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# STEM VIPS

## Visitors in Primary Schools

**Planning effectively for a scientist or engineer in your school**

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## Contents





# Foreword

**This STEM VIPS: Volunteers in Primary Schools booklet offers teachers and STEM professionals the chance to stop, read and reflect on how we can make visiting primary children the best experience for all**

As a leading UK University, we hold Social Responsibility as one of our core goals. Our outreach programmes thrive allowing cutting-edge research and teaching to be shared beyond our doors to inspire, motivate and challenge others and ourselves. Engaging with teachers is key to our strategy, working together to collaboratively identify the links to school curricular. Looking ahead, we know how powerful it is to broadening children awareness and understanding about roles and careers in STEM from an early age – something they go on to share with families too!

So take a look inside – the booklet brings together established ideas, some things you'll already know and some may remind you of things you've forgotten. The booklet was written as an outcome from an innovative project designed to develop and enrich the pre and post-placement experience of a STEM volunteer working with primary teachers. We collaborated to question what could be done to enhance the quality of the experience. Why? To enhance the quality and the fruitfulness of the volunteering experience for all groups involved – students, teachers and pupils alike.

Enjoy the read!

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- Acacias Primary School, Manchester
- Banks Lane Junior School, Stockport
- St Thomas CE Primary School, Stockport
- Crumpsall Lane Primary School, Manchester
- Mauldeth Road Primary School, Withington
- Vernon Park Primary School, Stockport

**This SEERIH project was funded by The University of Manchester's Faculty of Engineering & Physical Sciences' Strategic Fund, in association with The Museum of Science & Industry and The University of Manchester's Widening Participation Office.**


Want to learn more? A full project report is available from SEERIH.

Contact **seerih@manchester.ac.uk**

# Why organise a STEM visitor?

**89%**

**of STEM businesses struggle to recruit**

**(STEM Learning 2018)**

## The STEM skills gap has been reported for many years and continues to pose challenge for STEM businesses.

There is also widespread concern that the profile of those who do go on to study STEM subjects and pursue STEM careers is too narrow, with women, working-class and some minority ethnic groups remaining under-represented, especially in the physical sciences and engineering (ASPIRES Project 2009 -2013).

The earlier that pupils, particularly girls, who still lag well behind boys in taking up Stem subjects at secondary school, experience the fun, interesting and relevant nature of science and engineering, the more likely it is to spark their long-term interest.

Research has also identified the need to support primary science teachers and science leaders in the development of their specialist knowledge and confidence levels in teaching STEM subjects (The Confederation of British Industry 2015; Wellcome Trust 2014) and acknowledges that professional development that enables primary teachers to work in collaboration with university academics provides an opportunity to support the development of teacher confidence by helping to build primary teachers' scientific knowledge and awareness of science research and its uses and applications in world settings.

The case has been made in many forums, not only will teachers benefit in terms of confidence, knowledge and awareness but pupils are likely to view STEM subjects as accessible, achievable and in their future career pathways. For scientists and engineers, the rich experiences that come with communicating to younger audiences offer invaluable training in reframing research and knowledge to increase accessibility for the public. The question is:

**How can teachers and STEM visitors collaborate to achieve a high-quality learning experience for all?**

# Who are STEM visitors?


## There are literally thousands of inspiring people, with STEM-related careers, willing to give up their time to share their passion and promote STEM subjects to young learners.

They are not all scientists and engineers! In fact, most careers have an element of STEM. For example, a hairdresser must know about chemicals to mix hair dye, a landscape gardener must know about flowers, trees and the correct materials to use for paths and structures whilst a jeweller must know about a range of precious and semi-precious stones, metals and which can be used together.

There are also large numbers of people who do a wide range of jobs within the STEM industries, whilst not scientists or engineers, have a major role to play and a vast knowledge and expertise in STEM, e.g. Intellectual Property lawyers, administration staff, media services, marketing and accountants. The list is endless and introducing these people to pupils will not only raise aspirations but allow pupils to see how relevant a STEM pathway may be to their future career.

## Where to find them?

Your local community is filled with talented and inspiring people such as vets, nurses, dentists, architects' florists and builders and you will have a whole host of potential STEM visitors amongst parents, governors or family and friends who are willing to give up some time to share their passion.

There are also agencies whose sole purpose is to form links between schools and STEM volunteers, some of which are:

**www.sciencelive.net** is a platform to connect event organisers with science speakers.

**www.stemnet.org.uk** have thousands of science ambassadors who work in the STEM sector and volunteer their time to inspire the next generation about STEM subjects.

**www.founders4schools.org.uk** is a free service that allows teachers to connect with local business founders who can share how education has allowed their success.

**www.inspiringthefuture.org** here schools can access a range of science volunteers for free.

Your local university should have an outreach department and is also a good place to find potential STEM volunteers and activities.

## How to contact them?

Send an email, letter or social media 'shout-out' to discover parents, grandparents and and governors of the school do for a living and if they are willing to share some of their skills, knowledge and passion. Or ask pupils to devise a questionnaire they can carry out with family members for homework. Pupils are likely to have a deeper knowledge of local businesses and a letter writing activity will improve their literacy skills and may uncover more potential STEM visitors.

