (d)

The table below shows the length of time it took the students to get through security at the airport.

Time (minutes)	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30
Number of students	4	8	11	6	0	1

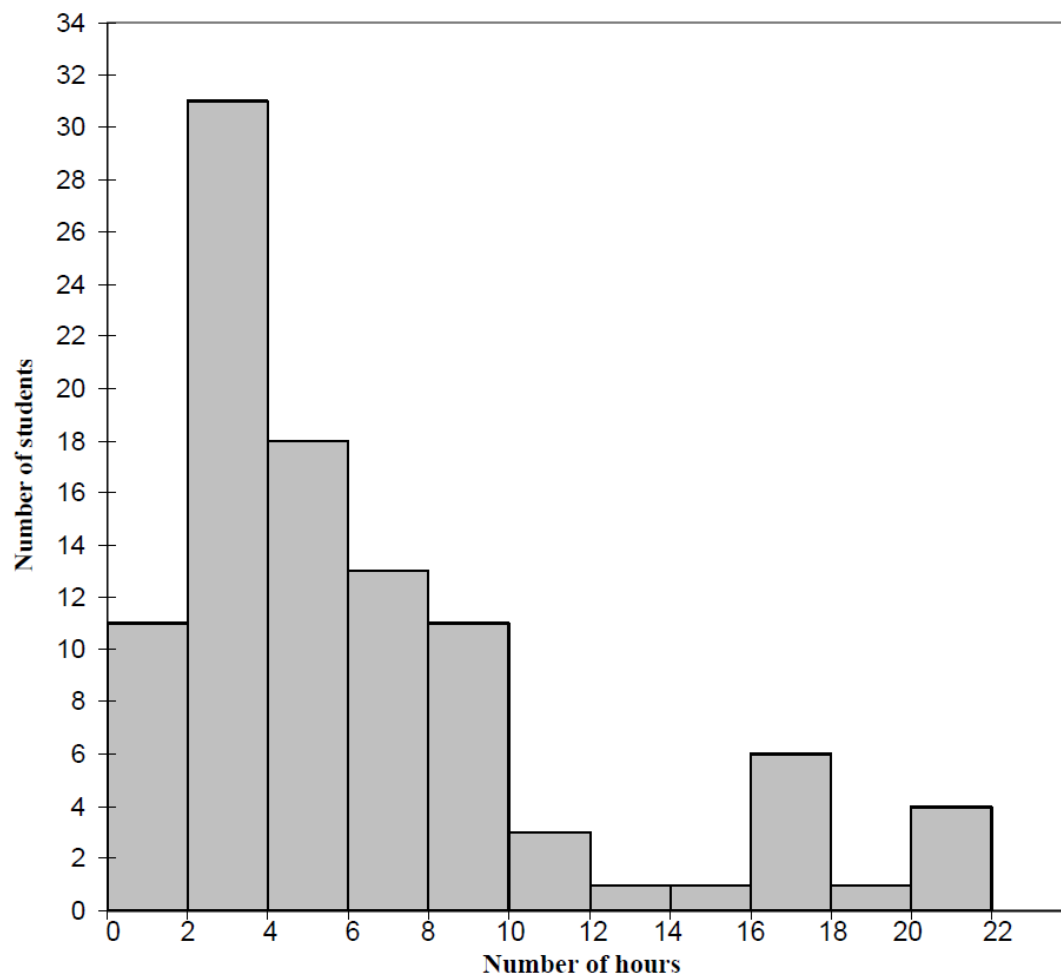
[Note: 5 – 10 means 5 minutes or more but less than 10 minutes, etc.]

Draw a **histogram** to represent this data. Label each axis clearly.



► **Section 5D: Exam Question 2 – JCHL 2014S Q5**

The phase 9 *CensusAtSchool* questionnaire contained the question “Approximately how long do you spend on social networking sites each week?” The histogram below illustrates the answers given by 100 students, randomly selected from those who completed the survey.



(i) Use the data from the histogram to complete the frequency table below.

No. of Hours	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22
No. of Students											

[Note: 2-4 means 2 hours or more but less than 4 hours, etc.]

(ii) What is the modal interval?

(iii) Taking mid-interval values, find the mean amount of time spent on social networking sites.

Section 5E – Stem and Leaf Diagrams

► Section 5E: Activity 1

The list below shows the vertical reach of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire .

