

Introduction : Agenda

Monday - Morning Session High-Quality Teaching and Learning

- OfSTED Improvement Objectives and OfSTED framework (implementation)
- National context
- School Curriculum for Learning
- EEF Impact on Learning Survey
- Learning Vocabulary (Talking about Learning)
- Learning Journeys
- Effective Learning and Effective Learners
- Executive Function
- Cognition and Metacognition
- Teaching and Learning Research, Theories and Principles
- Memory and Retrieval Practice
- High Quality Resources, Questioning and Feedback

Introduction : Agenda

Monday – Afternoon Session

- OfSTED Mathematics Research
- Developing Fluency

Introduction : Agenda

Tuesday - Morning Session

- **Computing Curriculum**
 - Computation Thinking
 - Scheme of Learning
 - Software and Resources
 - Programming Principles
 - Unplugged activities
 - Data Handling
- **Art and Design**
 - Scheme of Learning
 - Progression in Art and Design
 - Approaches to Art Teaching
 - Theme, media and materials, form and representation, artists
- **Design and Technology**

Introduction : Agenda

Tuesday - Afternoon Session

- **Personal, Social, Health and Citizenship Education (PSHCE)**
 - Strands
 - Myself
 - Myself and Others
 - Myself and the Wider World
 - Progression in PSHE
- Relationships Education (SRE)
- PSHE Resources and Resources

OfSTED Inspection

In October 2019, the school was inspected and was judged to be GOOD in all areas. In order to at least maintain GOOD and aim for OUTSTANDING at the next inspection (likely to be 2023), we need to:

- **make sure that the activities and resources that they use help pupils to learn the intended curriculum effectively. This is important to ensure that pupils' learning is maximised within lessons and over time.**
- **build the knowledge and understanding of subject leaders to develop their leadership skills and to make sure that the curriculum continues to evolve and develop**

and

- have schemes and sequences of learning in every subject
- be confident in our curriculum and be able to articulate it (deep dive)
- improve our understanding of teaching and learning
- Maximise learning so that it is deeper/remembered
- improve children's executive function, self-regulation and metacognition

OfSTED : Implementation (at classroom level)

Research and inspection evidence suggest that the most important factors in how, and how effectively, the curriculum is taught and assessed are the following:

- Teachers have expert knowledge of the subjects that they teach. If they do not, they are supported to address gaps in their knowledge so that pupils are not disadvantaged by ineffective teaching.
- Teachers enable pupils to understand key concepts, presenting information clearly and encourage appropriate discussion.
- Teachers check pupils' understanding effectively, and identify and correct misunderstandings.
- Teachers ensure that pupils **embed key concepts in their long-term memory** and **apply them fluently**.
- The subject curriculum is designed and delivered in a way that allows pupils to **transfer key knowledge to long-term memory**. It is sequenced so that new knowledge and skills build on what has been taught before and pupils can work towards clearly defined end points.

OfSTED : Implementation (at classroom level)

- Teachers use assessment to check pupils' understanding in order to inform teaching, and to help pupils embed and use knowledge fluently and develop their understanding, and not simply memorise disconnected facts
- Their **approach to teaching remains rooted in evidence** and the **key elements of effective teaching**. Teachers consider **the most important knowledge or concepts pupils need to know and focus on these**. **Feedback, retrieval practice and assessment are prioritised**.
- The medium for remote education enables all pupils to access lessons and learn.
- Teachers monitor pupils' engagement and communicate effectively with parents and colleagues if there are concerns.

Developing understanding, not memorising disconnected facts

Learning can be defined as an **alteration in long-term memory**. If nothing has altered in long-term memory, nothing has been learned. However, **transfer to long-term memory depends on the rich processes described above**. In order to develop understanding, pupils connect new knowledge with existing knowledge. Pupils also need to develop fluency and unconsciously apply their knowledge as skills. This must not be reduced to, or confused with, simply memorising facts. **Inspectors will be alert to unnecessary or excessive attempts to simply prompt pupils to learn glossaries or long lists of disconnected facts.**

National Focus

What is happening nationally?

- OfSTED focus on impact of teaching on pupils knowing and remembering more
- focus on metacognition
- Initial teacher training now focusing much more on metacognition and how children learn
- Two-year induction for new teachers including online training

Here is a video that is being used with new teachers.

National Focus



School Curriculum Strands

NORTHENDEN COMMUNITY SCHOOL

SCHOOL CURRICULUM STRANDS



What are the school's Curriculum strands?

School Curriculum Strands

NORTHENDEN COMMUNITY SCHOOL

SCHOOL CURRICULUM STRANDS

School Curriculum Strands

NORTHENDEN COMMUNITY SCHOOL

SCHOOL CURRICULUM STRANDS

Curriculum for Learning	Curriculum for Life	Curriculum for Academic Study	Curriculum for Enrichment

School Curriculum Strands

NORTHENDEN COMMUNITY SCHOOL

SCHOOL CURRICULUM STRANDS

Curriculum for Learning <i>Enabling pupils to be effective, independent and successful learners</i>	Curriculum for Life <i>Enabling pupils to be effective citizens, stay safe and be healthy, now and in the future</i>	Curriculum for Academic Study <i>Enabling pupils to develop knowledge, skills and understanding in academic subjects</i>	Curriculum for Enrichment <i>Enabling pupils to develop their interests and cultural understanding</i>
<p>We aim to enable pupils to:</p> <ul style="list-style-type: none"> develop their capacity and motivation to learn independently in and out of school know when and how to listen, think, discuss and ask relevant questions know how we learn and remember things organise themselves and plan their own learning, including having the necessary resources and completing homework build stamina, patience, and resilience in their approach to learning build and maintain positive self-esteem, knowing that they have strengths on which to build and improve see and talk about the progress they are making in their learning and what they are doing to improve use feedback to improve their skills and attitude to learning see learning as a journey and develop a positive growth mindset ("not yet") for future learning and achievement reflect on and make changes to their approach to learning or tasks accept mistakes and see them as positive learning opportunities set targets or challenges for themselves and with others, and focus and work hard to achieve them be resourceful in helping themselves to overcome difficulties and solve problems know when to seek help and support from others, including adults develop a thirst for knowledge and a desire to find out more about the world in which we live celebrate their learning and achievements, however small have confidence in themselves, their abilities and their future <p>© Northenden Community School</p>	<p>We aim to enable pupils to:</p> <ul style="list-style-type: none"> undertake simple everyday/life tasks appropriate to their age understand their uniqueness and the uniqueness and difference of others understand that they have a positive part to play in their families, school, local and wider community develop respect for others, including those with different characteristics develop good character traits, virtues and values, including honesty, friendship, thoughtfulness and responsibility understand, communicate and manage emotions and actions appropriately stay safe in a range of contexts understand how to maintain good physical and mental health share, play and work effectively with others, including in groups and teams share and communicate their views, thoughts and knowledge in a thoughtful, constructive and effective way behave and conduct themselves appropriately so that they have a positive impact on the school, their family and the community develop their spiritual, moral, social and cultural understanding (SMSC) understand their and other's rights in different contexts, and exercise and defend their rights appropriately understand and have respect for fundamental British values, including democracy, government, individual liberty and freedoms, the law and different faiths develop an understanding of the economy and the world of work make a positive contribution to the sustainability of the environment of the school, community and the wider world 	<p>We aim to enable pupils to:</p> <ul style="list-style-type: none"> prepare for the next stage of their academic education so that they have the skills, knowledge and confidence needed to start secondary school develop skills in reading and comprehension to a high level so that they can access the curriculum, engage with high-quality literature and other printed material, including in real contexts develop skills in writing to a high level so that they can communicate effectively through different genres of written text develop an understanding of concepts and skills in mathematics so that they are confident in their use of number and other domains to solve imaginary and real-life problems use ICT to support their learning and to apply digital literacy and computational thinking in different contexts develop skills, knowledge and understanding in a broad range of academic subjects, underpinned by the National Curriculum apply their knowledge, skills and understanding in different contexts, including imaginary and real situations make links between their learning from one year group to the next and across different themes or subjects talk confidently about what they know and what skills they are developing in different subjects understand that each subject can be studied on its own but see the connections between subjects and how they relate to one another understand the deeper aspects of learning in a subject, including how it contributes to their overall development 	<p>We aim to enable pupils to:</p> <ul style="list-style-type: none"> see learning in its widest sense, not just something that takes place in school take part in experiences, including outdoors, which support or go beyond their school-based learning visit museums, art galleries, libraries, theatres and music venues to experience first-hand the richness and variety of local, UK and world heritage and culture take part in different extra-curricular activities to develop their interests and talents over time to engage with the performing arts, including learning to read music and play a musical instrument take part in competitive school sports, at school and inter-school level have experiences and opportunities which develop their wider understanding of local culture, including the arts, religion and cultural diversity develop, share and celebrate their own interests, expertise, talents and achievements, including with others understand the very special place that Manchester is and what is on offer to engage their interests and develop their skills and talents over time understand the culture of the UK as a diverse and rich environment for learning and living take part in a residential visit, living and working alongside others learn from others, including experts and those in different types of work be curious and inquisitive about the things around them, including their local environment, nature, technological trends, politics, news and world events engage, participate and make a contribution in different contexts

Curriculum for Learning

Curriculum for Learning

Enabling pupils to be effective, independent and successful learners

We aim to enable pupils to:

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- use feedback to improve their skills and attitude to learning
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- have confidence in themselves, their abilities and their future

Why are we now?

On a scale of 1-5, to what extent are/do our pupils

- motivated to learn by themselves (for little reward)?
- know how to listen, think, discuss and ask questions?
- know how we learn, remember and recall learning?
- organise themselves and plan their own learning?
- have stamina, patience and resilience?
- know their strengths and the things they can improve?
- see and talk about learning processes and progress
- **expect and receive high-quality feedback and apply it?**
- reflect and make changes to the way they learn?
- set targets or challenges for themselves or each other?
- resourceful in their learning?
- know how to ask for help and describe their challenges?
- have a thirst for knowledge?
- celebrate their learning (but not necessarily by reward)?
- have confidence in themselves and as learners?

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What do we need to develop?

- Understanding about memory and recall
- Understanding about cognition and metacognition
- How we describe learning and learning processes
- Consistent language of learning
- Whole-school and consistent approach to teaching
- Whole-school teaching and learning policy
- Consistent use of visuals, worksheets, routines, ways of doing things, presentation of work, classroom management

We have moved on from:

- Visual
- Auditory
- Kinaesthetic
- Learning Preferences

buy they are still valid (will see later)

Education Endowment Fund – Impact Research

The EEF Teacher Toolkit, lists a number of strategies, resources and actions that schools have put in place to improvement achievement and raise attainment.

Which five do you think have the most impact?

- Arts participation
- Behaviour intervention
- Building environment
- Collaborative Learning
- Digital Technology
- Early Years Interventions
- Extending school time
- Feedback
- Homework
- Mastery learning
- Metacognition and self-regulation
- Sports Participation
- 1:1 tuition
- Oral language intervention
- Parental engagement
- Learning styles
- Reading comprehension strategies
- Reducing class size
- Repeating a year
- School uniform
- Streaming and setting
- Small group tuition
- Teaching assistants

Education Endowment Fund – Impact Research

The EEF Teacher Toolkit, lists a number of strategies, resources and actions that schools have put in place to improvement achievement and raise attainment.

- Feedback (8)
- Metacognition and Self-Regulation (7)
- Reading Comprehension Strategies (6)
- Early Years Interventions (5)
- 1:1 Tuition (5)
- Oral Language Intervention (5)
- Collaborative Learning (5)
- Mastery Learning (5)
- Digital Technology (4)
- Small Group Tuition (4)
- Behaviour Intervention (3)
- Extending School Time (3)
- Reducing Class Size (3)
- Parental Engagement (3)
- Arts Participation (2)
- Sports Participation (2)
- Homework (2)
- Learning Styles (2)
- Teaching Assistants (1) *
- School Uniform (0)
- Building Environment (0)
- Setting / Streaming (-1)
- Repeating a Year (-4)

Teaching Assistants

The IMPACT of Teaching Assistants scores relatively LOW IMPACT in the research as there were many examples in school where TAs were not deployed as effectively as they could be.

The effective use of TAs under everyday classroom conditions

1

TAs should not be used as an informal teaching resource for low attaining pupils



The evidence on TA deployment suggests schools have drifted into a situation in which TAs are often used as an informal instructional resource for pupils in most need. This has the effect of separating pupils from the classroom, their teacher and their peers.

Although this has happened with the best of intentions, this evidence suggests that the status quo is no longer an option.

School leaders should systematically review the roles of both teachers and TAs and take a wider view of how TAs can support learning and improve attainment throughout the school.

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2

Use TAs to add value to what teachers do, not replace them



If TAs have a direct instructional role it is important they add value to the work of the teacher, not replace them – the expectation should be that the needs of all pupils are addressed, first and foremost, through high quality classroom teaching. Schools should try and organise staff so that the pupils who struggle most have as much time with the teacher as others. Breaking away from a model of deployment where TAs are assigned to specific pupils for long periods requires more strategic approaches to classroom organisation. Instead, school leaders should develop effective teams of teachers and TAs, who understand their complementary roles in the classroom.

Where TAs are working individually with low attaining pupils the focus should be on retaining access to high-quality teaching, for example by delivering brief, but intensive, structured interventions (see Recommendations 5 and 6).

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3

Use TAs to help pupils develop independent learning skills and manage their own learning



Research has shown that improving the nature and quality of TAs' talk to pupils can support the development of independent learning skills, which are associated with improved learning outcomes. TAs should, for example, be trained to avoid prioritising task completion and instead concentrate on helping pupils develop ownership of tasks.

TAs should aim to give pupils the least amount of help first. They should allow sufficient wait time, so pupils can respond to a question or attempt the stage of a task independently. TAs should intervene appropriately when pupils demonstrate they are unable to proceed.

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4

Ensure TAs are fully prepared for their role in the classroom



Schools should provide sufficient time for TA training and for teachers and TAs to meet out of class to enable the necessary lesson preparation and feedback.

Creative ways of ensuring teachers and TAs have time to meet include adjusting TAs' working hours (start early, finish early), using assembly time and having TAs join teachers for (part of) Planning, Preparation and Assessment (PPA) time.

During lesson preparation time ensure TAs have the essential 'need to know':

- Concepts, facts, information being taught
- Skills to be learned, applied, practised or extended
- Intended learning outcomes
- Expected/required feedback.

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The effective use of TAs in delivering structured interventions out of class

5

Use TAs to deliver high quality one-to-one and small group support using structured interventions



Research on TAs delivering targeted interventions in one-to-one or small group settings shows a consistent impact on attainment of approximately three to four additional months' progress (effect size 0.2–0.3). Crucially, these positive effects are only observed when TAs work in structured settings with high quality support and training. When TAs are deployed in more informal, unsupported instructional roles, they can impact negatively on pupils' learning outcomes.

