

The logo for the Engage Teacher Conference, featuring the word "Engage" in white bold sans-serif font inside a dark teal rounded rectangle.

Engage

Teacher Conference

Engaging every student in science learning through inclusive practice

Learn how you can meet the individual needs of SEND learners alongside using inclusive practice to open science to everyone.

Rob Butler
Vicki Parry

Welcome, please be aware:

- Talks are recorded
- There will be time for questions at the end
- You can send messages in the chat or raise your hand.



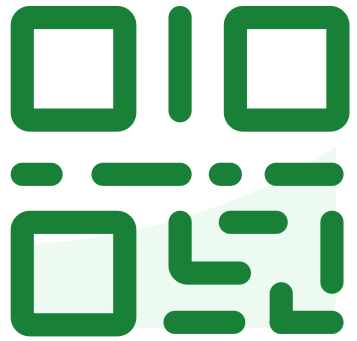
Engaging every student in science learning through inclusive practice



Rob Butler CSciTeach



Vicki Parry

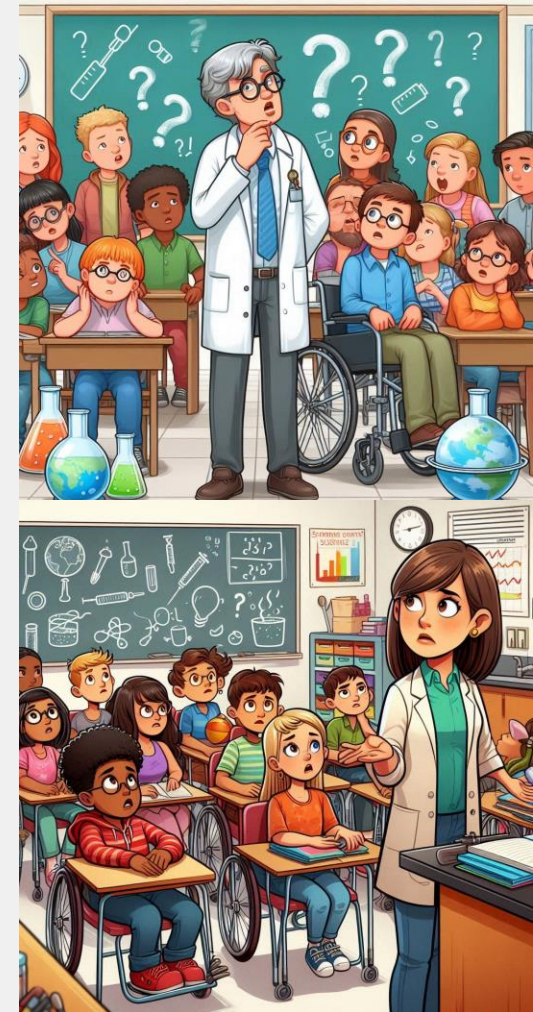


**Join at slido.com
#1271883**

The problem

We can have a wide range of needs within a science lesson:

- Learners with special needs/additional learning needs or a disability
- Learners with English as an additional language
- Learners from an ethnic minority background



EHC plans

434,354

pupils in schools in England. Up by 11.6% from 2023

► [What is this?](#)

EHC plans

4.8%

percent of pupils with an EHC plan. Up from 4.3% in 2023

► [What is this?](#)

SEN support/SEN without an EHC plan

1,238,851

pupils in schools in England. Up by 4.7% from 2023

► [What is this?](#)

SEN support/SEN without EHC plan

13.6%

percent of pupils with SEN support. Up from 13.0% in 2023

► [What is this?](#)

