Teaching and Learning (Sticky Knowledge) Policy (updated Sept 24)

AIM OF POLICY

- To embed a knowledge-rich, memory-friendly pedagogy (sticky knowledge) into the teaching and learning fabric of the school
- To provide a reference point for subject-leaders in curriculum planning and monitoring. There are clear expectations for subject leaders in terms of the effective implementation of the pedagogy.
- To provide guidance for teachers in the implementation of a sticky knowledge pedagogy in the classroom
- To be aware of and work towards end-points in each subject
- To be aware of and use the monitoring resources linked to the policy, ensuring that it is being consistently implemented
- To describe a range of pedagogical approaches being explored by the school in order to enhance sticky knowledge
- To provide subject-specific intents, implementations and impacts

INTENT

Our intent is to provide a programme of education which is rich in powerful knowledge and underpinned by strong values. Powerful knowledge is knowledge steeped in the traditions of each subject which empowers all our children to engage fully in their lives now and in the future.

For the children, we call this knowledge 'sticky knowledge' because we want them to understand that this is knowledge of such value it should stay with them forever. Our curriculum is both broad and deep, and is presented in a way to help knowledge stick by:

- ensuring that the entire national curriculum is well taught for all children
- strengthening the curriculum with cultural knowledge – the people, innovations and ideas which represent the very best of each subject – being mindful of those who have been overlooked in the past and ensuring diverse representation
- asking 'big questions' in order to develop children's curiosity about the knowledge they will be learning as well as developing a more evaluative stance towards 'knowledge'
- having a 'memory-friendly' pedagogy which particularly enables the children from our vulnerable groups, PPG, SEND and EAL, to learn successfully
- developing oracy across the school as a proven route to increasing confidence, academic outcome and wellbeing
- explicitly teaching the 'science' of sticky knowledge, bringing children on board with their improving ability to learn and developing empowered self-identities in all
- constructing a fluent curriculum where connections are easily made and learning is built upon
- ensuring that learning is suitably challenging while remaining mindful of cognitive overload
- encouraging pupils to consider how each topic is personally relevant to them and promoting a culture of life-long learning
- infusing teaching and learning with strong shared values and an ethos of working together

IMPLEMENTATION

<u>Creating a cohesive curriculum</u>

1. Our curriculum starts with the National Curriculum: Subject leaders create whole school subject sequences of learning, with due reference to the National Curriculum, ensuring that each year group is teaching age-appropriate knowledge which builds upon prior learning and feeds forward to agreed end-points. The progression overview for maths is derived from White Rose; for English, Target Tracker.

2. Subject leaders also create sticky knowledge mats for each topic detailing the National Curriculum expectations in addition to the cultural knowledge children are expected to learn with a focus on diversity. In developing the sticky knowledge mats, subject leaders are mindful of the need to balance challenge with cognitive overload. These mats also provide suggestions for assessment. There are also sticky knowledge mats for grammar concepts and for maths.
3. From the subject sequences of learning, year group teams construct curriculum maps for the academic year including specific links to prior knowledge (green) and across subjects (blue). The links to prior knowledge enable teachers to plan the first lesson of each topic, reminding children of what they already know and how they will build upon their knowledge.
4. Science and foundation subjects are planned lesson by lesson, from a 'big question' towards an agreed end-point (sticky knowledge mats) for each topic. Planning also includes differentiated end-points and learning for SEND children and those working at Greater Depth plus assessment activities for all groups. This is also true for maths and for English but the learning objectives are derived from the White Rose schemes of learning and Target Tracker respectively.
5. When planning for SEND, teachers refer to Pupil Profiles and any other information in order to ensure that learning reinforces any relevant targets and is appropriately differentiated whether that be in terms of end-point expectation or level of support.
6. When planning for Greater Depth, teachers consider the characteristics of children who require more cognitive challenge and this is reflected in the activities planned for them so that they are:
    a. Working independently beyond ARE including research, problem-solving and abstract thinking
    b. Developing advanced language skills which they apply with precision
    c. Applying what they've learned in one area of a subject to other areas
    d. Applying their knowledge consistently, confidently, fluently and flexibly
    e. Being able to explain what they have been doing to others, including teaching other children what they have learned.
7. Some teachers add further detail to their planning, especially in KS1, in order to add structure to their lessons. KS2 teachers often create PowerPoints which include learning objectives, success criteria, differentiated tasks and reviews. It is recognised, that at the point of lesson delivery, different teachers prefer to work in different ways. However, in order to provide consistency, pedagogical policies must be adhered to including the Planning, Feedback and Assessment policy.
8. Subject leaders and the Senior Leadership Team monitor planning and assessment in order to ensure that sticky knowledge is being taught and learned, feeding back to teachers over inconsistencies, dealing with misconceptions and supporting individuals/groups of learners.