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6

Adopt evidence-based interventions to support TAs in their small group and one-to-one instruction



Schools should use structured interventions with reliable evidence of effectiveness. There are presently only a handful of programmes in the UK for which there is a secure evidence base, so if schools are using programmes that are 'unproven', they should try and replicate some common elements of effective interventions:

- Sessions are often brief
- (20–50mins), occur regularly (3–5 times per week) and are maintained over a sustained period (8–20 weeks). Careful timetabling is in place to enable this consistent delivery
- TAs receive extensive training from experienced trainers and/or teachers (5–30 hours per intervention)
- The intervention has structured supporting resources and lesson plans, with clear objectives
- TAs closely follow the plan and structure of the intervention
- Assessments are used to identify appropriate pupils, guide areas for focus and track pupil progress. Effective interventions ensure the right support is being provided to the right child
- Connections are made between the out-of-class learning in the intervention and classroom teaching (see Rec 7).

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Integrating learning from work led by teachers and TAs

7

Ensure explicit connections are made between learning from everyday classroom teaching structured interventions



Interventions are often quite separate from classroom activities. Lack of time for teachers and TAs to liaise allows relatively little connection between what pupils experience in, and away from, the classroom. The key is to ensure that learning in interventions is consistent with, and extends, work inside the classroom and that pupils understand the links between them. It should not be assumed that pupils can consistently identify and make sense of these links on their own.

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What is effective learning?

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What is effective learning?



- How might we describe an effective learner?
- What is it that effective learners do?
- What is it that less effective learners do/do not do?

Characteristics of Effective Learning (Early Years)

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The Characteristics of Effective Learning

The Characteristics of Effective Learning describe behaviours children use in order to learn.

To learn well, children must approach opportunities with curiosity, energy and enthusiasm. Effective learning must be meaningful to a child, so that they are able to use what they have learned and apply it in new situations. These abilities and attitudes of strong learners will support them to learn well and make good progress.

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Success in the early years

Becoming an effective learner for life

There is a significant body of developmental psychology research which has established the central place of self-regulation in the early years, along with emotional and social aspects of development, as principal determinants of later academic success. Self-regulation is a concept that involves attitudes and dispositions for learning (the motivation, or 'will'), and an ability to be aware of one's own thinking (cognitive strategies, or 'skill'). It also includes managing feelings and behaviour. The development of cognitive and motivational self-regulation – 'skill' and 'will' – vary among individuals. As in other areas of development, these are highly sensitive to experience and therefore can be enhanced by effective practice in early years settings. It is critical, therefore, to bring into sharp focus the elements of self-regulation which underpin learning across all areas, developing from birth and supporting lifelong learning.

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Characteristics of Effective Learning Playing and exploring – engagement

Alongside development in all areas of learning which is enhanced in play, this strand particularly highlights the agency of the child in actively constructing knowledge and understanding through playful qualities of engaging with their environment and with others.

- **Finding out and exploring** is concerned with children's open-ended, hands-on experiences which result from innate curiosity and provide the raw sensory material from which children build concepts, test ideas, and find out;
- **Using what they know** in their play describes the importance of play as a context for children to bring together their current understandings, flexibly combining, refining and exploring their ideas in imaginative ways. Representing experiences through imaginative play supports development of narrative thought, the ability to see from other perspectives, and symbolic thinking
- **Being willing to have a go** refers to the role of play in children finding an interest, initiating activities, seeking challenge, having a 'can do' orientation, being willing to take a risk in new

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Characteristics of Effective Learning Active Learning – Motivation

This strand highlights key characteristics which arise from intrinsic motivation to achieve mastery – to experience competence, understanding, and autonomy.

- **Being involved and concentrating** describes the intensity of attention that arises from children concentrating on following a line of interest in their activities. This supports the deep level learning which should be a goal of early education: ‘In enhancing children’ s thinking, it is more important to aim at depth and not breadth. Deep understanding is more important than superficial coverage;
- **Keeping on trying** refers to the importance of persistence even in the face of challenge or difficulties, an element of purposeful control which supports resilience;
- **Enjoying achieving what they set out to do** refers to the reward of meeting one’s own goals, building on the **intrinsic motivation** which supports long-term success, rather than relying on the approval of others.



Are our rewards systems effective?

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Characteristics of Effective Learning Creating and Thinking Critically

Babies and children are thinkers who make sense of their experiences through perceiving patterns and developing concepts. As they engage in activities they actively think about the meaning of what they encounter, and over time begin to develop more awareness of their own thinking (metacognition). Awareness of oneself as a thinker and learner is a key aspect of success in learning

- **Having their own ideas** covers the critical area of creativity – of generating new ideas and approaches in all areas of endeavour. Being inventive allows children to find new problems as they seek challenge, and to explore ways of solving these;
- **Using what they already know to learn new things** begins in infancy as babies organise their sensory information to assess patterns and make predictions, with brains generating rules based on small datasets. Thinking becomes more conscious as concepts are developed and linked together, finding meaning in sequence, in cause and effect, and in intentions of others through both narrative and scientific modes of thought;
- **Choosing ways to do things and finding new ways** involves approaching goal-directed activity in organised ways, making choices and decisions about how to approach tasks, planning and monitoring what to do, and being able to change strategies. Recent research identifies that children giving explanations about how they solve a problem learn more than when simply given positive feedback and explaining errors leads to greater learning than explaining why something is correct – suggesting that understanding the processes of how problems are solved is more important than the right answer.

Characteristics of Effective Learning

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- build stamina, patience, and resilience in their approach to learning
- build and maintain positive self-esteem, knowing that they and have strengths on which to build and improve
- see and talk about the progress they are making in their learning and what they are doing to improve
- use feedback to improve their skills and attitude to learning
- see learning as a journey and develop a positive growth mindset for future learning and achievement
- reflect on and make changes to their approach to learning or tasks
- accept mistakes and see them as learning opportunities
- set targets or challenges for themselves and with others, and focus and work hard to achieve them
- be resourceful in helping themselves to overcome difficulties and solve problems
- know when to seek help and support from others, including adults
- develop a thirst for knowledge and a desire to find out more about the world in which we live
- celebrate their learning and achievements, however small
- have confidence in themselves, their abilities and their future



To what extent do pupils in all year groups

- find out and explore
- use what they know
- have a willingness to have a go
- choose ways to do things
- find new ways to do things
- enjoy achieving what they set out to do?

What is effective learning?

Curriculum for Learning

Enabling pupils to be effective, independent and successful learners

We aim to enable pupils to:

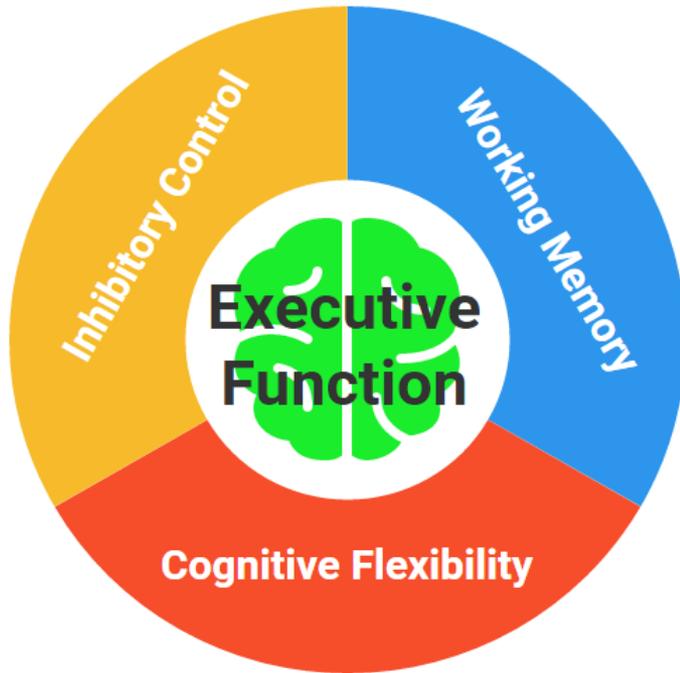
- develop their capacity and motivation to learn independently in and out of school
- know when and how to listen, think, discuss and ask relevant questions
- know how we learn and remember things
- organise themselves and plan their own learning, including having the necessary resources and completing homework
- build stamina, patience, and resilience in their approach to learning
- build and maintain positive self-esteem, knowing that they and have strengths on which to build and improve
- see and talk about the progress they are making in their learning and what they are doing to improve
- use feedback to improve their skills and attitude to learning
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- celebrate their learning and achievements, however small
- have confidence in themselves, their abilities and their future

Characteristics of Effective Learning do not stop in the Early Years yet it is not mentioned in the National Curriculum and we do not talk about it.

We need to

- develop a **Curriculum/Skillset for Learning** which builds on the Early Years characteristics of learning and sets out new challenges and contexts in which characteristics of learning and learning skills can be developed and made more explicit for each year group
- revisit and develop the characteristics of learning across all year groups

Executive Function



Executive functions are the cognitive skills we need to control and regulate our thoughts, emotions and actions in the face of conflict or distraction. There are three categories of executive functions:

- **Self-control** – ability to resist doing something tempting in order to do the right thing. Helps children pay attention, act less impulsively and stay focused on work.
- **Working memory** – ability to keep information in mind where it can be used to make connections between ideas, to make mental calculations and to prioritize.
- **Cognitive flexibility** – ability to think creatively and to be flexible to changing requests. Allows us to use imagination and creativity to solve problems.

EEF – Metacognition and Self-Regulation

Explicitly teach pupils metacognitive strategies, including how to plan, monitor, and evaluate their learning

Explicit instruction in cognitive and metacognitive strategies can improve pupils' learning. A series of steps—beginning with activating prior knowledge and leading to independent practice before ending in structured reflection—can be applied to different subjects, ages and contents.

While concepts like 'plan, monitor, evaluate' can be introduced generically, the strategies are mostly applied in relation to specific content and tasks, and are therefore best taught this way.

A series of steps—beginning with activating prior knowledge and leading to independent practice before ending in structured reflection—can be applied to different subjects, ages and contents.

EEF – Metacognition and Self-Regulation

Teachers should support pupils to plan, monitor, and evaluate their learning.

Modelling by the teacher is a cornerstone of effective teaching; revealing the thought processes of an expert learner helps to develop pupils' metacognitive skills.

Teachers should verbalise their metacognitive thinking (*'What do I know about problems like this? What ways of solving them have I used before?'*) as they approach and work through a task.

Scaffolded tasks, like worked examples, allow pupils to develop their metacognitive and cognitive skills without placing too many demands on their mental resources.

EEF – Metacognition and Self-Regulation

Set an appropriate level of challenge to develop pupils' self-regulation and metacognition

- Challenge is crucial to allow pupils to develop and progress their knowledge of tasks, strategies, and of themselves as learners.
 - However, challenge needs to be at an appropriate level.
-
- Pupils must have the motivation to accept the challenge.
 - Tasks should not overload pupils' cognitive processes, particularly when they are expected to apply new strategies.

EEF – Metacognition and Self-Regulation

Promote and develop metacognitive talk in the classroom

As well as explicit instruction and modelling, classroom dialogue can be used to develop metacognitive skills.

Pupil-to-pupil and pupil-teacher talk can help to build knowledge and understanding of cognitive and metacognitive strategies.

However, dialogue needs to be purposeful, with teachers guiding and supporting the conversation to ensure it is challenging and builds on prior subject knowledge.

EEF – Metacognition and Self-Regulation

Explicitly teach pupils how to organise and effectively manage their learning independently

Teachers should explicitly support pupils to develop independent learning skills.

Carefully designed **guided practice**, with support gradually withdrawn as the pupil becomes proficient, can allow pupils to develop skills and strategies before applying them in **independent practice**.

Pupils will need timely, effective feedback and strategies to be able to judge accurately how effectively they are learning.

Teachers should also support pupils' motivation to undertake the learning tasks.

EEF – Metacognition and Self-Regulation

Schools should support teachers to develop knowledge of these approaches and expect them to be applied appropriately

Develop teachers' knowledge and understanding through high quality professional development and resources.

Senior leaders should provide teachers with time and support to make sure approaches are implemented consistently.

Teachers can use tools such as 'traces' and observation to assess pupils' use of self-regulated learning skills.

Metacognition shouldn't be an 'extra' task for teachers to do but should be built into their teaching activities.

EEF – Metacognition and Self-Regulation

Promote and develop metacognitive talk in the classroom

As well as explicit instruction and modelling, classroom dialogue can be used to develop metacognitive skills.



What vocabulary and terms do we use when we are talking about learning?

Learning Vocabulary

- Fact
- Opinion
- Knowledge
- Process
- Skill
- Data
- Information
- Suggest
- Evidence
- Select
- Explain
- Compare
- Contrast
- Meaning
- Arc
- Theme
- Terms
- vocabulary
- Research
- Find out
- Discover
- Represent
- Display
- Think
- Conclude
- Explore
- Examine
- Link
- Relate
- Summarise
- Concept
- Idea
- Converse
- Discuss
- Dialogue
- Argue
- Present
- Infer
- Reflect
- Embed
- Revisit
- Revise
- Review
- Learning journey
- Synthesise
- Easy
- Difficult
- Challenge
- Replicate
- Empathise
- Personalise
- Appreciate
- Consider
- Observe
- Collect
- Prove
- Design
- Make
- Follow
- Choose
- Group
- Sort
- Chunk
- Organise
- Prioritise
- Experiment
- Practical
- Visual
- Auditory
- Experiential
- Kinaesthetic

Learning Vocabulary

- Narrate
- Narrative
- Pedagogy
- Instruction
- Extend
- Repeat
- Sequence
- Use
- Change
- Socratic talk
- Talk partners
- Debate
- Help
- Familiarise
- Exposition
- Cognition
- Motivation
- relevance
- Research
- Resilient
- Resourceful
- Reflective
- effort
- Opportunity
- Develop
- Strength
- Weakness
- Mistake
- Failure
- Success
- Criteria
- Work
- Undertake
- relevance

Often in school, we talk about LEARNING JOURNEYS

- “Where are you on the learning journey?”
- “How far up the mountain do you think you are?”
- “Who is falling back down the mountain?”
- “Who has dipped their toe in the water?”
- “Who is swimming confidently?”
- “Who is drowning a little?”
- “Who is on the right path?”
- “Today’s lesson was a bit of a roller coaster”

We can use learning journey “talk” to help pupils navigate their way through a series of lessons or journey. However, we need to be aware of ...

- the end point (otherwise how do they know how far they have travelled?)
- the pitfalls of different levels of ignorance (illusions of competence)

Learning Journey

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In what ways is learning like a roller coaster?

