ASSESSMENT TASK NOTIFICATION

	SUBJECT: Science **YEAR GROUP: 10** **TASK TITLE: Individual Research Task**	_____ **Student Name** **Submitted To:** _____

Name of Unit:	Scientific Method				
Type of Task:	Individual Research Task				
Due Date:	Aim, Hypothesis, Variables and Research Method Final Submission	Term:	3 3 3	Week:	1 2 6
Weight	36%				

OUTCOMES ASSESSED	4WS identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge 5WS collaboratively and individually produces a plan to investigate questions and problems 6WS follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually 7WS processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions 8WS selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems 9WS presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations

DESCRIPTION OF ACTIVITIES

Students are required to complete an Individual Research Project (IRP), handed out in Week 9, Term 2 and due in Week 6, Term 3.

Students are expected to develop their own research problem, using their own original ideas. Evidence will be required that the final work submitted for marking is the student's own. Students who have submitted plagiarised work as their own may be awarded zero marks.

Each teacher has created a OneNote workbook where students are to complete their IRP.

Students are expected to follow the following timeline in order to achieve maximum marks:

- **Term 2, week 9 -** IRP issued. Students begin to formulate their Research Problem. Log Book commenced.
- **Term 3, week 1 -** Research Problem (Aim) designed and relevant research indicating how your research relates to the problem being investigated. Hypothesis developed and Variables identified. Teacher will mark and give feedback.
- **Term 3, week 2 -** Method designed and recorded. Teacher to give feedback. Report should be commenced by now. Teacher will provide constructive improvements to be addressed before the final submission.
- **Term 3, week 6 -** Investigation conducted and final report (and changes made) completed in OneNote. Teacher will grade the final submission.

What is an independent research project?

An independent research project requires you to think of an interesting problem or question that you can answer by doing a scientific experiment. The best types of problems allow you to gather your results in numbers (**quantitative** results). They can then be graphed easily. For example, if you do an experiment with plants to determine which conditions they grow best in, you can get results by measuring their heights in centimetres. As an addition to your quantitative results you could also describe the results in words. These are called **qualitative** results.

What project to choose

You can choose any project you may be interested in. Just remember that you will need to research your problem (and prove your research) and that an experiment always has a variable that is changed so that it may be tested, and is not just demonstrating something. So, showing that putting mentos in coke will cause it to erupt, or that water will boil at 100^{o}C is NOT an experiment. But changing a variable in these activities and seeing the effect on the coke eruption or the effect on the boiling point of water IS an experiment. Good luck!

If you cannot think of your own project idea, you can choose one of the following:

*How does temperature affect the solubility of substances in water.

*How do generic products perform compared to the brand name products?

*Which packing materials are best at protecting breakable objects.

METHOD OF SUBMISSION	**ALL WORK WILL BE SUBMITTED ON ONENOTE** Late submissions lose 25% the first day, 50% the second day and on the third day no grade is given. Work that is plagiarised will not receive a grade and will need to be resubmitted. Sources that have been used in your assignment need to be acknowledged in a reference list. Computer / printer malfunctions are not considered a valid excuse for submitting an assessment late. Extensions must be requested from the TLC well before the due date

San Clemente High School IRP Guidelines

To demonstrate competency in the formulation of an Independent Research Project, students must select a project that embodies the following performance outcomes:

INITIATING THE INQUIRY:

What is the evidence that the student can formulate questions that can be explored byscientific investigations as well as articulate a testable hypothesis?

- Conducts research that informs the investigation (including bibliography)
- Asks empirically testable, scientific questions as an Aim
- Constructs drawings, diagrams, or models to represent what's being investigated
- Formulates a testable hypothesis that is directly related to the question asked

PLANNING AND CARRYING OUT INVESTIGATIONS:

What is the evidence that the student can design and perform investigations to explorenatural phenomena?

- Designs controlled experiments (with multiple trials) to test the suggested hypothesis
- Identifies and explains the independent and dependent variables in the hypothesis
- Clearly communicates the details of the procedures so that they can be replicated by another group of students
- Creates a detailed and clear data collection method for all trials
- Conducts multiple trials

REPRESENTING, ANALYSING AND INTERPRETING THE DATA:

What is the evidence that the student can organise, analyse, and interpret the data?

- Organises the data in tables and/or graphs
- Expresses relationships and quantities (units)
- Explains mathematical computation results in relationship to the expected outcome
- Analyses and interprets the data and finds patterns
- Draws inferences from the data
- Suggests strengths or weaknesses in inferences from which further investigation could result

CONSTRUCTING EVIDENCE BASED ARGUMENTS AND CONCLUSIONS:

What is the evidence that the student can articulate evidence-based explanations and effectively communicate conclusions?

- Able to discuss limitations of investigation, identify weaknesses in data and propose suggestions for further investigation for clarification
- Provides multiple representations to communicate conclusions (words, tables, diagrams, graphs, and/or mathematical expressions)
- Draws conclusions with specific discussion of limitations
- Uses language and tone appropriate to the purpose and audience
- Follows conventions of scientific writing, including accurate use of scientific/technical terms, quantitative data, and visual representations

IRP Marking Rubric 2017

Marks will be awarded in five sections of the IRP:

1. **Initiating the inquiry**
2. **Design of experimental procedures**
3. **Data collection, analysis, presentation and interpretation**
4. **Conclusions and Discussions**
5. **Conventions**

Initiating the Inquiry: What is the evidence that the student can formulate questions that can be explored by scientific investigations, articulate a testable hypothesis, identify variables and conduct research to support their question?

