***Human Biology ATAR – Task 3: Science Inquiry***

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

***Validation***

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| --- | --- | --- | --- |
| 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**

****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. Create a graph of the data the scientists collected 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)**

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1. Use your knowledge and understanding of the cardiovascular and respiratory systems to **explain** the effect of smoking on resting heart rate. **(4 marks)**

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1. Explain why subjects were asked to sit for 5 minutes, talking long deep breaths before their heart rate was taken. **(3 marks)**

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1. Describe two ways this experiment could be adjusted to ensure that it is ethical. **(2 marks)**

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1. Define reliability and describe one improvement that could been done to increase the reliability of this experiment. **(2 marks)**

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1. Define validity and describe one improvement that could have been done to increase the validity of this experiment. **(2 marks)**

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**Conclusion: [4 marks]**

1. Summaries the findings from this experiment and comment on the reliability and validity of the outcomes of the investigation. **(4 marks)**

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