**The Maths Curriculum**

**At Minchinhampton, we use CanDo Maths to deliver all National Curriculum requirements. Underpinning this scheme are 3 key ideas- teaching for understanding, belief and hard work. This is supported by the key messages of growth mindset/marvellous mistakes by Prof Jo Boaler.** **Through CanDo, we turn up the HEAT (High Expectations through Adaptive Teaching)**

**Minch Maths in Nursery/Reception**

**In Nursery, the children learn new concepts and embed knowledge through teaching sessions and their play when they are accessing provision. The learning environment has number representations throughout so that children are reinforcing skills and knowledge throughout the day.**

**In Reception, we ensure there is a strong focus on the Number domain, ensuring children have a solid, conceptual understanding of the numbers 1-10. Mathematics is addressed through a combination of adult led activities, small group activities, independent group activities and child-initiated play.**

**Through discussion, feedback and pupil voice, children talk enthusiastically about their maths lessons and speak about how they love learning about maths. Children show confidence and believe they can learn about a new maths area and apply the knowledge and skills they already have. Children know what they can do to help support their learning in maths.**

Our curriculum also follows these principles: -

C1**:** Disciplinary Knowledge

We want children to understand what it is to be a mathematician; to understand what it is to work mathematically; to feel confident working/thinking this way. To know that mistakes will happen, and that ‘trial and improvement’ is a successful strategy during maths.

C2: Substantive Knowledge

We look to ensure substantive knowledge is taught and learned in a carefully planned progression. We make links back to previous relevant knowledge and make this explicit to the children at the outset of each unit.

C4: Spirituality

We look to identify opportunities for spiritual reflection and growth when planning and in practice. *‘Knowledge is finite. Wonder is infinite.’ (Matt Haig).*

**Teaching methods** **used in Maths**

**Engagement:**

From Y1 onwards, we aim for our maths lessons to include all 3 elements of fluency (Do its), reasoning (Twist its) and with a consolidation of enquiry (Explore Its). Each maths unit/topic starts with a ‘Hook it’- a stimulus/way in to motivate and inspire thought and wonder.

E2 **Establish a learning culture- growth mindset & learning powers**

We start each academic year with a revisit of the work of Jo Boaler including key messages around growth mindset

* Any response is a good response—work with pupil responses as the raw material for learning in a lesson as opposed to looking for the correct response. We call these ‘Marvellous Mistakes’ and might talk about being ‘in the pit’.
* Marvellous mistakes should be seen as positive building blocks for learning. Everyone in class to be interested in, even excited by mistakes as an opportunity for learning to take place. ‘My Wonderful Mistake’ Exit cards- children write as they go out. Talk about mistakes as First Attempt In Learning. Teachers share their mistakes. (see E5) I don’t know YET- as the class motto- as opposed to I don’t know or I can’t do this
* ‘What I learnt’ exit cards- careful to use only when learning has taken place as opposed to consolidation.

E3: **High expectations & formative intervention**

We want to inspire our SEN and vulnerable children to develop a passion for maths. We respond to their needs when planning and delivering lessons. If a pupil or pupils are struggling to understand the learning we support them through:

* **Pre- teach—**pre-emptlearning taking place the next day and pre-teach the objectives beforehand to boost confidence.
* **Practical—**approach the learning again from a more practical and/or concrete angle (concrete- pictorial- abstract)
* **Peer support**-pupil works with another pupil on the concept they are struggling with
* Look to **consolidate the fluency** of a skill. Our DP (deliberate practice) sessions enable us to support the learning and memorisation of mathematical concepts.

E5. Quality **of Teacher Questions (ref also techniques to develop MASTERY)**

* Hook it!’ - a visual engaging stimulus which invites conversation and is more open ended. Say,’ Tell me what you wonder.’ Say, ‘Tell me what you notice’
* Wait time—make sure good amount of wait time gives pupil chance to answer your question
* Hinge questions (mid lesson formative assessment) A range of answers**—**discusseach of a multiple choice of possible answers.
* Keep it challenging- Asking why--**-** rather than is square a trapezoid, ask why is it/ rather than is 23 a prime– ask why is 23 a prime? In CanDo this is known as ‘what is it NOT?’
* Asking for clarification(explaining. defining, giving examples, supporting, enquiring)
* Can you develop on that? What do you mean by..? How does that help? Does anyone have a question to ask about that?
* Examples-Ask- ‘give me an example of what you mean’ / Ask anotherpupil to follow up on a response by providing an example. Can you provide an answer that no one has thought of?

E8: **Working together-talking**

* Peer teachers - pupils chosen to teach an extension of the lesson to a small group or to a partner
* Peer markers/Self marking/Live marking- pupils need to be taught to do this. Important that peers don’t write in pupil book- pupils write in their own book with peer guidance. It is written into our marking policy that especially in older classes, the pupils self-mark. Spotting own errors and self-correcting is considered a valuable opportunity for deeper learning.
* Peer tutoring– especially if being expected to provide elaborate explanations (as opposed to answers or procedural information) – has been found to sometimes be as impactful if not more so than 1:1 tutoring by adult.