E	E/D	D	D/C	C	C/B	B	B/A	A
- The inquiry question is irrelevant to the investigation. **- The student attempts to make a prediction of the expected results.**		**-The inquiry question is stated in general terms** **- Research is limited or irrelevant** **- The student articulates a prediction, but it has limited relationship to the question under investigation.** **-Student makes no reference to variables.**		**The inquiry question is stated in specific terms** **- Research is relevant to the question, but is not well organised.** **- The student articulates a prediction of the expected results, but with no explanation.** **-Student attempts to identify variables.** **-Student provides a sound logbook as a record of experimental progress.** **- Student attempts to reference second hand data in a bibliography.**		**The inquiry question is specific and testable.** **- Research is relevant and well organised.** **- The student articulates a prediction of the expected results, with reference to background research.** **-Student correctly identifies variables.** **-Student provides a detailed logbook as a record of experimental progress.** **- - Student provides a bibliography to cite research.**		**The inquiry question is specific, testable and challenging.** **- Research is relevant, well organised and provides insight into the inquiry.** **- The student articulates a possible explanation to the investigated question and a clear description of the expected relationships among the involved variables which are clearly stated.** **-Student provides a thorough logbook as a record of experimental progress.** **- Student provides a thorough bibliography to cite research.**

Design of experimental procedures: What is the evidence that the student can design and perform investigations to explore natural phenomena?

E	E/D	D	D/C	C	C/B	B	B/A	A
-The student attempts to record a method that is difficult to follow.		- The experimental design is not relevant for the stated question. -The method is vague and difficult to follow. - The data collection methods are vague and difficult to follow. - The inquiry design does not allow control of the independent variable.		- The experimental design is partially related to the stated question. -The method is detailed but incomplete. - The data collection methods are detailed but incomplete. - The inquiry design allows for control of one variable and measurement of one dependent variable.		- The experimental design matches the stated question. -The method is detailed and clear. - The data collection methods are detailed and clear. - The inquiry design allows for control of all involved variables and measurement of one dependent variable.		- The experimental design matches the stated question and shows innovation. -The method is detailed, clear and logical. - The data collection methods are detailed, clear and logical. - The inquiry design allows for control of all involved variables and valid measurement of the dependent variable.

Data collection, analysis, presentation and interpretation: What is the evidence that the student can organise and analyse the data?

E	E/D	D	D/C	C	C/B	B	B/A	A
- Limited data are based on one trial only. - The student does not record data in a table.		- Data are based on one trial only. -Data tables are limited. - The student attempts to record data in a graph that contains inaccuracies. - Data analysis and interpretation are inaccurate or irrelevant.		- Data are based on one trial only. -Data tables and graphs are presented, but they may be poorly organised. - Data analysis and interpretation are relevant, but not necessarily accurate.		- Data collected from several repetitions of the experiment. - Data tables and graphs are accurate and appropriately organised. - Data analysis and interpretation are accurate and relevant to the inquiry question.		- Data collected from several repetitions of the experiment and are consistent within a reasonable range. - Data tables and graphs are accurate and expertly organised and presented. - Data analysis and interpretation are thorough and directly related to the inquiry question.

Conclusions and Discussions: What is the evidence that the student can interpret the data, draw conclusions, and assess the validity of the conclusions?

E	E/D	D	D/C	C	C/B	B	B/A	A
- The conclusion offers limited relevance to the data.		**- The conclusions are not consistent with the data. - Limited sources of experimental errors are identified. - New relevant questions are not posed.**		**- The conclusions are based on the data. - Sources of experimental errors are identified, but their impact is not discussed. - New questions are posed but are not relevant.**		**- The conclusions are clear and consistent with the data. - The impact of possible sources of experimental errors on the results is discussed. - New relevant questions are posed.**		**- The conclusions are clear, consistent with the data and compared to the data from professional literature. - The impact of possible sources of experimental errors on the results is discussed and solutions offered to minimise future errors. - New relevant questions and suggestions for further research are developed.**

Conventions: What is the evidence that the student can accurately use scientific conventions to communicate ideas to others?

E	E/D	D	D/C	C	C/B	B	B/A	A
- Limited attempt to use appropriate language or tone.		**- Language and tone are inappropriate to the purpose and audience. - Attempts to follow the norms and conventions of scientific writing with major, consistent errors, for example in the use of scientific/technical terms, quantitative data, or visual representations.**		**- Language and tone are appropriate to the purpose and audience with minor inaccuracies. - Follows the norms and conventions of scientific writing with consistent minor errors, for example in the use of scientific/technical terms, quantitative data, or visual representations.**		**- Language and tone are appropriate to the purpose and audience. - Follows the norms and conventions of scientific writing including use of scientific/technical terms, quantitative data, and visual representations.**		**- Language and tone are appropriate to the purpose and audience. - Consistently follows the norms and conventions of scientific writing including use of scientific/technical terms, quantitative data, and visual representations.**