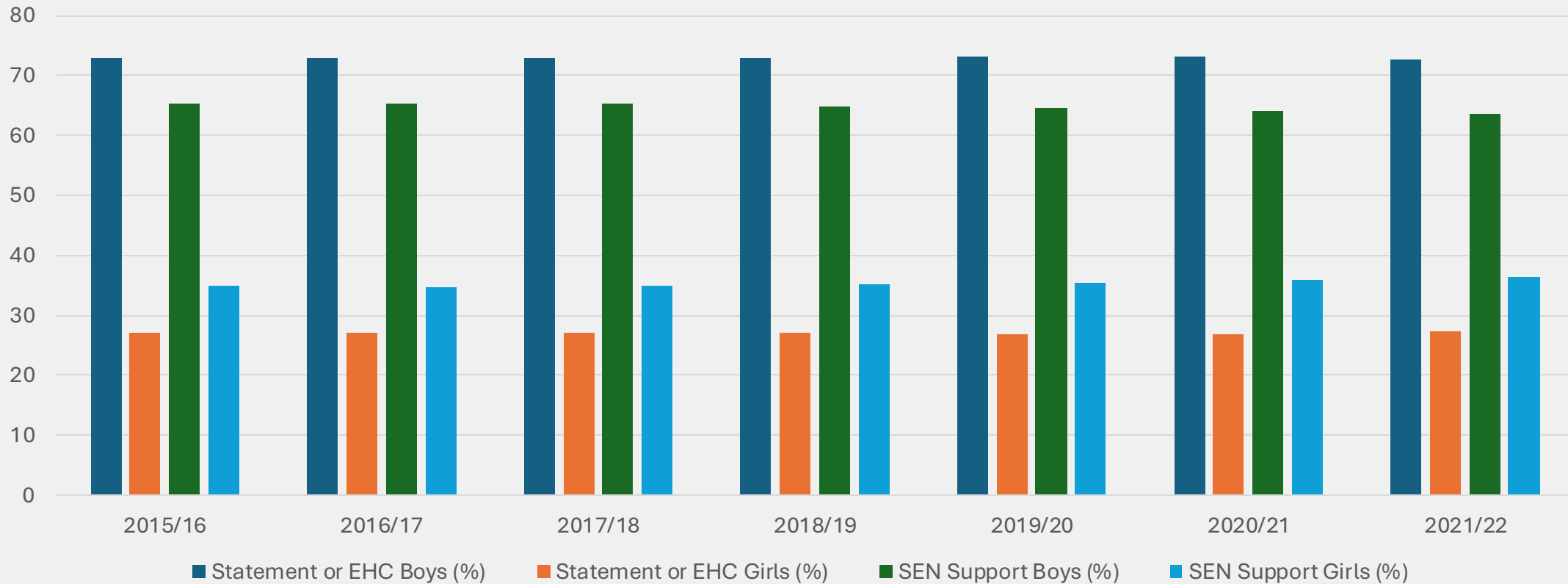
Over 1.6 million pupils in England have special educational needs (SEN)

An increase of 101,000 from 2023. This includes the number of pupils with an education, health and care (EHC) plan and the number of pupils with SEN support, both of which continue a trend of increases since 2016.

- The percentage of pupils with an EHC plan has increased to 4.8%, from 4.3% in 2023.
- The percentage of pupils with SEN (SEN support) but no EHC plan has increased to 13.6%, from 13.0% in 2023.

The most common type of need for those with an EHC plan is autistic spectrum disorder and for those with SEN support is speech, language and communication needs.

Age and Gender, by type of SEN provision and type of need - 2016 to 2022' for SEN Support and Statement or EHC in England between 2015/16 and 2021/22



<https://explore-education-statistics.service.gov.uk/find-statistics/special-educational-needs-in-england>