Learning Journey

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- It's better (or worse) after food and drink
- It makes me laugh, scream, cry and swear
- It makes me nervous and scared but I want to do it
- I'm sitting down but want to get off before it starts
- It's better done sitting next to someone else
- You get a better view from the front seat
- Once we're going, I want to get off but know I can't
- I don't know when it's going to finish
- It was over all too soon
- I want to do it again and again
- I never want to do it again
- There are lots of calm moments, surprises and quick turns
- Sometimes, I shut my eyes and think of something else
- It starts slowly but picks up speed as you keep going
- It's scary if it goes too fast
- It can be a goal or something to avoid ("I don't do roller coasters")
- Once I've done one roller coaster (and enjoyed it), I want to do different roller coasters
- It's best done in a safe environment but occasionally things go wrong
- Sometimes people feel ill or are sick (and have to stick it out!)
- You have to sit up straight and can't get up
- The photograph can be embarrassing
- The journey is not smooth
- There are lots of ups and downs
- Sometimes your head spins before and after the event



Learning Journey

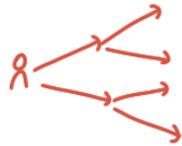
Visual metaphors for learning

2015-06-19b

I often draw stairs 
but sometimes
you have to
get worse before
you get better.



Often there's more
than one path.



There are many
kinds of journeys.



It helps to
have a map 
and signposts 
and a field journal 

Sometimes
I draw what
I learn from:



You can learn
from painful
things, too. 

Especially when you're
going in circles.



My interests tend to
flit about: 

but sometimes it feels
like I learn so slowly.

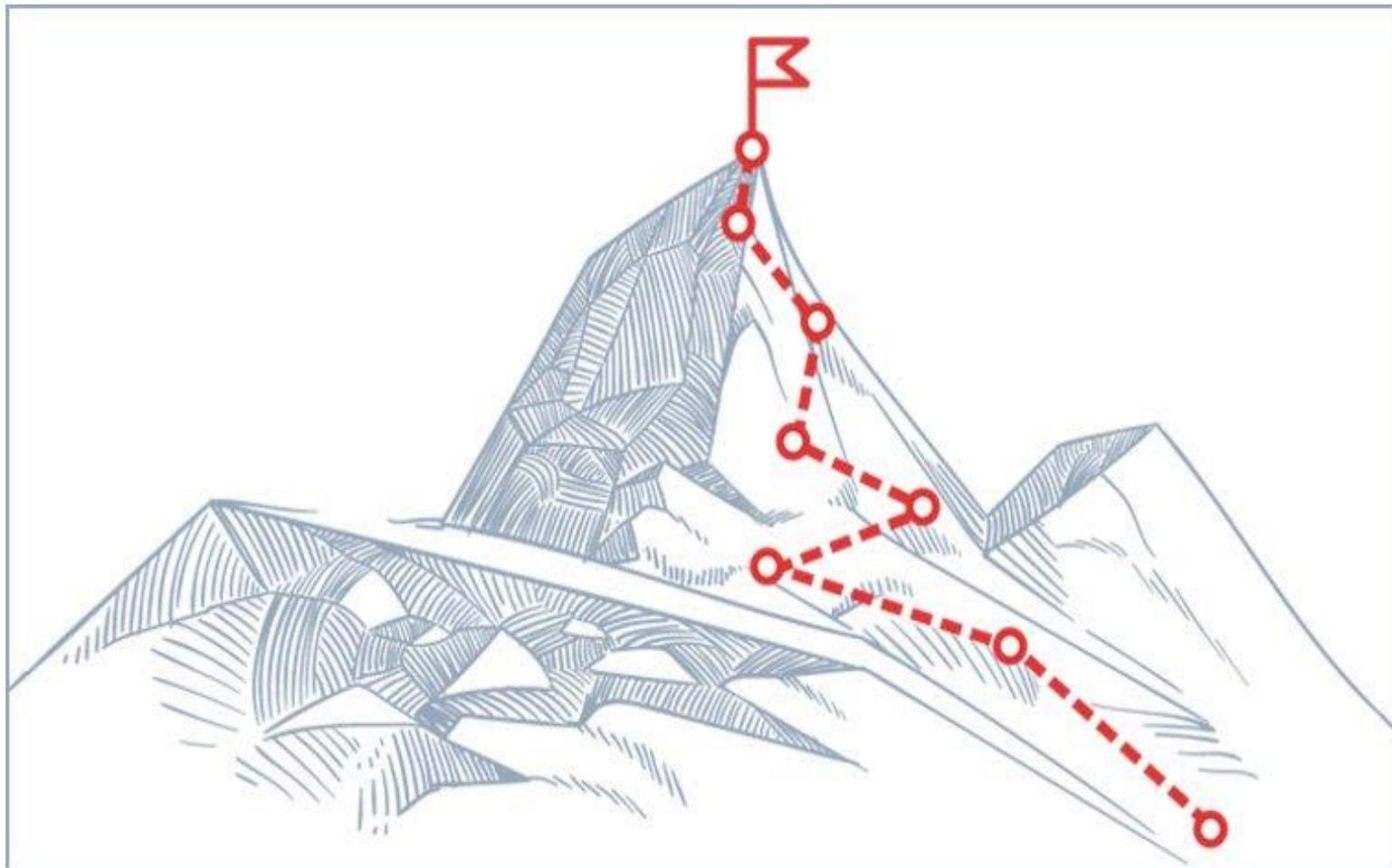
Still, if I add things up,
 I see I've

covered lots of
ground. So it's
good to look
back  and

 
move onward!

Learning Journey

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*Enabling pupils to be effective, independent
and successful learners*



Learning Journey

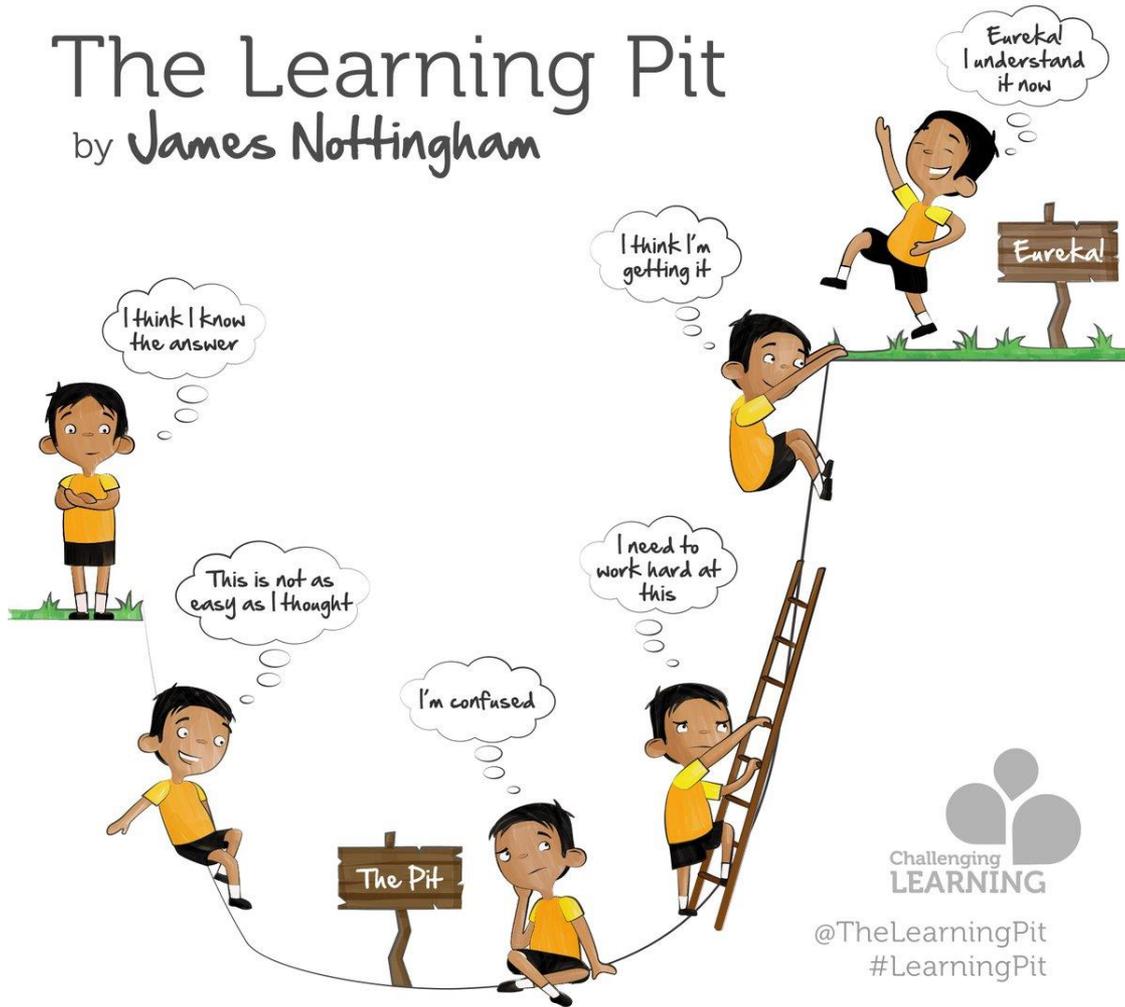
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The Learning Pit by James Nottingham



@TheLearningPit
#LearningPit

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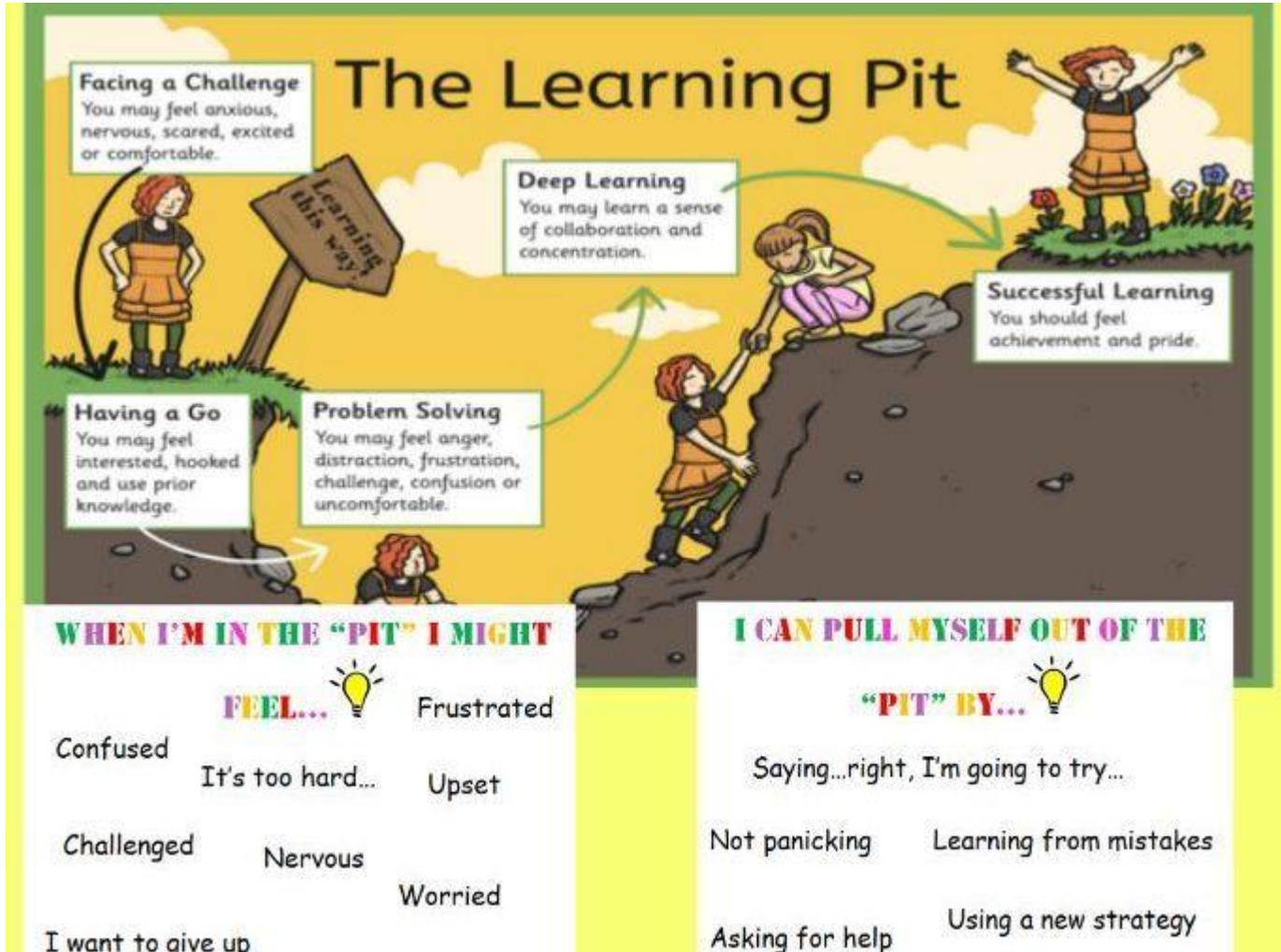
How do you
get out of
the pit?



Google
Self talk
Collaborate
Ask a friend
Think pair share
Ask 3 before me
Refer to your notes
Learn from mistakes
Use a known strategy

