Interdisciplinary inquiry A

Student resource pack – MYP 1

Based on pre-release material for the **November 2016** Interdisciplinary on-screen examination.

The pre-release material can be found at <http://idprm.ibo.org/n16.html#/English>

*Teachers should review ‘support’ sections of task overviews before issuing to students.*

# Interdisciplinary inquiry A – Overview

The statement of inquiry and inquiry questions for this interdisciplinary project are below. See the flow chart below to see how it is structures. Your teacher may provide you with further guidance on how they might like you to approach the tasks.

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| **Pre-release material sources** | <http://idprm.ibo.org/n16.html#/English> | November 2016 |
| **Statement of inquiry** | Individuals, communities and governments, with their different perspectives, all have a role to play in promoting environmental sustainability. | |
| **Global context** | Globalization and sustainability | |
| **Key/ related concepts that may be explored** | Perspective; Change; Systems; Communities  Governance; Environment; Choice; Cause and consequence; Adaptations | |
| **Inquiry questions** | **Factual**  What is sustainability?  What are the benefits of sustainability?  What measures can communities and/or individuals take to help protect the environment?  **Conceptual**  In what ways do our individual choices contribute to global issues?  How do humans interrupt natural environmental processes?  How can designers balance the needs of the environment with the needs of stakeholders?  How can data inform individuals?  How can evidence be used to change perspectives?  **Debatable**  Do governments and communities/individuals have equal responsibility to protect the environment?  Are all perspectives equally valid?  Are systems essential for a sustainable future?  *Please note that some questions may be factual or conceptual, based on the discipline through which it is being explored or the stage of a student’s education.* | |

# Tasks

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| **Task** | A | **Subject** | Integrated sciences | **Pre-release material sources** | 1 |
| **Relevant inquiry questions** | | How do humans interrupt natural environmental processes?  Do governments, communities and individuals have equal responsibility to protect the environment?  What measures can communities and/or individuals take to help protect the environment? | | | |
| **Task description** | | You are a scientist tasked with providing information for a politician who helps decide laws concerning protection of the environment. Your report must inform them about human impacts on the environment, particularly those related to pollution caused by burning fuels.  The politician’s team have given you some questions that they would like answered in your report:   * What are the natural processes in the carbon cycle? * Which human activities affect the carbon cycle? * Which human activities damage the environment, and what are the consequences? * Are there any long-term consequences that could emerge or get worse in the future, and how might this affect people? * What changes could individuals and governments implement to help protect the environment? * What consequences do you believe are the most worrying, and why? * What changes would be the best for the politician to focus on, and why?   *Before beginning to collect information for your report, you should decide which area you would like to focus on. This could be the area in which you live, it could be an area you have visited, it could be an area you have studied or it could be an area that interests you.*  *\* Use at least one source from the materials provided and at least one other source.* | | | |
| **Support** | | *Teachers may add/edit additional support here:* | | | |
| **Relevant objective strands** | | Ai. explain scientific knowledge  Aiii. analyse and evaluate information to make scientifically supported judgments.  Di. explain the ways in which science is applied and used to address a specific problem or issue | | | |

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| **Task** | B | **Subject** | Individuals and societies | **Pre-release material sources** | 5, 6\*, 7 |
| **Relevant inquiry questions** | | Do governments, communities and individuals have equal responsibility to protect the environment?  What measures can communities and/or individuals take to help protect the environment?  Are all perspectives equally valid? | | | |
| **Task description** | | You are a research assistant working for the mayor of a coastal city. This city has a fishing port, and a beach that attracts lots of tourists. Your task is to prepare the mayor for a ‘town hall’ meeting where he/she will answer questions and listen to views from the community on possible changes to the law that the government is proposing. The new law will require that fishermen use only sustainable fishing methods.  The mayor has asked for a briefing that includes information on the following:   1. **Perspectives.** How the law changes will affect different people, and what their views on this will be (do this for as many of the people below as you can)  * Fishers * Marine biologist * Supermarket chain CEO * Consumer  1. **Argument.** Present the advantages and disadvantages of different fishing methods and recommend which ones will be best for the environment in a conclusion. 2. **Sources.** Which sources have you used to get your information? Who wrote them, and what were they intended for? Are they trustworthy?   *\*\* You should use at least sources 5-7 provided in the pre-release material. You are encouraged to research further, citing other sources you have used.* | | | |
| **Support** | | *Teachers may add/edit additional support here:*  \*Please note that teachers may need to offer support when analyzing source 6. | | | |
| **Relevant objective strands** | | Dii. synthesize information to make valid arguments  Diii. analyse and evaluate a range of sources/data in terms of origin and purpose, examining value and limitations  Div. interpret different perspectives and their implications | | | |