197, 194, 200, 194, 208, 208, 202, 202,
213, 218, 205, 218, 224, 218, 222, 229,
189, 209, 210, 206, 197, 197, 214, 196

- (a) Represent this data by a Stem and Leaf Plot.
- (b) Why is this type of data suitable to be represented by a Stem and Leaf Plot.
- (c) What was the modal vertical reach of the class?
- (d) What was the median vertical reach of the class?
- (e) What was the mean vertical reach of the class?
- (f) What is the range of the data?

► Section 5E: Exam Question 1 – JCHL 2019 Q1

A business has 28 employees.

Their ages, in years, are given below.

32 41 57 64 19 21 35
18 43 54 63 65 33 22
39 58 18 42 20 34 21
49 33 55 34 57 43 63

Complete the stem-and-leaf diagram, showing the ages of all 28 employees.

► **Section 5E: Exam Question 2 – JCHL 2017 Q4**

The stem and leaf diagram below shows the number of copies of the *Newry News* sold each week over 17 weeks in a particular shop.

0	8					
1	6	6	7	9	9	9
2	0	1	5	6	8	
3	2	4				
4	1	3	p			

Key: $3|2 = 32$ copies of the *Newry News*

The value in the diagram for one of the weeks is p , where $p \in \mathbb{N}$, $1 \leq p < 10$.

- (a) The **range** of the data is 39. Find the value of p .
- (b) Find the value of each of the following statistics for this data:
- (i) the **mode**
 - (ii) the **median**

The **sum** of the data in the stem and leaf diagram is 431.

- (c) Use this fact to find the **mean** of the data, correct to one decimal place.
- (d) In the 18th week there was a special issue of the *Newry News*, and there were a lot more copies of it sold than in any of the other weeks.
- (i) Find the **modal** number of copies sold per week over the whole 18 weeks (i.e. the mode).
 - (ii) Find the **median** number of copies sold per week over the whole 18 weeks.

The **mean** number of copies sold per week over the whole 18 weeks was 28.5.

- (iii) Work out the number of copies that were sold in the 18th week.

► **Section 5E: Activity 2**

The lists below shows the length of the circumference of right wrist for a group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire. The data is split by gender.

Female

20.2, 15.1, 21.5, 19.1, 17.5, 16.3, 15.5, 19.2, 18.2, 15.7, 18.1, 15.1, 16.6, 15.5

Male

18.9, 16.4, 16.5, 21.2, 16.0, 17.1, 20.2, 19.0, 16.3, 18.5

Draw a **back-to-back stem-and-leaf plot** to display the students' measurements.

► **Section 5E: Exam Question 3 – JCHL 2014 Q3**

All of the students in a class took *IQ Test 1* on the same day. A week later they all took *IQ Test 2*. Their scores on the two IQ tests are shown in the tables below.

<i>IQ Test 1</i>				
86	104	89	105	96
96	103	94	104	119
115	79	97	111	108

<i>IQ Test 2</i>				
83	120	105	111	114
99	111	108	106	97
97	102	94	108	117

- (i) Draw a back-to-back stem-and-leaf plot below to display the students' scores.

IQ Test 1									IQ Test 2							
								7								
								8								
								9								
								10								
								11								
								12								

► **Section 5E: Exam Question 4 – JCHL 2014 Q3**

The ages of the 30 people who took part in an aerobics class are as follows:

18 24 32 37 9 13 22 41 51 49
 15 42 37 58 48 53 27 54 42 24
 33 48 56 17 61 37 63 45 20 39
 16 22 29 7 36 45 12 38 52 13
 33 41 24 35 51 8 47 22 14 24
 42 62 15 24 23 31 53 36 48 18

The ages of the 30 people who took part in a swimming class are as follows:

(a) Represent this data on a back-to-back stem-and-leaf diagram.

Aerobics class								Swimming class						
							0							
							1							
							2							
							3							
							4							
							5							
							6							

Key:

(b) Use your diagram to identify the median in each case.

(c) What other measure of central tendency could have been used when examining this data?

(d) Based on the data make one observation about the ages of the two groups.

