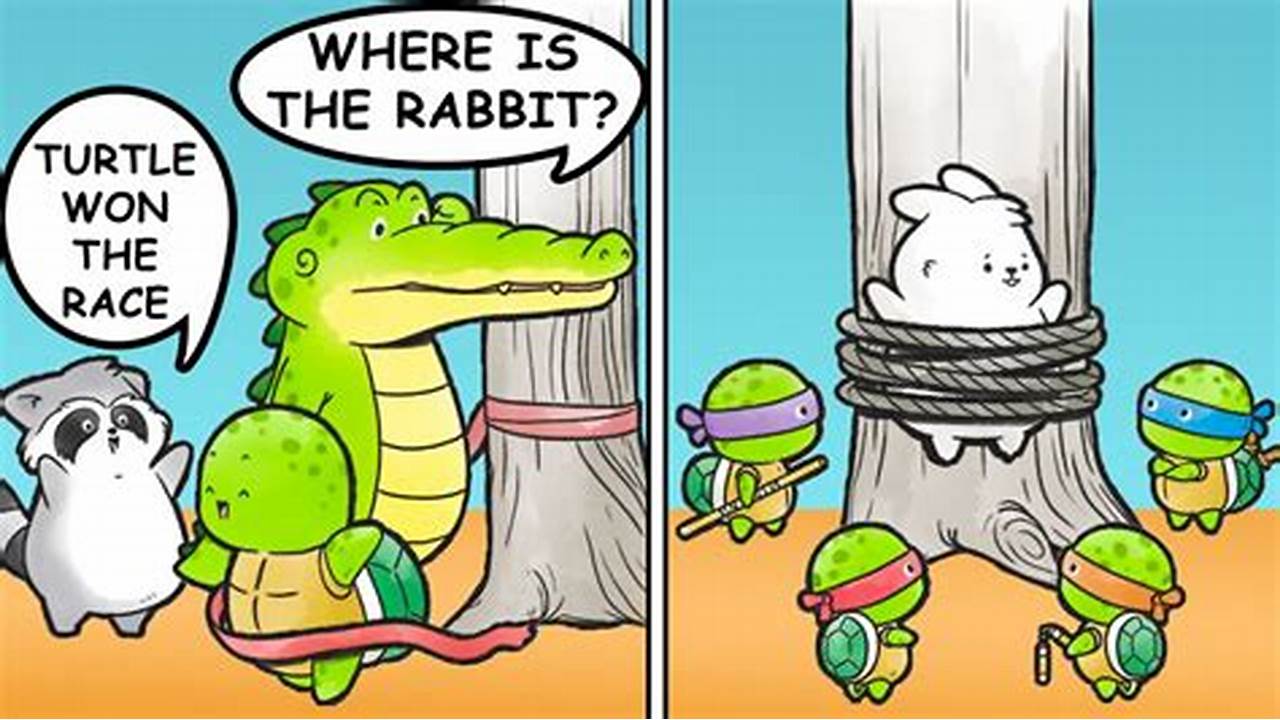
A logo for a college

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**YEAR 11 GENERAL SCIENCE IN PRACTICE**

**Wheels in Motion**

Task One: Reaction Time Investigation (30%)



LOGBOOK

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**TASK 1: Reaction Time INVESTIGATION**

This **INVESTIGATION** will take **13 HOURS** to complete in class.

This task has a number of parts:

A – Background research

B – Planning and conducting the investigation\*

C – Data processing and analysis, drawing conclusions and evaluating the investigation

D – Written report

E – Poster presentation\*

*\* These parts will be completed in groups*

**Task:**

Select or modify a practical activity to address your own investigable question or hypothesis. You may use a practical performed in class, a related simulation or another practical related to this unit (as negotiated with your teacher) as the basis for your methodology and research question.

**You have completed practical activities on:**

* Reaction times
* Reflexes

**Marks will be allocated as follows:**

|  |  |
| --- | --- |
| Logbook checkpoints | 30% |
| Draft material and method | 5% |
| Workplace health and safety | 10% |
| Group contribution | 5% |
| Poster presentation | 15% |
| Written report | 35% |

**Task weighting: 40%**

**Title: Reaction Time Investigation**

In Formula 1 (F1), getting off the start line quickly can be the defining moment of a race and determine a driver’s finishing place in the race. Reaction time is a crucial aspect of a driver’s ability to get off the starting line quickly and so drivers spend a lot of time improving their reaction time and training this specific aspect of racing.

According to McLaren F1 team the average reaction time of an F1 driver ranges from between 0.2 and 0.3 seconds. In the Japanese Grand Prix in 2019, Valterri Bottas recorded the fastest ever F1 reaction time of 0.04 seconds securing him the lead into the first turn of the race.

Your group will select a factor that could improve a driver’s reaction time and prepare a five week training program to improve reaction time. You have completed a number of practical activities and online simulations on measuring reaction time, as well as ways to improve reaction times.

