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| **Mathematics** |
| **Fluency** | **Understanding** | **Problem Solving** | **Reasoning** |
| An emphasis of skills in choosing and using appropriate procedures flexibly, accurately and efficiently. It is also about recall of knowledge and concepts. | It is when students make connections between related concepts and use the familiar to develop ne ideas. | There are two key elements: the solving of unfamiliar problems and the solving of meaningful problems. | The capacity of logical thought and actions, such as analysing, evaluating, explaining, inferring and generalising. |
| Develop skills in: * **Choosing** appropriate procedures
* **Carrying out** procedures flexibly, accurately, efficiently & appropriately
* **Recalling** factual knowledge & concepts
 | Develop the ability to:* **Build a robust knowledge** of adaptable & transferrable ideas
* **Make connections** between related ideas
* **Apply** the familiar to **develop** new ideas
 | Develop the ability to:* **Make choices**
* **Interpret**
* **Formulate**
* **Model**
* **Investigate**
* **Communicate** solutions effectively
 | Develop an increasingly sophisticated capacity for logical thought & actions such as:* **Analysing**
* **(Proving)**
* **Evaluating**
* **Explaining**
* **Inferring**
* **Justifying**
* **Generalising**
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| So what does it look like when they demonstrate fluency?They:* **Produce** answers efficiently
* **Recognise** robust ways ways of answering questions
* **Choose** appropriate methods
* **Recall definitions**
* **Use facts**
* **Manipulate information** and processes
 | So what does it look like when they demonstrate understanding?They:* **Connect** related ideas
* **Represent** concepts in different ways
* I**dentify** commonalities and differences between aspects of content
* **Describe** their thinking in a subject specific way
* **Interpret** subject specific information
 | So what does it look like when they formulate and solve problems?They:* **Design** investigations
* **Plan** approaches
* **Apply** existing strategies to seek solutions
* **Verify** that answers are reasonable
 | So what does it look like when they demonstrate reasoning?They:* **Explain** their thinking
* **Deduce** strategies
* **Justify** strategies & conclusions
* **Adapt** the known to the unknown
* T**ransfer** learning from one context to another
* **Prove** ( or provide evidence) that something is true or false
* **Compare** or contrast related ideas and explain their choices
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| This document was shared by Professor Martin Westwell and Margot Foster at the Murray and Mallee Regional Leaders day, Feb. 28th , 2013 |