Section 5F – Pie Charts

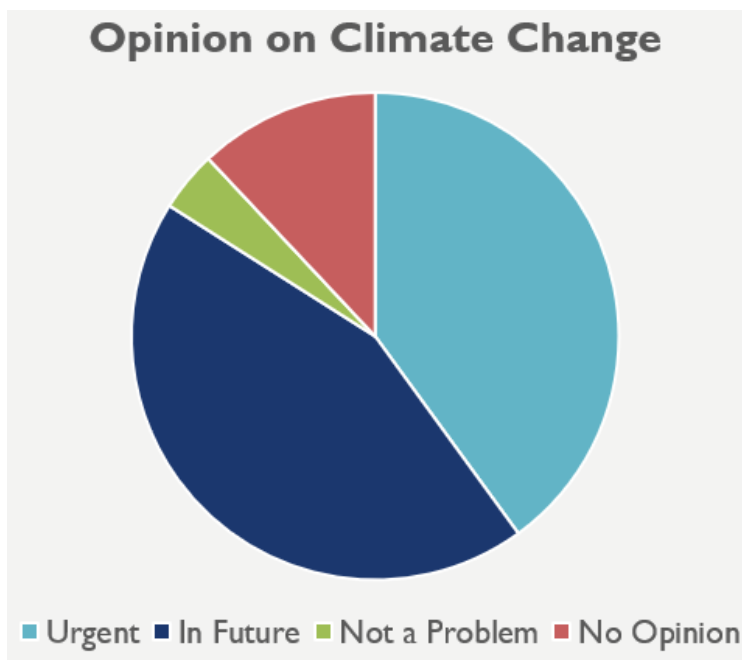
► Section 5F: Activity 1

A pie chart is a graph/ chart that uses sectors of a circle to show the relative sizes of data.

The Pie Chart here displays the results of 24 2nd Year students for Q10 (b) of the 2019/20 CensusAtSchools questionnaire.

10. b) Which option best describes your opinion on climate change? Select one answer.

- ☐ It is an urgent problem that needs to be managed now.
- ☐ It is a problem that needs to be managed in the future.
- ☐ It is not a problem.
- ☐ I don't know or have no opinion.



Which was the modal answer?

Is it possible to calculate how many of the 24 students thought climate change was an **urgent problem**?

What additional information would we need to work this out?

The table below shows the angle of each sector in the above pie chart. Complete the table to show the number of students that selected each answer.

Answer	Angle	No. of Students
Urgent	150°	
In Future	165°	
Not a Problem	15°	
No Opinion	30°	

► Section 5F: Activity 2

Question 6 of the 2019/2020 CensusAtSchools Questionnaire is on the right.

The answers of 24 second year students are summarised in the table below.

Display the data on a Pie Chart.

6. There are 2 billion children in the world today, aged 0 to 15 years old. How many children will there be in the year 2100, according to the United Nations? Select one answer.

- ☐ 4 billion
- ☐ 3 billion
- ☐ 2 billion

Children in 2100	2 Billion	3 Billion	4 Billion
Number of Students	1	19	4

► Section 5F: Activity 3

Q16 (b) of the 2019/20 CensusAtSchools questionnaire asks students what their opinion on the most popular car colour licensed in Ireland in 2018.

The following is the **actual** breakdown of colour of car sold in Ireland in 2018.

Grey (47,280)

Black (24,262)

White (19,443)

Blue (15,815)

Red (14,554)

Other (5,691)

Display the information on a **pie chart**.

16. b) What was the most popular colour of car licensed in Ireland in 2018?

The following are the answers of the 24 second year students.

Display the information on a **pie chart**.

Car Colour	Black	Grey	White	Blue	Red
Students	13	6	3	1	1

Compare the two pie charts making reference to the accuracies or inaccuracies of the students.

► **Section 5F: Exam Question 1 – JCHL 2014 Q5**

Students in a class are investigating spending in their local area. They carry out a different survey, and display the results.

John is investigating whether people pay for their weekly shopping with Credit Card, Debit Card, Cash, or Cheque.

When people tell him which one of these they usually use he writes it in a table. His results are shown below.