# Preparing for a STEM visitor

**Pupils will likely gain more from a STEM visitor if they are actively involved in its organisation in some way.**

Whilst you, as teacher, might initially suggest the idea for a visitor, from this point pupils should be encouraged to lead, with support, on the logistics of arranging the visit and have discussions about the purpose of the visit – pupils' contributions can then feed into the visit planning discussion you have with the STEM visitor.

Pupils might, for example, email the visitor (from a school email account) or write a letter to make arrangements for the visit. In doing so they can introduce themselves and start a dialogue with the visitor about their career, expertise and how they hope to support the pupils during their visit. This early dialogue will also, importantly, help pupils to start thinking about the questions they want to ask – basic questions could be asked via email, leaving more time during the visit for the discussion of BIG to HUGE questions.

## Task

**Think about how you can involve your pupils in the organisation of the STEM visitor's visit.**

These questions are a good starting point.

- What kinds of questions can we ask?
- How can we make sure everyone says something?
- Who will make the invitation? Written, email?
- Why do we invite and for what purpose?
- What questions do we want to ask?
- How do we prevent individuals dominating the visit?
- What do we want to talk about?



# Developing pupil questions

**Having a visitor in your school is a fantastic opportunity for pupils to ask and explore some BIG STEM questions. However, formulating such questions is something that pupils can find a bit tricky.**

So... before the visitor arrives in school, a session on developing pupils questioning skills would be very valuable. Here are some resources to help.

## The Question Mountain

Time spent teaching pupils about different question types is time well spent. If pupils understand the difference between open and closed questions, and, importantly, how to ask more of the latter, they will be a more valuable learning partner when working with their peers across the curriculum.

The question mountain was developed by Jon Chippindall (2012) as a pupil-friendly interpretation of Bloom's Taxonomy with question stems provided at each level of cognitive challenge. Schools have used this resource to help pupils formulate higher order questions. Pupils can be provided with the image below and, using the question stems, write a range of questions relating to their topic.

As they develop their questioning skills, pupils will be better able to frame their 'wonderings', driven by an innate curiosity, about the world around them. – which could then be used to guide the content of a visit.

## Task

**Work with pupils to develop their questioning skills before the STEM visitor arrives in school. Could each pupil write 3 BIG questions ready to ask the visitor?**

Defend your position about...?

**Evaluate...**

What do you think about...?

Can you create new and unusual used for ...?

**Create...**

How many ways can you...?

What other examples can you think of...?

How can that help us solve the problem...?

What would happen if...?

**Use...**

What other examples can you think of...?

Which facts show...?

What do you mean by...?

WHY?

**Understand...**

Can you explain why...?

Why does that happen...?

Why are they different...?

How many...?

Locate the...?

Point to...?

Who was...?

When do...?

**Know about...**

Can you name...?

List...?

True or false...?

What is...?

# Wonder-rich lessons

**Many science educators recommend that both teaching and curriculum design should foster a sense of wonder (Goodwin, 2001; Bianchi 2013a, 2013b)**

Whilst Witz (1996) argued it should be "a feature and a goal of science itself" wonderings can be an authentic starting point. After all, asking questions and finding ways to investigate them is a fundamental scientific skill.

What do pupils wonder about? How can we encourage pupils to wonder and how can we make space and time for pupils to share their wonderings? The Working Wonders Project, funded by the Primary Science Teaching Trust (Bianchi 2013) explored this and created the 6-step model to engage pupils in a wonder-rich process.

From the research, a six-step model emerged to promote 'Wonder-full' lessons.

**Setting**

Establishing ethos, valuing the things we wonder about

Making it 'safe' to share

**Stimulus**

Stimulate wonder using photographs, music, poetry, wonder talks

Exploring what puzzles and intrigues

**Space**

To think independently and collaboratively

Rich conversations, theorising, exploring the reasons

**Sorting**

Classifying the questions

Sorting into groups to assist exploration

**Seeking**

Turning questions to actions, undertaking an investigation exploration to move thinking forward

**Summarising**

Drawing conclusions

Addressing children's scientific conceptions

Revising the wonder

Revealing 'the best answer that science can currently offer'



## Task

**Consider how to promote pupil's wonderings before a STEM visit takes place. Could you install a "Wonder Wall" to display pupil's wonderings or a "Wonder box" for pupils to post anonymously? Consider how the six-step model could be used in your own practice.**

## 1. Setting

Reflect on the qualities and skills of scientists and the role of science in the world. Use this reflection to establish some key scientific principles, e.g.

- Scientists learn from mistakes.
- Asking questions and finding ways to investigate them is a fundamental scientific skill.
- Thinking about big scientific questions is exciting and complicated.

## 2. Stimulus

Use film clips, live demonstrations, wonder walks, music or real-life events connected to your chosen topic that will encourage curiosity and wonderings. Ask pupils to record their wonderings and questions on post it notes and display on a "Wonder Wall" or post them in a "Wonder Box"

## 3. Space

Having had the opportunity to ask questions and wonder about the chosen topic, space and the opportunity to think is needed next. Challenge pupils to have rich conversations about their reasoning and further opportunities to ask more questions.