To complete this task you are required to:

* Research
  + Reaction time
  + The importance of good reaction times when driving
  + Training methods to improve reaction time, ensuring the training method can be performed in class on a weekly basis
* Identify practical activities to modify\*
* Conduct a risk assessment and account for risks in the procedure\*
* Conduct the investigation\*
* Collect sufficient and relevant qualitative and/or quantitative data to address your investigation question\*
* Process and present the data appropriately
* Analyse the evidence to identify trends, patterns or relationships
* Analyse the evidence to identify errors and limitations with the data and procedure
* Interpret the evidence to draw conclusion/s
* Evaluate the relevance, accuracy, reliability and validity of the data
* Suggest possible improvements and extensions to the experiment
* Communicate findings in written report
* Communicate findings in a poster presentation\*

*\* These steps will be completed in groups*

**Checkpoints**

* Week 4 Research topic and construct question for investigation
* Week 4 Select practical activities and identify proposed modifications. Submit

draft method\*

* Weeks 5-9 Conduct investigation
* Week 9 Analyse data, draw conclusions, and evaluate evidence
* Week 9 Submit draft written report
* Week 10 Poster presentation\*
* Week 10 Submit final written report and logbook

*\*These items will only require one group document to be submitted*

**Authentication strategies**

The teacher will:

* Provide class time for task completion
* Monitor progress at specified check points
* Collect and annotate drafts
* Monitor student contributions to the group task

The student will:

* Maintain a logbook to document their progress
* Complete self and peer assessments of contributions to the group task
* Acknowledge all sources

**Part A: Background Research**

What is meant by “reaction time”?

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How is reaction time tested?

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What factors can affect someone’s reaction time?

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What activities are quick reaction time important for?

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Why are quick reactions required for driving?

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What activities or training methods can be used to improve reaction time?

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What activity can be done in a classroom setting with minimal equipment?

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What risks are involved with performing this/these activities?

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**Part B: Planning and Conducting**

What is the question you are investigating?

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How are you performing this investigation?

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What do you need to perform this investigation?

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How will you collect your data?

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How will you record your data?

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What are some of the safety considerations you need to keep in mind during this investigation?

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What are some safety precautions you can take?

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What equipment do you need to be careful of?

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List the materials you require:

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| --- | --- |
| **Quantity** | **Item** |
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Draw a diagram to show the set-up:

Write your method as numbered steps:

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Create a results table for all your all of your observations and raw data:

Draw any observations, images or diagrams:

**Part C: Data Processing and Analysis, Drawing Conclusions and Evaluating the Investigation**

Graphing your results:

* Use a descriptive title that links the independent and dependent variables
* Label your x- and y-axes (independent on the x- and dependent on the y-)
* Label units where appropriate
* Each scale must be even
* Use the AVERAGE results
* Plot your data accurately
* Use a key/legend if required (two or more lines)

What patterns can you see in your data?

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What relationships can you see between the independent and dependent variables?

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What else does your data tell you?

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Are there any anomalies (outliers) in your data?

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Can you explain these anomalies? Is it due to error or something else?

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Find supporting scientific evidence to explain your findings:

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Was your hypothesis supported or rejected?

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Justify your conclusion, make sure you refer to your data and directly relate it to your hypothesis:

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Was your experiment accurate, reliable and valid?

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Why/why not?

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What improvements/changes would you make for next time?

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**Part D: Written Report**

Your write-up should be written in third person (without using inclusive language such as I, we, our) and written in the past tense.

**Example:**

*INCORRECT*

I poured 200mL of distilled water into a beaker. (First person)

Pour 200mL of distilled water into a beaker. (Direct command)

*CORRECT*

200mL of distilled water was poured into a 500mL beaker.

Written reports have a formal layout and must contain the following headings:

* **Title** – Choose a name for the experiment. It should be informative ad describe the experiment.
* **Aim** – What is the purpose of the experiment? What are you trying to find out? Provide extra details not included in your title.
* **Hypothesis** – Includes independent and dependent variables and shows the relationship between them.

**Variables:**

* **Independent variable** – State what you will change (include units if possible)
* **Dependent variable** – State what you will measure (include units if possible)
* **Controlled variables** – List at LEAST THREE things you will keep the same to make it a fair test. Make sure you include ALL relevant details. Controlled variables must be more than one word. You must state why they must be controlled.

**Experiment Set-up:**

* **Equipment** – This should be a vertical list (like a shopping list) of all the equipment you need to carry out the experiment.
* **Method** – The numbered steps you will follow to complete this experiment. Written as a vertical list (like a recipe).
* **Diagram** – This helps to explain your method. Must be 2D, labelled and completed in pencil using a ruler.

**Results:**

* **Table** – Include what you measured (dependent variable) and observations that you have made. Needs a descriptive title and clear column headings with the units used.
* **Graph** – Draw a graph to help explain your results visually. Your graph should have a descriptive title (similar to the table) and clearly labelled axes with units. Dependent variable should always be on the y-axis and independent on the x-axis (unless you are measuring change over time, then time should be on the x-axis).
* **Conclusion** – State whether your results support or don’t support your hypothesis and use some actual data as evidence of your statement.
* **Discussion** – Discuss what you have found out in this experiment by using your own results and try to explain scientifically why you got these results.
* **Evaluation** – State things that went wrong or problems that occurred during the experiment. For each problem suggest ways to improve the experiment.

**Bibliography:**

* **Referencing** – Make sure to correctly add all references throughout your report and a reference page at the end.

Try using a website like:

<https://www.mybib.com/tools/apa-citation-generator>

**PART E: Poster Presentation**

A screenshot of a project

Description automatically generated