When assessing student work against the specific features described in the Earth and Environmental Sciencesubject outline, the following pointers may assist in making judgements about the quality of the evidence provided.

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| **Specific Feature** | **Evidence assessed** | **Higher quality evidence** | **Lower quality evidence** |
| **IAE1**  Investigation design | * Deconstruction of a problem * Hypothesis and variables, or an investigable question * Materials/apparatus * Method that outlines the trials and steps to be taken * Controlled and uncontrolled factors * Identification and management of safety and/or ethical risks * Justification for the design | * Detailed deconstruction exploring a range of aspects of a problem with critical thinking * Detailed design of an investigation for which outcome is uncertain * Hypothesis expressed with single independent variable in conventional format * Method is a valid test of the hypothesis proposed * Method has sufficient detail to be implemented without further information (e.g. specific types and quantities of apparatus/equipment, data to be collected) * Method could be realistically implemented * Detailed justification for selection of aspects of the method such as specific steps, variables, quantities and mode of measurement * Explanation of how and why to control range of variables * A suitable range of values/variations of the independent variables tested * Suitable sample size for repeated measurements of the dependent variable * Proposed data table to record data to be collected * Description of expected results or findings * Discussion of relevant safety or ethics | * No evidence of deconstruction of a problem * Outcome is known before the investigation is designed * Hypothesis missing/unsuitable/inappropriately expressed, or addresses multiple independent variables * Method is a commonly used procedure with minimal or no individual changes * Method lacking detail (e.g. specific apparatus/equipment, data to be collected) or would be difficult to actually implement * No justification for any aspect of the design * Minimal discussion of variables * Lacking consideration of how/why to control range of variables * Unclear what data is to be collected * No discussion of specific safety, ethical or legal considerations |
| **IAE2**  Representation of data | * Tables with headings and units * Significant figures * Graphs formatted appropriately with axes labelled * Line of best fit | * Collection of appropriate primary data from field work * Tables clearly structured and labeled * Graphs appropriate for the data, correctly labelled, suitable scale, easy to interpret * Appropriate line of best fit * Appropriate conventions for data e.g. averages, sig figs | * Tables/graphs difficult to interpret * Huge amounts of raw data are tabulated without averages * Incorrect type of graph/line of best fit was constructed * Conventions such as sig figs, labels, units of measurement not/incorrectly used |
| **IAE3**  Analysis | * Interpretation of data * Trends, patterns, relationships * Conclusion with justification * Limitations of conclusion | * Trends in data described * Effect of outlier(s) or aberrant values considered * Thorough, accurate interpretation of data relevant to the investigation * Data related to relevant science concepts * Sample calculation of processed data included * Uses findings from data analysis to form a relevant conclusion * Justification of conclusion by referring to results * Discussion of limitations of conclusion(s) e.g. how widely they could be applied | * No reference to data in interpretation/justification * Limited/no justification for the conclusion * Little understanding of limitations of the conclusion |
| **IAE4**  Evaluation | * Control of sources of uncertainty * Effects of errors on reliability, accuracy, validity of data | * Accurate identification and discussion of effects of specific systematic and random errors on data * Relevant links between errors and method * Explanation of the significance of errors on precision and accuracy of results and reliability of conclusion. * Clarity in discussion of precision, accuracy, reliability and validity * Possible explanations for causes of unexpected results including uncontrolled variables * Evaluates the appropriateness of the method to meet the aim of the investigation | * Random errors simply listed/defined * Mistakes confused with errors * Confusion between random and systematic error (or between precision and accuracy) * Very limited discussion or understanding of how significant the effects of errors are on the results * Generic explanation of the effect on data, not related to the specific investigation |
| **KA1**  Knowledge | * Depth and understanding of concepts | * Explanations of concepts show depth and detail (in specified tasks or sections) * Only occasional inaccuracies | * Explanations of concepts lack depth and detail (in specified tasks or sections) * Understanding of concepts (particular ones specified) very weak, many inaccuracies * Questions often not attempted/partially answered * Significant misunderstanding of concepts * Mostly only recall of simple concepts correct * Absence of more complex explanations |
| **KA2**  Application | * Use of knowledge in new and familiar contexts | * Understanding of concepts (particular ones specified) demonstrated in application in both familiar and unfamiliar contexts * Ability to solve problems, clearly communicating problem solving method * Evidence of research in more complex explanations | * Weak problem-solving skills * Difficulty applying understanding in an unfamiliar context * Confused explanations |
| **KA3**  SHE | * Interaction of science and society * Examples of the key SHE concepts | * Interaction between science and society integral to any SHE question * Selection of a focus for the SHE report linked to a Stage 2 topic, allowing relevant science to be included * SHE report focusses on exploring the interaction between science and society but with appropriate attention to the relevant science * SHE concept(s) specifically addressed * SHE concepts identified then further discussed * SHE concepts linked to the topic | * Selected focus of SHE report not linked to Stage 2 topic or has content that is too simple or too complex * Interaction between science and society not discussed * SHE concepts not specifically addressed or hidden in the report * SHE concepts only stated and not specifically discussed * SHE concepts not linked to any aspects of the topic * An information report prepared rather than a SHE investigation report * The focus of the SHE report limits the amount of science that could be included * SHE report focusses on the science rather than exploring the interaction between science and society * Lack of understanding/explanation of connection between science and society * Very few appropriate science concepts in the SHE report |
| **KA4**  Communication | * Representations such as formulae, equations, diagrams * Terminology and conventions * Language skills | * Easy to read and interpret * Conventions using formulae or equations, drawing and labelling diagrams clear and accurate * Conventions for acknowledging sources (in-text, reference list) regularly applied * Appropriate terminology correctly used * Reports are coherent * Structure of practical report appropriate, including all parts specified in subject outline * Concise explanations * Remaining within word limit | * Sentences are very difficult to read/ interpret * Conventions using formulae or equations, drawing and labelling diagrams frequently inaccurate * Conventions for acknowledging sources (in-text, reference list) not/irregularly applied * Appropriate terminology rarely/incorrectly used * Reports lack coherence * Repetition * Exceeding word limit |
| **General comments for teachers** | **Investigations folio** | * Open ended tasks allow students to investigate problems *rather than* tweak existing methods * task allows for exploration of situation with uncertain outcome * Opportunities to ponder, discuss, and research problems leads to creative deconstructions. * Task clearly directs students towards a SHE investigation *rather than* a research topic * Highlighting that the focus of the task is the interaction between science and society | * The scaffolding in investigation(s) limit the ability of the student to show a high level of capability/analysis/evaluation. * Task directs students towards an issues investigation or an information report rather than a SHE investigation * Very prescriptive tasks not allowing students to provide evidence of their deconstruction and investigation design skills. |
| **SATs** | * Questions cover sufficient breadth of the subtopics being assessed * Sufficient balance of descriptions and explanations in questions * Questions give the opportunity to analyse graphs and other data * Questions provide opportunity to apply knowledge and understanding in unfamiliar contexts * Some questions enable students to provide evidence of understanding of SHE * Some questions elicit understanding of science inquiry skills | * No questions give the opportunity to analyse graphs and other data * Questions focus too heavily on the routine and on recall. * Set of tasks provide little opportunity to explain concepts in depth/ apply understanding in new contexts * Set of task do not enable students to provide evidence of understanding of SHE * Set of task do not enable students to provide evidence of understanding of science inquiry skills |