***Human Biology ATAR – Task 1: Science Inquiry***

***Cardiovascular Health in teenagers (5%)***

***Validation***

|  |  |  |  |
| --- | --- | --- | --- |
| Name: | | | |
| Time allowed: 1 Lesson | | | |
| **Section** | Your Mark | Marks available | Percentage of Investigation |
| **Section 1:**  Introduction, Materials and Method and Results |  | 24 | 48% |
| **Section 2**:  Validation Test |  | 26 | 52% |
|  |  | **50** | **100%** |

**Declaration of Authenticity**

I (Student Name) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ declare that this work is my own and I have not plagiarised from any source.

Signature:  
  
Date:

**Cardiovascular Health Investigation - Validation Test**

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A researcher wanted to determine if regularly smoking cigarettes influenced humans resting heart rate.

The researchers found 16 males. These subjects were asked if they were smokers or non-smokers. They then came in each day for three days. During these visits the subjects were asked to sit in a dim room and take long deep breaths for 5 minutes before their heart rate was measured. The results for this experiment are shown below.



**Results: (8 marks)**

*Table 1: The resting heart rate of 16 subjects over three days and their smoking status.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Subject** | **Smoking Status  NS = Non-smoker  S = Smoker** | **Day 1 Resting**  **Heart Rate (bpm)** | **Day 2  Resting  Heart Rate**  **(bpm)** | **Day 3**  **Resting  Heart Rate (bpm)** | **Average Resting  Heart Rate**  **(bpm)** |
| 1 | N | 68 | 66 | 65 | 66 |
| 2 | N | 75 | 73 | 77 | 75 |
| 3 | N | 55 | 50 | 52 | 52 |
| 4 | N | 63 | 63 | 65 | 64 |
| 5 | S | 75 | 77 | 73 | 75 |
| 6 | S | 69 | 71 | 68 | 69 |
| 7 | N | 62 | 64 | 155 |  |
| 8 | N | 80 | 82 | 84 | 82 |
| 9 | S | 94 | 95 | 97 | 95 |
| 10 | N | 57 | 61 | 59 | 59 |
| 11 | S | 78 | 79 | 75 | 77 |
| 12 | N | 49 | 51 | 54 | 51 |
| 13 | S | 69 | 73 | 70 |  |
| 14 | N | 57 | 58 | 57 | 57 |
| 15 | S | 89 | 91 | 85 | 88 |
| 16 | S | 94 | 96 | 93 | 94 |

1. The average resting heart rate for each subject is shown above. However, two have not been calculated *(please see the bold rectangles).* Calculate the average resting heart rate for these two individuals and add them to the table. ***(2 marks)****(space provided for calculations if needed)*
2. The average resting heart rate for the group of individuals who were non-smoker was calculated and written in the table below. Complete the table by calculating the average resting heart rate for the group of individuals who were smokers ***(1 mark)***

*(space provided for calculations if needed)*

*Table 2. The average resting heart rate of a group of seven smokers and nine non-smokers*

|  |  |
| --- | --- |
| **Smoking Status** | **Average Resting Heart Rate (bpm)** |
| Non-Smokers | 63 |
| Smokers |  |

1. Using the results, the scientist collected. Create a graph of the data on the graph paper provided.  ***(5 marks)***

**Discussion: (14 marks)**

1. **Describe** the trend and/or pattern present in the data the student collected ***(1 mark)***
2. Use your knowledge and understanding of the cardiovascular and respiratory systems to **explain** the effect of smoking on resting heart rate. ***(4 marks)***
3. Explain why subjects were asked to sit for 5 minutes, talking long deep breaths before their heart rate was taken. ***(3 marks)***
4. Describe two ways this experiment could be adjusted to ensure that it is ethical.  ***(2 marks)***
5. Define reliability and describe one improvement that could been done to increase the reliability of this experiment. ***(2 marks)***
6. Define validity and describe one improvement that could have been done to increase the validity of this experiment. ***(2 marks)***

**Conclusion: (4 marks)**

1. Summaries the findings from this experiment and comment on the reliability and validity of the outcomes of the investigation.