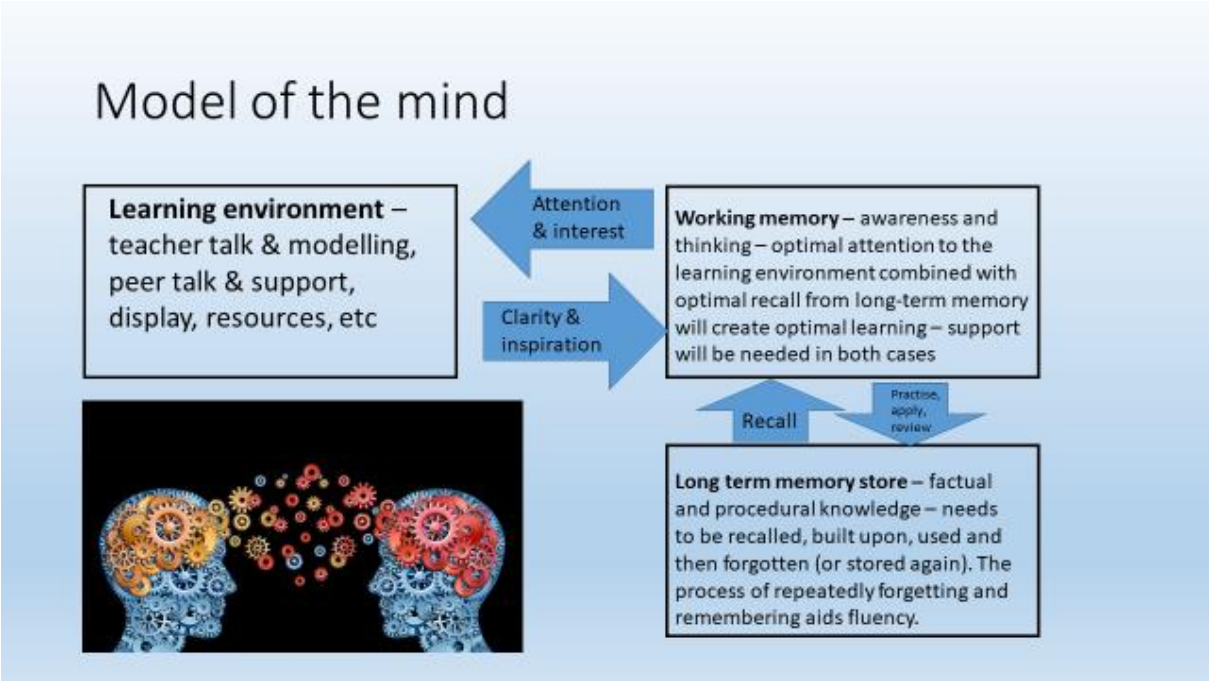
<u>Teaching, learning and assessing the curriculum</u>

Each topic of learning must include:

- at least one lesson at the beginning which explicitly refers to prior learning – what was learned and when – and encourages children to understand that that they have strong foundations from which to build their learning

Most lessons will include the following key elements:

- **imparting new knowledge** (usually the teacher/TLA) and **recalling relevant knowledge** (usually the child) – combining both in the working memory (**building on**)
- **practising and applying the knowledge** (rote and elaborative rehearsal, problem-solving) – moving knowledge into the long-term memory (making it sticky) and/or using the knowledge in meaningful ways
- **cognitive closure** – choosing the most important bits to store in long-term memory



Engaging children in the learning

At the point of learning, children need to be focussing their attention and recalling their knowledge, applying some energy to their own learning. For the best lessons, teachers and children will be equally active. Many children will be naturally curious, others will need motivating.

One of the best ways to engage children is to ask them why this aspect of learning might be personally important to them, avoiding talking about jobs in the future or passing tests but considering any interesting uses for their learning now. (This activity alone will represent a form of elaborative rehearsal.)

Recall

Thinking occurs when children combine information from the environment (the lesson) with what they already know (long-term memory) in new ways. This combination happens in the working memory and this is why recall of long-term memories (sticky knowledge) into the working memory is so important.

At the beginning of every lesson, children have an opportunity to recall relevant knowledge and be clear how it links with the learning objective. Teachers refer to schemes of learning and curriculum maps so that they too are clear about prior learning and how to build on it. It is important to keep reminding children to draw on their sticky knowledge – this will make learning less frustrating and more pleasurable/successful.

