**Yr12 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\***  **INS12-1**  **(Section 1 and 2 of Depth Study)** | develops and evaluates questions and hypotheses for scientific investigation | **Questioning**   * 1. Q6,   2. Q 1, 2, 3   3. Q 1, 2, 3,   4. Q 1, 2   **Predicting**  **2.2&2.6** Q 2 | ● develops and evaluatesa 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 questionsand 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 questionor hypotheses |
| **Planning investigations**  **INS12-2**  **(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** Q1,2,3,4,5  **2.3** Q 1,2,3, 4  **Designing**  **2.5** Q2&**3.1**  **Method& Risk**  **2.7& 2.8** | ● assessesmore 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, modifiesand 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**  **INS12-3**  **(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 | ● employssafe 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**  **INS12-4**  **Analysing data and information**  **INS12-5**  **Problem Solving**  **INS12-6**  **(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** Q1Sankey  **Data trends**  **4.1** Q1, 2  **Problem Solving**  **4.4** & **4.5** | ● 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, patternor 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  ● usesmodeling 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\***  **INS12-7**  (**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** |
| **Fact or Fallacy**  **INS12-14**  uses evidence-based analysis in a scientific investigation to support or refute a hypothesis | **Testing Claims**  How can claims be tested? | **Experimental procedure**  **4.2** Q1, 2, 3, 5  **Claims**  **4.1** Q4  **4.2** Q4 | ● plan and conduct an investigation based on testing a claim, and considers all of the following to a high level of detail: validity of the experimental design, reliability of the data obtained, accuracy of the procedure, including random and systematic error  ● evaluates the impact that sample sizes can have on the results of an investigation  ● assesses emotive advertising against evidence-based claims, including but not limited to claims about the efficacy of a product. | ● plans and conducts an investigation based on testing a claim, and considers all of the following: validity of the experimental design, reliability of the data obtained, accuracy of the procedure, including random and systematic error  ● evaluates the impact that sample sizes can have on the results of an investigation  ● compares differences and similarities of emotive advertising with evidence-based claims, including but not limited to claims about the efficacy of a product | ● plans and conducts an investigation based on testing a claim, and considers some of the following: validity of the experimental design, reliability of the data obtained, accuracy of the procedure, including random and systematic error  ● identifies one aspect of impact of sample size  ● compares differences of emotive advertising with evidence-based claims |
| **Impacts on Investigations**  What factors can affect the way data can be interpreted, analysed and understood? | **4.3** Q2, 3, 4, 5, 6 | ● using control groups in order to draw valid conclusions  ● evaluate the impact of societal and economic influences on the interpretation and manipulating statistical data | ● using control groups in order to draw valid conclusions  ● evaluate the impact of societal or economic influences on the interpretation or manipulating statistical data | ● using control groups  ● identifies the impact of societal and economic influences on the interpretation and manipulating statistical data |
| **Reading between the lines**  How does reporting of science influence the general public understanding of the subject? | **4.4** Q1, 2, 3, 4 | ● examines multiple examples of contemporary scientific debates and how they are portrayed in the mainstream media, including and beyond: accuracy of information, validity of data, reliability of information sources  ● evaluate the use and interpretation of media reporting of scientific developments with multiple examples  ● analyse how conflicts of interest can result in scientific evidence being suppressed, misinterpreted and misrepresented, giving examples of each. Discuss measures to counteract such conflicts, including commercial industries researching products for market  ● describe the halo effect and, using multiple relevant examples, explains how the influence of positive perceptions can result in the rejection of valid alternative perspectives | ● examines a contemporary scientific debate and how it is portrayed in the mainstream media, including; accuracy of information, validity of data, reliability of information sources  ● evaluates the use and interpretation of media reporting of scientific developments  ● analyse how conflicts of interest can result in scientific evidence being suppressed, misinterpreted or misrepresented and discuss measures to counteract such conflicts, including commercial industries researching products for market  ● uses the halo effect to explain how the influence of positive perceptions can result in the rejection of valid alternative perspectives | ● examines a contemporary scientific debate and how it is portrayed in the mainstream media, including some of the following: accuracy of information, validity of data, reliability of information sources  ● identifies the use and/or interpretation of media reporting of scientific developments  ● analyse conflicts of interest related to scientific evidence  ● use the halo effect to identify the influence perceptions of scientific evidence |
| Comment: | | | | | |

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