Credit Card	Debit Card	Debit Card	Cash	Debit Card
Credit Card	Cash	Cash	Credit Card	Debit Card
Debit Card	Debit Card	Cheque	Cash	Cash
Cash	Cash	Debit Card	Cash	Credit Card

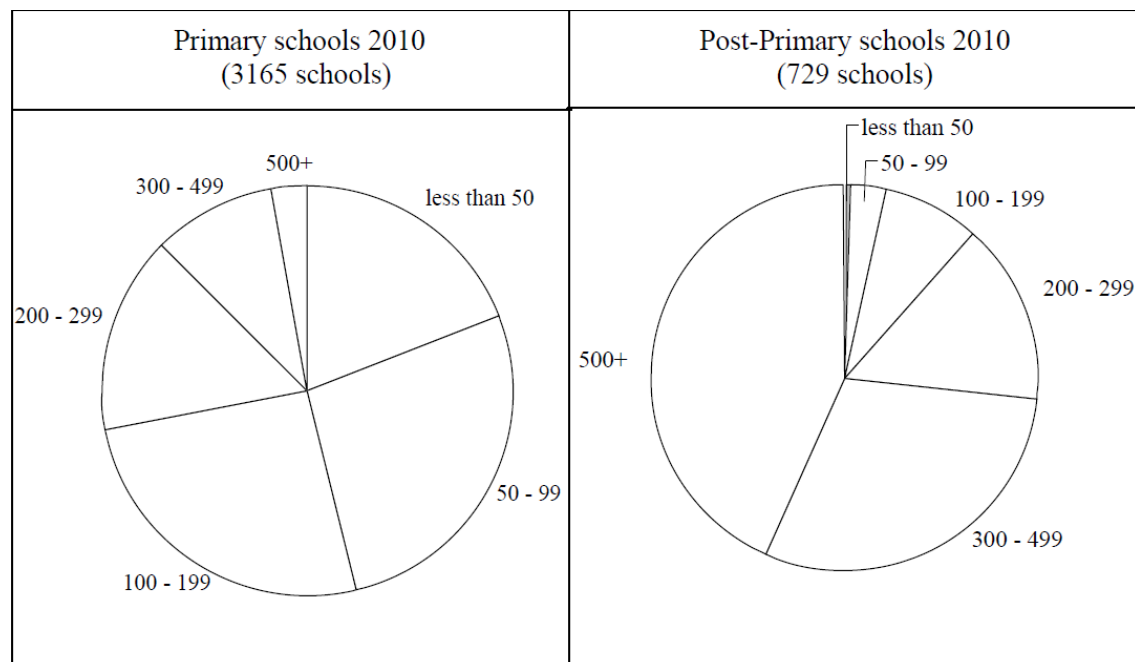
Fill in the frequency table below.

Method of Payment	Credit Card	Debit Card	Cash	Cheque
Frequency				

Display John's data in a pie chart. Show all of your calculations clearly.

► **Section 5F: Exam Question 2 – JCHL 2014S Q7**

The number of students attending primary and post-primary schools in Ireland in 2010 is illustrated in the pie-charts below.



The angle in the slice for Primary schools with between 100 and 199 pupils is 93.725° .

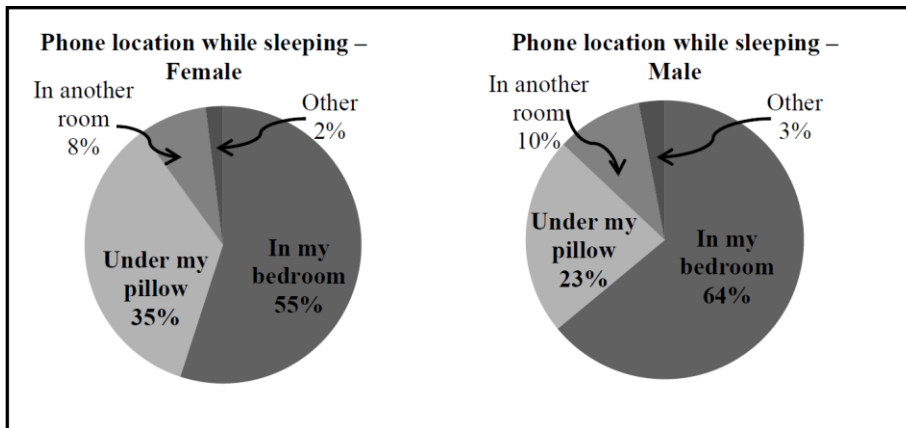
- (i) Calculate the number of schools in this category.

Mary claims that the charts show that there is roughly the same number of post-primary schools as primary schools in the 200 – 299 range. Do you agree with Mary?

- (ii) Give a reason for your answer based on the data in the charts.