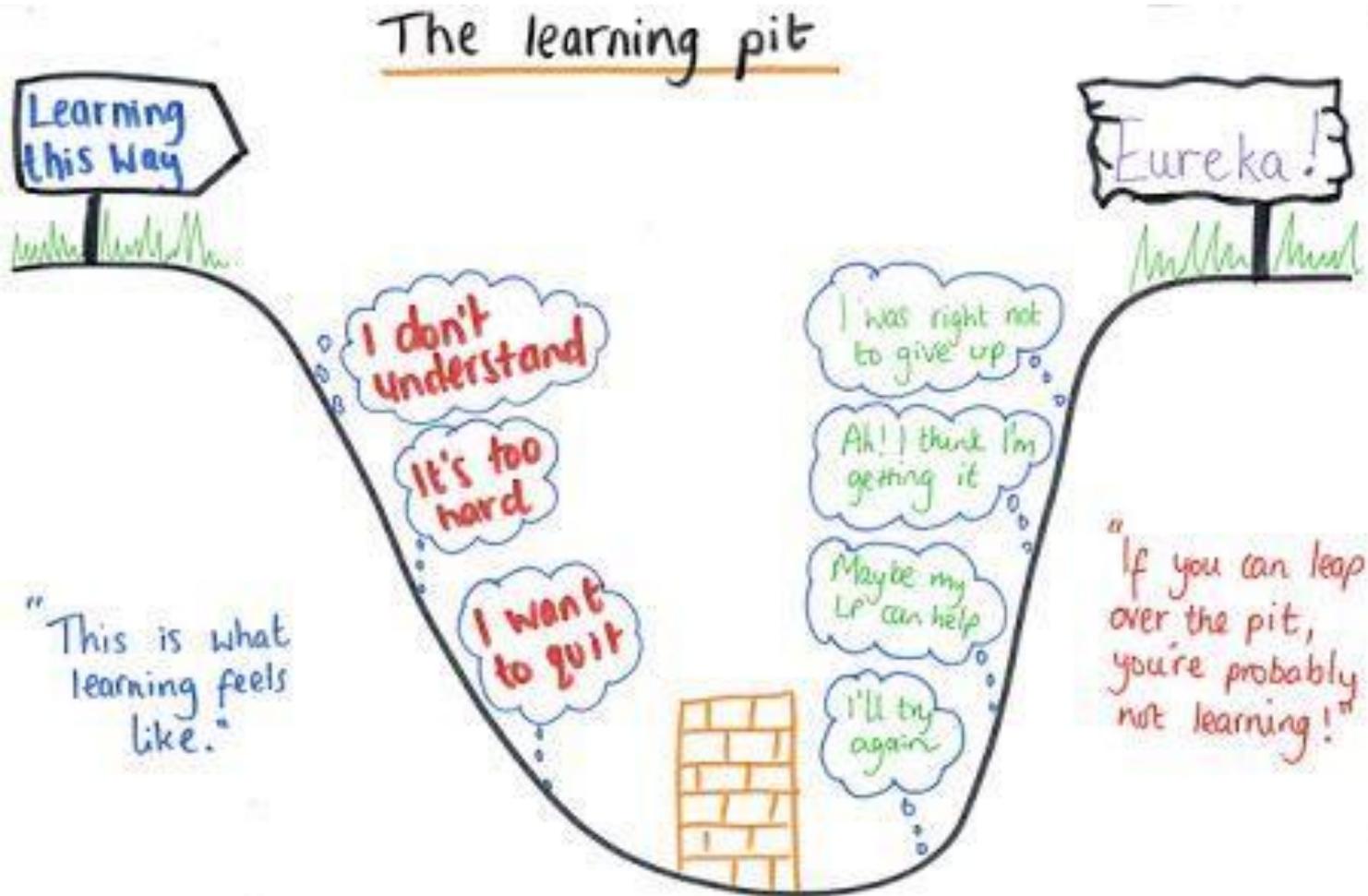
Learning Journey

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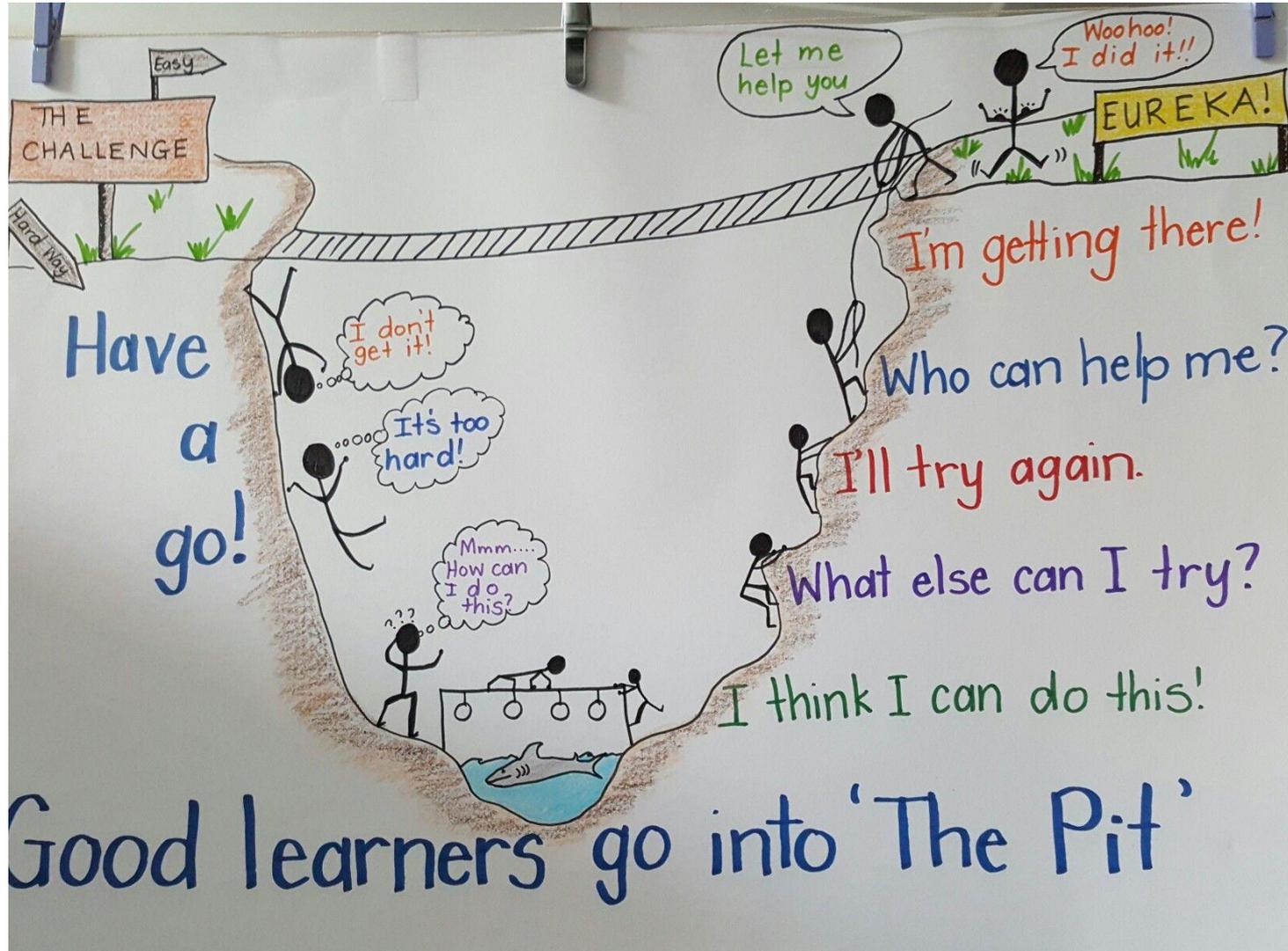
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Learning Journey

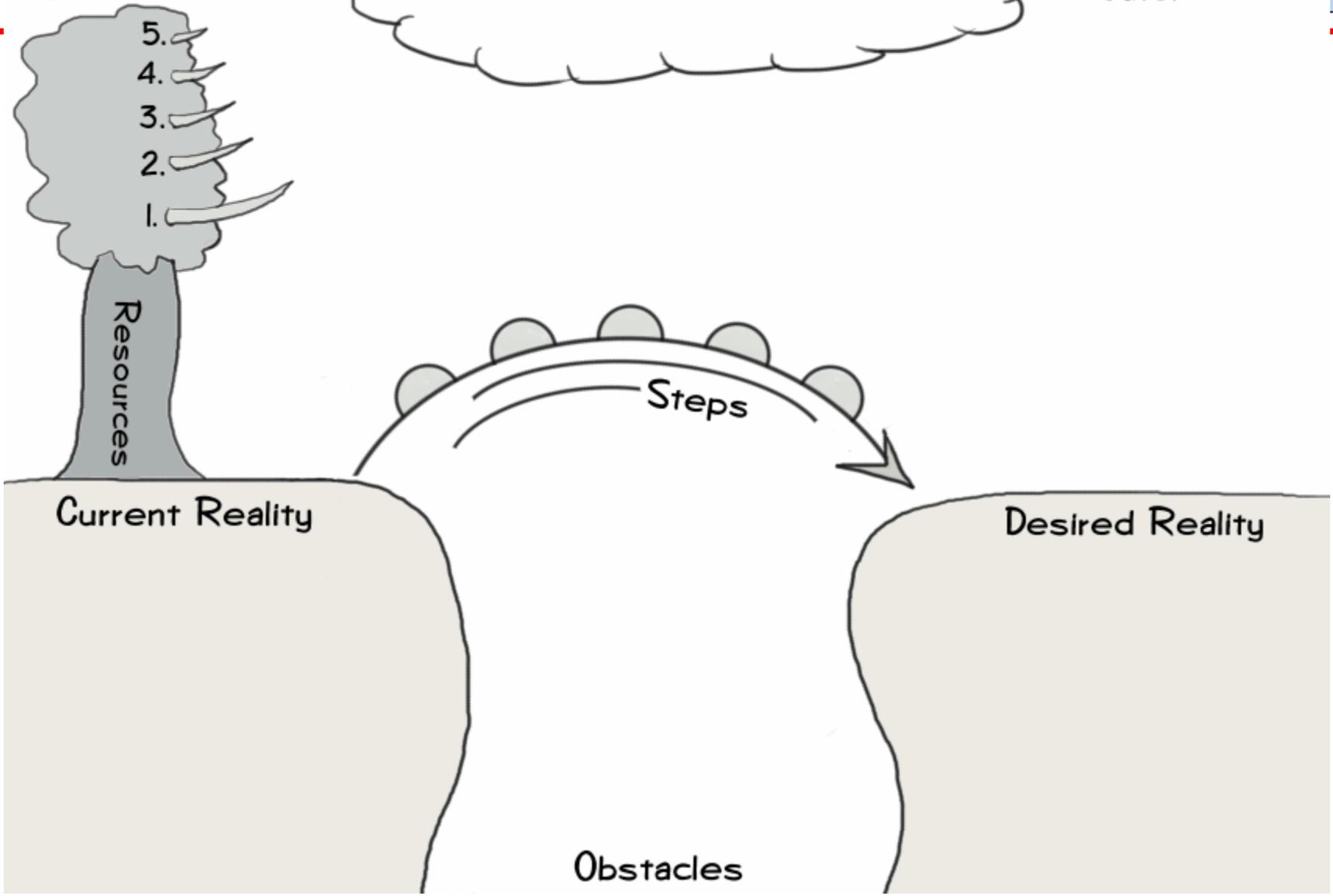
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Learning Journey

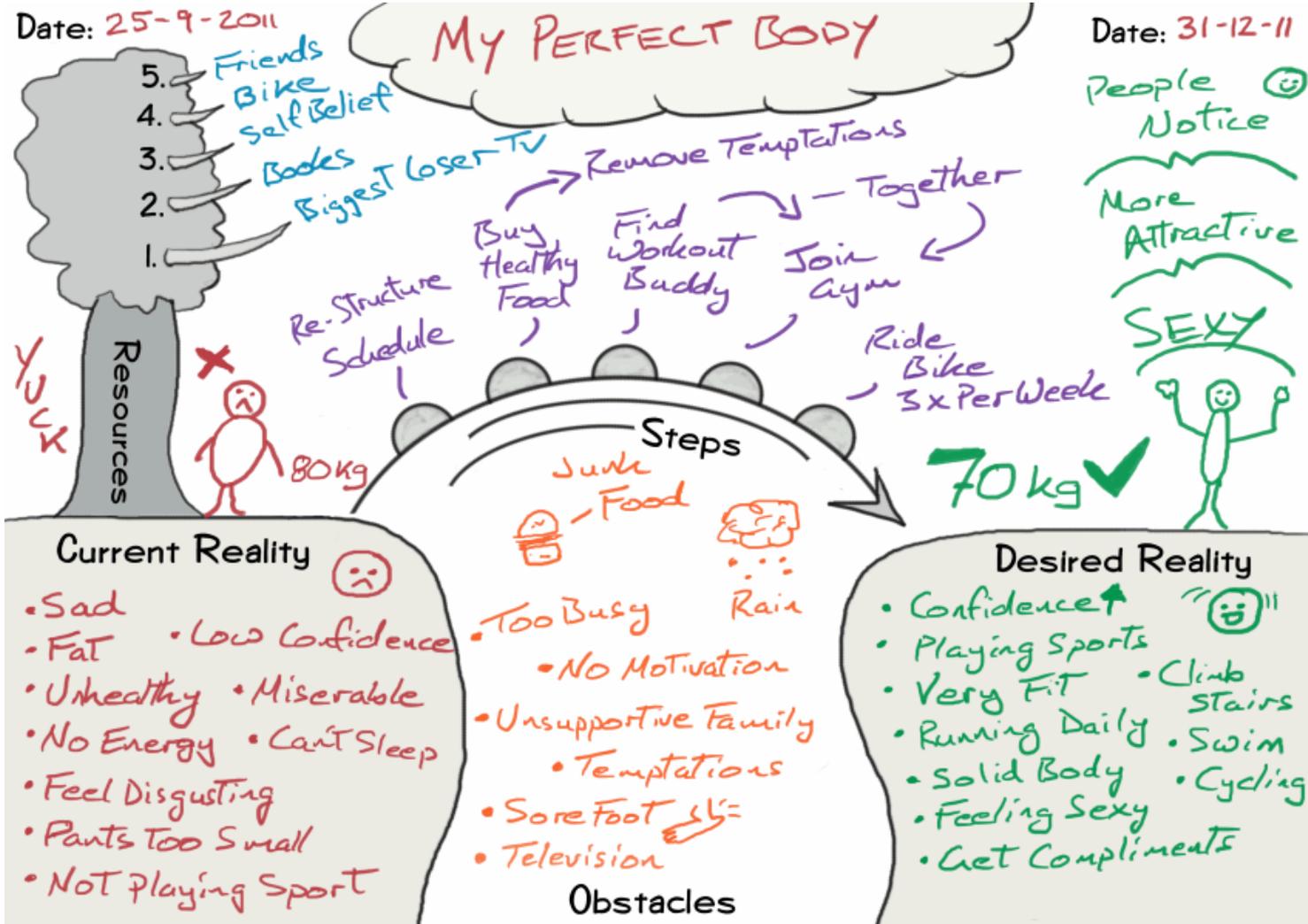
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Date: _____