Rote and elaborative rehearsal

Rote rehearsal is usually practising a procedure whether it is how to spell a word, add 3 digit numbers, blend colours, play an instrument, kick a ball, conduct a fair test, etc. What is common to all these procedures is that they should be done in a specific way to be effective.

Therefore the practice activities provided enable children to use the correct procedure with increasing fluency. If they start 'thinking outside the box' too quickly, they will only become fluent in ineffective or inefficient procedures. Rote rehearsal has the reputation for being boring but it actually eases anxiety for children while they get to grips with the procedure or concept. If children appear bored, it is time to move on to elaborative rehearsal.

Elaborative rehearsal is building on knowledge in new and exciting ways. It is still practice but in a way which actively links to prior learning, sometimes in other subjects or contexts, and creates a deeper understanding (hence the term 'elaborative'). These activities are much more open-ended and involve investigation, discussion

and debate, trial and error, imagination and creativity. Anything transformational - drawing a poem, turning maths procedures into mini-dramas, telling a story about a science concept, dancing a map, finding the maths in music, singing history – constitutes elaborative rehearsal.

Guided practice

Guided practice is an important and universal strategy for teaching at Bengeo. Based on Vygotsky's ZPD, it is commonly described as 'I do, we do, you do' and means that teachers move from modelling to shared learning to independence within one lesson, aiding fluency and avoiding misconceptions.

Applying sticky knowledge to problem-solving

A 'problem' is work that presents a moderate challenge, including things like understanding a poem or thinking of interesting sandwich fillings. Children need regular opportunities to use their knowledge independently and apply it to a problem (in most lessons) or investigation (at least once per unit).

Cognitive closure

Cognitive closure describes the process whereby the working memory selects what will be passed to the long-term memory and what will be discarded. It completes the rehearsal process and attaches sense and meaning to new learning, enhancing the likelihood of it being retained. It is different from review when the teacher does most of the work.

It is usually at the end of the lesson in order to tie everything together. It should involve attaching importance to the key parts of the lesson, usually at least mentally. It will always help to talk it through and, for older children, write it down.

Examples are: "In your head, I would like you to say to yourself the 3 most important things you learned today about… Be prepared to explain to your talk partner." "In your head, think about what you learned today and how it linked/built upon something you had learned already. Be prepared to explain to your talk partner." "Here are 3 possible future uses for what you learned today. Think, in your head, which one you can see yourself doing or think of another use. Write down your thoughts."

The dialogic approach

Bengeo is exploring the effective use of the dialogic approach, giving children opportunities to contribute to classroom discussions in a variety of ways in order to explore the limits of their own understanding. It also enables children to practise new ways of using language as a tool for constructing knowledge. The dialogic approach will become increasingly prominent as a pedagogical tool to enhance sticky knowledge; it is:

Collective - children address learning tasks together

Reciprocal - children listen, share and consider alternative viewpoints

Supportive – children express themselves freely and safely, without embarrassment, coming to a common understanding

Cumulative – children build on their own and others' contributions and chain them into a coherent line of thinking

Purposeful - The discussion is planned and structured with specific learning views or outcomes

Metacognition and children's knowledge of the role of memory

Children are provided with information about how the brain works and the role of memory in particular. They are encouraged to relate this knowledge to their own learning processes and helped to understand how it can enhance their acquisition of knowledge. The key facts they learn are:

- Attention and focus are the starting points of learning
- Building on knowledge, making links, having your own ideas, adapting and applying knowledge all contribute to securing knowledge in long-term memory
- Practising procedures and recalling knowledge repeatedly strengthens neural pathways (fluency)
- Choosing what to remember helps the memory process
- Knowledge can be elusive and requires some perseverance in recalling (playing hide-and-seek with memories); the process of forgetting and remembering, however, strengthens memory
- Learning collaboratively will benefit everybody ('Two brains are better than one.')

It is recognised that the more children know about the learning process, the more motivated they will feel to develop a conscientious approach to their own learning.