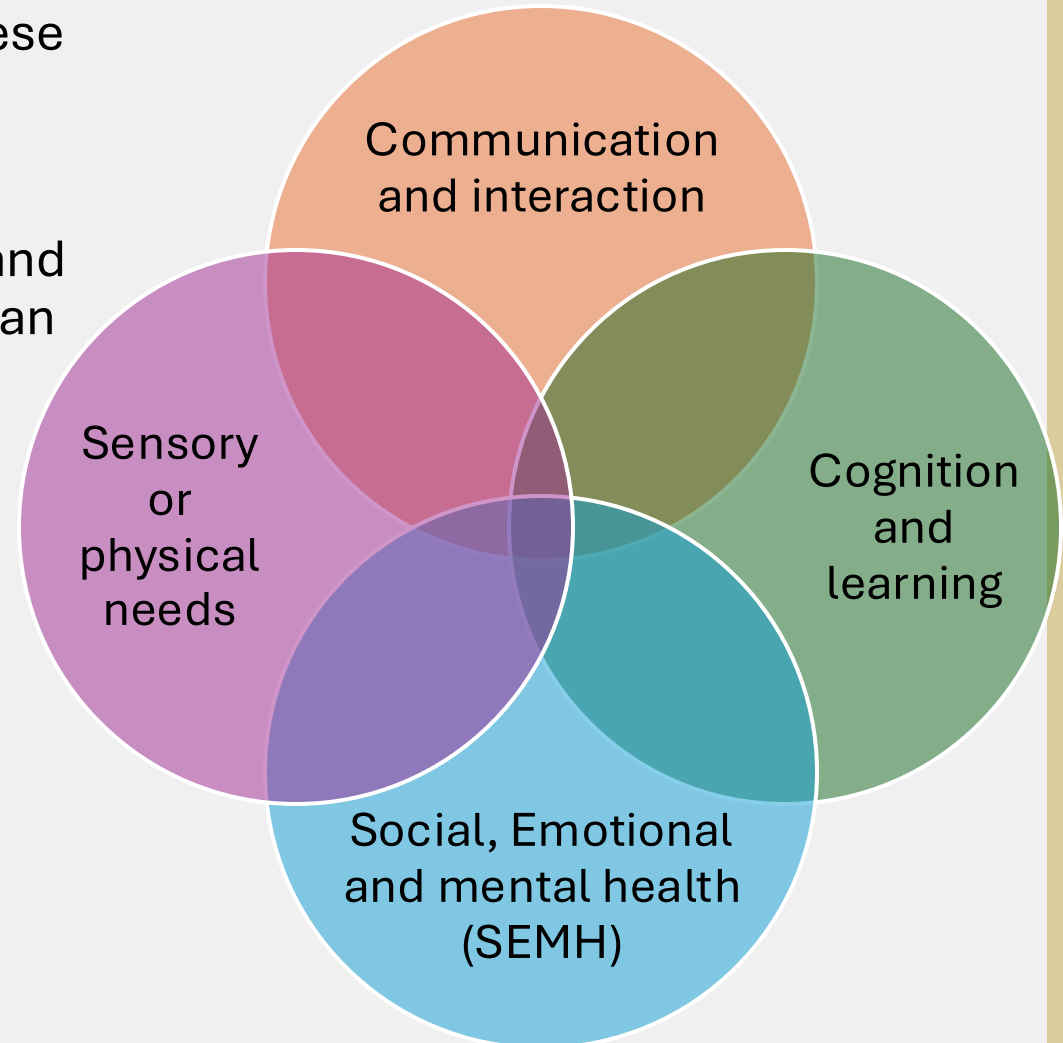
Categories of special need

There are four broad areas of SEND that we recognise as part of the Special needs code of conduct. These are:

Whilst they give a handle on SEND for diagnosis and talking about SEND, we also know that learners can have more than one diagnosis.

Cooccurrence (comorbidity)

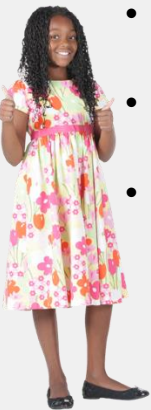
1. the occurrence of more than one illness or condition at the same time.
2. an illness or condition that occurs at the same time as another.



To label or not to label?

- Giving a learner a label can be seen as the answer to their difficulties, but the diagnosis doesn't tell the teacher what to do or what adaptations they need to make.
- Children with the same diagnosis can present very differently in the classroom
- Teachers need to think about how best to support their learners instead – think about the need and not the diagnosis/label. Let's not jump to conclusions.