Learning Journey

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Learning Journey

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UNCONSCIOUS INCOMPETENCE

You are unaware of the skill
and your lack of proficiency

UNCONSCIOUS COMPETENCE

Performing the skill
becomes automatic

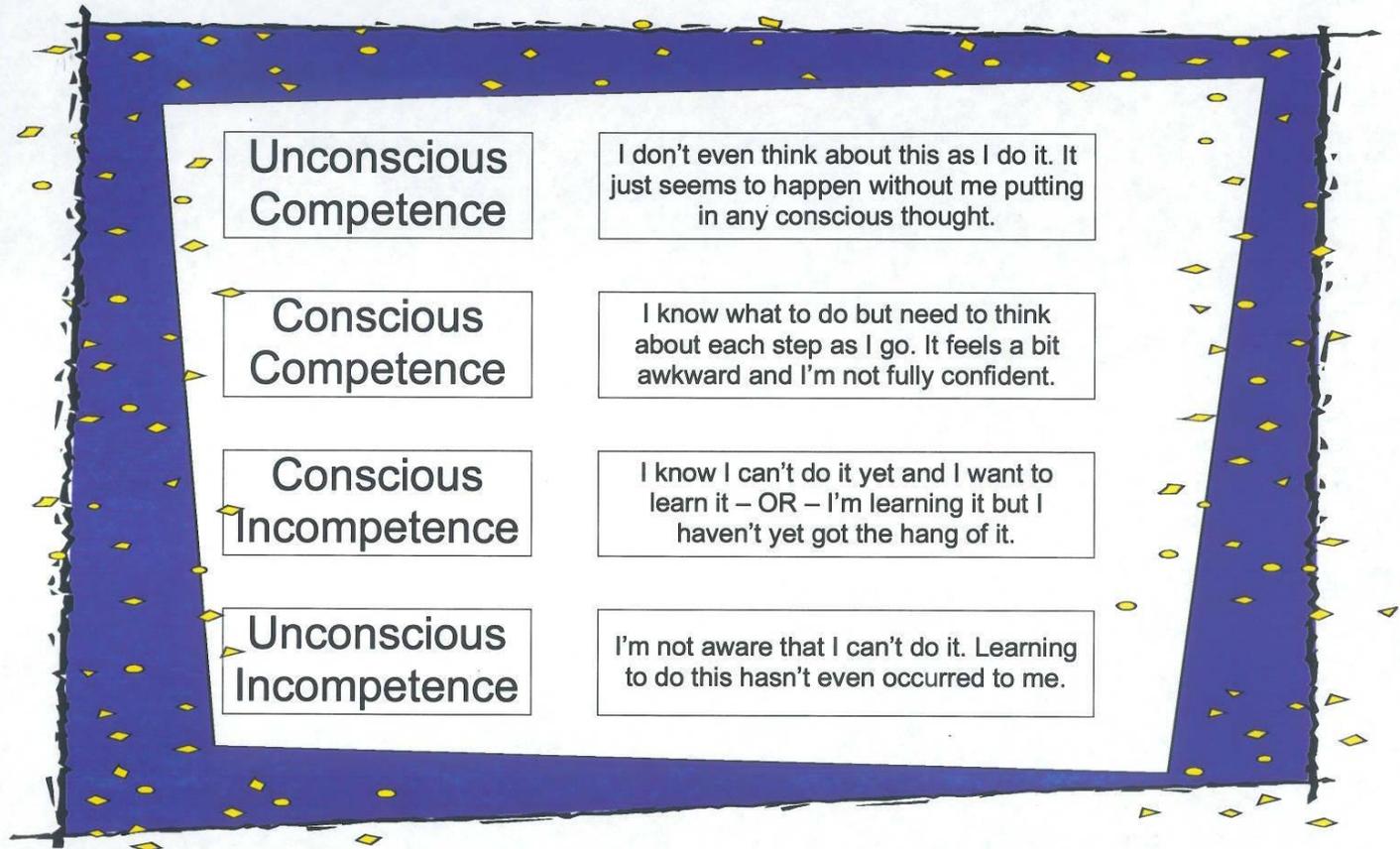
CONSCIOUS INCOMPETENCE

You are aware of the skill but
not yet proficient

CONSCIOUS COMPETENCE

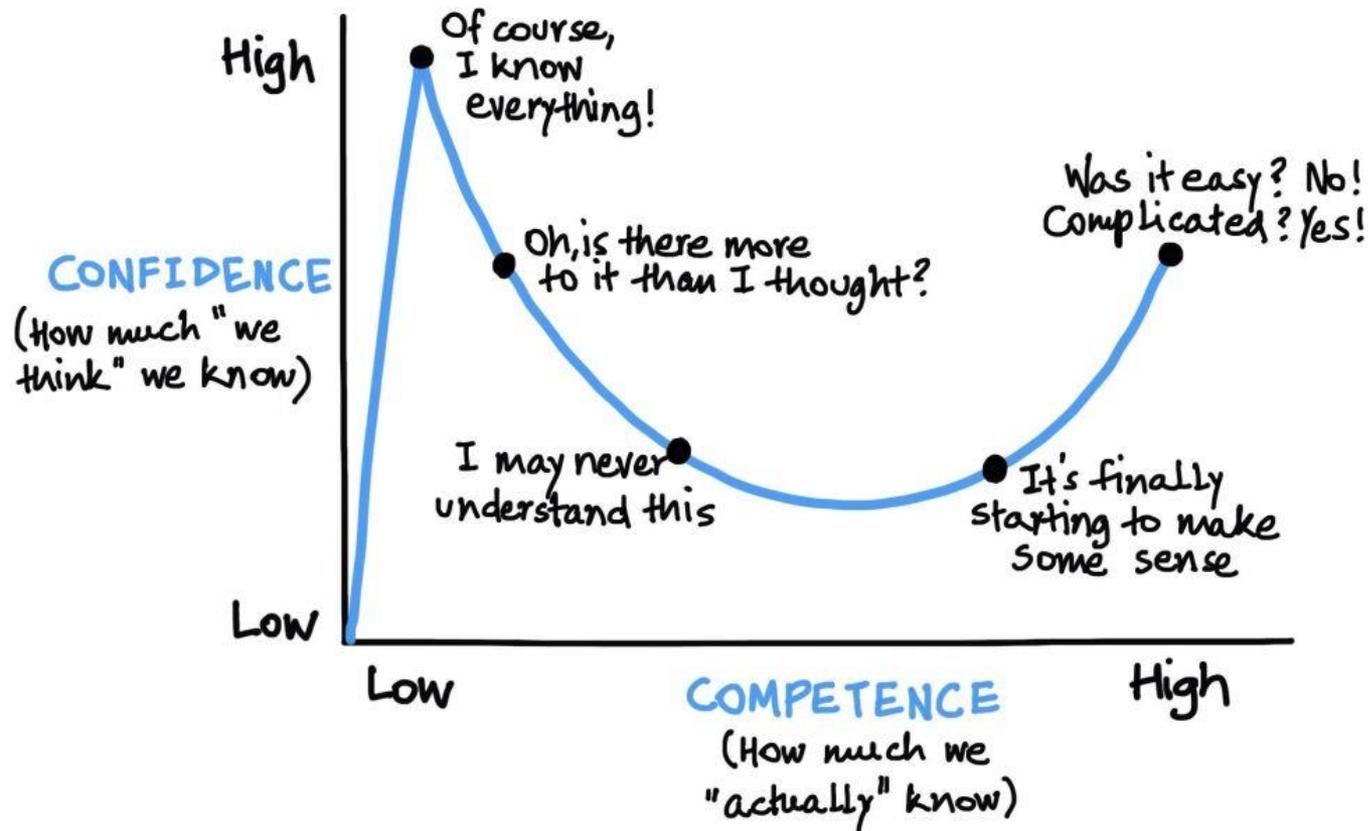
You are able to use the skill,
but only with effort

Four Stages of Competence



The Dunning Kruger Effect

[vishal@safalniveshak.com]



Levels of Ignorance

Stage 1

In this stage, a person has extremely little to no knowledge about the subject they are speaking of. **For people in this category, their humility is based not on realizing how little they know, but because they genuinely don't know.**

It's also worth noting that someone may be an expert and scholar in one subject, but are at this first level in their level of knowledge in another subject. **Neither should the person themselves or someone observing them confuse their level of expertise in that one subject with expertise in a subject they know nothing about.**

Levels of Ignorance Stage 2

True knowledge is structured, and to fully understand the breadth of a subject, one has to be able to grasp the knowledge structure of that subject, even if they don't acquire all the knowledge in that subject. At the *'Of Course I Know Everything'* stage, a person may have acquired some true knowledge but are unable to see the whole structure, so they think what they have is enough. Or they may not have true knowledge at all, and all they may have is information that is structured incorrectly and thus does not yield true knowledge. It is false knowledge, as it leads to incorrect beliefs

Such people believe they are not ignorant, but that they have sufficient knowledge, either because their shallow, incomplete structure has already been 'filled', or because they assume their incorrect structure to be accurate.

Levels of Ignorance Stage 3

The third is a period in which one recognizes their level of ignorance even if they have not reached the level of expertise. It starts at the point in the curve where it says *'I May Never Understand This'*.

A person at this level has now caught a glimpse of or seen the full structure, but has not yet filled it in with knowledge. They have finally understood how little they know and understand, but they have not yet moved further to compensate for that lack of knowledge and understanding. This person has finally realized that what they thought was black & white is mostly grey. It is natural to feel overwhelmed or confused at this stage, wondering what exactly to believe and what not to, and the difference between fact and opinion in a subject

Levels of Ignorance

Stage 4

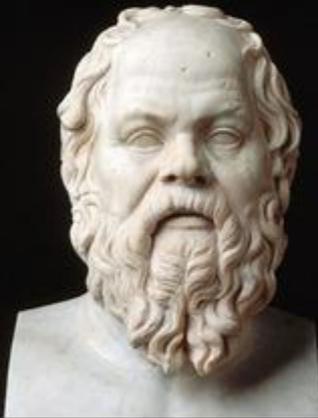
This person has moved on from merely being able to see the structure of their subject as we discussed in the 3rd level. They have not just filled in that structure with substantial amounts of knowledge, but have filled in many connections in that structure, perhaps even expanding that structure.

These scholars and experts usually realize the importance of networking with other experts in their own field and in other subjects, as they intimately appreciate their own limitations. They may perhaps borrow useful knowledge from other structures through consultation and cooperation with experts of those fields, and thus allow for interdisciplinary approaches to their own subject.

Memory : Recall Strategies

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You don't know what you don't
know.

~ Socrates

AZ QUOTES

A Journey Of 1000 Miles Starts With A Single Step

This metaphor means that a student who wants to learn something big (like a new language, or getting a degree) must start somewhere: so go out and start learning. Little by little, you'll get toward your learning goal.

Learning Is Like Building A House

Similar to the 'journey of 1000 miles' metaphor, this one shows that learning happens one step (or in this case, brick) at a time. I like in this metaphor that you get something at the end: a strong, sturdy building built on solid foundations of knowledge.

Learning Is Like Climbing A Mountain

If you've ever climbed a mountain, you know that it's hard work. You're often taking it 'one step at a time'. But, when you reach the top, you get a great sense of ecstasy. You can look down at the views and enjoy the fact that you conquered a great challenge.

Learning Is Like A Search For Hidden Treasure

This metaphor shows that learning doesn't necessarily happen in a slow, steady fashion. It might take you a long time to find the answers you're looking for. But, with persistence, you'll eventually find the 'treasure' you're after.

Learning Is Like Collecting Seashells

While the above metaphor of searching for hidden treasure implies there's one great 'nugget' of knowledge you're after, this one takes a different angle. This metaphor says that there are dozens of unique, interesting things to learn and we collect new, interesting and varied bits of knowledge as we go through life.

Learning Is Like Walking Through A Maze

Sometimes when we're in the middle of learning something new, we just don't know how to get past our confusion. We're like a person stuck in a maze, not sure which way to turn. We might have to trace our steps (or start again) to achieve the end result.

Learning Is Like Drowning In Too Much Information

Have you ever felt like you were drowning? You'd be flapping your arms about trying to grasp for something solid to grab hold of. Sometimes we feel the same sensation when learning. The information is all too hard and we're trying to grasp at anything that seems to make sense.

Learning Is Like Wrestling A Lion

Wrestling a lion would be tough. Just when you think you've got control over it, it'll buck its head and cause you even more trouble. Learning is similar: just as you think you understand something, you'll be presented with a new piece of information that will mean you'll have to keep struggling to learn and understand.

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Learning Is Like Eating a big meal

It's Hard To Digest The Information.

The idea of “digesting” information is great.

Sometimes when eating a big meal, we need to pause, sit back, and let the food settle. Similarly, when learning, we may need to pause to think things over for a while before continuing.

Learning Is Like Solving A Jigsaw Puzzle

I love jigsaw puzzles. You sit there and slowly work away at them while a picture slowly emerges. Learning is just like that: it requires time, patience and hard work to slowly build knowledge in your mind. Sometimes, you need the big picture to help you and start with what you know (the corners and edges).

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Learning Is Like Setting Across An Open Ocean.

When setting across an ocean, we can't see our destination point. We have to have a little bit of trust that there will be an end point eventually so long as we set our course and keep on going. It's a little bit about learning something new!

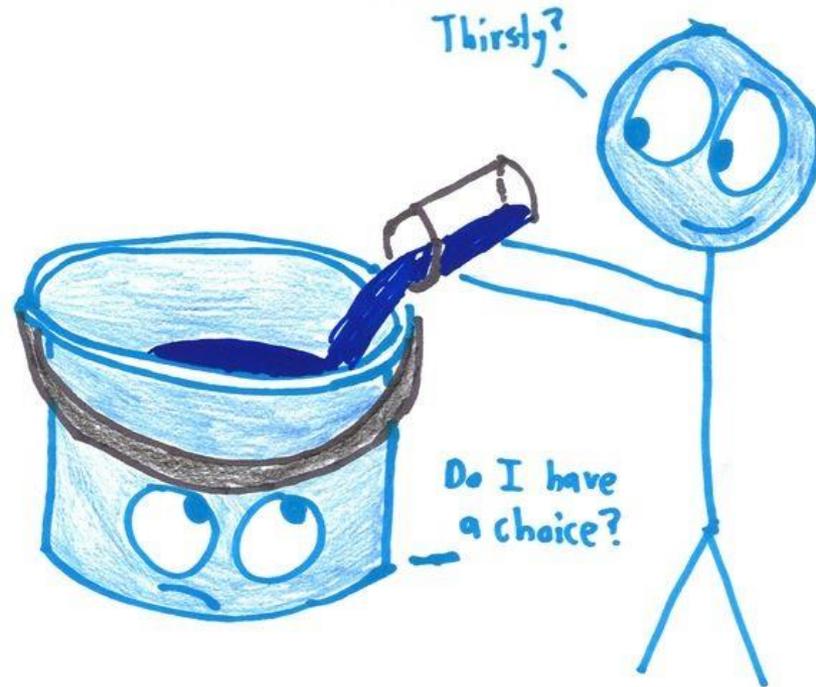
Learning Is Like Pulling Teeth.

Pulling teeth is painful! So is learning sometimes. When you're learning something that's boring and uninteresting, the lesson seems to go on forever – you might even say the lesson was painful like pulling teeth!

Student/Teacher Relationship

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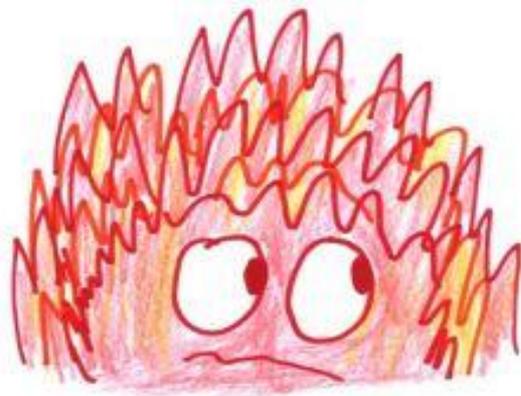
The student's mind is a bucket,
and the teacher pours in knowledge.



Student/Teacher Relationship

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and successful learners

Curiosity is a fire, and the
teacher is a fire extinguisher.

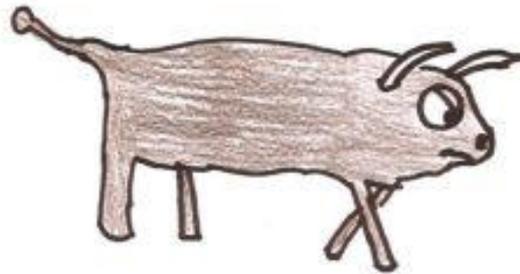


Student/Teacher Relationship

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Enabling pupils to be effective, independent
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The student is a snarling bull.
The teacher is a matador hoping
not to get gored.

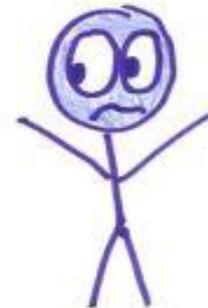


Learning Journey

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and successful learners

Students are cats, and the
teacher keeps putting out dry
food despite their repeated
refusal to eat it.



