Scan this QR code!

The WHY ...

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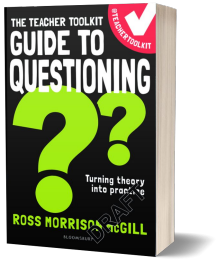
3 Reasons To Pause

Systematically checking for understanding



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Research suggests teachers pose up to XX number of questions in a typical school day.

How many do you think?

What, Why, How...

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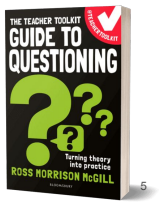
1. Developing a range of feedback/oracy methods
2. Automating questioning strategies
3. Developing a classroom culture for assessment



Amazon.co.uk/1472989384

Guide To Questioning

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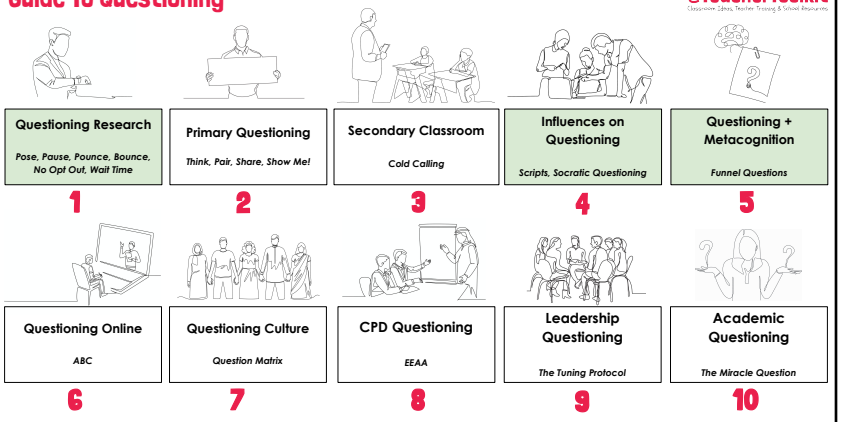

Guide To Questioning (McGill, 2023)

Why do we pose questions?

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1. to clarify
2. to challenge assumption
3. for retrieval; to gather viewpoints
4. to predict what we need to re-teach.

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Take 60+ seconds to read over the chapter summaries …

Wait Time as an Instructional Tool

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1. Research at University of Florida 1972
2. Analysed 300 tape recordings; 5 years!
3. Typical teacher waits (mean) <1 second after a question
4. Short time = less richer response
5. Increase to >3 seconds = improved logic / language
6. From 300-700% response improvement!

Professor Mary Budd Rowe

Wait Time Research

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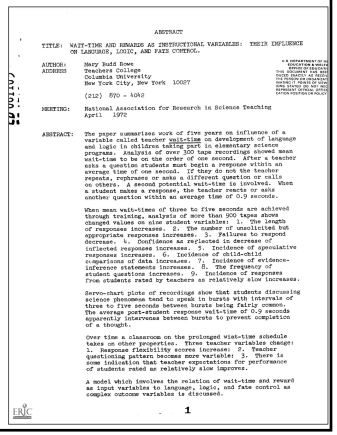

ABSTRACT

TITLE: WAIT-TIME AND REWARDS AS INSTRUCTIONAL VARIABLES: THEIR INFLUENCE ON LANGUAGE, LOGIC, AND FATE CONTROL.

AUTHOR: Mary Budd Rowe
ADDRESS: Teachers College
Columbia University
New York City, New York 10027

(212) 870 - 4042

MEETING: National Association for Research in Science Teaching
April 1972

ABSTRACT: The paper summarizes work of five years on influence of a variable called teacher wait-time on development of language and logic in children taking part in elementary science programs. Analysis of over 300 tape recordings showed mean wait-time to be on the order of one second. After a teacher asks a question students must begin a response within an average time of one second. If they do not the teacher repeats, rephrases or asks a different question or calls on others. A second interval is also involved. When a student makes a response the teacher reacts or asks another question within an average time of 0.9 seconds.