Learner 1
Diagnosis - autism



- Very methodical and struggles with changes
- Interested in a narrow range of topics
- Doesn't want to interact with other learners in class

Learner 2
Diagnosis - autism



- Wants to fit in socially in class but struggles to maintain relationships due to autism
- Sensory difficulties means they have difficulty processing speech

Learner 3
Diagnosis - autism



- Might fixate on friends and routines
- Struggles to manage school when there isn't structure and routine
- Copes well in school, meltdowns at home

Learner 4
Diagnosis – Speech, language and communication needs



- Struggles to follow class discussions
- Poor social skills because of difficulties interacting with peers

Science teaching – evolution not revolution

Meeting the needs of your learners need not involve wholesale change to your practice

Supportive tweaks to practice

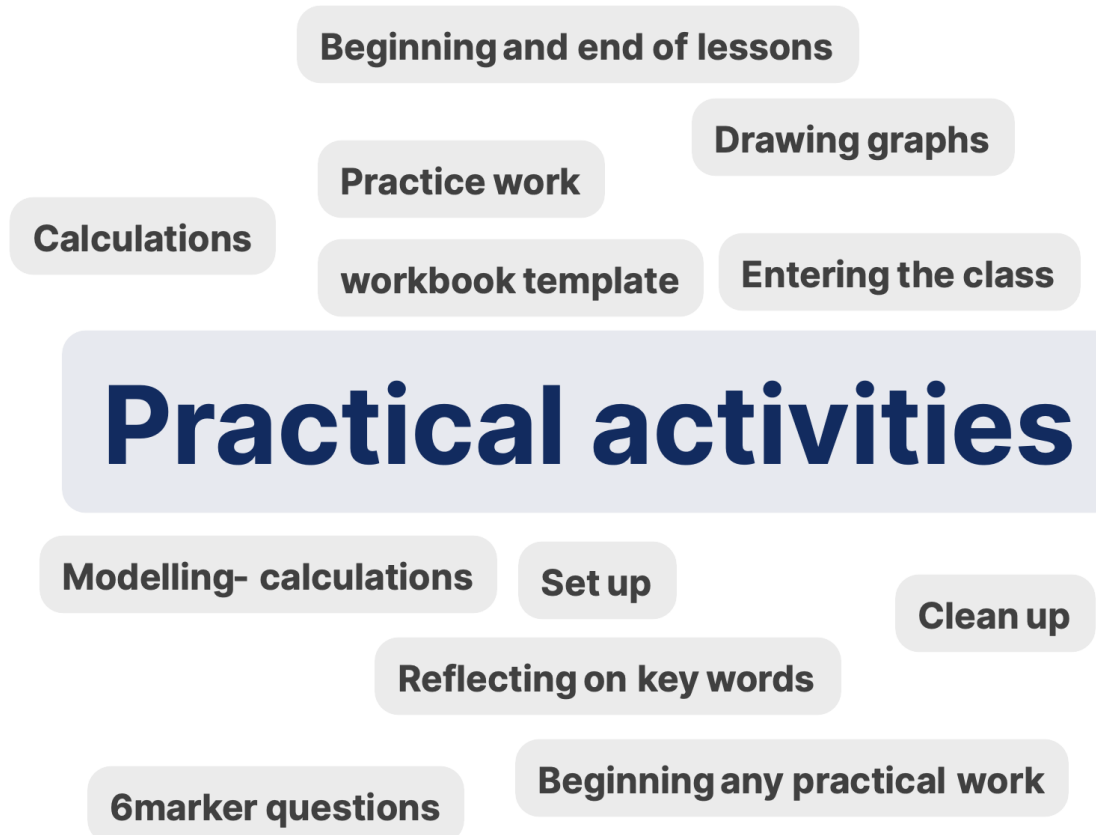
- Establish routines
- Provide structure – roles, think pair share
- Can you use visual instructions
- Can you plan for multimodal or multisensory teaching – don't rely on one sense/input (have you tried dual coding?)