Student/Teacher Relationship

Curriculum for Learning

Enabling pupils to be effective, independent
and successful learners

The student's mind is a sponge.

The teacher uses it to wash
dirty dishes.

Make sure to memorize
the formula for the
sum of a finite
arithmetic
sequence!



Sigh...

Student/Teacher Relationship

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and successful learners

The student's mind is a
garbage disposal, and it
breaks whenever the teacher
tries to force down something
too heavy.



Honey, does
quantum physics
go down the
disposal or in
the compost?

Student/Teacher Relationship

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The student's mind is a dartboard,
and the teacher chucks sharp
objects in its general direction
to see what sticks.



Student/Teacher Relationship

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The student's mind is a bucket
glued face-down. The teacher tries
in vain to bring it upright.



Education Principles / Theories

Over a number of years, lots of theories about the best way to teach and how to have the greatest impact on learners' progress have emerged.

Learning Styles

<p>Visual</p>  <p>* You prefer using pictures, images, and spatial understanding.</p>	<p>Musical/Auditory</p>  <p>* You prefer using sound and music.</p>	<p>Verbal</p>  <p>* You prefer using words, both in speech and writing.</p>	<p>Physical/Kinesthetic</p>  <p>* You prefer using your body, hands and sense of touch.</p>
<p>Logical/Mathematical</p>  <p>* You prefer using logic, reasoning and systems.</p>	<p>Social</p>  <p>* You prefer to learn in groups or with other people.</p>	<p>Solitary</p>  <p>* You prefer to work alone and use self-study.</p>	<p>What is your learning style?</p>

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Cognitive Strategies



- ❑ Pearson, Roehler, Dole and Duffy (1987) found that proficient readers need only **six cognitive strategies** in order to read well and most importantly understand texts.
- ❑ These strategies are based around building schema, synthesising information and fixing problems in our understanding.

Cognitive Strategies

If we look at these six cognitive strategies, they can be summarised as below:

- What do I already know?
- What is the most important?
- What sensory connection can I make?
- What inference can I make?
- How can I synthesise this?
- How can I fix things I don't understand?



Cognitive Strategies

Could primary schools use these strategies to, first of all, develop children as metacognitive readers rather than just 'children who can read' and then to use these skills (thinking behaviours) to improve cognition and learning across the whole curriculum?



Cognitive Strategies

What do I already know?

- Relating what I already know to what I am learning.
- Discovering which schema I already have around this learning.

What is the most important?

- Looking at the theme of a piece of learning.
- Choosing the pieces of information most important to developing my knowledge.

What sensory connections can I make?

- Building detailed images of the learning through my own experiences of senses and feelings.
- Discovering which sensory schema I already have around this learning.

Cognitive Strategies

What inferences can I make?

- Interpreting learning in relation to my schema to form conclusions.
- Making predictions based on my personal understanding of the learning.

How can I synthesise this?

- Summarising my learning based on the important points I have chosen.
- Including my schema, feelings and inferences in summarising to create a synthesis of my learning.

How can I fix things I don't understand?

- Knowing what problem is limiting my understanding of my learning.
- Finding solutions to the specific problem that is stopping my learning progressing.

Cognitive Strategies

- ❑ These **six areas** span all the curriculum subjects and form the basis of children thinking about their thinking.
- ❑ The use of **schema** ensures that children are locking new pieces of learning onto items already embedded in their long term memory.

Cognitive Strategies

The three learning links

- Strengthening pupils' regular recall of three **learning links** is a much more efficient way of helping pupils to recall what they already know.
- It is important that teachers' questioning follows the format of; 'have you got a learning link to self; a learning to the wider world; or, a learning link to texts?'
- These questions should be something that pupils get used to and should start from early years onwards.
- In the same way, pupils should be encouraged to answer using the following statements, 'I have a learning link to self'; 'I have a learning to the wider world'; or, 'I have a learning link to a text'.
- In summary when attempting to get pupils to recall their experiences or previous learning, teachers should focus on the following three aspects:
 - Learning link to self
 - Learning link to the wider world, or
 - Learning link to texts

Cognitive Strategies



Long term retention of knowledge through addition to existing schema



Me, my family and friends



The wider world



Other things I have read

Cognitive Strategies

Me, my family and friends



- Things I, my family or friends have done
- Things I like or dislike
- Memories of real life
- Places I have been
- Programmes I have watched
- My opinions
- Friends and families opinions
- Things I have learned in school

The wider world



- Things on the news
- Things in the community
- Real life events linked to others or other places
- Documentary TV shows

Things I have read



- Books
- Stories
- Articles
- Newspapers
- Comics
- Non-fiction texts

Cognitive Strategies

Teachers should get into the habit of using the following questions when starting a new unit of learning

- Does anyone have a **learning link to themselves**, friends or family?
- Does anyone have a **learning link to the wider world**?
- Does anyone have a **learning link to other text** they have read?
- Does this learning remind anyone of anything else they know?
- Does this learning make you think of anything that has happened in your life?
- Does this learning remind you of anything you have seen on the news or in a newspaper?
- Does this learning remind you of something you have learned at school before?

Cognitive Strategies

- Linking new learning to something you already know, have heard about or have experienced means that an existing neuron in the brain is firing alongside the one with the new learning.
- This is creating a stronger pathway in the brain and making it more likely that information will be retained. This means the knowledge is more likely to 'stick'.
- We accept that this is a very simplified explanation of how our brain uses existing schema to retain knowledge.
- Linking new learning to previous learning also helps embed knowledge in our long-term memory as we are returning to previous learning again and again.



Cognitive Strategies in HISTORY

What do I know already?	What is most important?	What sensory connections can I make?
<ul style="list-style-type: none"> • What schema do I have already around this historical topic? • Can I relate my own experiences to this source or topic? • What Learning to me, my family and friends, Learning to other texts I have read and Learning to the wider world connections can I make? 	<ul style="list-style-type: none"> • What is the most important theme of the whole source I am looking at? • Which are the most important parts or learning points to help me understand the source? • What is the purpose of this source? Is it reliable or balanced? 	<ul style="list-style-type: none"> • What detailed images, including my senses and emotions, can I make? • Even though the source doesn't say it, what details can I see/smell/hear/feel in my mind? • What sensory links from my schema can I make?
What inference can I draw?	How can I synthesise this?	How can I fix things I don't understand?
<ul style="list-style-type: none"> • What conclusions do I have when I have interpreted a source in relation to my schema? • What predictions can I make based on the source and my own schema? • What personal meaning have I taken from this source? • What literal facts from the source took me to my inferences? 	<ul style="list-style-type: none"> • How can I summarise my thinking around this historical source or topic? • How can I use my own schema, sensory connections, feelings and inferences to explain what I have understood? • Has my synthesis of a topic changed as I have found out more? • Do I need all the information I have read or thought about to synthesise this topic? 	<ul style="list-style-type: none"> • What type of problem is stopping my understanding of this historical concept? • How can I solve the problem that is stopping me understanding this historical concept? • What techniques do I know that help me overcome a historical enquiry problem?

Cognitive Strategies in SCIENCE

What do I know already?	What is most important?	What sensory connections can I make?
<ul style="list-style-type: none"> • What schema do I have already around this scientific topic? • Can I relate my own experiences to what I am learning? • What Learning to me, my family and friends, Learning to other texts I have read and Learning to the wider world connections can I make? 	<ul style="list-style-type: none"> • What is most important theme of the whole scientific idea? • Which are the most important sentences, words or diagrams to help me understand the idea? 	<ul style="list-style-type: none"> • What detailed images, including my senses and emotions, can I make? • What sensory links from my schema can I link to this scientific idea? • Have my images changed with learning more about a scientific idea?
What inference can I draw?	How can I synthesise this?	How can I fix things I don't understand?
<ul style="list-style-type: none"> • What conclusions do I have when I have interpreted this idea in relation to my schema? • What predictions can I make based on the idea and my own schema? • What personal meaning have I taken from this scientific idea? • What literal facts from the learning took me to my inferences? 	<ul style="list-style-type: none"> • How can I summarise my thinking around this scientific idea? • How can I use my own schema, sensory connections, feelings and inferences to explain what I think about this scientific idea? • Has my synthesis of this idea changed as I have learned more? • Do I need all the information I have read or thought about to synthesise this idea? 	<ul style="list-style-type: none"> • What type of problem is stopping my understanding of a text, diagram or table? • How can I solve the problem that is stopping me understanding this text, diagram or table? • What techniques do I know that help me overcome a problem when working scientifically?

Rosenshine Principles

Barak Rosenshine (1930 – 2017) was a professor in the Department of Educational Psychology at the University of Illinois. Along with Robert Stevens, he explored teacher instruction, and identified the approaches and strategies that were features of the most successful teachers' practice. His 2010 'Principles of Instruction' are grounded in a varied range of evidence from three sources:



- 1. Cognitive science research** focusing on how the human brain acquires and uses new information. This provided insights into how to overcome the limitations of working memory when attempting to learn new things.
- 2. Direct observation of 'master teachers'**, those whose students made the most academic progress as measured by attainment tests. These focused on aspects such as how they presented new information and made explicit links to prior learning, how they monitored and assess the understanding of their students, how they provided opportunities for rehearsal and practice, and the types of support used to scaffold the development of understanding and retention of knowledge.
- 3. Research on cognitive supports and scaffolds**, such as the use of models and **instructional procedures**, that helped students to learn complex tasks. From these sources, he identified seventeen 'instructional procedures' and ten key principles.

Rosenshine's Instructional Procedures

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1. Begin a lesson with a short review of previous learning.
2. Present new material in small steps with student practice after each step.
3. Limit the amount of material students receive at one time.
4. Give clear and detailed instructions and explanations.
5. Ask a large number of questions and check for understanding.
6. Provide a high level of active practice for all students.
7. Guide students as they begin to practice.
8. Think aloud and model steps.
9. Provide models of worked-out problems.
10. Ask students to explain what they had learned.
11. Check the responses of all students.
12. Provide systematic feedback and corrections.
13. Use more time to provide explanations.
14. Provide many examples.
15. Re-teach material when necessary.
16. Prepare students for independent practice.
17. Monitor students when they begin independent practice.

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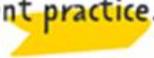
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Rosenshine's 10 Principles of Instruction

1. Review learning at the start. 
2. Present new material in small steps. 
3. Ask lots of good questions. 
4. Provide models and worked examples. 
5. Practise using the new materials. 
6. Check for understanding. 
7. Obtain a high success rate. 
8. Provide scaffolding and support. 
9. Encourage independent practice. 
10. Weekly and monthly review. 

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01 DAILY REVIEW



Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity.

Rosenshine suggests devoting between five and eight minutes every day, preferably at the [start of a lesson](#), to review previous learning. As [our cognitive load is quite small](#), if we don't review previous learning, then us trying to remember old information will get in the way of us trying to learn new information.

By dedicating a short period each lesson to reviewing and evaluating previous academic performance, students will ultimately perform better. This is because students will develop a more in-depth understanding of syllabus material, make connections between topics, and enhance their critical thinking skills.

This could be though self-marking homework, correcting mistakes from the previous lesson, getting students to go over what they found difficult or asking them what they remember about the topic so far.

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02 NEW MATERIAL IN SMALL STEPS



Our working memory is small, only handling a few bits of information at once. Avoid its overload — present new material in small steps and proceed only when first steps are mastered.

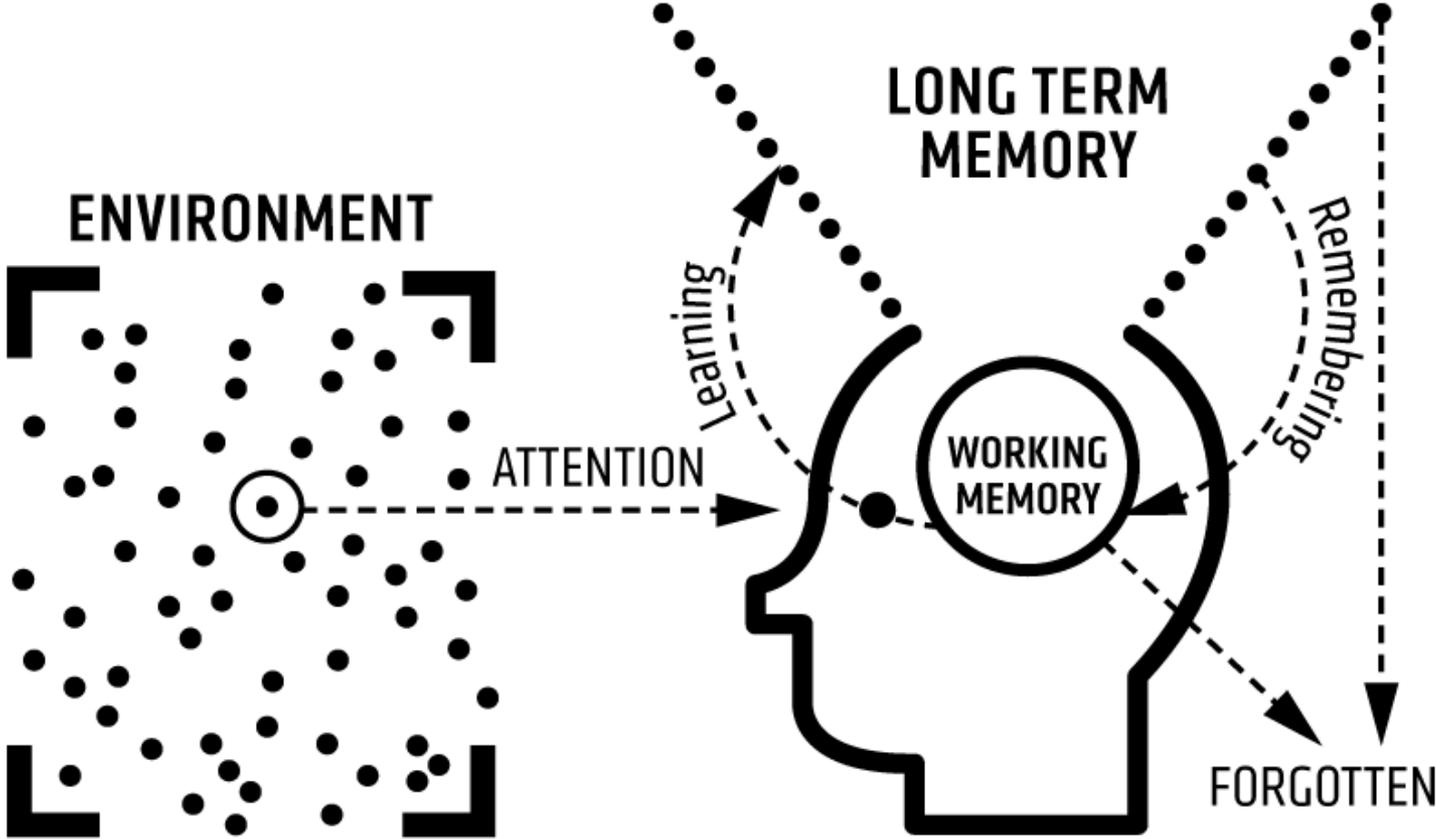
[Cognitive Load Theory](#) explains how our working memory has a limited capacity. So, if students are presented with too much information at once, the brain suffers from something known as overload. This causes the learning process to slow down or even stop since the brain can no longer process all the information being presented at that one time.