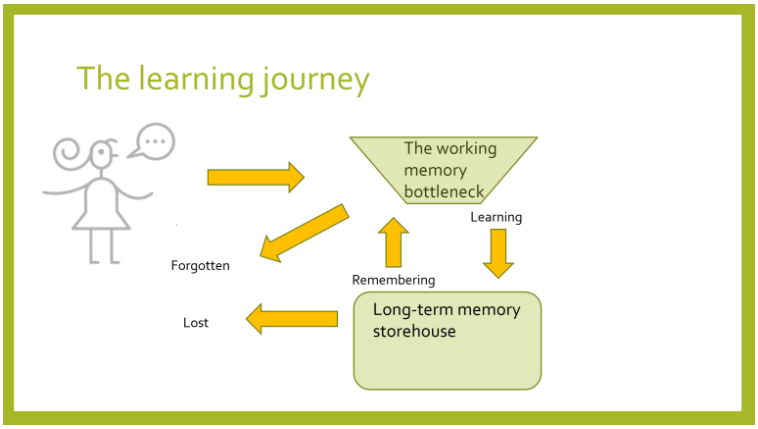
Self-regulation and values

In addition to knowledge, teachers help children become self-regulated learners by developing the following executive functions:

- Focusing on learning
- Planning and organising
- Flexibility and emotional resilience
- Metacognition and reflection

Teaching and learning is also underpinned by our core values (cooperation, respect, honesty, integrity, thoughtfulness, appreciation, patience, collaboration and tolerance).

SEND



It is important to identify where in the learning journey children with SEND are struggling and ensure support reflects their need. The common learning 'traps' to look out for are as follows:

Trap 1: Learning may not make it into the working memory due to problems with attention, speech/language or anxiety. Ensuring children are supported by sensitive Talk Partners is one way to help with attention and vocabulary, providing regular opportunities for low-stakes discussion. Providing visual and practical models as well as word banks will also support children trying to understand new concepts.

Trap 2: Children with learning difficulties will often struggle with cognitive overload as they may lack the building blocks of their peers. Therefore they will need knowledge presented to them in small steps and/or be provided with the building blocks they lack (scaffolding). It may be that the planned end-point is also differentiated so that they do not have more to learn than their peers.

Trap 3: Children with SEND often have difficulties with recall. This may be because they believe, as many children do, that if they cannot recall an answer immediately that they will never be able to so give up easily and/or guess. They will need lots of practice in persevering with recall, picking up clues from their peers or the learning environment and playing hide-and-seek with their memory – it is important for them to understand that the struggle to retrieve makes the memory stronger. This strategy depends on a lot of patience from those working with children with SEND and it is essential not to reteach before they have struggled; lessons need to be organised and differentiated in order to allow *all* children to struggle. Mnemonics, rhymes, metaphors, etc, will all help children to recall.

IMPACT

Assessment drives pupil progress and outcomes. There are robust assessment procedures (see policy) which ensure that teachers quickly understand what children know and to what degree, in addition to what helps and what hinders each child.

As a consequence:

- All children make good progress from their individual starting points academically, emotionally, creatively, socially and physically
- All children, including SEND and PPG, achieve the best possible outcomes
- Children are conscientious, confident and curious – applying themselves to learning and doing their best, producing work, across the curriculum, of high quality
- Knowledge, understanding and skills are secured and embedded in part due to children's metacognition and increasing understanding of the role of memory in their learning
- Children listen respectfully and with tolerance to the views of others; they display good communication skills, both written and verbal
- Children demonstrate emotional resilience and are able to persevere through challenges
- Children demonstrate inclusive attitudes and have a sense of responsibility towards the wider society
- Children are fully prepared for secondary school and beyond

Appendix A

End-Points

The curricular end-points for our children, by the time they leave Bengeo, are detailed, subject by subject. These end-points are derived from the National Curriculum and from subject leaders' views of what is most important. Once end-points are identified, way-points (sticky knowledge mats) are set along the route. Teachers know the end-points of all the subjects taught.

By the end of Year 6, we expect children to:

MATHS

- be fluent in the conceptual, factual and procedural knowledge of the primary maths curriculum, able to recall and apply knowledge with efficiency, accuracy and effectiveness
- solve problems by applying their mathematical knowledge to a variety of real-life or abstract scenarios, making appropriate and confident decisions as they work through steps and seek solutions
- reason mathematically by following a line of enquiry and presenting justification, argument or proof using precise mathematical language
- be resilient and exploratory in their approach to maths, recognising and learning from mistakes, noticing and using patterns, and applying a 'trial and error' approach