**Think of a time within science teaching
where students would benefit from routines
and structure**

 Think of a time within science teaching where students would benefit from routines and structure

Wordcloud Poll  14 responses  8 participants



Supportive tweaks to practice

- Speak in short sentences.
- Remember vocabulary - avoid unnecessary jargon or terminology. Frayer models. Teach vocabulary explicitly
- Allow processing/thinking time
- Classroom environment - consider lighting and background noise
- Text – font colour, size and typeface
- Consider executive function skills in your teaching

Executive function

Executive function describes a set of cognitive processes and mental skills that help an individual plan, monitor, and successfully execute their goals. The “executive functions,” as they’re known, include attentional control, working memory, inhibition, and problem-solving, many of which are thought to originate in the brain’s prefrontal cortex.

Psychology today

There are three main areas of executive function:

- Working memory - which governs our ability to retain and manipulate distinct pieces of information over short periods of time.
- Cognitive flexibility - which helps us to sustain or shift attention in response to different demands or to apply different rules in different settings
- Inhibitory control - which enables us to set priorities and resist impulsive actions or responses.

Twinkl

Consider how you give instructions

- Could you begin with the learner's name to get their attention
- Can you use visuals to make instructions clearer
- How can you allow thinking/processing time
- Perhaps you could repeat your instructions using the same words/phrases.
- Speak in short sentences and don't use words that aren't essential
- Try to avoid chaining questions or instructions together
- Try and say what you must do (not what you shouldn't do)
- Use very short & direct question forms – can you/will you/do you/where is etc

Implications for science teaching

	ADHD	Autism	Dyslexia	Speech language and communication
Struggles with working memory and cognitive overload	Yes	Frequently	Yes	Yes
Struggles with information processing and using language	Yes	Frequently	Yes	Yes
Executive function skills – planning and organising	Yes	Frequently	Yes	Yes
Struggles with change or worries about failure	Frequently	Frequently	Frequently	Frequently

Being inclusive helps everyone

"When you go to a supermarket, the doors open automatically. You might be able to get through them without this, but it makes it easier for you.

However, there are some people who, for whatever reason, find it very difficult to enter the store if the doors aren't automatic. There's support in place for those people who need it, and it happens to help you as well. This helps everyone!"

Gary Aubin

@SENDMattersUK

When I burned some magnesium in a crucible, the **product** inside the crucible weighed *more* than the magnesium did to start with. Why did that happen?

Trevor: I think I know the answer, but I don't want to look stupid if I get it wrong.

Des: I have no interest in chemistry, all I want to be is a chef when I am older.

Shabana: I wish I could use my phone to help translate the question. I am really stuck; I don't understand anything.

Laila: What is a crucible, as we are reading a book called that in English.

Ali: There are some big words that I don't understand I should have put my hand up at the beginning of this topic and asked then.

Olivia: My TA isn't here today so I don't know what is going on.

Katie: I wish I could see the equipment we used as I don't remember doing the experiment.

Marcus: I know the answer, but I am bored and can't be bothered.

Barriers to engagement

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Create an environment where students can get things wrong.

Trevor: I think I know the answer, but I don't want to look stupid if I get it wrong.

But they are expected (and supported) to have a go

Olivia: My TA isn't here today so I know what is going on.

Marcus: I know the answer, but I am bored and can't be bothered.

Vocabulary and cognitive load

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Science Capital and Careers links

Des: I have no interest in chemistry, all I want to be is a chef when I am older.

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When I burned some magnesium in a crucible, the **product** inside the crucible weighed *more* than the magnesium did to start with. Why did that happen?

How could you ask the question
in a more inclusive way?



How could you ask the question in a more inclusive way?



How could you ask the question in a more inclusive way?

Wordcloud Poll



7 responses



4 participants

If you've done show annotated diagram or video

Use symbols with the writing

Include a diagram

needed

explore

word

kew

room

Define vocabulary

definitions

Reminder of key words

Allow them to think pair share definitions first

When I burned some magnesium in a crucible, the **product** inside the crucible weighed *more* than the magnesium did to start with. Why did that happen?