When mean wait-times of three to five seconds are achieved through training, analysis of more than 900 tapes shows changed values on nine student variables: 1. The length of responses increases. 2. The number of unsolicited but appropriate responses increases. 3. Failures to respond decrease. 4. Confidence as reflected in decrease of inflected responses increases. 5. Incidence of speculative responses increases. 6. Incidence of child-child interaction increases. 7. Use of more and better evidence-inference statements increases. 8. The frequency of student questions increases. 9. Incidence of responses from students rated by teachers as relatively slow increases.

Servo-chart plots of recordings show that students discussing science phenomena tend to speak in bursts with intervals of three to five seconds between bursts being fairly common. The average post-student response wait-time of 0.9 seconds apparently intervenes between bursts to prevent completion of a thought.

Over time a classroom on the prolonged wiat-time schedule takes on other properties. Three teacher variables change: 1. Response flexibility scores increase: 2. Teacher questioning pattern becomes more variable: 3. There is some indication that teacher expectations for performance of students rated as relatively slow improves.

A model which involves the relation of wait-time and reward as input variables to language, logic, and fate control as complex outcome variables is discussed.

1

5 Reasons Why Wait Time Is Important

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1. Students need uninterrupted periods of time
2. Students are still learning to communicate
3. They need additional time to understand what is said
4. They need to learn when to 'take a turn'
5. Motor / verbal skills are developing …

The wait for a second interval is usually shorter!

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1. Take a turn …

Pose, Pause, Pounce, Bounce

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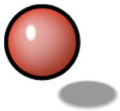
1. Pose

2. Pause

3. Pounce

4. Bounce



Funnel Questions: How does it work?

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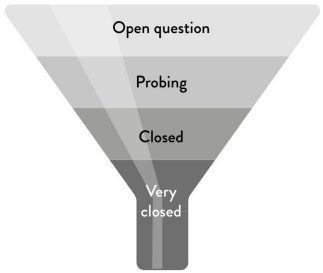
1. Increasingly specific
2. Requires higher level of detail



Funnel Questions Template

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Moving from broad to specific

Level 1
1 point each
Very broad/easy

Level 2
5 points each

Level 3
10 points each

Level 4
20 points each
Very specific/hard

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1. Grab a pen / paper
2. Get ready to think, share, show me!

Funnel Example – Starting Vague

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1. Name an invention that has significantly impacted daily human life?
2. Which invention has played a pivotal role in communication?
3. Which invention is used to record information in a physical format?
4. This object is often found in college and school classrooms …
5. It is used by both children and adults; it can easily fit in a pocket …
6. Can you think of an object that is commonly used for drawing?
7. Can you identify an object that employs a rolling mechanism?
8. Ballpoint pen!

Pyramid Questions

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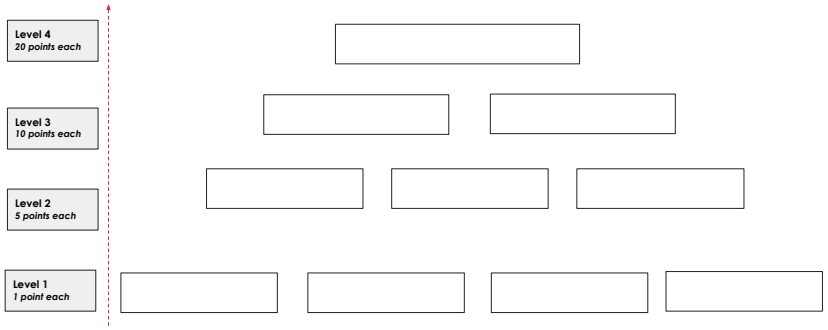

5 Benefits of Question Pyramids

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1	2	3	4	5
Retrieval *To pull out information*	**Consolidation** *To encode and store knowledge*	**Self/Peer Assessment** *To develop self-regulation*	**Big Questions** *To pose challenging questions*	**Classroom Activity** *Starter, plenary, quizzing planned resource*

Maths

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Level 4 *20 points each*

$\frac{3x}{6} = 4$

Level 3 *10 points each*

$6 \div 2 (1+2) =$

$2x - 8x - 4 =$

Level 2 *5 points each*

$2 + 2 + 8 =$

$3 \times 6 \times 2 =$

$97 - 2 - 17 =$

Level 1 *1 point each*

$2 + 2 =$

$7 \times 4 =$

$18 - 7 =$

$28 \div 4 =$

English

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Level 4 *20 points each*

How should you use a fronted adverbial?

