**Teaching Guideline**

**Holistic Development**

* It is assumed that students have had the concepts of multiples and factors, and know how to find multiples and factors of a number.
* For consolidating these two important concepts, and their connection with multiplication and division, this package includes relevant worksheets to familiarize students with the connection between different concepts.
* This package helps students to learn the concepts of common factors, common multiples, the highest common factor and the least common multiple through daily life scenarios. The aim is to build up the understanding of the concepts rather than to apply the concepts.
* This package guides students to find common multiples, common factors, the least common multiple and the highest common factor by listing the multiples and factors of two numbers, as required by the Curriculum Guide.

**Part 1: Common Multiples and the Least Common Multiple**

* + Students should have the concept of multiples. This part aims at introducing the basic concepts of common multiples and the least common multiple.
  + This part build up the concept of common multiples through two specific scenarios (mathematical models). However, these scenarios are by no means exhaustive. Teachers can choose one scenario to discuss with students and guide them to understand the meaning of common multiples and the least common multiple. Students may take time to understand common multiples and the least common multiple from different perspectives.
  + The main theme of this part is the repetition (adding repeatedly) of two different intervals. Due to the difference of the intervals, their repetition (duplication) may not always be coincident. The core concept is to find out when they will meet each other. In the “Common Multiples (Animal)” PowerPoint, the intervals are the leap distances of the frog and rabbit. In the “Common Multiples (Medicine)” PowerPoint, the intervals are the durations between the taking of medicines. The former is to compare lengths, while the latter is to compare durations in form of lengths.
  + Teacher helps students to associate frog (or rabbit) leaps with multiples. Then teacher asks students when the frog and rabbit will meet again (and again) if they start leaping at the same line, which leads to the concept of common multiples. Finally, teacher asks students where their first meeting place is, which leads to the concept of the least common multiple.
  + The scenario of taking medicine is similar. Teacher needs to associate the durations between taking a kind of medicine with multiples. After that, teacher discusses the scenario of taking 2 kinds of medicine which leads to the concept of common multiples. The association of the durations with the lengths shown in diagrams may not be trivial for some students. Teacher could illustrate with examples.
  + Both scenarios can help students to visualize the least common multiple (i.e. their first “encounter”), and to realize that the common multiples can be generated endlessly. The listing of the common multiples, as shown in the slides, illustrates that they are in fact multiples of the least common multiple.
  + Teacher could introduce the terms “common multiples” and “the least common multiple” through linking the concepts or the visualization with the specific meaning in the scenario. Nevertheless, students may need plenty of examples (of lengths or durations) to help them to grasp the meaning of the terms.
  + “Common Multiples” Worksheet provides practices of finding common multiples by listing. Although the questions involve only numbers without scenarios, teacher may illustrate if needed.
  + A GeoGebra file of “**Common Multiples**” is included which can be used in the latter stage of the teaching. The lengths (i.e. numbers for finding common multiples) in the file can be varied easily for making different examples or for comparisons.
  + Teacher can also make examples of common multiples by the GeoGebra file and then insert the relevant images to the PowerPoint.
  + Teacher can fit in various scenarios to the simple images (e.g. the rectangles) in GeoGebra as examples. The emphasis should be in the comparison of lengths.

**Part 2: Common Factors and the Highest Common Factor**

* + Students should have the concept of factors. This part aims at introducing the basic concepts of common factors and the highest common factor.
  + This part build up the concept of common factors through a specific scenario (mathematical model). Teachers can discuss with students the “**Common Factors (Fence)**” PowerPoint and guide them to understand the meaning of common factors and the highest common factor. Students may take time to understand common factors and the highest common factor from different perspectives.
  + The main theme of the PowerPoint is to find the suitable length of fence for the lawn. The emphasis should be on the comparison of lengths.
  + Students explore possible lengths of fence for one side of the lawn, which is the same as finding factors of a number. Students should learn the difference between factors and non-factors through observing the remaining gap (remainder) in the slides.
  + The other side of the lawn provides another example for students to distinguish the factors and non-factors of a number.
  + Next, students can consider the lengths of both sides of the lawn to find the lengths of fence suitable for both sides (common factors).
  + Finally, students can pick the longest suitable fence.
  + At this moment, the terms “common factors” and “the highest common factor” can be introduced. Nevertheless, students may need more examples of different lengths to help them to understand the meaning of these terms.
  + A GeoGebra file of “**Common Factors**” is included which can be used in the latter stage of the teaching. The lengths (i.e. numbers for finding common factors) in the file can be varied easily for making different examples or for comparisons.
  + Teacher can also make examples of common factors by the GeoGebra file and then insert the relevant images to the PowerPoint.
  + Teacher can fit in various scenarios to the simple images (e.g. the rectangles) in GeoGebra as examples. The emphasis should be in the comparison of lengths.