Transferable Skills International GCSE Subject Mapping: Computer Science

Transferable skills will help students cope with the different demands of degree study and provide a solid skills base that enables them to adapt and thrive in different environments across educational stages; and ultimately into employment. A good international education should enable students to start developing transferable skills as early as possible. Developing these transferable skills where they naturally occur as part of the International GCSE curriculum can help build learner confidence and embed the importance of this well-rounded development.

Our approach to enhancing transferable skills in our International GCSEs ensures that it is not only the academic and cognitive skills that are developed, but those broader elements that universities highlight as being essential for success. Skills such as self-directed study, independent research, self-awareness of own strengths and weaknesses and time-management are skills that students cannot learn from a textbook but have to be developed through the teaching and learning experience that can be provided through an international curriculum.

In the tables below, we have taken a framework of skills and provided mapping to suggest where each skill can be assessed, and where each skill could be developed for this subject. This will enable teachers and learners to understand where they are developing each skill, and examples of how they can develop each skill through this International GCSE.

NRC framework skill	**Skill interpretation in this subject**	**Examples of where the skill is covered in content**	**Examples of where the skill is explicitly assessed in examination**	**Opportunity for the skill to be developed through teaching and learning approach**
Cognitive skills				
Cognitive Processes and Strategies				
Critical thinking	Clarifying thoughts sufficiently that they can be expressed in a form that a computer can carry out Analyzing and identifying possibilities and strategies to meet a required process and outcomes. Identifying the outcome of a computational process	1.2.1 2.1.1 2.1.7 3.1.3 3.1.4 3.1.5 3.4.2 5.3.3	SAM paper 1 question 1(b) SAM paper 1 question 1(d) SAM paper 1 question 2(a) SAM paper 1 question 2(b) (i) (ii)	Critical thinking is a key part of computer science. Formative assessment of the outcomes of the use of critical thinking skills are embedded in developmental activities such as group projects and individual challenges.
Problem solving	**Solving problems** is the core of **computer science** Problem solving skills include breaking a large problem into a number of smaller ones, recognizing how problems relate to ones that have been solved, setting aside details of a problem that are less important, and identifying and refining the steps needed to reach a solution.	1.2.1 1.2.2 1.1.9 2.1.2 3.3.1 3.3.3	SAM paper 1 question 1(c) SAM paper 1 question 6(c) SAM paper 2 question 6	Problem solving skills are formatively assessed in individual, group and whole class activities that are key to the development of computational skills. Problem solving activities can involve selecting appropriate techniques and systems in addition to the development of algorithms and code.
Analysis	Organising ideas and thinking both creatively and logically.	1.1.2	SAM paper 1 question 1(e)	Analysis can often be formatively assessed during activities involving critical thinking and/or problem solving.

		2.1.5 3.3.2	SAM paper 2 question 5(b)	
Reasoning/argumentation	Piecing together information, usually to recommend or suggest further action.	4.2.5	SAM paper 1 question 3(a)	A skill that supports critical thinking and problem solving.
Interpretation	Evaluating alternative solutions or techniques when presented with a small number of well-defined alternatives	1.1.9 2.1.7 3.1.2 3.2.4	SAM paper 1 3(d)	A skill that supports critical thinking and problem solving.
Decision making	Judging multiple options or alternatives, in order to select one, so as to best fulfil requirements / needs	4.5.1 4.5.2 5.1.2 5.1.3 5.1.5	SAM paper 1 3(b) SAM paper 1 3(d)	A skill that supports critical thinking and problem solving.
Adaptive learning	Using skills, knowledge and understanding to respond the new and unfamiliar challenges.	1.2.3 1.2.4 4.2.6 6.1.4	SAM paper 1 4(c) (ii) SAM paper 2 question 6	Assessment of the way the students approach task that require 'thinking outside of the box'. To encourage students to approach tasks in the way the formative assessment should review process as well as product.
Executive function	Analysing a situation, planning and taking action, maintaining attention, and adjusting actions as needed to complete a task.	2.1.2	In paper 2	Not separately summatively assessed but critical in developing confidence in tackling problems of all types.
Creativity				
Creativity	Using efficient / effective strategies to create a solution / solve a problem	1.1.7 2.1.2	Tested in paper 2	High level transferable skill. Formatively assessed in group work using peer and self-assessment in addition to teach assessment of the outcomes.
Innovation	Suggesting novel solutions to the design / selection of computer science systems	4.4.3	SAM paper 1 3(e)	High level transferable skill. Formatively assessed in group work using peer and self-assessment in addition to teach assessment of the outcomes.