Level 3 *10 points each*

Write a sentence using subordinating conjunction

Give an example of a modal verb?

Level 2 *5 points each*

What is a subordinate clause?

What is a subordinating conjunction?

What is a relative clause?

Level 1 *1 point each*

What is a noun?

What is an adjective?

What is a verb?

What is a pronoun?

Science

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Level 4 *20 points each*

Explain why there may have been life on Mars…

Level 3 *10 points each*

Name 5 types of energy…

What is gravity?

Level 2 *5 points each*

What connects a covalent bond?

What is a subordinating conjunction?

What is an atom?

Level 1 *1 point each*

What is an atomic structure?

What is a transition metal?

Name 3 alloy metals…

What is an ionic compound?

5 Ways to Des

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What If?
To query the norm

1

Would You Rather?
To make choices

5

Inspired by John Dabell

What if...

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1.	What if there was only one religion?
2.	What if you could only communicate in the style of a musical?
3.	What if everyone had the same surname?
4.	What if there was no colour blue?
5.	What if all countries were islands?
6.	What if schools had no playgrounds?
7.	What if you could never turn left?

Inspired by John Dabell

Alternative Uses

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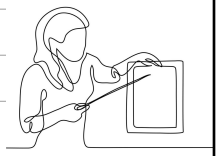
1.	How many uses can you think of for a paperclip?
2.	How many uses can you think of for a spoon?
3.	How many uses can you think of for a car tyre?
4.	How many uses can you think of for a brick?
5.	How many uses can you think of for a slipper?
6.	How many uses can you think of for a button?
7.	How many uses can you think of for a matchbox?



Inspired by John Dabell

Surreal Questions

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1.	What would an infinity elephant say to a Russian nesting doll?
2.	What would the floor say to the ceiling if they could speak?
3.	How would you wash an angry emotion?
4.	Is giraffe a good name for a giraffe?
5.	What would a hawk say to a drone?
6.	Can a dream dream?
7.	Is a grain of sand more useful than a grapefruit seed?

Inspired by John Dabell

Big Questions

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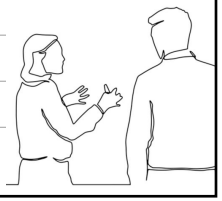
1.	Why isn't the Earth called Water if it is ⅔ water and ⅓ land?
2.	Why don't birds fly upside down?
3.	Is it possible for a fish to drown?
4.	Can a shadow feel any pain?
5.	Does a caterpillar have a brain and if so what does it look like?
6.	How much water does it take to make a book?
7.	Can a volcano ever spurt ice?



Inspired by John Dabell

Would You Rather... ?

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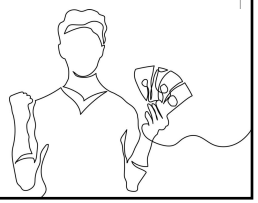
1.	Would you rather be a fly or a butterfly?
2.	Would you rather have three eyes and two hearts or three ears and two brains?
3.	Would you rather be an adjective or a noun?
4.	Would you rather be able to speak 12 languages or play 12 instruments?
5.	Would you rather have hands for feet or feet for hands?
6.	Would you rather be covered in hair or have no hair at all?
7.	Would you rather be fire or water?



Inspired by John Dabell

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Learn to take a turn ...

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2. Processing information

Chapter 5: Questioning + Metacognition

How questioning supports (or not) cognition and working memory ...

Teacher-designed questions that ask students to think about their learning process are essential metacognitive strategies for teachers to deploy.

1: Cognition and Working Memory

One way in which questioning can encourage metacognition is to use **funnel questions**. My interest in how the brain works, and why I believe that all teachers should know about it too, highlights why asking and **formatting** questions is critical ...

5: Funnel Questions

Funnel questions are a seri... that start with broad quest... focused. For example: 1) ... rld? 2) It is ... a rolling ...

Look at cartoon 5 for a moment ...

