

## Mathematics Diagnostic/Prescriptive Inventory (MDPI) General Description

The MDPI combines the advantages of personalized examiner/student interactions and on-line analytic capabilities. The student evaluation is conducted on a one-to-one personal basis by an educational professional. The MDPI goes beyond focusing on right and wrong answers but also relies on the examiner's judgments and observations. This is an important aspect of the MDPI approach because the examiner's observations of the student's performance is a key part of the input to the diagnosis

The MDPI is designed to be administered to students, ages 7 to 15, whose cognitive potential is at least in the average range. Depending upon the performance of the particular student and the experience of the examiner, the assessment can take between 45 minutes and 1.5 hours. The average is about one hour..

A key and unique element of the MDPI is *MDPI Analytics* which is a web-based, Expert System (ES), which summarizes and interprets the results of the assessment and provides the information necessary for the examiner to make a diagnosis of the student's learning issues. An ES is a computer application that emulates the decision-making ability of human experts. ESs are used extensively in the field of medicine. MDPI Analytics interprets a student's performance to present a deeper insight into that student's understanding of underlying concepts as well as those approaches that influence performance.

The major output of the MDPI Analytics is the student's *Mathematics Learning Profile*. This profile presents a detailed analysis of the student's performance. It defines the achievement levels as well as the qualitative factors that influence performance and the executive processes (cognitive factors) that can impact the learning of mathematics. The features of the student's Mathematics Learning Profile are synthesized in a *Summary of Findings* report, which can then be used to design personally tailored instructional approaches.

The components of the *MDPI Assessment* include:

- MDPI User's Manual
- MDPI Test Kit
  - Manipulative Models
  - Mathematical Aides
  - Activity Cards
- Data Recording Form
- MDPI Analytics
- MDPI Summary of Findings Chart

The **MDPI User's Manual** contains information about the administration, scoring, and interpretation of the MDPI. It also describe in depth features of the MDPI Analytics which allow the examiner to "drill deeper" into the findings reported by the MDPI. Finally, it includes guidelines as to how the findings from the MDPI can lead to responsive instructional strategies and personalized approaches to selected mathematical topics.

The **MDPI Test Kit** contains all of the manipulative materials, aides and activity cards necessary to conduct the evaluation. The *manipulative materials* include:

- Counting Chips
- Cuisenaire Rods
- Real Coins
- Base Ten Blocks
- Pattern Blocks
- 2 cm Cubes

The test kit also contains **aides** that can be offered to the student as the calculation items of the test are administered. The aides include:

- Hundreds Chart
- Number Lines: Whole Numbers & Integers
- Addition & Multiplication Tables
- Cm Graph Paper
- Calculator

**Activity Cards** are used in the evaluation as references for specific test items and are shown to the student. The Cards are in the form of easy to read and interpret flip cards that are “flipped” by the examiner and viewed by the student to cue the student to the test item being presented.

The **Data Recording Form** is used to record the results of the examination, including the specific responses offered by the student as well as key features of the student’s performance in approaching and responding the items presented. The examiner manually records the student’s responses as well as other relevant observations. The Data Recording Form contains cues to specific features which the examiner should note as the student proceeds on a given item. After the assessment has been completed the examiner records the information from the Data Recording Form into two worksheets on the MDPI Analytics program, the *Scoring Worksheet* and the *Performance Characteristics Worksheet*.

Once the examiner has entered the data from the evaluation, **MDPI Analytics** takes over. Using an online Expert System with algorithms designed to interpret the findings. The interpretative process then yields the student’s overall *Mathematics Learning Profile* in an easy to read **Summary of Findings Chart**. Those findings can then be used to fashion differentiated instructional strategies as well as approaches to specific mathematical topics that are most compatible with the student’s needs.