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| **Task** | C | **Subject** | Design | **Pre-release material sources** | 6\*, 8, 9 |
| **Relevant inquiry questions** | | What measures can communities and/or individuals take to help protect the environment?  How can designers balance the needs of the environment with the needs of the community and/or individuals? | | | |
| **Task description** | | Inspired by United Nations Sustainable Development Goal 11: Sustainable Cities and Communities, a local community is looking for ways to become more sustainable. You would like to be part of this project and have decided to identify one environmental problem and suggest a solution for it to contribute to making the community more sustainable.  You must choose a community; this may be the community in which you live, or it could be a community with which you are familiar or one in which you are interested. You must include relevant information about your chosen community when you specify the problem that you wish to address.  Once you have chosen your community, you must choose the environmental problem that you would like to address. If you have selected the community in which you live, you may already know of a problem; if you have decided to choose a community with which you are not familiar, you will need to do some research to identify a problem. Sources 6, 8 & 9 may help you to consider possible environmental problems.  Having identified the problem, you must research products and/or ways that others have used to solve the same or a very similar problem.  Considering the community, the problem and the solutions you have researched, develop a *list of success criteria* that your solution must meet.  Once you have developed a *list of success criteria,* you should present some *feasible ideas* for solutions. (A *feasible idea* is one that is realistic in the context of the community you have chosen).  From the different *feasible ideas*, choose the best one and create planning drawings/diagrams to outline the main details for making the chosen solution.  As you need to present your idea to other people, you must make sure that you present all information in a way that others can understand it. | | | |
| **Support** | | *Teachers may add/edit additional support here:*  \*Please note that teachers may need to offer guidance and/or support for students to extract key points from source 6. | | | |
| **Relevant objective strands** | | Ai. explain and justify the need for a solution to a problem  Aiii. describe the main features of an existing product that inspires a solution to the problem  Aiv. present the main findings of relevant research.  Bi. develop a list of success criteria for the solution  Bii. present feasible design ideas, which can be correctly interpreted by others  Biii. present the chosen design  Biv. create a planning drawing/ diagram, which outlines the main details for making the chosen solution. | | | |