4: Long-Term Memory

Where we store large amounts of information **waiting to be of service.** When describing long-term memory, broadly speaking, these are memories that are **not receiving** any **conscious attention**. Think, 'activating schema'...

Long Term Memory

- Semantic
- Episodic
- Explicit
  - Declarative
- Implicit
  - Non verbal

1. Can you see learning happen?

2. How does learning happen?

Learning Loop

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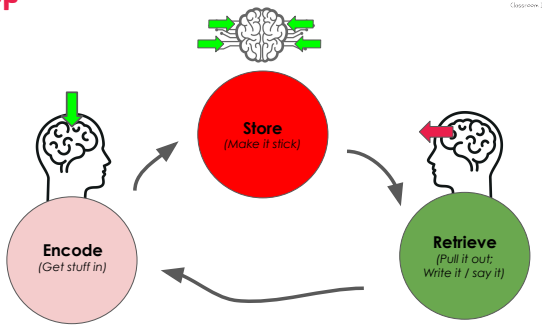

Spaced Practice (week/month/term = retest, not reteach)

Schema Construction

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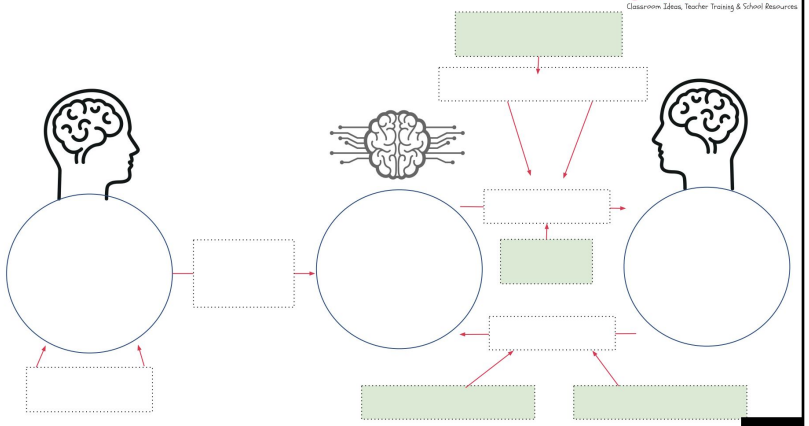

Page 5

Explainer – Practical Idea – Worked Example – Template

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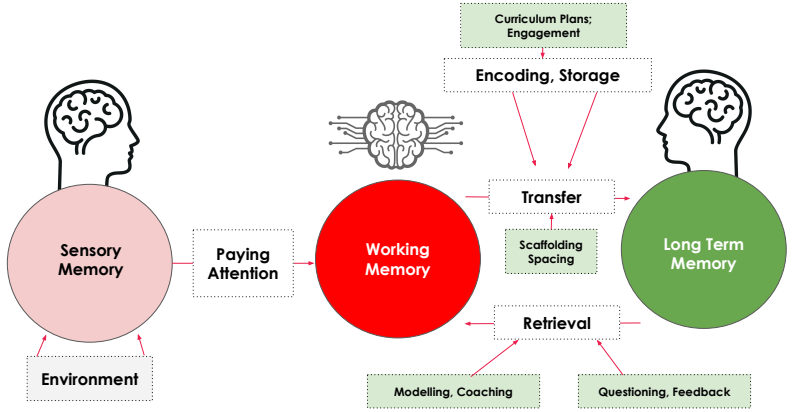

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We need time to process …

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A pause helps retention …

- 1,500+ teachers
- Daily CPD video
- Research focus
- No chats / Ads

SCAN ME!

Tuesdays & Thursdays, 7PM, term time only

Supporting Working Memory

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You need:

1. A pen
2. A loose piece of scrap, A4 paper
3. Listen to the rules …

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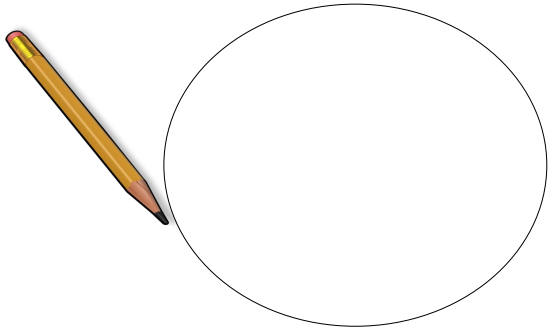