As a result, this principle suggests that information should be presented in small steps. This can be done by removing [any irrelevant material](#) from your lesson plan and to just focus on what your students need to know. Do not add extra information if it is not important and may detract or confuse what has been learned in the lesson.

Cognitive Load Theory

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WILLINGHAM'S SIMPLE
MEMORY MODEL



Cognitive Load Theory

What is Cognitive Load Theory?

Cognitive Load Theory explains that working (or short-term) memory has a limited capacity and that overloading it reduces the effectiveness of teaching. There are 3 types of cognitive load; Intrinsic (how complex the task is), Extraneous (distractions that increase load, and Germane (linking new information with the already stored in the long term memory).

Cognitive load theory builds on the premise that working (or short-term) memory has a limited capacity and that overloading it reduces the effectiveness of teaching. Much in the same way that having too many windows open on your computer, reduces its capability to work properly. Cognitive load refers to the amount of information the working memory can hold at any one given time. Most people can handle a cognitive load of between 3 and 7 separate pieces of information.

Cognitive Load Theory was initially developed by Psychologist, **John Sweller** in 1988 ([*Cognitive Load During Problem Solving: Effects on Learning*](#)), with further work done in 1998 ([*Cognitive Architecture and Instructional Design*](#)).

Cognitive Load Theory

Intrinsic Cognitive Load

Intrinsic cognitive load refers to the innate difficulty of the task. For example, recalling that clownfish live in anemones would be low intrinsic load, whereas, explaining why both species benefit from this would be a higher level of intrinsic load. Knowing that

Teachers can match the intrinsic load of a topic to the experience of the learner but can't do much to reduce the complexity of the topic.

In subjects ...

- We need to think about the intrinsic load of the lesson's content.
- What lessons have a low or high intrinsic load?
- Why might creating a story in ICT have a high intrinsic load?
- Facts tend to have a low intrinsic load, concepts a higher load
- However, if concepts are taught well and remembered (through schemas or relating it to what we already know), then the intrinsic load of a task or new knowledge can be reduced.

Cognitive Load Theory

Extraneous Cognitive Load.

Extraneous cognitive load is where we as teachers have the most control. Extraneous cognitive load is concerned with the material and environment we subject the students to.

Poorly constructed materials and busy classroom environments can lead to the split-attention effect and add to extraneous cognitive load. The split attention effect is when students are exposed to too much information and their attention is spread too thin. This can lead to a reduced intake of important information and slowed learning, as students are unable to process so much at once.

Irrelevant images, distracting sounds, cluttered worksheets, information beyond what is necessary, or animations or even fonts that are difficult to read, a monotone voice and complicated vocabulary all add to the extraneous load.

- How often are worksheets cluttered with unnecessary text or graphics?
- How often do we check and adapt published or online materials?
- How often do we review online materials for extraneous load?

Cognitive Load Theory

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ACTIVITY 2

Jenny is head of the Humanities faculty. Fatima is the head of the History department. Tom, Joe and Sue work for Fatima. Harry is the head of the Geography department. Jo, Chaz and Tarnia report to Harry. Sue, Jo, Chaz and Harry are working together on the joint Modern Europe Project.

Who is the highest ranking person on the Modern Europe Project?

Which department has the most people on the Modern Europe project?

Which people are not involved with the Modern Europe project?

OLI
CAV

Cognitive Load Theory

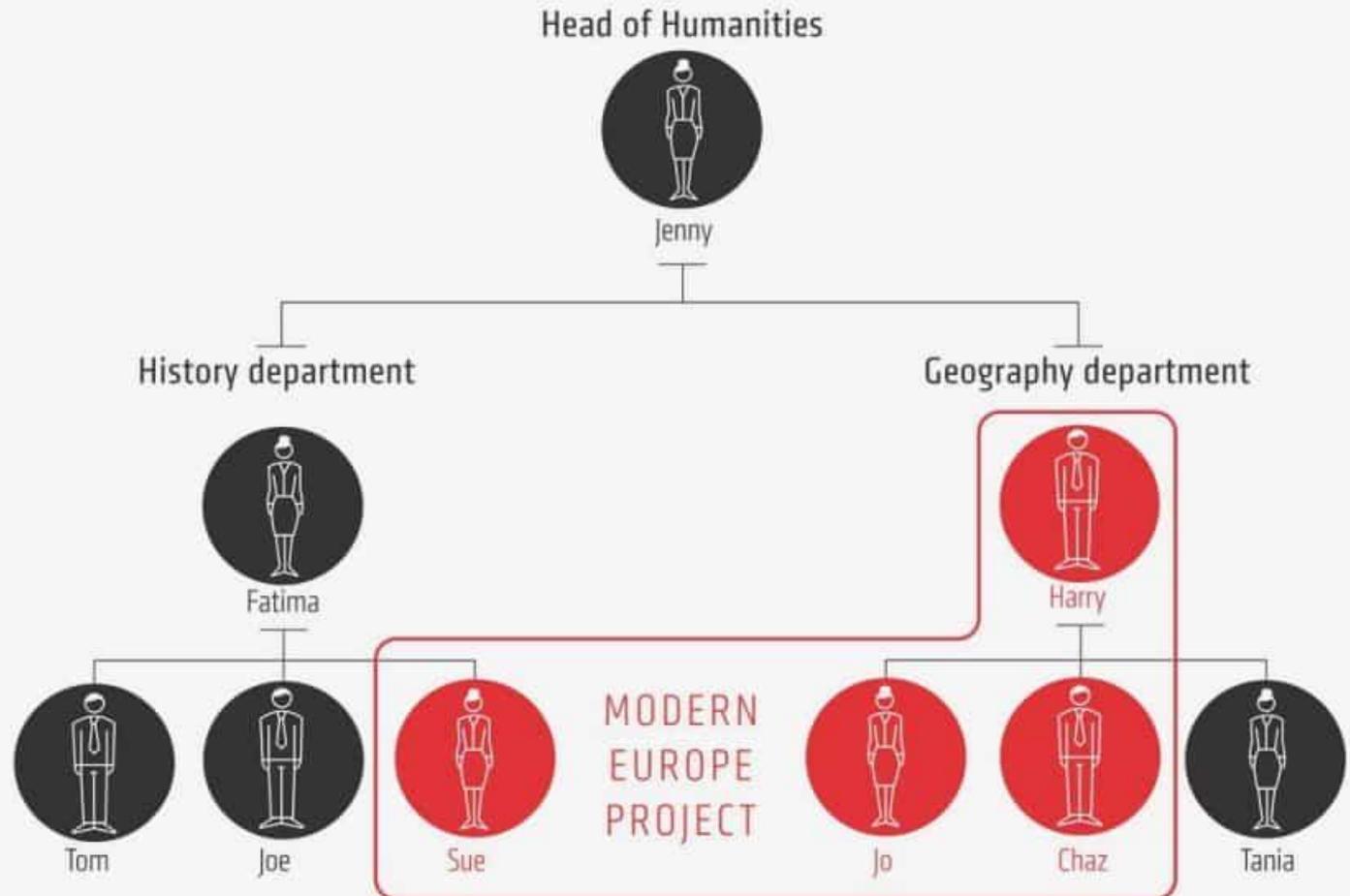
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Who is the highest ranking person on the Modern Europe Project?

Which department has the most people on the Modern Europe project?

Which people are not involved with the Modern Europe project?



Cognitive Load Theory

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Germane Cognitive Load

Germane load is what we actually want to happen, it is the capacity of the working memory to link new ideas with information in the long term memory (It's the moment we've all seen, the "a-ha" lightbulb when a student finally gets it!). The more prior knowledge a student has, the more effective the germane loading stage. Germane load is where [metacognitive strategies](#) come into play, it is where students are aware of their thinking processes and able to adapt new information accordingly. Teaching students the prerequisite skills prior to having them undertake a more complicated task will help them construct new schemas that strengthen their working memory.



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03 ASK QUESTIONS



The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.

Engaging in effecting questioning techniques is one of the most powerful tools a teacher can use to enhance student learning and encourage them to explore a topic in more depth. Questions allow teachers to:

- Establish how well a class is engaging with material
- Determine whether to dedicate more time to explore a topic
- Improve their students' [metacognition](#)
- Encourage their students to be [inquisitive themselves](#)
- Enhance student learning by requiring them to practice retrieval

See work by Tom Sherrington

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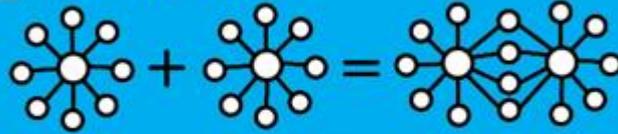
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04 PROVIDE MODELS



Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud help clarify the specific steps involved.

Teachers should model their thought process when presenting new material to students. By breaking down a task and showing students how to complete it, teachers can help students learn more effectively.

Worked examples, demonstrating how to solve a problem, and thinking aloud are all modelling strategies that teachers can use to aid student learning. This is because it allows students to focus on the specific task at hand, reducing the overall demand on their cognitive load.

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05 GUIDE STUDENT PRACTICE



Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers built in more time for this.

[Rosenshine states](#) that teachers need to be spending more time cultivating a classroom environment that provides students with the opportunity to practise retrieval with the material they're learning. The more students can practise rehearsal, the easier it becomes to retrieve this information from their long-term memory when they need it. Students need enough time to practise retrieval, ask questions, and get the help they need to further develop their understanding. This allows them to make connections between [their new learning and old knowledge](#) as they're forced to think more deeply about how this new material fits into the bigger picture.

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06 CHECK STUDENT UNDERSTANDING



Less successful teachers merely ask "Are there any questions?"
No questions are taken to mean no problems. False.
By contrast, more successful teachers check on all students.

Teachers should regularly check for student understanding. By checking students' understanding in the same sequential process that information should be taught, students are less error-prone in their learning and have a better fundamental understanding of the topic.

Checking for understanding typically leads to students explaining their answer, which leads to students [making connections to other lesson content](#) and, ultimately, cementing this information into their long-term memory.

If they haven't got the answer right, this is key information for teachers to know, as they can identify this as an area that needs to be revisited or retaught.

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07 OBTAIN HIGH SUCCESS RATE



A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.

[Rosenshine suggests](#) that the optimal success rate a teacher should strive for is 80%. This is because an 80% success rate highlights that students are understanding material and effective learning is taking place, but it also shows that student understanding is being challenged.

If students were consistently getting 90-100% on their tasks and assessments, it may indicate that the material is too easy. In contrast, the overarching benchmark of 80% highlights that student learning is predominantly error-free and students are more confident in their academic ability.

One of the most common misconceptions about motivation and success is that the former leads to the latter. But the reverse is also true. By obtaining a high success rate, we increase feelings of mastery and confidence, which serve to boost future motivation for the task.

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08 SCAFFOLDS FOR DIFFICULT TASKS



Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.

Scaffolds are the ladders and temporary platforms that builders place around a building during construction. They are there to help support the building's construction until it can stand on own. What kind of scaffolds do we use?

When introducing students to more complex material, Rosenshine suggests utilising scaffolding in your lessons. [Scaffolding](#) is when teachers facilitate students' gradual mastery of a concept or skill by gradually reducing teacher assistance. There is a shift of responsibility over the learning process from the teacher to the student. The temporary support it provides helps students reach higher levels of skill acquisition and comprehension that would have not been possible without assistance.

To use scaffolding effectively in the classroom, consider:

- Asking your students questions to check for understanding
- Using prompts such as “why” and “how” to help with retrieval
- Breaking a big task into smaller sections
- Proving students with worked examples or checklists they can refer to

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09 INDEPENDENT PRACTICE



Independent practice produces 'overlearning' — a necessary process for new material to be recalled automatically. This ensures no overloading of students' working memory.

Although scaffolding is important, your students should also be able to complete tasks independently and [take responsibility](#) for their own learning. [Developing independent learners](#) is important as it helps students to stay motivated and improve their academic performance. By practising a task over and over again in their own time (or 'overlearning'), students develop greater fluency and automaticity in the skill they're trying to learn. By overlearning a topic, students can recall this information automatically, keeping the space in their [cognitive load](#) free for new learning.

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The final principle is an extension of the first, but involves spacing out reviews of previous learning over weekly and monthly timeframes. This combination of [spacing](#) and [retrieval](#) is a strategy called [successive relearning](#) which involves spacing out the use of retrieval practise techniques on several occasions over time, until a certain level of mastery has been achieved (I.e. correctly retrieved from memory multiple times).

Successive relearning ensures students relearn content and maintain the ability to correctly retrieve this information. This allows them to make connections between new information and old knowledge, enhancing their understanding of a topic. Setting your students weekly homework tasks, asking them to complete a monthly reflection, or doing a quiz each month are all effective ways of implementing this learning strategy into the classroom.

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To what extent do we ...

- review learning on a daily basis?
- model, give examples, demonstrate?
- ask effective questions in different ways?
- give effective feedback that has impact?
- provide temporary scaffolds (and revisit the briefly)?
- provide time for independent practice?
- guide groups/individual – focussed on assessed needs?
- check understanding and address misconceptions/issues?
- plan the sequence of small steps in all subjects?
- Use high quality activities and resources that reduce load?

Why do some children constantly have gaps in their learning and never seem to catch up?

Memory

Back in September 2019, I introduced a number of objects and wanted you to commit them to long-term memory. We have since then tried to recall them and will probably so again?

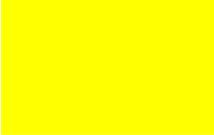
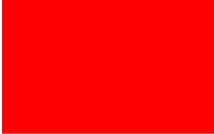
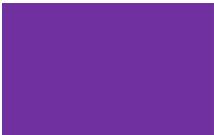
Before we start:

- **Who remembers doing that task?**
- **Who remembers why we did the task?**
- **What did the task teach us about organising the things we need to remember?**
- **What was the framework?**
- **Was there a way of organising the objects?**
- **How many objects were there? Did they all fit in the framework?**
- **Can any of the objects be retrieved/recalled quicker than others?**

OK ... let's see how many objects we can remember?

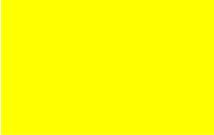
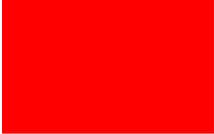
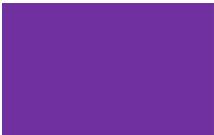
Let's use a recall device to help us ...