## 4. Sorting

Not all questions are created equal! During this process, pupils are encouraged to sort their questions and wonderings. They could be sorted into types that:

Can be answered through research

Are unanswerable, such as, why is the universe here?

Are unsuitable because they are either inappropriate or unclear.

## 5. Seeking

After sorting the questions and wonderings into groups, pupils must decide on which questions they will choose to find the answers to and how they will approach the answer seeking? They may decide to have a philosophical debate, carry out a fair test or interview an engineer.

## 6. Summarising

It is important to, as far as is possible, conclude the wonderings. This could be by revealing the best answer that science can currently offer or ensure some understanding of the big idea of science as a developing phenomenon.

The relevance of wondering and creating a "Context rich", "Activity rich" and "Response rich" approach to curriculum design helps pupils to see how scientists work whilst promoting thinking skills and keeping them curious.

# Starting to think about the purpose of the visit

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**The next step will be for you to meet (either virtually or face-to-face) to start planning the visit.**

The STEM Placement Planning Tool (pp.9-11) will be used to structure this conversation and will sign post the STEM visitor and yourself to further resources to support the visit. However, to get the most out of this planning conversation, please take some time to consider what you hope to get from working with the STEM visitor.

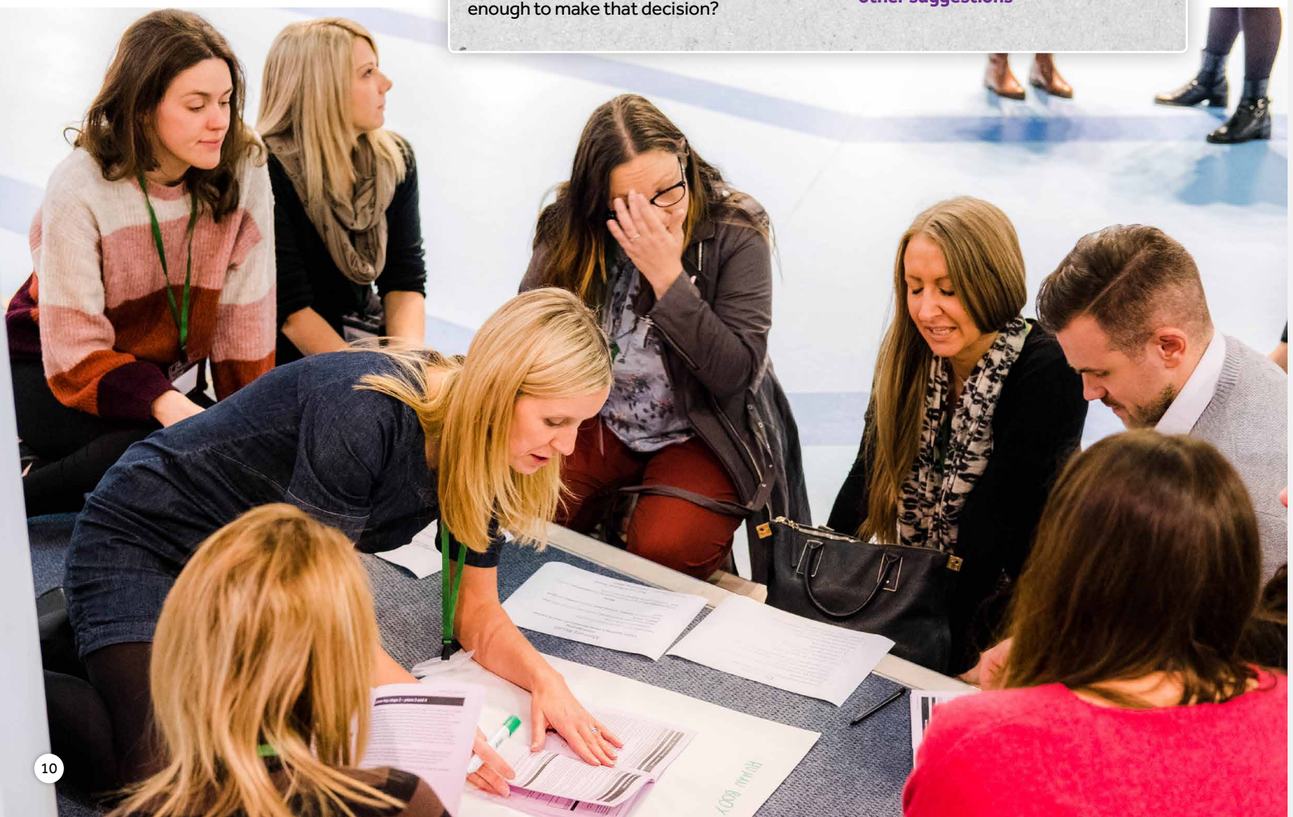
## Things to consider:

**Good** questions related to the logistics of the visit:

- **How will the visit be organised?**
- **Working with whom?**
- **Working where and when?**
- **Working with what resources?**

**Great** questions to ask about the focus of the visit. This is in fact the most important thing to discuss above all else. Prioritise time to making sure you're all agreed as to what you're wanting to gain from this. The pupils are the centre of that discussion – what will they learn from this experience? Do you know enough to make that decision?