Draw a circle
Add name to corner of page

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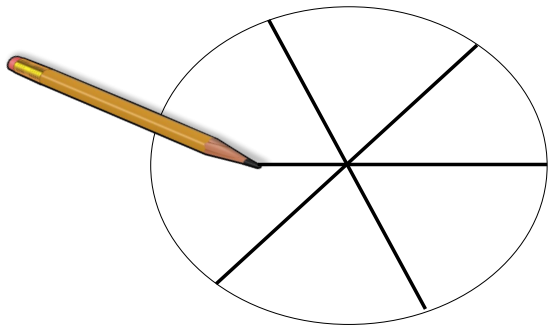

Divide into 6 pizza slices

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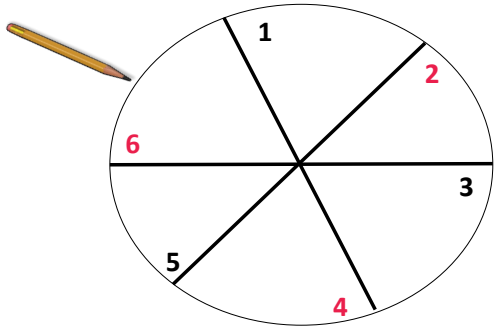

Number the pizza slices

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Check for Understanding

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1. Question
2. Questioning
3. Questionnaire
4. Query
5. Quiz
6. Quizzical
7. Quandary
8. Quibble
9. Inquire
10. Inquisition

Photo credit: www.kstfamily.com

Question Matrix

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	Is? / Does? Present	Has? / Did? / Was? Past	Can? Possibility	Should? Opinion	Would? / Could? Probability	Will? Prediction	Might? Imagination
What? Event							
Where? Place							
When? Time							
Which? Choice							
Who? Person							
Why? Reason							
How? Meaning							

Question Matrix

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	Is? / Does? Present	Has? / Did? / Was? Past	Can? Possibility	Should? Opinion	Would? / Could? Probability	Will? Prediction	Might? Imagination
What? Event							
Where? Place							
When? Time							
Which? Choice							
Who? Person							
Why? Reason							
How? Meaning							

The general level of difficulty of question increases… A "What is?" question is normally easier to create and answer than a "How might?" question.

www.bit.ly/QuestionMatrixPDF

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Image: John Tlumacki

	Is? / Does? Present	Has? / Did? / Was? Past	Can? Possibility	Should? Opinion	Would? / Could? Probability	Will? Prediction	Might? Imagination
What? Event							
Where? Place							
When? Time							
Which? Choice							
Who? Person							
Why? Reason							
How? Meaning							

Question Matrix

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	Is? / Does? Present	Has? / Did? / Was? Past	Can? Possibility	Should? Opinion	Would? / Could? Probability	Will? Prediction	Might? Imagination
What? Event					*Design a question here*		
Where? Place	*Design a question here*						
When? Time							*Design a question here*
Which? Choice			*Design a question here*				
Who? Person				*Design a question here*			
Why? Reason		*Design a question here*					
How? Meaning						*Design a question here*	

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3. Uninterrupted time

Cold Call and Working Memory

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MEMORY

Short Term Memory
(Static; conscious attention in the moment)

Long Term Memory
(Stored, waiting to be of service; developing)

to know...

Working Memory
(Limited processing = forms connections or not)

to know how ...

Concepts | **Rules** | **Facts**

Just sits waiting to be of service

Goal directed = produces action

Declarative Knowledge

Procedural Knowledge (Skills)

Wait Time Examples

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Hands down; no calling out; reply when asked

1. (1 second) Where is Mount Vesuvius?
2. (5 seconds) What is the 2nd planet in the solar system?
3. (1 second) Recall the colours of the rainbow?
4. (5 seconds) Who is the current and last president of USA?

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We need uninterrupted time ...

Structuring Conversations

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1. PRAISE	**Refer to any known** previous actions to validate the teacher's previous effort.
2. PROBE	**Ask** some probing questions, then narrow the focus. E.g. Tell me why XYZ?
3. IDENTIFY	**State** the issue and make clear 2 or 3 actions, plus any required support.
	1. 2. 3.
4. PLAN	**Plan** ahead & set a timeline. What are the barriers/risks? What support is needed?
	Agree action? Date / Time?
5. LOCK	**Lock** it in: Make sure they know exactly what to do next. How committed are they?

Structuring Feedback: PPIPL

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Praise	Probe	Identify	Plan	Lock
Clarify what good performance is	Facilitate self assessment	Deliver high quality feedback information	Encourage teacher and peer dialogue	Encourage positive motivation and self-esteem
1	2	3	4	5

PPIPL

Leverage Leadership (Bambrick-Santoyo, 2012).

Miracle + Exceptions

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"The boys never shut up!"

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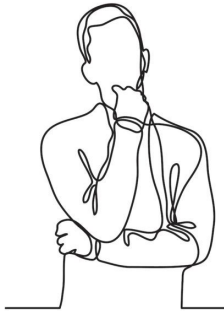
Conclusions...



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1. Priming / Set Conditions
2. Question / Pause
3. Seek 100% Response!

Guide To Questioning

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Questioning Research	Primary Questioning	Secondary Classroom	Influences on Questioning	Questioning + Metacognition
Pose, Pause, Pounce, Bounce, No Opt Out, Wait Time	*Think, Pair, Share, Show Me!*	*Cold Calling*	*Scripts, Socratic Questioning*	*Funnel Questions*
1	2	3	4	5

Questioning Online	Questioning Culture	CPD Questioning	Leadership Questioning	Academic Questioning
ABC	*Question Matrix*	*EEAA*	*The Tuning Protocol*	*The Miracle Question*
6	7	8	9	10

Guide To Questioning (McGill, 2023)


Guide To
Chapter by chapter over
1: Questioning Research
"Teacher questions / student answer
approximately 80 per cent of the ave
school day" (Stevens, 1912). Teacher
trained to improve their questioning
So, where should we start with the nc
instructional tool used in the classroo
5: Questioning and Metacognitio
One way in which questioning can e
to use funnel questions. When studer
self - questioning techniques through
scaffolding instruction, and metacog
employment, [their] interaction is ent
6: Questio
Learning the
pandemic,
teachers are
learning; "sc
help facilitat
small group
How can teachers teach better online?
10: Academ
What would
methodology
discussions be
design a strat
ning is the most
y used teacher
ion ..."
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e effective for particular teaching
ives, including statements and wait
rticipation and talking.
udent questions.
ning influences
ion is received
to understand
8: Effective Questioning CPD
Where would you start if you wanted to build a culture of effective questioning across a school organisation? Effective professional development requires the use of regular and targeted feedback ...
AUDIO
Guide To Questioning (McGill, 2023)


Developing Questioning Culture, Month by Month
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Month
September
Oct
April
May
June
Technique
What it's for
Mini-Whiteboards
A simple way to check for understanding and involve all students
Designed to be used as a guide for teachers, introduce each technique month by month into your classroom to support the development of an inquiry culture in classrooms; retention, study skills and discussion.
Each technique should be re positioned according to the curriculum, skills being developed and the timeframe being used.
Read more in Guide To Questioning
Introduce one new techniq month; deeper level eac
Retrieval Practice
Low stakes assessment which is desirably difficult
Question Matrix
Useful for developing a script; encouraging all aspects of thinking
Tuning Protocol
Mixes with miracle and clarifying questions to develop metacognition
EEAA
Developing depth of responses in written or spoken form
Socratic Questions
Building dialogue rather than questions creating a 'terminal point'
Pose Pause Pounce Bounce
Talking at pressure steps one stage further
Quizzing Software MCQs
Introduction to help support exam prep.
Cold Call No Opt Out
To ensure all students engage and respond
Wait Time / Funnel
To encourage students to process what has been said
Think-Pair-Share
A good way to encourage students to think first, working in pairs
Mini-Whiteboards
A simple way to check for understanding and involve all students
Guide To Questioning, McGill 2023


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Scan me for an Audio copy!
THE TEACHER TOOLKIT
GUIDE TO QUESTIONING
Turning theory into practice
ROSS MORRISON McGILL

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BACK-UP SLIDES

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FERMI QUESTIONS

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1. Grab a pen / paper
2. Get ready to think, share, show me!

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Fermi Example: How many balloons would it take to fill this room?

Fermi Examples

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1. How many teachers could you fit inside this entire room?
2. How many students would it take to surround your college if they held hands?
3. How many 16 year olds are there in [your town / city] ?
4. How many peas would you need to fill a bath?
5. How many exercise books could you stack on your kitchen table?
6. How many hours does a teacher sleep during the working week?
7. How many marshmallows would it take to cover your classroom floor?
8. How far does a bee fly each day?
9. How many people are airborne over the UK at any one moment?
10. If we all stood on top of each other's shoulders, how tall would the pile be?

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If The Answer Is

If The Answer Is

Pose the answer first = Hypophora
Originates from the Roman orator, Quintilian = used to verify the truth

1. Answer = Summative and Formative
2. Question = Give me two forms of assessment?
3. Answer = Venus
4. Question = What is the 2nd planet in the solar system?
5. Answer = Catherine of Aragon
6. Question = Who was the first wife of Henry VIII
7. Answer = Cardiff
8. Question = What is the capital city of Wales?
9. Answer = 135,000
10. Question = What is the population of Wrexham?

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Pyramid Questions

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7 Ways To Design Questions

7 Question Types

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	Type	Structure	Your example question	Which scheme / Year group?
1.	*Task*	*Task orientated*		
2.	*Thesis*	*Closed essay*		
3.	Meta	*Philosophical discussion*		
4.	Start, Set, Research	*Building an argument ...*		
5.	Empirical	*Check facts*		
6.	Multiple Choice	*Retrieval (Desirable difficulty)*		
7.	Implicit or Explicit	*Open or closed*		

7 Ways to Design Questioning

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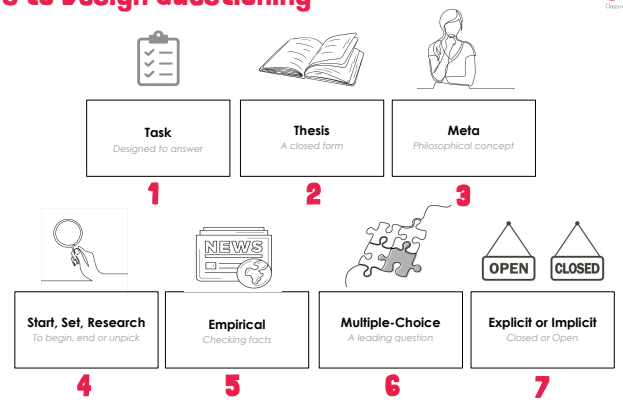

Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Task Questioning

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A question with a *task* designed to answer it...

1.	How many pockets are there on a snooker table?
2.	Why does the Earth rotate through night and day?
3.	What would happen if an empty coffee cup fell off from a table onto the floor?
4.	What happens to the water in a bathroom sink when you place your hand into it?
5.	Can you walk from London to Berlin?

Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Thesis Questioning

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A closed form of question...

1.	Who did the Romans fight with?
2.	Should Britain have left Europe?
3.	Is 3.2 an odd or an even number?
4.	Is 'misinformation' a made up theory?
5.	What is gravity?

Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Meta Questioning

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Philosophical concepts which lead to further questions...

1.	Is breathing clean air for free?
2.	Why is an Orange named by the colour orange, but a Banana not named yellow?
3.	Did the chicken or the egg come first?
4.	Did the tin or the tin opener come first?
5.	Does this question make sense?

Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Start, Set, Research Questioning

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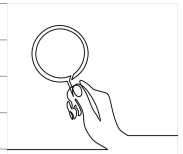
A question designed to begin or end lessons (and not necessarily the key focus)...

1.	To kickstart a debate...
2.	To help provoke students' thoughts as they leave the classroom.
3.	Posed to elicit enquiry during or after the lesson...
4.	Can be anecdotal.
5.	One example: What are reasons why President Donald Trump did not turn up to Biden's inauguration?



Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Empirical Questioning

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A question for checking facts...

1.	How many biro pens are in this room? (Direct experience)
2.	How many moons does Jupiter have? (Descriptive)
3.	Is Pluto round? (Indirect experience)
4.	Is a Panda bear more black or white in colour? (Factual)
5.	Do Gremlins exist? (Open empirical)

Inspired by 100 Ideas: Questioning for Primary Teachers (Worley, 2019)

Multiple Choice Questioning

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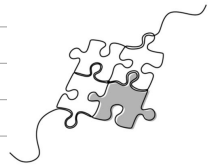
A leading question designed to elicit retrieval from memory...

1.	Good for setting an agenda
2.	To suggest the things students may not ask themselves
3.	You can hide the options before revealing the choices
4.	Obvious (or silly) incorrect options reduce the difficulty
5.	Scope to include two possibilities for discussion



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Explicit/Implicit Questioning

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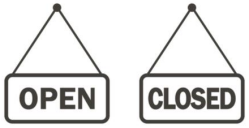
Implicit questions are open-ended, where as Explicit questions are closed...

1.	Implicit: What is a letter?
2.	Explicit: Is 'A' a letter?
3.	Implicit: What is Bhangra music?
4.	Explicit: Is this (insert sound) Bhangra music?
5.	Implicit: What is a teacher?
6.	Explicit: Is Ross McGill a teacher?



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Activity:

Design 7 different types of questions

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Research Questions

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"Who likes performance management?"

asks no headteacher ...

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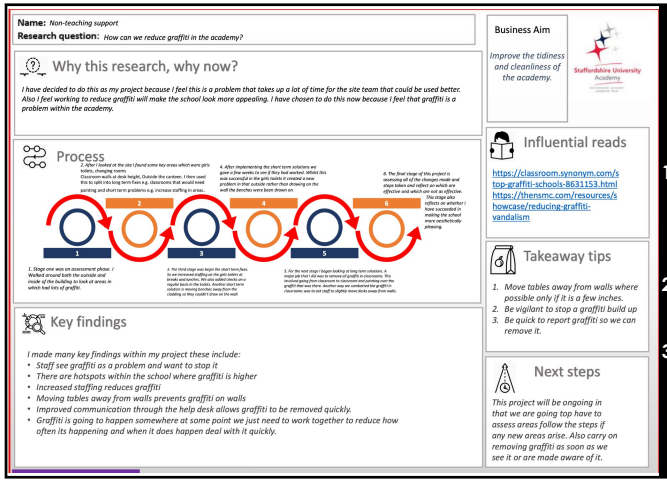
1. Scan this!
2. Look at pages 10, 47, 48
3. Spend a few moments discussing what you see.



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Page 10
Site Staff

1. Do all your support staff engage with appraisal?
2. How far off are you?
3. How could we improve the rigour of this RQ? E.g. data

Research–Evidence Culture Scale

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	Weak evidence culture	Developing eviden
1	No dedicated time to engage with research	Dedicated time for
2	Narrow culture focused on immediate goals	Culture looks towar
3	Inconsistent and/or low level of engagement with research evidence across the school	Senior leaders filter
4	Few staff are motivated	Key staff are motiv engaging with evic
5	Support structures - reading groups, research projects, learning communities - limited or unavailable	Support structures i research projects, I all staff are invited
6	No or very limited guidance on engaging with research evidence	Few informal polici engaging with rese
7	No research-related relationships with external organisations	Some research relc schools and extern

Easy–Access Research...

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1. EEF
2. Visible Learning (MetaX)
3. Google Scholar

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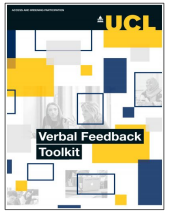
To what extent does VF implemented for 2 terms improve student engagement amongst disadvantaged pupils in years 7, 8 and 10?



Using an impact framework ...

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What do we want to know?

What will positive change look like?

How do we collect evidence systematically and sustainably?

What is our 'best current practice'?

What will we have to produce at the end?

Ross M. McGill works with teachers across the world and curates one of the most popular education blogs in the world (16M readers). The Sunday Times listed him as one of the '500 Most Influential People in Britain'.

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