► **Section 5F: Exam Question 3 – JCHL 2013 Q5**

In total 7150 second level school students from 216 schools completed the 2011/2012 phase 11 *CensusAtSchool* questionnaire. The questionnaire contained a question relating to where students keep their mobile phones while sleeping.



- (a) Given that this question was answered by 4171 girls and 2979 boys, calculate how many female students kept their mobile phones under their pillows.
- (b) Calculate the overall percentage of students who kept their mobile phones under their pillows.

A new pie chart is to be drawn showing the mobile phone location for all students.

- (c) Calculate the measure of the angle that would represent the students who kept their mobile phones under their pillows.

Section 5G – Scatter Plots

► Section 5G: Activity 1

Hans Rosling says that he is trying to show data in a way that people enjoy and understand.

Do you think he was effective in this aim? Explain your answer.

Having watched the video what relationship did you observe between the wealth and the health of a country?

► Section 5G: Activity 2

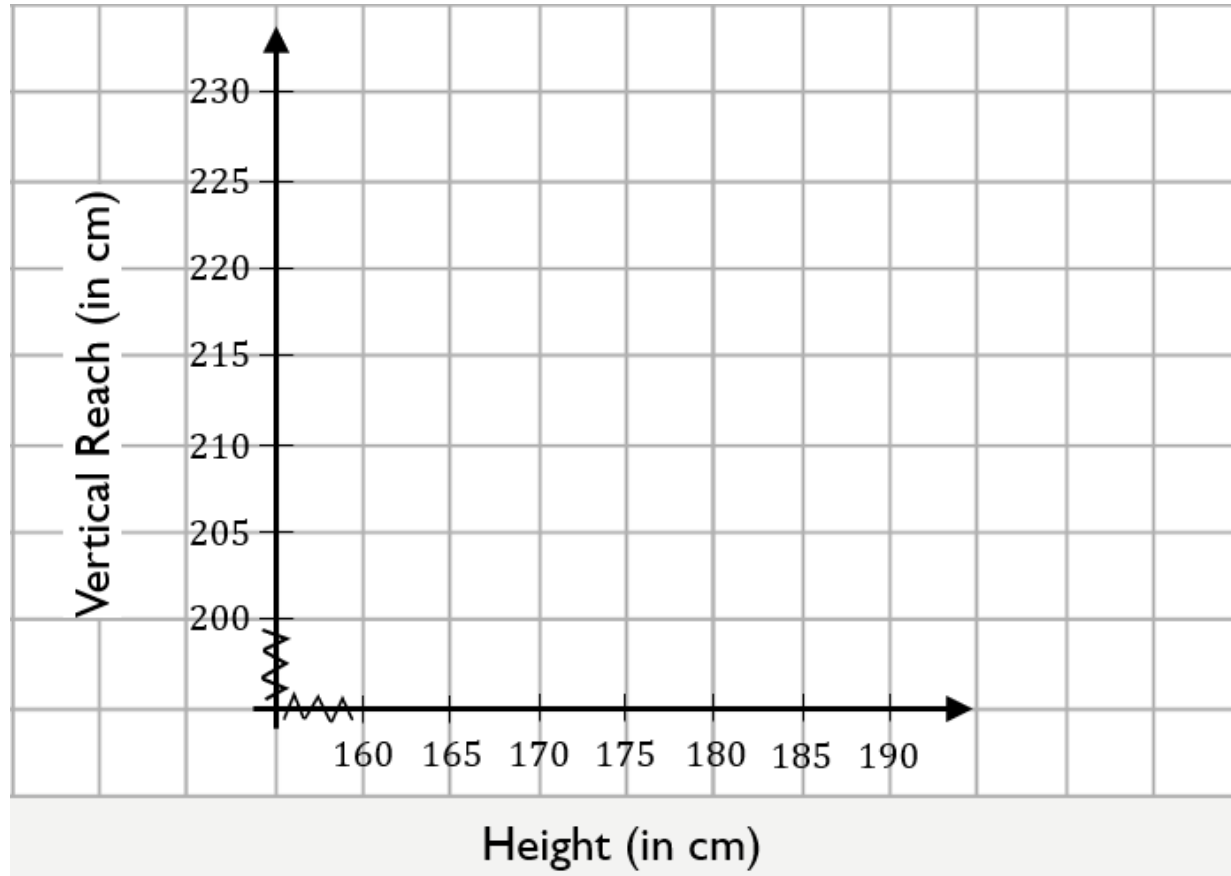
Reread each of the questions in the CensusAtSchools 2019/20 Questionnaire.