- ✔ **Increasing pupils' curiosity in STEM**
- ✔ **Sharing STEM visitor's research/job/expertise with pupils**
- ✔ **Enriching/enhancing delivery of the National Curriculum**
- ✔ **Raising awareness of STEM careers and showing what a real scientist/computer scientist/mathematician looks like**
- ✔ **Raising profile of STEM across school**
- ✔ **Enhancing teachers' subject knowledge**
- ✔ **All of the above/none of the above – other suggestions**





# STEM visitor Planning Tool

Name(s):

School where the visit will be held at:

| **1. Visit objectives** (tick the relevant points) | |
|---|---|
| ☐ Increase pupils' curiosity in STEM<br>☐ Sharing STEM visitor's research/job/expertise with pupils<br>☐ Enriching/enhancing delivery of the National Curriculum<br>☐ Raising awareness of STEM careers and showing what a real scientist/computer scientist/mathematician looks like<br>☐ Raising profile of STEM across school<br>☐ Enhancing teachers' subject knowledge | |
| **2. Visit duration** | **Your notes** |
| **When will the visit take place?**<br>• How many visits?<br>• Duration of visits? | |
| **What will take place before the visit to maximise impact?**<br>• How will pupils be involved in organising the visit?<br>• What work will pupils do before the visit? *(e.g. developing questions, learning about specific topics)* | |
| **3. Visit groupings** | |
| One class or many? One year group or many? | |
| Working with individual pupils/small groups/whole class? | |
| Are there any specific groups to target? *(e.g. girls in science)* | |
| What is the preference of teacher and visitor and why? | |

| 4.Location of activities | |
|---|---|
| Where is the best place for the activity to take place?<br>*(e.g. classroom, hall, school grounds, off-site, high school)* | |
| Why? | |
| **5.Technology requirements** | |
| What technology is available?<br>(*e.g.* Interactive Whiteboards) | |
| Internet Access – yes, no.<br>Have you got the access codes? | |
| Laptops and computers for pupils | |
| iPads or other tablets | |
| Laptops and computers for pupils | |
| Other | |
| **6. STEM Resources** | |
| What resources are available in school to support the visit? | |
| What resources could the STEM visitor bring along? | |
| Are there organisations which loan equipment which may support the visit? | |
| Staff resources – do any arrangements, e.g. extra support staff need to be recruited for this activity?<br>*(e.g.Teaching Assistants, parents etc)* | |
| Transport – will transport off site be required? | |

| 7. Group behaviour | |
|---|---|
| What behaviour management systems are in place?<br>How can the STEM visitor use these? | |
| **8. Visit Impact – legacy** | |
| What will happen after the visit? | |
| What impact do you expect this have? | |
| **9. Evaluation** | |
| How will the effectiveness of the visit be measured?<br>From perspective of teacher/visitor/pupil? | |
| **Other information** | |
| e.g. timings of school day, STEM visitor dress code, issues around working with groups of pupils independently or with supervision, name of head teacher, parking facilities, lunch arrangements. | |

## STEM visitor Planning Tool

| **Basic overview** – linked to the key objectives | |
|---|---|
| Topic/theme of the visit | |
| Objective(s) of the visit | |
| A successful visit will result in... | |
| Pre planning activities/ideas | |
| Visit activities/ideas | |
| Post visit activities/ideas | |



# Safeguarding

**All schools have a legal requirement to safeguard and promote pupil's welfare and have Designated Safeguarding Teams to make sure this happens.**

Volunteers and visitors to schools will be expected to share this commitment making sure the environment, and everyone in it, is safe.

Teachers should always refer to their school safeguarding policies and note key issues including when visitors need to be accompanied by school staff etc.

### Below are some useful Do's & Don'ts' to consider:

#### Do:

- provide a positive role model to young people
- dress appropriately ensuring clothing is not likely to be viewed as offensive/ revealing
- treat all members of the school's community with respect and tolerance
- work with pupils so that you are visible by a member of school staff
- respect a pupil's privacy and dignity
- always be able to justify any physical contact you have with a young person
- report any situations that may give rise to a complaint/misunderstanding

#### Don't:

- photograph a pupil without the school's permission
- use your personal mobile phone in areas used by young people
- ignore inappropriate behaviours towards pupils either by other pupils or adults
- share personal details with a pupil
- meet or contact pupils out of school including by text, email or social media
- discuss the school, pupils or adults working within the school on social media
- give gifts to a young person (unless part of the school's agreed rewards policy)

