ORANGE HIGH SCHOOL

ASSESSMENT TASK NOTIFICATION

Subject	Investigating Science
Year	12 (HSC)
Weighting	20%
Teacher	Mr Routh
Head Teacher	Mr Shea
Date given	Thursday the 21st of February 2019 – Week 4A Term 1
Date and school week	Wednesday the 20th of March 2019 – Week 8A Term 1 - Portfolio is due to the library by 9am - Presentations on the same day, during class Period 3.

Assessment Outline

PART 1 – Technology selection and research

- Select your technologies to research. TWO from the syllabus selections and TWO medical technologies.
- Begin your research as per the scaffold in Part 2.

PART 2 – Depth Study Portfolio

- Students will complete a portfolio and use the question guide, as a starting point to structure their ideas about technology and how it has help develop our scientific understanding of the world. They will submit this work and their research as a portfolio.

PART 3 – Presentation

- Students will present their depth study analysis during the Wednesday lesson. This will be marked by the teacher in a one-on-one discussion. (Time limit 2-3 minutes)
- All work will be submitted to the library by 9am on Wednesday the 20th of March 2019 – Week 8A Term 1.

Non-completion of Task:

If you know you are going to be away on the day that the task is due, you must make alternative arrangements with your classroom teacher. If you are away on the day of the examination, you must catch up with your classroom teacher on the first day you return to make alternate arrangements to catch up on this task.

Failure to follow the above procedures may result in a zero award.

Outcomes Assessed

INS12 – 1 Develops and evaluates questions and hypotheses for scientific investigation

INS12 – 4 Selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media

INS12 – 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose

INS12 – 13 Describes and explains how science drives the development of technologies

Year 12 Investigating Science Assessment Task 2

Depth Study Portfolio and Presentation

Weighting: 20%

TOPIC: Module 6 - Technologies

Due Date: Wednesday 20th March 2019 - Week 8A Term 1

Task Overview:

This task contains three parts.

PART 1 – Technology selection and research

- Select your technologies to research. TWO from the syllabus selections and TWO medical technologies.
- Begin your research as per the scaffold in Part 2.

PART 2 – Depth Study Portfolio

• Students will complete a portfolio and use the question guide, as a starting point to structure their ideas about technology and how it has help develop our scientific understanding of the world. They will submit this work and their research as a portfolio.

Part 3 – Presentation

• Students will present their depth study analysis during the Wednesday lesson. This will be marked by the teacher in a one-on-one discussion. (Time limit 2-3 minutes)

• All work will be submitted to the library by 9am on Wednesday the 20th of March 2019 – Week 8A Term 1.

Syllabus Outcomes:

INS12 – 1 Develops and evaluates questions and hypotheses for scientific investigation
INS12 – 4 Selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media
INS12 – 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose
INS12 – 13 Describes and explains how science drives the development of technologies

STEPS TO COMPLETE THIS TASK:

Part 1:

1. Select TWO of the four technologies below to research (from the syllabus).

- Computerised simulations and models of the Earth's geological history
- X-ray diffraction and the discovery of the structure of deoxyribonucleic acid (DNA)
- Technology to detect radioactivity and the development of atomic theory
- The Hadron collider and discovery of the Higgs boson

2. *Medical technology* can be considered as any *technology* used to save lives in individuals suffering from a wide range of conditions. In its many forms, *medical technology* is already diagnosing, monitoring and treating virtually every disease or condition that affects us.

   Technological developments lead to advances in science, its theories and laws and consequently drives new developments and creates new needs in society.

Select TWO medical technologies to research from the list below or any that you're interested in:

- Biomaterials used in biomedical devices (bionics)
- Improved surgical technique to treat a named medical condition
- 3D printer in medicine
- Diagnosis of medical condition – invasive or non-invasive
- Electromagnetic waves in medicine for diagnosis or treatment
- Genetic modification to treat disease
- 4D ultrasound
- Key hole and micro surgery
- Advanced biomaterials

Part 2:

Please note that the scaffolds supplied are here to assist you how to organise your ideas and gives you an idea of where to start your research. The scaffolds will not give you full marks, marks will depend on your level of understanding of the concepts and the technologies.