Identify pairs of data that we can collect from the questionnaire that can be paired so as to investigate if there is a relationship (correlation) between them?

► Section 5G: Activity 3

The table below shows the heights and vertical reaches of the 10 male second year students in our 2019/20 CensusAtSchool questionnaire.

- (a) Draw a Scatter Plot for this data and draw a line of best fit.
- (b) Is there a correlation between height and vertical reach?
- (c) Calculate the correlation coefficient?



► **Section 5G: Exam Question 1 – LCOL 2013 Q7 (f)**

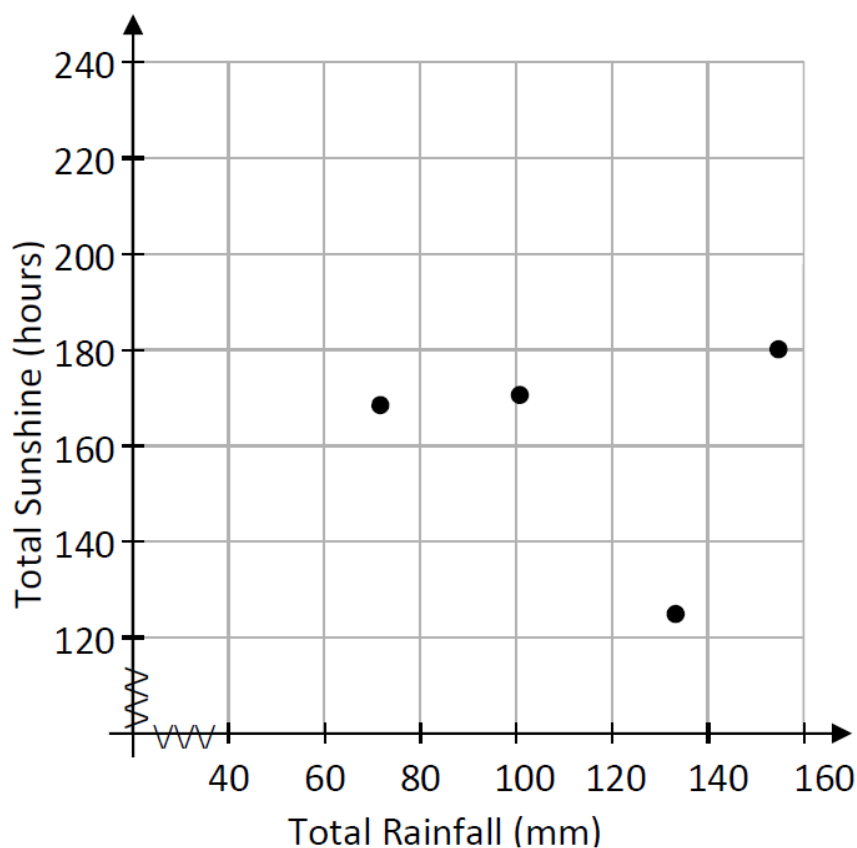
The table below shows the total rainfall, in millimetres, and the total sunshine, in hours, at Valentia, County Kerry, during the month of June from 2001 to 2010.

Total rainfall and total sunshine at Valentia in June										
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Rainfall (mm)	72	133	155	101	94	47	149	134	94	84
Total Sunshine (hours)	169	124	180	173	173	239	159	168	228	205

(Source: Met Éireann)

Part of a scatterplot of the data in the table is shown below.

The first four data points are plotted.



- (i) Complete the scatterplot.