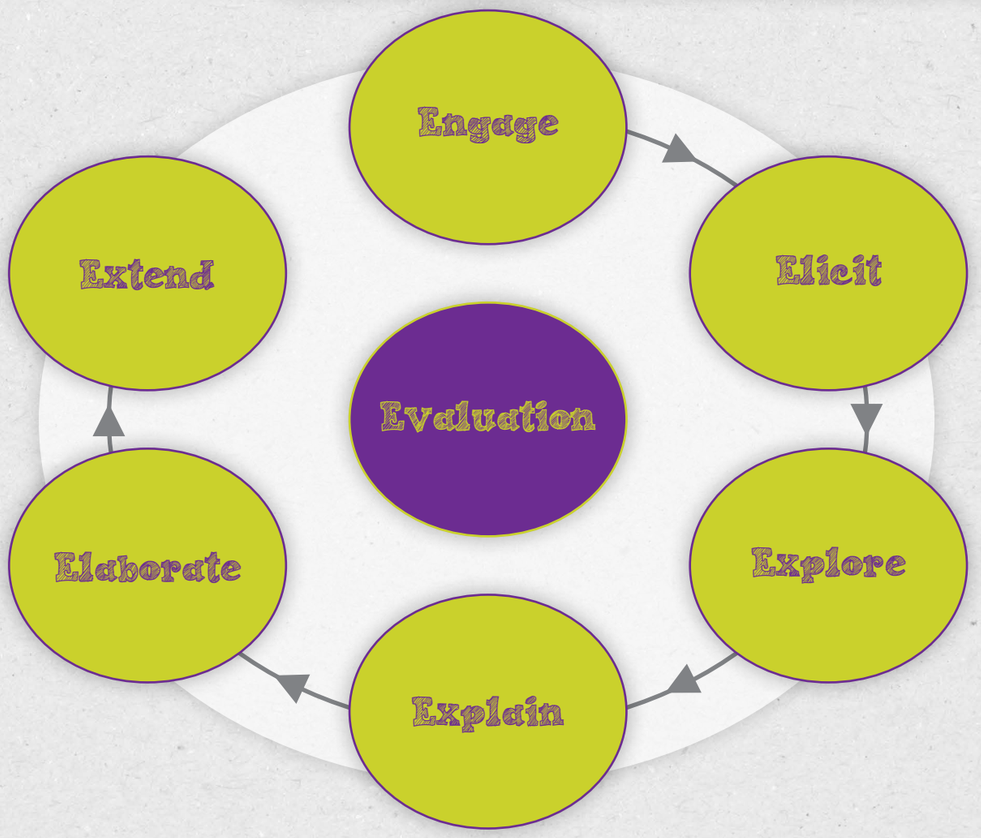
**Creating a risk assessment together before the visit happens can help you to consider further safeguarding issues. Always follow the correct risk protocols.**

# Enhancing the learning experience

**There are various approaches and learning strategies that can support teachers and STEM visitors plan and deliver a great learning experience for pupils.**

The following section offers information about approaches that are developed by others, and useful to apply to our thinking in this booklet:








# 7 E's Learning

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**The 7Es cycle[1] sequences learning experiences to allow pupils to construct their understanding of a concept over time.**

It promotes active learning where pupils are doing much more than listening and reading. Using this model allows pupils to discuss, analyse, collaborate, investigate, question and evaluate their experiences.

## Engage

This is about hooking pupils in. Doing exciting, engaging activities to get them wondering and asking BIG questions – (see further reading). Relating content to pupils' own experiences, and wonderings, can help to heighten their engagement.

**Activities:** Teacher/pupil 'wow' demonstrations, pupil experiments, trips, discussions linking to pupils' personal interests/experiences.

## Elicit

To move pupils' understanding on we must first elicit what they know and what they think they know (misconceptions). This is where those rich open-ended questions come in – get pupils chatting and you'll hear some fantastic explanations for the phenomena they experience in the world around them.

**Activities:** Use of collaborative learning structures, pupils share ideas on post-its, pupils complete quiz, recorded discussions.

## Explore

Once we know what pupils know, it is our job as facilitators of learning to move their understanding on. We do this by providing experiences through which they can construct their own learning as they explore 'stuff'. Some experiences are purposefully designed to contradict false beliefs they hold (that we've just elicited), e.g. 'metal always sinks' "Here, go play with this metal take away tub and tell me if it floats or sinks?"

**Activities:** Lots of hands-on experiments! Simulations if experimentation not possible, pupil-led research.

## Explain

This is the stage when key concepts are discussed, and refined explanations jointly constructed through pupil and teacher talk. This may then be Extended and Elaborated on, if appropriate, to further learning. Such extensions may focus on the application of pupils' developing knowledge to novel contexts. For example, from what they have just learnt about materials, can pupils explain why object X is made from material Y?

**Activities:** Class discussion using high-quality questioning, pupils record and communicate their explanations through visual representations, written work, and the use of technology.

## Evaluation

Teaching is a dynamic process. As such, it is key to constantly evaluate 'how things are going' and, importantly, react accordingly. For example, when eliciting pupils' understanding we might realise the activity we had in mind for them to explore through will be far too easy or difficult, and we have to adjust this as required. Or, we might find in the explanation stage that pupils have picked up new misconceptions, so we quickly design a new activity for them to explore... and so on.