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| **Task** | D | **Subject** | Mathematics | **Pre-release material sources** | |  | | --- | | 5, 7 (& additional resource ‘[*Tuna fish farming*’](https://www.ibo.org/contentassets/c509c4de3811435093a423eca09d5e78/infographic-on-bluefin-tuna-fish-farming-in-japan.pdf)) | |
| **Relevant inquiry questions** | | Do governments, communities and individuals have equal responsibility to protect the environment?  How do humans interrupt natural environmental processes?  Can individuals really effect global change? | | | |
| **Task description** | | You are the owner of a bluefin tuna farm. Your farm is positioned at sea inside a circular space with diameter 280 metres and you have 80 000 juvenile bluefin tuna ready to move to the farm. Your task is to plan the layout of the farm and ensure you make the best use of the available space to maximize profits.  Note the following information:   * the average weight of a juvenile bluefin tuna 20 kg * bluefin tuna gain approximately 10 kg in weight per year * you will sell when the average weight reaches 70 kg.   Your plan should include the following:   * **Technical information –** How you can make the best use of the available space for your juvenile fish * **Bluefin tuna characteristics –** How many fish you can keep in the pen, and what are the feeding requirements? * **Sales and profits of farmed bluefin tuna –** Make calculations for the sales and profit when the fish are sold.   Design a farm with multiple cylindrical pens and make calculations for the relevant factors.  *\* You should use the additional source supplementary to the pre-release material ‘‘*[***Infographic on bluefin tuna farms in Japan***](https://www.ibo.org/contentassets/c509c4de3811435093a423eca09d5e78/infographic-on-bluefin-tuna-fish-farming-in-japan.pdf)*’, and you may use any other clearly-referenced sources to help you as well.* | | | |
| **Support** | | *Teachers may add/edit additional support here:*  It will help to sketch or draw a scale drawing of an aerial view of the farm within the circular space.  Using the ***Infographic on bluefin tuna farms in Japan***, the following calculations will support your plan:   * circumference and volume of the two cylindrical pens * the number of bluefin tuna in the larger cylindrical pen * the number of cylindrical pens that can fit in the space for the 80 000 bluefin tuna * the approximate weight of feed required for the bluefin tuna each year * the approximate weight of full grown bluefin tuna on the farm * the amount of sales for the 80 000 bluefin tuna * the amount of profit for the 80 000 bluefin tuna.   The following formula will help:  1000 Kilograms = 1 Tonne  Diameter = Radius x 2  Circumference of a circle = π × Diameter  Volume of a cylinder = π × Radius × Radius × Height  Cost = Sales - Profit  Percentage profit = (Profit ÷ Cost) × 100 | | | |
| **Relevant objective strands** | | Ciii. move between different forms of mathematical representation  Di. identify relevant elements of authentic real-life situations  Dii. select appropriate mathematical strategies when solving authentic real-life situations  Diii. apply the selected mathematical strategies successfully to reach a solution  Div. justify the degree of accuracy of a solution  Dv. justify whether a solution makes sense in the context of the authentic real-life situation | | | |

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| **Final interdisciplinary task – addressing the SOI using findings from subject-grounded tasks** | |
| **Statement of inquiry** | Individuals, communities and governments, with their different perspectives, all have a role to play in promoting environmental sustainability. |
| **Inquiry questions** | **Factual**  What is sustainability?  What are the benefits of sustainability?  What measures can communities and/or individuals take to help protect the environment?  **Conceptual**  In what ways do our individual choices contribute to global issues?  How do humans interrupt natural environmental processes?  How can designers balance the needs of the environment with the needs of stakeholders?  How can data inform individuals?  How can evidence be used to change perspectives?  **Debatable**  Do governments and communities/individuals have equal responsibility to protect the environment?  Are all perspectives equally valid?  Are systems essential for a sustainable future?  *Please note that some questions may be factual or conceptual, based on the discipline through which it is being explored or the stage of a student’s education.* |
| **Task description** | You are an environmental influencer; your task is to raise awareness of one of the issues highlighted by the subject grounded tasks and/or the pre-release material. You should produce an awareness \*campaign that will attract a large number of followers and mobilize people to make a difference in a local community. You must draw on what you have learned in the subject grounded tasks.  In your \*campaign you should raise awareness by:   * combining knowledge from two subjects * considering more than one perspective * citing the pre-release material used (eg pre-release material Nov 2016 Source 2 Animal Welfare).   To attract a large number of followers, you must present information clearly and consider which means of communication would be most effective, (for example blogs, presentations, podcasts, adverts, social media posts, three-dimensional structures, infographics, debates, videos, musical compositions, calls to action).  \*Campaign: a planned series of actions. (In this case, it will be several different communications. These can be all the same form – such as a series of blogs – or they can be in different forms).  You may also wish to include a brief overview of the entire campaign. |
| **Support** | *Teachers may add/edit additional support here:*  Your awareness campaign **could** be in the form of blogs, presentations, podcasts, adverts, social media posts, three-dimensional structures, infographics, debates, videos, musical compositions, calls to action or a combination of any of these. |
| **Relevant objective strands** | Bi. Synthesize disciplinary knowledge to demonstrate interdisciplinary understanding  Ci. Use appropriate strategies to communicate interdisciplinary understanding effectively  Cii. List sources |

