

## Example 1: Breaking the code

### General guidance

[How to use this teacher support material](#)  
[Teacher responsibilities](#)  
[Skills and strategies required by students](#)  
[Developing the exploration](#)  
[Use of technology](#)  
[Planning](#)  
[Authenticity](#)  
[Assessment criteria](#)  
[Record keeping](#)

### Assessed student work

[Overview](#)  
[Examples of explorations](#)  
[Example 1](#)  
[Example 2](#)  
[Example 3](#)  
[Example 4](#)  
[Example 5](#)  
[Example 6](#)  
[Example 7](#)  
[Example 8](#)  
[Example 9](#)  
[Example 10](#)  
[Example 11](#)  
[Example 12](#)  
[Example 13](#)  
[Example 14](#)  
[Example 15](#)  
[Example 16](#)  
[Example 17](#)  
[Example 18](#)  
[Example 19](#)  
[Example 20](#)  
[Example 21](#)  
[Frequently asked questions](#)

## Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	3	3	1	6	4	15	13
Maximum possible achievement level	4	3	4	3	6	6	20	20



[Student work \(PDF\)](#)



[Annotated student work \(PDF\)](#)



[Comments](#)

## Comments

### Criterion A: Communication

A2—The work is coherent but not well organized. There is no aim or rationale in the introduction.

### Criterion B: Mathematical presentation

B3—There is good definition of terms.

### Criterion C: Personal engagement

C3—While there was not “abundant” evidence, there was sufficient to award level 3: for example, making her own code (page 9); learning and describing unfamiliar maths; and timing herself doing the spreadsheet (page 9).

### Criterion D: Reflection

D1—Only limited reflection, some on the significance of the timing of the spreadsheets.

### SL Criterion E: Use of mathematics

E6—She used mathematics beyond the syllabus (derangements). Her understanding of this was verified in discussions.

### HL Criterion E: Use of mathematics

E4—This is sophisticated but descriptive rather than rigorous mathematics.