[1] 7 Es Learning Cycle. Access at http://edutechwiki.unige.ch/en/7e_Learning_cycle

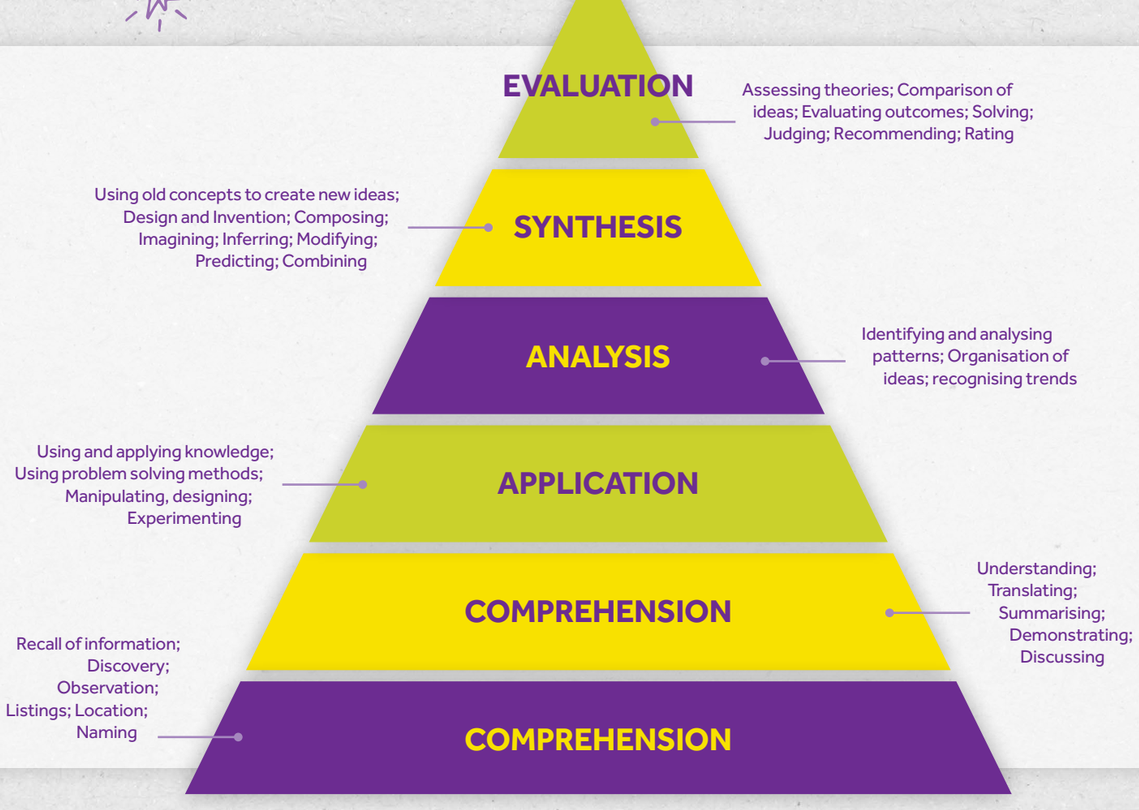
# Bloom's Taxonomy - supporting and challenging all learners

**All pupils are different. They have different interests and ideas, display particular preferences for different subjects and, for a multitude of reasons, make progress at different rates.**

As such, a key concept in teaching and learning is that of differentiation. Differentiating involves the tailoring of tasks and questions to match individual pupil's (or groups of pupils) level of comprehension (why the elicitation stage of the 7E model is so important!).

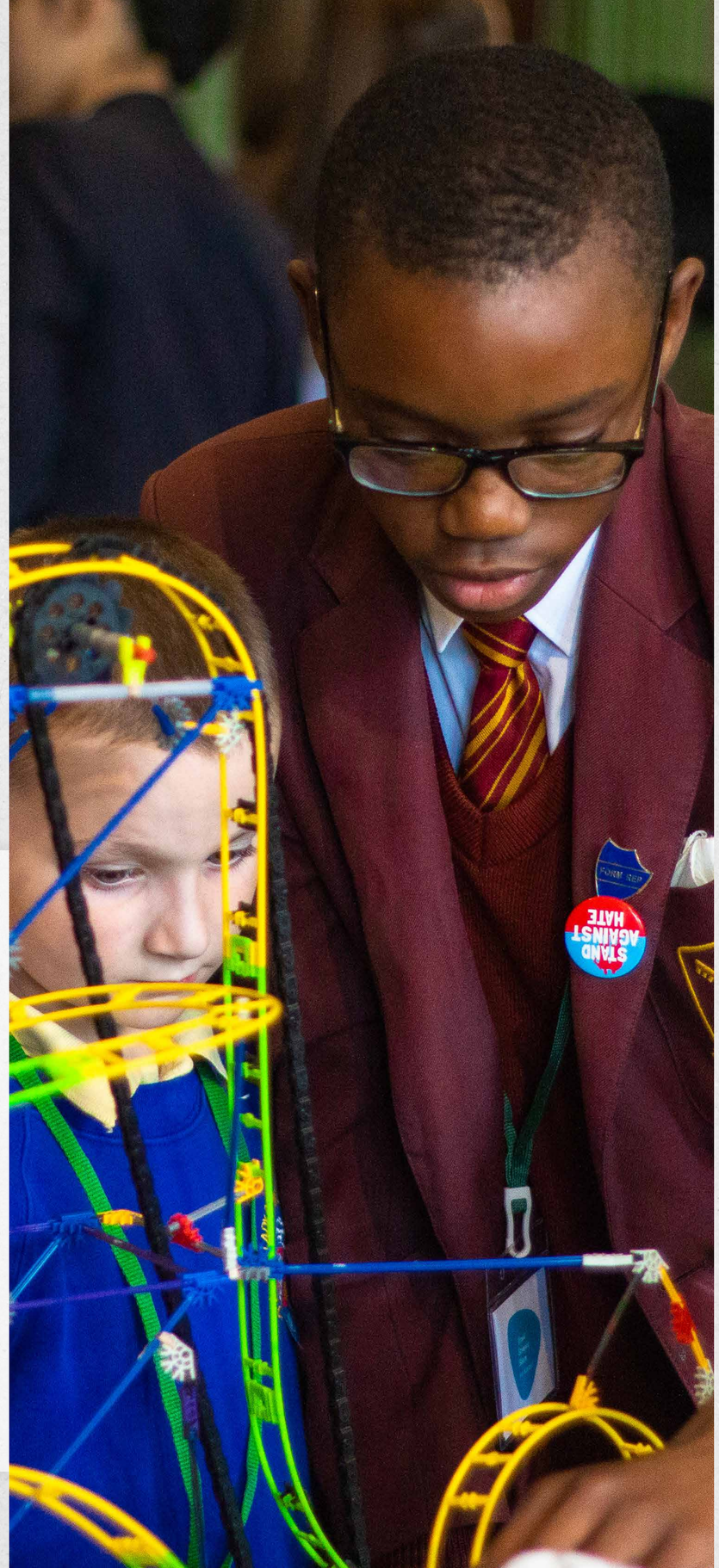
In a 'typical' class of 30 pupils, it is usual for a teacher to design a core activity and then have a task designed to challenge more confident pupils and a task to support less confident pupils. They will also then further differentiate through their questioning.