# Assessment materials

## Task A – Integrated sciences

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| **MYP 1 – Task A** | | |
| **Level** | **Level descriptor** | **Task-specific clarification** |
| **7-8** | Ai. **outline** scientific knowledge  Aiii. **interpret** information to make **scientifically** **supported** judgments.  Di. **summarize** the ways in which science is applied and used to address a specific problem or issue | The student:  Ai   * **Outlines** details of most of the steps in the carbon cycle * **Outlines** details of human activities that damage the environment (including examples that are due to carbon emissions), with an **outline** of some consequences   Aiii   * **Interprets** how some of these consequences may affect future generations, and makes a **scientifically-supported** judgement about which are the most significant * **Interprets** the effectiveness of the changes by detailing how they would help, and making a **scientifically-supported** recommendation   Di   * **Summarizes** some general and specific changes that individuals/ governments could make that would reduce damage to the environment |
| **5-6** | Ai. **state** scientific knowledge  Aiii. **apply** information to make **scientifically** **supported** judgments  Di. **outline** the ways in which science is used to address a specific problem or issue | The student:  Ai   * **States** a range of steps in the carbon cycle * **States** human activities that damage the environment, and **states** some future consequences   Aiii   * **Applies** information to make a **scientifically-supported** judgement about which consequences are the most significant, but without giving details about how it was decided * **Applies** information to make a **scientifically-supported** recommendation about which change(s) should take priority, but without giving details about how it was decided   Di   * **Outlines** details of some general changes that individuals/ governments could make that would reduce damage to the environment |
| **3-4** | Ai. **recall** scientific knowledge  Aiii. **apply** information to make **judgments**  Di. **state** the ways in which science is used to address a specific problem or issue | The student:  Ai   * **Recalls** the names of some stages of the carbon cycle * **Recalls** some human activities that damage the environment, and some future consequences   Aiii   * **Applies** information to make a judgement about which consequences are the most significant, but without giving details about how it was decided * **Applies** information to make a recommendation about which change(s) should take priority, but without giving details about how it was decided   Di   * **States** some changes that individuals/ governments could make that would reduce damage to the environment |
| **1-2** | Ai. **select** scientific knowledge  Aiii. **apply** information to make **judgments**, **with** **limited** **success**.  Di. **state** the ways in which science is used to address a specific problem or issue, **with** **limited** **success**. | The student:  Ai   * **Selects** (from a list) the names of some stages of the carbon cycle * **Selects** (from a list) some human activities that damage the environment, and future consequences   Aiii   * **Applies** information to make a judgement about which consequences are the most significant **with limited success**, and without giving details about how it was decided * **Applies** information to make a recommendation about which change(s) should take priority **with limited success**, and without giving details about how it was decided   Di   * **States** changes that individuals/ governments could make that would reduce damage to the environment, with **limited success** |

## Task B – Individuals and societies

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| **MYP 1 – Task B** | | |
| **Level** | **Level descriptor** | **Task-specific clarification** |
| **7-8** | Dii. gives detailed justification of opinions using information  Diii. consistently **identifies and analyses** a range of sources/data in terms of origin and purpose  Div. consistently **identifies** different views and their implications | The student:  Dii   * Gives detailed information about at least 3 fishing methods, including how they work **and** why they are sustainable/ not sustainable * Gives an opinion on which method is best, and why   Diii   * Uses information from the relevant provided sources and at least 2 additional sources of their own, consistently **identifying** their origin and purpose in order to **analyse** their reliability   Div   * **Identifies** at least 4 different stakeholder views on sustainable fishing, then **identifies** simplyhow the law changes will affect all of them |
| **5-6** | Dii. gives sufficient justification of opinions using information  Diii. **identifies** the origin and purpose of a range of sources/data  Div. **identifies** different views and most of their implications. | The student:  Dii   * Gives information about at least 3 fishing methods, including how they work **or** why they are sustainable/ not sustainable * Gives an opinion on which method is best, and why   Diii   * Uses information from the relevant provided sources and at least 1 additional source of their own, **identifying** the origin and purpose of most of them   Div   * **Identifies** at least 3 different stakeholder views on sustainable fishing, then **identifies** simplyhow the law changes will affect most of them |
| **3-4** | Dii. justifies opinions with some information  Diii. **identifies** the origin and purpose of sources/data  Div. **identifies** some different views and suggests some of their implications | The student:  Dii   * Gives information about at least 2 fishing methods * Gives an opinion on which method is best   Diii   * Uses information from the relevant provided sources only, **identifying** the origin and purpose of at least 2 of them   Div   * **Identifies** at least 2 different stakeholder views on sustainable fishing, then **suggests** what the implications of the law changes will be for at least 1 of them (though this may be incomplete or incorrect) |
| **1-2** | Dii. rarely uses information to justify opinions  Diii. **identifies** the origin and purpose of limited sources/data  Div. **identifies** some different views. | The student:  Dii   * Gives an opinion on which method is best, but with little information about fishing methods   Diii   * Uses information from only 1 of the relevant provided sources and/or **identifying** the origin and purpose of only 1 source   Div   * **Identifies** at least 2 different stakeholder views on sustainable fishing |

