**Yr11 Investigating Science Depth Study Marking Rubric**

**Name(s): Title: Class:**

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| **Curriculum**  **Outcomes**  **Skills** | **Descriptor** | **Depth Study**  **Reference** | **Above Stage** | **At stage** | **Beginning Stage** |
| **Questioning and predicting\***  **INS11-1**  **(Section 1 and 2 of Depth Study)** | develops and evaluates questions and hypotheses for scientific investigation | **Questioning**   * 1. Q 6,   2. Q 1, 2, 3   3. Q 1, 2, 3,   4. Q 1, 2   **Predicting**  **2.2 & 2.6** Q 2 | ● develops and evaluates a range of inquiry questions and hypotheses to identify an original concept that can be investigated scientifically, involving original primary data and clearly linked to and supported by secondary data  ● multiple reviews and justified modifications of questions and hypotheses to reflect growing depth of knowledge and incorporation of new evidence | ● develops and evaluates inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and secondary data  ● single modification of questions and hypotheses to reflect new evidence | ● develops an inquiry question and hypotheses to identify a concept that can be investigated scientifically, involving primary and/or secondary data  ● modifies question or hypotheses |
| **Planning investigations**  **INS11-2**  **(Section 2 of Depth Study)** | designs and evaluates investigations in order to obtain primary and secondary data and information | **Aim**  **2.1**  **Variables**  **1.1** Q 1, 2, 3, 4, 5  **2.3** Q 1, 2, 3, 4  **Designing**  **2.5** Q2 & **3.1**  **Method & Risk**  **2.7 & 2.8** | ● assesses more than 2 risks, and selects appropriate materials and technologies when designing and planning an original investigation  ● justifies and evaluates the use of dependent and independent variables and experimental controls to ensure that a valid procedure is developed that allows for the reliable collection of data. Attention to detail in method when identifying and avoiding influence of controlled variables.  ● evaluates, modifies and justifies an investigation in response to new evidence | ● assesses two risks, and selects appropriate materials and technologies when designing and planning an investigation  ● justifies and evaluates the use of dependent and independent variables and experimental controls to ensure that a valid procedure is developed that allows for the reliable collection of data  ● evaluates and modifies an investigation in response to new evidence | ●identifies a risk, and/or selects appropriate materials or technologies when designing and planning an investigation  ● justifies and/or evaluates the use of variables and/or experimental controls for a mostly valid procedure that allows for repetition of data  ● modifies an investigation in response to new evidence |
| **Conducting Investigations**  **INS11-3**  **(Section 2 and 3 of Depth Study)** | conducts investigations to collect valid and reliable primary and secondary data and information | **Secondary source research**  **2.4** Q 1, 2, 3, 4  **2.5** Q1  **Data collection**  **3.2 & 3.3**  **Referencing**  **2.4** Q4  **Bibliography**  Section 5 | ● employ, evaluates and documents safe work practices and managed risks  ● uses appropriate technologies to ensure and evaluate accuracy  ● selects, extracts and cross references information from a wide range of reliable secondary sources and acknowledges them using an accepted referencing style | ● employs and evaluates safe work practices and manages risks  ● uses appropriate technologies to ensure and evaluate accuracy  ● selects and extracts information from a wide range of reliable secondary sources and acknowledges them using an accepted referencing style | ● employs safe work practices  ● uses appropriate technologies to ensure accuracy  ● selects and/or extracts information from reliable secondary sources and acknowledges them using a referencing style |
| **Processing data and information**  **INS11-4**  **Analysing data and information**  **INS11-5**  **Problem Solving**  **INS11-6**  **(Section 3 and 4 of Depth Study)** | 11-4 selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media  11-5 analyses and evaluates primary and secondary data and information  11.6 solves scientific problems using primary and secondary data, critical thinking skills and scientific processes | **Data representation**  **3.3** Graph  **4.3** Sankey  **Data trends**  **4.1** Q1, 2  **Assessment**  **4.2** Q1, 2, 3, 4  **Problem Solving**  **4.6** Q1, 2, 3 & **4.7** | ● selects qualitative and quantitative data and information and represents them using a range of formats, digital technologies and appropriate media  ● evaluates, improves and justifies the quality of data  ● derive trends, patterns and relationships in data and information  ● assess error, uncertainty and limitations in data  ● assess the relevance, accuracy, validity and reliability of primary and secondary data and suggest improvements to investigations  ● use modeling (including mathematical examples) to explain phenomena, make predictions and solve problems using evidence from primary and secondary