Science: Interdisciplinary Project (Advanced Higher) Assessment Support Pack

Administrative information

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Content

History of changes

Version	Description of change	Date
03	Sections 9, 10 and 11 removed.	07/10/19

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Section 1

About this Assessment Support Pack

About this Assessment Support Pack

This Assessment Support Pack provides guidance on approaches to delivery and assessment of the Unit, Science: Interdisciplinary Project (Advanced Higher).

It should be read in conjunction with the Unit Specification, Science: Interdisciplinary Project (Advanced Higher).

The Assessment Support Pack can be used in a variety of ways including, for example:

- to generate evidence which demonstrates that candidates have achieved all cognitive and generic skills across the three stages of the Unit
- to provide exemplification of the standard of performance expected of candidates achieving the Unit, ie as a benchmark
- to help centres customise assessment tools for the Unit
- to give practitioners new ideas
- to use as a staff development tool.

It is important to emphasise that the content of this Assessment Support Pack is accessible to everyone.

Centres are encouraged to devise their own assessment tools and verify their suitability through their own internal quality assurance procedures. An effective internal quality system should be in place within the presenting centre.

Recommended reading

Before using this Assessment Support Pack, it is recommended that centres read the following documentation:

- Unit specification, Science: Interdisciplinary Project (Advanced Higher) (F785 47)
- Arrangements Document for the Scottish Baccalaureate in Science (G9CX 47).

In addition, centres may find the following documentation useful:

- *Guide to Assessment (AA4147, February 2019)*
- *Internal verification: A guide for centres (AA7617, June 2019)*
- *Quality Assurance of Assessment Arrangements in Internal and External Assessments: Information for Schools (FA7266, August 2019)*
- *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Details of these and other SQA publications are available on our website. Most publications can be downloaded free of charge from our website at **www.sqa.org.uk** on the 'Publications, Sales and Downloads' section. If you require a publication to be sent to you, please telephone our Business Development and Customer Support team on 0303 333 0330 quoting the product code and, where a charge is applicable, have a purchase order number or credit card details available.

Section 2

About the Interdisciplinary Project

About the Interdisciplinary Project

The prime focus of the Interdisciplinary Project is the development of cognitive and generic skills which will assist the candidate to: advance as an independent learner; increase confidence; develop own learning and improve career prospects.

These skills will help candidates to tackle complex areas and also to contribute to a wider and deeper understanding of the role these skills can play. This is why these skills are valued so highly in education and industry.

The Interdisciplinary Project allows candidates to apply and extend their learning in a contemporary context, either as a stand alone qualification or as part of the Scottish Baccalaureate in Science. Candidates should select a project and design their own experience in which to further develop their skills and abilities as a successful independent learner within one of the stated broad contexts. In carrying out the project they should further develop specific cognitive and generic skills that they will need to be successful in life, future learning and work.

Candidates will be assessed on their ability to plan, manage, complete and evaluate their project and their own learning/skills development. While the assessed skills are not based on subject content, it is important that the assessor(s) are competent in science to be able to determine whether both the processes adopted and the application of knowledge/skills are appropriate to the project.

Candidates may wish to undertake the Interdisciplinary Project as part of a group. However each individual candidate must clearly define his or her roles and responsibilities and must demonstrate an appropriate level of participation in all three stages of the project. In order to pass the Unit each individual candidate must complete all five pieces of mandatory evidence and achieve at least the evidence criteria for a Grade C.

Section 3

Cognitive and generic skills

Cognitive and generic skills

Some of the ways in which candidates may demonstrate the cognitive and generic skills that are developed and assessed through the Interdisciplinary Project are outlined below.

Application of subject knowledge and understanding

- Think about practical uses for the sciences they have learned.
- Build these ideas into meaningful and realistic contexts, chosen from one or more of the Broad Contexts (*citizenship, economic development, employability, enterprise and sustainable development*).
- Plan how they can use their knowledge of sciences effectively as part of a successful project.
- Use science knowledge to help them carry out various aspects of the project.

Research skills – plan, research, analyse and evaluate

Plan

- Define the research subject by identifying its scope and key concepts.
- Define the research process by identifying tasks and creating a schedule.
- Show initiative in choosing methods of research eg contacting companies, surveys, focus groups, experimentation.
- Identify and use relevant tools, resources and contacts for the research process.