- Here's a photo of a practical we did last lesson.
- We used this equipment (say names and show)
- This is what we did
- This is what our results were
- Why did the mass of the crucible and product increase, how could this have happened?

Can subtle adjustments be made to the first comment to convey the same intended message?



Teacher's comment to whole class	Better to say...	Even better to say...
"You have all completely forgotten your learning about electricity from primary school"	"We need to relearn some basics about electricity"	"We will revise the differences between series circuits and parallel circuits"
<i>more emotive</i>		<i>less emotive</i>
<i>less objective</i>		<i>more objective</i>
<i>is summative</i>		<i>promotes progress</i>
<i>does not provide students with useful steps for learning</i>		<i>provides students with useful steps for learning</i>



What tweaks can you make to your classroom environment to make it more accessible?



What tweaks can you make to your classroom environment to make it more accessible?

Wordcloud Poll



6 responses



4 participants

Encourage discussion and different perspectives

Establish routines

Understand learners mindset

Showing the equipment we used

Don't make assumptions about learners

Clear directions

Next steps

What will be your actions as a result of today:

- Short term?
- Medium term?
- Long term?

Any questions?

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Vicki Parry vickiparry@ase.org.uk

CPD to follow up on this:

1st Oct - SEND Strategies in the Classroom

16th Oct- SEND in our classroom

14th Nov - Language and oracy

26th Nov - Teaching resources for SEND

11th Dec - Practical Work and SEND

<https://www.ase.org.uk/events>

included
secondary

26th Jan, 2nd, 9th, 23rd Feb, 2nd March 9th March

included
primary

12th, 19th, 26th March, 23rd, 30th April 7th May

Bias in the Classroom & including every child

Inclusive language, practice & curriculum

Taking science further & Opportunities for progress

<https://www.ase.org.uk/events>

ASE Membership

£45 a year (free for ECT and Trainees)

- Resources
- Welcoming science community to share experience and knowledge and support you
- CPD programme, many sessions included in membership.
- 50% discount on specialist courses and conferences

<https://www.ase.org.uk/ase-membership>

Useful links to challenge your thinking

General reading

National Autistic society <https://www.autism.org.uk/>

Ambitious about autism <https://www.ambitiousaboutautism.org.uk/>

How to talk and write about autism <https://www.autism.org.uk/contact-us/media-enquiries/how-to-talk-and-write-about-autism>

Research on person first language <https://journals.sagepub.com/doi/10.1177/1362361315588200>

The PDA society <https://www.pdasociety.org.uk>

Sensory differences

National Autistic Society video on sensory differences - <https://www.youtube.com/watch?v=aPknwW8mPAM>

Vanish TV Advert with an autistic girl https://www.youtube.com/watch?v=4Xtog_zRRJg

Communication

Widgit online software <https://widgitonline.com/en/home>

David Paterson's integrated instructions <https://edu.rsc.org/feature/improving-practical-work-with-integrated-instructions/3009798.article>

Concept cartoons - <https://www.ase.org.uk/system/files/SSR%20December%202015%20061-067%20Naylor.pdf>

Concept cartoons links to STEM resources - <https://www.stem.org.uk/resources/collection/4226/science-concept-cartoons>

Role badges <https://www.stem.org.uk/resources/elibrary/resource/475274/role-badges>

Speech, language and communication needs - https://www.youtube.com/watch?v=Onqn_7xzp2Q

What is dyslexia - <https://www.youtube.com/watch?v=v6Hld-aSdhg>

ADHD and working memory - <https://www.youtube.com/watch?v=Nls3wxRZEoE>

Dyslexia, dyspraxia and overlapping learning difficulties - <https://www.youtube.com/watch?v=dXhO3-S1L-o>

Amazing things happen - <https://www.youtube.com/watch?v=RbwRrVw-CRQ>

Engage Teacher Conference

Thank you

Complete the **5-minute feedback form** for the chance to win one of ten **£10 Amazon vouchers!**
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