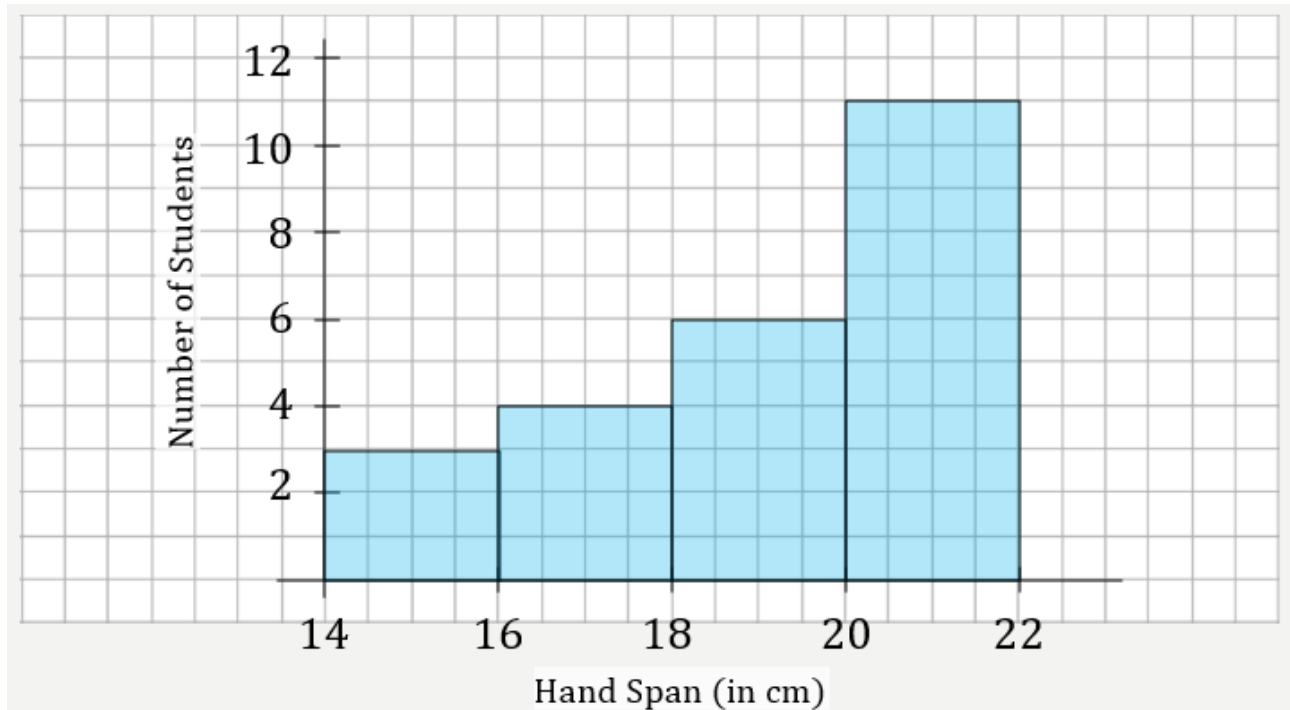
One of the numbers in the table on the right is the correlation coefficient for the data above, correct to 1 decimal place.

- (ii) Based on the scatterplot, select the number that you think most accurately reflects this data. Explain your choice.

Section 6 – The Shape of a Distribution

► Section 6: Activity 1

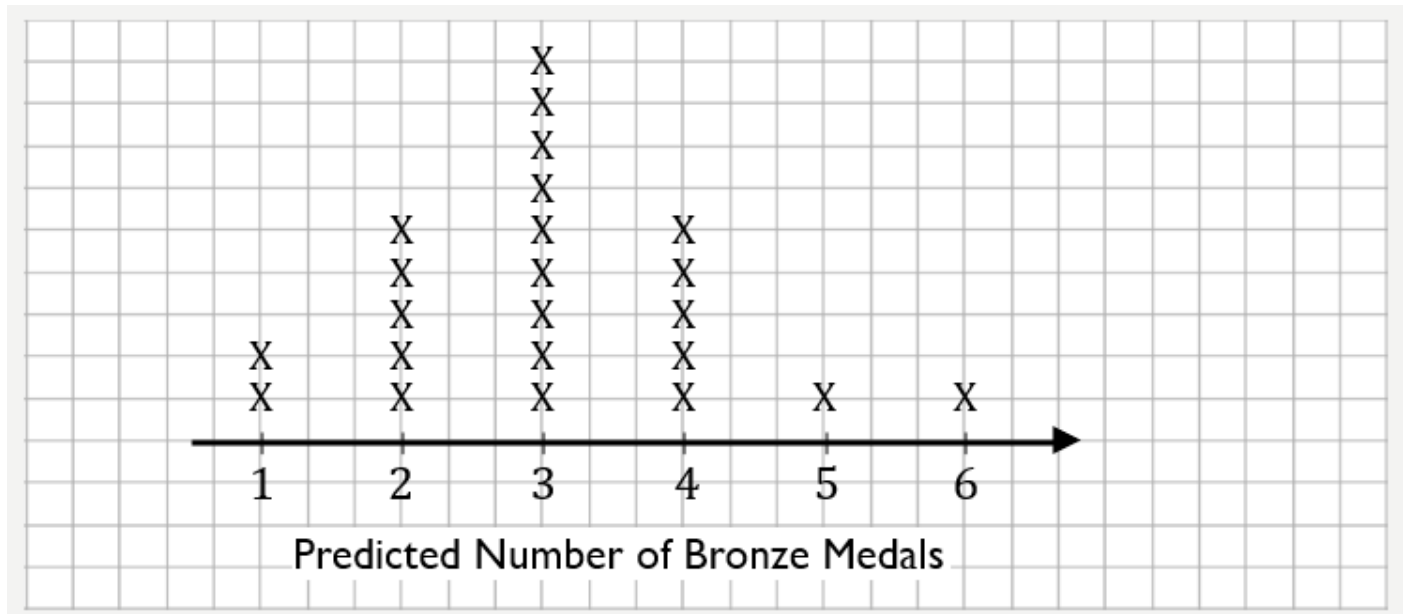
The histogram below shows the hand span (in cm) of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.