Bloom's is a taxonomy familiar to educational practitioners for categorising tasks depending on the cognitive challenge associated with them. See diagram[1]. Simple recall of facts sits at the bottom of the taxonomy whilst more challenging tasks, towards the top, require pupils to operate at an 'evaluative level': thinking about their thinking (metacognition).




[1] Bloom's Taxonomy. Access at https://en.wikipedia.org/wiki/Bloom%27s_taxonomy






# Asking great questions

**Questioning allows us to 'Elicit' understanding or 'Extend' learning. But how can we be sure we're asking the right questions, or more specifically, the right types of question?**

## Question types

Questions may be broadly categorised as either 'open' or 'closed'.

Closed questions typically require a short response with little room for elaboration, e.g. What's your favourite subject? What's 7×8? Closed questions do little to divulge pupils' understanding and tend to close discussion rather than open them up – avoid asking these if you can!

A simple strategy to move questions away from being closed is to add 'why' or 'how', e.g: Why is X your favourite subject? How do you work out 7×8? These questions are more effective at eliciting pupils' understanding and promoting dialogue to enhance learning.

## Try this:

**Pose – Pause – Pounce – Bounce**

Once you've planned some good quality questions, ensuring a good delivery to maximise their impact is equally as important. This is a simple, yet effective, no-hands up questioning technique that keeps learners alert and ready to respond.

## Try this simple method when asking questions:

**POSE: Pose the question.**

**PAUSE: Give pupils thinking time.**

**POUNCE: Ask a pupil for their response.**

BOUNCE: Use their response to stimulate a number of responses from other pupils (do they agree/disagree? Why?) as you 'bounce' the question around the room.

# Engaging all learners using Kagan Approaches

**When working in schools, it is important to maximise pupil engagement. Kagan approaches (Kagan, S. 1994) or collaborative learning structures, are a great way to achieve this.**

These structures, used for pair, group or whole class work, are designed so all pupils contribute to a task or discussion. Here are a few simple structures to try during your visit.

## Think-Pair-Share

When posing a question, ask pupils to think of their own answer. Then ask pupils to exchange their answers with a partner. Share a selection of pairs' answers with the class.

## All Write Round Robin

Provide groups with flip chart paper. When asking a question, pupils take turns to write their ideas on the flip chart paper. When selecting pupils to feedback they can choose to feedback any of the ideas from their flip chart.

## Quiz – Quiz – Trade

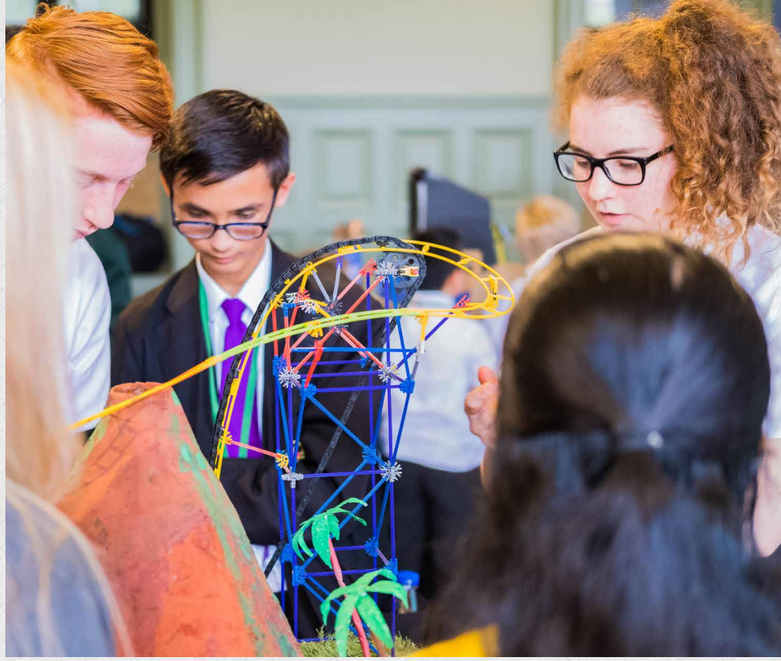
Make up a set of question cards on a particular topic (enough for one per pupil). These should have a question on one side and the answer on the other, as shown below.