Memory

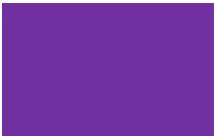
Memory

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	Transport	Shapes	Sport	Kitchen
				
				
				
				
				

Memory

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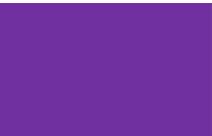
	Transport	Shapes	Sport	Kitchen
				
				
				
				
				

Memory



Exception

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	Transport	Shapes	Sport	Kitchen
				
				
				
				
				

Memory : Applying a Framework for recall

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	What can you tell me about
Ancient Egypt	
Greeks	
Romans	
Mayans	

Memory : Applying a Framework for recall

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	Buildings	Religion	Events	Warfare	Evidence
Ancient Egypt					
Greeks					
Romans					
Mayans					

Memory : Memory Strategies

How can we try and commit things to memory?
How do we remember?



- Rhymes
- Sayings
- Mnemonics (e.g. BODMAS)
- Acrostics (Every Green Bus Drives Fast)
- Lists
- Tables / Charts
- Ordering
- Repetition
- Spaced repetition (rather than cramming)
- Interleaving (vs blocking)
- Visualise
- Word or picture (Memory Palace) association
- Personal experience (e.g. a visit somewhere)
- Senses
- Frameworks / templates

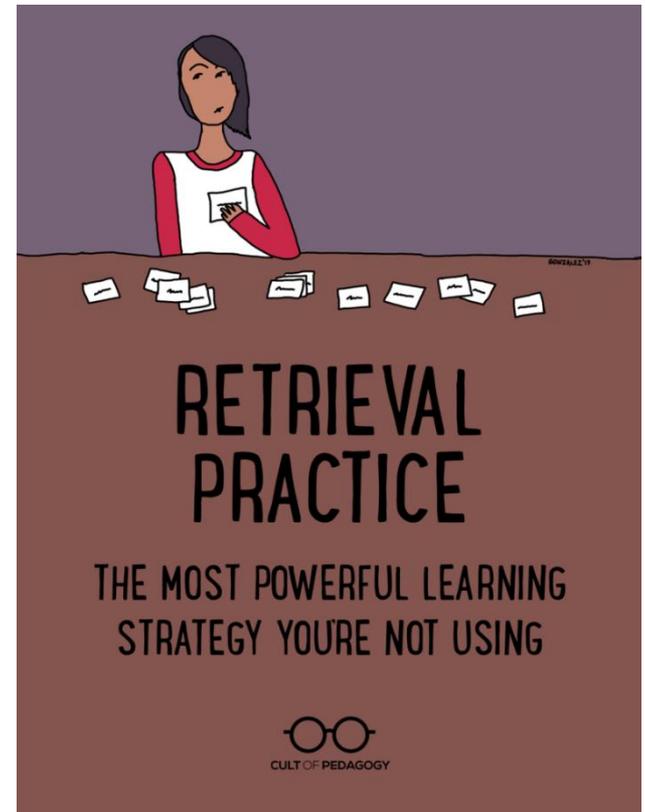
How do you
try and
remember
things?

Memory : Retrieval Practice

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How can we recall things from our long-term memory?
How can we revisit learning?

- **Retrieval practice**
- Self-challenges
- Self-quizzing
- No stakes quizzes
- Subject frameworks (grids to complete)
- Think-Pair Share
- Talk for a minute (or 30 seconds, 2 minutes)
- Write notes for a minute
- Mind map / fish bone diagram
- Draw for a minute
- Flashcards (clue with 3-4 facts on reverse)
- Share a fact with class (different to last time)
- Explain to yourself
- Summarise for others
- Story or narration

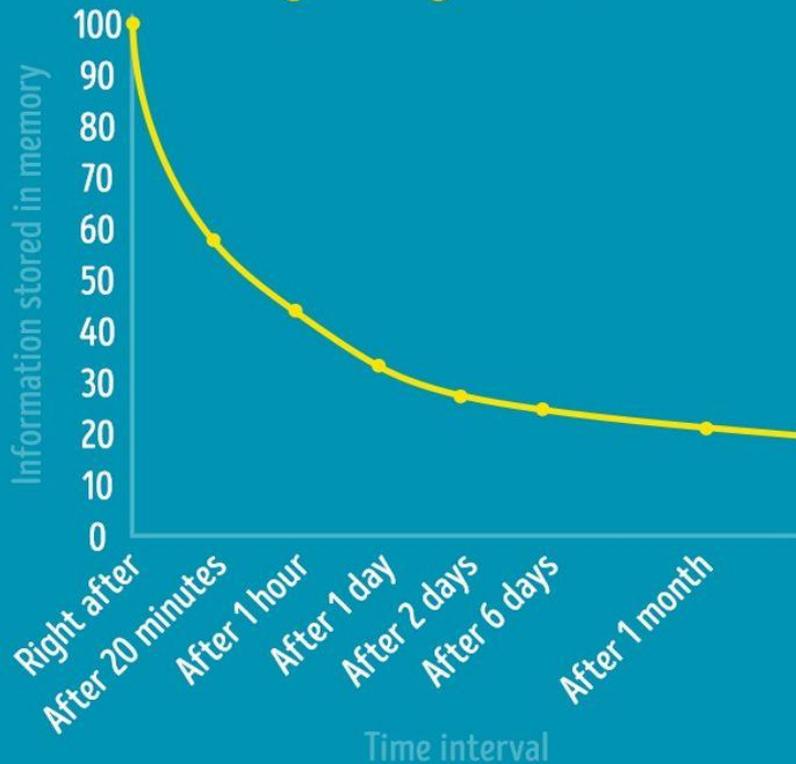


Memory

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The Ebbinghaus Forgetting Curve



Spaced repetition technique

TO MEMORIZE QUICKLY:

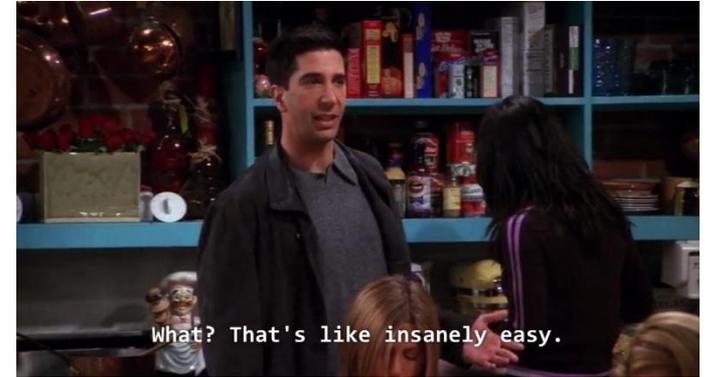
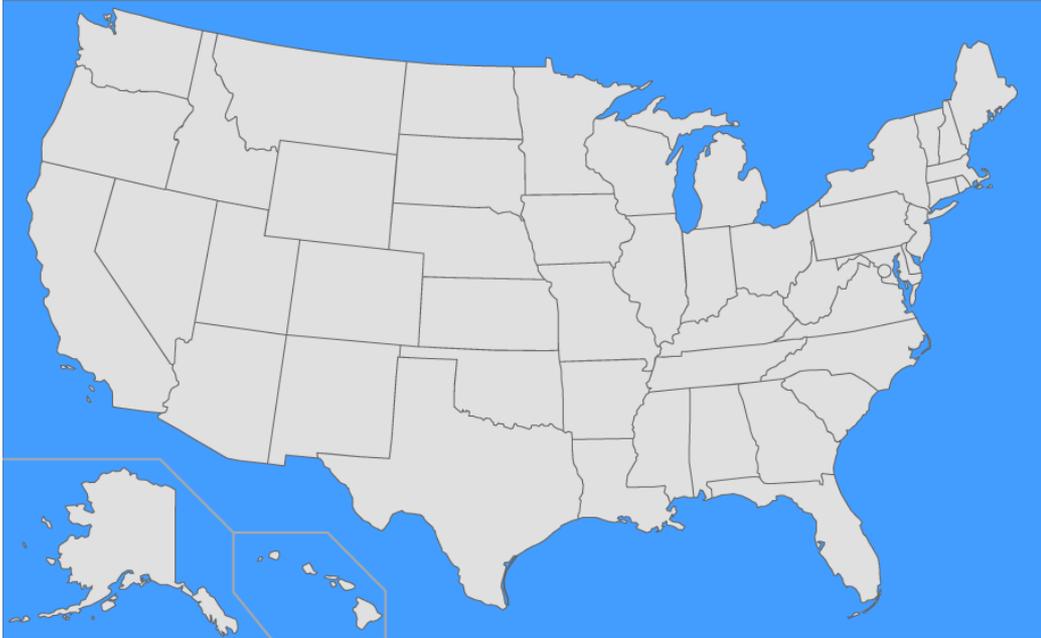
1st repetition	right after learning
2nd repetition	after 15-20 minutes
3rd repetition	after 6-8 hours
4th repetition	after 24 hours

TO MEMORIZE FOR A LONG TIME:

1st repetition	right after learning
2nd repetition	after 20-30 minutes
3rd repetition	after 1 day
4th repetition	after 2-3 weeks
5th repetition	after 2-3 months

Retrieval Practice

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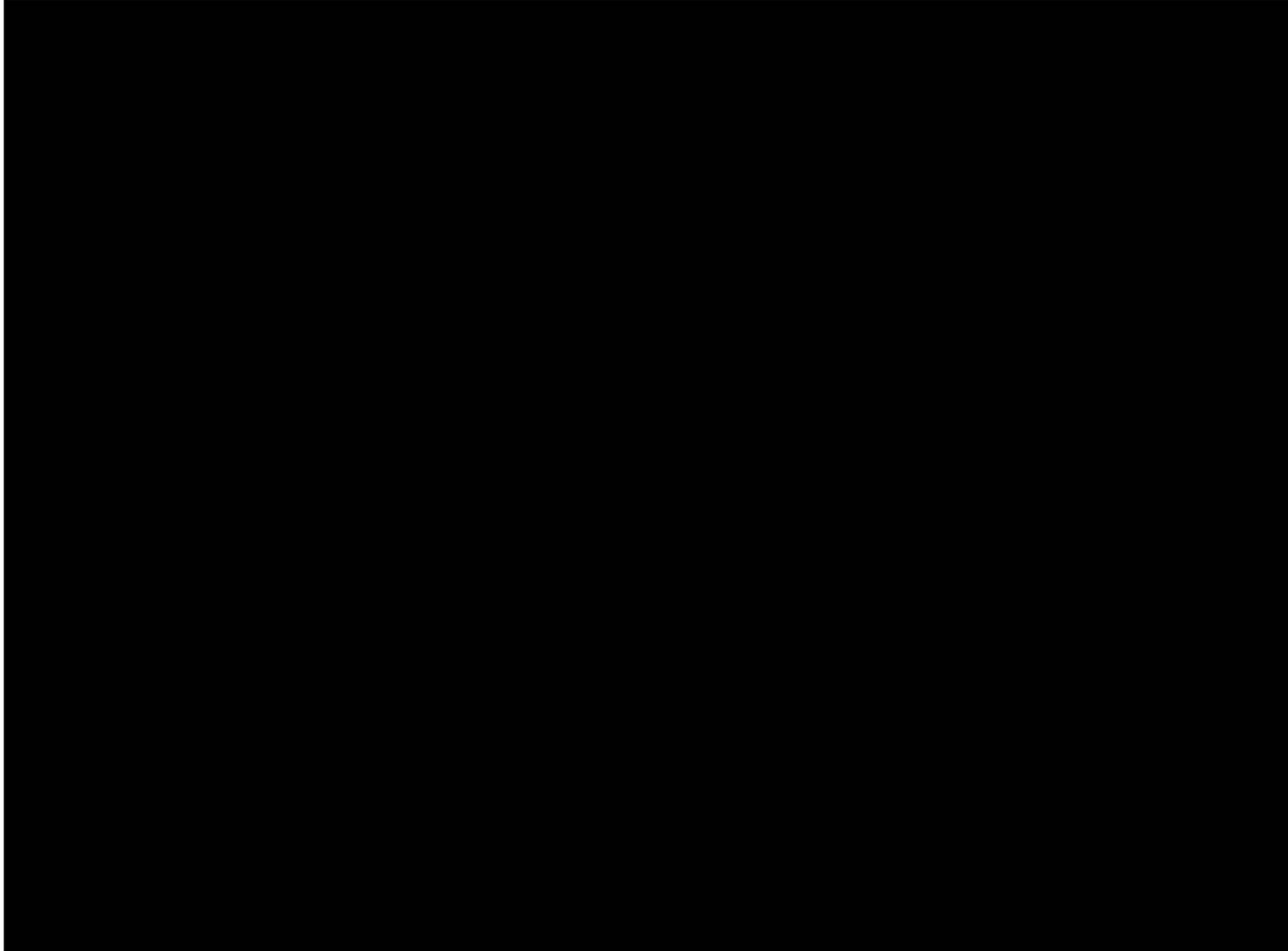
We are going to (collaboratively) name the states of the USA.

- What might help us?
- Which states are easy to name and why?
- Which states are might be more challenging and why?
- How can we overcome challenges next time? (Remember the one you always forget)
- In what ways can we approach the task? (think back to cognitive strategies – Personal, Reading, Wider World)

Retrieval Practice

Curriculum for Learning

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and successful learners*



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Alabama

Alaska

Arizona

Arkansas

California

Colorado

Connecticut

Delaware

Florida

Georgia

Hawaii

Idaho

Illinois

Indiana

Iowa

Kansas

Kentucky

Louisiana

Maine

Maryland

Massachusetts

Michigan

Minnesota

Mississippi

Missouri

Montana

Nebraska

Nevada

New Hampshire

New Jersey

New Mexico

New York

North Carolina

North Dakota

Ohio

Oklahoma

Oregon

Pennsylvania

Rhode Island

South Carolina

South Dakota

Tennessee

Texas

Utah

Vermont

Virginia

Washington

West Virginia

Wisconsin

Wyoming

Retrieval Practice



What will help you remember or retrieve them for next time?

- Map –journeys, e.g. Route 66, southern coast)
- Associations – music (Chicago blues, Nashville Tennessee, New York New York, Yellow Rose of Texas, I come from Alabama, Pennsylvania 6500, Oklahoma)
- Geography – coasts and corners (e.g. Washington, Maine, Florida, Nevada)
- North and South (two compass points for two states which have North/South)
- TV Programmes – Hawaii 5-0, Chicago Hope, Frasier (Seattle), Friends (New York)
- Holiday destinations – New York, Florida, Las Vegas, California, Boston
- Oddities (e.g. Rhode Island which is not an island and Hawaii which is)
- The ones you know you will forget (Milwaukee, Wyoming)
- The alphabet
- There are 26 beginning A-M and 26 beginning N-Z
- There are 16 (nearly 1/3 of them) (8 each) beginning with M or N (four of which are NEW)
- 3 beginning with C (third letter of the alphabet)
- The first letter (A) has four and the last letter has 4 (W)
- V has two (two lines of V) and W has four (four lines of W)

High Quality Activities

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What is a high-quality activity?

Pitfalls?

High Quality Resources

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What is a high-quality resource?

Pitfalls

High Quality Questioning

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What is a high-quality questioning?

Pitfalls

High Quality Feedback

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What is a high-quality feedback?

Pitfalls