Describe the shape of the histogram.

► Section 6: Activity 2

The line plot below shows the predicted number of bronze medals Ireland will get at the 2020 Tokyo Olympics of the group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire.



Describe the shape of the line plot.

► Section 6: Activity 3

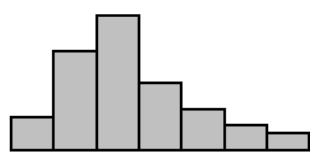
The back to back stem and leaf diagram below shows the length of the circumference of right wrist for a group of 24 second year students in our CensusAtSchool 2019/2020 Questionnaire. The data is split by gender.

MALE						FEMALE				
					15	1	1	5	5	7
5	4	3	0		16	3	6			
			1		17	5				
		9	5		18	1	2			
			0		19	1	2			
			2		20					
			2		21					
KEY : 15 5 = 15.5										

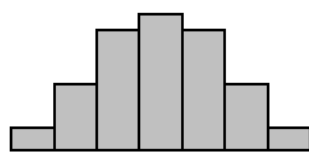
Describe the shapes of distributions for both the males and females.

► Section 6: Exam Question 1 – LCHL 2012S Q2 (a)

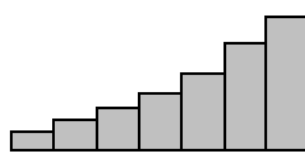
The shapes of the histograms of four different sets of data are shown below.



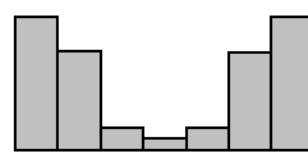
A



B



C



D

Complete the table below, indicating whether the statement is correct (✓) or incorrect (✗) with respect to each data set.

► **Section 6: Exam Question 2 – LCOL 2012S Q6 (a)**

Describe the distribution of the data, by making **one** statement about **each** of the three characteristics indicated below.

14	9									
15	7									
16	0	1	1	4	6	7	7	7	8	
17	0	1	1	2	3	4	5	6	6	8
18	0	0	7							

shape of distribution:

location of data (central tendency / average):

spread of data (dispersion):

► **Section 6: Exam Question 3**

– LCOL 2012S Q7 (c) (i)

Máire knows already that the male athletes tend to be slightly faster than the female athletes. She also knows that athletes can get slower as they get older. She thinks that male athletes in their forties might be about the same as female athletes in their thirties. She decides to draw a back-to-back stem-and-leaf diagram of the times of these two groups for the swim. There were 28 females in their thirties, and 32 males in their forties. Here is the diagram:

Describe what differences, if any, there are between the two distributions.

Female, 30 – 39 years

4	13
	14
1 0	15
9 8 8 7 3 2 2	16
6 4 3 2	17
1	18
9 6 3 1 0 0	19
	20
3 3 2	21
4	22
	23
8	24
	25
5	26
	27
	28
7	29

Male, 40 – 49 years

	13
9	14
1 3 4 5 6	15
3 4 6 7 7 8	16
6 7 7	17
0 1 3 8 9	18
0 0 1 2 3 4	19
3 9 9	20
2 2	21
	22
0	23
	24
	25
	26
	27
	28
	29

Key: | 14 | 9 means 14·9 minutes.