Concept commentaries – HL

Opportunities to consider and discuss the key concepts underpinning the syllabus are signposted

throughout the Hodder Education Student Books for Mathematics for the IB Diploma. This

document contains some further ideas about how teachers can draw out and elaborate on these

concepts, thereby fostering deeper understanding. It also contains suggestions about how the

Teaching and Learning Resources can be used to complement the content outlined in the

Student Books.

1 Counting principles  
2 Algebra

Concept focus: Generalization, Patterns

The concepts of generalization and patterns can be brought together through the Pascal’s triangle task in the **Teaching and learning resources**.

The task would serve as an excellent introduction to the HL course as it encourages mathematical discovery and pattern spotting. The focus of the task can be the value of the coefficients and how these are represented using combinations, this can then be linked to binomial expansions. It offers a thorough review of students’ ability to manipulate algebra.

3 Trigonometry

Concept focus: Equivalence, Quantity

As an introduction to this chapter students should be shown the ‘Do you speak Babylonian?’ PowerPoint in the Teaching and learning resources. The prior knowledge in the textbook offers an opportunity for students to work in small groups and discuss the concepts of quantity and equivalence. The questions bring a focus to the fact that a quantity varies in space and time.

4 Complex numbers  
8 Vectors

Concept focus: Representation, Space

The concepts of representation and space feature heavily in these two chapters and they can be connected by the topic of vectors. The ‘Introduction to Vectors’ PowerPoint in the **Teaching and learning resources** serves as a nice introduction to the concept of space.

There are lovely TOK discussion points in Chapter 4 that offer up discussions around the concept of representation. There is a lot of potential for an exploration piece around these topics.

5 Mathematical proof

Concept focus: Generalization

The concept focus for this chapter is supported by the TOK discussion ‘Ways of knowing’. The ‘Proof by Induction’ PowerPoint in the **Teaching and learning resources** supports the **Section 5A** in the textbook and should be discussed prior to starting this section in the book.

6 Polynomials  
7 Functions

Concept focus: Representation

The concept of representation is prominent in these two chapters. The **Teaching and learning resources** offer discussion on polynomial division and the ‘Oblique asymptotes’ PowerPoint consolidates students’ use of the division technique. These tasks should be attempted before starting **Section 6B** in the textbook.

Before commencing with **Section 7C** in the textbook consider giving the students the ‘Absolute value’ task from the **Teaching and learning resources**. It will serve as a nice introduction to the topic and enhance the understanding of the concept of representation.

9 Probability

Concept focus: Modelling, Approximation

Both the textbook and the **Teaching and learning resources** focus on the concept of approximation with regards to probability.

The concept of modelling can be incorporated by having students work on the Monty Hall Problem from the **Teaching and learning resources** before starting this chapter of the book.

10 Further calculus

Concept focus: Approximation

The concept of approximation is prominent in both the **Teaching and learning resources** and the textbook.

**Key point 10.1** can be enhanced with the ‘Differentiation from first principles’ PowerPoint from the **Teaching and learning resources**. **Key point 10.10** can be introduced by using the ‘Volume of Revolution’ PowerPoint and consolidated using the ‘TOK’ PowerPoint around the subject of Gabriel’s Horn and infinite areas and finite volumes. Approximation is a key feature of these activities.

11 Series and Differential Equations

Concept focus: Change

The concept of change can be augmented by using the activities in the **Teaching and learning resources.** The section in the textbook that discusses Euler’s method can be introduced by using the PowerPoint in the learning pack. The resource also comes with a spreadsheet that the students can use to change the value of the variables in order to understand the concept in more detail.