**Re: Thinking**

T1: Generating thinking/ using P4C approach

* Visualisers- show the workings of / layout/ approach to a problem.
* Twist its**—**spot the misconception (what is it not) and explain why
* Progression throughout school of language such as I wonder/I notice

**Re Clarity of Learning:**

CL1: Know their starting points

* An **elicitation** (not always written) developing into and including a recap on previous learning and then upcoming learning. This includes ‘vocabulary recap’ and stem sentences used for key vocab/ knowledge.
* **What went wrong-** look at a piece of work and work out/ discuss where they went wrong

CL2: Be clear about the end point and the big picture

* **Working out the learning intention-** provide the pupils with an activity/ model text/ challenge/ mistake/ model making a mistake- and then ask them to predict the LI or come up with the success criteria.

CL3: Be clear about the steps to get there

* **Success Criteria-** Examples might include a model algorithm-a visual aide-memoir for pupils and a reference point for teachers when explaining and then evaluating learning during a lesson.

**CL4-** How can we help our vulnerable/SEND learners with this?

* Songs/Retells/Video clips
* Pre-teach units - child could become the teacher
* Child led - e.g. Maths buddies
* Heads up - giving them notification that they will be asked about it at a later stage
* Stem sentences/Parrot responses
* Make the pupil an active participant in their own learning - own the consolidation

**Re Pupil autonomy:**

PA1: Pupils exploring their own ideas and questions.

* **Pupils as teachers—**pupilsconducting mini-lessons for other pupils; pupils writing their own test rather than doing the test; pupils explaining a concept in their own words rather than completing an exercise.

PA2: Pupil self-evaluation

* **Mark your own-** pupils to mark their own work using guides/ check lists etc

PA3: Pupil independence- ideas could include:

* **Help desks—**for example of maths resources- for pupils to go to if they need support
* **5B’s—** brain- board- book- buddy- boss- to encourage pupils to solve their query independently rather than going immediately for help from the teacher.
* **Resourcing-** ensure pupils have resources available in class generally and for specific lessons to ensure they feel fully supported in their learning.

**Re Proof of learning:**

PL1: All student response systems

* **Mini white boards--** for example ask the children to write down their method for solving a maths problem. Make sure they all hold their boards up at the same time.
* **Randomiser/ numbers on each chair/ Lolly pop sticks**-**-**Have lolly pop sticks with pupils’ names written on. Vary the way you use the lolly pop sticks, for example have a ‘joker’ stick which allows you to ask anyone you want or use other randomiser strategies. Use randomiser on white board. Use all 3 different methods in each lesson to keep it from going stale. Younger classes might have pupil photos to pull out of pack.
* **Exit passes-**pupils only able to go to the carpet/leave the room once they have given a response
* **Number skill booklets**
* SEN/vulnerable learners use **KPI documents** to ensure gaps are being addressed and closed.

PL2: Picking up on and responding to needs quickly:

Do a **quick check-** move quickly around the room picking up on how well the pupils ‘get’ the learning. Work out how many pupils are struggling and respond immediately through:

* **Mini-lesson**- provide those pupils who need it with another mini-lesson- explaining concept in different way
* **Stay on the carpet-** Pupils self-evaluate how confident they are to start working independently- using traffic lights/ thumbs up etc- if feeling panicked or lacking confidence then the teacher re-explains in a different way.
* **Peer support**- pair them up with someone who does understand/ provide group with an expert.
* **Support the skill-** provide the pupils who need it with a resource to support them- for example a x tables square if it is their knowledge of times tables standing between them and achieving the learning.
* **Simplify the skill-** Change the task for the group who are struggling to make the learning more accessible for them.
* **Go back to the beginning-** start again with the group who are struggling and take them right back to the beginning of your teaching/ the unit/ the concept to the point where they do begin to understand.
* **Repetition/ practise/ over-learning-** provide those struggling with further opportunities to repeat and over-learn the skill/ concept.

PL3: Feedback pupils to teacher

Learning is revisited to ensure that important knowledge and vocabulary has a chance to enter the long-term memory.

* **Mini white boards**
* **Hinge questions**- these based on the important concept that is critical for pupil understanding. Present mid lesson to evaluate progress. Must be diagnostic not up for discussion. All pupils must respond. Must be able to collect and interpret all pupil responses within 30 seconds.
* **Real time tests-** quick tests carried out at outset of lesson or end of one lesson to prepare for the next. These to quickly elicit pupil understanding

PL4: Retrieval Practice

* End of unit Remember Its/ Ready to Progress
* Misconceptions retrieval– (presented as hinge questions) can be general, based on previous lessons or classwork. Often ones that pupils can find confusing, tend to always get wrong or aren’t necessarily true to begin with.