

## 附錄

### 附錄一：數學科之國定課程能力指標與各等級描述之範例

英國國定課程能力指標(attainment target)主要依各學科之知識領域，分為 8 個層次，其下，各有其能力描述(level description)。就數學科而言，其知識領域主要包含以下四個方面：

- 1、使用與應用數學(using and applying mathematics)
- 2、數與代數(number and algebra)
- 3、形狀、空間與測量(shape, space and measures)
- 4、資料處理(handling data)

在每個水準的能力描述中，主要呈現的是在每個關鍵階段結束後，學生在該水準下應該具有或證明之能力。就各關鍵階段預期達到的水準，如表 2 所示，例如：就關鍵階段 1 而言，其學習的能力水準範圍約是介在 1-3，而在該階段結束後(年齡 7 歲)時，預期必須能達到水準 2。

至於各水準(level1 至 level8)之描述，以下茲舉使用與應用數學為範例進行陳述，其它科目及細節，請見英國教育部網站：

#### Level 1

Pupils use mathematics as an integral part of classroom activities. They represent their work with objects or pictures and discuss it. They recognise and use a simple pattern or relationship.

#### Level 2

Pupils select the mathematics they use in some classroom activities. They discuss their work using mathematical language and are beginning to represent it using symbols and simple diagrams. They explain why an answer is correct.

#### Level 3

Pupils try different approaches and find ways of overcoming difficulties that arise when they are solving problems. They are beginning to organise their work and check results. Pupils discuss their mathematical work and are beginning to explain their thinking. They use and interpret mathematical symbols and diagrams. Pupils show that they understand a general statement by finding particular examples that match it.

#### Level 4

Pupils are developing their own strategies for solving problems and are using these strategies both in working within mathematics and in applying mathematics to practical contexts. They present information and results in a clear and organised way. They search for a solution by trying out ideas of their own.

#### Level 5

In order to carry through tasks and solve mathematical problems, pupils identify and obtain necessary information. They check their results, considering whether these are sensible. Pupils show understanding of situations by describing them mathematically using symbols, words and diagrams. They draw simple conclusions of their own and give an explanation of their reasoning.

#### Level 6

Pupils carry through substantial tasks and solve quite complex problems by independently breaking them down into smaller, more manageable tasks. They interpret, discuss and synthesise information presented in a variety of mathematical forms. Pupils' writing explains and informs their use of diagrams. Pupils are beginning to give mathematical justifications.

#### Level 7

Starting from problems or contexts that have been presented to them, pupils progressively refine or extend the mathematics used to generate fuller solutions. They give a reason for their choice of mathematical presentation, explaining features they have selected. Pupils justify their generalisations, arguments or solutions, showing some insight into the mathematical structure of the problem. They appreciate the difference between mathematical explanation and experimental evidence.

#### Level 8

Pupils develop and follow alternative approaches. They reflect on their own lines of enquiry when exploring mathematical tasks; in doing so they introduce and use a range of mathematical techniques. Pupils convey mathematical or statistical meaning through precise and consistent use of symbols that is sustained throughout the work. They examine generalisations or solutions reached in an activity, commenting constructively on the reasoning and logic or the process employed, or the results obtained, and make further progress in the activity as a result.