

BEPS ESSENTIAL AGREEMENT on TEACHING MATHEMATICS

March 9 2012

Preamble:

Mathematics is a systematic way of describing the world, developed by human beings over millennia and constantly refined through the elegant power of mathematical reasoning. It is inherently connected to our sense of wonder and curiosity, and starts with simple questions like *how many? how big? where is it? or why does this look like that?* With Mathematics we can answer such questions with increasing sophistication, engaging with the world around us safely, socially, productively and with a sense of satisfaction.

All children can learn mathematics and become numerate, but by themselves they learn a basic, everyday numeracy that involves counting, locating, recognising shapes and patterns, solving simple problems and so on. Without explicit teaching children do not move into the rigorous and more complex layers of mathematics.

Agreement:

We agree that our purpose as teachers at BEPS is to lead all students towards the beauty and intrinsic value of the mathematical system, to guide them through the zones of proximal development appropriate to their own developmental stages, and to ensure that over time they master the tools necessary to actually do mathematics with a high level of achievement.

These tools include problem solving strategies, number sense, accuracy and precision, the notion of proof, computational skills and how to know when to use them, estimation and the technologies associated with doing mathematics effectively, from rulers to calculators to computer programs.

We agree on the fundamental things we must do to teach mathematics effectively:

- 1. We must know the mathematics curriculum:** this includes VELs and the new Australian Curriculum, the stages and phases of learning appropriate to different ages, and also the broader view of mathematics as a humanly created system. What we don't know we will learn, through reading, discussion, team work, PD courses and reference to others with greater knowledge.
- 2. We must know the students we teach,** both personally and in terms of their learning goals and achievements. This means using all available data, both quantitative and qualitative, to plan for effective learning. It means sharing information with each other about our students. We agree to personalise the learning, differentiate the curriculum and, as we de-privatize the classroom we ensure that individual teachers share responsibility for children's learning. The whole team teaches each child.
- 3. We must know and practice the best forms of pedagogy,** appropriate to the subject matter and to the actual children we teach. This means using constructivist teaching approaches to enable children to understand concepts and empower them to employ a range of skills and strategies in authentic ways. Knowledge is actively created by the child in his/her own mind, not passively received from the environment or the teacher. We see learning mathematics as a process of adapting to and organizing one's quantitative world, not remembering preexisting ideas and rules imposed by others.

Thus at BEPS we do not base our teaching on the *transmission model*, where students passively "absorb" mathematical structures given to them as "instruction". We do not transmit facts, skills and drills to students in isolation or by rote. Just as children best learn to read by experiencing the joy of great stories, they best learn mathematics by experiencing its beauty and the joy of mathematical engagement.

4. Our Mathematics Planning originates with the developmental sequence outlined in the First Steps documents. Our resources include picture story books, Maths 300, RIME, MCTP and similar texts, Maths Task Centre kits, hands-on and manipulative material, ICT and a wide range of mathematical tools such as rulers, calculators and grid paper.

We agree to plan in teams and to consciously deprivatize the mathematics classroom. Student progress and needs will be tracked through extensive one:one conferencing and by the collection and sharing of data.

We employ investigations, mathematical modelling, demonstrations, open ended questions, problem solving, peer teaching, targeted toolbox sessions, games and student choice through the Maths Menu. All of these approaches will be used at different times so that students experience a range of teaching modes.

5. We agree to emphasise the development of student thinking because most mathematics actually happens in the student's own mind. We engage students in deep conversation about their mathematics, asking questions such as "*what makes you say that?*" and teaching them that mathematics is a limitless field of enquiry - there is always more to discover.

6. We agree that our Mathematics Curriculum is concept - driven and not content based. The content to be learnt derives from underlying core mathematical concepts appropriate at each Developmental Phase.

We require students, over time and in appropriate ways, to make their thinking visible and to engage with the mathematical concept of proof. This requirement includes students learning to present and publish their work orally, on paper and digitally with clarity and a high degree of pride in their achievements.