## Task C – Design

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| **MYP 1 – Task C** | | |
| **Level** | **Level descriptor** | **Additional notes and definitions of command terms** |
| 7-8 | Ai. **explains** and **justifies** the need for a solution to a problem  Aiii. **describes** the main featuresof an existing product that inspires a solution to the problem  Aiv. **presents** the main findings of relevant research  Bi. **develops a list** of success criteria for the solution  Bii. **presents** feasible design ideas, using an appropriate medium(s) and outlines the key features, which can be correctly interpreted by others  Biii. **presents** the chosen design **describing** the key features  Biv. **creates** a planning drawing/diagram, which **outlines** the main details for making the chosen solution | **Additional notes (adapted for MYP 1)**  **Criterion A**  Students should present the information they have found through their \*research in their own words. Students should not copy and paste information from sources.  \*Research is more than simply using the pre-release materials; students are required to do independent research on the community and on products that inspire a solution to the problem.  **Criterion B**  • For this task, a feasible idea (Bii) is one that could be created in the community specified by the student.  • Examples of “planning drawings/diagrams” for digital design solutions include website navigation maps, interface layout—aesthetic considerations (websites), detailed sketches (graphic design), detailed storyboards (video editing and animations), and so on.  • Examples of “planning drawings/diagrams” for product design solutions include scale drawing with measurements (orthographic), part and assembly drawings, exploded drawings, recipes, cutting plans, and so on.  **Definitions of command terms**  **Explain:** Give a detailed account including reasons or causes. (See also “Justify”.)  **Justify:** Give valid reasons or evidence to support an answer or conclusion. (See also “Explain”.)  **Analyse:** Break down in order to bring out the essential elements or structure. (To identify parts and relationships, and to interpret information to reach conclusions.)  **Develop:** To improve incrementally, elaborate or expand in detail. Evolve to a more advanced or effective state.  **Summarize:** Abstract a general theme or major point(s)  **Present:** Offer for display, observation, examination or consideration.  **Outline:** Give a brief account or summary.  **List:** Give a sequence of brief answers with no explanation  **State:** Give a specific name, value or other brief answer without explanation or calculation.  **Create:** To evolve from one’s own thought or imagination, as a work or an invention.  **Identify:** Provide an answer from a number of possibilities. Recognize and state briefly a distinguishing fact or feature.  **Construct**: Display information in a diagrammatic or logical form. |
| **5-6** | Ai. **explains** the need for a solution to a problem  Aiii. **outlines** the main featuresof an existing product that inspires a solution to the problem  Aiv. **outlines** the main findings of relevant research  Bi. **develops a few** success criteria for the solution  Bii. **presents** a few feasible design ideas, using an appropriate medium(s) and labels key features, which can be interpreted by others  Biii. **presents** the chosen design **stating** the key features  Biv. **creates** a planning drawing/diagram and **lists** the main details for the creation of the chosen solution |
| **3-4** | Ai. **outlines** the need for a solution to a problem  Aiii. **states** the main featuresof an existing product that inspires a solution to the problem  Aiv. **Outlines some of** the main findings of relevant research  Bi. **states a few** success criteria for the solution  Bii. **presents** more than one design ideas using an appropriate medium(s) or labels key features, which can be interpreted by others  Biii. **states** the key features of the chosen design  Biv. **creates** a planning drawing/diagram or **lists** requirements for the creation of the chosen solution |
| **1-2** | Ai. **states** the need for a solution to a problem  Aii. **states** the findings of research  Bi. **states one** basic success criterion for a solution  Bii. **presents** one design idea which can be interpreted by others  Biii. **creates** an incomplete planning drawing/diagram |