A simple scaffold to research and organise your ideas (use the more detailed scaffold in the how to organise the portfolio section):

a. Medical Technology: _____
b. Year of Discovery/Application of this Technology: _____
c. Link this Technology to a Scientific Model, Theory or Law:

_____

_____

_____

d. Assessment of Impact and Implications of this Technology:

- BEFORE…Explain previous technology utilised OR lack of technology to utilise
- CONTRIBUTION…Explain how this new technology is used in a named field of medicine
- AFTER THE CONTRIBUTION…How has this technology enhanced understanding or progressed knowledge of a named field of medicine?

Scaffold: Abstract

This is a 250 word (maximum) summary of the portfolio and all the other sections of this assessment. This must be completed last and after you have done the rest of the sections. It is to be then inserted into the first section of the portfolio.

An abstract summarises, usually in one paragraph of 250 words or less, the major aspects of the entire portfolio in a prescribed sequence that includes:
1) The overall purpose of the research problem(s) you investigated;
2) The basic design of the portfolio;
3) Major findings or trends found as a result of your analysis; and,
4) A brief summary of your interpretations and conclusions of your research.

http://libguides.usc.edu/writingguide/abstract

Scaffold: A brief analysis of three scientific articles related to the field study

Students must review THREE scientific articles. They must write a summary of each article and discuss the relevance of each article to any of their chosen technologies

1. Find a few articles linked to your various technologies
2. Read the articles, to see if you think it is related to your work. Read the abstract, it is a good start to have a quick general idea of the article.
3. If it is ok, read and write down summary dot points. (about 10 – 20, should be enough)
4. As you go, note down how any of the information is relevant (does it relate to the technology, if so, how)
5. Once completed write down in full sentences a summary of each article (8 sentences per article).
6. Write TWO paragraphs on how it relates to your technology (2 paragraphs per article).
7. You must reference your articles as well.

Part 3:

Portfolio of the students' research and bibliography will be submitted to the library by 9am, on Wednesday the 20th of March 2019 – Week 8A Term 1.

1. Students will present their depth study analysis during the Wednesday lesson. This will be marked by the teacher in a one-on-one discussion. (Time limit 2-3 minutes)

2. This discussion involves students using their portfolio as a stimulus to demonstrate their knowledge of the concepts and skills needed to conduct their Depth Study Research.

How to organise your portfolio:

1. **In an A4 display folder**
2. **All information is to be printed and neat.**
3. **The portfolio must follow the below organisation:**
   - i. **Title page (include your name, class and teacher)**
   - ii. **Contents page**
   - iii. **Abstract (one paragraph)**
   - iv. **A brief summary of each of the four technologies selected (max one paragraph each)**
   - v. **Technology 1 (Syllabus) (Minimum 2 pages)**
     a. Identify the technology
     b. Identify the year that the technology was made
     c. Detailed link explained between the technology and its corresponding scientific model, theory or law (approx. ½ page)
     d. Pictures of the technology (minimum 4 pictures or diagrams)
     e. A detailed assessment of the impact/implications of the technology: (approx. 1 page)
        - BEFORE…Explain previous technology utilised OR lack of technology to utilise
        - CONTRIBUTION…Explain how this new technology is used in a named field of medicine
        - AFTER THE CONTRIBUTION…How has this technology enhanced understanding or progressed knowledge of a named field of medicine?

     f. Assess the impact that developments in the technology have had on the accumulation of evidence for any related scientific theories, laws or models (minimum 3 paragraphs)
   - vi. **Technology 2 (Syllabus) (Minimum 2 pages)**
     a. Identify the technology
     b. Identify the year that the technology was made
     c. Detailed link explained between the technology and its corresponding scientific model, theory or law (approx. ½ page)
     d. Pictures of the technology (minimum 4 pictures or diagrams)
     e. A detailed assessment of the impact/implications of the technology: (approx. 1 page)
        - BEFORE…Explain previous technology utilised OR lack of technology to utilise
        - CONTRIBUTION…Explain how this new technology is used in a named field of medicine
        - AFTER THE CONTRIBUTION…How has this technology enhanced understanding or progressed knowledge of a named field of medicine?