| What is an algorithm? | An algorithm is a precise sequence of instructions. |
|---|---|

Hand out one card to each pupil. Pupils wander around the class and find a partner when you call 'Pair Up'. They take turns to quiz each other using the cards then exchange cards before starting to wander around again. You can keep repeating 'Pair Up' to allow pupils to quiz each other several times with different cards.



# Reviewing the visit using PMI



**Plus, Minus, Interesting (PMI) is a thinking tool developed by Edward De Bono (1992) and can be used to stimulate thoughts and ideas or as an evaluation and feedback tool. PMI can be used in several ways:**

## Whole class approach

Draw three columns on the board with the headings P - M - I. Ask pupils to voice their opinions on each of the respective areas. What was a positive or "Plus" outcome of the visit? What did they find interesting? What was a minus or negative experience for them?

## Group approach

Organise the pupils into small groups and get them to come up with 3-5 plus and minus points and 2 or 3 interesting points around the issue. Alternatively, ask the groups to consider only one aspect of the visit and then bring them together to debate it. It can be useful to allow groups to "carousel" allowing time for them to read the other's PMI statements before discussing as a whole class.

## Individual approach

Give individual pupils a table with the headings P-M-I. ask them to reflect upon and write about their own plus, minus and interesting experiences before discussing as a whole class or group.

| Plus | Minus | Interesting |
|---|---|---|
| • What they liked<br>• What they learned<br>• What they did well | • What they did not like<br>• What they did not understand<br>• What could be improved | • What they found interesting<br>• Any questions from the visit?<br>• Any future investigations as a result? |

The results of this task can be followed up in post visit activities.

idea

# How can post-visit activities add to the experience?

**After the visit has been completed, pupils should be encouraged to 'keep in touch' with the visitor (via a school method).**

They could, for example, email (again using a school account) with details of work they have completed inspired by the visit. You could use the visit as a stimulus for some rich literacy activities such as letter writing or report writing. If the visitor is willing, the pupils could occasionally email with questions they think the visitor could help with – like an expert 'phone a friend'!

## Teacher and STEM visitor discussion

Use the results from your PMI activity to write positives about the experience but also, 'even better if..' and share. Link this back to the objectives identified for the project. What has the impact on the pupils been? How do you know?

## Pupils' experience

For the pupils, using role play may be an effective evaluation process – pretend to be reporters for a newspaper and write, film or record:

- What did the visitors do/say?
- What was interesting? Why?
- What was fun? Why?
- What wasn't so great? Why?
- For next time it would be 'even better if'...

**Pupils' 'scientific posters' in the style of a scientific research poster.**

- What they are exploring and why? (equivalent of literature review)
- How? (experiment/method)
- What happened? (results)
- What they found out? (conclusion/interpretation of results)
- Fair test? (evaluation)

**Primary STEM Project – Evaluation task**

Teachers and STEM visitors could work collaboratively to compile a short presentation with 4 slides as an evaluation for the project. Add lots of photos, videos etc to the presentation to support each slide.

**Slide 1:** What happened in your school?

**Slide 2:** What was the impact on the teacher/their teaching?

**Slide 3:** What was the impact on the pupils?

**Slide 4:** What was the impact on the STEM Volunteer?



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# SEERIH: Science & Engineering Education Research and Innovation Hub

SEERIH is a nationally recognised hub of science and engineering education specialists. We offer innovative continuous professional development programmes for teachers to ensure high-quality learning outcomes for young people.

Based in The University of Manchester's Faculty of Science and Engineering, SEERIH positively influences the experience and learning outcomes of teachers and young people in science and engineering. Our programmes provide teachers with innovative, research-led teaching and learning practice.

We pride ourselves on working in partnership with STEM educators, businesses and cultural organisations and our work draws interest both nationally and internationally. SEERIH is led by an experienced steering group of academics and professional service staff from each Faculty at The University of Manchester, and they guide our work so that it contributes to the University's strategic vision.

## Our core principles

We are relentless in our ambition to push the boundaries of primary science and engineering education. We collaborate with teachers in research and curriculum development.

We are driven by our desire to fascinate and inspire teachers and young people about science and engineering.
We enhance school improvement by working in partnership with schools, educational bodies, researchers, scientists, engineers and creative professionals to make vivid the opportunities science plays in our world.

We are passionate about defining quality science teaching and learning. We listen and respond to teachers, advocating, challenging and influencing national policy for science and engineering education.

## Contact us

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