sources  ● use scientific evidence and critical thinking skills to solve problems | ● selects qualitative and quantitative data and information and represents them using a range of formats, digital technologies and appropriate media  ● evaluates and improves the quality of data  ● derive trends, patterns and relationships in data and information  ● assesses error, uncertainty and limitations in data  ● assesses the relevance, accuracy, validity and reliability of primary and secondary data and suggest improvements to investigations  ● use modeling (including mathematical examples) to explain phenomena, make predictions and solve problems using evidence from primary and secondary sources  ● use scientific evidence and critical thinking skills to solve problems | ● selects qualitative and/or quantitative data and/or information and represents them  ● improves the quality of data  ● derives a trend, pattern or relationship in data and information  ● assess an error, uncertainty or limitations in data  ● assess the relevance, accuracy, validity and/or reliability of primary and/or secondary data and suggests an improvement to investigations  ● uses modeling to explain phenomena, make predictions and/or solve problems using evidence from primary and/or secondary sources  ● use scientific evidence and/or critical thinking skills to solve problems |
| **Communicating\***  **INS11-7**  (**Section 5 of Depth Study)** | communicates scientific understanding using suitable language and terminology for a specific audience or purpose | **Planning communication**  **Section 5**  Q1, 2, 3, 4, 5  &  **Actual communication of investigation** | ● selects and uses suitable forms of digital, visual, written and oral forms of communication  ● selects and always applies appropriate scientific notations, nomenclature and scientific language to communicate in a variety of contexts  ● constructs evidence-based arguments with strong links to collected data. Engages in peer feedback to evaluate an argument or conclusion, incorporates that feedback into Depth Study | ● selects and uses suitable forms of digital, visual, written and/or oral forms of communication  ● selects and mostly applies appropriate scientific notations, nomenclature and scientific language to communicate in a variety of contexts  ● constructs evidence-based arguments and engages in peer feedback to evaluate an argument or conclusion | ● selects or uses digital, visual, written and/or oral forms of communication  ● selects or applies scientific notations, nomenclature and/or scientific language to communicate in a variety of contexts  ● constructs arguments |
| **Curriculum**  **Outcomes**  **Content** | **Inquiry Questions** | **Depth Study**  **Reference** | **Above Stage** | **At stage** | **Beginning Stage** |
| **Scientific Models**  **INS11-10\***  develops, and engages with, modeling as an aid in predicting and simplifying scientific objects and processes | **Models to Inform Understanding**  What is a scientific model?  What makes scientific models useful? | **Role of a Model**  **4.4** Q1, 2, 3, 4  **Strengths and Limitations**  **4.5** Q1, 2 | ● examines 3 or more types and use of models that may be used in science – with specific relevance to the Depth Study  ● explains how scientific models are used to make predictions that are difficult to analyse in the real world due to time frames, size, cost and other limitations  ● assesses the effectiveness of models at facilitating the understanding of scientific processes and concepts | ● examines 1 or 2 types and uses of models that may be used in science – with relevance to the Depth Study  ● explains how scientific models are used to make predictions that are difficult to analyse in the real world due to time frames, size and cost  ● assesses the effectiveness of models at facilitating the understanding of scientific processes | ● examines the types or use of models that may be used in science  ● identifies how scientific models are used to make predictions  ● identifies how models can facilitating the understanding of scientific processes |
| **Constructing a Model**  How can a model be constructed to simplify understanding of a scientific concept | **Model planning and Building**  **2.5** Q2  **3.1** | ● investigates a scientific concept and process that can be represented using a model, by:  – planning a model with reference to the scientific literature and clear and extensive incorporation of the literature findings into the building of the model  – constructing a model using appropriate resources beyond the ATSE kit to represent the selected scientific concept | ● investigates a scientific concept or process that can be represented using a model, by:  – planning a model with reference to the scientific literature  – constructing a model using appropriate resources to represent the selected scientific concept | ● investigates a scientific concept or process that can be represented using a model, by:  – planning a model  – constructing a model using appropriate resources |
| Comment: | | | | | |

\*Compulsory section of Depth Study (Note: any one of the 4 Modules can be extended)