     f. Assess the impact that developments in the technology have had on the accumulation of evidence for any related scientific theories, laws or models (minimum 3 paragraphs)
   - vii. **Medical Technology 1 (Depth Study) (Minimum 2 pages)**
     a. Identify the technology
     b. Identify the year that the technology was made
     c. Detailed link explained between the technology and its corresponding scientific model, theory or law (approx. ½ page)
     d. Pictures of the technology (minimum 4 pictures or diagrams)
     e. A detailed assessment of the impact/implications of the technology: (approx. 1 page)
        - BEFORE…Explain previous technology utilised OR lack of technology to utilise
        - CONTRIBUTION…Explain how this new technology is used in a named field of medicine
        - AFTER THE CONTRIBUTION…How has this technology enhanced understanding or progressed knowledge of a named field of medicine?

f. Assess the impact that developments in the technology have had on the accumulation of evidence for any related scientific theories, laws or models (minimum 3 paragraphs)

viii. Medical Technology 2 (Depth Study) (Minimum 2 pages)

a. Identify the technology
b. Identify the year that the technology was made
c. Detailed link explained between the technology and its corresponding scientific model, theory or law (approx. ½ page)
d. Pictures of the technology (minimum 4 pictures or diagrams)
e. A detailed assessment of the impact/implications of the technology: (approx. 1 page)
   - BEFORE…Explain previous technology utilised OR lack of technology to utilise
   - CONTRIBUTION…Explain how this new technology is used in a named field of medicine
   - AFTER THE CONTRIBUTION…How has this technology enhanced understanding or progressed knowledge of a named field of medicine?
f. Assess the impact that developments in the technology have had on the accumulation of evidence for any related scientific theories, laws or models (minimum 3 paragraphs)

ix. Scientific Article analysis (Minimum 1 ½ pages)

a. Once completed write down in full sentences a summary of each article (8 sentences per article).
b. Write TWO paragraphs on how it relates to your technology (2 paragraphs per article).

x. Reference list

Marking Rubric: **Depth Study Portfolio and Presentation** **NAME:** _____

Outcomes Assessed:	Task section	Developing	Achieving	High	Exemplary	Total:
INS12 – 1 Develops and evaluates questions and hypotheses for scientific investigation	**Scientific Article analysis**	• ONE article selected • Descriptions of each article given (less than 8 sentences each) **1 – 2 marks**	• TWO linked articles selected • Descriptions of each article given (less than 8 sentences each) • TWO paragraphs for each article which demonstrate a link between the article and the technology selected **3 – 6 marks**	• THREE clearly linked articles selected • Descriptions of each article given (less than 8 sentences each) • TWO paragraphs for each article which demonstrate a link between the article and the technology selected • Good use of language, including scientific terminology. **7 – 8 marks**	• THREE clearly linked articles selected • Detailed descriptions of each article given (8 sentences each) • TWO paragraphs for each article which demonstrate a link between the article and the technology selected • Sophisticated language used, including scientific terminology. **9 – 10 marks**	
INS12 – 4 Selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media	**TWO technologies** **Linked to the syllabus**	• Identifies TWO technologies linked the syllabus and the year they were invented/used • A visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology **1 – 2 marks**	• Identifies TWO technologies linked the syllabus and the year they were invented/used • A link between the technology and the corresponding concept is given • A visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology **3 – 5 marks**	• Clearly identifies TWO technologies linked the syllabus and the year they were invented/used • Satisfactory link between the technology and the corresponding concept • A labelled visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology • Satisfactory assessment and explanation of how the technology has helped to accumulate information and led to the development of the concept **6 – 8 marks**	• Clearly identifies TWO technologies linked the syllabus and the year they were invented/used • Detailed link between the technology and the corresponding concept • A clearly labelled visual representation is supplied of the technology • Detailed assessment of the impacts or implications of the technology • Detailed assessment and explanation of how the technology has helped to accumulate information and led to the development of the concept **9 – 10 marks**	
	TWO technologies **Additional Depth Study analysis**	• Identifies TWO technologies not linked to the syllabus and the year they were invented/used • A visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology **1 – 2 marks**	• Identifies TWO technologies not linked to the syllabus and the year they were invented/used • A link between the technology and the corresponding concept is given • A visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology **3 – 5 marks**	• Clearly identifies TWO technologies not linked to the syllabus and the year they were invented/used • Satisfactory link between the technology and the corresponding concept • A labelled visual representation is supplied of the technology • Satisfactory assessment of the impacts or implications of the technology • Satisfactory assessment and explanation of how the technology has helped to accumulate information and led to the development of the concept **6 – 8 marks**	• Clearly identifies TWO technologies not linked to the syllabus and the year they were invented/used • Detailed link between the technology and the corresponding concept • A clearly labelled visual representation is supplied of the technology • Detailed assessment of the impacts or implications of the technology • Detailed assessment and explanation of how the technology has helped to accumulate information and led to the development of the concept **9 – 10 marks**	