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Intrapersonal skills				

Intellectual openness				Intellectual openness is important in developing confidence in problem solving / computational skills
Adaptability	Persisting in the face of difficulties, such when writing code or designing an algorithm	1.1.5	SAM paper 1 question 8(c)	Using small steps to develop a willingness to tackle problems where the solution is not obvious at the outset. Formative assessment of group and individual task from across the specification.
Personal and social responsibility	Appreciating ethical issues in computer science	6.1.2 6.1.3	SAM paper 1 5(a)	Contribution to whole class research activities.
Continuous learning	Expanding skills and skill-sets through learning and increasing knowledge	1.1.1 1.1.7	Tested in paper 1 and 2	Using small steps to develop a willingness to tackle problems where the solution is not obvious at the outset. Formative assessment of group and individual tasks.
Intellectual interest and curiosity	Willing to tackle challenging problems; researching appropriate solutions and seeking to widen knowledge and increase understanding	1.1.9	Tested in paper 1 and 2	Contribution to whole class research activities. Group research activities – presentations and involvement in challenging others and response to peer questioning
Work ethic/conscientiousness				Formative assessment in these areas can be supported by self-assessment including the use of I can statements.
Initiative	Using computational skills to develop own understanding and problem solving abilities	1.1.2 1.1.9		Observation and the use of student activity logs when involved in group / individual tasks.
Self-direction	Demonstrating autonomous learning	1.2.1 1.2.2	SAM paper 2 question 6	Use of class focussed research activity carried out in small groups and including presentations on outcomes of a task.
Responsibility	Taking responsibility for finding and correcting errors in coding and algorithms	1.1.5 2.1.5 2.1.6	SAM paper 1 question 8(c) SAM paper 2 question 5(a)	Acting as 'test buddy' in supporting another student's work as well as logging the debugging of their own work.
Perseverance	Seeking to remove all errors in code and algorithms using testing and other tools.	1.1.5	SAM paper 1 question 8(c)	Review of development process.
Productivity	Using computational skills accurately and efficiently to produce code and algorithms	1.1.1 1.1.4 1.1.6 1.1.7 1.1.8 1.2.1 2.1.1 - 2.1.7	SAM paper 2 question 1(a) SAM paper 2 question 1(c)(ii) SAM paper 2 question 2(a) SAM paper 2 question 2(b) SAM paper 2 question 2(c) SAM paper 2 question 3(b) SAM paper 2 question 3(c)	Individual and group focussed and extended tasks.

		2.2.1 – 2.2.2 2.3.1 – 2.3.5 2.4.1 – 2.4.3 2.5.1 – 2.5.3 2.6.1 – 2.6.3	SAM paper 2 question 4(b) SAM paper 2 question 5(b) SAM paper 2 question 6	
Self-regulation (metacognition, forethought, reflection)	Developing an approach to problem solving and program design that maximises both the suitability of the product and the efficiency of the process	1.1.9 1.2.1 1.2.2 2.1.2 2.1.4 2.1.7	SAM paper 2 question 1(b) SAM paper 2 question 2(b) SAM paper 2 question 6	Group activity, peer review and whole class presentations of problem solving activity.
Ethics	Demonstrating awareness of the need to utilise the power of computer science in a way that benefits all	5.2.1 5.2.2 5.2.3 5.2.4 5.2.5 6.1.2	SAM paper 1 question 8(a) SAM paper 1 question 8(b) SAM paper 1 question 8(d)	Research activity and small scale projects.
Integrity	Taking ownership of their own work and responding to challenges	6.1.2 6.1.3		Self-evaluation and development logs / diaries.
Positive Core Self Evaluation				
Self-monitoring/self-evaluation/self-reinforcement	Planning and reviewing own work as a matter of course			Self-evaluation and development logs / diaries. Short term and longer term planning.

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Interpersonal skills				
Teamwork and collaboration				
Communication	Able to communicate ideas to peers and teachers and to discuss the logic of algorithms and code (verbally or written)			Group work, presentations and peer questioning.
Collaboration	Working with peers on shared tasks; giving feedback on peers on problem solving and other tasks			Group work, presentations and peer questioning.
Teamwork	Working with peers to solve problems and create programs			Group work, presentations and peer questioning.
Co-operation	Share ideas with peers and supports peers who are finding tasks difficult			Peer mentoring; acting as test buddy
Interpersonal skills	Giving feedback to peers that is appropriate and delivered in a way that encourages them			Acting as test buddy.
Empathy/perspective taking	Not applicable			
Negotiation	Not applicable			
Leadership				
Leadership	Leading a group of peers to complete a task			Observation, peer evaluation, assessment of outcomes.
Responsibility	Taking responsibility for the progress and outcomes of a group task involving problem solving or similar			Observation, peer evaluation, assessment of outcomes.
Assertive communication	Leading the discussions in a group task ensuring that decisions are made and that group members are all involved			Teacher observation; peer review
Self-presentation	Presenting outcomes of a group or individual task to the whole class			Presentations of individual and group activity.