Research

- Carry out research from a variety of sources.
- Keep records and notes on strategies, sources, tools and resources used.
- Adopt a referencing methodology (where appropriate).

Analyse

- Analyse the usefulness and reliability of materials gathered and resources consulted.
- Return to the research stage as necessary.

Evaluate

- Evaluate the research process.

Interpersonal skills – negotiate and collaborate

- Consider other people's views/feedback.
- Discuss issues of concern, seeking resolution where needed.
- Adjust approach in response to a situation/environment.
- Have positive self belief.
- Be confident enough to offer and ask for support.

Planning – time, resource and information management

- Estimate timescales and set milestones (targets).
- Monitor/record progress using tools such as schedules, diaries, logs and calendars to help completion of activities.
- Consider any probable barriers to achievement and take steps to minimise them.

Independent learning – autonomy and challenge in own learning

- Use skills responsibly to make things happen.
- Take the initiative to establish links with other learning environments/opportunities.
- Look for challenges and don't necessarily take the easy option.

Problem solving – critical thinking, logical and creative approaches

- Generate and explore ideas to support the project.
- Use creative approaches such as lateral thinking.
- Use logical, step by step thinking approaches.
- Consider how a situation may have arisen and possible contributory factors.
- Think critically about possible actions/changes that would improve the situation.
- Analyse points of view in source materials in order to support findings from the research eg flaws in the reasoning; relevance; reliability; supporting evidence; credibility of sources of evidence.

Presentation skills

- Choose appropriate formats and apply effectively eg written, oral, video, multimedia.
- Consider the target audience, the layout, structure, degree of formality of the presentation.
- Gather, select and include relevant information or ideas, emphasising the main points.
- Present information/ideas/reflections with supporting detail in a logical order, reaching a reasoned conclusion.

Self evaluation – recognition of own skills development and future areas for development

- Ask for feedback and deal positively with praise, setbacks and criticism.
- Reflect on experiences and feedback from others to assess the development of knowledge, skills and understanding.
- Learn from experiences and use to inform future progress.

Section 4

Broad contexts

Broad contexts

The project must explore and bring out the relevance of science in one or more of the broad contexts of citizenship, enterprise, employability, economic development and sustainable development. The following definitions are provided as guidance.

Citizenship

The exercise of rights and responsibilities within communities at local, national and global levels; and making informed decisions, and taking thoughtful and responsible action, locally and globally.

Education for citizenship in Scotland, Learning and Teaching Scotland 2002

Enterprise

- Develop enterprising attitudes and skills through learning and teaching across the whole curriculum.
- Experience and develop understanding of the world of work in all its diversity, including entrepreneurial activity and self-employment.
- Participate fully in enterprise activities, including those which are explicitly entrepreneurial in nature, and in which success is the result of 'hands-on' participation.
- Enjoy appropriately focused career education.

Determined to succeed, Scottish Government, 2002

Employability

A set of achievements – skills, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen occupations.

Learning to work: enhancing employability and enterprise in Scottish further and higher education, Scottish Funding Council 2007

Economic development

The development of economic wealth of countries or regions for the well-being of their inhabitants. From a policy perspective, economic development can be defined as efforts that seek to improve the economic well-being and quality of life for a community by creating and/or retaining jobs and supporting or growing incomes and the tax base.

Wikipedia, December 2008

Sustainable development

Development which secures a balance of social, economic and environmental wellbeing in the impact of activities and decision: and which seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs.

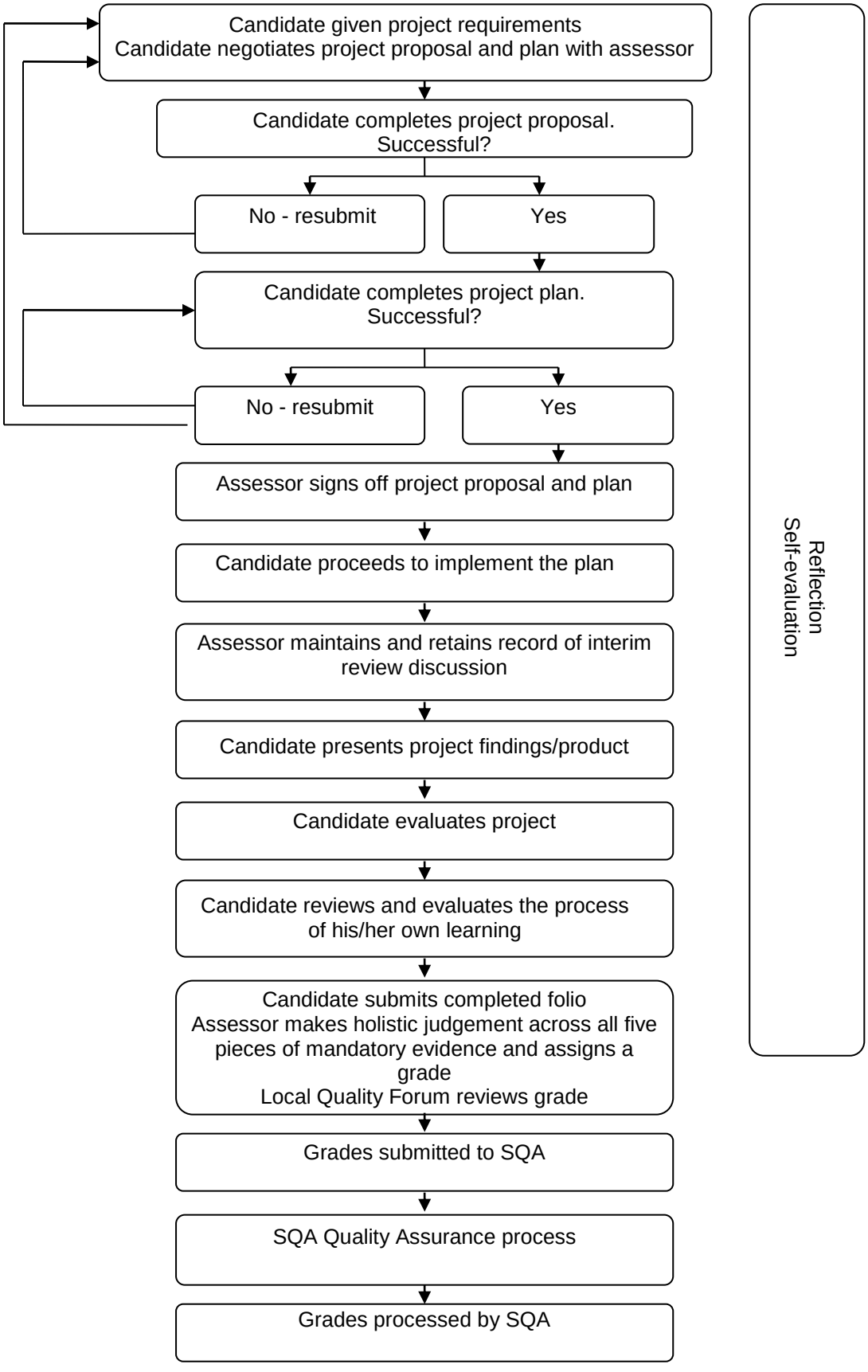
Best Value guidance, Scottish Government, 2004

Section 5

Overview of process

Overview of process

The flowchart provides an overview of the process undertaken while carrying out the project.



Section 6

Project requirements

Project requirements

The information below sets out the requirements of the Interdisciplinary Project. This information should be given to candidates for reference before they consider the interdisciplinary project.

Project requirements – Information for candidates and assessors

The project you choose must be an investigation or a practical assignment. It should be of personal/career interest to you and will provide you with opportunities to do the following:

- link with and work within different and less familiar learning environments to support the project.

- Use your knowledge and understanding of science and other areas of learning across the curriculum in one or more of the following broad contexts:

    - employability
    - enterprise
    - citizenship
    - sustainable development
    - economic development.

- Make connections between subject knowledge and the wider world.

- Develop the following cognitive and generic skills:

    - **application** – of subject knowledge and understanding
    - **research skills** – analysis and evaluation
    - **interpersonal skills** – negotiation and collaboration
    - **planning** – time, resource and information management
    - **independent learning** – autonomy and challenge in own learning
    - **problem solving** – critical thinking; logical and creative approaches
    - **presentation skills**
    - **self evaluation** – recognition of own skills development and future areas for development.

Evidence of achievement should be organised in a folio or e-portfolio which contains five mandatory pieces of evidence. These are:

- project proposal
- project plan
- presentation of project findings/product
- evaluation of project
- self-evaluation of generic/cognitive skills development.

Assessors should ensure that they fully complete the Assessor Report along with the final grade and include this with the candidate evidence.

Evidence in the folio may be presented in any suitable recorded format including e-evidence.

Group projects

You may wish to undertake the Interdisciplinary Project as part of a group. **Each** member of your group must clearly define his/her roles and responsibilities and must demonstrate an appropriate level of participation in all five stages of the project.

You must complete all five pieces of mandatory evidence **individually**, with reference to your **own** work on the project and **your** individual skills development. However, when working as part of a group it is expected that you would make reference to collaborative work you have undertaken, emphasising your role in the project.

Section 7

Guidance on learning and teaching approaches

Guidance on learning and teaching approaches

Context for delivery

The Interdisciplinary Project is designed to provide opportunities for personal development through combining and applying a range of skills and knowledge and through exposure to less familiar learning environments. The Interdisciplinary Project should be seen as an experiential rather than a taught programme with the teacher/lecturer acting as a facilitator throughout and the candidate taking ownership of their project.

Candidates may wish to undertake the Interdisciplinary Project as part of a group. However each individual candidate must clearly define their own roles and responsibilities and must demonstrate an appropriate level of participation in all three stages of the project. In order to pass the Unit each individual candidate must complete all five pieces of mandatory evidence and achieve at least the evidence criteria for a Grade C.

1 Introduction to the skills base (cognitive and generic skills)

It will be important to have a well-planned induction to this Unit to ensure that candidates are fully aware of its nature and purpose. Time should be spent at the outset, introducing the candidates to the importance of the cognitive and generic skills valued by employers and Higher Education. This could be done using speakers from Higher Education and/or industry, but equally could be done by teacher/lecturer delivery and discussion.

Induction to the Unit should also establish clearly the contexts in which the project could be set and the terms of the project requirements. Timescales, responsibilities and constraints should be discussed and understood at the outset. Candidates should be encouraged to explore the range of opportunities available to them and to develop creative ideas before finally working on an appropriate project proposal and plan. They should also be encouraged to set themselves personal challenges and to site their project clearly within an area of personal or career interest. The importance of self-motivation, autonomous learning and self-management should be stressed.

It may be useful at this stage to spend some teacher/lecturer-led time or self-directed time considering project management skills and identifying other skills areas where the candidate may wish to seek additional advice or mentoring eg from specialist or online resources. It is important at this stage to discuss with candidates the range of presentation methods that might be suitable for their project eg demonstration, presentation software, website, written and/or oral report, piece of drama, recording, wiki, blog or a combination of methods.

It will also be helpful for the candidate to carry out and note an informal self evaluation of the specified cognitive and generic skills. This would provide a base line for comparison towards the end of the project when a formal self evaluation of development in these skills has to be made.

2 Project planning phase

Stage 1 of the project will involve considerable teacher/lecturer support and discussion with candidates. This is necessary to guide candidates in their choice of an area which interests them within one or more of the broad contexts (employability, enterprise, sustainable development, citizenship, economic development), and will help them to be clear about the project's aims and objectives. This discussion will also highlight to candidates what the purpose of the project is, what it will bring to them individually in terms of their skills development and how they might plan to do it, including where they might access different learning environments.

At the very early stage of the project, candidates should be supported by teacher/lecturer in open dialogue which may help them deal with difficult areas eg setbacks, timings, establishing viable scope of the project. This phase of formative work will encourage the skills development needed throughout the project.

Assessment of the project is holistic and therefore summative assessment and the overall grade should not be considered until Stage 3 where candidates have had the opportunity to demonstrate their experiential learning and the generic and cognitive skills.

(a) Assessment plan

Identification of submission dates for the project proposal, plan, presentation and the final folio of work should be discussed with candidates in the initial stage of the project. These dates should be built into the assessment process.

The assessment process should be explained and discussed with candidates so they are clear about what is expected of them.

(b) Project proposal

The project proposal must be considered suitable by the teacher/lecturer to meet the requirements of the Unit. The project must be achievable within the time available. The teacher/lecturer must acknowledge agreement of the proposal before the candidate proceeds to the planning stage. The candidate can be given an opportunity to revisit the project proposal and resubmit where appropriate.

(c) Project plan

Teachers/lecturers may be required to provide candidates with varying levels of support depending on each candidate's cognitive and generic skills. The support should be in form of prompts, suggestions and questioning. The candidate can be given an opportunity to revisit the project plan and resubmit where appropriate.

Teachers/lecturers should be satisfied at project approval stage that proposed work settings will provide candidates with access to appropriate resources and support and that appropriate centre partnership arrangements, where necessary, are in place.

(d) Resubmission/reassessment of project proposal and project plan

Candidates should not proceed to Stage 2 until the teacher/lecturer considers the project to be viable.

Time is allowed at the initial stage within the Unit for dialogue, feedback and resubmission of the project proposal and the project plan. Where candidates have not presented a viable plan, they should be encouraged to remediate and resubmit.

SQA's advice is that there should normally be one resubmission opportunity, or in exceptional circumstances two. In some cases candidates may be required to resubmit original work which has been revised to take account of earlier weaknesses. In other cases, candidates may be required to provide a new project proposal and/ or plan. In all cases, evidence from the original submission should be used for formative purposes prior to resubmission.

3 Implementation of project

Once the project proposal and plan have been approved by the teacher/ lecturer, the candidate will carry out the work independently. Candidates will be expected to take initiative, and to carry out and monitor their agreed plans. They will be expected to manage time, resources, links and relationships effectively throughout and to take a problem solving approach, re-prioritising when necessary.

Candidates will also be expected to set up information management systems in order to handle and organise complex information. This could involve, for example, a manual system, an e-portfolio, electronic office, webhosting and/or a referencing system.

It is important throughout the project that the candidate builds in time for reflection, actively seeking feedback from peers, specialists, teacher/lecturer and others, taking stock of progress and noting significant learning points in terms of self-development.

It is equally important that the teacher/lecturer allocates time to discuss progress and give feedback to the candidate on a one-to-one basis throughout the project. However, part of the challenge in this Unit is that the candidate will take a high degree of responsibility and ownership of the project and its management. The teacher/lecturer should not take a directive role or make frequent interventions.

During implementation, candidates are expected to further develop problem solving skills such as how to manage conflicting demands and deal with setbacks. They may not always choose the most appropriate actions first time but with reflection, would demonstrate their learning through selection of better/alternative courses of action. These should be apparent and explicit actions rather than 'I realised, so next time I will…' statement of intent.

Working collaboratively and constructively with others, eg peers, teachers, employers, supervisors or college tutors, will be an integral part of the process and candidates should be encouraged to consider the importance of developing effective interpersonal skills. It will also be important, where partners are involved in delivering and supporting the project, that regular opportunities are identified to share feedback on candidate progress.

Candidates who, with the approval of their centre, carry out project work in a workplace, community base, other educational institution or virtual community, should have clear guidance provided to them on partnership arrangements and roles and responsibilities. This guidance should include health, welfare, safety, communication and confidentiality issues.

In the final stages of the project, there may be the opportunity for candidates to deliver their project presentation to a variety of audiences eg peer groups, colleagues across partner organisations, involving them where appropriate. Sharing the learning with others and being open to their feedback could help to inform the final evaluation of their project and the self evaluation of their cognitive and generic skills development.

4 Evaluation of the project and self evaluation

When evaluating the project, candidates must include an evaluation of the project process (planning and implementation) in addition to an evaluation of the project findings/product. This should be done in terms of strengths, weaknesses and learning points.

SQA's advice is that for each piece of evidence there should normally be one resubmission opportunity, or in exceptional circumstances two. In some cases candidates may be required to resubmit original work which has been revised to take account of earlier weaknesses. In all cases, evidence from the original submission should be used for formative purposes prior to resubmission.

5 Opportunities for developing Core Skills

The project stages of planning, applying and evaluation provide ample opportunity for development of each component of Problem Solving. Within the project itself it is likely that there will be many concurrent strands which require careful thought and management, with creative approaches to possible solutions. Considerable evaluation through reflection and feedback from others on all aspects of the project is part of the assessment.

There are opportunities for using and developing communication skills when negotiating with teachers, tutors and peers, reading complex documents, presenting complex information to others and presenting and discussing project outputs. These opportunities are typical of communication tasks in the workplace and in Further or Higher Education.

Candidates should ensure that relevant information is presented clearly and coherently, including any specialist forms, with attention to spelling, punctuation and grammar which helps the meaning to be clear to the degree and accuracy expected in professional workplaces. When presenting information, candidates should use appropriate, accurate and recognised referencing systems, eg bibliographies, webographies, citation.

Working cooperatively with others is central to this Unit, as negotiation of learning environments, use of resources, context of theme and feedback from others all rely on cooperative and interpersonal skills. It is likely that other people's roles, feelings and behaviours will require to be taken into account as the project activity progresses.

Managing information systems provides a good opportunity to develop ICT skills through use of an e-portfolio to store and present information. It is likely that candidates will access electronic information from a range of sources related to both the theme chosen and/or specialist science at the planning and implementing stage of the project. In addition, in presenting information, multi-media software packages and specialist software packages in science and technology provide further opportunities for creative approaches in using ICT.

NB When accessing information candidates are expected to follow centre guidelines and etiquettes already established for using web sources. This would include any legal compliance in for example downloading, copyright or privacy.

Section 8

Guidance on approaches to assessment

Guidance on approaches to assessment

In this section of the Assessment Support Pack, reference is made to the assessor of the Unit. In many cases the teacher/lecturer facilitating the Unit will be the assessor. However, in some cases, a teacher/lecturer who was not the primary facilitator, but who has relevant competence in the project or the project process, may be an assessor. It is possible that, due to the interdisciplinary nature of the project, several assessors may be involved in assessing one project.

As an assessor you will make a holistic judgement across all five pieces of mandatory evidence required for the Unit. The standards of competence and grade criteria given in the Unit specification will allow assessors to evaluate the strengths and weaknesses of each piece of evidence before arriving at a judgement of the project overall. This should not be a 'tick list' approach to assessment but an overall evaluation using the grading criteria.

Formative assessment is particularly useful at the beginning of experiential learning. Assessment of skills and their application through the project should be considered when candidates have had the opportunity to develop skills which they can apply again. This approach of self-regulation may be new to candidates (and assessors) and is based on a shared understanding of standards.

Candidates should refer to the grading criteria contained within the assessment checklist before submitting the project proposal. The assessor should look at the same checklist to identify where the criteria have been demonstrated for the proposal and use the comments box in the proposal template to record and discuss with the candidate the criteria that have been met. Where criteria have not been met, this also should be recorded as candidate feedback. The candidate should then be given the opportunity to resubmit the project proposal taking on board the feedback. When the candidate resubmits the project proposal the assessor reviews their original comments to check feedback has been addressed. It is at this point that the assessor should consider the potential to proceed to the project plan.

The same process should be repeated for the project plan. Should the project plan indicate that the project is not viable, the candidate should be given the opportunity to reflect, amend and resubmit.

A copy of the project proposal and plan should be signed and retained by the assessor as a record of negotiation of evidence that the candidate has successfully prepared and presented a suitable project proposal and produced a justified a workable plan, ready for implementation.

Skills of planning and adjusting actions in response to changing circumstances should be ongoing and evidenced throughout the project. Skills development, for example through managing risk and exploring new options, should be evidenced throughout and assessed towards the end of the project. Ample opportunity should be given to candidates to learn from their new experiences and to show any relevant change.

It is recommended that candidates have an opportunity to rehearse/draft the presentation of project findings/product.

The submitted findings/product should be evaluated by the candidate before any assessor feedback is given in order to avoid influencing the candidate's own evaluation.

Once all five pieces of mandatory evidence have been assessed, a holistic judgement across all five pieces of evidence should be made.

To award an overall grade, the assessor should refer to the following:

A indicative of a highly competent performance across the five pieces, with all pieces meeting all additional Grade A criteria

B indicative of a competent Grade C performance across the five pieces, but with some aspects of work which meet the criteria for highly competent performance (as outlined by the Grade A criteria)

C indicative of a competent performance across the five pieces, with all aspects of the work meeting the criteria identified for Grade C performance.