Outcomes Assessed:	Task section	Developing	Achieving	High	Exemplary	Total:
INS12 – 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose	**Presentation of the portfolio**	• Portfolio organisation is followed correctly • Includes a variety of visual representations linked to the technology • Abstract given • Bibliography (less than 4 supplied) **1 – 2 marks**	• Portfolio organisation is followed correctly • Most of the work is neatly printed and is placed in an A4 display folder • Includes a variety of visual representations linked to the technology • Abstract given • Bibliography (5 – 9 supplied) **3 – 4 marks**	• Portfolio organisation is followed correctly and is mostly the same as the scaffold • All work is neatly printed and is placed in an A4 display folder • Includes a variety of visual representations linked to the technology • Detailed abstract given • Detailed bibliography (10 – 14 supplied) **5 marks**	• Portfolio organisation is followed correctly and is 100% the same as the scaffold • All work is neatly printed and is placed in an A4 display folder • Includes a variety of visual representations linked to the technology • Clear and detailed abstract given, within the word limit • Detailed bibliography (minimum 15 supplied) **6 marks**	
INS12 – 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose	**Presentation to the teacher (discussion)**	• Links discussion to bibliography • Links to the portfolio and bibliography **1 mark**	• Links discussion to bibliography (5 sources) • Links to the portfolio and bibliography • Presented with some confidence • Easy flowing discussion **2 marks**	• Links discussion to bibliography (5 - 9 sources) • Good use of the portfolio and bibliography, uses the portfolio as a medium to engage the audience • Presented with some confidence and good eye contact • Easy flowing discussion **3 marks**	• Links discussion to a completed bibliography (minimum 10 sources) • Effective use of the portfolio and bibliography, uses the portfolio as a medium to engage the audience • Presented with confidence and good eye contact • Discussion sounds natural and not read off palm cards **4 marks**	
INS12 – 13 Describes and explains how science drives the development of technologies	**Presentation to the teacher (discussion)**	• Limited understanding of the depth study analysis and the concepts involved • Minimal use of scientific terminology **1 - 2 mark**	• Demonstrates a good level of knowledge of the depth study analysis • Students uses some scientific terminology • Demonstrates some understanding of the concepts involved in the depth study analysis **3 marks**	• Through discussions with the teacher during the presentation, students demonstrate a high level of knowledge of the depth study analysis • Students uses some scientific terminology • Demonstrates a good understanding of the concepts involved in the depth study analysis **4 marks**	• Through discussions with the teacher during the presentation, students demonstrate a deep knowledge of the depth study analysis • Students use of scientific terminology is at an exemplary level • Student can demonstrate an exemplary understanding of the concepts involved in the depth study analysis **5 marks**	
					Total Marks:	**__/45**

Teacher Feedback: