Developing Questioning Techniques at Gracemount High School

The Butterfly Effect

Low effort High Impact

The Butterfly Effect

As romantic as it is mathematical, the **butterfly effect** theory can be found in all areas of life. The 'butterfly effect' – so called because if sufficient butterflies whirr their wings in the Amazonian rain forest a tornado can be unleashed hundreds of miles away. Of course this won't happen every time but sometimes if the climate and conditions are right who knows what can happen!

Within education this theory has been promoted by Sir Tim Brighouse. He encourages schools to share their best ideas recognising that some of these ideas are very simple and very powerful and most appealingly they should be interventions which require **low effort but have high impact**.

Developing teachers questioning is recognised as a possible "butterfly effect". We hope you find this resource useful and one that you can refer to time and time again.

Enjoy, practise, take a risk and learn from!

The Importance of Questioning

Research suggests:

- Teachers ask up to two questions every minute, up to 400 in a day, around 70,000 a year, or two to three million in the course of a career
- Questioning accounts for up to a third of all teaching time, second only to the time devoted to explanation.
- Most questions are answered in less than a second. That's the average time teachers allow between posing a question and accepting an answer, throwing it to someone else, or answering it themselves.
- Research has found, however, that **increasing the wait time** improves the number and quality of the responses - three seconds for a lower-order question and more than 10 seconds for a higher-order question.

Questioning techniques can be developed easily in class through **practice and experimentation**. All teachers should consider how and when they question, embedding a variety of techniques to support the learning in the classroom. Highly effective, skilled questioning will have a **significant impact on the learning** experience within your classroom and ultimately improve your pupils learning.

In the next few pages a variety of techniques are highlighted and explained for your reference. You will be familiar with some and no doubt many will be embedded in your classroom practice already. Nevertheless there may be some that are new to you or unfamiliar with.

No Hands Up

A simple theory which can be used to maximize pupil engagement in the classroom.

You can watch an example of this by following the link below.

The Classroom Experiment (Ep.1) - YouTube

The basic theory is to inform the pupils that they should only raise their hand to **ask a question**, **not to answer one**. The teacher then chooses pupils to answer, therefore gaining information on whether everyone is learning. This can take some time to reinforce and when you first implement this you'll have a battle on your hands. Nevertheless it's worth reinforcing and some, if not most of your pupils will be familiar with this.

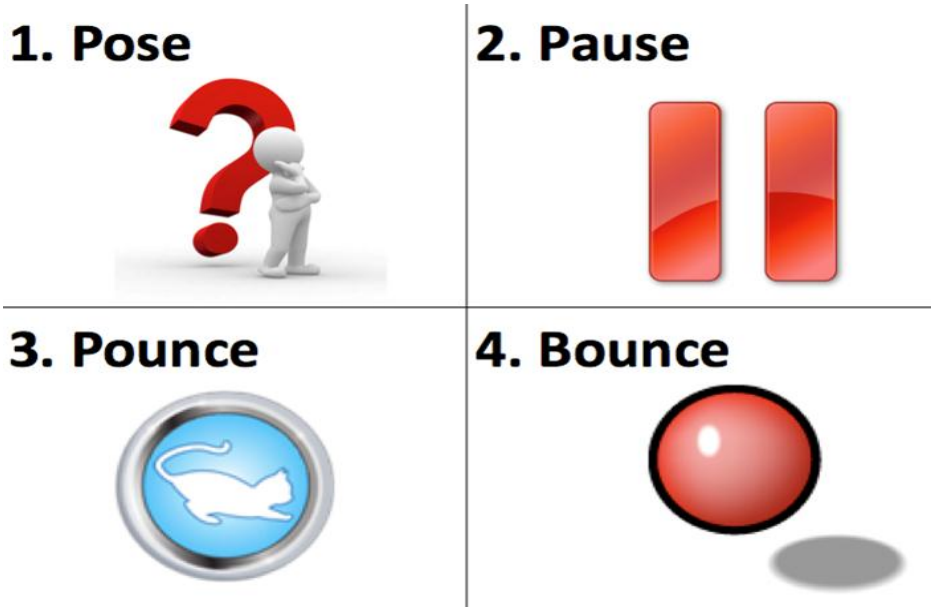
How the teachers choose is a crucial part of this technique. Simple techniques from the following can be adopted.

1. Lollipop sticks (or something similar) with pupils names to ensure a random choice. (Ian Stanton's **the cup of truth** has to be seen to be believed!)

2. For the more IT literate www.classtools.net – fruit machine programme where you can input names, save it and play it to choose pupils at random.

3. The Name Game can also be used for this – it's a PowerPoint slide show with pupil's names that can be stopped at random.

4. Write numbers on balls or counters that tally to register or seating position and re-use with every class.



A very simple strategy but one that **needs a lot of practice and teacher discipline.** Pupils need to get used to the technique and it is worth explaining that you intend to use this with them.

Watch this short clip to help: https://www.youtube.com/watch?v=029fSeOaGio

An explanation of each of the stages is below.

1) POSE

- Give the **context** of your approach to the class.
- **Insist on hands down** before the question is delivered.
- Provide a question or a series of questions, ensuring that you ask the students to remain reflective.

2) PAUSE...

- This is the **hard part**.
- Ask the class to hold the thought; ... think; ... think again...

    1. If students are captivated and engaged, try holding the silence for a little while longer and...
    2. Push the boundaries. Keep the reflection for as long as possible.

3. You can use a classroom monitor/timekeeper if you want to support you with this. Give them a stopwatch or ask them to count to 10 in their head. They can then give you a signal to move on to the pounce stage.

3) POUNCE (!)

- Insist the answer to the question comes from student A and possibly student B, directly and fast!

- Of course **plan in your mind who you are going to ask**, before speaking to the class.

- Name student A to respond and don't move.

- Possibly don't speak and nip any comments, grunts or noises in the bud! It's magic when you can hear, see and feel a captivated learning audience. We've all seen it.

- Wait for an answer... pause... **decipher the support needed** if no response is evidently on its way. (Of course, at this stage, you can instigate various strategies for peers to support the questionable student A).

- If student A does manage to answer, the fun part starts here...

4) BOUNCE!

- Ask another student B (immediately) after the POUNCE response, their opinion of student A's answer.

- This can be developed by asking student B and C **their opinions** to student A's response, **irrespective if the answer is correct or not**.

- An additional strategy is to bounce the question to a group A...and subsequently, a sub-group B if group A do not deliver a suitable way forward.

- This ensures the teacher is engaging a significant number of students with the question at hand, whilst using this strategy, it also ensures the entire class can be called upon at any given time by just returning to phase 1 or phase 3.

The basic premise to this technique is to ask students **'tell their neighbour'** as a means of articulating their thoughts. It can also be used as away of introducing a new topic/technique by telling students what the new topic is and then ask them to tell their neighbour everything they know about it.

3 key Steps

1) Ask a question, give thinking time and then ask students to discuss and tell their neighbour their thoughts.

2) Having done this put the pupils into groups so that they can discuss the question further.

3) When you are ready for pupils to give you their answers, seek group responses rather than responses from specific individuals.

One key advantage is that many pupils feel safer making contributions when teachers use this questioning format and of course pupils love collaboration and learning from each other.

This is a great technique to use when tests are returned and the class are discussing the "how" and "why" of the right answer. It's also great for whole class discussions or in other situations where you are encouraging peer collaboration such as reading and understanding the same piece of text. Person A and B read the same paragraph, Person A summarises the meaning of the paragraph to person B, they discuss and agree/or not and then repeat the process with person B summarising.

The process of agreeing should include reasoning over the validity of the consensus answer, as well as reasoned negation of misconceptions or wrong answers.

Enquiry Questions

Use an enquiry question to stimulate **high-level thinking** in the lesson or unit.

e.g.

Instead of, “Is the United Kingdom a democratic society”?

Try

How democratic is the United Kingdom?

Instead of “Is our school ethnically diverse”?

Try

How ethnically diverse is our school?

Closed questions have the following characteristics

- They give you *facts*.
- They are *easy* to answer.
- They are *quick* to answer.
- They keep control of the conversation with the *questioner* – (usually the teacher)

This makes closed questions useful in the following situations:

1) Establishing facts quickly.
2) Revision on a topic – testing their understanding.

Closed questions can be useful however are not great at facilitating the use of abstract thinking skills, encouraging talking or eliciting much understanding. Open questions are more likely to do this and thus improve learning.

Open questions have the following characteristics:

- They ask the respondent to ***think*** and ***reflect.***
- They will give you ***opinions*** and ***feelings***.
- They hand control of the conversation to the ***respondent*** **– (usually the pupil)**
- Begin with words such as: *what, why, how, describe*.

This makes open questions useful in the following situations:

1) As a follow on from closed questions, to develop a conversation and open up someone who is rather quiet?
2) To find out more about a persons understanding, their wants, needs, problems, and so on.
3) To get people to realize the extent of their learning and what needs to be achieved (to which, of course, you have the solution).

Using open questions can be scary, as they seem to hand the baton of control over to the other person. However, well-placed questions do leave you in control as you steer their interest and engage them where you want them.

When opening learning conversations, a good balance is **around three closed questions to one open question**. The closed questions start the conversation and summarize progress, whilst the open question gets the other person thinking and continuing to give you useful information about them.

A neat trick is to get them to ask *you* open questions. This then gives you the floor to talk about what you want. The way to achieve this is to intrigue them with an incomplete story or benefit.

Invert the question 

This is very similar to using open and closed questions.

Instead of asking a question that requires factual recall, invert it to request explicit reasoning e.g.

“Is France a democracy?”

becomes

“What does it mean for France to be a democracy?”

“Is 3 a prime number?”

becomes

“Give (x) amount of reasons why 3 is a prime number?”

If this is the answer……what is the question?

A simple, yet effective technique to reverse the traditional questioning style. You may be familiar with this form the TV Programme, “Mock the Week”. A short clip for those that are not easily offended is included.

https://www.youtube.com/watch?v=Gh2bveIhfC0

This allows you to:

1) Reversing the standard question and answer dichotomy - it can deepen the pupils thinking.

2) Use different categories from your subject to facilitate pupil choice.

3) Can easily be used for open or closed questions.

Mini Whiteboards

A technique we are probably all familiar but there is more to this than waving pieces of plastic in the air.

The key advantage is that there is no more efficient way to find out:

a) Who knows.
b) Who doesn't.

A huge advantage is that in each case every pupil answers whether individually, in pairs or groups.

What does this yield?

1. Correct answers.

2. Common errors or misconceptions.

3. Unexpected answers or approaches that add depth / interest to the lesson.

4. Students admitting they don't know.

However, the **Critical Factor** is the **follow up questions** from the immediate feedback.

- To those who got it right the least important thing to know is the right answer, the question is how did you work it out?

- Then those who were slightly wrong – what made you think that?

- And so on.

Some examples may be:

1) Why do you/what happens when……. (4 marks) Bonus marks for use of key terminology.

2) Write a sentence in French telling me…….

3) Write a sentence about …..

4) Draw a diagram of…….

5) Calculate 23% of 89.

In each case you are able to:

- Raise participation and engagement levels.
- Get you instant feedback.
- Deepen knowledge through follow up questioning
- Raise attainment.

Please take into account the following:

1. Making them difficult to access. Every teacher should be able to access a set! Please contact ruth.mcfarlane@fife.gov.uk for more information!!!

2. Failing to take account of the responses – this is criminal (well almost). The point is to use the student's responses to inform what happens next.

3. Using them too little (novelty items)

4. Using them too often (students become jaded and impact wears off).

Starter Questions

Starter Questions

The following first two minutes of this clip are helpful when considering starter questions and balancing the need for always having specific learning intentions. – A common misconception in 21st century teaching.

https://www.youtube.com/watch?v=kPf0nQFfv50

Starter questions are a neat way of getting classes involved in learning straight away. These can be questions displayed that allows pupils to get access to learning immediately.

However, we can at times use these questions **INSTEAD** of learning intentions to start a lesson. This may be used when we don't have a specific learning intention for the whole class, but a "horizon" of learning intentions.

An example maybe:

Why is it colder at the top of a mountain even when you are closer to the sun?

This generates discussion and pupil can work individually, in pairs and groups to discuss and bring the answers back to the whole class.

Simple starter questions can also be used to get the class "started". Good examples of this are when questions are on the board and pupils are asked to start work immediately. This could be a follow on from the last lesson or an introduction to the days lesson/focus.

Exit Passes

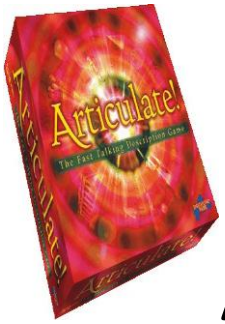
Exit Passes

Use post-it notes or something similar to evaluate learning. Groups, pairs or individuals can answer:

- What have I learnt?
- What have I found easy?
- What have I found difficult?
- What do I want to know now?

It's important to re-visit these in the next lesson or pupils will see this as a waste of time. These should provide the teacher will valuable feedback which can shape the structure / content / learning of the next lesson.

These can also be used to evaluate topics / courses. Good for self-evaluation purposes and can be kept or photographed as evidence.



Articulate the Answer

Give students the opportunity to **articulate their thinking** before answering. This tends to follow the order below:

1. 30 seconds silent thinking before any answers.
2. Share thinking with another in pairs for 2-3 minutes.
3. Write some thoughts down before answering.
4. Discuss with your neighbour the answer given by others.

The important aspect here is to use incorrect answers as a discussion point. Rather than dismissing something because it is wrong or saying 'that's interesting' etc use the misconception in reasoning to draw the process out into the open.

This leads to improving on misconceived reasoning and an atmosphere in which it is OK to be wrong.

X and Y

A great technique for developing, and checking on pupils understanding of key issues/topics.

Ask students why X is an example of Y

e.g.

Why is an apple an example of a fruit?

Why is a fox an example of a mammal?

Questioning in this way **avoids factual recall** and asks for the **underlying reasoning** to be made explicit.

Laminate a set of cards so every member of the class has four, with **A, B, C and D** written on them. Ask questions with four answers and pupils can show you their answer – another way to do this is use the mini whiteboards as highlighted earlier.

Encourage them not to look at other people's response and remember wrong answers can be as valuable as right answers. You **must** take time to explore the reasoning.

Walking Debate

A Walking Debate can be useful when discussing an issue or viewpoint, or finding a solution to a problem with pupils. It can also be an alternative way to have a class debate. It's a great technique to ensure maximum engagement and can provide a visual experience to the learning also.

Teachers need to display the debate cards in sequence from 'Strongly Agree' to 'Strongly Disagree', with 'Neutral/Unsure' in the middle on the wall of the classroom.

Next, a statement or question is read out to the class and they are asked to **position themselves** at one end of the class-room if they agree with the statement and at the other end if they disagree. If using questions you can have different possible answers placed around the room. Those who are uncertain can stand in the middle.

During the discussion of the issue students **can move their position**. Teachers need to **gain views from all sides and discuss the alternative views even if no one has chosen to stand there**.

An alternate idea could be that pupils attach or stick their name card beside the debate statement that corresponds with how they feel or what they think. This allows for effective discussion surrounding all view points on a topic and also allows pupils to question each others views and deepen understanding.

Question Tokens

This is a simple technique to get pupils to consider when to ask for help. It shouldn't be used every lesson but can be effective when you want to pupils to develop responsibility and independence in their learning.

The premise of these is that the students are given a set number of tokens in the lesson and have to choose when to use it (or not) - the idea being that they will think twice before asking the teacher and try to encourage students to think for themselves.

They can "cash" in their token for one question but are advised by you to use wisely.

COUPON FOR THE ANSWER TO ONE QUESTION. USE WITH CARE … DO YOU WANT TO WASTE YOUR QUESTION?	***COUPON FOR THE ANSWER TO ONE QUESTION. USE WITH CARE … DO YOU WANT TO WASTE YOUR QUESTION?***
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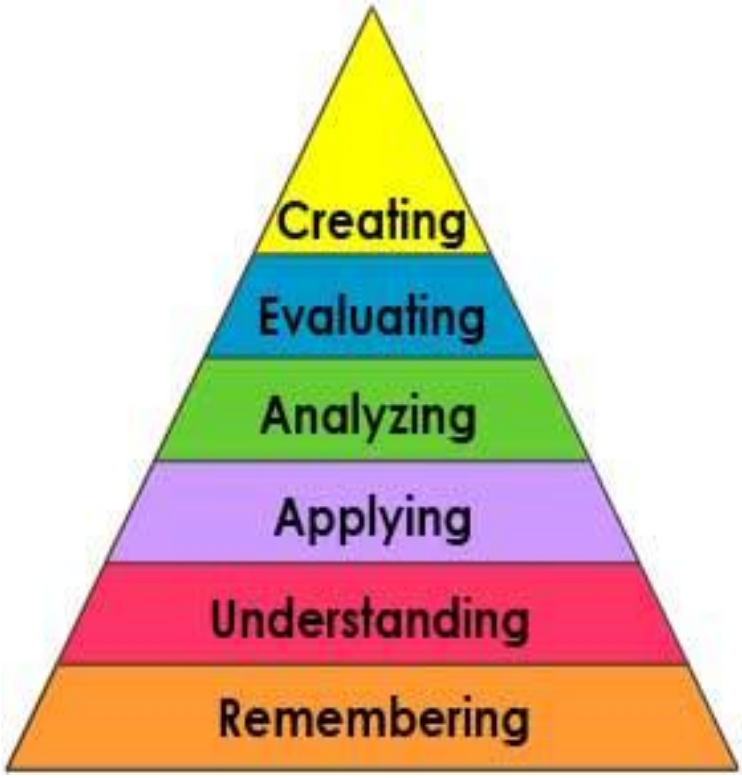
Blooms Taxonomy (revised 2000)

This is often used in order to **promote higher forms of thinking** in education such as analyzing and evaluating, rather than just remembering facts (rote learning). The revised version, shown below, concentrates more on the **verbs** rather than nouns; it's about the actual "doing" that's important.

When considering the **planning of questioning** into a lesson it can be helpful to consider **what level of thinking** you want your pupils to be engaged in. Some teachers do explain to pupils when they are asking "Higher Order Questions", so they expect a more detailed response. By **embedding key words into your questions** you can begin to further develop pupil thinking skills.



Language to Encourage Higher Order Thinking Skills - (HOTS)

In the table below you can begin to incorporate some of the words in your questioning.

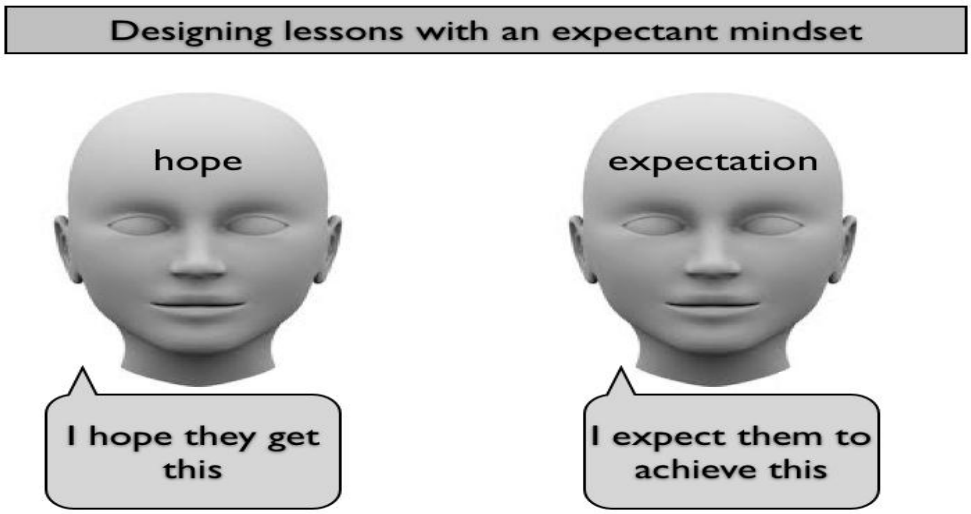
Category	Key Words to Consider
Remembering – recall previous learned information.	Define, describe, identify, label, list, match, name, recall, select, recognise
Understanding – comprehending the meaning, translation, interpret instructions and problems.	Comprehend, convert, distinguish, estimate, explain, give an example of.., infers, interpret, paraphrase, predict, rewrite, summarise, translate.
Applying – use a concept in a new situation. Apply what was learned in the classroom into unfamiliar situations.	Apply, change, construct, demonstrate, discover, manipulate, modify, operate, predict, prepare, produce, relate, show, solve, use.
Analyzing – Separate material or concepts so that they can be understood. Distinguish between facts and inferences.	Analyze, breakdown, compare, contrast, deconstruct, differentiate, distinguish, identify, illustrate, justify, relate, summarise, support.
Evaluating – make judgements about the value of ideas or materials.	Appraise, compare, conclude, critique, defend, describe, evaluate, explain, interpret, justify, relate, support.
Creating – build a structure or pattern. Put part together to form a whole, with emphasis on creating a new meaning or structure.	Categorise, combine, compile, compose, create, devise, design, explain, generate, rearrange, reconstruct, revise, rewrite, tell, organise.

Marginal Learning Gains

We all know that what and **how we think as a teacher influences what we do** in the classroom. New research, based on the work of the British Olympic Cycling Team focuses on Marginal Learning Gains (MLG).

The MLG here is characterised by the **mindset of the teacher** and how this is communicated through the design and delivery of learning experiences. It comes down to a **(tiny)** change in our language and, as a result, the language of our learners.

The MLG focus is intended to **aid the pre-planning and thinking-through** of the level and quality of thinking, discussion and articulation of understanding you are **EXPECTING** as a result of the learning that you design.



In being **explicit** about expectations, we can **frame success criteria** in a far more purposeful and succinct way. If we want a group to come up with some good questions about a topic, we can start to think about **how many questions** we realistically, or ambitiously, *expect* them to come up with. **Then we can specifically tell them how many questions we really expect them to generate**. If we think they will need about three minutes to do this, we can tell them we expect them to come up with (x number) of questions in (x amount) of time. In this way, we will can be clear about our expectations **and** communicate *our* belief in *their* ability to achieve this at the same time, SO THAT we nurture their personal sense of agency and a 'can do' attitude in learning.

So, "I want you to come up with some ideas" becomes, "I *expect* each one of you to identify *six* important points in the text and select the *three* most important in (specific time)"

And, "Some of you might be able to/ could/ should…." becomes, **"I *expect* those of you who are working at level (x)** / (insert names if needed) to be able to…by (midway point in the lesson/ end of lesson/)…SO THAT….you can show me/ each other that you can/ understand/ know/…'

The impact of using the language of expectations

1. Every student thinks **more deeply** about the task at hand because they know they have to **generate a specific number of initial ideas** within a structured time frame.
2. **Every student will engage** in the decision-making process (rather than just going with the first / loudest / most confident / forceful idea) because they are specifically **required to justify** the selection that they made (AUTONOMY)
3. Every student **feels safe to contribute** because they are specifically asked to **use their 'best thinking'** not come up with the right or best answer.

Precise language to reinforce expectations	
Instead of saying…….	**Be precise…….**
Look at the two pictures?	**Compare** the two pictures
What do you think is going to happen?	What do you **predict** will happen?
What do you think of this?	What **conclusions** can you draw from this?
How can you explain?	What **evidence** do you have to support this?
Have a go at that one next…	Try to **analyze** that one next.

Precise language to listen for	
Instead of hearing…….	**Listen for…….**
I had a go at this	**I analyzed** this first
I think number 6 will be next	I **predict** number 6 will be next
Maybe it wasn't Macbeth's fault after all	I **conclude** it wasn't Macbeth's fault **because**
I think it's like that because...	The **main reason** for why it does that is….
Is it -4	**My calculations** show that the answer is -4.

NOTES/REFLECTIONS

Developing Questioning Techniques – Personal Reflection

Name:_____

Technique	Used (✓)	Effectiveness Scale 1-5	Will I use again?	Comment
No Hands Up				
Pose, Pause, Bounce , Pounce				
Think, Pair and Share				
Enquiry Questions				
Closed				
Open				
Invert the question				
If this is the answer…… what is the question				
Mini whiteboards				
Starter Questions				
Exit Passes				
Articulate the answer				
X and Y				
Walking Debate				
Question Tokens				
Higher Order Thinking Skills – the language we use				
Marginal Learning Gains – the language and structure of our questions.				