

Mapping the BitL questions

Understanding

Students build a robust knowledge of **adaptable** and **transferable** mathematical concepts. They **make connections** between related concepts and progressively **apply the familiar to develop new ideas**. They develop an understanding of the relationship between the ‘why’ and the ‘how’ of mathematics.

Students build understanding when they:

- connect related ideas,
- identify commonalities and differences between aspects of content,
- describe their thinking mathematically
- **represent concepts in different ways**,
- **interpret mathematical information**.

Reasoning

Students develop an increasingly sophisticated capacity for logical thought and actions, such as **analysing**, **proving**, **evaluating**, **explaining**, **inferring**, **justifying** and **generalising**.

Students are reasoning mathematically when they:

- **explain their thinking**,
- **deduce and justify strategies** used and conclusions reached,
- **adapt the known to the unknown**,
- **transfer learning from one context to another**,
- **prove that something is true or false**
- **compare and contrast related ideas and explain their choices**.

Problem Solving

Students develop the ability to **make choices**, **interpret**, **formulate**, **model and investigate** problem situations, and communicate solutions effectively.

Students formulate and solve problems when they:

- **use mathematics to represent** unfamiliar or meaningful situations
- **design** investigations and **plan** their approaches,
- **apply** their existing strategies to **seek solutions**
- **verify** that their answers are **reasonable**.

Fluency

Students develop skills in **choosing** appropriate procedures, **carrying out** procedures flexibly, accurately, efficiently and appropriately, and **recalling** factual knowledge and concepts readily.

Students are fluent when they:

- **calculate answers efficiently**,
- **recognise robust ways** of answering questions,
- **choose appropriate methods** and approximations,
- **recall definitions** and regularly use facts
- **manipulate expressions** and equations to find solutions.

What patterns/connections/relationships can you see?

Can you answer backwards questions?

Can you represent or calculate in different ways?

In what ways can you prove?

In what ways can you communicate?

In what ways can your thinking be generalised?

What can you infer?

How can you interpret?

In what ways can you model and plan?

In what ways can you solve and check?

Reflect

What can you recall?

Can you choose and use your mathematics flexibly?