## Task D – Mathematics

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| **MYP 1 – Task D** | | |
| **Level** | **Level descriptor** | **Task-specific clarification** |
| **7-8** | Di. **identify** the relevant elements of the authentic real-life situation  Dii. **select** adequate mathematical strategies to model the authentic real-life situation  Diii. **apply** the selected mathematical strategies to reach a correct solution to the authentic real-life situation  Div. **explain** the degree of accuracy of the solution  Dv. **describe** correctly whether the solution makes sense in the context of the authentic real-life situation. | The student:  Di   * **identifies** at least three relevant factors   Dii   * has **selected** at least two correct mathematical strategies   Diii   * has supporting calculations, that are fully correct, for the geometrical shapes, characteristics of the fish **and** sales and profit   Div   * **explains** the degree of accuracy by considering the averages and by rounding values.   Dv   * **describes** if their calculations make sense by referring to the constraints. |
| **5-6** | Di. **identify** the relevant elements of the authentic real-life situation  Dii. **select** adequate mathematical strategies to model the authentic real-life situation  Diii. **apply** the selected mathematical strategies to reach a valid solution to the authentic real-life situation  Div. **describe** the degree of accuracy of the solution  Dv. **state** **correctly** whether the solution makes sense in the context of the authentic real-life situation. | The student:  Di   * **identifies** at least two relevant factors   Dii   * has **selected** at least two correct mathematical strategies   Diii   * has supporting calculations, at least two fully correct, for the geometrical shapes, characteristics of the fish **and** sales and profit   Div   * **describes** the degree of accuracy by considering the averages or by rounding values   Dv   * **states** if their calculations make sense by referring to the constraints. |
| **3-4** | Di. **identify** the relevant elements of the authentic real-life situation  Dii. **apply** mathematical strategies to reach a solution to the authentic real-life situation  Diii. **state**, but **not** **always** **correctly**, whether the solution makes sense in the context of the authentic real-life situation. | The student:  Di   * **identifies** at least two relevant factors   Dii   * has supporting calculations, at least one fully correct, for the geometrical shapes, characteristics of the fish **and** sales and profit   Diii   * **states** if their calculations make sense by referring to the constraints, with some errors. |
| **1-2** | Di. **identify** some of the elements of the authentic real-life situation  Dii. **apply** mathematical strategies to find a solution to the authentic real-life situation, with **limited** **success**. | The student:  Di   * **identifies** at least one relevant factor   Dii   * has supporting calculations, with errors, for one of; geometrical shapes, characteristics of the fish **or** sales and profit. |

## Interdisciplinary task

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| **Final interdisciplinary task – MYP 1** | | |
| **Level** | **Level descriptor** | **Task-specific clarification** |
| **7-8** | Bi **synthesizes** disciplinary knowledge to demonstrate **consistent** interdisciplinary understanding  Ci communicates interdisciplinary understanding with clarity, **organization and coherence**  Cii **acknowledges** relevant sources | The student:  Bi   * appropriately **and** correctly combines knowledge from two subjects to raise awareness.   Ci   * presents all information and ideas clearly * organizes allinformation and ideas in a coherent and logical manner.   Cii   * lists relevant sources. |
| **5-6** | Bi **synthesizes** disciplinary knowledge to demonstrate interdisciplinary understanding  Ci communicates interdisciplinary understanding in a way that is **mostly** clear  Cii **identifies** sources | The student:  Bi   * appropriately **or** correctly combines knowledge from at least two subjects to raise awareness.   Ci   * presents most information and ideas clearly   Cii   * lists sources. |
| **3-4** | Bi **connects** disciplinary knowledge to achieve **adequate** understanding  Ci communicates interdisciplinary understanding with **some** clarity | The student:  Bi   * links knowledge from at least two subjects to raise awareness   Ci   * presents some information or ideas clearly. |
| **1-2** | Bi establishes **few and/or superficial** connections between disciplines  Ci communicates interdisciplinary understanding in a **limited way** | The student:  Bi   * combines knowledge from at least two subjects.   Ci   * conveys little information and/or few ideas. |