ENGLISH

- be able to read and write sufficiently fluently and effortlessly for them to manage the general demands of the curriculum in Year 7, across all subjects and not just in English, recognising that there will continue to be a need for pupils to learn subject-specific vocabulary.
- be able to reflect their understanding of the audience for and purpose of their writing by selecting appropriate vocabulary and grammar, exercising a conscious control of sentence structure and understand why sentences are constructed as they are
- understand degrees of formality in vocabulary choice and age-appropriate, academic vocabulary through consolidation, practice and discussion of language
- have confidence, enjoyment and mastery of language in a variety of ways eg. through public speaking, performance, debate, etc
- have developed a love of literature, including literary heritage, through widespread reading for enjoyment and to have developed the habit of reading widely and often, for both pleasure and information

SCIENCE

- develop scientific knowledge and conceptual understanding through biology, chemistry and physics.
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- have the scientific knowledge required to understand the uses and implications of science, today and for the future
- be enthusiastic scientists, able to 'see' the science in different subjects and open to pursuing careers in the sciences

RE

- connect their knowledge and understanding of some religions and worldviews, reflecting on these using specific religious vocabulary
- analyse different viewpoints within and between religions and beliefs
- understand the impact of faith on believers within local, national and global contexts
- demonstrate respect and compassion responding to diverse viewpoints about belonging, meaning and truth
- explore shared human responsibility and values through enquiry and experience, and express personal reflections with increasing curiosity

- identify the importance of moral choices, selecting examples and giving reasons to support their ideas

ART

- have developed skills across a range of media together with the independence and enthusiasm to create artwork of their own
- have a fuller knowledge of artists/designers and be able to recognise their work
- communicate confidently about their own work and that of others
- be able to use their observational skills to produce work of good quality, one which has built on knowledge and skills over the course of their time at school
- experience enjoyment and confidence when expressing their artistic ideas

COMPUTING

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology

HISTORY

- be enthusiastic historians with chronologically secure knowledge and understanding of British, local and world history, establishing clear narratives within and across the periods they study
- be able to note connections, contrasts and trends over time and develop the appropriate use of historical terms
- be able to regularly address and sometimes devise historically valid questions about change, cause, similarity and difference, and significance
- construct informed responses that involve thoughtful selection and organisation of relevant historical information
- understand how our knowledge of the past is constructed from a range of sources

GEOGRAPHY

- be enthusiastic geographers, curious and fascinated about the world around them and its population.
- develop contextual knowledge of the location of globally significant places, both terrestrial and marine, including their main physical and human characteristics
- understand the processes that give rise to key physical and human geographical features of the world. How these are interdependent and can change over time.
- be competent in the geographical skills needed to:
    - collect, analyse and communicate a range of data gathered through experiences and fieldwork that deepen their understanding of geographical processes.
    - interpret a range of sources of geographical information, including maps, diagrams, globes, aerial photographs and Geographical Information Systems (GIS)
    - communicate geographical information in a variety of ways, including through maps, numerical and quantitative skills and writing at length.
- use their growing knowledge about the world to help them deepen their understanding of the interaction between physical and human processes, and of the formation and use of landscapes and environments.

PE

- be confident movers and to enjoy physical activities

- have been taught a range of skills and have built upon such skills
- display the core values both in lessons and when representing the school eg respect, fair play, honesty and teamwork
- be able to recognise and talk with confidence about their own skills and that of others
- value the benefits of engaging in physical active and how this contributes to a healthy lifestyle

PSHE

- have a strong sense of self-identity and can express a level of independence while maintaining positive relationships with others
- can explain why different forms of positive and negative prejudice and discrimination happen and can challenge their own and others' attitudes and values and accept difference in others
- can explain

MUSIC

- be able to evaluate music across a range of historical periods, genres, styles and traditions, including the works of the great composers and musicians
- be able to sing and to use their voices
- to create and compose music
- understand how music is created and communicated, including through the inter-related dimensions: pitch, duration, dynamics, tempo, timbre, texture, structure and appropriate musical notations

D&T

- generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern piece and computer-aided
- select from and use a wider range of tools and equipment to perform practical tasks accurately, and a wider range of materials and components, including construction materials, textiles, and ingredients
- evaluate, investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how events and individuals in design and technology have helped shape the knowledge
- use the basic principles of a healthy and varied diet to prepare dishes

MFL

- listen and understand the spoken language, joining in conversations and responding appropriately to questions or giving opinions
- develop accurate pronunciation and intonation.
- present ideas and information orally to a range of audiences.
- read and understand key words, phrases and simple writing and have the ability to use a dictionary when new vocabulary presents itself.
- write ideas clearly in sentences involving describing people, places, things and actions.
- understand basic grammar, eg. masculine, feminine and neuter forms, high-frequency verbs, key features and patterns of the language; know how to apply these and build them into sentences, looking at how these are similar or differ from the English language